



A manual of midwifery for midwives

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MIDWIVES' MANUAL

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DRS. ROBERT AND FANCOURT BARNES.

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A SYSTEM OF OBSTETRIC MEDICINE AND SURGERY, THEORETICAL AND CLINICAL, for the Student and the Practitioner. By ROBERT BARNES, M.D., Consulting Obstetric Physician to St. George's Hospital, &c.; and FANCOURT BARNES, M.D., Physician to the Royal Maternity Charity, and Consulting Physician to the British Lying-in Hospital. The Section on Embryology contributed by Professor MILNES MARSHALL.

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materially to the usefulness of the work. . . . We can confidently recommend it as a trustworthy guide whether to the student or to the practitioner.'—BRITISH MEDICAL JOURNAL.

'This is one of the best works on midwifery we have seen, and we have great pleasure in bringing it very favourably under the notice of our readers.'—GLASGOW MEDICAL JOURNAL.

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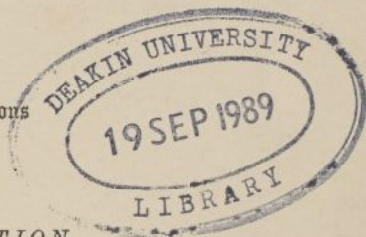
A MANUAL
OF
M I D W I F E R Y
FOR MIDWIVES

BY

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CONSULTING PHYSICIAN TO THE ROYAL MATERNITY CHARITY OF LONDON
LATE CONSULTING PHYSICIAN TO THE BRITISH LYING-IN HOSPITAL
HONORARY CORRESPONDING FELLOW GYNÆCOLOGICAL SOCIETY, BOSTON, U.S.A.
HONORARY CORRESPONDING FELLOW SOCIÉTÉ IMPÉRIALE
DE MÉDECINE DE CONSTANTINOPLE
CORRESPONDING MEMBER OF THE OBSTETRICAL AND GYNÆCOLOGICAL
SOCIETY OF PARIS

With Illustrations



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PREFACE.

THE last Edition of this work having been exhausted in about two years, it has not been necessary to do more to this new edition than carefully to revise it. This I have done, and I believe the work will be found to be as complete as its scope admits of. I have brought the chapter on Antiseptics into line with the latest additions to our knowledge on that subject.

FANCOURT BARNES.

36, BROADWATER DOWN,

TUNBRIDGE WELLS.

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MIDWIVES' MANUAL.

CHAPTER I.

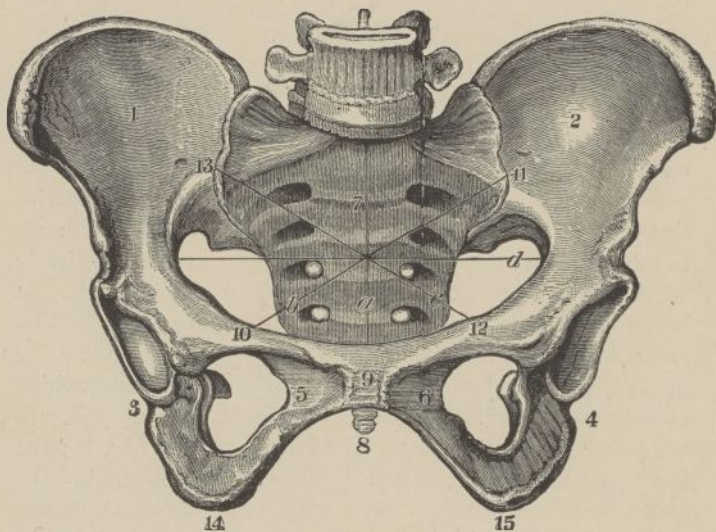
THE PELVIS.

As a knowledge of the rough anatomy of the pelvis, or bony canal through which the child passes in labour, forms the groundwork of Midwifery, it is well to begin with a description of it. The *pelvis*, or *basin*, so called from its resemblance to a basin, is a bony ring placed between the spine, which is supported by it, and the thigh-bones upon which it rests. It is composed of four bones: the two *ossa innominata*, or hip-bones, which bound it in front and on either side; the *sacrum*, or cross-bone; and the *coccyx*, or tail-bone, which close it in behind. The *ossa innominata* on each side are composed of: the *ilia*, or haunch-bones, 1 and 2 (fig. 1); the *ischia*, or seat-bones, 3 and 4 (fig. 1); and the *rami* of the *pubes*, or branches of the *share-bone*, 5 and 6 (fig. 1). These unite at 9 (fig. 1) to form the joint called the *symphysis pubis*.

The *sacrum* is a triangular bone, composed of five *vertebræ*, or spine-bones, joined together into a compact mass. The *coccyx*, which is united to the end of the *sacrum* by a movable joint, is made up of four rudimentary *vertebræ*. The *pelvis* is divided by the ridge called the *ilio-pectineal line* which runs round the upper margin or inlet, into the true and false *pelvis*. The false *pelvis* is that portion of the *pelvis* which is above the *ilio-pectineal line*; it is bounded on each side by the *ossa iliaca*, or *iliac bones* (1 and 2); in

front and behind it is incomplete. The true pelvis is that portion of the pelvis which is beneath the ilio-pectineal line or brim. The superior circumference or upper opening is called the inlet; it is formed by the ilio-pectineal lines (10, 12) at the sides and the pubes (9) in front, and behind by the upper part of the sacrum called the promontory. The inlet is somewhat heart-shaped; it has three principal diameters; (1st) the antero-posterior, sacro-pubic or conjugate

FIG. 1.



THE PELVIS.

a; (2nd) the transverse *d*; and (3rd) the oblique diameters *b*, *c*. The antero-posterior or conjugate diameter extends from the upper border of the pubes in front to the middle of the promontory of the sacrum behind; it should measure in a normal pelvis $4\frac{1}{2}$ inches. The transverse diameter, the longest of the three, extends from the middle of the brim on one side to the middle of the brim on the other side; its average measurement is from 5 to $5\frac{1}{4}$ inches.

There are two oblique diameters. The right oblique diameter extends from the right sacro-iliac synchondrosis (13), or joint between the sacrum and ilium, to the left ilio-pectineal eminence (12); it usually measures 5 inches.

The left oblique diameter extends from the left sacro-iliac synchondrosis (11) to the right ilio-pectineal eminence (10).

We now come to the *cavity* of the pelvis. This comprises that part of the pelvic tube or canal which is between the inlet or brim and the lower opening or outlet. The cavity is bounded in front by the symphysis pubis (9), behind by the sacrum and coccyx (7 and 8). In front the cavity is shallow, measuring an inch and a half, the length of the os pubis (9); behind it is deeper, measuring between $4\frac{1}{2}$ and 5 inches, the length of the sacrum and coccyx (7 and 8). The hinder wall of the pelvis is curved (see fig. 1).

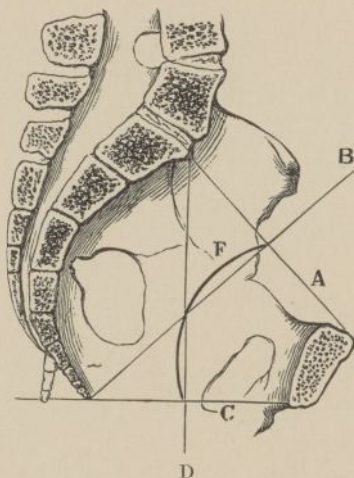
The depth of the pelvic cavity and the curvature of the sacrum have an important influence in labour. If the cavity is shallow and the sacral curvature moderate, the labour is likely to be easy and natural; but if the cavity is deep and the sacral curvature is great, the labour is likely to be tedious and even difficult.

The *pelvic cavity* in the living subject (see fig. 10) is lined with muscles, the psoas and iliacus muscles, and contains behind, the rectum, or lower part of the bowel; in the middle the uterus, the vagina, the ovaries, the Fallopian tubes which connect the uterus to the ovaries on either side, and the broad ligaments which envelop them; in front the bladder. Blood-vessels and nerves also pass through or are distributed in the pelvic cavity, and are liable to pressure and other injuries during and after labour.

The lower circumference, or *outlet*, is of a very irregular shape; it is bounded by three points—that is, the tuberosities of the ischia (14, 15) on either side, and the tip of the coccyx (8) behind. The outlet has two diameters: the antero-posterior, which extends from the tip of the coccyx (8) to the under surface of the pubes (9), and the transverse, which

extends from the back part of one ischial tuberosity (14) to the same point on the other (15). The transverse diameter is constant, measuring 5 inches. The antero-posterior diameter varies from $4\frac{1}{2}$ inches in the ordinary state, to $5\frac{1}{2}$ when the head is passing through the outlet and pushing back the coccyx. The faint lines at E show how the coccyx goes back during labour, the joint between it and the sacrum being movable.

FIG. 2.



PLANES AND AXES OF PELVIS.

The *planes* and *axes* of the pelvis. A *plane* is an imaginary flat surface, which we may represent substantially by a sheet of paper. Thus, a sheet of paper laid on the brim or inlet of the pelvis would represent the *plane* of the brim or inlet. Other sheets of paper laid across the tube or canal of the pelvis would represent the planes of the pelvis at the different points at which they were placed. Now if the tube or canal formed by the pelvic bones, and called the pelvic cavity, were a straight hollow tube, like the bore of a gun, it

would present only one plane throughout its entire length : that is to say, a sheet of paper placed at one end of it would be parallel to a sheet of paper laid over the other end. It would also, as a result, have only one axis, and that a straight line. The pelvis, however, is a curved tube, and so its planes are different at different parts of the tube.

The *axes* of the pelvis together represent the general direction which is given to any body which is passed perpendicularly in succession through the various imaginary planes, or, in other words, through the curved tube of the pelvis. The general axis of the pelvis is called the curve of Carus. A rod standing perpendicularly upon a plane, represented by a sheet of paper, will represent the *axis* or direction of that plane. In other words, the axes of the pelvis are imaginary lines drawn at right angles to the various imaginary planes of the pelvis.

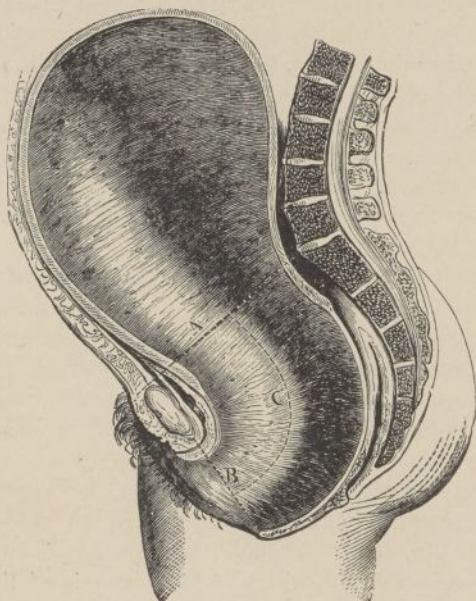
The chief planes of the pelvis are : the plane of the outlet, and the plane of the brim or inlet. Let the line A, drawn from the upper surface of the pubes to the promontory of the sacrum, represent the superior plane, or plane of the inlet ; then the line B, drawn through it at right angles down to the coccyx, will represent the axis or direction of the brim or superior plane.

Let the line C, drawn from the tip of the coccyx to the under surface of the pubes, represent the plane of the outlet ; then the line D, drawn through it at right angles to the promontory of the sacrum, will represent the axis of the outlet. Any number of lines drawn in a similar way from the posterior surface of the pubes to different points on the sacrum will represent the various planes of the pelvis, and lines drawn through these planes at right angles will represent the various axes of the pelvis. The sum or result of the united direction of these imaginary planes is seen in the curved line E. This curve is called the curve of Carus, and represents approximately the direction followed by the child's head in its passage through the pelvic cavity.

In labour the axis of the parturient canal includes, in addition to that of the pelvis, the cavity of the uterus above, and the perinæum and soft parts below.

In those cases where the uterus hangs forward over the pubes, as in cases of pendulous belly, the axis of the uterus and the axis of the child do not coincide, as they should do,

FIG. 3.



THE MOUTH OF THE WOMB IS OBLITERATED, AND THE VAGINA DILATED AS IN LABOUR.

The curved line c shows the axis of the parturient canal: B, the plane of the outlet; A, the plane of the inlet. (After Playfair.)

with the axis of the pelvic brim; and thus the child cannot enter the pelvis in the normal direction. This may give rise to shoulder or other mal-presentations. Again, if the lower, or perinæal end of the parturient canal is rigid or otherwise abnormal difficulty may arise in the labour.

The peculiarities of the female as compared with the

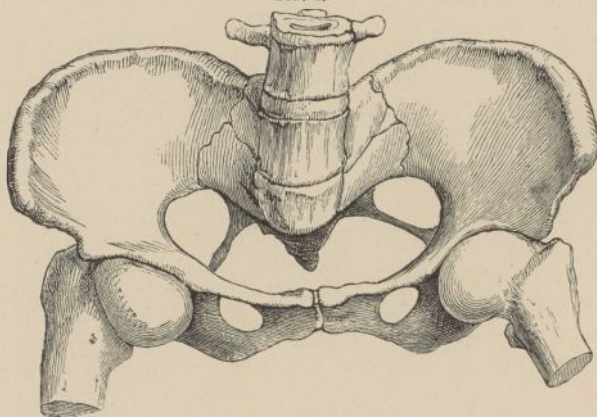
male pelvis are, that in the female the bones are lighter and more expanded, the iliac bones are broader, thus giving greater prominence to the hips, and affording a broad support for the pregnant uterus towards the end of gestation. The inlet and outlet are larger, the cavity larger, the promontory of the sacrum less projecting; the coccyx is movable, which it is not in the male, and the arch of the pubes is wider. Moreover, the relative width of the transverse diameter is markedly greater in the female. The greater width thus obtained across the hips gives rise to the waddling motion which is characteristic of a well-developed pelvis.

CHAPTER II.

DEFORMITIES OF THE PELVIS.

THE most common causes of deformity of the pelvis are *rickets*, or *rachitis*, and *osteomalacia*, a peculiar softening of the bones which occurs in adult life. Disease of the spine may affect the pelvis by causing the vertebræ or spine-bones

FIG. 4.



RICKETY PELVIS, SHOWING CONTRACTION OF THE CONJUGATE DIAMETER AT THE BRIM AND EXPANSION OF THE OUTLET. (After Barnes.)

to become dislocated into, or grow down into, the pelvis, and so partially occlude it. This is called *spondylolisthesis*. Lastly, the pelvis may be deformed by bony excrescences or growths which may sprout into it.

Rickets, or *rachitis*, is by far the most common cause of pelvic deformity. Rickets, being a disease of childhood, not

only causes deformity of the pelvis, but arrests the growth and development of the pelvis. Hence rickety pelvises are generally undersized.

The rickety pelvis is usually flattened; that is, the symphysis pubis is pressed back towards the sacrum, and the promontory of the sacrum bulges forward into the cavity of the pelvis. The effect of this is to absolutely shorten the conjugate or antero-posterior diameter, and to relatively

FIG. 5.



KYPHOTIC PELVIS, SHOWING LENGTHENING OF THE CONJUGATE, AND CONTRACTION OF THE TRANSVERSE DIAMETER. (After Hugenberger.)

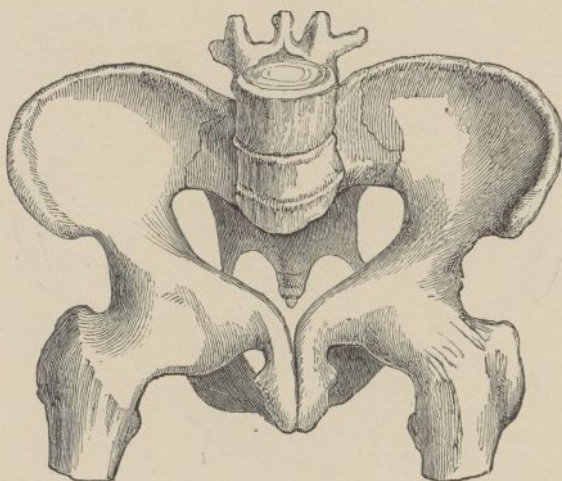
lengthen the transverse diameter. Although in the rickety pelvis the conjugate diameter is shortened, the cavity of the pelvis and the outlet are not always diminished, and may even be somewhat expanded (see fig. 4).

In rickety pelvises, where the conjugate diameter is only slightly diminished, the first stage of labour will be protracted. The presenting part will remain longer above the brim. The os uteri will dilate more slowly, and prolapse of

the funis or cord is likely to occur, because the head does not fill the brim as it should do, and the cord thus slips down on one side of it. If the contraction at the brim is more marked the head may not enter at all. It will then be necessary to deliver by the forceps or by turning, and in extreme cases to diminish the bulk of the child's head by craniotomy.

In the *kyphotic pelvis* (fig. 5) the diameters of the inlet are reversed, the conjugate or antero-posterior being the

FIG. 6.



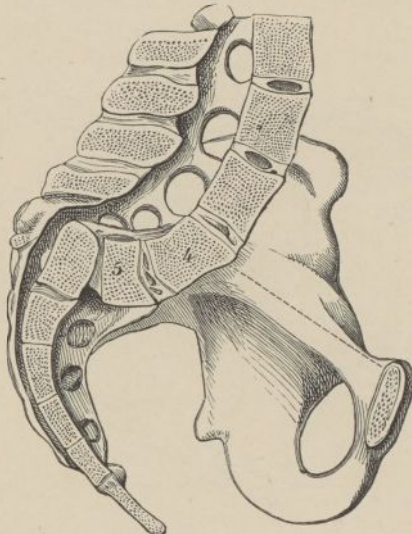
OSTEOMALACIC PELVIS, SHOWING THE BEAK-LIKE SHAPE OF THE PUBES.
(After Barnes.)

longest, and the transverse being the shortest. The result is that the long axis of the child's head enters in the conjugate diameter instead of the transverse.

The *funnel-shaped pelvis* consists in a convergence of the outlet, while the brim and cavity remain unaffected. That is, the tuberosities of the ischia or seat-bones are nearer to each other than they should be, and the lower end of the sacrum is pushed too much forwards.

The *osteomalacic pelvis* (fig. 6), or *malacosteon pelvis*, is a deformity which occurs in adult life. The bones become soft and yield under pressure, and so the pelvis becomes crumpled up, so to speak, into the shape seen in fig. 6. The peculiar beak-like form which the pubes assumes is readily distinguished during life; it can be seized between the forefinger and thumb. This disease is very rare in England.

FIG. 7.



SPONDYLOLISTHETIC PELVIS, SHOWING DISLOCATION INTO THE PELVIC BRIM OF THE LUMBAR VERTEBRÆ.

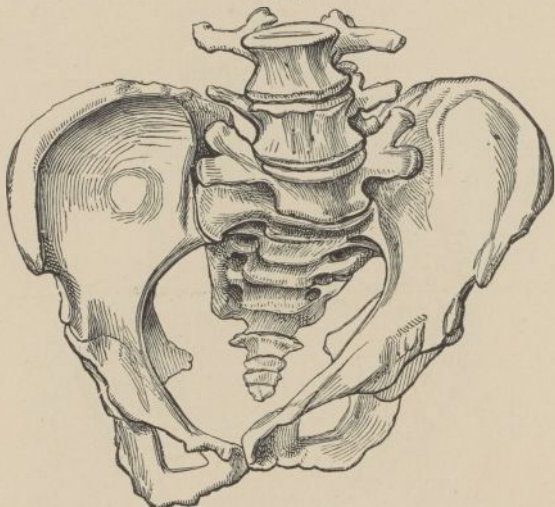
4, fourth vertebra; 5, fifth lumbar vertebra.

The author has seen only one case in this country. In some parts of the Continent, on the Rhine and near Milan, it is not uncommon. In the osteomalacic pelvis, the bones being soft, they can sometimes be stretched open by the hand passed up the vagina in labour; a foot of the child is then seized, and delivery is effected by turning. In most cases, however, even craniotomy is insufficient, and it is necessary

to resort to Cæsarian section as the only means by which the delivery can be accomplished.

The *spondylolisthetic pelvis* is that deformity which results from disease in the lumbar vertebræ or spine-bones at the small of the back. The spine-bones become softened, and then slip forward into the pelvis (see fig. 7). The spine-bones marked 4 and 5 are the fourth and fifth lumbar spine-bones. The dotted line shows the measurement of the new

FIG. 8.



OBLIQUELY DISTORTED PELVIS, OR NÆGELE'S PELVIS. (After Nægele.)

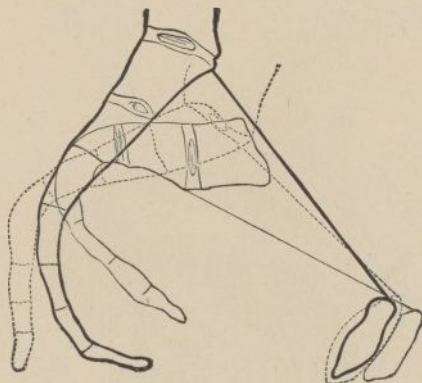
conjugate diameter resulting from the dropping into the pelvis of the fourth and fifth lumbar vertebræ. This distortion is extremely rare.

The *obliquely distorted pelvis*, or Nægele's pelvis, results from disease of the joint or articulation between the sacrum and the ilium. The joint is called the sacro-iliac synchondrosis. The disease generally affects only one side of the pelvis, as is seen in fig. 8, where the left sacro-iliac synchondrosis, or joint between the sacrum and ilium, is diseased.

The result of the disease, being one-sided, is to distort the pelvis on one side, obliquely. In minor degrees of this deformity delivery may be effected by the forceps or by turning, but where it is extreme craniotomy is necessary.

Two other forms of abnormal pelvis are usually described. The first is merely a pelvis which is larger in all its diameters than a normal pelvis. This is called the *pelvis æquabiliter justo major*. The second is a pelvis rather smaller in all its dimensions than a normal pelvis. This is called the *pelvis æquabiliter justo minor*.

FIG. 9.



SHOWS SECTIONAL VIEWS OF THE NORMAL PELVIS (THE STRONG LINE), THE OSTEOMALACIC PELVIS (THE FINE LINE), AND THE RICKETY PELVIS (THE DOTTED LINES).

In fig. 9 are shown the different effects upon the conjugate diameter produced by the two chief forms of pelvic disease, rickets and osteomalacia.

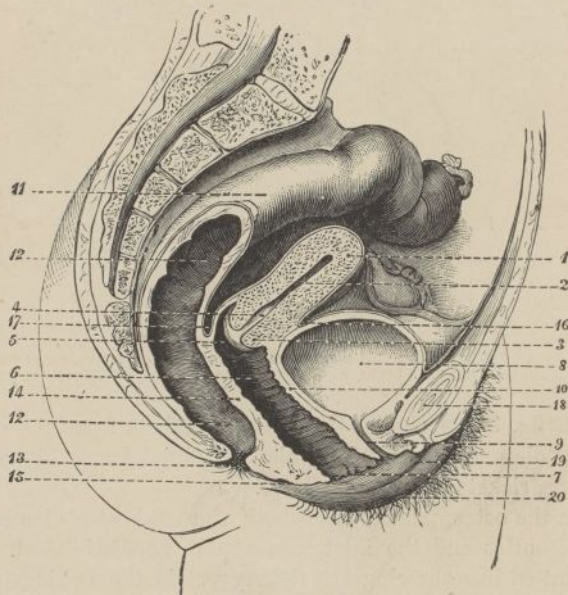
In the osteomalacic pelvis both the conjugate diameters at the outlet and the inlet are seen to be diminished. In the dotted line showing the rickety pelvis the conjugate is seen to be diminished at the inlet or brim, and lengthened at the outlet.

CHAPTER III.

THE FEMALE GENITAL ORGANS.

THE principal organs we are concerned with are contained within the true pelvis, and are called the internal organs of generation. They consist of: 1, the ovaries, in which the

FIG. 10.

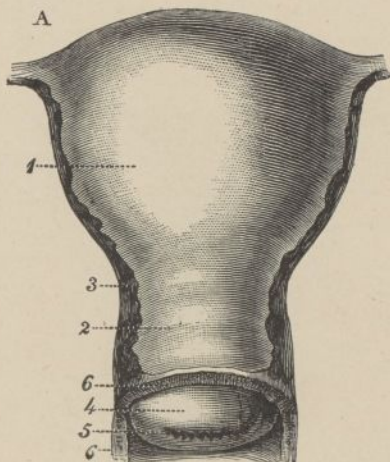


SHOWING THE PELVIC ORGANS IN SECTION

1, body of uterus; 2, its cavity; 3, the vaginal portion; 4, canal of cervix; 5, os uteri externum; 6, the vagina; 7, orifice of vulva; 8, interior of bladder; 9, urethra; 10, vesico-vaginal septum; 11, rectum; 12, its cavity; 13, anus; 14, recto-vaginal septum; 15, perinæum; 16, vesico-uterine sac of peritoneum; 17, Douglas' pouch of peritoneum; 18, os pubis; 19, labium minor; 20, labium majus. (After Sappey.)

ova are formed ; 2, the Fallopian tubes, which are the excretory ducts to the ovaries, and along which the ovum passes on its way from the ovary into the uterus ; 3, the uterus, a muscular organ which receives and nourishes the fecundated ovum, and which finally expels it when it has developed into a full-grown foetus ; 4, the vagina, or front passage, a canal to connect the uterus with the exterior and

FIG. 11.



ANTERIOR ASPECT OF UTERUS.

1, body of uterus, much larger than that of the neck ; 2, the neck ; 3, isthmus ; 4, os tincæ ; 5, os externum, a transverse fissure, its margin notched ; 6, 6, vagina. * (After Sappey.)

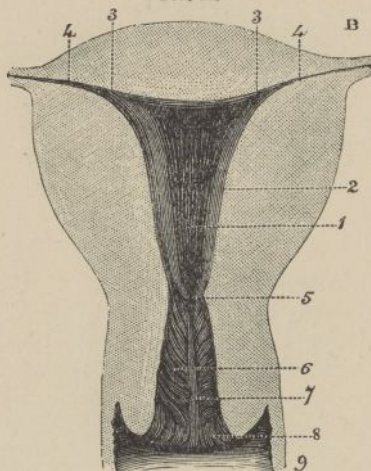
to serve in copulation ; 5, the urethra, or canal leading from the bladder.

The bladder, the rectum, or lower bowel, the connective tissue uniting the various organs one to another and carrying their blood-vessels, nerves, and lymphatics, together with the muscles, cushioned with fat, complete the contents of the pelvis.

The *ovaries*, which are about an inch and a half long, are placed in front of the rectum on either side of the uterus.

They are supported between the folds of the broad ligament which is formed by the membrane called the peritoneum. The ovaries contain the ova. It has been estimated that each ovary contains 36,000 ova, or eggs. The fold of peritoneum (fig. 10, 17) which comes down behind the uterus between it and the rectum is called Douglas' pouch, and is often the seat of abscess, collections of blood, and ovarian tumours whilst small.

FIG. 12.



UTERINE CAVITY.

1, cavity of body; 2, left lateral border; 3, 3, upper border; 4, 4, its upper or lateral infundibuliform angles continuous with the Fallopian tubes; 5, its lower angle or isthmus, forming the os internum; 6, cavity of the neck; 7, arbor vitæ; 8, posterior lip of os externum; 9, vagina. The space between 3, 3, is the fundus of the uterus. (After Sappey.)

The *Fallopian tubes* are the ducts or tubes along which the ova pass from the ovaries to the uterus. They are placed in the thickness of the broad ligament, and extend from the upper angles of the uterus to the ovaries on either side. They open at one end into the uterus, and at the other end they have a fringe-like opening, which is called the fimbriated extremity. This is close to the ovary, and catches the ovum as it escapes from the ovary during a menstrual period.

The *uterus*, or *womb*, is a hollow, muscular organ destined to receive the fecundated ovum and to expel it when mature. It is situated in the cavity of the pelvis between the bladder and the rectum, beneath the intestines and above the vagina, which helps to support it (see fig. 10). It is held in position by the broad ligaments and the round ligaments, and partly supported by the vagina. The movements of the uterus are limited by its connections, and depend upon the condition of the adjacent organs. For example, if the bladder is full the uterus will be pushed backwards against the rectum; if the rectum is overloaded it will push the uterus forwards.

The uterus is somewhat pear-shaped, slightly flatter in front than behind. It consists of a fundus, a body and a neck, and is composed of muscle and fibrous tissue. The vagina is inserted round the sides of the neck of the uterus. The virgin uterus measures about 2 inches, and weighs about an ounce and a quarter. The average length of a uterus which has borne children is $2\frac{3}{4}$ inches; its width is $1\frac{3}{4}$ inch; and its thickness or diameter from back to front is about 1 inch. In its non-pregnant condition the uterus weighs about 2 oz., but at the end of pregnancy it weighs as much as 2 lb., having increased in size to hold the growing fœtus. The os uteri, or mouth of the womb, presents an anterior lip and a posterior lip; in women who have not borne children it is smooth to the touch, but in women who have borne children it is usually fissured and uneven at the edges.

In the human subject the uterus consists of a single cavity; that is, it is single. In most animals it has two cavities and is double.

The cases in which a double uterus occurs in the human being are the result of arrested development.

The cavity of the uterus is about two and a half inches in length; it is of a triangular shape, and presents a narrowing or isthmus (fig. 12, 5), which is called the os uteri internum, or internal mouth of the womb. At the fundus of the uterus the two Fallopian tubes open into it (fig. 12, 4, 4). It will

The cavity of the cervix uteri, or neck of the womb, is marked by longitudinal ridges and smaller transverse ridges (fig. 12, 7) called the *arbor vitæ*, or tree of life. The furrows between the ridges in the cavity of the cervix or neck are lined with glands, which lubricate it during labour, and in the non-pregnant state are the main source of the whites, or leucorrhœa.

The *vulva* comprises the external organs of generation—that is : the Mons Veneris, the labia majora and minora, the clitoris, the meatus urinarius, the hymen when present, or its remains, the carunculæ myrtiformes, the fourchette, and the orifice of the vagina (fig. 13).

The *Mons Veneris* is the rounded eminence in front of the pubes above the vulva. It is formed of a cushion of fat under the skin. At the epoch of puberty it is covered with hair.

The *labia majora*, or large lips, are the two prominent folds of skin bounding the vulva. They unite below to form the fourchette, which is generally ruptured in the first labour. The space between the fourchette and the anus constitutes the perinæum. The space between the fourchette and the entrance to the vagina is called the fossa navicularis. The labia majora are analogous to the male scrotum.

The *labia minora*, nymphæ, or smaller lips, are two folds of skin, assuming the character of mucous membrane, extending from the internal aspects of the labia majora upwards to the clitoris, round which organ they pass to unite and form the hood and frenum of the clitoris.

The *clitoris* is an erectile organ placed at the upper part of the vulva, and is analogous to the male penis.

The small tubercle which appears at the end of it is called the glans of the clitoris.

The *meatus urinarius* is just underneath the clitoris. It is the orifice of the urethra, or canal from the bladder. It usually presents a longitudinal or starred slit, the borders of which are notched and projecting.

The *hymen* is a crescentic membrane attached to the

posterior two-thirds of the orifice of the vagina. It is usually present in virgins. When the hymen has been torn the lacerated shreds contract into the little tags of mucous membrane called the *carunculæ myrtiformes*.

The *mammary glands*, or breasts, are so intimately connected with the process of reproduction that it is usual to describe them along with the organs especially devoted to that function.

The *mammæ*, or breasts, are usually two in number, placed one on each side of the chest over the front aspect of the third, fourth, fifth, and sixth ribs. Their bulk depends chiefly upon an accumulation of fat which lies between the excretory ducts and lobes of the glands.

The *mamma*, or breast, consists of the *mammilla* or nipple, the *areola*, or dark ring round it, and the ducts and lobes which form the chief part of the gland.

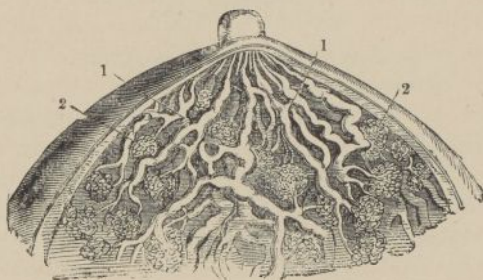
The *mammilla*, nipple, is the conical projection which is placed at the summit of the *mamma*. It contains numerous blood-vessels as well as the openings of the lactiferous or milk ducts.

The power of erection under irritation which it possesses is due to the presence in it of muscular fibres, which contract and harden the nipple, and the distension of its blood-vessels, which become turgid.

