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STUDENT'S GUIDE SERIES

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VICTORIA UNIVERSITY

DISEASES

OF

WOMEN

BY

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TO GUY'S HOSPITAL; EXAMINER IN OBSTETRIC MEDICINE
TO THE UNIVERSITY OF OXFORD, AND TO THE UNIVERSITY OF LONDON

Author of "A Manual of Midwifery for the Student and Practitioner"

FIFTH EDITION



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PREFACE TO THE FIFTH EDITION.

In the present edition, I have added a preliminary chapter on the anatomy of the female genital organs. I have thought this likely to be convenient to students, since, in any examination paper on Midwifery and the Diseases of Women, one question on anatomy or physiology is generally included.

Fifty-five new figures have also been added in this edition, many of them illustrating pathological conditions. Some of these have been taken direct from the specimens by the photo-gravure process. As in former editions, I have abstained from including diseases of the bladder, or the operation for vesico-vaginal fistula.

I have omitted all descriptions and figures of pessaries for anteversion and anteflexion of the uterus, believing that the view gains more and more acceptance in this country that mechanical treatment is rarely of advantage in such conditions, and that, at any rate, it should not be recommended, unless it be

to those who have given special study to the diseases of women.

Figure 52, showing Hodge's pessary in position, is drawn to a scale two-sevenths the size of nature. In Figure 18, showing the mode of introducing the uterine sound, and in Figures 59, 60, 61, 62, and 81, illustrating the varieties of prolapse and hyperplasia of the cervix uteri, the scale is two-ninths of the natural size.

49, Wimpole Street,
February, 1893.

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DISEASES OF WOMEN.

CHAPTER I.

ANATOMY OF THE FEMALE GENITAL ORGANS.

The female genital organs are commonly divided into two groups—(1) The external organs, comprising the Mons Veneris, with the structures included in the vulva, namely, the labia majora and minora, clitoris, vestibule, fossa navicularis, and fourchette; and (2) The internal organs, comprising the vagina, uterus, Fallopian tubes, and ovaries.

The *Mons Veneris* (Fig. 1 : 12) is a rounded prominence above the pubes, consisting of fat and cellular tissue, covered, from the time of puberty, with hair.

The *Labia Majora* (Fig. 1 : 1) form the lateral boundaries of the vulva. They consist of two thick, nearly parallel folds of skin, continuous in front with the Mons Veneris. Posteriorly they converge slightly, and are continued rather farther back than the anterior margin of the perineum. In the adult, they are covered with stout crisp hair, more abundant on the outer surface than the inner. They contain fat and cellular tissue, also elastic and unstriped muscular fibres, similar to those of the dartos in the male. They are provided with sebaceous and sweat glands.

The labia majora correspond in development to the scrotum. Hence the cleft scrotum in a case of hypo-

spadias in the male resembles more or less the labia majora, and, in infancy, may lead to a mistake as to sex. An inguinal hernia descends into the labium majus, as it does in the male into the scrotum.

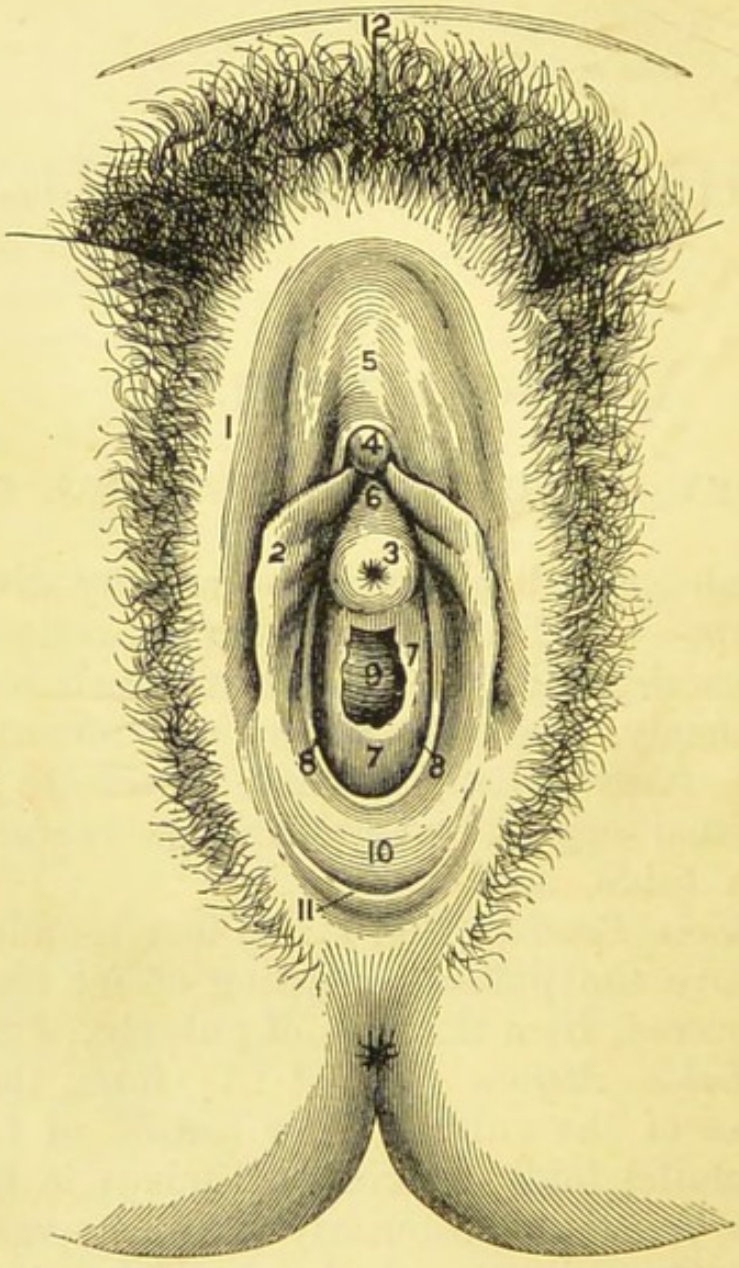


Fig. 1.—The Vulva in the Virgin, as seen when its sides are separated by lateral traction.

1, labium majus; 2, labium minus; 3, meatus urinarius; 4, glans clitoridis; 5, clitoris; 6, vestibule; 7, hymen; 8, duct of vulvo-vaginal gland; 9, vagina; 10, fossa navicularis; 11, fourchette.

The labia majora, forming the outlet of the vulva, look downward in the upright position of the adult, so that the Mons Veneris only is seen from the front. Normally, in the virgin, their internal borders are in

contact, so that they cover and conceal the clitoris and nymphæ. But, when the nymphæ are larger than usual, they project between the labia majora. In the infant, the labia majora are directed somewhat more forward, and do not so much conceal the internal parts.

The *Labia Minora* or *Nymphæ* (Fig. 1 : 2) are two folds of skin, one on the inner border of each labium majus. Anteriorly, they converge, and divide into two branches. The upper branch passes above the clitoris, and unites with its fellow to form the prepuce of the clitoris. The lower unites with its fellow below the clitoris. The development of the nymphæ varies considerably. Usually they are lost on the inner border of the labia majora at about the junction of the middle and lower third of the lateral border of the vulval orifice. But they may extend only one-third of the way down that border, or they may extend its whole length, uniting with the fourchette. A slight development of the nymphæ is often associated with a scanty growth of pubic and vulval hair. The nymphæ are covered with thin delicate skin, approximating in appearance to mucous membrane. Hence they used to be described as folds of mucous membrane. But, being skin, their glands are not mucous glands, but sweat and sebaceous glands, the latter being especially numerous about the prepuce of the clitoris. The nerve terminations also correspond to those found in skin and not in mucous membrane.

The line of demarcation between skin and mucous membrane can sometimes be seen in a young girl. It runs within the nymphæ, at the sides of the vestibule, and crosses the fossa navicularis between the fourchette and the hymen.

The *Clitoris* (Fig. 1 : 4, 5) corresponds, on a smal. scale, to the penis, except that it is not perforated by the urethra, and has no corpus spongiosum. It arises by two crura attached to the rami of the pubes. These unite superiorly to form the body of the clitoris, consisting of two corpora cavernosa, united in the

middle line. The glans clitoridis only is free above the level of the mucous membrane. The clitoris has also a suspensory ligament attached to the symphysis pubis. It is erectile, and is supplied by the pudic artery and pudic nerve, like the penis. The prepuce of the clitoris forms a kind of hood above it, but does not completely cover it.

The *Vestibule* (Fig. 1 : 6) is a triangular surface of mucous membrane, somewhat less than an inch in length. The apex, in front, is formed by the clitoris. Its sides are formed by the diverging nymphæ, and its base by a transverse line constituting the entrance of the vagina. At the centre of this base is the urethral orifice, or *meatus urinarius* (Fig. 1 : 3), from which the hymen diverges at each side. The vestibule contains mucous glands.

The *Hymen* (Fig. 1 : 7) forms the separation between the vulva and the vagina. It consists of a fold of mucous membrane, generally crescentic with its concavity forward, and terminating anteriorly at the meatus urinarius, where it is represented only by a thickening of the mucous membrane, which causes the posterior border of the meatus to be more prominent than the anterior. Often this thickening forms a rim directed forwards, and somewhat overlapping the meatus. Sometimes the hymen is annular, but narrower in front than posteriorly. In rare cases, the vagina is closed, either by an imperforate hymen, or by a septum immediately behind the hymen. A cribriform opening to the hymen is described as occasionally seen, but is very rare. In the virgin the orifice of the hymen is closed by apposition of its sides so as to form a longitudinal slit, or stellate figure, with its greatest axis longitudinal, the edges of the hymen being everted, so as to look downward. The vagina is not seen as shown in Fig. 1, until the sides of the vulva are drawn apart. In rare cases, the hymen forms a transverse slit. Immediately behind the hymen the vagina forms a transverse slit in all cases.