The *areola* is the ring surrounding the nipple. In blondes it is usually of a pink colour, in brunettes it is of a darker colour. During pregnancy the *areola* becomes dark from the deposit in its tissues of pigment or colouring matter. The milk is secreted in the lobes (fig. 14, 2), and is conveyed along the galactophorous or milk ducts (fig. 14, 1) to the nipple. The secretion of milk in women who are suckling is accompanied by a peculiar sensation in the breasts called the 'draught.' The sympathetic relation between the *mammæ* and uterus is demonstrated by the contraction of the womb which is caused by placing the child to the breast immediately after labour. It may even cause severe after-pains.

Occasionally it happens that a woman has four or six mammæ. I saw a woman in St. Thomas's Hospital who had four breasts; two in the usual places on her chest, and two additional ones on her abdomen on either side of the

FIG. 14.



1. GALACTOPHOUS OR LACTIFEROUS DUCTS. 2. LOBES OF THE MAMMARY GLAND.

navel. In fact, the mammæ are only developments of the skin containing sebaceous glands. This explains the phenomenon which is occasionally seen of men being capable of secreting milk and suckling children.

CHAPTER IV.

OVULATION AND MENSTRUATION.

OVULATION, or the ripening and escape of an ovum from the ovary, takes place once a month, and is usually accepted as the cause of *menstruation*, or the monthly discharge of blood from the womb.

Every month one of the little cells, or Graafian vesicles, in an ovary swells up and bursts, setting free the ovum it contains. The ovum thus liberated is picked up by the fimbriated extremity of the Fallopian tube, and passes along the tube into the uterus, where it may either perish or become impregnated.

The Graafian vesicle from which an ovum has escaped is developed into the 'corpus luteum,' so called on account of its yellow colour. When pregnancy occurs the corpus luteum becomes hardened, and a white starlike cicatrix, or scar, is formed in its centre. But if pregnancy does not take place the corpus luteum rapidly disappears. At the place on the surface of the ovary through which the ovum burst a scar is left, and remains as evidence of the event. The number of the scars so seen on the ovary give an approximate idea of the age of the woman.

Menstruation, the menses, catamenia, or monthly discharge of blood from the womb, takes place, as its name implies, once a month. It is coincident with the rupture of a Graafian vesicle and the escape of the ovum from the ovary. At first the menstrual discharge is of a brownish colour; at the end of two days the discharge consists of bright red blood, and lasts about three days. As menstrua-

tion ceases the discharge changes from red to brown, and at this time the Graafian vesicle generally bursts and the ovum escapes. During the first days succeeding menstruation the vaginal secretions contain *débris* of epithelial scales from the internal surface of the uterus and tubes, and the remains of the ovum itself have been observed. The quantity of blood lost varies in different women. It ranges from 3 to 4 ozs. When it much exceeds this quantity it is called menorrhagia. There is a widely spread popular belief that menstrual blood is fœtid or poisonous. This certainly obtains under conditions of disease or uncleanness. The menstrual blood flows from the womb. If the uterus is examined by the speculum blood is seen to issue from the os or mouth of the womb. In cases of inversion of the womb—that is when it is turned inside out, as sometimes happens in labour—blood has been seen to ooze from the surface at the menstrual period. The usual periodicity is twenty-eight days.

In temperate climates menstruation appears between the ages of thirteen and fifteen, concurrently with the appearance of other signs of puberty, as the growth of hair on the genital parts and the swelling of the breasts.

Many cases are on record where children have menstruated at very early ages. In some cases they have menstruated within a few days of their birth. Sir Astley Cooper saw a child which began to menstruate at three years old, and who at seven years and a half had all the appearance of a thick-set, stunted woman. There are well-authenticated instances of pregnancy at twelve years of age.

The period at which the menses cease is not so certain. Irregularity usually begins about the age of forty to forty-five. The function may continue to fifty or even beyond. At all events, pregnancy not seldom takes place after the age of forty-five; but fifty may be regarded as the extreme limit of liability to pregnancy.

Vicarious menstruation is a flow of blood at the monthly period from the nose or some other part, generally a mucous

membrane, of the body. It may occur from the stomach, when blood will be vomited at that period, or from the lungs, when it will be coughed up. It has been observed to ooze from the skin, forming a true bloody sweat. I saw a girl of thirteen, a patient of my father's, who had a monthly discharge of blood from the nipples.

As a rule, menstruation ceases during pregnancy and suckling. The law is that from the moment of conception until the child is weaned, the menses are absent. If the uterine surface were to pour out blood during pregnancy, the ovum would be dislodged and abortion take place. However, in some cases menstruation takes place during the first months of pregnancy without causing abortion.

The symptoms of menstruation are congestion of the genital organs; the ovaries, uterus, and breasts swell and become turgid; the breasts swell visibly, become firmer to the touch, and even painfully hard. As regards constitutional symptoms, many women, beyond a sense of fulness and temporary lassitude, feel no unusual sensations. In others, however, the function is performed with more or less difficulty, constituting what is called dysmenorrhœa. Pains in the back, in the lower part of the abdomen on one side or the other, and down the thighs may be present. There may be vomiting and diarrhœa. In some the mental faculties are more or less disturbed. Irritability, despondency, false ideas, and even delusions render the sufferer for the time really irresponsible.

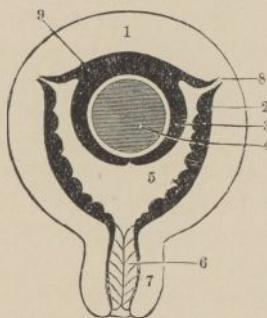
CHAPTER V.

THE OVUM, THE PLACENTA, THE UMBILICAL CORD, THE FÆTUS.

WHEN impregnation takes place the mucous lining of the uterus becomes thickened and vascular. It thus forms a favourable soil in which the ovum may take root.

The *ovum* on reaching the uterus becomes imbedded in the thickened mucous membrane, which grows round it and

FIG. 15.



- 1, fundus of the uterus; 2, decidua vera; 3, decidua reflexa; 4, ovum; 5, cavity of uterus between the decidua vera and the decidua reflexa, not yet united; 6, arbor vitæ; 7, cervix uteri; 8, opening of Fallopian tube into upper angle of uterus; 9, decidua serotina. (After Dalton.)

forms the decidua. The *decidua* consists at first of two layers: the decidua vera, or true decidua, and the decidua reflexa, or reflected decidua.

The decidua vera is that portion of the thickened uterine mucous membrane which remains in contact with the inner or muscular wall of the uterus.

The decidua reflexa is a projection or outgrowth of decidua vera which grows round the ovum (fig. 15, 3).

That portion of decidua vera which lies at the point of union of the ovum with the uterine wall is called decidua serotina (see fig. 15, 9).

After the third month of pregnancy the two layers of decidua vera and reflexa unite and form one membrane.

The *chorion* is the outer membrane of the ovum which covers the fœtus. In the early stage it is covered with tufts called villi. Hence the name shaggy chorion. Later on, many of these villi shrink and disappear, and those which remain are penetrated by blood-vessels running from the fœtus, and which form the fœtal element of the placenta.

The *amnion* forms the internal layer of the sac which contains the fœtus. It secretes the amniotic fluid, the waters in which the child floats during the uterine period of its existence.

The *liquor amnii*, the amniotic fluid, or the waters, consists of water holding in solution a small quantity of albumen and some salts. The liquor amnii protects the fœtus during its uterine existence from shock and jolting as well as from the womb contracting upon it. It also gives room for the movements of the fœtus. In labour it helps to dilate the mouth of the womb, being contained in the amnion or bag of waters, which is pressed down into the mouth of the womb and gradually opens it up.

The *placenta* may be regarded as composed of two parts : the maternal portion and the fœtal portion. On the side of the mother the blood-vessels of the placenta consist of arteries and veins with a series of cavernous cells between them, the basis being a development of the uterine mucous membrane or decidua. It is developed from that part of the mucous membrane of the uterus to which the ovum becomes attached when it first enters the uterus.

The blood-vessels, both arteries and veins, in the part of the uterus immediately connected with the placenta become enlarged. The veins especially are developed into large

channels or sinuses. The arteries running between the uterus and placenta assume the appearance of corkscrews, and are called curling arteries.

On the side of the foetus, the arteries which come from the foetus through the umbilical cord divide and subdivide, so that finally a capillary or minute branch runs into a villus, and at the extremity of the villus it *turns back and becomes a vein* (fig. 16). The little veins thus coming from the villi

FIG 16.



SMALL ARTERY IN VILLUS TURNING BACK AS A VEIN. (After Barnes.)

are gathered together into large trunks, which unite into the large vein of the umbilical cord.

Although, for the purposes of description, the placenta is divided into a maternal and foetal portion, there is no marked line of division to be seen between them.

The *foetal circulation*, or the circulation of the blood in the foetus.—The leading fact to bear in mind is that the circulation of the blood of the mother and the circulation of the blood of the foetus are entirely separate and distinct from each other. The mother's circulating apparatus has its own

system of blood-vessels ; that of the foetus also has its system of blood-vessels. In the placenta these two systems of vessels come into contact or lie side by side. They are never connected so that maternal blood can flow directly into the vessels of the foetus or *vice versa*. To take the *maternal system* first. The arteries in the uterus run directly into the placenta, and there, instead of the capillaries or minute vessels, which in other parts of the body join the arteries to the veins, the arteries open into an irregular vascular cavity or system of sinuses, or channels, in which the mother's blood flows gently along. From this cavity the blood is taken onward—that is, it returns to the mother through the various sinuses, or vein channels, which are continuous with the venous sinuses in the uterus. These sinuses in turn run into the veins of the pelvis, and thence into the *vena cava*, or great vein, of the body.

Then to take the *fœtal system*. The fœtal blood, in order to receive its purification, is brought from the fœtal heart by the large artery, or *aorta*, which gives off an artery on either side, called hypogastric, which run together in the umbilical cord. On reaching the placenta these arteries subdivide, as already explained, and run into the villi, and there form capillaries, or minute vessels, which are continuous with the veins which carry the blood back through the umbilical vein to the foetus. The blood so brought back is carried through the large vein of the liver and the *vena cava*, or great vein, to the heart. One peculiarity of the fœtal blood is that, inasmuch as the placenta represents the lung of the adult, and is the great source of nutrition, the blood of the foetus undergoes purification and replenishment in the placenta, and thus the arteries carry to it impure blood, and the veins bring from it purified blood.

The *placenta* presents two surfaces—the fœtal and the maternal. The internal or *fœtal surface* is smooth, and is covered with a layer of the amnion, through which the branches of the umbilical arteries and vein, which are the blood-vessels

of the cord or navel-string, are seen to branch out and divide before entering the substance of the placenta. The umbilical cord is generally inserted into the middle of the fœtal surface of the placenta; but sometimes it is inserted into or near the edge of the placenta, when it is called 'battledore placenta.' The external surface of the placenta which is in contact with the uterus is divided into a number of lobes. When the placenta is expelled after labour, the divisions between these lobes are plainly seen. The placenta is usually about eighteen inches in circumference, and one or two inches thick.

In cases of twins each child generally has its own placenta and bag of membranes. Sometimes the placenta are attached to different parts of the uterus, at others they are close together and seem fused into one. In rare cases there is only one placenta for the twin or triplet children. When twins are contained in one amniotic sac, they are generally, if not always, of one sex.

The *funis*, umbilical cord or navel-string, forms the means of communication between the placenta and the fœtus. At full term the cord varies in length from about 1 to 2 feet. In very rare cases it may reach to 5 or even 6 feet. It contains the two umbilical arteries and the umbilical vein. The bulk of the funis is made up of gelatinous matter which contains and supports the umbilical vessels. In labour, if the child is alive, and the cord comes down before the child, that is, is prolapsed, it may be taken hold of and the *fœtal pulse*, that is, the beating of the arteries in the cord, be felt. After delivery the cord is occasionally found to be knotted. This is occasioned by the child, while in the uterus, floating through a loop of the cord. In some cases this knotting is so tight that the fœtus is killed either before or during delivery.

The *fœtus* is the term applied at the end of the third month of pregnancy to the product of conception. During the first three months of pregnancy it is spoken of as the *embryo*.

In the second month the embryo is developed so as to weigh about 60 grains, and the head and extremities are visible. In the third month the embryo weighs about 200 grains; the head is large in proportion to the rest of the body. At the fourth month the sex of the foetus may be distinguished; it weighs from 4 to 6 oz. and measures about 6 inches. At the fifth month it weighs 10 oz. and measures about 10 inches. The nails begin to form. At the sixth month the foetus weighs 1 lb. and is about 12 inches in length. The eyelashes are formed. The testicles are still in the abdomen. By the seventh month the foetus weighs 3 or 4 lb. and measures about 14 inches. The eyelids are open, the testicles have descended into the scrotum. During the eighth month the foetus weighs from 4 to 5 lb. and measures about 19 inches. At the end of the ninth month it usually weighs about $6\frac{1}{2}$ lb. and measures 20 inches; but in exceptional instances the child may weigh 8, 9, 10, or even 17 lb.

The new-born child is covered with greasy, whitish material called the *vernix caseosa*, or cheesy varnish. This protects its skin, while in the womb, from the action of the amniotic fluid, or waters.

CHAPTER VI.

THE SIGNS AND SYMPTOMS OF PREGNANCY.

THE signs and symptoms of pregnancy are of two kinds : the subjective signs and the objective signs.

The subjective symptoms are those which the patient feels or describes herself, such as suppression of the menses, morning sickness, quickening, and other sensations which may be experienced by the patient herself, but are not seen by the midwife.

The objective signs are those changes which can be seen, heard, or felt by the midwife. Such are enlargement of the abdomen, pigmentation of the areolæ, the presence of milk in the breasts, ballottement, the foetal heart. These are signs which present themselves to the midwife, which she can see for herself, and are therefore the most valuable.

The signs and symptoms of pregnancy are best described and most easily remembered if described somewhat in the order in which they are commonly observed. But it should be borne in mind that they are never isolated, but that they are really so many forms of expression of one ruling physiological state.

Suppression of the menses is generally looked upon as the first presumptive symptom of pregnancy. It must not, however, be regarded as an infallible symptom, inasmuch as women sometimes menstruate regularly for three or four months after conception. Indeed, cases are on record where menstruation has persisted throughout the whole period of gestation. Some women only menstruate while they are pregnant. It is needless to say that such cases are of extreme rarity. It should be remembered that in newly married

young women the menses may at first be suppressed and the breasts swell during three or four periods without pregnancy being present.

Salivation, or dribbling of saliva from the mouth, is sometimes troublesome on account of the saliva secreted, which amounts in some cases to one or two pints a day.

Nausea and vomiting, or morning sickness.—As soon as conception has taken place nausea and vomiting frequently set in. Usually the sickness commences within four days after conception. It may be deferred until the fourth week. The vomiting is usually most distressing in the early part of the day, and so it has been called 'the morning sickness.' The patient often feels hungry as soon as the vomiting ceases, eats a hearty meal, and may feel no more distress for the remainder of the day. As a rule, the patient only vomits mucous secretions from the stomach, the food being retained. Cases, however, occur in which no food can be kept on the stomach; the patient gets thin, worn out, and so broken down that if abortion does not result and put an end to her sufferings, it is necessary to induce it in order to save her life. In the great majority of cases it ceases at the beginning of the fourth month. The morning sickness is said to be caused by the irritation of the nerves of the uterus by the stretching of the tissue of the uterus during its growth in pregnancy. But Dr. Barnes in his Lumleian Lectures showed that there exists in pregnancy an exalted tension of the nervous centres which greatly increases the response to peripheral and emotional irritation. In his view the vomiting is a convulsive phenomenon.

M. Jorissenne has pointed out that in pregnancy the frequency of the pulse does not change with the position of the patient. In non-pregnant women the pulse beats slower in the reclining than in the standing posture.

Violet discolouration of the vagina is an early and valuable sign of pregnancy. The vagina presents a deep violet hue instead of the rosy appearance seen in the non-pregnant state.

Enlargement of veins on the legs is an early sign, often one of the first, of pregnancy. Small networks of veins are seen on the thighs and legs. The veins of the labia majora are often dilated. Lastly, the veins round the anus and inside the lower end of the rectum are also frequently enlarged, giving rise to external piles in the former, and internal piles in the latter case.

During the early months of pregnancy the chief symptoms which guide us in diagnosis are : the violet deepening of the vagina, with a copious creamy secretion consisting of epithelial scales from the cervix uteri and upper part of the vagina, the enlargement and anteversion of the uterus, together with the turgescence of the breasts and the discoloration of the areolæ.

The presence of one or other of the above signs alone does not afford evidence of pregnancy, but when they occur together the presumption of pregnancy is almost absolute, especially if they are accompanied by the known subjective signs, such as morning sickness and suppression of the menses.

Sometimes associated with these symptoms there may be an escape of blood from one of the mucous membranes, as the lungs, stomach, or bowel, and more frequently from the inner part of the uterus, causing abortion.

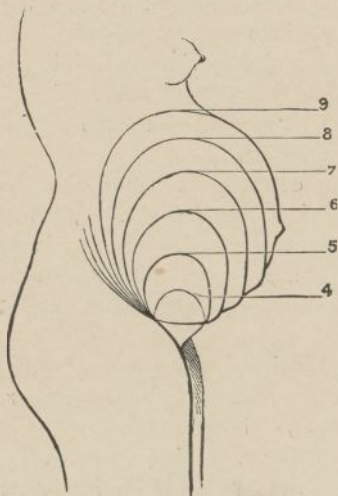
This is one of the results of the increased tension which exists in the blood-vessels during pregnancy.

Changes in the mammæ, or breasts.—About the second month of pregnancy the woman begins to have a feeling of fulness, swelling, tenderness, and throbbing. The nipples become tender. The veins on the surface of the breasts enlarge and become knotted. The circles, or areolæ, round the nipples become altered in colour, changing to a brownish hue. Where previous pregnancies have existed silvery streaks or scars are seen radiating on the breast from the nipple towards the circumference. The secretion of milk in the breasts is strong evidence of pregnancy. Often as early

as the ninth or tenth week milk may be pressed out. If only one drop can be procured it is a sufficient test.

Enlargement of the abdomen is a familiar symptom, although in itself it is of no great importance. During the first thirty or forty days of pregnancy the uterus sinks lower in the pelvis, so that the abdomen is even flatter than before. This fact gave rise to the French proverb, 'En ventre plat

FIG. 17.



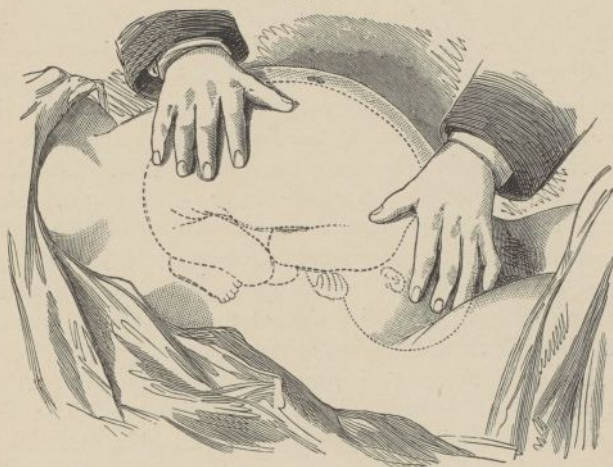
SHOWING THE HEIGHT OF THE FUNDUS OF THE UTERUS AT DIFFERENT PERIODS OF PREGNANCY. (After Schultze.)

enfant il y a.' It is not until the end of the fourth month that the uterus begins to rise above the brim of the pelvis.

About the middle of the fifth month the fundus or bottom of the uterus may be felt midway between the umbilicus, or navel, and the pubes. By the end of the sixth month it reaches as high as the umbilicus, or navel. At the end of the ninth month it has reached almost as far as the lower end of the sternum, or breast-bone. These different stages are seen in fig. 17. When the foetus dies the uterus ceases

to enlarge, although the dead child may be carried for several months in the womb. During the few days immediately preceding labour the womb sinks down towards the pelvis, so that the abdomen looks smaller than before. Towards the end of gestation the umbilicus, or navel, often becomes turned inside out. This is due to the stretching of the parts by the gravid uterus. Occasionally, too, a darkish line extends down the middle of the abdomen from the umbilicus to the pubes.

FIG. 18.



MODE OF ASCERTAINING THE POSITION OF THE FÆTUS BY PALPATION.
(After Playfair.)

During the last weeks of pregnancy the position of the fœtus in the uterus may be felt by palpation: that is, by feeling the body of the child through the walls of the abdomen. The patient is placed on her back in the position shown in the diagram. With a little practice it is not difficult to detect the position of the fœtus in the uterus. Where the abdominal walls are loaded with fat of course it is not so easy. By means of this manœuvre it is often possible to

make out a transverse presentation before or at the beginning of labour.

Movements of the fœtus, or quickening.—The movements of the fœtus in the womb are usually first perceived by the mother about the end of the fourth month of pregnancy. It is a vulgar error to believe that at the 'quickening' the child first becomes alive or quickened. The embryo is alive from the moment of conception. Not unfrequently after quickening the morning sickness and other dyspeptic symptoms subside. It has been said to depend on the rising of the womb out of the pelvis, which occurs at the fourth month.

Ballottement, or repercussion, is a valuable means in detecting pregnancy. It consists in the displacement by the examining finger of the fœtus, which floats up in the liquor amnii, and rebounds on to the finger with a soft jerk. It may be practised externally and internally. *External ballottement* may be performed thus: the woman being placed on her knees leans down on her elbows; the fœtus then gravitates to the fundus of the uterus; the hand is then placed on the fundus and a jerk upwards is given; the fœtus is propelled to the opposite side of the bag of the amnion and rebounds on to the hand at the fundus.

Internal ballottement is most easily performed by placing the patient on a couch in a half-sitting position; the examining finger is then passed up the vagina in front of the os uteri until the uterus is felt through the vaginal wall; a sudden push is then given, when the fœtus rises in the bag of waters and falls back on the examining finger with a perceptible force.

Auscultation of the fœtal heart is one of the most valuable and trustworthy signs of pregnancy. The fœtal heart may first be heard between the fourth and fifth months. The patient is placed on her back and the sounds of the fœtal heart listened for through the abdominal walls by means of a stethoscope. If the patient is fat or the bladder full the fœtal heart may not be heard. When the sounds of the

foetal heart are clearly made out the existence of pregnancy is beyond dispute. The foetal heart beats rapidly, at the rate of between 140 and 150 beats per minute, while that of the mother is beating at the rate of 80 or 90 per minute.

The uterine souffle, bruit, or placental murmur, is usually audible a few weeks before the foetal heart; it is a blowing sound coincident with the beat of the mother's pulse. The cause of it is not clearly made out. It is heard, like the foetal heart, through the abdominal walls. It probably depends upon the rushing of the blood through the blood-vessels of the womb. It is most often heard above one or other groin.

The vaginal pulse, as it is called, is the throbbing of the arteries which is felt by the examining finger in the vagina. It is sometimes most distinct, at others absent.

Kiestein.—When the urine of a pregnant woman is allowed to remain in a glass vessel protected from the dust, a peculiar coating forms on the surface in about forty-eight hours; this coating or pellicle is called *kiestein*. It is an uncertain sign, however, and of no special value.

Shortening of the cervix has been described as a symptom of pregnancy. It was thought that as pregnancy advanced the cervix of the uterus gradually shortened; that is, its cavity became encroached upon and finally at the end of pregnancy merged into the cavity of the body of the uterus. It is not, however, until just before labour that the cervix becomes obliterated. During pregnancy the cervix gradually becomes softer than before, and the os uteri becomes patulous or gaping.

Besides the above signs and symptoms various changes, physical and moral, take place in the pregnant woman. The antipathies, strange appetites, the attacks of toothache, salivation, varicose veins in the legs, are all familiar and of frequent occurrence. It may be laid down as a general rule that pregnancy predisposes to any disease, mental or bodily, which may be dormant in the patient, and it thus may be regarded as a test of the soundness of the constitution of the patient.

CHAPTER VII.

SPURIOUS PREGNANCY — ABNORMAL PREGNANCY, INCLUDING
TWIN OR MULTIPLE PREGNANCY, SUPERFETATION, EXTRA-
UTERINE OR ECTOPIC GESTATION, AND MISSED LABOUR.

THE condition known as *spurious pregnancy*, or pseudocyesis, occurs most frequently in women who have reached or passed the climacteric or change of life. It is also occasionally observed in young women recently married, or in the unmarried who have clandestinely incurred the risk of pregnancy. The abdomen is observed to enlarge, menstruation may or may not have ceased, milk may be secreted in the breasts, the areola is more or less darkened, morning sickness and other digestive disturbances are present. The patient will declare that she can feel the movements of the child in the uterus. Generally, after these symptoms have lasted for some weeks or months, they gradually disappear and the patient gets well. In rare cases the symptoms of spurious pregnancy persist until the end of nine months, when a spurious labour sets in accompanied by all the usual pains.

The symptoms just described are constitutional and most likely depend upon some morbid irritation of the ovary. The enlargement depends almost entirely upon the presence of wind, or flatus, together with an increased deposit of fat in the abdominal walls. The passage of flatus along the intestines is taken for the movements of the child. A proper physical examination of the uterus of course quickly decides the question. This examination is much facilitated by the use of chloroform.

There are several diseases which give rise to enlargement

of the abdomen : as, ovarian tumours, dropsy, fibroid tumours of the womb or collections in the womb of retained menses, air, or water ; also some diseases of the liver or kidneys. All these conditions can be distinguished from true pregnancy by physical examination and a due consideration of the collective symptoms in each particular case.

FIG. 19.



SHOWING ONE DISPOSITION OF TWINS. (Ramsbotham.)

Multiple, including twin, pregnancy is not uncommon. Twin pregnancy occurs once in about 90 labours ; triplets are much more rare, occurring only once in about 8,000 labours, and four or more children at a birth of course are rarer still. In twin pregnancies the children are often of

opposite sexes, but in a considerable number of instances the children are of the same sex. In the first case the children are contained each in its own bag of membranes. United twins, as the Siamese, have always been of the same sex. In the latter case they are contained in the same bag. Twin pregnancies depend upon the simultaneous escape and impregnation of two ova from two Graafian follicles. Twins are generally small from being born prematurely. In triplets the children are still smaller, while in quadruplets the premature expulsion of imperfectly developed fœtuses is almost certain.

During uterine life, in the majority of cases, the twins are each contained in a separate bag of membranes or chorion, and each has a separate placenta. Sometimes there is only one chorion containing the two fœtuses with their amniotic sacs. In these cases placentæ are both attached to the uterus close together, or fused into a single mass forming one large placenta.

The shape presented by the abdomen in twin pregnancy differs from that seen in single pregnancy. The uterus is unusually large, irregular in shape, broader across, and often presents a sulcus or depression between the two fœtuses, down the middle of the abdomen. The presence of twin pregnancy may be diagnosed, during the last months of pregnancy, by palpation. Palpation consists in feeling the child by the hands through the abdominal wall. It is best practised with the patient lying on her back. The two fœtal heads and the separate fœtal trunks may be made out by this means. This, in conjunction with the hearing of two distinct fœtal hearts, renders the diagnosis certain.

Superfetation implies the additional impregnation of a second ovum after one ovum has already become impregnated in the womb. There is much doubt as to the possibility of a second pregnancy occurring in an already pregnant uterus. It is beyond doubt, however, that such a phenomenon can only take place during the first weeks of pregnancy, before the two layers of decidua, the decidua vera and the

decidua reflexa (fig. 15, 2, 3), have united. The cases which have appeared to give the greatest support to the theory of superfœtation are those where a negress, after having connection with a negro and a white man, has been delivered of a black child and at the same time of a white child. Or cases where a second child has been born a few weeks after the birth of a preceding apparently mature child. But the cases which have most frequently been cited as a proof of superfœtation are those in which a full-grown living child is born along with a small shrivelled dead child. The true explanation of these cases is that they were twin conceptions, and that one fœtus has been killed early in gestation by compression, and is simply retained in the womb until the natural term of labour is reached.

In those cases where the uterus is bi-lobed, or divided into two compartments, the fœtus contained in one horn or half may be born before that contained in the other horn, and thus give rise to the idea of superfœtation having occurred.

By *extra-uterine* or *ectopic fœtation* is meant pregnancy occurring outside the uterus. When it takes place in the peritoneal cavity of the abdomen, among the intestines, it is called *abdominal gestation* or pregnancy. If the ovum becomes impregnated in the ovary and grows there, it is termed *ovarian gestation*. But the most common seat of extra-uterine gestation is in one of the Fallopian tubes: this is called *tubal gestation*.

In tubal pregnancy, which is the most common form of extra-uterine gestation, the sac containing the ovum usually bursts somewhere about the third or fourth month. In most cases this is attended with fatal consequences; owing to the profuse escape of blood into the abdominal cavity and shock and inflammation. But the contents of the ruptured cyst may be discharged by the vagina or rectum, and the patient finally recover. This, however, is usually a long process, and the patient often succumbs during its progress.

The pregnancy may go on to term and no signs of labour

set in; the foetus die and be carried for months or years, during which time it may either shrink up and become hard and stonelike, when it is called a *lithopædion*, or a stone-child; or it may be gradually evacuated piecemeal by the rectum or vagina.

In *abdominal gestation* the ovum grows among the intestines and the placenta becomes attached to one or more coils of intestine. When an abdominal pregnancy goes on to term, the child is delivered by laparotomy: that is, extracted through an incision in the abdomen; and the placenta is left behind to break down and slough out through the wound in the abdomen, which is only partially sewn up for that purpose.

It has happened that at the end of a normal pregnancy labour has set in and stopped, the foetus being retained in the uterus. This is '*missed labour*.' In the case of missed labour recorded by Dr. Oldham, who gave it this name, portions of the foetus were discharged through the os uteri during a period of three months after full term, at the end of which time the woman died. At the post-mortem examination the decomposing foetus was found to have eaten its way through the anterior wall of the uterus and had attacked the posterior wall of the bladder. Reasoning on this case especially, many authorities have doubted that true missed labour ever occurs. But some cases apparently free from ambiguity have been recorded by McClintock and others. And I have in conjunction with my father seen a case in which we actually extracted the foetus piecemeal by the hand from the cavity of the uterus many months after the missed labour. The patient recovered, and we traced the gradual return of the uterus to its ordinary state.

CHAPTER VIII.

DISEASES OF PREGNANCY.

THE so-called diseases of pregnancy are in many instances nothing more than an exaggeration of some of the signs and symptoms of pregnancy already described. For example: excessive nausea and vomiting, œdema, or swelling of the legs and feet, hæmorrhoids, and varicose veins in the legs are only symptoms which have crossed over the border of physiology into pathology or disease.

Other diseases of pregnancy depend upon some displacement or change in the uterus itself: such as retroversion, or prolapsus of the gravid uterus. The results of the mechanical pressure exerted by the uterus upon the surrounding parts are seen in the swelled legs, the increased tension of blood in the arteries, and the temporary presence of albumen in the urine. The effects of the increased nervous energy during pregnancy are witnessed in the outbreaks of chorea, or St. Vitus's Dance, epilepsy, hysteria, and the puerperal mania which may precede or follow the delivery of the child.

Excessive nausea or vomiting is one of the most prominent disorders which occur during pregnancy. In the aggravated cases of the vomiting of pregnancy the symptoms are those of inflammation of the stomach. The vomit is often black and mixed with blood. The epigastrium becomes tender to the touch, the patient is feverish, prostrated, the nausea is constant, and the mere sight of food or drink is sufficient to cause a renewal of the vomiting. The patient loses flesh, the countenance becomes pinched and haggard, and finally,

if relief is not obtained, succumbs to a low form of delirious fever.

Many cases yield to the ordinary remedies ; such as calumba and soda, oxalate of cerium, morphia, or bismuth ; but where these fail the production of abortion may hold out the only chance of saving the patient's life. Abortion, however, may occur spontaneously, and thus put an end to the disease.

In some cases it has been found that the os uteri was eroded or ulcerated, and the vomiting has been relieved by the application of nitrate of silver to the sore. In this way I have several times arrested the vomiting. The most effectual remedy in some cases is the dilatation of the neck of the uterus. In some of the most severe cases the ovum is diseased : that is, there is a mole-pregnancy. It would appear from the investigations of Dr. Brock that occasionally obstinate vomiting in pregnancy cannot be traced to any definite cause, but seems to depend upon the constitution of the individual.

Jaundice, or icterus, occasionally occurs during pregnancy, and may be due to the obstruction caused by the pressure of the gravid uterus on the liver. The jaundice may be the result of acute yellow atrophy of the liver ; a disease in which the liver wastes away rapidly in a few days and the patient is intensely jaundiced and dies. Abortion frequently takes place before death.

Diarrhœa may be an unpleasant complication of pregnancy. Attention to the diet and a few drops of laudanum will generally relieve it. It sometimes accompanies the severe vomiting.

Constipation is not unusual during pregnancy. It is doubtless the result of pressure of the enlarged womb upon the intestines and the consequent interference with their natural movements. Not unfrequently it is favoured by the neglect of proper exercise. The defective action of the bowels will generally be improved by a more liberal use of

fruit, vegetables, and a Seidlitz powder the first thing in the morning, or some one of the mineral waters, such as Pullna, Hunyadi Janos, Friedrichshall, or Rubinat, may secure a daily action of the bowels. The compound liquorice powder of the Prussian Pharmacopœia, in doses of one teaspoonful in half a tumbler full of cold water at bedtime, is especially useful and safe. An enema of soap and water with some olive oil in it is often very useful in combating the constipation.

Hæmorrhoids, or piles, are frequent complications of pregnancy. They are produced in part by the pressure of the gravid uterus upon the veins in the rectum, and in part as a result of the loaded state of the rectum or lower bowel, and greatly by the increased volume of blood and the attendant strain upon the blood-vessels induced by pregnancy. It is of especial importance to secure a regular action of the bowels where there is a disposition to piles. Sometimes there are internal piles: that is, piles just inside the bowel; in straining at stool they are often protruded, and should be gently pushed back by a finger which has been oiled. The application of the ordinary ointment of galls and opium (*unguentum gallæ cum opio*) is often attended by relief. Hot fomentations are also soothing.

Ptyalism, or *salivation*, occurs occasionally in the course of pregnancy. It is an excessive discharge of saliva from the mouth. Cases are on record where as much as three or four pints have been spat out during the day. It is needless to say that this is a most distressing complication of pregnancy. Astringent gargles may be of some use, but the salivation is not easily controlled as long as the pregnancy lasts.

Neuralgia from decayed teeth, or from healthy teeth, is also of not uncommon occurrence. It is well not to extract teeth during pregnancy without great consideration.

Cough is a common symptom of pregnancy. The cough of pregnancy is of nervous origin and of a spasmodic nature. Difficulty of breathing, especially during the last months,

when the enlarged womb is pressing upon the lungs, is also met with.

Syncope, or fainting, is seen in some delicate women : it is more common at the end of the fourth month, when the mother first perceives the movements of the fœtus. During the attack a little sal volatile is the best remedy. Of course the patient is allowed to lie on the bed or a couch until the faintness has passed off.

Edema, or swelling of the legs, is one of the effects on the circulation of the pressure of the enlarged womb on the veins which carry back the blood from the lower half of the body towards the heart.

It may also result from a watery condition of the blood. It is also one of the forerunners of puerperal eclampsia or convulsions, which is one of the most serious and fatal diseases of pregnancy. Whenever œdema is observed, the urine should be examined, and if found to contain albumen the occurrence of puerperal convulsions must be looked for and guarded against. Albumen is detected by boiling a little of the urine in a spoon over a candle with or without the addition of a few drops of nitric acid, when a white-of-egg cloud or clots reveal its presence. When albumen is thus found the use of purgatives is indicated.

If, however, the swelling of the legs persists as well as the presence of albumen in the urine, together with headache, giddiness, and imperfect sight, the danger is great, and the expediency of bringing on labour without delay must become a question for consultation.

Albuminuria of pregnancy.—During the course of pregnancy, albumen may be found in the urine. In some cases the quantity is slight and disappears after labour. In others it is much increased, and sometimes to such a degree that premature labour has to be excited. In such cases convulsions or eclampsia are not unlikely to occur. They may appear before, during, or after labour.

The nervous diseases of pregnancy are numerous and of

great importance. As my father pointed out in his Lumleian Lectures, there is an increased nervous tension during pregnancy. A reserve store of nerve force is being laid in during pregnancy which is to be used in labour for the expulsion of the child. This increased nerve force may occasion various diseases. Among the minor nervous manifestations we may place the insomnia, or sleeplessness, which often wearies the pregnant woman, the irritability of temper, the headaches, the neuralgia, and those cases in which different forms of paralysis occur ; such as loss of power in both legs, paraplegia ; loss of power down the leg and arm of one side, hemiplegia.

When one or other of the above forms of paralysis occurs, it may be in association with the presence of albumen in the urine, and the question of premature induction of the labour arises. Where the paralysis is not complicated with albumen in the urine, the patient may go safely to her full term.

Chorea, or St. Vitus's Dance, is one of the more dangerous complications of pregnancy. It usually occurs in young married women pregnant for the first time, and who have had chorea in childhood. Where the disease is not checked by the usual remedies, such as bromide of potassium, iron, and arsenic, and the patient is becoming worn out by the incessant jerking movements which characterise the disease, and to which it owes its name of St. Vitus's Dance, the last remedy in all diseases of pregnancy steps in—the induction of premature labour. Chorea occurring in pregnancy is specially severe and dangerous. It sometimes ends fatally, and sometimes in insanity.

Tetanus is not uncommon in hot countries in connection with pregnancy and labour. Occasionally it occurs in this country during pregnancy or the lying-in. It is, however, more frequent in abortions.

Bladder disturbances are not uncommon. The patient may suffer from *retention of urine*, or inflammation of the inner coat of the bladder, cystitis. Where retention of urine is present, it commonly depends upon some displacement of the

womb which presses upon the urethra or urinary canal, and thus prevents the escape through it of the urine from the bladder. The most common displacement which thus produces retention of urine is retroversion, or falling backwards, of the gravid or pregnant womb. Retroversion of the gravid uterus, besides producing retention of urine, is likely to cause abortion. The treatment is to push up the fundus of the uterus into its place in front of the sacrum.

As well as from retention of urine pregnant women often suffer from *incontinence of urine*: that is, an inability to hold their water, which is continually dribbling from them. Whenever there is dribbling of urine, distention of the bladder should be suspected, and the catheter passed without delay; it is then seen whether the dribbling arises from inability to hold the water or from a distended bladder. This gives rise to soreness and irritation of the genitals as well as much mental distress to the patient. The wearing of an abdominal belt, which supports the womb and thus lifts it off the bladder, often relieves this symptom.

Leucorrhœa, or the whites, is a frequent concomitant of pregnancy. In some cases it is profuse and requires treatment. It proceeds chiefly from the glands in the cervix uteri, and is often associated with an excoriation or ulceration of the mouth of the womb. In addition, the congested state of the vagina, already alluded to under the signs of pregnancy, favours the secretion of the leucorrhœal discharge. In such cases, the discharge being to a great extent natural, it is rarely necessary to do more than bathe freely with tepid water.

Pruritus, or itching of the vulva, sometimes occurs. It may be caused by the irritating action of the leucorrhœal discharge. It is generally relieved by cleanliness and the application of lead lotion.

Prolapse of the uterus—that is, a falling outside of the womb—may occur during pregnancy. It is not common. The tendency as the pregnancy progresses is for the womb to rise up again through the pelvis into the abdomen, thus

effecting a natural cure. When prolapse of the uterus occurs, the uterus should be supported by a pessary until it has risen out of the pelvis into the abdomen.

Anteversion, or leaning forwards of the pregnant uterus, nearly always exists as a natural condition during the early months of pregnancy. It may cause some irritability of the bladder by leaning too much against that organ. In those cases where the belly is pendulous and the abdominal walls are lax, there may be a falling too much forwards, or anteversion of the gravid uterus during the latter months of pregnancy. The abdominal belt is especially useful in these cases.

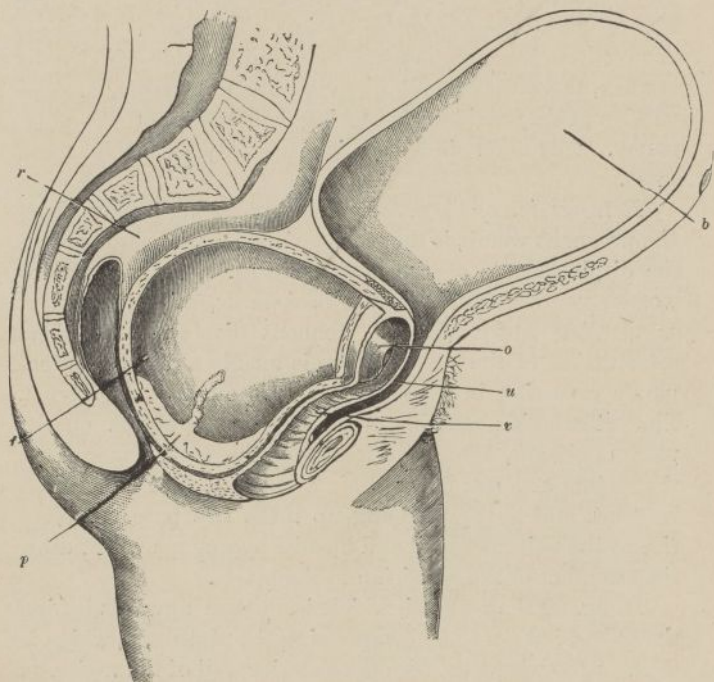
Retroversion of the gravid uterus, or falling backwards of the pregnant womb, is the most serious and dangerous of all the displacements of the gravid uterus. In non-pregnant women retroversion, or falling backwards, and retroflexion, or bending backwards, are frequent displacements. The retroversion of the gravid uterus is mostly a result of pregnancy occurring in a uterus which is already retroverted. The retroversion remains, and as pregnancy goes on the uterus enlarges, fills up the cavity of the pelvis, presses on the rectum or lower bowel behind, on the neck of the bladder in front, and so by stopping up these two passages gives rise to the painful bowel and bladder symptoms which draw the attention of the physician to the pelvis.

In fig. 20 the os uteri, which is pushed upwards behind the pubes, is seen to be compressing the urethra, *u*, which is drawn upwards along with the anterior wall of the vagina *v*; *b* is the distended bladder; *f* is the fundus of the uterus, which is pressing the rectum *r* against the sacrum, and thus causing an obstacle to the escape of fæcal matter from the bowel.

The signs of retroversion of the gravid womb are: enlargement of the abdomen, which is painful to the touch, caused by the distended bladder; the finger passed into the vagina is carried forwards behind the pubes, instead of going

backwards towards the sacrum ; the presence of a solid body is felt through the posterior wall of the vagina ; the os uteri is high up above the pubes and difficult to reach ; and lastly, the mouth of the urethra or meatus urinarius is drawn up

FIG. 50



RETROVERSION OF THE GRAVID UTERUS. (After Barnes.)

b, distended bladder ; *r*, rectum pressed upon by fundus uteri ; *o*, os uteri above the pubes ; *f*, fundus uteri in the hollow of the sacrum ; *u*, urethra drawn up ; *v*, vagina ; *p*, placenta.

into the vagina with the anterior wall of the vagina, so that its orifice is almost obliterated, and it is sometimes extremely difficult to pass the catheter.

The treatment of retroversion of the gravid uterus con-

sists first, in passing the catheter and relieving the distended bladder ; and secondly, in pushing the retroverted fundus up above the sacrum out of the pelvis. This is done by pressing against the fundus with one or two fingers, either in the rectum or in the vagina, and pushing upwards and to one side of the promontory of the sacrum. This is sometimes a difficult operation. The patient should lie on her left side, somewhat on her belly. Chloroform must be given. The fundus is thus pushed out of the pelvis, and the pregnancy may go on smoothly to term. Frequently, however, abortion occurs spontaneously as a result of the retroversion, or may happen from the pressure on the uterus, from pushing it up out of the pelvis. Sometimes the retroversion cures itself by the anterior wall of the uterus growing upwards out of the pelvic cavity, the foetus going with it, and finally the remaining pouch of the uterus, which was fixed under the sacrum, being also drawn out of the pelvis. In those cases where it is impossible to raise the retroverted uterus out of the pelvis, the only resource which remains is the induction of abortion. This is most readily done by puncturing the membranes. But mostly great difficulty will be found in doing this, owing to the os uteri being out of reach.

The pregnant woman is liable to contract the various fevers : scarlet fever, small-pox, measles, and typhoid. When this happens the liability to abortion is greatly increased.

In some cases epilepsy appears for the first time during pregnancy ; in others the pregnancy seems to abolish the epileptic fits.

Pregnancy may be complicated by the presence of an ovarian tumour. In such a case the pregnancy may go on to term and labour be performed without any mishap. On the other hand the tumour may be fixed in the pelvis and form an obstacle to the passage of the child's head during labour ; or it may rise into the abdomen and cause distress by its large size.

Fibroid tumours of the womb may coexist with pregnancy,

and may in some cases cause no unpleasant symptoms either during pregnancy or during labour. Like ovarian tumours, however, they may give rise to great difficulties both during pregnancy and in labour. A fibroid tumour, like an ovarian tumour, may find its way into the pelvis. It may cause abortion. If pregnancy goes on to term, it may be an obstruction to labour; it may give rise to post-partum hæmorrhage by preventing the due contraction of the uterus. It may also cause rupture of the uterus. Or as a consequence of injury from the bruising of the tumour by the passage of the child, it may give rise to blood-poisoning or child-bed fever.

Amongst the diseases of pregnancy should be mentioned the diseases to which the ovum or embryo are liable, including mole-pregnancy; but it will be more convenient to describe these in the chapter on Abortion.

CHAPTER IX.

ABORTION AND PREMATURE LABOUR.

By the term *abortion*, or miscarriage, is meant the expulsion of the ovum from the uterus before the fœtus is *viable*: that is, before there is any possibility of its living. The earliest period at which a child is viable is at the beginning of the seventh month. A child born before this may actually draw breath, but it can hardly survive.

Premature labour implies the premature expulsion of a viable child: that is, the birth of a child capable of surviving although it has not been carried to full term. A child is viable after the beginning of the seventh month.

The occurrence of abortions is not by any means uncommon. It is more frequent among multiparæ—that is, women who have borne several children—than in primiparæ, or women pregnant for the first time.

The *causes of abortion* may be divided into two classes: 1, those depending on the fœtus; 2, those depending on the mother. But these two causes constantly act together, so as to be hard to distinguish in particular cases.

A frequent cause is extravasation or pouring out of blood from the uterus between the two layers of decidua, the decidua vera and the decidua reflexa. Where only a slight amount of bleeding takes place, and when it does so near the os uteri, which is the spot where the ovum is not so closely attached to the uterus, abortion may not follow. When the bleeding takes place in larger quantities and nearer to the fundus of the uterus, the point of attachment of the ovum, the blood effused separates the ovum from its attachment to the uterus, and thus causes abortion. Now, when such a

hæmorrhage has taken place the result may be the immediate expulsion from the uterus of the extravasated blood and the ovum along with it. This constitutes an ordinary abortion. In some cases, however, the blood and the ovum are retained for a time in the uterus and undergo a fibrinous change into a fleshy mass called a *fleshy mole*, which may not be expelled until some weeks have elapsed.

FIG. 21.



HYDATIDIFORM DEGENERATION OF THE CHORION.

A common cause of abortion is the degeneration of the chorion into a mass of little vesicles resembling white currants. This is called *hydatidiform degeneration of the chorion*. It is also called cystic, vesicular, or *bladder mole*.

This degeneration usually commences at an early period of pregnancy before the formation of the placenta, and involves the whole of the chorion. It almost always involves the death of the embryo.

The growth of the hydatids, as they are erroneously called, is luxuriant, and the mass when expelled may weigh several pounds. But more frequently expulsion takes place whilst the mole is comparatively small. It is sometimes attended by albuminuria. Its course is usually marked by sickness and the other signs of pregnancy, but it is remarked that the enlargement of the uterus does not follow the same equal and regular progress that it does in normal pregnancy. That is, we may find a uterus not corresponding in size to the bulk of the calculated period of pregnancy. Its course is marked by irregular discharges of blood, and blood-stained water, sometimes containing little bladders detached from the hydatidiform mass. This gives rise to the appearance familiarly described as resembling currants floating in currant juice. When this is seen the condition is certain, and the uterus should be emptied. This is sometimes a very serious and difficult proceeding. After this, even when expelled, more than ordinary care is required in the after-treatment, as the patient is liable to all the diseases which may attend ordinary and severe labour.

Fatty degeneration of the placenta is another cause of abortion. It was first described by my father. The villi of the chorion become invaded with fat granules, and this conversion into fat interferes with the functions of the chorion villi and so leads to abortion. Fatty degeneration of the placenta depends upon some unhealthy condition of the mother's blood. Syphilis has been assigned as a frequent cause of it, but it may certainly arise independently of this disease.

It is known by the placenta showing in parts or generally a whitish appearance, and by the tissue easily breaking down. But the microscope is necessary to show the fat granules.

Abortion may result from various causes of nervous irritation, as over-frequent coitus, fright, anxiety, sudden shock to the nervous system. The different fevers, small-pox, measles, scarlet fever, typhus and typhoid fevers may cause it. The poisoned state of the blood which exists in syphilis

is perhaps the most frequent of all the causes of abortion. Inhaling noxious gases, as coal gas, carbonic acid, or carbonic oxide gas, will cause it. Lead-poisoning may also give rise to it.

A blow or a fall may cause abortion by setting up bleeding, or by mechanically separating the ovum from its attachment to the uterus.

Certain drugs possess the power of exciting the uterus to contract and thus expel the ovum. These drugs have been called *oxytocics*, because they hasten labour. They are: ergot of rye, cannabis indica, and savin. Galvanism may excite it. Although it is commonly supposed that the oxytocic drugs just mentioned are capable of producing abortion, their action is most uncertain, and is never relied upon in cases where, on account of some condition of the patient, it is necessary to induce abortion.

The first symptom of an approaching abortion, or miscarriage, is hæmorrhage from the uterus. It may be slight or profuse, and may begin with only a slight show, or with the sudden discharge of a large quantity of blood. There is generally pain, due to the uterine contractions, and when pain and hæmorrhage are both present abortion is almost certain to occur.

In attempting to ward off a threatened miscarriage our chief resources are rest, quiet, and sedatives. The patient should be placed in bed and kept perfectly quiet, the bowels should not be opened, and she should be kept on a low and unstimulating diet. Wine, beer, and spirits should be avoided. A little opium in the form of ten drops of laudanum may be given every four or six hours.

When it is impossible to prevent the abortion the sooner the uterus is emptied the better. On examination the os may be found dilated and the ovum protruding. In such cases it may be possible to detach it with the finger and remove it. It is desirable, however, to share the responsibility in such cases by a consultation. It is sometimes useful while waiting

for assistance to plug the vagina to restrain the hæmorrhage. This can be done by the introduction of a large sponge, or by pledgets of lint soaked in glycerine or oil. Plugging the vagina is most easily and efficiently performed through a speculum.

Sometimes the foetus is expelled and the placenta and membranes, or secundines, as they are called, are retained. This is one of the most dangerous forms of abortion, because so long as the secundines are retained the patient is exposed to two dangers: septicæmia, or blood-poisoning, from the absorption of the decomposing placenta; and hæmorrhage, which is likely to continue until the uterus is emptied, and which may drain the patient of nearly all her blood. The treatment where this occurs is to dilate the os uteri and to introduce two or three fingers into the uterus and remove what remains of the placenta and membranes. This is best done when the patient is under chloroform. Occasionally, the placenta so retained forms a kind of polypus called *placental polypus*. It may be necessary to remove it in the same way as fibroid polypi of the uterus are removed—by the wire *écraseur*, if it cannot be separated by the fingers.

Abortion is often treated too lightly; women talk of a 'slight miscarriage,' meaning an abortion of an early date. If a woman who has miscarried quickly resumes the active duties of life, she often incurs serious danger. Consequences similar to those which follow labour at term are apt to result. She has, in the first place, to recover from the loss of blood, which is often great. In the next place, the womb has to undergo a change similar to that which is undergone after labour, to return to its natural state. To effect this safely a corresponding period of perfect rest is necessary. Chronic inflammations and displacements of the womb are the consequence of neglect of this rule. But more immediate dangers are incurred. Among these are: pelvic inflammations, septicæmia, or blood-poisoning—which is a form of puerperal fever—and the other diseases of childbed.

CHAPTER X.

THE ANATOMY OF THE FŒTAL HEAD.

THE fœtal head is that part of the fœtus which is of chief interest and importance in reference to the mechanism of labour. It is the largest and the firmest part of the child's body. In natural labour it comes first, and where it passes the rest of the body easily follows. This law commonly holds good, even in cases of narrow pelvis where the head can only be dragged through after being reduced in size by operation.

The bones composing the fœtal skull may be divided into two sets: those comprising the cranium or vault of the head, and those composing the face and under surface of the skull or the base.

The bones of the cranium are: the two parietal or side bones, the frontal or forehead bone, the two temporal, and the occipital or back bone of the head. The parietal, frontal, and occipital bones are somewhat soft and yielding. They are joined together by membranes, so that when pressed together in labour they overlap each other, and thus diminishing the size of the child's head render its passage through the pelvis more easy.

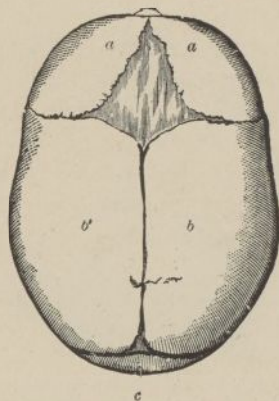
The temporal bones and those forming the face and base of the skull are firmer and so joined together as to be practically unyielding.

The sutures, or seams, are the lines of union of the bones of the cranium. Where the bones have not yet grown together they are united by membranes.

The chief sutures of interest are: 1. The *coronal suture*, so called from its being at the position in which the ancients

wore their triumphal crowns. It is a line between the frontal bones, *a, a*, and the parietal bones, *b', b*; it extends transversely from the summit of one temporal bone (fig. 24, *d*), over the head, to the summit of the temporal bone on the other side; its line is broken by the great or anterior fontanelle, which is seen between *a, a*. 2. The *sagittal suture*, so called from its being straight like an arrow, runs directly back from the coronal suture in the middle line to the lambdoidal suture behind; it lies between the two upper borders of the parietal

FIG. 22.



a, a, the two incompletely united halves of the frontal bone; *b, b'*, the right and left parietal bones; in front of them is the anterior fontanelle, between them is the sagittal suture; *c*, the occipital bone; in front of it is the posterior fontanelle, between it and the parietal bones is the lambdoidal suture.

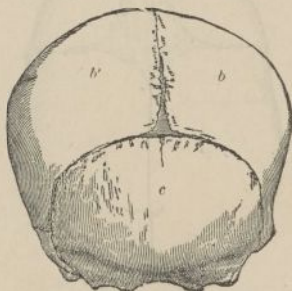
bones *b', b*. 3. The *lambdoidal suture*, so called from its resemblance to the Greek letter lambda (Λ), is the line seen between the occipital bone *c*, and the posterior borders of the parietal bones *b, b'* (fig. 22). The division in front down the middle of the forehead between the two halves of the frontal bone is called the *frontal suture*. The sutures which it is of importance to recognise by the touch during labour are the sagittal, the coronal, and the lambdoidal.

The *fontanelles*, or *bregmas*, are the spaces between the

cranial bones where the sutures approach each other. They are the anterior or greater fontanelle, and the posterior or lesser fontanelle. The anterior or greater fontanelle, or bregma, is a lozenge-shaped space into which two fingers can be laid; its long diameter is from before backwards. It is the interspace seen (fig. 22) between the two halves of the frontal bone *a, a*, and *b', b*, the two parietal bones. The posterior or lesser fontanelle is small and of triangular shape.

The sagittal suture enters the posterior fontanelle in front; at the sides it receives the two halves of the lambdoidal suture. It is important to recognise the posterior

FIG. 23



Showing *b', b*, the posterior halves of the parietal bones; *c*, the occipital bone; the posterior fontanelle is the triangular interspace seen between the occipital and the parietal bones.

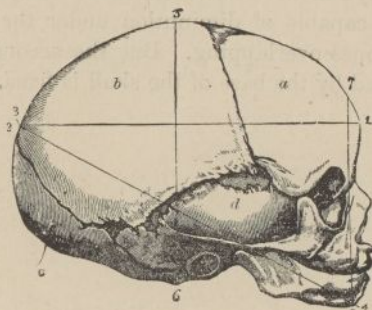
fontanelle by the touch to enable one to determine the position of the head in labour.

The sagittal suture is recognised when felt by its finishing at both ends by entering a fontanelle; the coronal, by its running at one end into a large fontanelle and terminating at its other end in a hard part of the cranium. The lambdoidal is distinguished by its only communicating with the smaller fontanelle. The anterior fontanelle is distinguished by its having four angles; the posterior fontanelle has only three angles. Sometimes there is a *false fontanelle* in the

middle of the sagittal suture ; this results from an imperfect development of one, or both, of the parietal bones.

The diagnosis of these sutures and fontanelles by the touch is rendered difficult when the head has been long engaged in the pelvis and the scalp has become swollen and puffy. Such cases have been mistaken for breech presentations. As a rule the heads of male children are larger and harder than those of females ; they do not therefore pass through the pelvis so easily. This accounts for the greater proportion of tedious labours with male children and their greater mortality during and after birth.

FIG. 24.



THE DIAMETERS OF THE FŒTAL SKULL.

1 to 2, occipito-frontal ; 3 to 4, occipito-mental ; 5 to 6, cervico-bregmatic
7 to 8, fronto-mental.

In relation to the diameters of the pelvis, which have been already discussed, we must study *the diameters of the fœtal head* which have to fit in with the diameters of the pelvis in labour.

The occipito-frontal diameter is the distance between the upper part of the occiput 1, and the centre of the frontal bone or forehead 2 ; it usually measures $4\frac{1}{2}$ inches. The occipito-mental is the longest of the fœtal diameters ; it is the distance between the point of the middle of the chin 4, and the upper part of the occipital bone 3 ; it measures about $5\frac{1}{2}$ inches.

The cervico-bregmatic or trachelo-bregmatic is the length of the line between 5, the posterior angle of the anterior fontanelle or bregma, and 6, the posterior margin of the foramen magnum, or large hole at the base of the skull through which the spinal cord passes to join the brain; it measures $3\frac{3}{4}$ inches.

The fronto-mental is the length from 7, the upper part of the frontal bone, to 8, the centre of the mental or chin bone; its usual length is $3\frac{1}{2}$ inches.

The bi-parietal diameter is the length between the two parietal bones, across the skull; it represents the thickness of the head, and measures $3\frac{1}{2}$ or 4 inches. There is another transverse diameter taken between the two ears. This measures barely 3 inches. The first transverse diameter, the bi-parietal, is capable of diminution under the pressure of labour; the bones overlapping. But the second transverse diameter formed by the base of the skull is fixed.

CHAPTER XI

THE MECHANISM OF LABOUR.

IN considering the mechanism of labour we have to study the movements of the foetal head through the pelvis and parturient canal. The mechanism of labour comprehends three constituents: a body which has to be expelled, consisting of the foetus and the placenta; the expelling power, that is, the uterus and its assistant muscles; and a canal through which the body has to be driven, which is composed of the pelvis or hard parts and the lower segment of the uterus, vagina, and vulva, which constitute the soft parts.

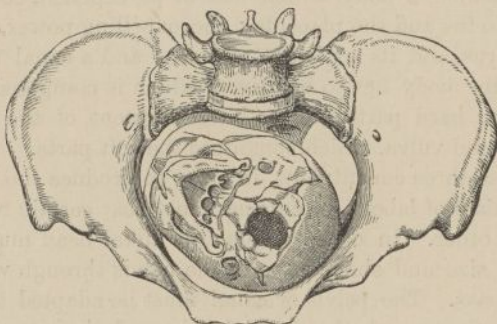
These three constituents, in order to produce the healthy mechanism of labour, or eutocia, must bear certain relations to each other. In other words, the foetal head must be of such a size and shape as to fit the pelvis through which it has to pass. The pelvis or canal must be adapted to allow of the passage of the foetal head; and the uterus must possess an expelling or pushing force sufficient to drive the foetus through the pelvic canal.

Any disturbance in the due relation of these constituents will entail some departure from the healthy standard of labour, and produce dystocia.

The foetal head may present, or enter the pelvis, in four different positions. They are: 1, left occipito-anterior; 2, right occipito-anterior; 3, right occipito-posterior; 4, left occipito-posterior. In the passage through the pelvis the head undergoes several movements: flexion, rotation, extension, and restitution, which last is undergone outside the pelvis. In the first position, the head enters the pelvis in the right

oblique diameter, with the occiput forwards opposite the left acetabulum, or hip-socket, and the forehead backwards opposite the right sacro-iliac synchondrosis, or joint between the sacrum and ilium. At first the long diameter of the head is on a level with the diameter of the brim of the pelvis; but soon the occiput descends lower into the pelvis than the sinciput, or forehead. This descent of the occiput before the sinciput is called *flexion* of the foetal head because it bends the child's chin on to its chest. It is the first of the series of movements described by the foetal head in its passage through the pelvis. Its object is to allow the shortest antero-posterior

FIG. 25.



SHOWING THE FOETAL HEAD IN THE FIRST POSITION ENTERING THE PELVIS.

diameter of the child's head: that is, the occipito-bregmatic diameter, or the distance between the occiput and anterior fontanelle, to enter the oblique diameter of the pelvis. The movement of flexion is produced by the uterus pushing down the spine of the child's body which is nearer the occipital end than the sincipital, or forehead, end of the head, and so causing the occiput to descend.

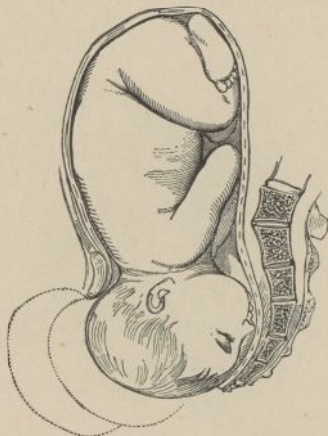
Fig. 25 shows the entrance of the foetal head into the pelvis in right oblique diameter or first position.

As the head continues to descend in the pelvis the long diameter becomes level again and the head performs the

second movement: *Rotation*. This is the turning of the long or occipito-frontal diameter of the head from out of the oblique diameter almost into the antero-posterior diameter. The reason for this is that the head being now in the cavity of the pelvis the longest diameter of the head naturally fits into the longest diameter of the pelvis, which, in its cavity, is the antero-posterior.

It is usual to explain the rotation of the head by supposing

FIG. 26.



EXTENSION AND EMERGENCE OF THE FETAL HEAD IN THE FIRST POSITION.

The dotted lines indicate the changes in position undergone by the head as it emerges.

that when the head reaches the inclined planes of the ischial spines and the descending rami of the pubes, it is turned forwards by the inclination which they give it.

Another explanation is, that the part of the head which first reaches the floor of the pelvis is turned forwards by the resistance it meets from the floor of the pelvis and perinæum.

The next movement is that of *Extension* of the head, and this is accomplished in the following manner:—The child's face and forehead are now lying in the hollow of the sacrum.

As the pains continue to force the occiput forwards it finally arrives between the two rami or branches of the pubes. Here it becomes fixed, being moored as it were to the pubes by the back of the child's neck which is behind the pubes. The occiput being thus fixed under the pubes, the result of the further expulsive efforts of the uterus upon the child's face is to push it down over the lower part of the sacrum and perinæum until it emerges at the vulva. This act draws the chin away, or *extends* the chin from the child's chest upon which it was before bent or flexed.

FIG. 27.



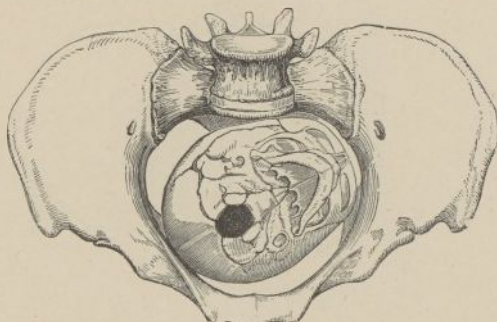
EXTERNAL ROTATION OF HEAD IN FIRST POSITION. (After Playfair.)

Fig. 26 shows the occiput fixed under the pubes and the successive stages of the extension of the head: that is, its drawing away from the pubes is shown by the dotted lines. The face is at first seen in the hollow of the sacrum, then over the perinæum, and at last outside the vulva. The outside dotted line shows how the head is turned up in front of the symphysis pubis by the direction imparted to it by the perinæum.

The head being now outside the vulva, it makes its last movement, that of *Restitution*.

The movement of restitution consists in the child's face turning up towards the right thigh of the mother. This is caused by the shoulders of the child descending into the pelvis in the opposite diameter to that taken by the head: that is, the shoulders enter in the left oblique diameter and rotate in the pelvis just as the head did, only in the opposite direction. This rotation in the opposite direction of the child's shoulders causes the rotation or *Restitution* of the child's head. The right shoulder gets under the symphysis pubis, where it remains as a fixed point. The left shoulder then sweeps over the perinæum, as the face did, and is

FIG. 28.



THE FETAL HEAD ENTERING THE BRIM OF THE PELVIS IN THE SECOND POSITION.