In a woman no longer a virgin, but nulliparous, the edges of the hymen are usually notched at several places nearly to its base, but the base can be traced as continuous. In a parous woman the base is no longer continuous. There may be isolated portions of the hymen remaining separated by gaps of smooth mucous membrane: or the hymen may be represented only by isolated tags, the *carunculæ myrtiformes*. The characteristic fact is that there has been not merely laceration, but more or less sloughing of intermediate portions from pressure. This effect upon the hymen is the most constant of all the signs of parity.

The *Fourchette* (Fig. 1 : 11) forms the anterior margin of the perineum. In most cases, when the parts are at rest, there is no sharp fold of skin, but only a gradual convexity from the perineum as far as the hymen. (*See* Fig. 2 : 9, p. 6.) The skin is drawn forward into a fold when the vulva is stretched laterally by the fingers, or by the fœtal head advancing in parturition. In some cases, however, the fold exists in all positions. This is so especially when the nymphæ are longer than usual; and the fourchette then unites their posterior extremities. When the nymphæ do not extend so far, the fourchette is lost laterally on the sides of the labia majora, a little anterior to their ends. It does not unite the posterior extremities of the labia majora, as is often stated.

The *Fossa Navicularis* (Fig. 1 : 10) is the space between the fourchette and the hymen. It only assumes the form of a boat-shaped depression when it is stretched laterally by an index finger placed in it on each side. The demarcation between skin and mucous membrane crosses it.

The *Bulbi Vestibuli* are elongated plexuses of veins lying one at each side of the vaginal orifice, partially covered toward its outer side by the sphincter vaginæ muscle. (Fig. 3 : 5, p. 7.) They lie in front of the anterior layer of the triangular ligament, and, anteriorly, are united by a tapering extremity to the

glans clitoridis. They are regarded as corresponding to the corpus spongiosum in the male.

The *Vulvo-vaginal Glands*, or *Glands of Bartolini* (Fig. 3 : 4), lie one on each side of the vaginal orifice, somewhat behind the posterior extremity of the bulbi vestibuli, and between the two layers of the triangular

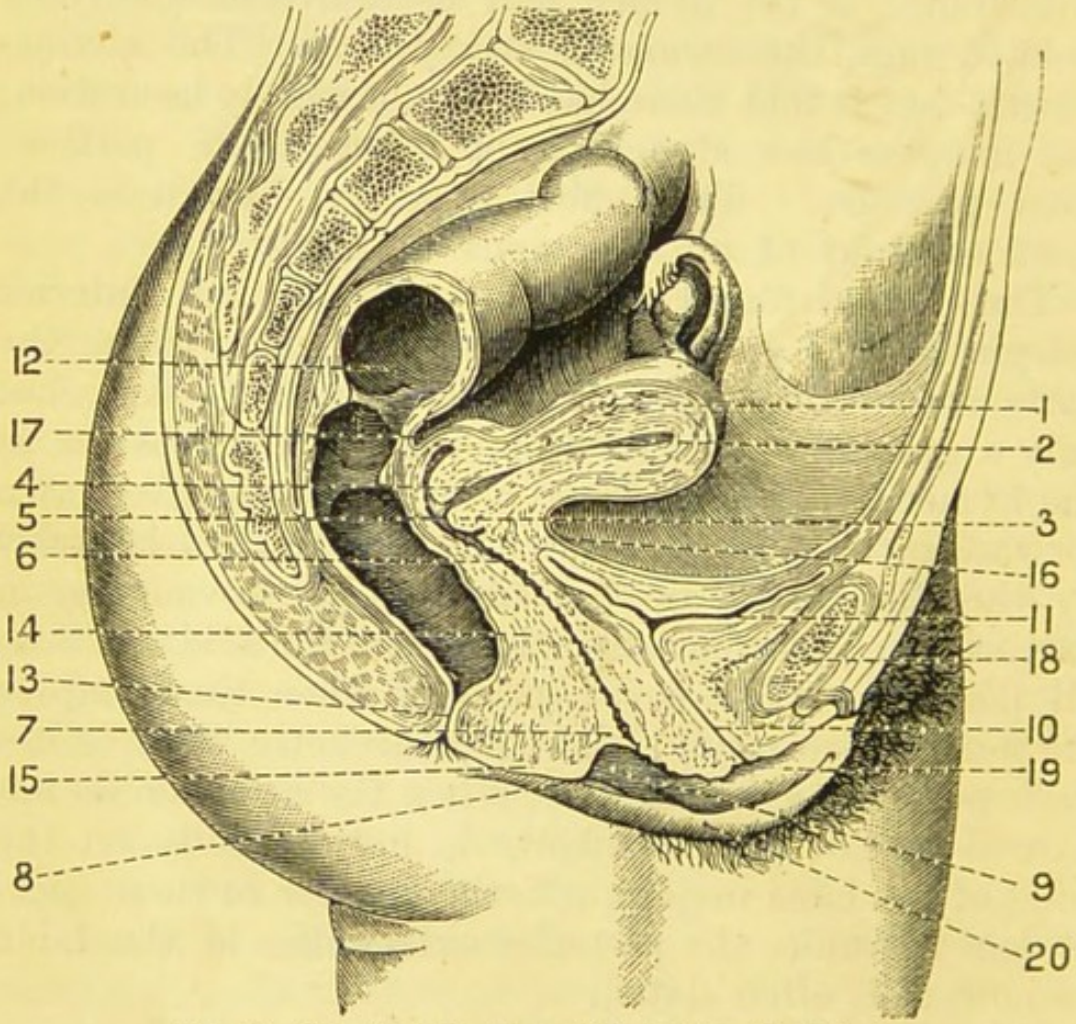


Fig. 2.—Vertical Section of Pelvis in the Virgin.

1, body of uterus; 2, its cavity; 3, the vaginal portion; 4, canal of cervix; 5, os uteri externum; 6, the vagina; 7, hymen; 8, fourchette; 9, fossa navicularis; 10, urethra; 11, bladder; 12, rectum; 13, anus; 14, recto-vaginal septum; 15, perineum, forming the lower border of the triangular perineal body; 16, vesico-uterine fossa of peritoneum; 17, recto-vaginal or Douglas's fossa of peritoneum; 18, os pubis; 19, labium minus; 20, labium majus.

ligament. The duct, about half an inch long, runs forward and opens just outside the hymen, a little below the centre of its lateral border. The glands correspond to Cowper's glands in the male, and secrete lubricating mucus under the influence of excitement and in labour.

The *Pelvic Floor* fills up the outlet of the bony pelvis, and is made up of certain muscles, with fasciæ and connective tissue. Its external surface is convex and covered with skin. It is pierced by the rectum, the orifice of which is firmly closed by the sphincter

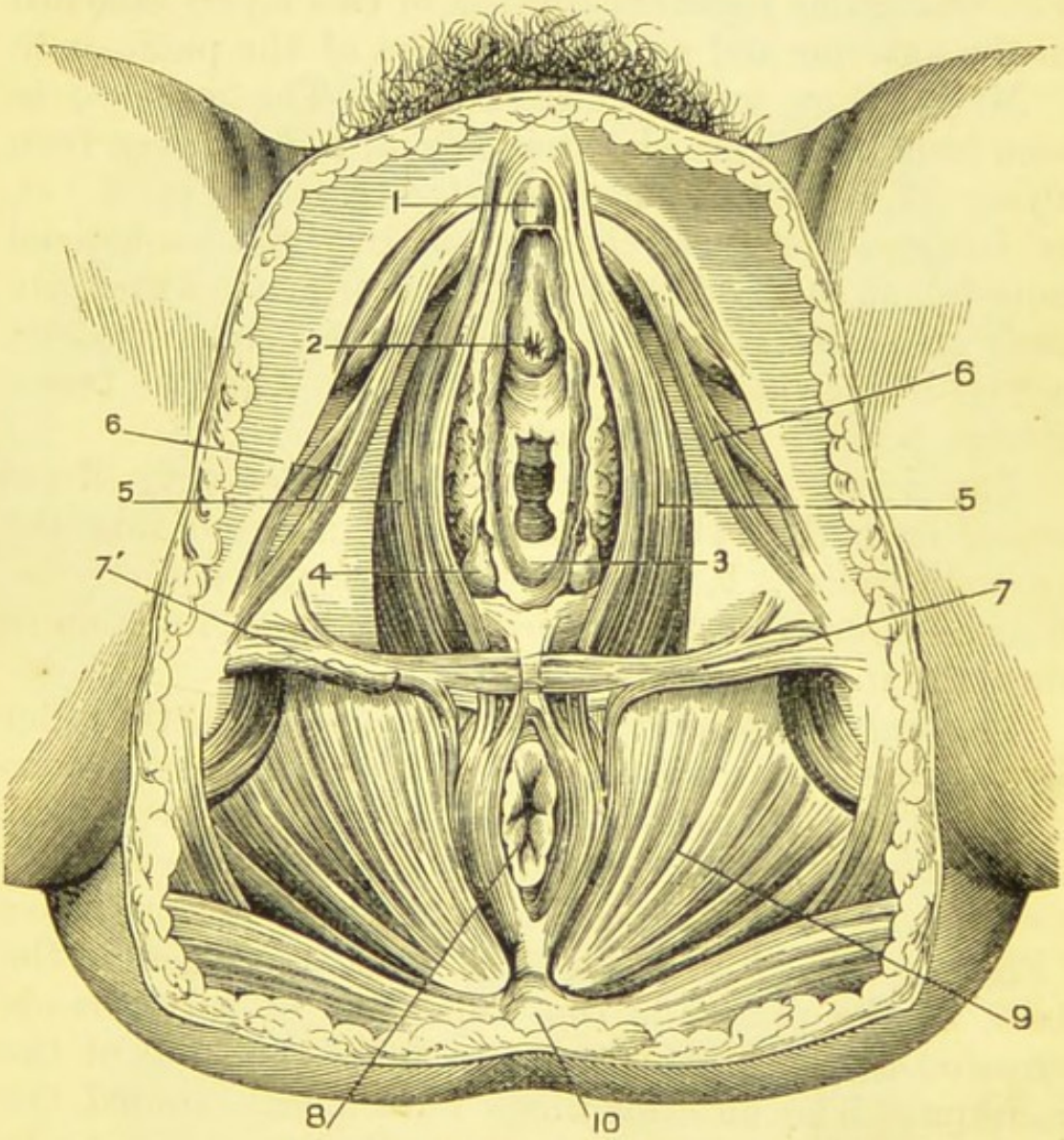


Fig. 3.—Muscles of Pelvic Floor.

1, glans clitoridis; 2, meatus urinarius; 3, hymen; 4, vulvo-vaginal gland; 5, sphincter vaginæ, or bulbo-cavernosus; 6, erector clitoridis, or ischio-cavernosus; 7, transversus perinei; 8, anus, with sphincter ani surrounding it; 9, levator ani; 10, coccyx.

ani, and by the vagina, which forms a transverse slit, while the vulva is a longitudinal slit.

Fasciæ of the pelvic floor.—The superficial fascia is formed by the subcutaneous connective tissue, and corresponds to the superficial fascia in other parts.

The deep layer of the superficial fascia is attached laterally to the borders of the pubic arch, down to the level of the transversus perinei muscle. It dips down behind the transversus perinei (Fig. 3 : 7), and unites with the anterior layer of the triangular ligament. The triangular ligament consists of two layers attached to the anterior and posterior borders of the pubic arch.

Muscles of the Pelvic Floor.—The muscles, as seen from below, are shown in Fig. 3, p. 7 ; as seen from above in Fig. 4. The *sphincter vaginæ* (Fig. 3 : 5), or bulbo-cavernosus, consists of two flat superficial muscles, at each side of the vaginal orifice. Anteriorly each arises by three slips, close to the clitoris, posteriorly it blends in the perineal body with the transversus perinei and sphincter ani.

The *erector clitoridis* or *ischio-cavernosus* (Fig. 3 : 6) arises from the tuber ischii, and is inserted into the crus clitoridis. It is doubtful whether it has any influence in erecting the clitoris, but it has a function in drawing it backward in coitus.

The *transversus perinei* (Fig. 3 : 7) arises from the tuber ischii, and blends with its fellow in the perineal body.

The strongest muscles forming the most important elements in the pelvic floor are the levator ani and the coccygeus. These are best seen in the view from above (Fig. 4). The *levator ani* (Fig. 4 : 5) is attached to the back of the pubes, to the white line of pelvic fascia crossing the obturator internus, and to the spine of the ischium. The anterior fibres form a loop around the vagina (Fig. 4 : 2′), and constitute the true sphincter to that canal, rather than the comparatively weak muscle called sphincter vaginæ. The middle fibres blend with the sphincter ani ; the posterior unite with their fellows of the opposite side, and some are attached to the tip of the coccyx. In connection with this muscle, a narrow but firm fibrous band leaves the pubes at each side, near the apex of the pubic arch, and is lost upon the posterior vaginal wall, near its centre.

The *Coccygeus* arises from the spine of the ischium,

and spreads out, in a fan shape, to be attached to the side of the coccyx, and lower part of the sacrum.

The Vagina (Fig. 2 : 6, p. 6) is a canal approximately parallel to the brim of the pelvis—that is to say, inclined at an angle of about 60° to the horizon.

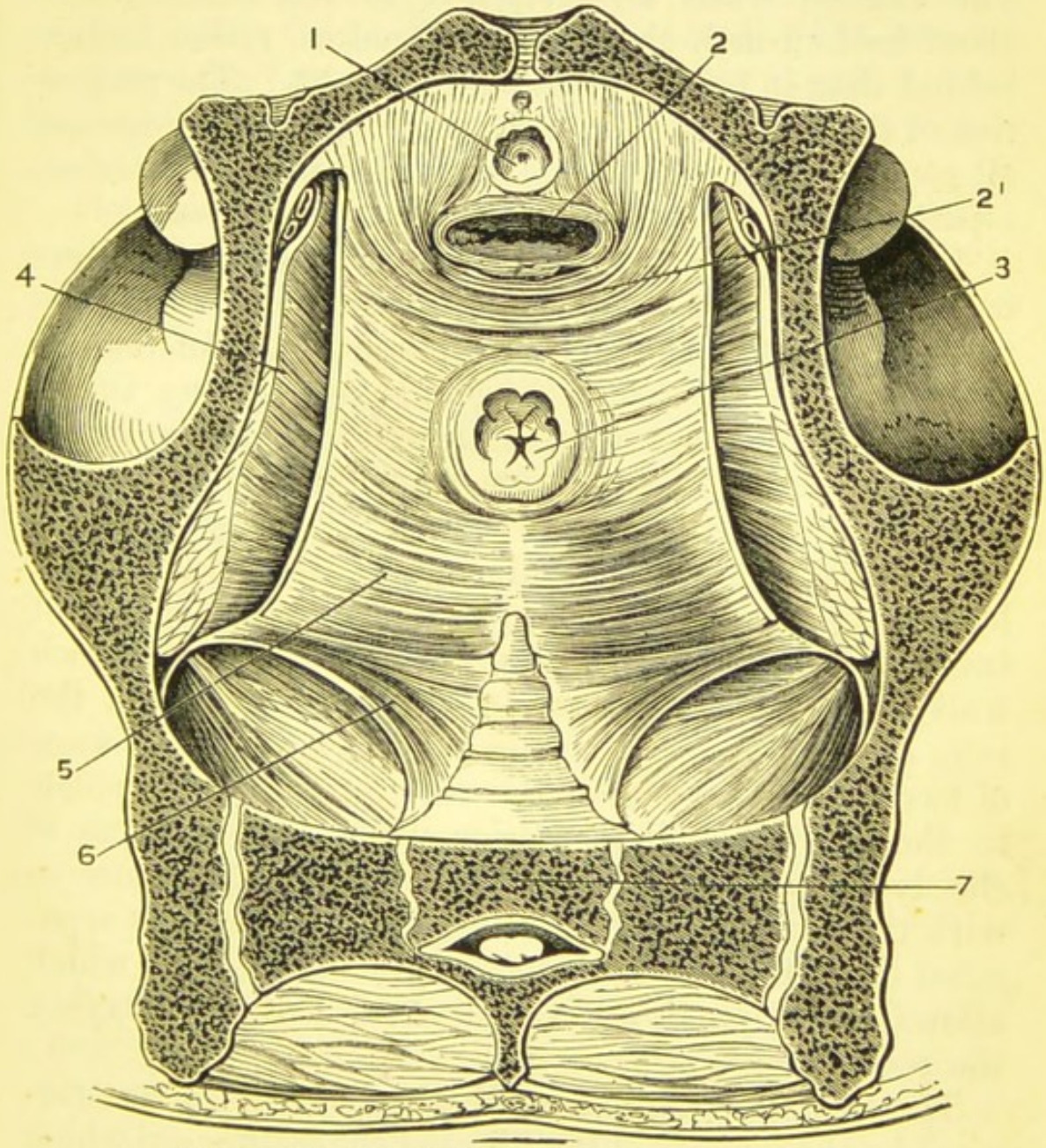


Fig. 4.—Muscles of Pelvic Floor seen from above.

1, urethra; 2, vagina; 2', anterior fibres of levator ani surrounding vagina; 3, anus; 4, obturator internus; 5, levator ani; 6, coccygeus; 7, sacrum.

When unstretched, it forms a transverse slit, and has thus an anterior and posterior wall, which are in contact with each other. Each wall is broader above than below, and thus approximates to a triangular shape.

The cervix uteri, the axis of which is nearly at right angles to the vagina, is inserted into the anterior wall at the upper part. The posterior wall is therefore longer than the anterior, the former measuring, when unstretched, about four, the latter about three inches. The vaginal walls are attached to the cervix uteri about half an inch above the external os, rather higher behind than in front. (Fig. 6 : 9, 10, p. 12.) The projection of the cervix uteri into the vagina forms a depression all round. This is regarded as divided into an anterior, a posterior, and two lateral *fornices* or *culs-de-sac*.

The lining membrane of the vagina is mucous membrane, having a squamous epithelium. It is normally destitute of glands, although some anatomists describe occasional mucous glands as existing in it. The surface is thrown into numerous transverse rugæ, which facilitate its expansion in parturition. Outside the epithelium is a layer of connective tissue, containing some unstriped muscular fibres, then an internal longitudinal layer, and an external circular layer, of involuntary muscular fibres. At the centre of each wall towards its lower part is a prominent ridge, the relic of the formation of the canal by the coalescence of two halves. That on the anterior wall corresponds to the urethra. The anterior wall of the vagina is closely connected with the bladder, and still more so with the urethra. The posterior vaginal wall is separated from the rectum by loose connective tissue, which allows the vaginal wall to descend without carrying the rectum with it.