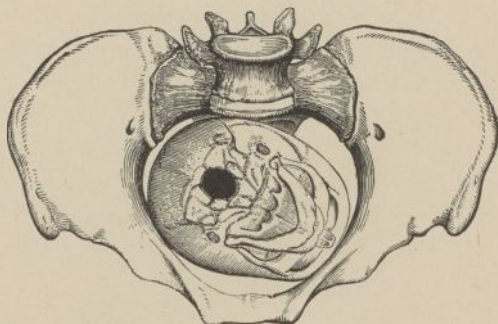
generally delivered first, followed by the trunk of the child. The breech follows in the same direction as the shoulders: that is, one hip comes under the pubes and the other passes along over the perinæum. This completes the mechanism of a natural labour in the first position.

In the second position, the occiput of the child's head is turned towards the right acetabulum, or hip-joint socket, and the forehead towards the left sacro-iliac synchondrosis. The finger feels the posterior fontanelle upwards and to the right; downwards to the left it feels the anterior fontanelle or bregma. The sagittal suture lies in the left oblique diameter.

The mechanism of labour with the head in the second position is precisely similar to that with the head in the first position, except that the rotation movement takes place in the opposite direction, and that the face turns to the mother's left thigh. Thus, if the mother is lying on her left side the child's head turns down on to the bed.

In the third position of the foetal head at the brim, the occiput is backwards, opposite the right sacro-iliac synchondrosis, and the sinciput, or front half of the child's head, forwards, opposite the left acetabulum. The third position is the reverse of the first position. They are both in the

FIG. 23.



FETAL HEAD PRESENTING AT THE BRIM OF THE PELVIS IN THIRD POSITION.

right oblique diameter, only in the first position the occiput is in front; in the third it is behind.

When the head presents in the third position it may pass through the pelvis in two ways. Either it may descend into the pelvis with the forehead forwards and emerge at the vulva with the chin under the pubes and the occiput passing over the perinæum, or it may rotate into the second position and emerge with the occiput under the pubes and the face passing over the perinæum.

Where the pelvis is unusually roomy or the head smaller than usual, the rotation from the third into the second posi-

tion may not occur, owing to the want of sufficient pelvic resistance. In such a case the head is driven through the pelvis in the position in which it enters the brim.

If the occiput on reaching the spine of the ischium passes *behind* it, the head emerges in the occipito-posterior position, which is shown in the accompanying figure.

When the occiput has thus descended into the hollow of the sacrum, the expulsion of the head is almost sure to be difficult and tedious. The head has to be moulded before it can emerge. The occiput is compressed and the contents of

FIG. 30.



EXPULSION OF THE HEAD IN THE OCCIPITO-POSTERIOR POSITION.

the child's head are squeezed forwards into its forehead, so that when the child is born its forehead is high and prominent and the back of its head flattened and slanting downwards. In this position it is frequently necessary to aid the delivery, and save the child's life, by the application of the forceps.

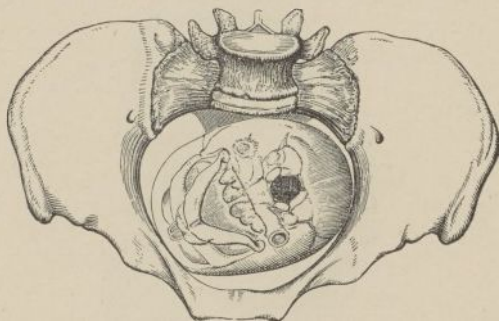
In the majority of cases the head on entering the pelvis in the third position descends into the pelvis until it meets the spine of the right ischium, when it passes in front of the spine and is thus rotated into a second position. In performing this movement the occiput turns from opposite the

right sacro-iliac synchondrosis to opposite the right acetabulum.

In the fourth position the occiput is opposite the left sacro-iliac synchondrosis, and the sinciput opposite the right acetabulum. The fourth position is the reverse of the second position. They are both in the same oblique diameter, the left, only in the second position the occiput is in front, while in the fourth it is behind.

The mechanism of delivery in the fourth position is similar to that in the third. The head descending into the pelvis in the fourth position either rotates into the first

FIG. 31.



FETAL HEAD PRESENTING AT THE BRIM OF THE PELVIS IN THE FOURTH POSITION.

position by passing in front of the spine of the ischium, or passes behind it and does not rotate, but emerges at the vulva with the forehead under the pubes.

The first position is by far the most frequent position in which the head presents at the brim. The next in frequency is considered to be the third position.

Many cases of presentation in the third position have been recorded as presentations in the second, but this is explained by the fact that they were not recognised until they had rotated into the second position. The second position is usually considered to be the next in frequency, and the fourth is regarded as rare.

In relation to the mechanism of labour in head presentations a few words as to the formation of the *caput succedaneum*, or subsidiary head, which is the name given to the puffy swelling which forms on the presenting part of the child's head during labour, are necessary. The *caput succedaneum* is an effusion of fluid from the blood into the tissues, under and in the scalp. It is produced by the pressure of the os uteri round the head in the first stage of labour, and by the pressure of the pelvis round the head during the second stage of labour. Its situation varies according to the position of the head. If the head is presenting in the first or fourth positions in which the right parietal bone is the presenting part, it forms upon that bone. When the left parietal bone is the presenting part, as it is in the second or third positions, the *caput succedaneum* forms upon it.

The explanation of the fact that the *caput succedaneum* forms upon the presenting part is, that it is the part which is least exposed to pressure, and so the blood collects in it and is unable to pass away from it on account of the compressing circle of the os uteri or pelvis round the child's head just above the situation of the *caput succedaneum*.

In tedious labours where the head is long subjected to pressure, the *caput succedaneum* becomes large and brawny and forms an obstacle to the diagnosis of the position of the head. It is not a condition of much importance when the child is once born, because the effusion is quickly absorbed and the *caput succedaneum* rapidly disappears. The *caput succedaneum* or an equivalent swelling thus becomes the index of the presenting part; so, when the face presents, the equivalent swelling is formed on the cheek and eye which were lowest in the pelvis: and so likewise with the breech, the equivalent swelling forms on that buttock which was lowest in the pelvis, also extending to the vulva in the female child and the scrotum in the male. And, again, when the shoulder presents and the arm comes down, these parts become extremely swollen and discoloured. And so,

immediately after birth, the caput succedaneum shows the part which had presented.

The observation of these swellings has a practical application: for some hours, and occasionally for some days, after the child is born, it bears testimony to the mode in which it presented and the character of the labour.

During prolonged labour in head presentations, the foetal head undergoes certain changes in shape. This is called 'moulding of the foetal head.' In small pelves the foetal head is unable to pass through and still retain its globular form. It undergoes a process somewhat similar to that undergone by a wire in wire drawing, in which a piece of wire is successively drawn through a series of holes, each smaller than the other, until it has acquired the requisite thinness. Thus, when the vertex presents and the head gradually passes through a narrow pelvis, the occiput emerges first and the chin last, and the head is drawn out in length from the occiput to the chin. In other words, the occipito-mental diameter of the child's head is increased in length, constituting the 'sugar-loaf head.' The deformity thus produced soon disappears, and in a few days the child's head recovers in great part its globular form; but in many cases, to some degree, the form impressed by labour is retained for a long period of time and even through life.

CHAPTER XII.

THE STAGES OF LABOUR.

PARTURITION has been divided into two orders—Eutocia and Dystocia. *Eutocia* signifies a natural labour following a favourable course both for mother and child: *Dystocia* signifies a difficult labour, the course of which is unfavourable either to the mother or the child or both. Before describing the actual stages of labour, it may be well to notice certain premonitory signs and symptoms of labour which have sometimes been grouped together under the name of the *Preliminary or Preparatory stage*.

During the last fourteen days or so of pregnancy there is usually a settling down or subsidence of the abdominal tumour. The abdomen diminishes in size, because the pregnant womb sinks into the pelvis. The breathing becomes much easier, as a result of the diminished pressure of the womb upwards on to the lungs; and the fatigue of walking or moving about is much lessened.

One of the consequences of this settling down of the womb is an irritation of the bladder, and a frequent desire to pass water. The bowels are opened two or three times a day. The effect of these frequent evacuations is to free the pelvis from superfluous matter, and thus to give more room for the passage of the foetal head in labour. There are painless uterine contractions, the effect of which is to make the uterine tumour still more plainly felt, and still lower down towards the pelvis. Finally, the uterine contractions become attended by pain, and at the onset of these pains there is often a discharge of blood; this is called the ‘show.’ This is produced

by the separation of the membranes from the vicinity of the os by the contractions of the uterus, thus tearing the small vessels which connect the membranes and the uterus.

The signs of labour are: the presence of painful uterine contractions; a discharge of mucus tinged with blood; softening and dilatation of the os uteri; and formation of the 'bag of waters.'

The pains are divided into true pains, and false or spurious pains. *The true pain* comes on at tolerably regular intervals, gradually rises to a certain pitch of intensity, and as gradually dies away. It commences at the back and fundus of the uterus and proceeds down towards the neck or cervix. During its presence the fundus of the uterus becomes hard, and the os distended and dilated by the protrusion of the bag of waters. If an examination is made at this moment, the bag of waters is felt pointing through the os uteri like a full bladder.

The false or spurious pains do not affect the dilatation of the os; they do not accelerate the labour. They are short and irregular both as to their duration and intervals of appearance. They are chiefly felt in front in the abdomen. Derangement of the stomach and bowels is perhaps the most frequent cause of spurious pains. This may arise from having taken food which has disagreed, or from a loaded state of the bowels, or from the irritation caused by the pressure on them of the gravid womb.

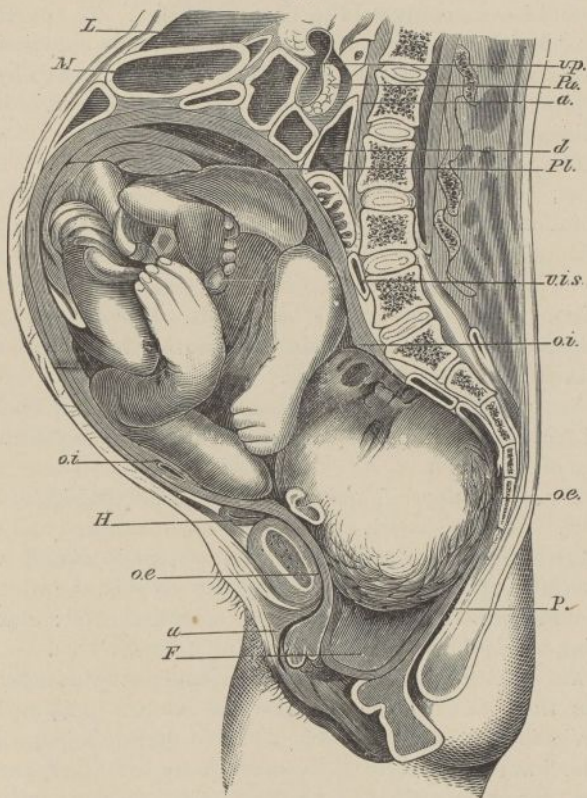
The stages of labour are three. Each stage is marked by the achievement of a certain event.

The first stage is the stage of dilatation of the cervix, which is terminated by the rupture of the membranes or bag of waters. *The second stage* is the stage of the passage of the child through the pelvic canal, which is ended by the expulsion of the child. *The third stage* is the casting off and extrusion of the placenta.

The first, or the dilatation stage of labour.—In this stage the process of expansion of the cervix and os uteri results in

the obliteration of the os and cervix uteri and the formation of one continuous parturient canal. (See fig. 3.) This is effected in part by the contractions of the body and fundus

FIG. 32.



COMPLETION OF FIRST STAGE. (After Braune.)

L, liver; *M*, stomach; *v.p.*, colon; *Pa*, pancreas; *a*, aorta; *d*, intestines; *Pl*, placenta; *v.i.s.*, vena cava; *o.i.*, os internum; *H*, empty bladder; *o.e.*, os externum; *u*, urethra; *P*, rectum; *F*, bag of waters.

of the uterus, which tend to draw up the cervix, and so gradually to shorten and obliterate it. But the eccentric

pressure of the amniotic bag, or bag of waters, is the chief agent in the dilatation of the os and cervix by stretching them open. During the process of dilatation of the os, the patient often feels sick and actually vomits. This is a purely reflex act, and is commonly held to be a good sign. The proverb says, 'A sick labour is a healthy labour.' At the completion of the dilatation of the os, the patient may be attacked by a rigor, or fit of shivering: this also is a reflex act, not of bad significance.

The bag of waters is formed in the following way:—The uterus, contracting on the membranes which are full of the amniotic fluid, squeezes a pouch of it towards the os uteri which offers the least resistance. When the uterus relaxes after a pain, the protruding bag of waters relaxes, and the position of the child may then be felt. When the uterus contracts again during a pain, the bag of waters becomes tense and stretches open the os.

As soon as the os is fully dilated the bag usually bursts, and the waters escape with a gush. This terminates the first stage of labour.

The second stage of labour, or the stage of expulsion of the foetus. As soon as the membranes have ruptured and the waters have escaped, the uterus contracts more closely and powerfully upon the child. In addition to this, the woman can now aid herself by the effort of 'bearing down': that is, taking a deep breath, and then straining downwards.

The efficacy of an expulsive or bearing-down effort depends upon the following conditions:—The woman holding her breath closes the glottis (that is, the lid of the windpipe); this is the first act: then by a movement partly voluntary, partly reflex, the chest walls become firmly fixed so as to offer a solid basis for the muscles of the back and abdomen to pull upon; these muscles, aided by the simultaneous contraction of the diaphragm, thus greatly diminish the capacity of the abdominal cavity and drive the contents—that is, the intestines, the uterus, and the foetus—down towards the pelvic

outlet, which is the point of least resistance. As an important part of this process, there is a simultaneous relaxation of the sphincters, or circular muscles which form the mouths of the uterus, vagina, and rectum. Presently, the necessity for breathing and the exhaustion of the nerve force expended in this effort induce the opening of the glottis and the relaxation of all the expulsive muscles. The sphincters recover some of their contractility, and the uterus with the presenting part, either membranes or child, fall back into the abdomen. After an interval of repose and restoration of nerve power, the process is renewed.

During the intervals between the pains in the second stage, the patient often drops asleep for a few minutes. This sleep, short and disturbed as it is, is beneficial, and renews the strength for further efforts.

Cramp in the legs is often complained of during the progress of the second stage. It results from the pressure of the child's head upon the sacral and obturator nerves, which go down to the legs. In addition to the cramp in the legs, the woman often complains of pain in the back, and cries out to the nurse to hold it.

If we examine during a pain, we feel the head advance during the pain and recede a little when it is over. We may sometimes feel the anterior lip of the os uteri, pressed down and swollen, between the child's head and the pubes. It expands more slowly than the posterior lip, and this accounts for its getting caught between the head and the pubes before it has had time to rise out of the pelvis. Occasionally it becomes so pressed down as to be visible between the labia. This is especially marked in first labours.

As the head enters the vagina, the expulsive action of the vagina greatly increases. Each pain is accompanied by a strong impulse to bear down.

As the head approaches the perinæum, the contents of the rectum or lower bowel, if they have not been previously evacuated, are squeezed out by the pressure of

the child's head, the resisting power of the sphincters being lost.

The anterior wall of the rectum is pressed against the anus, and is often seen through the distended orifice of the latter. Sometimes even the relaxation of the sphincter ani is so complete that the lower part of the bowel is forced out.

The perinæum gradually stretches and becomes thinner and thinner, as it is expanded by each succeeding pain. Between the pains the head goes back and the perinæum relaxes again. At last, when the child's head is almost outside the vulva, and the perinæum is stretched to its utmost, it recedes over the child's face, and the head is born. It is at this moment that the perinæum is likely to be torn, especially in primiparæ.

At the moment when the head is distending the vulva and perinæum to their fullest, the agony of the patient is at the highest point and she gives vent to a cry. This cry opens the glottis or lid of the windpipe, and then the whole mechanism of expulsion is arrested, relaxation ensues, and rupture of the uterus, vagina, and perinæum is averted.

The expulsion of the foetus terminates the second stage of labour.

The third stage, or stage of expulsion of the placenta, follows upon the delivery of the child. When the child is born, the first act of the uterus is to contract upon the placenta. These contractions of the uterus detach the placenta from its attachment to the uterine surface, and at the end of from ten to fifteen minutes it is generally expelled by the unaided action of the uterus. Another effect of the contraction of the uterus after the expulsion of the child is to prevent the occurrence of hæmorrhage.

The period which elapses between the birth of the child and the expulsion of the placenta varies: sometimes it follows immediately on the expulsion of the child; at other times there is a considerable interval. Usually it is expelled within half an hour.

When the placenta is only expelled from the uterus into the vagina, its presence there may excite, after a while, bearing-down pains and contraction of the vagina. Under these circumstances a slight traction of the cord suffices to complete the removal of the placenta. If there are twins,

FIG. 33.

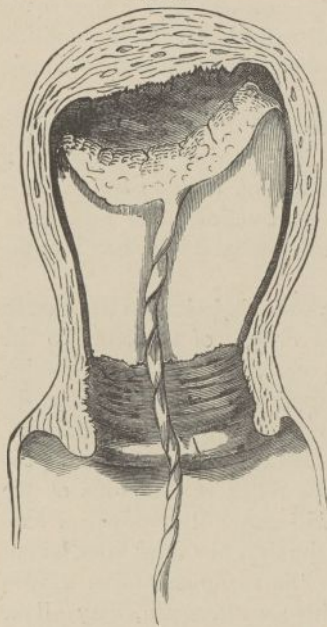


FIG. 34.



FIG. 33.—REPRESENTING FIRST STAGE OF SEPARATION OF PLACENTA FROM FUNDAL ATTACHMENT. COMMENCING INVERSION OF PLACENTA. (Robert Barnes.)

FIG. 34.—SECOND STAGE OF DETACHMENT OF PLACENTA FROM FUNDAL ATTACHMENT. INVERSION COMPLETE, DRAGGING MEMBRANES ON MATERNAL SURFACE. (Robert Barnes.)

the placenta of the first child is rarely expelled until after the birth of the second child. The membranes of the second ovum become distended and pressed down into the vagina, where they burst as in a natural single labour. The parts being already dilated by the passage of the first child, the

expulsion of the second is more easily performed. This usually takes place in about twenty minutes after the delivery of the first child.

The delivery of the placenta terminates the third stage of labour.

Upon the expulsion of the placenta, the uterus, being emptied of its contents, usually contracts into a firm hard ball of about the size of a small foetal head. This condition gradually disappears as the discharge called the lochia sets in.

The uterus is more readily excited to contract by manipulation and reflex action than it is during the progress of labour. After labour the introduction of the hand into the vagina causes powerful uterine contractions, and these contractions are still more forcible if the hand is passed into the uterus.

The influence of *reflex action*—that is, irritation transferred by the nerves from the various organs of the body to the great nervous centres and back again—is seen in the uterine contractions which follow the application of the child to the breast. The sensation in the breasts known as ‘the draught,’ which is caused by a rush of blood to the breasts during the secretion of milk, also induces reflex contractions of the uterus. Any mental emotion will generally produce a contraction or after-pain. Within the first few days after labour the sensation of the draught in the mammæ, and a sudden secretion of milk, together with an after-pain, may all be produced by merely offering the child to the mother to suckle. Other modes of exciting reflex contractions of the uterus will be described in the chapter on the treatment of Post-partum Hæmorrhage.

CHAPTER XIII.

THE MANAGEMENT OF NATURAL LABOUR.

THERE should be no delay in obeying the first summons to a lying-in woman. If on arriving the midwife finds that the labour is only just beginning, she can leave the patient for a few hours and return when wanted. But if she delays attending and anything goes wrong, or the child is born before her arrival, she is sure to be blamed. The midwife cannot tell, until she has herself seen and examined the patient, whether or not the labour is advanced and her assistance needed. She must remember that some women become alarmed at the first pains of labour, and send off an urgent summons for the midwife, whilst others quietly bear their pains and neglect to send for the midwife until the head is almost on the perinæum, or the child even born. For these reasons, the first call to a lying-in woman should be answered as speedily as possible.

And here it may be mentioned that the midwife, having begun her attendance upon a woman in labour, should in no circumstances leave her and go off to some other case. Having once begun a case, it is her duty to see the patient safely through her labour.

The *midwife* should take with her in her bag a Higginson's or other enema syringe, a pair of scissors, some stout pins for the binder, a soft elastic catheter, sal volatile, and ergot of rye, either in powder or in the form of the fluid extract, and some thread. She should also carry in it some pure carbolic acid for making antiseptic solutions; or some perchloride of mercury pastilles for making perchloride solutions. The *monthly nurse* should have ready at the time of labour all

the clothes for the infant, the diapers, binder with strong sharp pins, carbolic lotion, macintosh, draw-sheet, large pan to receive the after-birth, a roller towel to fasten to the end of the bed for the patient to pull upon during the second stage of labour, a catheter, and a Higginson's syringe. The baby-linen, diapers, and binder should all be aired and warmed in front of a fire in the lying-in room. There should be plenty of hot and cold water at hand. The nurse should wash all sponges and flannels in a 1 to 80 solution of carbolic acid, not only during the labour, but for at least three weeks afterwards. She should throughout be cheerful and kind, and avoid relating difficult cases and other unpleasant tales to her patient. In sponging the private parts of the patient the nurse should always use water with some disinfectant, such as Condyl's fluid, listerine, or carbolic acid in it. In placing a fresh diaper to the vulva she should see that it is well aired and warm.

Beef-tea, barley water, or soda water and milk, should be at hand for administration during the labour. Wine and spirits are bad, and if given too freely are apt to cause post-partum hæmorrhage.

Before an examination is made, inquiries should be made as to the state of the bowels and bladder, when the pains first set in, and whether the former labours, if there had been any, were natural or not.

Management of the first stage.—An examination can now be made. The lying-in woman is quietly informed that the midwife wishes to see if all is 'going on as it should.' The patient is then placed on her left side, with her head and shoulders low down on the bed and the thighs and knees drawn up. Her back should be placed towards the right edge of the bed.

If labour pains are present, the finger may be introduced during the occurrence of one. The midwife can examine with either hand, and it is a good thing to begin by acquiring an equal facility for examination with both hands. Passing the hand, which has been previously smeared with lard, cold cream, oil, or vaseline, along between the buttocks, the orifice of the

vagina is arrived at. The forefinger of the right hand is then guided along up the vagina, directing its tip backwards towards the hollow of the sacrum, where the os is generally felt. (See fig. 35.) When the os is high up, as it often is during the first stage of labour, it may not be easy to reach it with the fingers of the right hand, and the examination should be completed with the left hand, which can be passed higher than the right ;

Fig. 35.



EXAMINATION DURING THE FIRST STAGE.

because when the woman is lying on her left side the rounded back of the left hand of the accoucheuse fits into the hollow of the sacrum. The finger is then inserted into the os as in fig. 35, and the condition of the os is made out by sweeping the finger gently round its circumference.

If the os is then found to be soft and dilatable, the chances are in favour of an easy and expeditious labour. If, on the contrary, it feels hard and rigid, the labour is likely to be slow.

When the os is sufficiently dilated to admit the top of a finger, as in fig. 35, the presentation may be made out through the membranes. This is best done in the interval of a pain, when the membranes are lax. During contraction of the uterus the amniotic bag is tense and distended with fluid, and prevents the presentation being clearly made out. The examination should therefore occupy the time taken up by a pain and part of the interval following it. During the pain the extent of the progress made is ascertained, and during the interval the presentation and other points are best made out. During the first stage it is not necessary to make repeated examinations; they do not aid the labour, and only serve to alarm and fatigue the patient.

If it is found that the patient is suffering from false pains, a dose of castor oil, from a half to one ounce, should be administered, which will clear the intestines, and so remove the probable cause of the false pains. After the bowels have been cleared, ten drops of laudanum given in a little water will relieve any pains which persist. Or ten drops of laudanum may be added to the castor oil and taken together. The head may often be felt through the anterior wall of the cervix, but it may be mistaken in this way for the breech. The examination also reveals the state of the vagina as regards moisture and distensibility. The condition of the rectum is made out by pressing the finger into the posterior wall of the vagina; if it is loaded with fecal matter, it gives the impression of pressing the finger into a mass of dough. The shape and capacity of the pelvis, the rupture, or integrity of the membranes, are also to be made out before concluding the examination.

The examination having been made, and the labour found to be in the first stage, with the os dilated to the size of a shilling and the pains not very strong, it is best to allow the patient to get off the bed and walk about the room, resting herself at intervals on a chair, and taking some refreshment, as beef-tea, or milk. An enema of warm water and soap with some olive oil in it may be given during this stage with

advantage, if the bowels have been found loaded. The nausea and vomiting which may be present during this stage may be treated with soda water or a little ice to suck.

It is of advantage that the patient should walk about or sit in the upright posture during the first stage, as in this position the axis of the uterus is brought into a line with the axis of the pelvis, and the entrance of the head is favoured. In multiparæ, in whom the belly is often pendulous, the abdomen requires to be supported by a binder in this stage, so that the uterus is kept supported in the line of the axis of the brim of the pelvis. Bearing-down efforts are useless in the first stage, and should be discouraged.

As a rule, the average duration of a natural labour is about twenty-four hours; but in primiparæ this period is often exceeded, and in multiparæ the duration of labour is frequently much less than twenty-four hours.

The time occupied in the complete dilatation of the os is from four to six hours, but it often takes longer than this, and in many cases less. In a normal pelvis with soft and distensible os and perinæum, the labour will be expeditious; but if the os is rigid and the perinæum firm and not easily distensible, the labour will become tedious.

The full dilatation of the os uteri is often accompanied by a rigor, or attack of shivering: the patient does not feel cold, and the rigor does not imply anything wrong.

As soon as the os is ascertained to be fully dilated, the midwife may proceed to *rupture the membranes*, unless they have already burst. This is best done by pressing a sharp nail against the membranes whilst they are distended by the waters during a pain. In those cases where the os is quite soft and dilatable, but does not dilate under the action of the bag of waters, it is sometimes advisable to rupture the membranes without further delay, as in such cases there is probably an excess of liquor amnii in the sac, which prevents the full contractions of the uterus. The rupture of the membranes in these cases is followed by the rapid dilatation of

the os by the presenting part, which is now forced down into it by the uterus. On the other hand, uterine action may be arrested by the rupture of the membranes in those cases where the quantity of amniotic fluid is small, and the uterus contracting regularly. There are cases where the head is low down, the os fully dilated, and the membranes lying closely over the presenting head, in which, owing to there being very little fluid in the amniotic bag, it is not easy to tell whether the membranes are ruptured or not. The guide is afforded by the thick, rough, and hairy sensation afforded by the scalp of the child. It is in such cases that the child is likely to be born with a 'caul'—that is, a portion of the membranes caught over the head.

The midwife having ruptured the membranes, and the os being fully dilated, the first stage of labour is at an end, and the *Management of the second stage of labour* commences.

During the second stage we may regulate, to a certain extent, the nature of the pains, by exciting the patient to cry out, and so relax the excessive straining, if the pains seem too violent; and to hold her breath, and so aid the expulsive efforts when they appear to be feeble.

The position in which the patient is placed during labour varies in different countries. In the Old Testament women are described as being delivered in a sitting posture, and a labour chair was used in France in 1573. In some parts of Germany labour chairs are still in use, and in some parts of Ireland the woman sits between her husband's knees during delivery. In France at the present day women are delivered lying on their backs on a bed specially prepared for the accouchement, and which is appropriately termed the 'lit de misère,' or bed of misery. After the labour is ended the patient is transferred to her usual bed. In England the general custom is to place the woman on her left side near the edge of the bed, with her knees drawn up. On the whole this is the best position. In it, examinations are made without disturbing the patient, the perinæum is readily watched

during the expulsion of the foetal head, and the exposure of the patient is reduced to a minimum.

The patient then should be placed, in the position just described, on the bed which has been prepared for the purpose. A macintosh or waterproof covering should be laid over the bed, and covered with one or two sheets folded to receive the discharges of blood and water which come from the woman during the second and third stages of labour. Brown paper may be made waterproof by being smeared with pitch like the 'papier goudronné' which is used in Paris instead of waterproofs and macintoshes. The paper has the double advantage of being cheap and of only being used once. It is thrown away after the labour. Macintoshes used time after time, as they are in some lying-in hospitals, only serve as traps for contagion and favour the development of puerperal fever. When macintoshes are used they should always be carefully washed in a 1 in 80 carbolic solution and hung out to dry.

When the os uteri has entirely disappeared, the vagina and uterus form one continuous parturient canal, which is adapted for the easy passage of the head. (See fig. 3.)

Supporting the perinæum.—The practice of supporting the perinæum as the head descends on to it has been blamed by some, but its value when properly carried out is beyond doubt. The greatest danger to primiparæ is laceration of the perinæum. This is, no doubt, because the soft parts, having never been so stretched before, do not yield to the process so readily as in subsequent labours. The anterior margin of the perinæum which is called the fourchette (see fig. 13) is commonly ruptured in the first labour.

The more gradual the progress of the head is through the vulva, the more time has the vulva to expand, and the less likely is the perinæum to be torn. Hence when the pains are violent and the head is driven too forcibly on to the perinæum, it is useful to support it with the palm of the hand, so applied as to add to the length of the sacrum, and

to extend the floor of the pelvis. Rupture occurs mostly in consequence of the head being driven too much backwards : so the perinæum is best protected by support from behind forwards, and by guiding the head forwards. By repeating this process during successive pains, the too rapid dilatation of the perinæum is averted and its subsequent laceration may be avoided. The approach of the expulsion of the head is indicated by the increasing thinness of the perinæum, especially at its anterior margin. At this moment the support of the perinæum is especially needed. As the head emerges, it should be pressed forwards against the pubes, so as to take off as much strain as possible from the perinæum. The same manœuvre is useful while the shoulders are passing. Laceration often only occurs after the head has passed, because the perinæum is not supported during the expulsion of the shoulders and trunk.

Great relief is often given during the second stage by the nurse supporting the lower part of the back. The patient frequently calls out for her back to be held during the pains in the second stage. During this stage the midwife may greatly comfort and encourage the patient by a few cheering remarks, telling her that the labour is progressing naturally and that it will soon all be over.

As soon as the child's head is born, we must examine whether the *cord be twisted round the child's neck*. If it is so, it should be gently drawn down and slipped over the child's head. If it should be too tightly encircling the neck to admit of being drawn down over the head, or if the head is being driven down too quickly, then the encircling loop should be opened a little to let the body pass through it. But a third case may happen : that is, the encircling loop may be so tight as not to admit of being either drawn over the head, or of opening to let the body pass through. In such a case the child is in danger of being strangled : it gets blue and black in the face ; and its body, held back by the cord, cannot be born. The remedy here is to get a finger under the loop, to

guide by it one blade of a pair of scissors, and cut the loop. Then both cut ends should be held by the fingers, or tied if there is time. Of course when the child is born the cord can be tied again at the proper place.

The cord may be twisted twice, or even three times round the neck. In such a case, it will be the more likely to require to be divided.

When the child is born, it should at once be placed in the most suitable position for breathing. As a rule, the sudden shock it receives from exposure to the air is sufficient to excite efforts at inspiration. A gentle pat on the back, or blowing, or sprinkling cold water in its face, will often excite respiration. If these simple methods fail, recourse must be had to one of the several methods of artificial respiration which will be described in the chapter on the Management of the Infant.

The umbilical cord should not be tied until the child has well breathed and cried, or until the pulsation can no longer be felt in it. The cord is usually tied in two places: one about two inches from the child's abdomen, the other about two inches beyond this: it is then cut between the two ligatures with a pair of scissors. Care must be taken not to cut the cord too near the ligature which is next to the child's abdomen, or it may slip off and allow the escape of blood. It is better to use blunt scissors to cut the cord, as this crushes and bruises the vessels in the cord and thus helps to prevent subsequent bleeding. It is well to examine the cut end of the cord an hour or so after the child is born, in order to see if there is any escape of blood, in which case a fresh ligature should be applied.

Immediately after the child is born the midwife should place her hand over the woman's abdomen to secure contraction of the womb, and at the same time to ascertain if there may not be a second child in the uterus.

Management of the third stage, or the placental stage.—The proper management of this stage is as important as that of the second stage. In some cases the expulsion of the placenta

follows immediately upon that of the child, sometimes with the same pain. Usually, however, the uterus remains in a state of rest for some minutes after the expulsion of the child.

The midwife then should place a hand over the fundus of the uterus and exert a moderate pressure upon it. This may excite a pain, and if it does so, the action of the pain should be aided by grasping the uterus with one or both hands, and at the same time pressing it downwards into the pelvis. This manœuvre may at once be successful in expelling the placenta; but if it is not so, it must be repeated at the next pain. This mode of managing the expulsion of the placenta has been taught and practised with success for many years at the Rotunda Hospital, Dublin, and at the British Lying-in Hospital. If this plan is carefully carried out, the chances of hæmorrhage will be reduced to a minimum. A pinch of snuff to set up a cough which may expel the placenta is an old remedy. Traction or pulling at the cord is useless as a mode of delivering the placenta, as well as dangerous. It may give rise to rupture of the cord, or, worse still, it may produce inversion, or turning inside out of the womb. In fact inversion of the womb has frequently been produced in this way. When the placenta cannot be delivered in the way just described, the hand may be gently introduced into the uterus and passed between it and the placenta, which is then seized and delivered by the hand. As the placenta is escaping from the vulva, it should be caught and turned round and round, so as to twist the membranes into a coil. This prevents any part of the membranes being left behind. On the expulsion of the placenta it should be examined to see if it is complete, and if all the membranes have come with it. This being the case, it had better for hygienic reasons at once be thrown on to the back of the fire and burnt. As soon as the placenta has been removed, the external genitals should be gently sponged with warm water, and a warm dry napkin placed on the vulva. The soiled linen may be removed and sent out of the room.

After the delivery of the placenta, a bandage or binder should be applied to the abdomen. This exerts a gentle and moderate pressure on the uterus and abdomen. The binder is a broad linen or calico bandage, of about three and a half feet in length and eighteen inches in breadth. It is usually fastened round the mother's belly with four stout pins, but it may be fastened with strings sewn on to it. There are also binders made specially which can be tightened with straps. The binder should not be fastened too tightly, but so as to give comfortable support. The great point is that the binder should seize well below the hips, otherwise it will ride up and become useless. If everything has gone on well, the patient may be moved to the other side of the bed and made comfortable in about half an hour. But if she is weak from hæmorrhage or other cause, she must be allowed to rest an hour or more undisturbed. She should in no case be allowed to lie in wet sheets and clothes.

CHAPTER XIV.

THE MANAGEMENT OF THE LYING-IN.

THE mother having been made comfortable and the child having been washed, it should be put to the breast for a few minutes. This early application of the child to the breast acts beneficially in two ways: on the child by satisfying its natural instinct to suck, as well as by the first milk opening its bowels, and on the mother by securing a due and permanent contraction of the uterus. When the midwife has put the child to the breast, has found it suck, and has examined the uterus and found it contracted, ascertained that there is no bleeding, and found the pulse under 100, she may safely leave the patient.

Suckling or lactation.—In the majority of women some milk is present in the breast before labour sets in. This milk which is first secreted in the breasts differs somewhat from the milk which is secreted after the first two days of suckling. It is called *colostrum*. It is viscid and yellowish, and contains an undue proportion of fat globules. It is purgative in its action upon the child, and so quickly clears the intestines of the *meconium*, as the greenish, viscid matter found in the intestines of the new-born child is called.

Besides the above advantages in early applying the child to the breast, there are others to be observed. By the natural and gentle irritation of sucking the secretion of milk is promoted, and being drawn off as soon as it is formed, the breast does not become unduly distended. If there is too long a delay in applying the child, the breasts may become distended and hardened, the nipple shortened and even drawn in or

retracted. When the child is fed, instead of being allowed to follow its instinct to suck, it soon loses it, and thus when applied late to a distended breast with a sunken nipple, is unable to draw out the retracted nipple. Even if it does so, it is at the cost of acute pain to the mother, as the process of sucking in such a condition of the breast is extremely difficult. A considerable effort on the part of the child is necessary to draw out the nipple, and the soft delicate skin which covers it is likely to be abraded and sore. This condition is the beginning of *abscess*, for the mother dreads and avoids the application of the child, and the breasts in consequence become harder, knotted, and painful. Dragging pain is felt up under the axillæ or arm-pits, and the glands in these regions are often painful and enlarged.

Under these influences *milk fever* will result. This is ushered in by a rigor or fit of shivering, severe headache, foul tongue, feverish condition, and rapid pulse, 120 or 140 per minute. The treatment which is needed is the action of some saline purge; sulphate of magnesia, say 100 or 160 grains dissolved in an ounce and a half of rose water, makes a useful draught. If this fails to relieve the bowels, an enema of soap and tepid water with some sweet oil in it may procure an evacuation. If not, the patient may have a second draught of sulphate of magnesia at the end of four hours, and so on until the bowels act. This treatment usually suffices, and in two or three days all the symptoms have disappeared.

When the inflammation in the breast ends in suppuration or the formation of matter, it usually *points* in one part of the breast: that is, the skin over that part becomes thin, shiny, and red, and then blue. Under these conditions the sooner the abscess is opened and the matter let out, the better. If the abscess is not opened the matter *burrows* about under the skin in various directions, may destroy part of the gland and undermine the patient's health. If the patient can bear it, the breast ought to be drawn by a glass made for the purpose, or the breast-pump may be used.

A most convenient and effective breast-pump is an empty soda-water bottle. Choose one with a round smooth mouth. Fill it with hot water; pour out the water quickly; then, having greased the tip with lard or butter, apply it gently over the nipple. A vacuum is formed in the bottle by its cooling, and this may be increased by wrapping a rag wrung out of cold water round it. The milk then gently flows into the bottle with the least possible disturbance to the patient. When but a few drops of milk, or none at all, is extracted, it is useless to persevere, as we only give the patient needless pain and increase the irritation in the breast.

When once an abscess has formed in the breast, it seldom happens that the mother can use it for suckling. The child has to be supported entirely from the other breast, which as a rule suffices for the work.

The strength of the patient requires support whilst the abscess is discharging. A little wine or porter may be taken: her food should be nutritious. It may be necessary to relieve the bowels, which may be done by castor oil in doses of from $\frac{1}{2}$ to 1 ounce; or by sulphate of magnesia in doses of from 100 to 160 grains in an ounce and a half of rose water with 15 drops of compound spirit of chloroform; or soap and water enemas mixed with some sweet oil or castor oil.

Sore nipples.—If the nipples are only excoriated, or sore from the presence of fissures or cracks, they may be relieved by smearing a little of a pomade made of one part of oxide of bismuth to nine of vaseline, or spirit such as brandy, or solution of carbolic acid in the proportion of two parts of acid to 100 parts of water. Nipple shields made of thin sheet lead are of great service. Sore nipples should be carefully washed and dried before and after each application of the child to the breast. If suckling is persevered in, it should be through a tube connecting a shield on the breast with an artificial nipple which the child takes.

Galactorrhœa, or excessive flow of milk, sometimes occurs during the first few weeks after delivery. As a rule such

milk is watery, does not nourish the child, and quickly upsets its digestive apparatus. Frequently the only thing to be done in such cases is to give up suckling altogether.

The diet during lactation or suckling must be regulated according to the patient's strength. If she is full-blooded, strong and healthy, she should be confined to farinaceous food, such as arrowroot, tapioca with milk, for the first two or three days, until the milk secretion is fairly established and the bowels have been opened, when she may be put on an ordinary diet. If she is weak and delicate, she requires nourishing food, such as beef-tea, fish, and a little wine, from the first.

When it is determined that the mother shall not nurse her child, the secretion of milk may be suppressed by the use of saline purgatives such as sulphate of magnesia, an abstemious diet, and the application of evaporating lotions to the breasts. Belladonna plasters applied to the breasts may help to disperse the milk. As a rule women who do not suckle bear children more rapidly than those who do, and are more liable to subsequent disease of the uterus, and other troubles. A woman who suckles her child generally has an interval of from $1\frac{1}{2}$ to 2 years between each confinement, but those who do not suckle may bear a child every twelve months and suffer in general health in consequence.

Deficient secretion of milk often depends upon general debility. In such cases it is useless or even injurious to attempt to stimulate it. But in some cases *galactagogues*, or remedies which stimulate the flow of milk, may be of use. The leaves of the castor-oil plant made into poultices and applied to the breasts are said to promote the secretion of milk. The diet should be liberal and nourishing.

The management of the lochia forms an important part in the after-treatment of labour, as the condition of the patient varies with the quality and quantity of the discharge. The lochia is the name given to the discharge which sets in on the completion of labour, and which usually continues for

from ten days to three weeks. During the first three days or so, the lochia consist almost entirely of blood. At the end of this time they become more watery and of a palish red hue; this colour changes about the seventh or eighth day into a greenish hue which has given rise to the term 'green waters.' It now contains fewer blood globules and more pus or matter. This greenish appearance continues until the disappearance of the discharge at about the third week after delivery. The lochial discharge is poured out of the womb and accumulates at the end of the vagina; it is therefore advisable to let the patient sit up from time to time, so as to drain off the accumulated fluid. Otherwise, being retained, it rapidly decomposes, becomes exceedingly offensive, and may even give rise to blood-poisoning. When the lochia are scanty or unusually offensive, the vagina should be daily syringed with warm water and Condyl's fluid, in the proportion of a wineglass to a tumbler of water, which increases the flow of the lochia and at the same time clears away the offensive matter. The napkins worn during the lochial discharge should be frequently changed.

It is a good rule to allow the patient to pass water in the kneeling position, which is most favourable for the draining away of the lochial discharge. When excessive fœtor of the lochia is observed together with a quickened pulse and other feverish symptoms, the condition of the patient is likely to be serious, and a consultation is advisable.

The after-pains are caused by contractions of the uterus after labour. They more frequently occur in multiparæ than in primiparæ. They vary in intensity in different women—in some they scarcely excite attention, in others they are most severe and distressing.

They are chiefly caused by the contractions of the uterus upon some clots or pieces of membranes which have remained in the uterus, and are of the nature of colic. When the uterus has firmly contracted after labour, and contains no clots or membrane, after-pains are not likely to set in. It

is therefore desirable, especially in women who have borne several children, to secure complete evacuation, and firm contraction of the uterus after labour. For this reason it is usual to give a dose of ergot after delivery to multiparæ.

It has already been pointed out that the early application of the child to the breast tends to prevent the occurrence of after-pains by promoting early contraction of the uterus.

The after-pains should not be checked, unless too severe, because they tend to promote the expulsion of substances which, if retained in the womb, might decompose and set up blood-poisoning or puerperal fever. If persistent, it will be necessary to ascertain if anything is retained in the uterus. When an opiate is thought necessary, ten minims of liquor opii sedativus in a little aromatic water will be useful.

Retention of urine.—It frequently happens that during the first few days after labour the patient, especially if she be a primipara, is unable to pass water. This results in some cases from nervousness, as in primiparæ, in others from paralysis of the bladder, arising from the pressure to which it has been subjected during labour, or from swelling of the urethra, from its having been bruised in the labour. Sometimes, in multiparæ especially, the uterus, remaining large and soft after labour, falls back in retroflexion, and thus the os, pointed forwards, presses on the urethra and stops the urine. Hence, whenever the urine does not pass properly, an examination should be made. In these cases the water may be drawn off by the catheter night and morning, and if necessary more frequently. The best kind of catheter is an elastic male catheter about a number eight in size. In passing the catheter the midwife should place the patient well on the edge of the bed, with her knees drawn up. She can then separate the lips of the vulva and will see the orifice of the urethra (see fig. 13) just under the clitoris, and above or just on the upper margin of the entrance to the vagina. The catheter, previously oiled (lard blocks up the end of the catheter and prevents the urine

from flowing through it), is gently passed along the urethra for about five inches, and the urine is run off into a vessel held at the end of the catheter. The catheter should be kept in a 1 in 80 carbolic solution.

If the midwife makes a point of feeling the orifice of the urethra with the tip of her finger when she passes the catheter, she will soon be able to pass the catheter without exposing the patient, which is always a preferable proceeding.

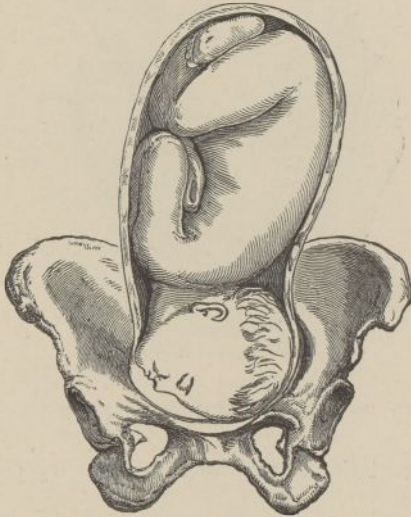
The pulse should be watched during the first hours after labour. If it is under 100 per minute, the chances are all is going well, but if it rises much over a hundred, hæmorrhage, fever, or some other complication may be threatening.

CHAPTER XV.

THE MECHANISM AND MANAGEMENT OF FACE PRESENTATIONS.

IN the majority of cases delivery of face presentations is accomplished by the unaided efforts of nature. There are *four presentations of the face* at the brim, just as there are

FIG. 36.



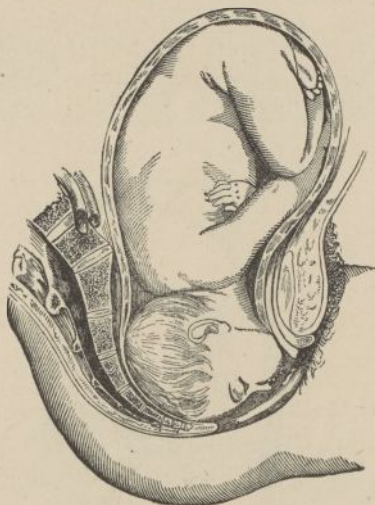
FACE PRESENTATION IN THE FIRST POSITION AT THE BRIM. MENTO-POSTERIOR.

four of the vertex or head. The four face presentations may be divided into two classes, mento-posterior, in which the chin is backwards, and mento-anterior, in which it points forwards. The first and second facial presentations are

mento-posterior: that is, the chin points either towards the right or left sacro-iliac synchondrosis, according as it is a first or second position.

The third and fourth facial presentations are mento-anterior: that is, the chin points either towards the left or right acetabulum, according as it is a third or fourth

FIG. 37.



ROTATION FORWARDS OF THE CHIN.

position. The mento-anterior presentations are extremely rare.

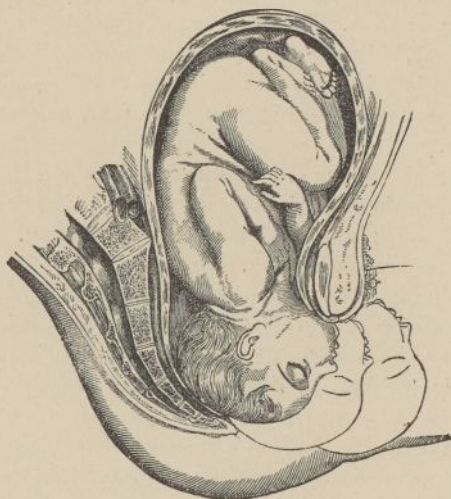
Face presentations occur in the frequency of 1 in 230 cases.

On examining in a face presentation in the mento-posterior or chin-backward position, the examining finger feels the child's nose; if the finger is carried forwards along the nose, it reaches the forehead, which lies behind one or other acetabulum or hip-joint; carried backwards the finger perceives the child's mouth with the chin in the hollow of

the sacrum, in front of one or other sacro-iliac synchondrosis. The examination should be carefully and gently conducted in order to avoid injury to the child's eyes.

As the labour advances the face descends into the floor of the pelvis and reaches the spine of the ischium, which directs it forwards. This causes the rotation forwards of the chin under the pubes, thus turning it round from the back

FIG. 38.



PASSAGE OF THE HEAD THROUGH THE EXTERNAL PARTS IN FACE PRESENTATIONS.

The head is becoming flexed and sweeping over the perinaeum.

part of the pelvis to underneath the pubes. The annexed figure shows the position the chin takes up under the pubes after it has thus rotated forwards.

The chin having rotated forwards, advances under the arch of the pubes, and the occiput fills up the hollow of the sacrum. One or other cheek and the chin of the child will be the presenting part, and if the labour advances, will emerge under the pubes. When the chin has emerged it

becomes almost fixed, and the head, which has been bent back or extended, has now to bend forwards or become flexed to allow of its exit from the pelvis. This allows the vault of the cranium and occiput to sweep in succession along over the perinæum and to be expelled.

As the face has been the presenting part, the caput succedaneum will have formed upon it. The result is very disfiguring. The side of the face which was lowest and most anterior is of a deep purple, and swelled up so that the eye cannot be opened. Like the caput succedaneum in head presentations, this disappears without much trouble in a few days. The less it is meddled with the better; poultices and hot fomentations are only likely to lead to gangrene or ulceration.

The trunk rotates and emerges in the same way as in a head presentation, the right shoulder being usually under the pubes and the left passing under the perinæum. The hips follow in the same direction.

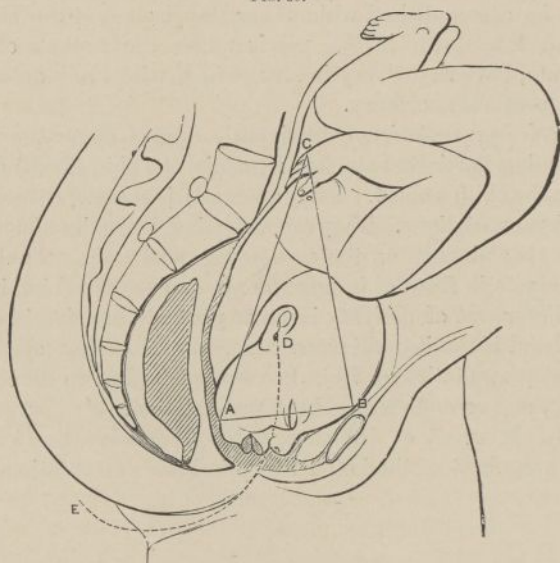
In some cases the head descends to the floor of the pelvis without rotation of the chin forwards. When this happens the further the head descends the more tightly it becomes jammed in the pelvis; this is shown in the accompanying figure.

In the figure 39 the face is seen swollen by pressure, and pressed down close to the vulva. The head cannot descend because the occiput is jammed between the child's shoulders, and forms with the thickness of the chest the base or thick edge of a wedge, A B C, which is much longer than the conjugate or oblique diameters of the pelvis. The application of the forceps, so that traction can be made in the direction of the curved line D E, and the chin drawn over the perinæum, will break up the wedge, A B C, and restore the flexion of the head, which may then be delivered. In some cases the head is jammed down so tightly that it requires to be diminished in size by craniotomy before the child can be born.

In face presentations, even when all goes well, and the

chin rotates under the pubes, the danger to the child is considerable. When the rotation of the chin does not take place, and the head gets jammed, as in fig. 39, the death of the child is almost certain. The unusual pressure upon the child's head and upon the vessels of its neck in face presentations furnishes the explanation of the increased mortality, which is about 1 in 10 births, of the children. Even when the child

FIG. 39.



SHOWS THE POSITION OF THE HEAD WHEN ROTATION FORWARDS OF THE CHIN DOES NOT TAKE PLACE. (After Barnes.)

survives, its face is much swollen and disfigured, as has been already mentioned.

The danger to the mother is also somewhat greater than in head presentations, owing to the more tedious and exhausting nature of the labour.

The management of a face presentation consists, in the large majority of cases, in leaving it to the efforts of nature,

which suffice for the expulsion of the child. But in those cases where the chin does not rotate forwards, but descends on to the floor of the pelvis, artificial delivery is necessary. If the head is still movable, turning may be available under chloroform; but if the head be jammed, the forceps or craniotomy may be required. The important points to bear in mind are, that if the chin is found to have rotated forwards and be under the pubes, the labour, in all probability, will be accomplished without assistance; but if the chin is found low down in the pelvis under the hollow of the sacrum, natural delivery is almost impossible, and operative measures are necessary.

Brow presentations occasionally happen from the head becoming partially extended: that is, the chin drawn away from the child's chest. They are really just between face and head presentations. They are recognised by feeling the round frontal eminence as the presenting part and the anterior fontanelle in front of it, and the nose and eyes behind it.

The mode of delivery in brow presentations is either by the head becoming still more extended, and so developed into a face presentation, or by its becoming flexed on to the child's chest, and so ending as a head presentation.

In the event of difficulty, or too long delay, the forceps offers the best method of delivery in brow presentations.

CHAPTER XVI.

THE MECHANISM AND MANAGEMENT OF BREECH, INCLUDING
KNEE AND FOOTLING PRESENTATIONS.

THE presentations next in order of frequency are those of the breech, or in order to include knee and footling presentations, which are only modifications of breech presentations, we may group under the name of *pelvic presentations* those of the breech, knee, or foot.

If we consider for a moment the usual position of the child in the uterus when the pelvic end presents, we shall be able more readily to understand why presentations of the breech are more common than footling, and footling presentations more frequent than those of the knee.

The usual position of the child is with the knees drawn up on to the abdomen, and the feet close to the buttocks or nates. In this position one or both feet may be felt at the same time that the breech is made out. Now, as the most usual attitude is with the knees drawn up on to the abdomen, the feet necessarily follow, and the presentation is one of the breech. When the knees are not drawn up so far, a foot may be felt below the child's breech; the presentation is then said to be a footling. But if, as occasionally happens, the child's thigh is stretched out and the knee bent, it becomes the lowest part, and thus produces a knee presentation.

In a large proportion of breech cases the labour is premature, and therefore, as regards the mechanism of the labour, presents little difficulty. Breech presentations, then, may, like face presentations, be classed under the heading of natural labours, because the long axis of the child's body

—that is, its spinal column—corresponds, or is in the same line, with the long axis or canal of the uterus and pelvis.

The dangers in breech cases to mother and child are greater than in head or face presentations. The reasons for this are: 1st, the funis or cord is liable to compression during the passage of the child's trunk and head through the pelvis: this interrupts the circulation of the blood in the cord, and causes the death of the child; 2nd, the placenta may be squeezed against the child's head, and the circulation in it arrested; 3rd, the child's life may be endangered before its passage through the pelvis by the contractions of the uterus upon it. This results from the too complete escape of the liquor amnii after the rupture of the membranes; the child's buttocks presenting do not act as a ball-valve, filling the brim of the pelvis, like the head, and so keep back some of the waters, but they allow of their complete evacuation. The uterus then contracts directly upon the child and may cause its death. Again, from the breech not dilating or opening the neck of the womb so well as the head does, the labour is often difficult and tedious.

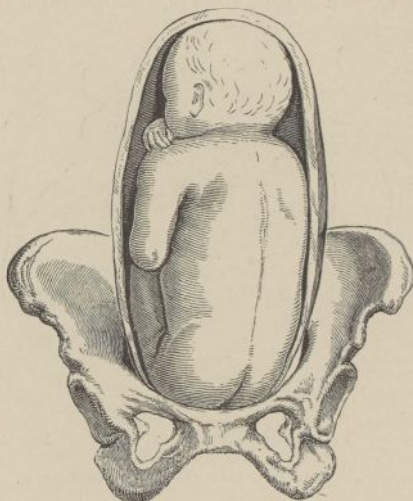
The nates or breech may present in two ways: either with the child's back forwards, when it is called a dorso-anterior; or with the child's back turned backwards, when it is a dorso-posterior presentation. Of these the most common is the dorso-anterior, in which the child's back is in front. This is seen in fig. 40. The presence of a breech presentation may be made out by palpation through the abdominal wall, when the hard globular head of the fœtus can be grasped between the two hands. But this is not easy in fat women where the abdominal walls are several inches in thickness.

When an examination is made by the vagina it is not difficult, even before the os is dilated, to mark the difference to the touch caused by the softer and smaller pelvic extremity of the child. The bag of membranes protrudes in a different manner to that in head presentations. Instead of being

round, it is conical and elongated, and protrudes some distance through the os. In addition, owing to the pelvic end of the child not filling the mother's pelvis, the waters escape with a rush when the membranes rupture.

On examining through the os in a breech case when the membranes have ruptured, the finger first may feel a round soft prominence in which, by pressing a little harder, a bony protuberance is felt, which is the thigh bone. If the finger

FIG. 40.



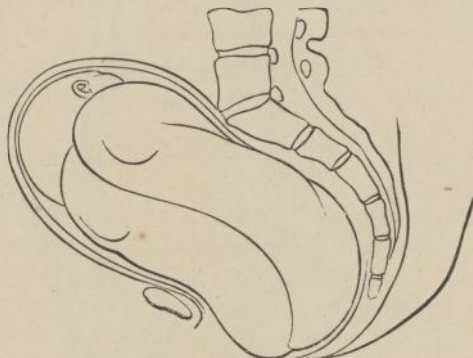
DORSO-ANTERIOR PRESENTATION OF THE BREECH IN THE FIRST POSITION.

is passed farther up it comes to a groove, which is the line between the two thighs, and in which may be felt the scrotum or vulva, according as the child is a male or a female. On the other side of this groove will be felt another soft round prominence, which is the other buttock. In an antero-posterior presentation the anus, or opening of the lower bowel, is felt in the front part of the groove and the scrotum or vulva backwards. On withdrawing the finger it may be found

stained with meconium, which will corroborate the diagnosis. Indeed, meconium is often passed, and gives evidence of breech presentation. It is the result of the squeezing of the child's abdomen by the uterus. This is an indication that the child is in danger, and is a motive for expediting its birth.

The mechanism of labour in a breech case in a dorso-anterior or back-forwards position is as follows. In a dorso-anterior presentation of the breech in the first position, the transverse diameter of the child's pelvis will be in the oblique diameter at the brim: that is, the left buttock of the child

FIG. 41.



SHOWING THE POSITION OF THE FŒTUS WHEN THE TRUNK HAS ENTERED THE PELVIS.
(After Barnes.)

The Trunk takes the shape of the letter S.

will be opposite the right acetabulum, and its right buttock in front of the left sacro-iliac synchondrosis, as in fig. 41.

The examining finger, therefore, impinges upon the left buttock, which is the lowest, and is forwards. Behind, and in front of the left sacro-iliac joint, is felt the right buttock, and between them, in a direction coinciding with that of the right oblique diameter, is felt the groove between the buttocks. As the breech is driven down into the pelvis, so does the anterior buttock become more depressed, so that, as seen in fig. 41, the left buttock reaches the floor of the pelvis first,

and then rotates forwards under the pubes, while the right buttock fills the hollow of the sacrum. The left buttock having now arrived under the arch of the pubes, remains there, while the right buttock passes over the perinæum, and emerges at the vulva.

As soon as the breech has emerged, the legs and feet slip out, and the lower part of the trunk is born.

FIG. 42.



DESCENT OF THE HEAD.

The belly of the child faces the right thigh of the mother. The thorax or chest and the shoulders of the child now descend with the arms crossed over the chest. The shoulders follow in the same direction as the buttocks of the child, and the left rests under the pubes while the right shoulder passes over the perinæum.

While the trunk and shoulders of the child pass through the pelvis, the head enters the brim in the right oblique

diameter. It then descends with the forehead towards the right sacro-iliac joint. The occiput turns forwards under the pubic arch, and the face lies over the perinæum. The chin, nose, forehead, and vertex then pass in succession over the

FIG. 43.



SHOWING ABDOMINO-ANTERIOR POSITION OF BREECH. (After Ramsbotham.)

perinæum, and the head is born. It is during this stage that the child is likely to die from pressure on the umbilical cord, which is jammed between the child's head and the walls of the pelvis. Any delay, therefore, after the trunk is born should be avoided.

The mechanism of a breech presentation in the *second dorso-anterior*, or back-forward position, is similar to that just described, except that the breech enters the pelvis in the right oblique diameter.

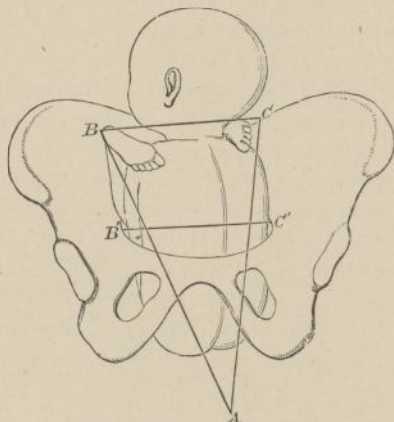
In the *third position of the breech*, or the dorso-posterior, the left buttock of the child is in front of the left sacro-iliac joint, and the right buttock forwards behind the right acetabulum. The breech descends into the pelvis, the right buttock rotates forward under the pubes, where it becomes fixed, and the left buttock passes over the perinæum and is born. The head enters in the right oblique diameter at the pelvic brim with the occiput backwards towards the right sacro-iliac joint; as it descends into the pelvis, it rotates forwards under the pubes, and the face passes over the perinæum as in a dorso-anterior position.

In the *fourth position of the breech* the transverse diameter of the breech enters the pelvis in the right oblique diameter, and so, the back of the child being turned towards the mother's spine, the right buttock of the child is opposite the right sacro-iliac joint, and the left buttock behind the left acetabulum. The breech and shoulders descend, as in the third position, and the head enters the pelvis in the left oblique diameter, the occiput coming forward and the face turning to the sacrum.

In some cases of breech presentation the labour may become arrested or difficult from the legs being extended or stretched out, and the toes drawn up over the shoulders, close to the face (fig. 44). When this happens the thin edge of the wedge ABC , which is represented by the child's pelvis, may enter the pelvis of the mother, but the thick edge of the wedge, which is formed by the chest, shoulders, arms, head, and legs, becomes jammed, as seen in fig. 44. The broad end of the wedge being larger than the line $B'C'$, which is the transverse diameter, is unable to enter it. Delivery is effected in such cases by passing the hand up in front of the child's belly, seizing a foot and drawing it down, thus decomposing the wedge. This is a difficult operation.

In managing a breech case there is one proceeding which should be especially avoided. When the legs and breech are born, the midwife should not at once seize them and endeavour to extract immediately, but should allow the uterus due time to expel the rest of the child's body. If the legs are seized, and the child's body rapidly drawn down, the chin is drawn away from the chest, and the result may be a malposition of the aftercoming head. This involves delay

FIG. 44.



THE POSITION OF THE FŒTUS WITH THE LEGS EXTENDED AND THE FEET OVER THE SHOULDERS. (After Barnes.)

of the head in the pelvis, pressure on the cord, and probable death of the fœtus.

When one or both arms are caught up by the side of the child's head, the plan is to pass one or two fingers along up the child's back on to its shoulder, and then press the arm down the front of its chest. This operation is called the 'liberation of the arms.'

In breech cases the stage of the greatest danger to the child is after the shoulders are born, and while the head occupies the pelvic cavity. The uterus, which now contains

nothing but the placenta, contracts firmly, and squeezes the placenta against the foetal head; this tends to arrest the circulation of blood in the placenta. In the next place the umbilical cord is being jammed between the child's head and the walls of the pelvis; this also tends to impede or stop the circulation of blood in the cord. The result is, the child is in imminent danger of suffocation. It is then at this stage that traction should be made upon the child's head and the delivery effected. Before doing this, it is well to pull down a coil of cord along by the side of the child's head, so as to prevent dragging on the navel.

The mode of extracting the head is to place the fingers of one hand over the back of the child's neck, while the fingers of the other hand are introduced into the vagina and hooked gently into the child's mouth, upon which a very small amount of traction can be made. The child's body should be drawn backwards away from the pubes; this unhitches the occiput from under the pelvis arch, and the head can then be extracted. Where the resistance is great, the application of the forceps is the readiest and safest mode of effecting the delivery of the child's head.

Knee and footling presentations, being merely modifications of breech presentations, present no essential difference in their mechanism, nor do they call for any different treatment.

CHAPTER XVII.

TRANSVERSE PRESENTATIONS.

TRANSVERSE presentations are those in which the long diameter of the child lies across the long diameter of the uterus. This is the most unfavourable position in which the fœtus can present.

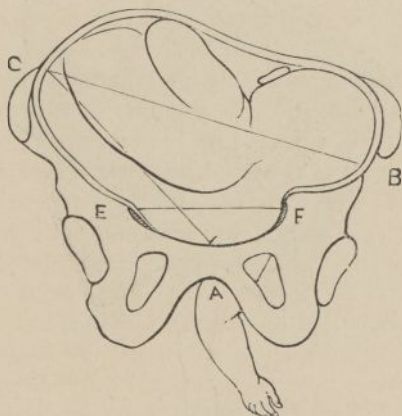
In speaking of transverse presentations, it is most convenient to describe them as shoulder or arm presentations, because, sooner or later, the arm always comes down and forms the presenting part. The proportion of arm presentations is about 1 in 230 cases.

The causes of arm presentations are not clear. It is said that an excessive quantity of liquor amnii, by allowing more free movement to the fœtus, disposes to cross presentations. Unusual obliquity of the uterus—that is, a hanging too much forwards or to one side of the uterus by diverting the long axis of the uterus from the axis of the brim of the pelvis—has also been described as a cause of transverse presentations. Malformation of the uterus disposes to arm presentations. In fact, any complication which may prevent the head entering the brim of the pelvis may turn it aside into one or other iliac fossa, and so allow the shoulder to descend into the pelvic brim. In premature labours arm presentations are much more frequent than in those at full term. This is explained by the fact of the greater mobility of the immature fœtus in the uterus than that of a fœtus at full term, which is more accurately adapted to the uterine cavity.