The posterior vaginal wall is rendered convex forward by the tonicity of the fibres of the levator ani which encircle it. Hence the canal is sigmoid-shaped in antero-posterior section, and the finger introduced into the virgin vagina impinges upon the cervix uteri in front of the os.

The *perineal body* (Fig. 2 : 15, p. 6) forms the lower part of the septum between vagina and rectum, where the walls of the two canals diverge. It is roughly triangular

in antero-posterior section. The base is the *perineum*, or skin between anus and vulva; the apex is continuous with the upper and thin portion of the recto-vaginal septum. The main substance of the perineal body is made up of the intersections of muscles, mainly of those of the levator ani with the sphincter ani and sphincter vaginæ. It is thus a firm structure; and, when intact, supports the anterior vaginal wall in resisting the intra-abdominal pressure, which is exerted at right angles to the vaginal canal, or nearly so.

The UTERUS is a hollow muscular organ, having thick walls. On coronal section, it is seen to be made up of two

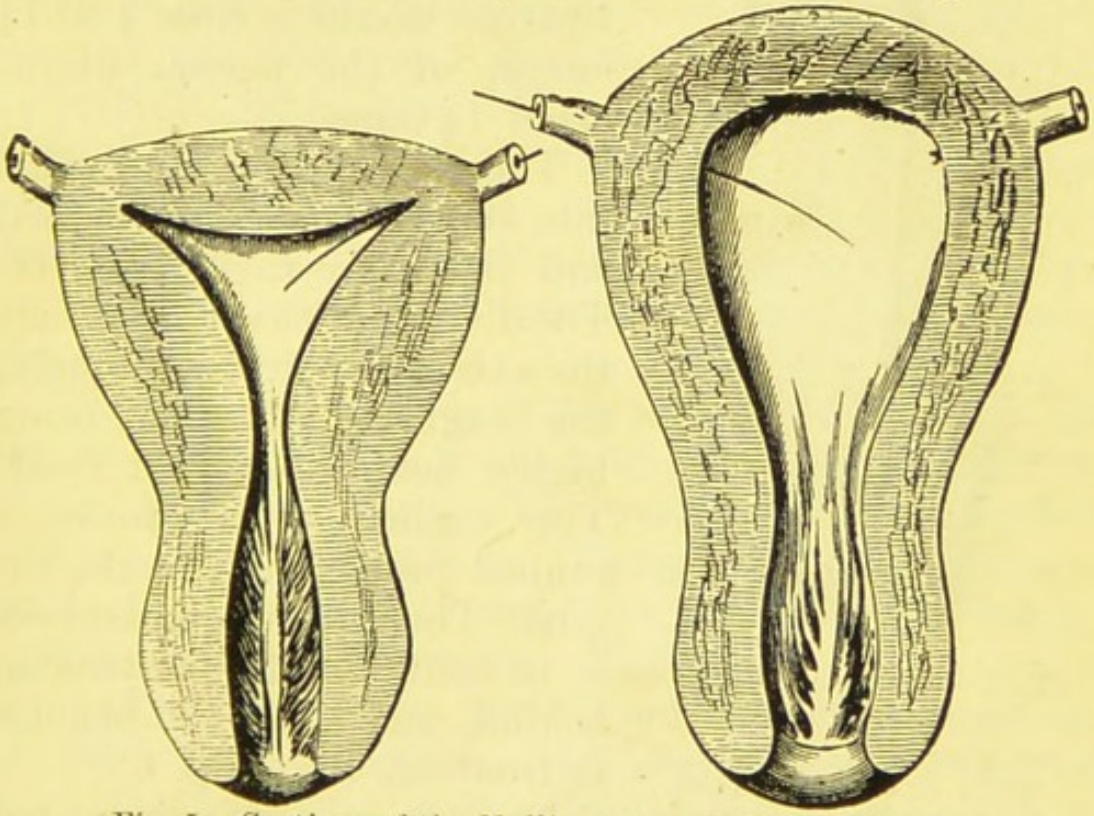


Fig. 5.—Sections of the Nulliparous and Parous Uterus.

parts, the body and cervix, differing in the character of their lining mucous membrane, and divided by a constriction, the internal os.

Regarding the uterus as a whole, the posterior surface is covered by peritoneum down to the level of the septum dividing the pouch of Douglas from the vagina, about half way down the posterior surface of the cervix. The attachment is very close at the upper part, but becomes looser over the cervix. The anterior surface is covered with peritoneum for its upper half;

the lower half is in contact with the bladder, cellular tissue intervening, down to the level of the vaginal reflection. Laterally the peritoneum leaves the sides of the uterus to form the broad ligaments. The anterior surface of the body of the uterus is nearly flat, the posterior surface much more convex (Fig. 6 : 1, 2). The length of the uterus externally is from $2\frac{3}{4}$ to $3\frac{1}{4}$-in., its width at the fundus from $1\frac{1}{2}$ to $1\frac{3}{4}$-in., the thickness of its walls about $\frac{1}{2}$-in., the length of its cavity in the virgin uterus $2\frac{1}{4}$-in. The weight of the multiparous uterus is from 1 to $1\frac{1}{4}$ ounce, of the parous uterus about $1\frac{1}{2}$ ounce.

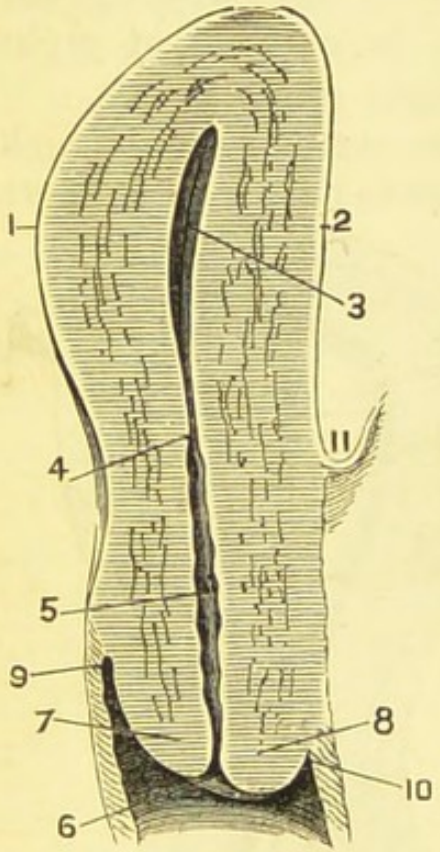


Fig. 6.—Antero-posterior Section of Uterus.

1, posterior wall; 2, anterior wall; 3, cavity of body; 4, internal os; 5, cavity of cervix; 6, external os; 7, posterior lip of cervix; 8, anterior lip of cervix; 9, posterior vaginal fornix; 10, anterior vaginal fornix.

The *cervix uteri* is divided into two portions—the vaginal and the supra-vaginal cervix. The division between them cuts the axis of the cervix obliquely, the vaginal reflection being higher behind than in front. The vaginal cervix forms a conical projection into the vagina. The supra-vaginal cervix is in contact with peritoneum behind, and with the bladder in front (*see* Fig. 2, p. 6).

The vaginal cervix is covered outside with squamous epithelium like that of the vagina. Normally this is continued into the cervical canal for about $\frac{1}{8}$ to $\frac{1}{4}$-in., and then changes suddenly into cylindrical epithelium. There are numerous papillæ approaching the surface, but normally no glands. Gland cavities, however, generally occluded, are often formed under the influence of irritation, and constitute the so-called "ovula Nabothii." The external os in the multiparous uterus

is a smooth, round, or oval opening, which feels a mere dimple to the finger. In the parous uterus it is more transverse. When lacerations have occurred, it is often cleft deeply on one or both sides, so as to divide the cervix into anterior and posterior lips.

The *cavity of the cervix* is spindle-shaped, bounded below by the external and above by the internal os. Its lining mucous membrane is thrown into complicated ridges and furrows, forming what is called the "arbor vitæ." There are median ridges on the anterior and posterior walls, and numerous oblique ridges radiating from these. (Fig. 5, p. 11.) The mucous membrane is provided with numerous racemose mucous glands, which open on the ridges and furrows. They are lined with cylindrical epithelium. The upper limit of the arbor vitæ does not always correspond with the greatest constriction of the canal, forming the os internum. Before puberty, it extends into the body of the uterus. In the parous uterus it does not extend so high as in the nulliparous.

The *cavity of the body of the uterus* is triangular, the angles corresponding to the internal os and the orifices of the Fallopian tubes. The walls are convex inwards in the nulliparous uterus. The anterior and posterior walls are in contact, or nearly so, the cavity containing only a few drops of mucus. The mucous membrane of the body of the uterus forms a soft layer varying from $\frac{1}{16}$ to $\frac{1}{8}$-in. in thickness. It is in immediate contact with the muscular wall, without the intervention of any loose connective tissue. It contains numerous glands, the utricular glands, not racemose like those of the cervix, but simple or branching ones, which run more or less nearly at right angles to the surface. The surface is covered with a simple layer of cylindrical ciliated epithelium. The epithelium of the glands is also cylindrical and ciliated, at any rate in their more superficial portions. The lumen of the glands generally becomes wider in the deeper part of the mucous membrane. The tissue between the glands is connective

tissue of rather embryonic type, containing round and spindle-shaped cells, with fibrillæ amongst them.

The muscular wall of the uterus consists of involuntary muscular fibres, which grow to a great size in pregnancy. Amongst them is some connective tissue, and round and oval cells. Three layers of muscle are described, but are not distinct in the unimpregnated uterus.