In arm presentations the danger both to mother and child is increased, especially when the presentation is not recog-

nised until late in the labour, when the membranes have ruptured, and the arm is forced down into the vagina. If an arm presentation is recognised during the first stage of labour, before the membranes have ruptured, the malposition of the child may be rectified, and the presentation converted into a natural one. By abdominal palpation, as shown in fig. 18, transverse presentations may be made out some weeks before labour sets in. They can then, by the process of external version—that is, by turning the child round by

FIG. 45.



SHOWS THE POSITION OF THE CHILD IN A DORSO-ANTERIOR PRESENTATION AFTER THE ESCAPE OF THE LIQUOR AMNII. (After Barnes.)

pressing on it through the abdominal walls—be converted into head presentations. The abdominal binder is then applied round the woman's abdomen, and a head presentation secured. In this way transverse presentations may be avoided.

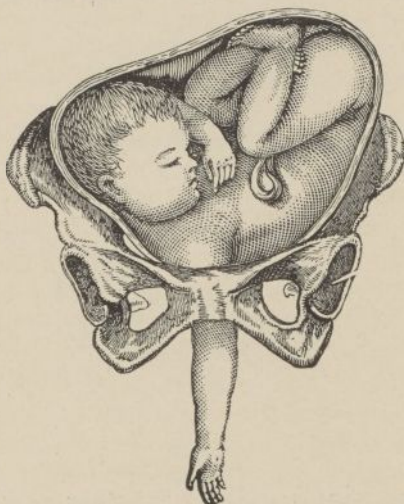
There are two chief varieties of shoulder presentations. In the first the child's back is forwards towards the mother's abdominal wall, as is shown in the accompanying figure; this is called dorso-anterior.

The head and trunk form the thick end or base of the

wedge A B C, and the arm forms the apex or thin edge A. The child cannot pass through in this position because the base, B C, of the wedge is greater than the transverse diameter, E F, of the pelvic brim. In the second variety the child's back is turned backwards towards the mother's spine; this is called dorso-posterior.

In a dorso-anterior, or back-forwards position, the child's

FIG. 46.



SHOWING THE POSITION OF THE CHILD IN A DORSO-POSTERIOR PRESENTATION.

head may lie in the right iliac fossa, or in the left iliac fossa, as it does in fig. 45. When the head in a dorso-anterior position lies in the right iliac fossa or cavity, the left arm presents. If the head, as in fig. 45, lies in the left iliac fossa in a dorso-anterior presentation, it is the right arm which presents. In the same way in dorso-posterior presentations, when the head is in the right iliac fossa, the right arm presents; if in the left iliac fossa, the left arm presents. In

fig. 46, the head is seen in the right iliac fossa, and the right arm of the child is seen to be presenting.

Presentations in the dorso-anterior position are nearly twice as frequent as those in the dorso-posterior.

Unless abdominal palpation has been practised before the commencement of labour, or during its first stage, the presence of an arm presentation may not be detected until a vaginal examination is made during labour. On examining before the os uteri is dilated, the midwife will notice the absence of the round, solid mass formed by the foetal head. Later, when the os begins to dilate, the membranes will protrude in the elongated sausage-like form which has already been described as occurring in breech cases, and which is generally characteristic of mal-presentations. The dilatation proceeds more slowly and painlessly, owing to the absence of the head from the os uteri. During this stage the diagnosis of the presentation may be aided by feeling the position of the child through the abdominal walls by the process of palpation. When there is reason to suspect any mal-presentation, it is better to examine between the pains when the membranes are lax, in order to avoid their premature rupture, and so destroy the means of rectifying the position of the child before the presenting part has been pushed down into the pelvis.

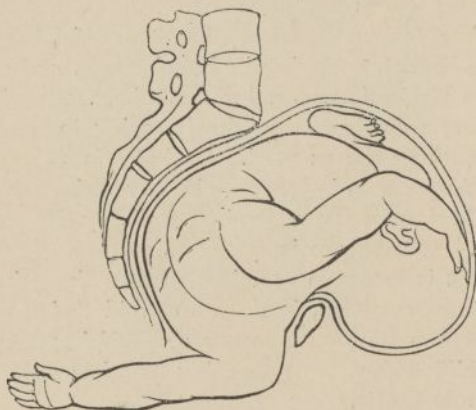
As soon as the membranes have ruptured, either the shoulder, the elbow, or the hand will be more distinctly felt through the os. The *shoulder* presents a smooth, rounded prominence which leads on one side along the ribs, and on the other side up the child's neck to the chin or ear. The armpit or axilla can also be felt under the shoulder. The *elbow* very seldom presents at the os; but when it does so, it is easily recognised by bringing it down, so that the hand may be felt. The elbow, when bent, points downwards towards the child's feet, and thus forms a guide as to the position of the foetus across the pelvic brim. The *hand* is distinguished from the foot by the greater flatness of the

palm, the greater length and mobility of the fingers, and by the free play of the thumb, which can be drawn across the palm.

When the hand has descended into the vagina, or has appeared at the vulva, the diagnosis between right and left can be made out by taking hold of it as if in the act of shaking hands.

A shoulder presentation may terminate, without artificial aid, in one of two ways. In the first, which is called

FIG. 47.



SHOWING PROCESS OF SPONTANEOUS EVOLUTION.
The arm is laid horizontally to save space on the page.

spontaneous version, the shoulder is changed for some other presentation, such as the breech or head. This is effected by the action of the uterus.

The second mode in which an arm presentation may terminate is by *spontaneous evolution*, or, as it is sometimes called, *spontaneous expulsion*: that is, the foetus is driven through the pelvis and expelled with the arm still presenting. The shoulder and arm become jammed down into the pelvis, the head remains above the pelvis, and gradually the body of the child becomes doubled up and pushed through

the pelvis, appearing at the vulva in the following order : first, the side of the chest ; then the belly, breech, and lower extremities ; the head then follows last. The beginning of this process is shown in fig. 47, where the trunk of the child is seen to be emerging from the vulva bent up.

It is almost needless to say that the child is born dead when it has undergone the process of spontaneous evolution. The pressure which is required to force the child through the pelvis, doubled up in this way, is enormous. Spontaneous evolution is only likely to occur in those cases where the pelvis is roomy and well-developed, and the child not large.

The cases in which delivery is effected by spontaneous version or by spontaneous evolution are extremely rare, and we cannot rely upon its being terminated in either of these ways.

The essential treatment of an arm presentation is to turn—that is, to convert the arm into a breech or vertex presentation. This is more easily done early in the labour, if possible before the membranes have burst ; at all events before the shoulder has got jammed into the pelvis, and the uterus has firmly contracted upon the child. The midwife should, therefore, send for assistance as early as possible. When the child's hand has been in the vagina for several hours, the child is very likely to be born dead.

Side presentation.—In rare cases the side of the infant may present ; it is known by feeling the ribs. The treatment is the same as in arm presentations. The *back* may present, but it is extremely rare, as are presentations of the *chest* or *belly*.

Compound presentations are occasionally met with, such as a hand and arm, or a hand and a foot, or the funis and feet, or two hands. The hand and head may present together, but these presentations, when they do occur, which is rarely, are chiefly found in small premature or dead children which may be too small to follow the ordinary rules of the mechanism of labour.

CHAPTER XVIII.

FUNIS PRESENTATIONS, OR PROLAPSE OF THE CORD.

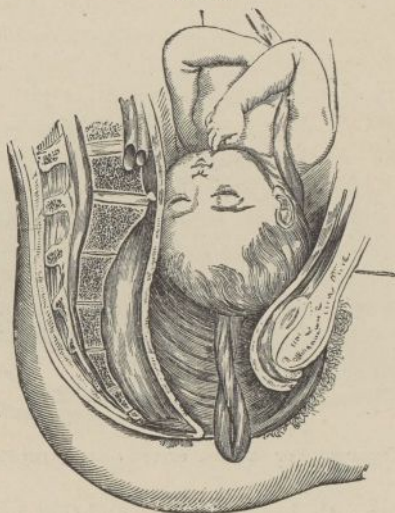
THE funis, or umbilical cord, occasionally presents or falls down, either by itself during the early stages of labour, or descends together with the arm, breech, head, or other presenting part of the fœtus. Prolapse of the cord may happen at any stage of labour. When it does happen the child's life is in considerable danger, because the prolapsed portion of the cord is pressed upon during the descent of the presenting part of the fœtus, and the circulation of the blood in the cord is thus arrested. The child is then in imminent danger of death by asphyxia or suffocation.

The same causes which contribute to the malposition of the child, such as pelvic distortion, placenta prævia, excess of liquor amnii, also favour prolapse of the umbilical cord. All conditions which prevent the complete filling of the lower portion of the uterus and the pelvic brim by the presenting part of the child leave space unfilled through which the cord may slip.

Prolapse of the funis is very likely to take place if it is larger than usual, or if it grows from near the lower margin of the placenta, and if a copious rush of liquor amnii occurs when the membranes burst. In a healthy labour the lower portion or segment of the uterus which contains the presenting head descends at an early period into the brim of the pelvis, which it fills in and fits. In this way, as soon as the membranes rupture and the waters escape, the head descends into the os uteri, which it fits and closes like a ball-valve. This valve action of the head is so complete that a certain

portion of the liquor amnii is usually retained until after the expulsion of the child. Among other causes of prolapse of the funis may be mentioned standing or sitting at the time when the membranes have burst. It is advisable, therefore, that the patient should be lying down at the moment when this event is expected. When the cord can be felt through the membranes in front of the presenting part great care should be taken to avoid rupturing the membranes. For as

FIG. 48.



PROLAPSE OF THE UMBILICAL CORD.

long as the membranes remain entire the cord is not in danger of compression. Another reason for avoiding rupture of the membranes is that, the further advanced the labour becomes before the waters break, the shorter is the time left after that event for the compression of the cord during the stage of expulsion of the child.

The symptoms of funis presentations are clear enough when once the membranes have ruptured. There may be

several inches of cord outside the vagina which may thus be recognised by the touch and by inspection. The prolapsed cord may be cold, flaccid, and pulseless, or it may be warm, turgid, and pulsating. These tests also apply to the earlier stage, when a loop of cord is still in the vagina and cannot be seen. When the cord descends with some presenting part it can only be mistaken for a hand or foot, which might feel somewhat like it.

There is, however, one thing for which a piece of cord

FIG. 49.



POSTURAL TREATMENT OF PROLAPSE OF THE CORD. (After Playfair.)

has not infrequently been mistaken, and that by persons of experience: namely, a coil of intestine protruded through a rupture in the vagina or uterus. In this way a coil of intestine, mistaken for umbilical cord, has been drawn down and cut off. To avoid a recurrence of such a dangerous act it is well to make a rule of never cutting the cord except when it is outside the vulva, and clearly seen to be attached to the foetus.

In the treatment of prolapse of the cord the great point is obviously to secure the cord from pressure. To attain this

end we must try to replace the loop of cord in the uterus above the presenting part. This may sometimes be done by the fingers, if the presenting part of the child is not firmly engaged in the brim of the pelvis; and the operation is greatly facilitated by placing the patient in the knee and elbow posture. Unfortunately, this is not always satisfactory, inasmuch as the cord often comes down again with the first pain after having been returned; and this process may repeat itself indefinitely. Still, while the midwife is waiting for assistance she may endeavour to keep the cord in the uterus by means of the postural treatment. This consists in placing the patient upon her elbows and knees in the position shown in the accompanying figure. In many cases the cord will at once sink down behind the head by the action of its own weight, especially if the membranes are unruptured. In any case it is more easy to push it back into the uterus in this position. When the head has engaged in the brim the cord can no longer prolapse, and the labour will proceed smoothly. Of course, in cases where the cord is prolapsed, and found to be pulsating, the midwife should without delay send for assistance, in order to secure as speedy a termination to the labour as possible.

There have been invented several instruments for replacing the cord. But they are rarely at hand when wanted, and require particular care in using them at the right moment. Where reposition cannot be accomplished, some advantage may be gained by pressing the loop of cord on one side of the promontory of the sacrum. In this way it will be to some extent protected from pressure. But when reposition fails we must endeavour to shorten the period of pressure on the cord by accelerating the labour. In suitable cases the forceps may answer, and even turning be justifiable.

CHAPTER XIX.

PLACENTA PRÆVIA AND HÆMORRHAGE BEFORE DELIVERY.

By *Placenta Prævia*, the placenta in front or first, is meant the attachment of any portion of placenta to the lower or cervical circumference or zone of the uterus. The placenta may dip down to the margin of the internal mouth of the womb, when it is called *marginal* or *incomplete* placenta prævia; or it may wholly cover the internal mouth of the womb, when it is called *complete* or *central* placenta prævia.

Normally the placenta is attached to the fundus or upper zone of the uterus remote from the os uteri, but in certain cases it is found growing to the uterine wall close to or over the os uteri. When this happens hæmorrhage during pregnancy is not unlikely to happen, and this may be followed by abortion. As a rule the hæmorrhage does not occur before the end of the third month, although it is possible that many abortions occurring before and after that date are the consequence of the placenta being attached to the lower portion of the uterus. The hæmorrhage in placenta prævia comes from the part of the uterus from which the placenta is detached.

One of the *first symptoms* usually noticed of placenta prævia is a sudden attack of hæmorrhage taking place somewhere near the end of the fifth month without any warning, and sometimes without any obvious cause. The blood passed is usually of a bright red colour, and is most usually passed at one end of the periods corresponding with a menstrual epoch. The hæmorrhage may subside, and all go on well for

a time, when bleeding again sets in, resulting in abortion or premature labour.

The seventh and eighth months are the most critical times. Clots remaining between the walls of the uterus after previous hæmorrhages are apt to become hardened, and so excite contractions of the uterus which result in labour.

On vaginal examination the os uteri may be found only very slightly dilated ; but if there is room for the admission of a finger, the soft, spongy mass of placenta will be felt in place of the smooth, elastic membranes. In complete placenta prævia nothing but placenta will be felt, through which the presenting part of the fœtus may be indistinctly perceived. If the placental presentation is only partial, part of the membranes, as well as the edge of the placenta, can be distinguished.

The danger both to mother and child in placenta prævia is serious. The mother runs the risk of death from hæmorrhage, and the child is in imminent danger of dying asphyxiated from want of its due supply of blood from the mother. It has been estimated that more than one-half the children in cases of placenta prævia are lost.

And if the mother escape death from hæmorrhage at the time, she may sink later on from fever, the result of the injury the parts have undergone during labour.

If, during the last months of pregnancy, a woman is suddenly attacked with bleeding, the presence of a placental presentation is more than probable. In these circumstances a careful vaginal examination should be made, in order to ascertain the conditions present. In most cases where the hæmorrhage has proceeded from a placental presentation the os will be found sufficiently soft and dilated to allow of the admission of a finger. The presence or non-presence of a portion of the placenta can be readily made out.

The *treatment* will vary according to the nature of the case. If the hæmorrhage is only slight, and there is little or no pain, and the os is not dilated, there is a chance of the bleeding

passing off and the pregnancy continuing ; especially if the pregnancy is not advanced beyond the fifth or sixth month. In this case, of course, the patient should have complete rest and quiet in bed.

The diet should consist of milk, arrowroot, and a little beef-tea. Stimulants should be avoided, as they are apt to encourage bleeding by quickening the pulse.

Opium may be given, if there is any pain, in the form of from fifteen to twenty drops of laudanum, in a wineglass half filled with water. In cases of slight bleeding, and during the earlier months of pregnancy, the above treatment may be sufficient ; but if the hæmorrhage is at all profuse, and uterine action has set in, the pregnancy must be brought to an end. The chief agent in arresting hæmorrhage is uterine contraction. To excite this is, therefore, the first indication in treatment. The rupture of the membranes, by lessening the bulk contained in the uterus, enables it and excites it to contract more readily. The first thing to do, then, is to puncture the membranes. A binder applied over the uterus aids it to contract and moderate the hæmorrhage by forcing the presenting part of the child into the os. The labour then proceeds, the cervix or neck of the uterus expands, the presenting part descends and acts as a plug on the surface of the uterus which has been bared of placenta, and the bleeding ceases. In such cases the labour may terminate favourably both for mother and child. The midwife, however, must not count upon such a happy issue. She should always send for assistance whenever severe flooding sets in before labour. Profuse and uncontrollable hæmorrhage may set in at any moment, and the mother's only chance depend upon the rapid delivery of the child.

Accidental hæmorrhage.—The word 'accidental' has been applied to bleeding which occurs during the last three months of pregnancy from a normally situated placenta. It is used to distinguish hæmorrhage which proceeds from a normally attached placenta from that coming from a placenta prævia, which is called 'unavoidable hæmorrhage.'

As pregnancy approaches its end the muscular fibres of the uterus are more fully developed, and in consequence more easily excited to contraction, than during the early stages of pregnancy.

The consequence is, that causes which would otherwise be harmless are now capable of exciting strong uterine contractions. These contractions cause a partial separation of the placenta from the uterus, and thus give rise to hæmorrhage, called 'accidental.'

The causes of accidental hæmorrhage are numerous. Over-exertion, straining in lifting weights, mental emotion, or direct violence, as from a blow or a kick, may give rise to sudden uterine contraction, which may cause partial separation of the placenta from the uterine wall, and so cause hæmorrhage. It most frequently occurs in women who have borne many children, and who are not in good health. Any constitutional taint predisposes to degeneration of the placenta, and at the same time favours its untoward separation from the uterus.

The *symptoms* of the so-called 'accidental' hæmorrhage are the escape of blood by the vagina, often severe pain in the belly, referred to the uterus, and in some cases a feeling of faintness. The blood escapes from the placental site along between the wall of the womb and the bag of waters until it runs out at the os uteri.

There are cases, however, in which the diagnosis is not so plain. The placenta may be partly detached, blood may be poured from the bared surface, but none escape by the vagina. This is called '*concealed accidental hæmorrhage*.' In these cases the blood does not escape from the os uteri, but remains in the womb, where bleeding may go on to a fatal extent.

The symptoms of this condition are severe pain, faintness, coldness of the surface, pallor of the countenance, which is expressive of anxiety, restlessness, giddiness, dimness of vision, quick sighing breathing, and a weak, rapid, and easily compressible pulse. The uterus is sometimes felt to enlarge; it becomes painful when touched, and is at times irregular in shape.

In placenta prævia flooding comes on *with pain*; in accidental hæmorrhage it comes on *between the pains*. Then the blood flow from placenta prævia is arterial, whereas in accidental hæmorrhage it is venous.

In such a case the first thing to be done is to secure uterine contraction, which is effected by rupturing the membranes, and hastening as soon as possible the delivery of the child.

Where the blood escapes from the vagina and is only slight the usual treatment of hæmorrhage—namely, the recumbent posture, rest, quiet, absence of stimulants, and the administration of a few drops of laudanum—may suffice to restrain the hæmorrhage and to allow the pregnancy to pursue its course. The application of an abdominal binder is useful in preventing, by its compressing power, the collection of blood within the uterus.

CHAPTER XX.

HÆMORRHAGE DURING AND AFTER DELIVERY.

HÆMORRHAGE after delivery, or post-partum hæmorrhage, implies hæmorrhage which occurs after the expulsion of the placenta. It is usual, however, to describe the hæmorrhage which may set in after the birth of the child, and before the expulsion of the placenta, under the same heading of post-partum hæmorrhage.

Where the bleeding takes place from the uterus several days after delivery it is called '*secondary hæmorrhage*.'

Although the course and termination of a labour may have been in every respect natural, it may be followed by an attack of post-partum hæmorrhage. This may be so profuse as to endanger the life of the mother, and even prove fatal. The first in time of the floodings which may follow the birth of the child is that which sets in before the after-birth is expelled. This is due to partial or complete separation of the placenta, and its retention in the uterus. The uterus cannot contract properly. The proper way to deal with this case is not to pull upon the cord, but to try to cast off the placenta by firmly compressing the uterus by both hands through the belly. Under this plan the placenta is often thrust quite out into the bed. The uterus then contracts, and the hæmorrhage commonly stops.

In some rare cases, however, the placenta is *adherent*: that is, it grows so firmly to the uterus that it is necessary to peel it off by passing the hand into the uterus. This is an operation not free from danger, requiring great delicacy yet firmness.

The *most common cause* of hæmorrhage after delivery is the

absence of proper contraction of the uterus. When the uterus can be felt firm, hard, and contracted after the labour, there is but little fear of hæmorrhage. The absence of due contraction in the uterus after labour may depend upon some constitutional disorder. For instance, in women who have suffered from any wasting disease, or whose vital powers have been exhausted by a long and complicated labour. Post-partum hæmorrhage has also been observed to occur after very rapid labour, in which the second stage has been unusually short, and in which the placenta has been expelled almost simultaneously with the child.

Fibroid tumours of the womb are likely to produce hæmorrhage after delivery by preventing the contraction of the uterus. Inversion, or turning inside out, of the uterus is also a cause of it. The bleeding not infrequently proceeds from lacerations of the cervix or vagina, and in such cases the uterus may be found firm and contracted.

The *symptoms* of hæmorrhage after delivery are the loss of blood from the vagina; the absence of uterine tumour—that is, the outline of the uterus cannot be felt as a firm, hard substance—and the gaping and flaccid condition of the os uteri, if examined by the hand in the vagina.

The general symptoms are dimness of sight, faintness, with marked pallor, vomiting, cold hands, feet, and legs, and a clammy perspiration. The pulse is weak, rapid, and can hardly be felt. When the above symptoms are observed the danger is extreme, and no time should be lost in obtaining assistance.

The *treatment* is based upon the endeavour to produce contraction of the uterus. This can be done in several ways. By the administration of a dose of ergot, twenty to thirty minims of the liquid extract in a wineglass half-full of water, or a teaspoonful of the powdered ergot stirred up in some warm water, the uterus may be made to contract. Firmly grasping it in the hand, through the abdominal wall, usually compels contraction; or the gentle and cautious passage of the hand into the cavity of the uterus, for the removal of any clots

which may be there, is a valuable means of exciting uterine contraction.

The uterus may be excited to contract under the influence of *shock*. This may be produced by the application of ice in the vagina, or cloths soaked in cold water to the vulva.

When there has been much blood lost, and the patient is faint, it is a good plan to tilt up the end of the bed and remove the cushions from under the patient's head. The patient should be lying on her back—the sitting posture might cause faintness. By these means the head is placed lower than the rest of the body, and so the little blood which is left in the body drains down to the head and averts fatal fainting. Perfect rest and quiet are necessary for some days. The tendency to fainting must be met by the administration of brandy in small doses. Later the patient will require a nourishing diet, including beef-tea, wine, and tonics, for some weeks.

For some days after the patient is likely to complain of a constant headache over the forehead; this results from the loss of blood to which she has been subjected, and the consequent malnutrition of the brain. Where the above measures fail to arrest the hæmorrhage the last resource is to inject a solution of iron into the uterine cavity; this never fails; but it is a serious proceeding, and should only be undertaken by a medical practitioner.

The form of hæmorrhage to which the term 'secondary hæmorrhage' has been applied usually results from the retention of a portion of placenta or a blood-clot in the uterus. It may set in some hours or some days after delivery. When it is persistent the only effective treatment consists in opening up the mouth of the womb and removing whatever is retained there. This, of course, would only be done in consultation with a medical practitioner.

CHAPTER XXI.

TARDY AND PRECIPITATE LABOUR.

THE average duration of an ordinary healthy labour is twenty-four hours. When a labour exceeds this time it results from a deficient action of the uterus and its auxiliary muscles, and is called *tedious or tardy labour*. If, on the other hand, the action of the uterus is excessive, the labour may be terminated in a very much shorter space of time than twenty-four hours. A labour begun and completed within a few hours is said to be a *rapid or precipitate labour*.

As just stated, *tardy labour* results from *uterine inertia*, or inactivity of the uterus, and this condition proceeds from various causes. In some constitutions the action of the uterus is naturally feeble, just as in others it is vigorous. A state of general debility during pregnancy or at the time of labour disposes to uterine inertia. The influence of climate on the uterus is marked. Tropical heat disposes to uterine inaction, while cold increases the action of the uterus. Frequent child-bearing has been said to be a cause of tedious labour, each successive labour being attended by an increased feebleness of the muscles of the womb. An additional cause is the weakness of the abdominal muscles, which after many labours become unable to support and help the uterus.

In some cases where labour has occurred in very young girls it has been tedious; and, on the other hand, it is a matter of common observation that in women who are

pregnant for the first time at an advanced period of life the labour is slow, from rigidity of the parts.

Up to a certain point, delay in the first stage of labour, before the rupture of the membranes has taken place, is not attended by serious symptoms. There is often a total cessation of the pains for many hours before they again set in. Delay in the second stage—that is, the stage of expulsion—is more dangerous, because of the pressure of the child against the mother's soft parts. The delay may result from total cessation of labour pains and a flaccid condition of the uterus, or the pains may have ceased and the uterus be found in a state of continued contraction upon the child. In some cases there is a succession of short and ineffective pains, which harass the patient but fail to promote expulsion of the child.

A common cause of tardy labour is malposition of the uterus, and this obtains chiefly where the abdominal walls are flabby and relaxed from previous labours or other causes. The uterus, not being supported in front by the abdominal walls, falls forward, throwing the axis of the uterus out of relation to the axis of the brim of the pelvis, and so when labour sets in the child is projected towards the promontory of the sacrum, instead of into the pelvic brim. The remedy here is to restore the uterus to its proper position by the application of a binder, or by placing the patient on her back. If this is not done, the anterior lip of the uterus descends in the second stage in front of the child's head, and offers a serious obstacle to the progress of labour.

The *state of the bladder and bowels* is a frequent cause of tardy labour. If the rectum is loaded with hardened fæces a mechanical impediment is offered to the passage of the child. This should be removed by clearing out the bowel with soap-and-water enemas. Distention of the bladder also gives rise to deficient uterine action, which is at once relieved by emptying the bladder with the catheter.

Labour supervening in a patient suffering from bronchitis,

pleurisy, or any other chest disease, is likely to be tedious, because she is unable to take deep inspirations, hold her breath and then bear down, and so aid the action of the uterus, as she would do naturally. The uterus is thus left to do its work alone, and in consequence the labour progresses slowly.

Mental emotion is well known to exert a powerful effect upon the action of the uterus. For example, the entrance of the *accoucheur* into the lying-in chamber is frequently the cause of a temporary cessation of the labour pains; on the other hand, the confidence his appearance sometimes inspires may excite healthy action. In some cases sudden fright acts in quite another way—it precipitates labour. The action of the uterus is likely to be disturbed in those cases where there is any cause for mental depression or anxiety, and the result of this disturbance is usually seen in deficient action of the uterus and tedious labour.

An *excessive quantity of liquor amnii* occasionally retards labour during the first stage. This is the result of the undue distention of the uterus, which prevents it contracting with its usual force.

The treatment of the various causes of tedious labour has been pointed out in describing them. But there is a plan of treatment which has not yet been mentioned and which may be applied successfully, under given conditions, in many cases. It is the timely administration of ergot. Before giving ergot it must be remembered that its action on the uterus is to produce continued and strong contraction of that organ. If, therefore, there is a mechanical obstruction which prevents the uterus, thus powerfully contracted, from expelling its contents, it may rupture. The rule, then, should be, in cases of deficient uterine action, when the os is fully dilated, the head low down near the outlet, and there is plenty of room in the pelvis, that ergot may be given. But this should only be done after careful consideration.

There is another way of exciting uterine contraction and

at the same time aiding it when produced. This consists in placing the hands over the mother's belly and carefully compressing and pushing it down towards the pelvis. The compression excites uterine contraction, and the pushing down propels the child through the pelvis. This mode of proceeding has the advantage over ergot that the amount of pressure can be diminished, increased, or withdrawn when necessary. It is absolutely under the control of the operator; ergot is not. Pressure can only be produced by applying a binder over the abdomen and drawing in the ends. In many cases this is a useful proceeding.

There are cases, however, in which neither ergot nor pressure on the uterus suffices to expel the child. It is then that the application of the forceps will save the child's life and spare the mother hours of suffering and the consequences which result from prolonged pressure of the foetal head upon the mother's soft parts. Some of these are vesico-vaginal and recto-vaginal fistulae, rupture of the uterus, and exhaustion of the mother.

Precipitate labour is usually seen in robust, muscular women with large roomy pelves. But it may result in delicate women from some mental emotions, such as fright. For instance, the sudden terror in death from drowning or from suffocation will cause the expulsion of the child in a remarkably short space of time. Blood-poisoning from the inhalation of noxious gases, such as carbonic oxide, will also produce it. In the altered condition of the blood in fevers, such as small-pox, typhus, and scarlet fever, and in kidney disease, producing albuminuria, the action of the uterus may be in excess, and cause the rapid expulsion of the child. Rapid labour is also likely to occur when the pelvis is abnormally large. In this case it results from the absence of proper resistance to the expelling power of the uterus.

The dangers of precipitate labours are, rupture of the uterus from the too violent contractions; and laceration of the perinaeum, which has no time to distend, but is burst

open, as it were. In addition to these, hæmorrhage, with or without retention of the placenta; inversion, or turning inside out of the wound; prolapse, or falling down; and in some cases procidentia, or extrusion of the womb outside the vulva, may result from the violent and irregular action of the uterus.

The treatment, then, in precipitate labour should consist in allaying the excessive uterine action. This is done by keeping the patient in the recumbent posture, free from all mental emotion, and avoiding unnecessary examinations. Fifteen or twenty drops of laudanum in a wineglass of water, the administration of chloroform, or an emetic, are the chief medicinal remedies for quieting uterine action. The best kind of emetic in strong, full-blooded women is tartar emetic. This may be given in one dose of half an ounce of the wine of antimony; but where the patient is not strong it is better to give thirty-drop doses of the same wine every hour.

CHAPTER XXII.

OBSTRUCTIONS TO LABOUR ON THE PART OF THE MOTHER
AND ON THE PART OF THE CHILD.

ONE of the most common causes of obstructed labour is a *rigid condition of the os uteri and cervix*. This condition often results from nervousness on the part of the patient, or from the too early rupture of the bag of waters, which is thus prevented from slowly opening up the cervix. In the majority of cases the rigidity of the cervix and os disappears after a time; in others recourse has been recommended to the warm bath and various other means; but the administration of chloroform is the most certain and available. In the more obstinate cases the use of Barnes' hydrostatic bags is especially serviceable. In some cases, especially when the rigidity is due to scars or cicatricial tissue, the result of previous history, small incisions have to be made round the os uteri to obtain the necessary degree of dilatation.

The consequences of obstruction to labour from a rigid os are not usually of much importance, except when the membranes have ruptured and the presenting part is pressed down on to the rigid cervix. In these cases interference may be necessary. There may also be hypertrophy and lengthening of the neck of the womb causing obstruction to labour.

A *rigid and unyielding condition of the perinæum* may obstruct the labour in the second stage. This is most frequently met with in primiparæ. Gentle friction with lard, or oil, or vaseline will aid in the relaxation and distention of the perinæal parts. But if the labour pains are powerful and the perinæum remains rigid it is in danger of being torn through.

In such cases the distention is aided by small incisions into the edge of the perinæum, made on either side. In this way laceration through the perinæum into the bowel is averted. Rarely the *hymen* may persist and present a cartilaginous condition which may retard the expulsion of the head.

Occlusion or closure of the os sometimes causes an obstruction to labour. On examination the os uteri may be found represented only by a minute opening at the end of the cervix, which in such cases is usually also undilated. The occlusion may be congenital, or result from the healing of scars from previous labours. The only mode by which dilatation can be effected is incisions round the os and dilatation by Barnes' hydrostatic dilators. Of course in such a case the midwife would send for assistance.

The *vagina* may be very small, or it may be contracted throughout or at one spot. In this case a similar treatment to that described may be necessary. But in ordinary cases free injection of warm water, aided or not by the hydrostatic bags, will overcome the difficulty. In all cases of rigidity much good is effected by giving twenty or thirty drops of laudanum.

Thrombus, or blood-tumour, may prove a mechanical impediment to the passage of the head along the vagina. A thrombus depends upon the rupture of a blood-vessel, generally a vein, in the wall of the vagina or in one of the labia. The blood then gradually collects until a large swelling or tumour called a thrombus is formed. This swelling may burst and allow the escape of the blood contained in it.