Arrangement of Pelvic Peritoneum.—The peritoneum descends from the posterior wall of the abdomen, and covers the first part of the rectum and anterior surface of the sacrum. It gradually leaves the second part of the rectum, but dips down to form a pouch behind the cervix uteri, descending behind the upper half inch, or sometimes upper inch, of the posterior vaginal wall. (Fig. 2, p. 6.) It then ascends the posterior wall of the uterus, and forms a fold over the uterus and Fallopian tubes, reaching right across the pelvis from side to side. The parts of this fold at each side of the uterus are termed the broad ligaments of the uterus; and the whole fold has been called the mesometrium. The peritoneum descends the anterior wall of the uterus and broad ligaments down to about the centre of the uterus, corresponding with the position of the internal os. It is then reflected over the bladder, and leaving the bladder, reaches the anterior wall of the abdomen, a little above the top of the pubes. The pelvis thus contains an ante-uterine and a retro-uterine fossa of peritoneum. The term "pouch of Douglas" is applied, not to the whole retro-uterine fossa, but to that deepest portion of it which lies below the centre of the uterus, and is bounded laterally by the utero-sacral ligaments, diverging from the centre of the uterus to the sides of the sacrum. Behind it has the rectum and the anterior face of the sacrum; in front the supra-vaginal cervix, and the upper half inch, or upper inch, of the vagina. It generally dips lower on the left side than on the right. Normally, the upper part of the retro-uterine fossa is filled by

small intestines, but not the pouch of Douglas, or at any rate, not its lower portion. Its walls are in apposition, or it contains only a few drops of peritoneal serum.

Ligaments of the Uterus.—The formation of the broad ligaments has already been described. Each broad ligament consists of a double fold of peritoneum, with a thin layer of connective tissue intervening. It extends outward and somewhat backward from the side of the uterus to the pelvic wall in front of the sacro-iliac synchondrosis, there coming in contact with the obturator internus muscle. The layers of peritoneum separate somewhat as they approach the pelvic wall. For the greater part of its extent the broad ligament

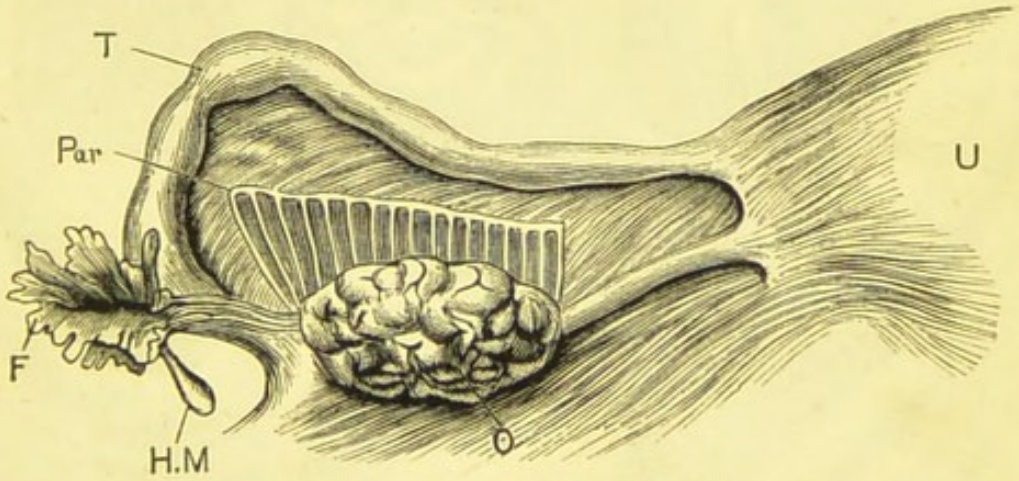


Fig. 7.—Right Broad Ligament seen from behind.
U, uterus; T, Fallopian tube; F, fimbria; H M, hydatid of Morgagni; O, ovary, united to uterus by ovarian ligament; Par, parovarium.

has a free and loose upper border, formed by the Fallopian tube. (Fig. 7.) The ovarian fimbria connects the extremity of the Fallopian tube with the ovary. This, together with the upper margin of the outer part of the broad ligament, not occupied by the Fallopian tube, is described as the *infundibulo-pelvic ligament* of the ovary.

As seen from above (Fig. 8, p. 16) the broad ligament appears to diverge into three divisions. The central is the Fallopian tube forming the free border. The anterior is the *round ligament* of the uterus. This arises near the origin of the Fallopian tube, and takes a curved course outward, forward, and upward, to be inserted near the inner column of the external abdomi-

nal ring. It consists mainly of unstriped muscle, but contains also some striped muscle, and corresponds to the gubernaculum testis in the male sex.

The posterior division is formed by the ligament of the ovary passing from the angle of the uterus to the ovary itself. The ovary projects from the posterior lamina of the broad ligament, attached to it by a peri-

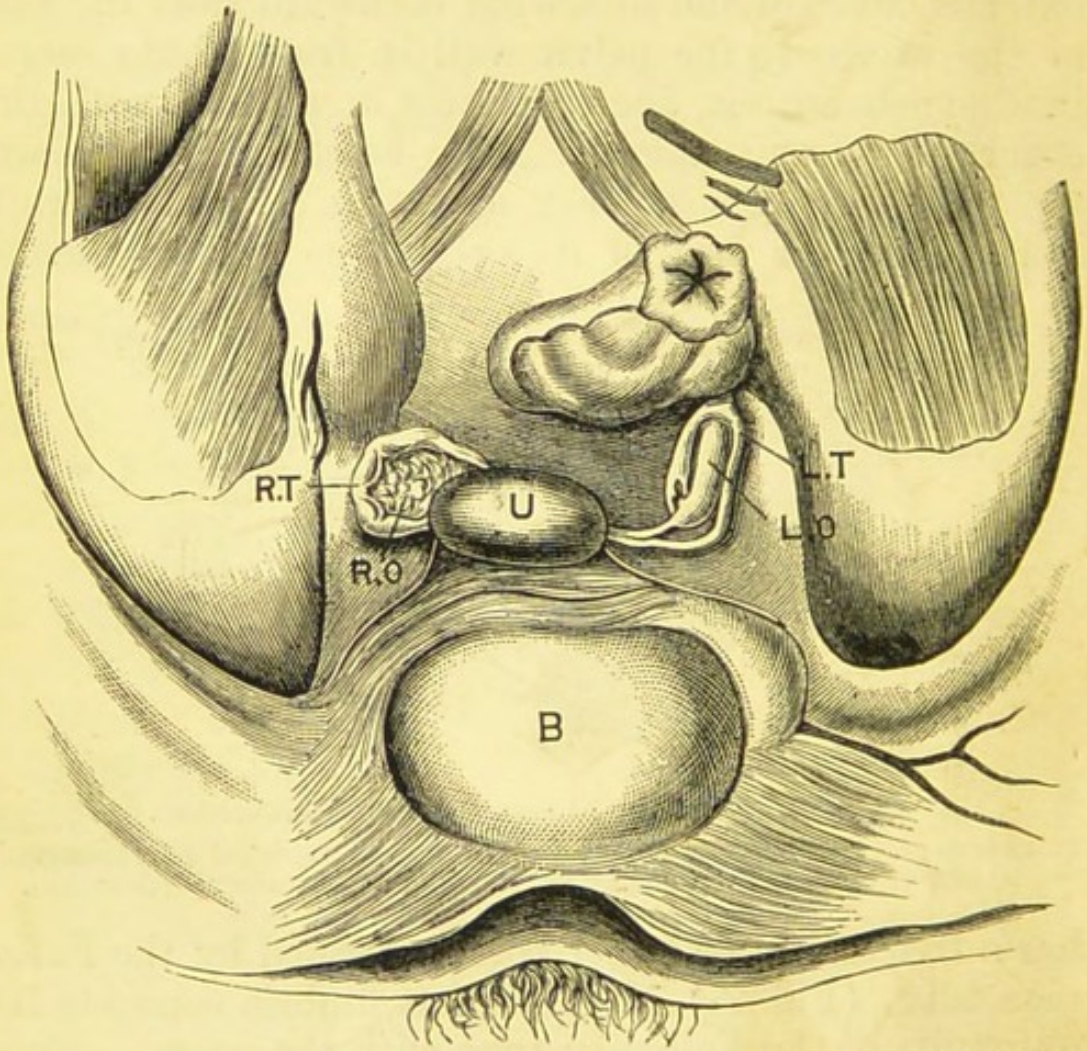


Fig. 8.—Position of Uterus and Ovaries as seen from above, the bladder being partially filled.

U, uterus; R T, right Fallopian tube; L T, left Fallopian tube; R O, right ovary; L O, left ovary; B, bladder.

toneal fold, the mesovarium. The ovary is not covered, strictly speaking, by the peritoneum of the broad ligament, but by the modified germ epithelium.

The *utero-sacral ligaments* form ridges on the posterior laminæ of the broad ligaments near to their base. On each side a fold of peritoneum—the fold of Douglas—runs from the lower part of the body of the uterus,

close to the internal os, backward and outward to the second bone of the sacrum, and forms the upper rim of the lateral boundary of the pouch of Douglas. Beneath these folds are strong fibrous bands, which can be readily felt from the rectum. If a fresh specimen of broad ligament is stretched out and held up to the light, the *parovarium*, or remains of the Wolffian body (Fig. 7, p. 15) is seen. The duct runs near the Fallopian tube, becoming lost as it approaches the uterus. From it straight tubes run vertically, or slightly converging, toward the ovary, and may penetrate its hilum.

In the same space, between the ovary and tube, is seen a plexus of veins, the pampiniform plexus. The broad ligament thus contains a part of the round ligament, the Fallopian tube, the ligament of the ovary, the parovarium, the uterine and ovarian arteries and veins with their branches, the pampiniform plexus, nerves and lymphatics, connective tissue and unstriped muscular fibres, the last especially on its surface. The ureter crosses its base, on its way toward the bladder. The ovary is attached to its posterior surface, without being actually contained in it.

The broad ligaments allow considerable movement of the uterus, and in pregnancy are stretched upward, so that their border becomes nearly vertical. The round ligaments, being muscular, draw the fundus forward, when it has been much displaced backward, as by a distended bladder, but are not usually on the stretch. The centre of the uterus at the level of the internal os is its most fixed portion, being firmly attached by the utero-sacral ligaments to the sacrum, and connected anteriorly to the pubes through the connective tissue at the base of and around the bladder. Usually the right broad ligament is a little shorter than the left, so that the fundus deviates a little to the right, and the front of the uterus is also rotated somewhat to the right. (*See* Fig. 8.)

The Fallopian Tubes are two tubes, one running from each angle of the uterus, by which the uterine

cavity communicates with the peritoneal cavity. They are enclosed in the upper free margin of the broad ligament. The length of each tube is about four inches; but owing to its curved position, the fimbriated extremity is not distant usually more than about two inches from the angle of the uterus. The uterine portion of the tube is the narrowest, and barely admits a bristle. On leaving the angle of the uterus it runs outwards for about an inch, its whole diameter being about $\frac{1}{6}$-inch. This portion is called the isthmus. It then becomes thicker and its lumen wider, and curves first upwards and forwards, then backwards, downwards, and finally inwards, so that it encircles the ovary, and its fimbriated extremity lies beneath it; and, in the normal position, nearer to the uterus than the centre of the tube. This shape is compared to that of a shepherd's crook (Fig. 8, p. 16). This portion is called the ampulla, and its outside diameter is about $\frac{3}{8}$-inch. The fimbriated extremity (pavilion or infundibulum) consists of bifurcating fimbriæ, radiating from the peritoneal opening of the tube. The longest fimbria, or ovarian fimbria, is attached to the ovary, and keeps the fimbriated extremity within a fixed distance from that organ. The uterus being commonly nearer to the right side of the pelvis, the right tube is often rather shorter than the left; the right ovary has its long axis more vertical than the left, and thus the right tube curves more downwards, and lies nearer to the side of the uterus than the left.

On transverse section, it is seen that about three-fourths of the circumference of the tube is covered with peritoneum. The remainder is in contact with the cellular tissue between the layers of the broad ligament, here called meso-salpinx. Next comes the muscular wall, consisting of an outer longitudinal and inner circular layer of unstriped muscular fibre. The innermost layer is the mucous membrane, which is destitute of glands, but is thrown into deep longitudinal folds, so that on transverse section a stellate opening is

seen, with very small central lumen. These folds, by increasing the surface of mucous membrane, answer the purpose of glands. They are continuous with the fimbriæ at the ostium. Both fimbriæ and lining membrane are covered with cylindrical ciliated epithelium. The ciliæ are supposed to produce a current of peritoneal serum towards the open ostium, and in the direction of the uterus.

Development.—The Fallopian tubes, uterus, and vagina are developed from the ducts of Müller, two tubes which in the embryo run from the front of the Wolffian body to the cloaca. The lower portions unite to form the uterus and vagina; the upper portions remain separate as the Fallopian tubes. The tube has originally a cæcal extremity, which remains as the hydatid of Morgagni (Fig. 7, H.M., p. 15), attached to the fimbriæ of the Fallopian tube. The pavilion of the tube is thus an opening formed in the duct of Müller a very short distance from its cæcal extremity. Varieties in the development and coalescence of the ducts of Müller lead to certain congenital malformations.

The OVARIES lie one at each side of the uterus, attached to the posterior face of the broad ligament (Fig. 7, p. 15). The ovary is a small flattened ovoid body, its length, on an average, about $1\frac{1}{3}$-in., breadth $\frac{3}{4}$-in., thickness $\frac{3}{6}$-in. Its weight normally varies from 60 to 120 grains.

Ligaments.—The anterior border or hilum of the ovary is attached obliquely to the broad ligament by the mesovarium, a fold of peritoneum, through which the vessels and nerves enter. The strongest attachment of the ovary is the ovarian ligament, which runs from its inner angle to the angle of the uterus, just behind the origin of the Fallopian tube. This ligament is not liable to stretch much, and therefore causes the ovary, in any displacement, to describe the arc of a circle about the angle of the uterus. The attachment of the ovary by the ovarian fimbria to the pavilion of the tube, and thence, by the free border of the broad

ligament, to the pelvic wall, is called the infundibulo-pelvic ligament of the ovary.

Structure.—The ovary consists of a connective-tissue stroma in which are embedded the Graafian follicles, which contain the ovules. It is made up of two portions—a cortical zone containing the Graafian follicles, or most of them, and a medullary zone, consisting of the stroma near the hilum, carrying

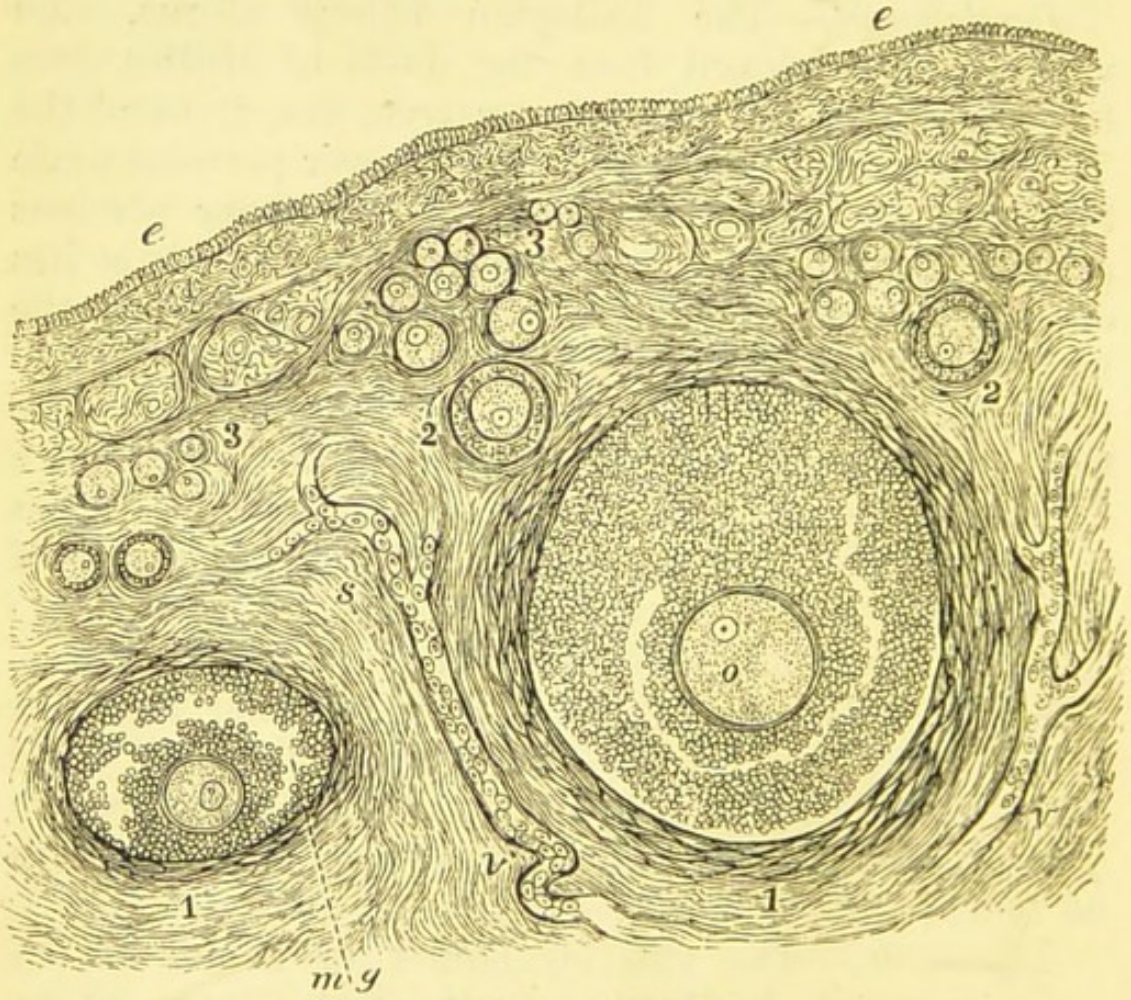


Fig. 9.—Section of Cat's Ovary.

e, epithelium; *mg*, membrana granulosa; *v*, vessel; *o*, ovule; 1, medium-sized follicles; 2, smaller follicles; 3, smallest follicles.

vessels and nerves. The surface is covered with a cubicle epithelium (Fig. 9, *e*), different in character from the flattened epithelium of the peritoneum. The line of demarcation between the two can be seen at the hilum. A fibrous membrane beneath this is described, and termed the tunica albuginea, but is only a condensed portion of the general stroma. The smallest follicles lie close to the surface. As they get somewhat

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longer they lie deeper in the ovary; but as they approach maturation, their superficial part again approaches the surface, and the wall becomes thinned until it gives way (Fig. 10). The stroma consists of wavy, dense, connective tissue mingled with elastic fibres, and some unstriped muscular fibres. Besides the follicles there may be seen one or more corpora lutea of menstruation, developed from the membrana granulosa of a follicle which has ruptured, and many fibrous spots, which remain as the ultimate relic of the corpora lutea. The surface of the ovary is smooth in a child. In the adult it becomes wrinkled

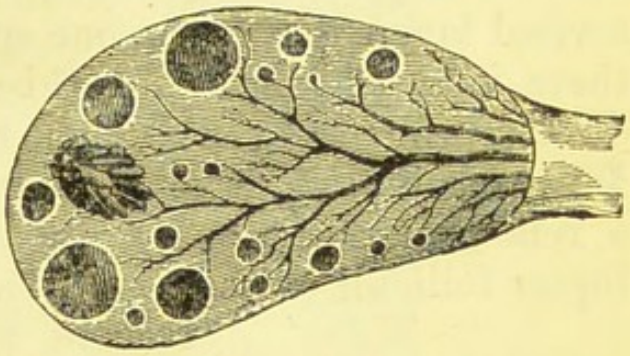


Fig. 10.—Transverse section of Human Ovary, showing Graafian follicles approaching maturation. (About twice the natural size.)