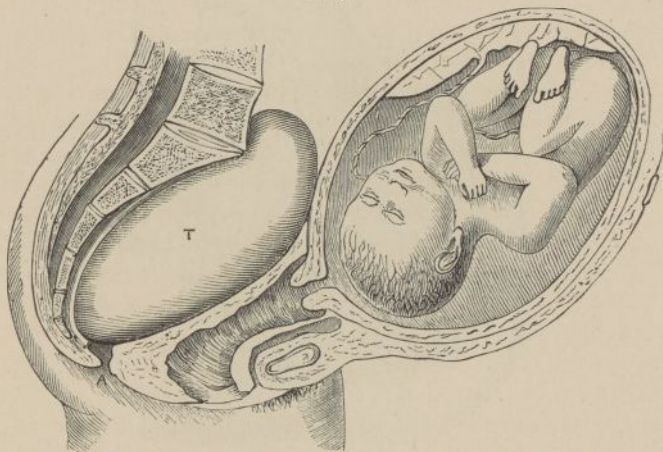
The presence of polypoid tumours springing from the uterus constitutes a serious obstacle to delivery. Ovarian tumours may occasionally act in a similar way by remaining in the pelvis and obstructing the passage of the child's head.

The way in which a labour may be obstructed by a tumour blocking up the pelvis is shown in the accompanying illustration. (See fig. 50.) A fibroid tumour growing from the uterus might block up the passage just in the same way. The treatment of these cases must necessarily vary with the nature

of each case, and is always more or less difficult. An attempt may be made to push the tumour up out of the pelvis into the abdomen, and in some cases this may be easily effected. Where this proceeding is impossible, removal of the tumour, or craniotomy, and in some cases Cæsarian section, must be resorted to.

Sometimes the bladder with the anterior wall of the vagina may prolapse and form an impediment to the passage of the child through the pelvis. This is called *vaginal cystocele*. As a rule this complication results from over-distention of the

FIG. 50.



LABOUR OBSTRUCTED BY AN OVARIAN TUMOUR, T, OBSTRUCTING PASSAGE OF CHILD THROUGH THE PELVIS—THE UTERUS IS PUSHED FORWARDS AND UPWARDS.
(After Barnes.)

bladder, from the patient not having passed water during labour. The treatment is obviously to empty the bladder, and this is best done by a long elastic catheter, which will bend and reach down into the folds of the bladder.

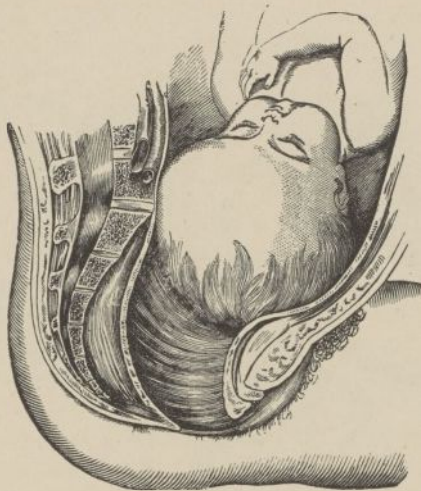
Deformities of the pelvis present obstructions which vary with the degree of pelvic malformation. In Chapter II. the different varieties of deformed pelvis are figured and described.

In the slighter contractions of the pelvis the only effect on the labour is to render it slow and tedious. In the more marked forms artificial assistance is usually required for the completion of the delivery.

We must now consider some of those conditions in the child itself which may obstruct the progress of labour.

One of the most important diseases which may affect the child in the uterus is *hydrocephalus*, or water on the brain.

FIG. 51.



LABOUR IMPEDED BY HYDROCEPHALUS.

It results from the effusion of a quantity of fluid within the cranial cavity.

When the head is much increased in size, as in fig. 51, the diagnosis of the condition is not always easy. The presenting part is arrested above the brim of the pelvis, and feels less firm and resistant than it does in a normal head. The sutures are felt widely separated, and the fontanelles are of large size. The membranous parts between the bones bulge, and give the feel

of a bag full of water. The treatment of such a case consists in reducing the bulk of the child's head by craniotomy. Cases of course occur in which the head is only slightly distended and labour may terminate naturally.

The labour is sometimes obstructed by a dropsical condition of the child's abdomen, called *ascites*. When the child's belly is distended to such a degree as to arrest the progress of labour the treatment is to puncture it and let the

FIG. 52.



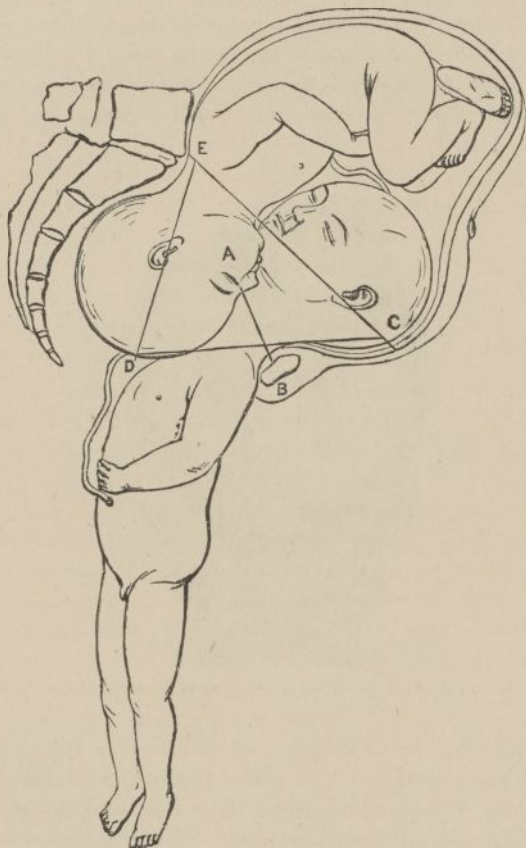
TWIN PREGNANCY: HEAD OF FIRST CHILD AND BREECH OF SECOND CHILD PRESENTING.

fluid drain off. In this case, after the head is born, there is great delay in the delivery of the body, which cannot be accounted for without passing the hand into the uterus, when the abnormal position of the child's belly may be made out.

The occurrence of *twin pregnancy* occasionally causes an obstruction to the progress of labour. Some delay in the birth of the first child frequently happens, and this results from the uterus, distended by the bag of waters containing

the second child, being unable to act with all its force and in its usual direct manner upon the first child.

FIG. 53.



HEAD LOCKING: FIRST CHILD COMING FEET FIRST, SECOND CHILD HEAD FIRST.
(After Barnes.)

As a rule, when the first child is born the second quickly follows, the parts having been well dilated by the passage of

the first child. When any unusual delay occurs, and the membranes of the second child remain intact, contraction of the uterus, and consequent expulsion of its contents, is most quickly excited by rupturing the membranes. The birth of the second child may then quickly take place. In some rare cases most serious difficulties occur in the progress of twin births. It may happen that the first child presents by the breech, which may be born, and that the head of the second child may have meanwhile entered the pelvic cavity, and may now obstruct the passage along that canal of the first child. This is called *head locking*. When this happens the death of the first child is inevitable, and the extraction of the second can only be effected after decapitation has been practised on the first. This complication is shown in fig. 53.

In this way a wedge is formed, the thin edge of which is D, and the thick edge, or base, is E C. When the first child is decapitated along the line A B it is seen that the wedge is broken up, and the second head can pass through the pelvis.

Various forms of *monstrosity* in the fœtus give rise to obstructions which may in some cases only be overcome by Cæsarian section or craniotomy, while in others the monster may be born alive naturally. Two-headed monsters offer the greatest obstructions to labour as a rule.

The collection of masses of *hardened fæces* in the rectum may offer serious obstruction to labour. These may be felt through the posterior vaginal wall by the examining finger. The remedy in such cases consists in washing out the rectum with soap-and-water enemas, in which about one-third of sweet oil should be mixed.

The bladder may be distended and obstruct the labour. When this is suspected the catheter should be passed at once.

CHAPTER XXIII.

RUPTURE OF THE UTERUS.

RUPTURE of the uterus is one of the most terrible and at the same time most fatal accidents which can happen to the pregnant or parturient woman. In the majority of cases the rupture occurs spontaneously, without any previous warning, and from no obvious cause. Although rupture of the uterus nearly always occurs during the progress of labour, there are cases recorded in which it has happened during pregnancy after over-exertion of some kind or another, and even where no exertion or violence had been undergone.

The rupture may take place in any part of the uterus, but the most common seat is the cervix, at or near to its junction with the vagina.

The laceration may take place at the fundus or in the body of the uterus, or it may involve the entire length of the uterus. Sometimes it happens that the laceration is circular in its direction, and so runs round the cervix, completely dividing the womb into two parts, or the womb from the vagina. The rent has occasionally extended into the bladder, which, as has been shown in the chapter on the female genital organs, is attached by its posterior wall to the anterior surface of the cervix. The greater frequency of ruptures occurring at or near the cervix is explained by the fact that the cervix has to withstand the greatest amount of extension caused by the contractions of the uterus and distention from the passage of the foetus.

Rupture of the uterus may occur in labours which have been unusually rapid. In these cases it probably results

from long-continued, violent, and sudden contractions of the uterus.

It may also happen in labours which have been protracted, and here the most common cause is a boring through of the uterus from its being squeezed and ground between the child's head and some bony projection of the pelvis. This is especially seen in deformed pelvises, where part of the uterus is ground between the projecting promontory of the sacrum and the presenting head. Where this action takes place rupture of the uterus may not occur in every case during the labour, but the bruised tissues may ulcerate through and slough away after the labour, and so cause communication between the bowel and vagina, which are called *recto-vaginal fistulae*, or between the vagina and bladder, called *vesico-vaginal fistulae*. In a few cases the greater part of the vagina, together with part of the rectum and bladder, have sloughed away after labour, leaving one cavity, in which the fæces and urine collected, called a *cloaca*.

As a rule, rupture of the uterus occurs more frequently in women who have borne several children, and who are feeble or broken down in constitution, than it does in primiparæ. Malpresentations favour the occurrence of rupture, and the most common of these seems to be presentation of the arm. Changes in the structure of the tissues of the uterus, such as result from fatty degeneration and from cancer, aid in effecting rupture or laceration.

When rupture of the uterus has occurred *the symptoms* are usually very marked. There is generally a sharp, sudden, excruciating pain. The patient may call out that something has burst. The presenting part of the child recedes, and, in those cases where the laceration is extensive, the child escapes altogether from the uterus into the cavity of the abdomen, where it may be felt through the abdominal walls. Another complication may arise: coils of intestine may escape through the rent and fall down into the vagina, or even protrude at

the vulva. Together with the above signs there will be symptoms of collapse. The patient's pulse will be feeble, rapid, and flickering; there will be cold sweat on the face, vomiting and retching, and general signs of prostration.

In some cases, where the child and placenta have been expelled notwithstanding the rupture, the laceration may heal up and the patient recover, and this even when coils of intestine have escaped into the vagina. But when the child has escaped into the abdominal cavity the best chance for the mother is its removal through an incision in the abdominal wall. This operation is called 'laparotomy.'

When in the presence of such an accident, the midwife should be especially careful not to pull away or cut off anything. Coils of intestine have been mistaken on several occasions, by careful and competent practitioners, for loops of umbilical cord, and have been drawn down and cut off, needless to say with fatal results to the mothers.

CHAPTER XXIV.

INVERSION OF THE UTERUS, HOUR-GLASS CONTRACTION,
AND ADHERENT PLACENTA.

INVERSION of the uterus consists in the turning inside out, either wholly or partly, of the womb. The uterus just after labour may be compared to an empty pocket; if a hand is put into the pocket and it is caught hold of at the bottom and drawn up, the pocket will be *inverted*, either wholly or partly, according as the pocket is only partly or wholly drawn out.

Inversion of the uterus occurs, in the majority of cases, either during or immediately after labour. It is commonly believed that the most frequent way in which it is produced is by traction on the cord, to remove the placenta after the birth of the child. The placenta being attached to the fundus of the uterus, the cord draws it down together with the fundus, just in the way the bottom of a pocket is drawn up by the hand.

Although it is clear that inversion of the uterus may be produced in this way, it may also be caused by pressure downwards from above and outside the abdomen. This happens when, instead of grasping the uterus in the hand and squeezing it as one would an orange, the midwife merely presses it downwards with the ends of her fingers. The effect of this is to push part of the fundus inside the womb, and so produce the first stage of inversion. Sometimes inversion has been caused by the combined action of these manœuvres; the fundus being pushed down from above by the hand outside the abdomen, and being drawn down from below by pulling upon the cord.

In many cases inversion of the uterus occurs spontaneously from irregular action of the uterus. Some parts of the uterus are flaccid and relaxed, while other parts are in a condition to contract. The relaxed portion may then fall into the contracting portion, and thus the inversion is produced.

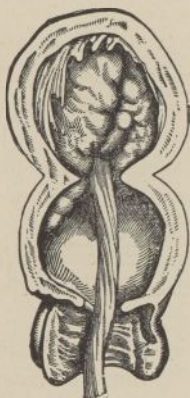
The *symptoms* of inversion of the uterus vary with the degree of the inversion. If there is merely a slight depression at the fundus uteri, it may pass altogether unnoticed, and disappear without interference. When the inversion is more complete the symptoms are clear enough. At the time of the occurrence they are those which indicate nervous shock; the pulse becomes small and rapid, the patient is faint, cold, and clammy; there are vomiting, abdominal pain, and a feeling of bearing down. Hæmorrhage nearly always occurs, and it is sometimes severe. The amount of hæmorrhage depends upon the contraction of the uterus. If the inverted part is nipped by a ring of firmly contracted uterine tissue the blood cannot enter the uterus, and bleeding does not take place. But if the whole organ is relaxed the bleeding is likely to be profuse.

On making an examination by the vagina, it is, if the inversion be complete, found to be filled by the entire uterus, which forms a large round mass. If the finger is passed up alongside of this mass, it finally reaches the junction of the uterus with the vagina, and can go no farther. The placenta may or may not be attached to the inverted fundus of the uterus. When the inversion is partial the inverted portion of the uterus is felt like a round ball in the vagina, and the fingers can be passed by it through the os uteri, which sometimes firmly encircles it. If the hand be placed over the abdomen in the usual place for grasping the uterus, it will be found that the firm globular mass formed by the contracted womb is not there. It is inverted and lies in the vagina.

The *treatment* consists in at once endeavouring to push

back the inverted portion through the os uteri. The midwife would, of course, send for assistance. While waiting for assistance the midwife should keep the patient quiet and give her nourishment, such as milk, or a little brandy, if necessary. She should not give ergot. Should the placenta be adherent, it is safer to make no attempts to remove it before the arrival of the physician ; especially as it is a moot point as to whether the inversion should or should not be reduced before doing so.

FIG. 54.



HOURL-GLASS CONTRACTION OF THE UTERUS.

Hour-glass contraction is the result of an irregular and spasmodic contraction of certain muscular fibres of the uterus. In some cases it arises from ergot having been given to the patient before the expulsion of the placenta. The spot at which this contraction usually takes place is the internal os uteri, which divides the cavity of the cervix from the cavity of the uterus. This is shown in the accompanying figure, where the placenta is seen shut in, in the upper part of the womb, by the contraction at the internal os. The cavity of the cervix is seen below, occupied only by the umbilical cord.

It is seen that the uterus is contracted in a ring round the internal os, while it is relaxed above, where the placenta is situated. This arises from the irregular and spasmodic contraction which is the cause of this condition. If the placenta happens to be detached, and lies *encysted*, or incarcerated, as it is called, in the fundus of the uterus, it may give rise to bleeding from the relaxed portion of the uterus. When it is not separated bleeding is not so likely to occur. I have overcome the spasm of the uterus in hour-glass contraction by giving the patient one or two drops of nitrate of amyl to inhale.

Adherent placenta is by no means common. In most cases a part only of the placenta is adherent, the remainder being cast off. The cause of adherent placenta is said to be some diseased condition of the placental tissue. The adhesion of a patch of placenta to the uterine wall frequently gives rise to hæmorrhage, and the uterus is prevented from properly contracting by its presence. In many cases where the whole of the placenta remains in the uterus, and is thought to be adherent, it is in reality detached, but is not expelled from want of proper contraction of the uterus—uterine inertia, as it is called. In these cases it is easily removed by the hand by outward compression, as described at page 89. Where there is a patch of placenta left adhering, its presence is often not easy to recognise, nor is it always easy to remove it. The occurrence of bleeding and the incomplete contraction of the uterus, attended by spasm or colicky pains, always point to the presence of something in it. The hand may be cautiously introduced and the portion of placenta scraped off by the fingers.

CHAPTER XXV

PUERPERAL INSANITY.

DURING pregnancy the nervous system undergoes marked changes. There is a gathering up of nerve-force throughout the pregnancy ready to be used in labour. In most women this increase and storing up of nerve-power is carried on during the pregnancy and used in the labour with advantage. But this is not always the case. The excess of nerve-force may be misapplied either *during the pregnancy, the labour, or while suckling*. The irritable, peevish condition so often seen in pregnant women may at any time pass on to insanity, as may the melancholic, depressed state which is frequently observed under similar circumstances.

Puerperal insanity is not so frequently met with during pregnancy as it is in the lying-in just after labour. It occurs more often in primiparæ than in women who have borne several children ; partly, no doubt, as a result of the greater dread of their coming labour which women have who are pregnant for the first time. But in a large proportion of cases there is another and a more powerful element at work : it is hereditary taint. If inquiry is made into the family history of those patients, it will be found that there is clear proof of insanity in the family. It only wanted the disturbing influence of pregnancy to rekindle it.

The insanity of pregnancy occurs, as a rule, between the third and seventh months of pregnancy. Sometimes it begins with impregnation itself, and returns with each successive pregnancy. The insanity may assume any form, but the melancholic is the most frequent, and this is often accompanied by a suicidal tendency.

There is a condition known as *transient mania*, or, more strictly speaking, *delirium*, which occurs during the progress of labour. This happens most frequently just as the head is passing through the vulva, or during the height of a pain. Like the insanity of pregnancy, and for similar reasons, it is most likely to occur in first labours. While in this condition of transient mania women may commit the most extravagant acts. They may attack the attendants, or may attempt to and in some cases succeed in destroying the child. The administration of chloroform when these symptoms show themselves is the most satisfactory mode of treatment.

That form of puerperal insanity which is most frequently met with is the *puerperal mania*, which sets in within a short time after delivery. This appears to result chiefly from the shock received by the nervous system in labour. The local injuries received during parturition, as well as the consequent exhaustion and the constitutional weakness resulting from the pregnancy, all combine to favour the mental disturbance. It sometimes appears in connection with suppression of the lochia or inflammation of the uterus. Hereditary tendency has already been mentioned as a cause. Mental emotion, the receipt of bad news, anxiety, worry, improper nourishment, may all, either singly or collectively, induce an attack of puerperal mania. The mental anxiety experienced by single women who have become pregnant, and who dread disgrace, is especially apt to produce insanity, as well as puerperal fever and other complications. Puerperal mania has resulted from the nervous exhaustion caused by profuse post-partum hæmorrhage. The attack comes on in most cases during the first week or ten days after labour. It may appear suddenly or develop gradually. More frequently there are premonitory signs which are observed for several days before the actual mania sets in. The patient is either unusually loquacious, talking needlessly upon every occasion, or she is unnaturally quiet and taciturn, refusing to answer when spoken to. She complains of her husband,

the nurse, and anyone else who may be attending to her, and there is a strong predisposition to injure or kill the child. Careful watching is necessary to prevent this. The patient complains of the light; any slight noise or movement in the room irritates her. Utter inability to sleep is frequent, and even when sleep is procured it is not of a refreshing nature, but disturbed by starts, muttering, and dreams. The words uttered by the patient in puerperal mania are quite incoherent, often indecent, and violent.

Not unfrequently the patient refuses to take any food, or if she eats declares that the food is poisoned. When nourishment is refused the condition of the patient is serious; she wastes away, and becomes so weak and enfeebled as to be incapable of moving. The milk disappears from the breasts and the lochia cease. There is a characteristic and peculiar smell about the body, and the breath is exceedingly offensive.

Fortunately most cases terminate in recovery; some in the course of a few weeks, others after several months. Gooch used to say that the question was not whether the patient would recover, but when she would recover. But in some instances the insanity remains permanently.

The treatment is to remove, if possible, all sources of irritation to the patient. Persons about her to whom she has taken a dislike should be kept out of her sight. The room should not be too light, and irritating topics of conversation should be avoided. They recover more quickly when nursed by strangers; the sight of their husbands especially and other relatives only irritates them, and does more harm than good.

CHAPTER XXVI.

PUERPERAL CONVULSIONS.

THE term *puerperal convulsions*, or *eclampsia*, signifies a remarkable kind of convulsion, which may seize the pregnant woman just before labour, during labour, or immediately afterwards. The convulsive attack lasts from one to three minutes, and resembles the epileptic fit.

The causes of puerperal convulsions are not clear. One cause is the retention of urinary matters in the blood from deficient action of the kidneys. But the peculiar tension of the nervous system which exists in the pregnant woman is a predisposing cause of convulsions. And this explains the fact that emotion may produce convulsions; the nervous system is so highly wrought that the smallest mishap throws it out of gear. Convulsions may be produced by the irritation caused by the child's head pressing on the uterus or vagina; by the examining finger of the accoucheur.

During pregnancy the blood of the pregnant woman undergoes certain changes which predispose to the outbreak of convulsions. The blood is more watery, it contains more fibrin, and is constantly liable to a form of empoisonment from the entry and retention of matters which ought to be thrown off by the lungs, liver, and kidneys. These poisonous matters are supposed to irritate the brain, and thus to excite convulsions.

The attack of convulsions usually comes without warning, suddenly. But if the pregnant woman is carefully watched it will be found that certain symptoms nearly always precede the convulsive fits. The most important and marked of these

is headache, often of a severe nature. In association with this there are attacks of dizziness, spots before the eyes, and in extreme cases there is complete blindness. When, however, a pregnant woman complains of headache and dizziness there is need of investigation. The loose skin underneath the eyelids may be puffy and the arms and legs swell, so that when pressed by the finger or the clothes impressions are left as if the flesh were dough or putty.

In all probability the urine in such a case will be found to contain albumen. A little of the urine boiled in a teaspoon over a spirit-lamp or a gaslight will deposit a thick whitish substance like white of egg. If the midwife recognises the above symptoms in a pregnant woman she should consult with a practitioner as to the treatment to be adopted.

In many cases the above symptoms are not observed, and the attack comes on suddenly. As already said, it is like an epileptic fit. The muscles of the whole body are drawn up and relaxed by successive spasmodic contractions. All the muscles are affected, as is shown by the contents of the bladder and bowel being often expelled unconsciously. The muscles of the face are so drawn up and twitch in such contortions that the patient can no longer be recognised. The eyelids are half-closed, and show between them the whites of the eyeballs, which are turned upwards under the upper eyelids. The teeth are grinding; and the tongue, getting caught between them, is often severely bitten. The mouth is drawn, and there is a froth mixed with blood, from the wounded tongue, upon the lips.

At the beginning of the attack the face is quite pale, but it rapidly becomes dusky and almost purple from the stagnation of the blood in the veins, which are seen to swell up and become turgid. The breathing is carried on with difficulty; it is quick and produces a hissing noise. During the attack the patient is quite unconscious and devoid of sensation. This alarming condition happily is not of long duration, rarely extending beyond three minutes. The patient recovers

consciousness more or less, and remembers nothing. No further attack may ensue, or another may occur in a few minutes, succeeded by fresh ones. Sometimes there is a respite of several hours between the attacks. When the fits follow each other in rapid succession the patient is in danger of dying either in an attack or quickly after from exhaustion, or from effusion on the brain.

The danger to both mother and child is great. It is said that out of every three or four cases one mother dies. Out of thirty-six children ten died.

When the convulsions come on during pregnancy, labour results almost invariably. And this is undoubtedly because the uterus, like the muscles of the body, is contracted by the convulsive action of the attack. The uterine contractions are sometimes so violent that the child is expelled suddenly during a convulsion while the attention of the attendants is being given to the patient. Another thing may happen: the labour having been started in one convulsion, the contractions of the uterus in their turn bring on fresh convulsions.

The treatment which is attended by the greatest success is the administration of chloroform by inhalation. The patient may be kept under the influence of the chloroform for an hour at a time; or it may only be administered at the beginning of and during each attack. Chloral hydrate, in doses of twenty grains, mixed with twenty grains of bromide of potassium, is also of great value, and may be injected into the rectum in those cases where the patient is unable to swallow. The injection of a solution of one-third of a grain of morphia under the skin is also useful, if the patient cannot swallow.

None of the above modes of treatment should be undertaken by the midwife on her own responsibility; she would, of course, share this with a practitioner.

CHAPTER XXVII.

PHLEGMASIA DOLENS, OR WHITE LEG, THROMBOSIS, AND
SUDDEN DEATH.

PHLEGMASIA DOLENS, or white leg, is one of the results of the peculiar condition of the blood in pregnant and lying-in women. The condition known as white leg results from the formation of a blood-clot in the large vein which passes up along the front of the thigh into the abdomen, and which is called the femoral or thigh vein. Although this disease is most frequently met with in lying-in women, it also occurs in non-pregnant women, and even in men.

It may attack both legs at the same time, but most frequently it is only seen in one leg; and of the two legs the left is more often affected than the right. There is a tendency for the disease to spread from one leg to the other. Some patients appear to be specially liable to the disease and in these persons it may occur several times. It seems as if having once attacked a leg, there was a predisposition left behind to a recurrence of the affection in subsequent pregnancies. In one case I saw, with one of the midwives of the British Lying-in Hospital, both legs and both arms of the patient were affected with phlegmasia dolens.

The first *symptoms* of white leg in a lying-in woman are those of fever. There may be an attack of *cold shivers*, called *rigors*, together with the other signs of fever disturbance, such as headache, quick pulse, dry, hot skin, and pain. The affected leg may be hot and painful. The pain, which nearly always accompanies the disease, may begin in the calf of the leg, from whence it spreads up the leg along the thigh

into the abdomen ; or it may commence deep down in the abdomen, and from thence spread along through the groin down the thigh into the leg. Sometimes the pain comes on quite suddenly in the calf of the leg, which swells up and becomes very hot and acutely painful to the touch. The part which is most tender is along the front and inner side of the thigh, where the large femoral vein runs along.

The swelling first appears in that part where the pain is. If the pain is first felt deep down in the abdomen and in the groin, the swelling is most likely to begin in the buttock and vulva ; if the pain has commenced in the leg, the swelling will begin there. The colour of the skin is characteristic ; it has a white, tense, shining appearance. The peculiarity of the swelling in white leg is that when pressed with a finger it does not *pit*, or leave the impression of the finger, like a piece of dough, as does the swelling of dropsy. On the contrary, it is firm and hard ; and if it is pricked no fluid escapes, as it does in dropsy. When the whole leg is affected it is greatly increased in size. The leg may thus swell up in a few hours to double its normal size. The large veins of the leg may be felt hard and cord-like. This is the result of their being filled with blood-clot, and of inflammation of the veins and lymphatic vessels. They are tender to the touch, and the skin over them is often red.

The glands in the groin become affected and swell up into hard lumps. They are very painful, and in some cases matter forms in them and they burst.

The constitutional condition of the patient is serious ; the pulse is rapid and weak, the temperature is raised to 101 or 102: that is, two or three degrees above normal ; the bowels are constipated, the tongue is white and loaded, and there is often great thirst. This state of things may last for only a few days, or it may continue for several weeks. As a rule, after the acute stage has lasted about a fortnight, the symptoms gradually disappear ; the swelling and tenderness diminish, the pulse becomes slower, the temperature falls ;

and lastly the pain disappears, and with it the attendant restlessness and sleeplessness.

The disappearance of the swelling is always a long and tedious process. It is some weeks before the leg returns to its ordinary size, and it may be months. There is a hard, brawny, *wooden* feeling in the leg for some time after the swelling has disappeared. The gradual recovery just described is, fortunately, the most common conclusion of the disease: but it may terminate fatally. When this happens it results from suppuration, or the formation of matter in the leg: that is, one or more abscesses may form either in the leg or in the joints or both. In such cases the patient dies from the consequent blood-poisoning and exhaustion. In other cases, due mostly to the intensity of the poison, the blood-clotting is imperfect, the clots break up, and the patient dies from general blood infection.

Death is caused in some cases by a piece of the clot in the femoral vein getting loose and being carried along in the blood to the heart, where it may become lodged, increase in size, and so stop the heart's action. This is one form of *cardiac thrombosis*, or heart-clot. Portions of clot may also pass through the heart into the lungs, where it blocks up a blood-vessel, and so causes death by asphyxia. This is called *embolism*.

The *causes* of the disease appear to be too early exertion after labour, exposure to cold, and a poisoned state of the blood. The disease usually begins within the first few days after delivery. It is seldom seen after the second week.

The *treatment* consists mainly in perfect rest. The limb must be supported in an easy position, and wrapped round in thick layers of cotton-wool. Sometimes relief from pain is obtained by sprinkling the cotton-wool with laudanum. The constitutional treatment must be directed by the physician.

It has already been mentioned that a piece of clot, from the *thrombus* or *blood-clot* which exists in the femoral vein

in phlegmasia dolens, may become detached and carried to the heart, where it may become arrested and increase in size by fresh deposit upon it from the blood, and so block up the heart and cause death by stopping its action. This is *cardiac thrombosis*. And it has also been mentioned that small fragments of clot so carried from the femoral vein may pass through the heart and block up the blood-vessels in the lungs, and so cause death from asphyxia. This is *pulmonary embolism*. *Sudden death* during the lying-in may thus occur. Some days, it may be two or three weeks, after delivery, in a patient to all appearance going on well, symptoms may suddenly set in of hurried, difficult breathing, feeble, labouring pulse, and a pale death-like appearance of the countenance. These symptoms point to the formation of a blood-clot or thrombus in the heart. The clot gradually increases in size, the cavity of the heart becomes filled with it, and in consequence is unable to send any fresh blood into the lungs, and finally stops beating, choked, as it were, by the clot or thrombus.

When a portion of blood-clot is carried by the blood into the blood-vessels of the lungs the symptoms are even more sudden and appalling. All at once, without any warning, the patient is found gasping for breath, the face becomes purple from the stagnation of blood in the veins, she struggles violently for air, and dies in a few minutes. This is called *pulmonary embolism*.

The treatment is almost hopeless; but in some less severe cases the patient has rallied and recovered under the administration of sal volatile and brandy in repeated small doses. But in the majority of cases the patient, in her struggles for breath, is unable to swallow anything.

Sudden death immediately after labour has also occurred from the shock caused by rupture or inversion of the uterus. *Air in the veins* has caused death within a few hours after labour. The air is said to enter the veins through the uterus at the placental site, where the large uterine veins

are gaping after the detachment of the placenta, before the uterus has contracted and closed them.

And during labour *apoplexy* from the effusion of blood in the brain may cause sudden or rapid death. In these cases loss of consciousness, stertorous or snoring breathing and convulsions, with paralysis of one side of the body, are the distinguishing symptoms.

CHAPTER XXVIII.

PUERPERAL FEVER.

By puerperal fever as commonly understood is meant a disease to which lying-in women are especially prone, and which seems to depend upon some definite poison which is extremely contagious. The fever varies considerably in its symptoms and in its severity, and appears to be associated in different cases with different local inflammations. In some cases inflammation of the uterus, called *metritis*, is prominent; in others the tissues which surround the uterus and bind it to the bladder and neighbouring organs are involved in the inflammatory process, and this variety is termed *pelvic cellulitis*, inflammation of the cellular tissue of the pelvis. In a large number the peritoneum is inflamed, and *peritonitis* is the most obvious symptom. In some of the most contagious and fatal cases there are no symptoms of metritis or inflammation of the womb, nor are there any abdominal or pelvic symptoms pointing to peritonitis or pelvic cellulitis. The patient sinks from the intensity of the fever-poison.

The *causes* of puerperal fever are best classed under two headings—the *autogenetic* and the *heterogenetic*. In the *autogenetic, self-generated*, division the poison originates in the person of the patient, and then infects her. In the *heterogenetic, generated from without*, division the poison is of foreign origin, and is conveyed to her from without.

The causes of *self-infection* are the decomposition of the tissues of the lying-in woman, or the decomposition of portions of placenta or blood-clots which have been left in the uterus. The blood of the pregnant woman may also be

poisoned by the absorption of fluids from a retained putrid foetus. In cases where the pelvis is contracted and the soft parts of the mother have been ground between it and the child's head for some hours, the parts so squeezed may slough after delivery, and the woman may infect herself by the absorption of the decomposing tissues.

But the most common cause of autogenetic or self-originating puerperal fever is the absorption into the blood of the decomposing fluids from retained portions of placenta or coagula of blood in the uterus. As a rule, when the cavity of the uterus is not completely emptied after labour the os uteri does not close up, but remains gaping, and this favours the admission of air into the uterus, which aids materially in the decomposition of its contents.

Inflammation may be caused during the lying-in, and puerperal fever may result from want of caution on the part of the patients or their nurses. Thus, getting out of bed in a perspiration and walking barefooted across a cold floor to a water-closet has not infrequently been the beginning of an attack of puerperal fever.