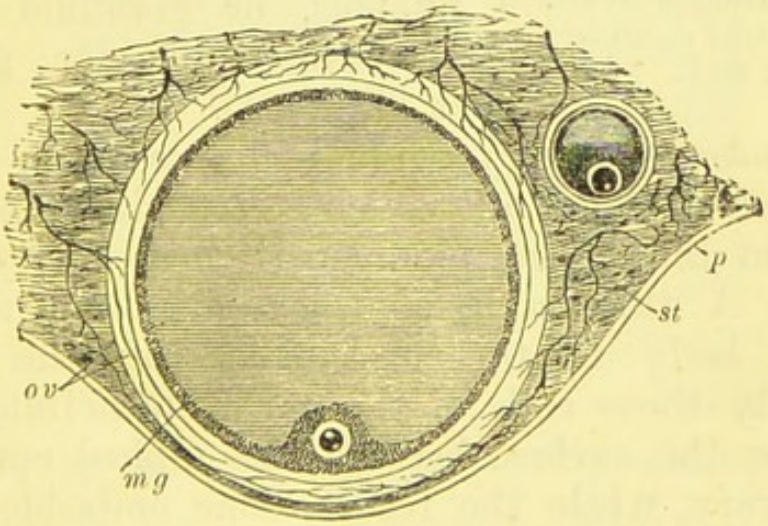


Fig. 11.—Section of two Graafian Follicles of different sizes.

p, peritoneal or quasi-peritoneal covering; *st*, ovarian stroma; *o v*, the two outer layers of the ovisac, the so-called tunica fibrosa and tunica propria; *m g*, membrana granulosa, or epithelial lining of the ovisac. Around the ovum the accumulated cells are seen forming the discus proligerus. (Enlarged about eight diameters.)

and scarred, from the rupture of follicles; after the menopause it becomes smaller and still more wrinkled (Fig. 7, p. 15). The developed Graafian follicle is generally described as having three coverings. The outer,

or tunica fibrosa, consists of highly vascular connective tissue; the middle, or tunica propria, consists merely of the condensed stroma around the follicle. The inner and most important layer, lining the follicle, is the membrana granulosa, made up of rounded granular cells several layers deep. At one spot on the circumference there is a thickening of this epithelium, called the discus proligerus, in which the ovum is embedded. When the follicle is approaching maturity, it contains a relatively large space filled with clear fluid, the liquor folliculi (Fig. 11, p. 21). The follicle normally reaches about $\frac{1}{4}$-in. diameter at maturity, but follicles larger than this are often seen.

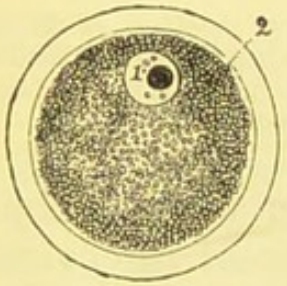


Fig. 12.—Human Ovule. 1, germinal vesicle; 2, yolk.

The ovum itself may be regarded as a developed cell about $\frac{1}{150}$-in. in diameter, having a cell-wall, or zona pellucida, containing the yolk or cell-substance, a nucleus, or germinal vesicle, and a nucleolus, or germinal spot (Fig. 12).

Development.—Every ovule is derived from a cell of the "germ epithelium," which is a modification of the epithelium lining the pleuro-peritoneal cavity of the embryo. A thickening of this epithelium near the Wolffian body is the first trace of the ovary. Eventually those cells of the germ epithelium which remain on the surface become the cubical epithelium of the ovary, while the rest become embedded in the stroma, and form, some or all of them, the ovules. Authorities differ as to the exact process by which the ovules are embedded, and many hold that the cells of the membrana granulosa are also derived from the germ epithelium. According to Foulis the stroma grows amongst the cells of the germ epithelium, and eventually isolates every cell, except those on the surface. The cells of the membrana granulosa are derived from the connective tissue cells surrounding

the ovule (Fig. 13). Certainly, in the human ovary, the smallest ovules appear to lie naked in the stroma, surrounded only by a few elongated cells, like con-

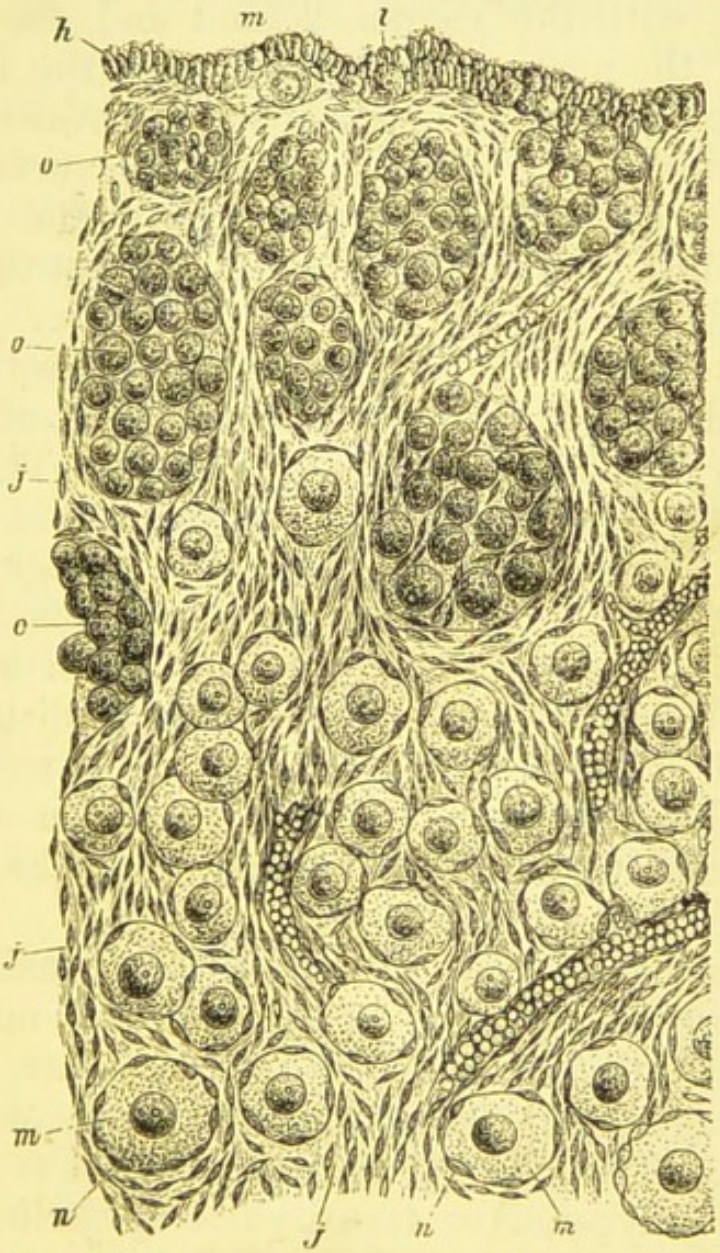


Fig. 13.—Section through the Ovary of a Human Fœtus of Seven Months.

On the surface is seen the germ epithelium (*h*); at *l* is seen a large spherical germ epithelium corpuscle; lower down groups of similar corpuscles, or egg-clusters (*o*), are embedded in the meshes of the connective tissue stroma (*j*); many primordial ova (*m*), in various stages of development, are seen, chiefly in the lower part of the figure; in contact with each primordial ovum are fusiform connective tissue corpuscles (*n*), similar to the fusiform corpuscles of which the stroma consists; numerous blood-vessels ramify throughout the ovary. (After Foulis.)

nective tissue cells, and resembling those shown as surrounding the primordial ova in Fig. 13.

The Bladder and Urethra.—The bladder is in

contact in front and below with the pubes—from which it is separated by a triangular space of loose cellular tissue between bladder, pubes, and urethra—behind and below with the vagina, behind and above with a portion of the neck of the uterus from the internal os to the anterior vaginal fornix, with the broad ligaments at each side. The rest of the upper surface of the bladder is covered by peritoneum. The pouch of peritoneum in front of the bladder is about the level of, or a little below, the top of the pubes when the bladder is empty. It is carried upwards as the bladder is distended. It is also carried upwards by the stretching of the cervix uteri in labour. The shape of the empty bladder, when contracted, is ovoid or pyriform. When lax, it is triangular in sagittal section (*see* Fig. 2, p. 6). When the bladder is distended, the uterus is carried bodily backward, or retroposed, and partially retroverted. In extreme distension, all the small intestines are displaced, not merely from the pouch of Douglas proper, but from the whole retro-uterine fossa of peritoneum, and the uterus is pressed back against the sacrum.

The muscular wall of the bladder consists of unstriped muscular fibres. The fibres are much interlaced, but an external longitudinal layer, a middle circular layer, and an internal longitudinal layer are described. The mucous membrane consists of several layers of polygonal or transitional epithelium, with a layer of connective tissue beneath.