Emotion and mental anxiety are fertile causes of serious disturbances. It is well known that a large proportion of deaths which occur in those lying-in hospitals where single women are received may be directly traced to the mental anxiety and torture they undergo. I have seen puerperal fever result and terminate fatally from the ill-treatment of a husband, who had a drinking party in his wife's room the night after her confinement.

The causes of *heterogenetic* puerperal fever conveyed to the lying-in woman from without are numerous, and in many cases it is impossible to trace them. The experience of most obstetric physicians is that any decomposing matter brought into contact with a lying-in woman may give rise to blood-poisoning. For instance, at the lying-in hospital in Vienna the students who were attending in the dissecting rooms were allowed to go from them to the lying-in wards

and examine and deliver puerperal women. The result was that about one in every ten women so delivered died of puerperal fever. This, no doubt, resulted from the direct conveyance of decomposing matter in the hands of the students to the genital parts of the women. When proper precautions were taken, and the students compelled to disinfect themselves before attending lying-in women, the mortality decreased. Erysipelas has frequently been the starting point of puerperal fever. Puerperal fever has arisen in one patient from the contagion of erysipelas in another patient having been conveyed to her.

The atmosphere in which the lying-in woman is placed may be the cause of infection. This was abundantly illustrated in the wards of lying-in hospitals before it was customary to pay attention to the necessary hygienic precautions. Overcrowded wards, with windows carefully shut, on the plea that the patients might take cold, were nothing more than forcing-houses for the poisonous germs which so readily multiply under two conditions: warmth and moisture.

It is certain that the puerperal woman is especially liable to infection from various fevers, such as scarlatina, typhoid, small-pox, and diphtheria.

During the lying-in state women are more liable to catch these fevers than at ordinary times. In some cases exposure to the contagion of these fevers seems to do no more than reproduce the particular disease in the lying-in woman. For instance, a lying-in woman who has been exposed to the contagion of scarlet fever catches it, and has all the characteristic symptoms of that fever. On the other hand, the same contagion conveyed to another lying-in woman might develop all the symptoms of puerperal fever.

The poisonous material, or septic matter, as it is called, may be conveyed from one puerperal patient to another. This fact has also been illustrated in lying-in hospitals where, from the neglect of antiseptic precautions, puerperal fever frequently spreads from one patient to another.

The poison may also be carried from one patient to another in private practice by a particular nurse, midwife, or physician. Many instances of this have been recorded.

In some cases the midwife or practitioner may be suffering from some unhealthy or foul discharge which poisons the lying-in woman. Some years since a physician in America, in spite of every sanitary precaution that he took, had forty-five cases of puerperal fever in his private practice in one year. The explanation lay in the fact that he was suffering from ozæna, a foul discharge from the nose, and that this was the source of infection.

Dirty sponges, linen, and any other articles which may have been used for one woman may carry the poison to another. All such articles should, therefore, be thoroughly cleansed and afterwards disinfected in a carbolic solution of 1 in 40: that is, a tumbler full of the carbolic acid to forty tumblers full of water.

The *symptoms* of puerperal fever are generally first noticed within two or three days after labour. Blood-poisoning more rarely takes place after the fifth or sixth day after delivery. By this time the uterus has usually fairly contracted, the sinuses are closed, any lacerations or wounds of the soft parts of the mother have all but healed, and consequently there is no raw surface to absorb poisonous elements, whether generated in the mother herself or brought to her from without.

The first symptoms are generally a feeling of chilliness and an attack of shivering, or rigors. The pulse is quick, varying from 110 to 145 beats per minute. There is a rise in the temperature to 102°, 104°, and even 106° in the worst cases. As a rule the lochia cease or are greatly altered in appearance, and the milk is not secreted or is suppressed.

The countenance is sunken, and indicates considerable mental anxiety. Frequently there is diarrhœa and vomiting and retching. The vomit is often of a dark colour like 'coffee grounds.' The tongue is furred, and often covered with a gluey-looking substance called 'sordes.' The breath has a

peculiar sweetish odour. The breathing is hurried and noisy, and in bad cases it is rendered still more difficult by the bronchitis which is present. These symptoms may last for several days, and the patient may gradually get worse, the pulse becoming more rapid and feeble, the temperature continuing to rise, the breathing getting more hurried and laboured, until she sinks from exhaustion.

In other cases special symptoms are observed in addition to the above. Where there is *peritonitis* there is pain and tenderness felt over the lower part of the abdomen. The pain is continuous, unlike the spasmodic after-pains. It gradually increases, the abdomen swells up, from the accumulation of gas and air in the intestines. This is called 'tympanites.' It becomes so tender that the patient shrinks from the slightest touch, and in some cases is unable to bear even the weight of the bedclothes. The knees are drawn up, to diminish the stretching of the abdominal muscles. The pulse is rapid and feeble, varying from 140 to 160 beats per minute. The skin is hot and dry. The breathing is characteristic. It is entirely thoracic: that is, carried on by the muscles of the chest alone, there being no rise and fall of the abdomen, as is seen in natural breathing. The result is that the upper and front part of the chest is heaved up and down in a marked manner with each inspiration. The respirations, which should be about twenty in the minute, may run to forty or more. The case, when it ends fatally, is generally terminated by a low, muttering delirium; the face presents a remarkably pinched and anxious expression; the skin becomes cold and clammy, and death from exhaustion closes the scene.

There is another form, called the *pyæmic* form, of puerperal fever. The blood-poisoning is more gradual, and is marked during the first week or so by rise in temperature, and increased frequency of pulse, with, in most cases, diarrhœa. There may be, during this period, no symptoms of pain. The lochia will, however, most likely have ceased on the second or third day. At the end of eight or ten days local signs of blood

infection set in. The joints swell, become red and extremely tender to the touch. Usually the joints are affected symmetrically : for instance, both knees may swell up, become red, tender, and matter form in them. The finger-joints are often affected. Abscesses may form in other parts of the body—in the lungs, for instance. It is rare that the patient recovers when inflammation has appeared in the joints.

The *treatment* is to endeavour to prevent the absorption of fresh poison into the blood and to sustain the patient, if possible, through the attack. The cavity of the uterus should be syringed out twice a day with a solution of carbolic acid in the proportion of an ounce of acid to forty ounces of tepid water.

If this is done early, at the first symptoms of fever, it may disperse the attack at its onset. The value of washing out the cavity of the uterus in this way is beyond doubt. But this is a serious operation, and must be done by a medical man. The pulse and temperature often fall within a few hours after the first injection.

The diet of the patient is of importance. To combat the exhausting effect of the fever her strength must be sustained by strong beef-tea, and as much milk, with or without soda-water, as she can drink. The yolk of an egg beaten up with a little brandy forms a concentrated form of nourishment easy to take and readily digested. Where there is much exhaustion this may be given every hour in addition to the beef-tea. As a rule stimulants must be freely administered. When there is much nausea or vomiting, iced champagne is most easily taken and is most likely to stop the sickness. Brandy may be given every half hour in doses of from one to two teaspoonfuls when there is delirium and the pulse is weak and thready.

Quinine in doses of from five to ten grains may be given twice a day. It is common to combine it with opium. If there are symptoms of peritonitis, doses of from fifteen to twenty-five drops may be given of the tincture of opium or

laudanum. Turpentine stupes or linseed poultices applied over the abdomen are often soothing and afford great relief.

When a midwife has under her care a case of puerperal fever the exigencies of the case require her attendance at least once, and in most cases two or three times a day. At these visits she comes into special contact with the patient. She has to adjust the binder, apply fomentations to the abdomen, syringe out the vagina, and otherwise attend on the lying-in woman. The conscientious performance of these duties involves the impregnation of the midwife with the puerperal fever infection. She is thus rendered specially liable to convey the infection to others. During her attendance, therefore, on a case of puerperal fever she should hand over her other patients to some other midwife and cease for the time attending any fresh labours. She should also, as far as possible, avoid going into a lying-in hospital or having any intercourse with another midwife.

At the termination of the case she should have all her clothes disinfected. She should disinfect herself, by taking a Turkish or warm bath, and if possible an *air-bath* in the shape of a few days' holiday in fresh air. It is advisable to keep her finger-nails cut short and cleared, by the careful use of the nail-brush and a solution of carbolic acid or Condyl's fluid, of any *débris* which might harbour infection.

Under these precautions she may safely resume her practice.

Lying-in hospitals and charities which employ midwives are in a great measure responsible for the lives of their patients, and it is their duty to make such arrangements that their midwives are able to relinquish for a time their attendance on lying-in women. A midwife who reports to her hospital or charity the fact of her having a case of puerperal fever under her care should be entitled to a temporary salary, which will relieve her from continuing her practice and running the risk of conveying the contagion to other patients.

CHAPTER XXIX.

THE MANAGEMENT OF THE INFANT.

THE first act of a new-born child is to commence breathing and to cry out in doing so. The first cry of the child is of good augury, for it testifies to the fact of respiration being fully established.

In many cases, however, the child is born apparently dead; it makes no effort at respiration and looks blue in the face. This condition is a common result of an excessively tedious second stage of the labour. The head has been pressed upon for several hours in the mother's pelvis, and perhaps the circulation of the blood in the placenta interrupted by the prolonged contractions of the uterus. Where this pressure on the head has occurred the child is flaccid and pale. This is the worst form of asphyxia. The nervous centres have, perhaps, been injured by compression, and the child cannot breathe. But in cases of labour with prolapse of the cord, and when the cord has tightly embraced the neck, asphyxia is a common result. The asphyxia resulting from pressure upon the cord is the most simple form. When the asphyxia results, as in this case, from interruption of the circulation, the child is blue in the face. Sometimes efforts are made at inspiration while the child's head is still inside the pelvis. The result is that fluids are drawn into the lungs and asphyxia ensues.

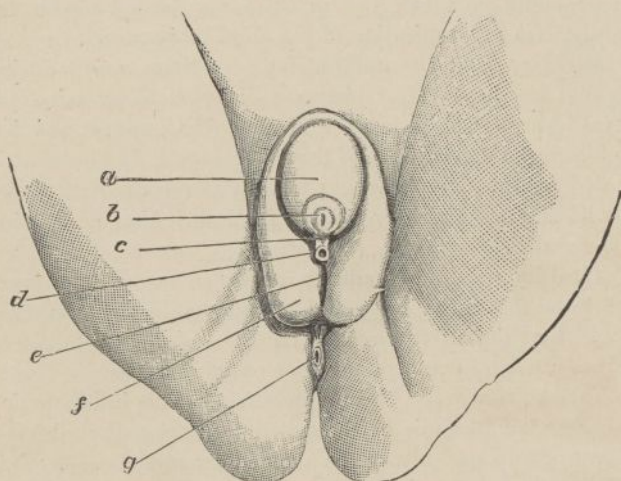
The first step in such a case is to tie the cord so that the child may be separated from the mother, and so be more convenient for the necessary manipulation. In many cases irritation of the nerves in the surface of the skin, by blowing

in the child's face, slapping it on the chest or back, or rubbing the back briskly with some brandy, is sufficient to excite respiration. Dipping the child first in warm water and then in cold water sometimes answers the purpose. This dipping must be done quickly. Where these means fail, recourse may be had to artificial respiration. This is most easily and effectually accomplished by Sylvester's method. The midwife, having placed the child on its back on the bed, takes its elbows, one in each hand, and draws them up above its head; this expands the chest and allows air to enter. She then brings the arms down again and presses them one on each side against the child's chest; this squeezes some of the air out of the chest. This manœuvre should be repeated about sixteen times in the minute. Air is thus successively drawn in and out of the lungs; and if the heart is still beating, even imperceptibly, animation may be restored. If during the process the child is observed to give the smallest gasp, the midwife should be encouraged to persevere in her efforts, as the most feeble attempt at respiration is ground for hope. Another mode of producing artificial respiration is that described by Dr. Howard. The midwife lays the child on its back along the palm of her left hand, with its head hanging downwards over the side of her arm; she then with the right hand squeezes the child's chest by grasping it and pressing it, at the same time suddenly withdrawing her hand; this drives the air out with a jerk; the elasticity of the ribs causes them to expand again, and so draw in fresh air; this is again driven out by pressing the chest. The above manœuvre should be performed with deliberation, giving time between each squeeze of the chest for the ribs to expand and for the air to enter the lungs.

Hermaphrodites.—It sometimes happens that the genital organs of the child are so deformed that it is impossible to tell to which sex the child really belongs. When this is the case the child is called an 'hermaphrodite.' Fig. 55 is drawn from an hermaphrodite born in my wards at the British

Lying-in Hospital. The clitoris was as large as a penis, and it was impossible to tell during its life to which sex it belonged. The child died three weeks after birth, and on dissection was found to be a female with occluded vagina and enlarged clitoris. Most cases resemble this one more or less, and it is a good example of what is meant by the term 'hermaphrodite.'

FIG. 55.



a, enlarged clitoris; *b*, depression simulating the opening of the urethra; *c*, frænum clitoridis; *d*, small canal through which urine was passed; *e*, furrow between labia; *f*, labium majus; *g*, anus.

If the child has breathed properly and cried out soon after its birth, it should be washed and dressed as soon as possible in front of the fire. Warm water should be used and the child may be plunged bodily into it, keeping its head above water. It is not absolutely necessary to wash or, as is sometimes done, to scrape off every particle of the *vernix caseosa*, or cheesy varnish, which adheres so closely to the body of the new-born child. If the child is washed clean and well dried, the vernix soon dries up and drops off

by itself. It is usual to burn a hole in a piece of linen and to pass the stump of umbilical cord through it and wrap it up. The charred linen is supposed to be disinfectant, by virtue of the charcoal it contains; this may be so, but it must be in a very small degree. It answers equally well to cut a hole in the piece of linen to be used to envelop the cord. A pad of linen is then placed over the navel, and a flannel binder wound over this round the child's abdomen. Care should be taken not to wrap the flannel binder too tightly, lest the respiration of the child be impeded.

Bleeding from the navel-string sometimes occurs during the first few hours after birth. It is well to examine the navel after the child has been born a few hours, to see that no bleeding is going on. If there is bleeding the cord should be tied again. The bleeding usually results from the cord not having been tightly tied, or from shrinking of the cord underneath the string.

Healthy children should be *washed* in warm water every night and morning. A special sponge should be kept for the face. By using dirty pieces of flannel and dirty sponges, or sponges which have been used for other purposes, the child's eyes are poisoned and become inflamed. This inflammation is called 'ophthalmia of the new-born,' or ophthalmia neonatorum, and can always be avoided by cleanliness. This ophthalmia is sometimes caused by the application of ointments, which are sometimes semi-putrid, to the child's face. Soap is not necessary, but the body should be gently cleansed from head to foot with a sponge or flannel. Care should always be taken to thoroughly dry the child, especially between its legs and buttocks. Cold water should not be used; even when the child is four or five months old it is better to make the water tepid.

The *clothing* of the infant should be light, warm, and loose enough to allow the free movement of its arms and legs. Tight bandaging should be avoided; it restrains the natural movements of the child's limbs and also impedes its

breathing by pressing on the abdomen, and so preventing the full descent of the diaphragm, which is necessary to allow of a complete inspiration. It is better that all the infant's clothes should be made to fasten with strings, and the use of pins avoided. The arms, shoulders, and legs of infants should be covered up. They have not the power of resisting cold like grown-up people. The head alone should be kept cool. The napkins which it is usual to wrap round the child's hips for the reception of its excrements should be changed immediately they are soiled either by fæces or urine. The neglect of this precaution entails various eruptions and excoriations of the skin, which irritate the child and lower its general health.

Suckling.—It has already been said that both for the sake of the mother as well as the child, it may, as soon as it has been washed and dressed, and the mother has rested a little, be placed to the breast. The child's sucking causes contraction of the uterus, and the *colostrum*, or milk first secreted in the breasts, by its slightly purgative action promotes the expulsion of the *meconium*, or dark-greenish viscid fluid with which the intestines of the new-born child are loaded. If the child takes the breast during the first few days no other aperient is necessary. The natural food for an infant is its mother's milk, and the best way to feed it is by suckling. During the first few days, until the milk is fully secreted in the mother's breasts, it may be necessary to give the infant a little cow's milk. This should be done with a teaspoon, and the milk is made to resemble mother's milk more nearly by the addition of a little water and sugar. Regularity in the feeding-hours should be aimed at from the first. The infant should be put to the breast at intervals of two hours during the day. At night it does not require so much feeding, and should be encouraged to sleep. As the child grows older it is not necessary to feed it so frequently, and some of its meals should be omitted. If the infant is fed regularly from the first, it will soon acquire habits of

regularity, which favour the proper digestion and assimilation of its food. It is a bad plan to soothe the child every time it cries by giving it the breast. When so treated it does not always draw milk, but sucks in air, and the result is indigestion, colic, and wind in the stomach.

The *food of the nursing mother* or wet-nurse should be nourishing, but not too rich. Ale or stout may be taken at meals, but the excessive use of stimulants should be guarded against. It is a common mistake for a suckling woman to overfeed herself, and thus upset the digestion of her child as well as her own. A nursing woman, as well as the child, should have plenty of fresh air; in fine weather they should go out every day. The room they inhabit should be freely ventilated. Dimness of sight, giddiness, palpitation, shortness of breath, pain between the shoulders, or sweating in bed of a night, are symptoms that point to constitutional exhaustion and indicate that the patient's strength is not sufficient to bear the prolonged strain of suckling. In such cases she should cease suckling, and the child be either fed by a wet-nurse, or brought up by hand.

When the mother has not sufficient milk for the child its food may be supplemented by asses' milk, which is best given mixed with a little sugar, and one-third the quantity of warm water or warm lime-water added. It is better for the child to have a little breast-milk than none at all, and the plan of feeding partly by the breast and partly by the hand is better than bringing up the child by the hand alone. It is to be remembered that mother's milk is the best of all foods for the infant. If it is fed by a wet-nurse, care should be taken to select a healthy woman, between twenty-five and thirty-five years of age, who is free from any strumous or other taint. And if possible her infant should not be more than three months old.

The time for *weaning* is best indicated by the arrival of the teeth. When six or seven teeth have appeared the child should be gradually weaned. As a rule it should not be fed

by the breast after the ninth month. As soon as the front teeth are cut it should have one or two meals daily of some bread-and-milk or nursery biscuits, in addition to the breast. A little weak beef-tea or broth may be given once a day, and these meals gradually increased until the child is weaned. The broth or beef-tea may be commenced, according to the strength of the child, soon after the seventh month. The yolk of a soft-boiled egg may be given. When the child is about a year and a half old it may have some carefully minced meat given it once a day. It will, however, up to its second year, still require a large proportion of milk.

The habit of giving young infants meat, potatoes, and other food eaten by grown-up people is most dangerous. It cannot be digested, and consequently passes almost unaltered through the child, giving rise to diarrhœa, rickets, and other disorders. It is equally bad to give stimulants to young infants.

In *feeding by hand* the first point to bear in mind is, that the food given should contain as nearly as possible in the same proportion the elements contained in the mother's milk. Milk only, then, should be used in feeding infants. Asses' milk and goats' milk more nearly resemble the mother's milk than any other, and are therefore the best, when they can be obtained; but in most cases this is impossible, and recourse must be had to cow's milk, which under certain conditions answers the purpose sufficiently well. Two-thirds of fresh milk mixed with one-third of hot water, the whole being sweetened, should be given. If there is a tendency to diarrhœa or rickets, lime-water may be used, instead of the plain water, with great benefit. The feeding-bottle from which the milk is given should be kept scrupulously clean. The remains of the milk after each meal should be emptied, and the bottle should be scalded and rinsed out, and placed in water until again required for use. The cork and tube should also be thoroughly cleansed. If the feeding-bottle is not kept perfectly clean, drops of milk remain in it,

decompose and turn sour, and upset the child's stomach. The child should have its meals from the bottle regularly at fixed hours. Its food should consist wholly of milk up to the time of cutting its teeth, when it may begin to take bread-and-milk and broth, as if it had been suckled. When good cow's milk cannot be had, the Swiss condensed milk may be often used with advantage.

The diseases, such as diarrhœa, wasting, and rickets, so commonly seen in children brought up by hand, arise chiefly from neglect of the above rules. It is supposed that the cow's milk does not contain sufficient nourishment, and so the child is injured by the administration of one or other of the various foods for infants, such as corn-flour and arrow-root, which it cannot digest, and which do not contain the necessary nutritive elements. These foods for infants contain starch in large quantities, which cannot be digested. It is most *injurious* to a baby under nine months of age to be fed with *anything but milk*.

Proper *ventilation* is of vital importance to young children. The windows of the nursery should be opened at least two or three times a day, to secure a complete change of air in the room. The nursery should, if possible, be a large room, with plenty of light and air.

Sleeping.—It is advisable from the first to put the infant to sleep in a cot or cradle. The cot can be placed alongside the mother's bed. The child should be well wrapped up with warm, light clothing. Sleep at regular hours is of great importance to the infant, and with a little trouble the child can be taught to take its rest at stated times. During the first few months of its life the infant naturally spends the greater part of its time in sleeping, only waking up to take its food. It is a bad habit to nurse an infant to sleep; it should be accustomed to go to sleep by itself. This can only be done by always putting it to sleep in its cradle. The various soothing medicines or sleeping drops which are advertised should be absolutely avoided—they nearly all contain opium, and are most harmful to the children. No

opiates or sedatives should be administered to infants except by the prescription of a medical practitioner.

When the weather is fine the child should be taken out, at least twice a day, an hour or so in the morning, and again in the afternoon. When taken outside the house it should always be carefully wrapped up. Its legs should be protected by long woollen stockings, and its hands ought always to be covered with warm woollen gloves. If the sun is hot, care should be taken to protect the child's head from the heat.

When an infant *cries* it is usually because it wants food or because it is in pain. If it cries from the latter cause the child refuses the breast when it is offered, and its features are drawn up and indicate pain. When it is crying for food, it sucks eagerly at anything, such as the tip of a finger which is presented to it, and is at once soothed by the breast or feeding-bottle.

The bowels of a new-born child should be moved twice a day, although the child may be thriving with only one action daily. If there is *costiveness* half a teaspoonful of castor oil, or as much powdered sulphur as will cover a sixpence, may be given in a little syrup. The constipation may be caused by an imperforate anus: that is, the absence of a proper opening to the bowel. This condition, of course, requires immediate surgical relief.

Diarrhœa is in most cases the result of something wrong in the infant's diet. If it is not relieved by attention to its food, medical advice should be sought. *Green stools* result as a rule from some errors in food or from constitutional disorder, and always require medical treatment.

Vomiting also results in most cases either from the child's stomach being overloaded with food or from the milk being sour and disagreeing with it. The infant should not be allowed to take too much milk at one time.

The *navel-string* dries up and falls off in a few days, leaving a raw spot which soon heals up. The bellyband should be worn for about a month, until the navel has

become depressed. If it bulges, it should be pressed in by placing a small pad or compress over it. When, as sometimes happens, the raw spot left by the cord is inflamed and discharges, it may be bathed with a weak solution of Condyl's fluid or carbolic acid.

Port-wine stains and *mother's marks*, as they are called, are generally due to a growth of veins under the skin called a *naevus*. As a rule these require surgical attention, and the earlier this is obtained the better. Tongue-tie, hare-lip, or cleft palate also demand prompt surgical interference, especially as they may prevent the child from being able to suck. Children are also not unfrequently born with six or seven fingers on one or both hands. The sooner the supernumerary fingers, which often are only attached by skin, are removed the better. In some cases of cleft palate the deformity is so extensive that the child can neither suck nor be fed, and only survives a few days. *Convulsions* may arise from a variety of causes, but in all cases medical advice should be sought. As a rule convulsions are due to the food not being properly digested. It is therefore advisable to see that the milk is good and properly administered. If the child is seen at the time the convulsions are present it is a good plan to place it in a warm bath.

When the child has the *thrush*—that is, a collection of white spots inside its mouth—it is a sign that its food disagrees with it. As a rule rubbing the white spots with some borax mixed in honey will remove them. If the child is hand-fed its milk should be changed. When, however, the child, in addition to the thrush in its mouth, has an eruption round the anus between the buttocks, it requires further medical treatment.

Premature children require especial care in bringing up. Their vitality is low, and there is but little warmth in their bodies. This must be supplied to them from without. The room should be kept warm, and they should be put to bed in the mother's arms. It occasionally happens that children are born with one or more teeth already cut.

CHAPTER XXX.

ANTISEPTICS IN MIDWIFERY.

THE object of antiseptics in midwifery is to prevent the absorption by the patient of poisonous, or, as they are called, septic germs. A woman in labour is especially exposed to the entrance into her system of any poisonous or septic matter which may be near her. In the first place, during the passage of the child through the pelvic canal, the passages are opened and ready to receive infective germs. In the second place, after the expulsion of the child, and the placenta, the various parts of the parturient canal are also open for the reception of the infective germs. To begin at the vulva, there may be more or less extensive laceration of the perinæum or vaginal tissues. Here is the first weak spot. The mouth of the womb may also be more or less extensively lacerated. Here is the second weak spot. In the uterus itself is the placental site, and here the uterine sinuses, or large veins, may be open ready for the reception of the infective germs unless this entrance has been closed by the complete contraction of the uterus. Here is the third weak spot.

It is thus clear that the woman who has just been delivered may easily be attacked by poisons introduced from without. These poisons, or septic germs, may be so introduced by the attending accoucheur; or midwife or otherwise. When this happens, the poisoning, or septicæmia, which results, is called heterogenous, meaning poison introduced from without. The patient herself may be poisoned by septic material which has become generated within the

uterus or vagina. This form of septicaemia, or blood-poisoning, is autogenetic, or self-produced. In order to guard the patient against the absorption of septic germs introduced from without or generated within her genital organs, two things are essential—first, that the attending accoucheur, or midwife, the patient herself, and the lying-in room should all be aseptic: that is, absolutely clean and free from germs. The second condition is to destroy any septic germs which may have found a place in the pelvic organs.

The first condition, then, is one of personal cleanliness in the midwife. It is essential that the nails should not be allowed to grow too long, and be carefully cleaned with a nail-brush, before the midwife attends a labour. As a rule it is a good thing to have a fire burning in the lying-in room. This is useful in several ways: foul matters can be thrown into it and burned, and ventilation is secured in the room at the same time that the air is kept dry. An important point of the hygiene of the lying-in room is the immediate removal therefrom of any soiled linen or any evacuations from the patient.

Before making any examination of the patient, the midwife should carefully wash her hands and anoint the examining finger with carbolised vaseline. All washings of the genitals should be made with a 1 in 80 carbolic solution. One important point is to ensure complete contraction of the uterus after delivery. This helps to shut the door against the entrance of septic material into the uterine cavity, as well as to expel any septic matters which may be there. For this reason it is useful to administer a mixture three times a day for the first four or five days after labour, containing 'liquid extract of ergot, tincture of opium, quinine, and dilute phosphoric acid.' The vagina may be syringed out with a 1 in 40 tepid solution of carbolic acid twelve hours after labour; this may be repeated daily during the first week of the lying-in. Many obstetricians now use as a vaginal injection a solution of one part of perchloride of

mercury (corrosive sublimate) to two thousand parts of water. This solution is made by the midwife dissolving pastiles containing perchloride of mercury with a little colouring matter in water. These pastiles are now sold at most chemists'. If the perchloride of mercury solution is used the midwife must bear in mind the fact that she is dealing with a poison. The symptoms of sublimate poisoning are a coppery taste in the mouth, a red line along the gums near the teeth, salivation, and diarrhoea. If these symptoms appear, the mercurial injections must immediately be abandoned. Deaths have occurred from mercurial poisoning, even in the skilled hands of the late Professor Tarnier.

Mercurial intra-uterine injections should not be given. The most efficient as well as the safest intra-uterine injection is a 1 in 60 solution of carbolic acid. Other antiseptic injections are used, such as Condry's fluid or a solution of tincture of iodine.

One of the best antiseptics which have recently come into use is chinisol. According to Klein's investigations, it has the same bactericidal or germ-killing power as the corrosive sublimate or perchloride of mercury. It is non-poisonous to the human body, and causes no irritation. Solutions of 1 part of chinisol to 4,000 of water are efficacious in most cases, but it may be used as strong as 1 in 500 if the discharge is foetid.

EXAMINATION QUESTIONS.

1. What are the diameters of the pelvis at the brim?
2. What is the true pelvis; what is the false pelvis?
3. What are the signs and symptoms of pregnancy?
4. What is spurious pregnancy?
5. What is extra-uterine pregnancy, and how does it usually terminate?
6. Describe what you mean by the Mechanism of Parturition. How would this knowledge influence you in your management of a breech case?
7. What is your management of the third stage of labour?
8. What are the stages of labour? Mention your duties in each stage.
9. What are the evils which may arise from omitting to attend immediately a summons to a case of labour?
10. What sign in a case of labour would induce you to send for medical assistance?
11. Describe what you mean by a natural labour.
12. What are the indications of commencing labour?
13. Under what circumstances would you consider it necessary to seek medical assistance in a case of prolonged labour in the second stage, the head being the presenting part?
14. What do you understand by the term 'natural labour'? Describe your duties in regard to its successive stages.
15. Mention in detail the several facts that should be ascertained on first visiting a patient supposed to be in labour.
16. Give your management of the lying-in woman during the first ten days following parturition, mentioning the symptoms that would indicate puerperal fever.

17. What conditions of the lying-in woman during the week following delivery would suggest your sending for medical assistance?
18. What questions would you ask on your first visit to a patient after delivery; and what points would you specially look to?
19. How would you recognise, and what would you do in, Presentations of (a) Face, (b) Funis, (c) Hand or Foot, (d) Breech, (e) Placenta?
20. Describe the progress of labour in a case of face presentation, and the duties of the midwife in regard to it.
21. How would you distinguish a breech presentation, and for what other presentations may it be mistaken?
22. How would you manage a breech labour?
23. How would you detect a cross-birth, and a breech presentation?
24. What are the difficulties met with in the delivery of the after-coming head (in cases of breech presentation); and how are they to be overcome?
25. Distinguish between a breech and a face presentation.
26. Explain the movements of the child's head in passing through the pelvic cavity, both in head and breech presentations.
27. Mention the different kinds of unnatural presentation. By what characters are they distinguished?
28. Mention some of the chief difficulties of labour which would induce you to seek the advice of a qualified practitioner.
29. Under what circumstances is prolapse of the umbilical cord likely to occur? How would you manage such a case?
30. You are called to a woman at or about the full term of her pregnancy, and find her bleeding profusely; what steps would you take to arrest the bleeding until medical help could be obtained?
31. What would probably be the cause of hæmorrhage during labour? How would you deal with it?
32. What symptoms during the latter months of pregnancy would lead you to suspect the existence of placenta prævia; and how would you detect it?
33. What are the causes of post-partum hæmorrhage? State what you would do in a severe case before help could arrive.
34. What treatment and precautions would you adopt previous to and after delivery, with a view to prevent post-partum hæmorrhage?

35. How would you endeavour to prevent post-partum hæmorrhage, and how would you deal with it when it occurs?

36. What are the duties of the midwife in cases of threatened or actual flooding after the birth of the child?

37. In what cases does post-partum hæmorrhage most frequently occur? How would you attempt to prevent it? Describe your treatment of a case.

38. In cases of sudden hæmorrhage occurring during and after labour, what would you do?

39. What are the causes of tardy labour?

40. What are the various causes of delay in labour? How would you recognise them? What would you do in those cases requiring simple treatment? In what cases would you send for assistance?

41. Give the causes of delay in labour: (1) on the part of the mother; (2) on the part of the child. Mention the treatment you would pursue in each case, and the cases where you would deem further assistance necessary.

42. Distinguish true from false labour pains. What are after-pains generally due to? How do you distinguish them from pain due to peritonitis?

43. What is your practice in delivering the after-birth?

44. Distinguish between spurious and true labour pains.

45. What are after-pains? How would you treat them?

46. What conditions on vaginal examination would lead you to suspect contraction or distortion of the pelvis?

47. How would you ascertain whether a patient is in labour?

48. What symptoms and signs would lead you to suspect the death of the foetus in utero?

49. State what are the two most ordinary positions of the head at the brim of the pelvis in natural labour; and how you would distinguish them.

50. How would you treat a child apparently stillborn?

51. How would you advise the bringing up of a child—(1) when partly, (2) when wholly, deprived of its mother's milk?

52. What causes hæmorrhage after the birth of the child? How would you treat it?

53. How do you determine whether a child is stillborn? Describe the various means you would have recourse to, to resuscitate a stillborn child. For how long a time would you persevere in your efforts?

54. Give the treatment of 'thrush'; of sore umbilicus; of infantile diarrhœa and of inflamed breast (in the infant).

55. If a child has to be brought up by hand, what would you give it from birth up to the twelfth month?

56. What is the most common cause of infantile diarrhœa, and how would you treat it?

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