The base of the bladder as seen from within has three openings—the internal orifice of the urethra, and the orifices of the two ureters. The internal orifice of the urethra bisects the distance from the meatus urinarius to the cervix uteri, each half being 1½-in. The line joining the ureters again bisects the distance between the internal orifice and the cervix uteri, the orifices of the ureters lying about ⅝-in. on each side of the middle line. The triangular space formed by the three orifices is called the trigone.

The urethra is a straight canal about 1½-in. long, its posterior wall closely blended with the anterior wall of the vagina. Its walls have a double layer of unstriped muscular fibre, the outer layer being circular. The epithelial lining is squamous at the lower part, and resembles that of the bladder at the upper. There is a layer of connective tissue beneath it. Skene's glands are two tubules lying near the floor of the urethra, and extending upwards from the meatus urinarius about ¾-in.

Course of the Ureters in the Pelvis.—The ureter, descending in front of the psoas muscle, crosses in front of the external iliac vessels from without inward about ½-in. below the bifurcation of the common iliac artery. It then lies in front of the internal iliac vessels. This part of its course lies in the false pelvis.

At about the level of the pelvic brim the ureter crosses in front of the uterine artery from without inward. From this point to its entrance into the bladder wall extends the spindle-shaped portion of the ureter. It forms a bow with its concavity directed forward, and is somewhat dilated near its centre. It lies above the levator ani muscle, and crosses the base of the broad ligament of the uterus obliquely from behind forwards and inwards. Where it is opposite the cervix uteri, it crosses beneath the uterine artery from behind forwards, at a point distant from ⅜-in. to ¾-in. from the cervix. This distance is of great importance in reference to vaginal hysterectomy or supra-vaginal amputation of the cervix. From this point to its entrance into the bladder-wall it lies at first to the side and then in front of the vagina, still slanting inwards. The portion of the ureter piercing the bladder wall runs for a distance of ¾-in., obliquely downwards and inwards.

Vessels of the Uterus and Ovaries.—The ovarian artery, corresponding to the spermatic artery in the male, arises from the abdominal aorta, a little below the origin of the renal artery. It crosses in front of

the external iliac artery; and, on reaching the brim of the pelvis, enters between the folds of the broad ligament, near its free margin. Thence it runs tortuously toward the angle of the uterus, and gives off branches to the Fallopian tube, numerous branches to the ovary, and a branch to the round ligament. The terminal branch turns downwards near the angle of the uterus, and becomes continuous with the terminal ascending branch of the uterine artery. From this loop between

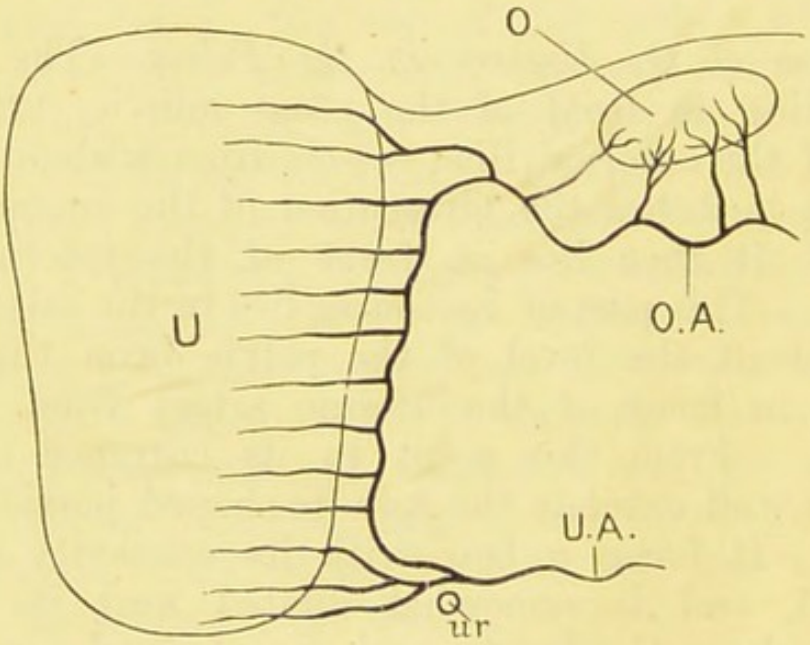


Fig. 14.—Diagrammatic representation of arrangement of Uterine and Ovarian Arteries.

U, uterus; O, ovary; U A, uterine artery; O A, ovarian artery; u r, section of ureter.

the two vessels most of the branches supplying the uterus arise (Fig. 14).

The uterine artery arises from the anterior division of the internal iliac, and passes downward and inward between the layers of the broad ligament and near its base toward the cervix uteri. At a distance of $\frac{3}{8}$-in. to $\frac{3}{4}$-in. from the cervix, it crosses above the ureter. As it approaches the cervix it gives off branches to supply the cervix uteri. The terminal branch then ascends between the layers of the broad ligament, a little outside the uterus, to unite with the ovarian artery, as already described.

The branches of artery which supply the uterus enter the uterine wall at the side, and then divide into two branches, which encircle the uterus horizontally, at about one-third of the distance from the outer to the inner surface, uniting with corresponding branches from the other side. From these loops short branches, the "curling arteries" of the uterus, of cork-screw like shape, run inward to the mucous membrane. This arrangement allows flexions of the uterus to occur with the least possible interference with its circulation, since each level of the uterus receives an independent supply from the broad ligament, and returns the blood by corresponding veins. On the other hand, any traction or pressure upon the broad ligaments will

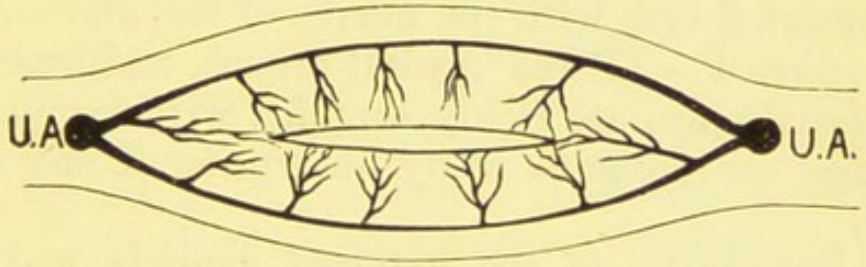


Fig. 15.—Arterial Loop supplying Uterine Wall.
U A, section of terminal branch of uterine artery, joining ovarian artery, as shown in Fig. 14. (After JOHN WILLIAMS.)

cause greater interference with the uterine circulation. The vaginal arteries arise from the anterior division of the internal iliac. Some branches are also derived from the uterine artery. The internal pudic artery supplies the vulva and perineum, the terminal branches going to the clitoris.

The distribution of the veins corresponds in general with that of the arteries. The veins are destitute of valves, and there are numerous plexuses freely communicating with each other. The most marked of these is the pampiniform plexus, lying between the layers of the broad ligament, in the interval between the ovary with its ligament and the Fallopian tube. The blood enters this plexus from veins coming both from uterus and ovaries, and leaves it by the

ovarian vein. The right ovarian vein enters the inferior vena cava direct; the left ovarian vein enters the renal vein.

Nerves.—The nerves of the uterus and ovaries are derived mainly from the sympathetic system, united with branches of the lower lumbar and sacral nerves. The cervix and vagina are supplied from the inferior hypogastric plexuses, one at each side of the vagina. A plexus containing ganglia at each side of the vagina near the cervix and somewhat posterior to it is described as the *ganglion cervicale uteri*. The body of the uterus is supplied from the hypogastric plexus, lying over the bifurcation of the aorta and between the common iliac arteries. In connection with the ovary is the ovarian plexus derived from the renal plexus, and connected also with the nerves of the uterus.

Lymphatics.—All the genital organs, and especially the internal ones, are richly supplied with lymphatics, and hence are prone to ready absorption of any septic matter.

The lymphatics of the external genitals, and those of the lower fourth of the vagina, pass to the inguinal glands, which therefore become enlarged in syphilis and in cancer of the vulva.

The lymphatics of the main part of the vagina, of the bladder, and cervix uteri, pass to the hypogastric glands which lie in the neighbourhood of the external and internal iliac vessels.

The lymphatics of the body of the uterus, of the ovaries, and of the Fallopian tubes, pass along the broad ligaments and reach the lumbar glands. Some lymphatics are said also to pass through the base of the broad ligament to the obturator glands, near the obturator foramen.

CHAPTER II.

MEANS OF PHYSICAL DIAGNOSIS.

Vaginal Touch and Bimanual Examination.—When a local investigation is considered desirable, the internal examination *per vaginam*, made by the index finger, or the index and middle fingers of either hand, will in most cases be the first exploratory measure which should be undertaken. It should, however, be invariably combined with abdominal palpation by the other hand placed externally over the pubes; for, if this be omitted, it is quite possible for the examiner to overlook the existence of tumours of considerable size, or of pregnancy of advanced duration. The position of the patient is of great importance. On the Continent and in America, the dorsal position is universally adopted, while in Britain it is more common to choose the left lateral position. Each position has its own advantages. The left lateral position, combined with the introduction into the vagina of the right index finger, has the disadvantage that the sensitive palmar surface of the finger can only be turned towards the posterior and lateral vaginal walls, and not towards the anterior wall, which it is most essential to explore. It has the still greater drawback that it does not allow of any effectual use of the conjoined or bimanual manipulation. On the other hand, the lateral position allows the perineum to be more fully retracted, so that the finger can explore more deeply the posterior vaginal

cul-de-sac and posterior portion of the pelvis, while its flexor surface has the most convenient direction for this purpose. The dorsal position should always, therefore, be employed first, but it is generally desirable to turn the patient afterwards into the lateral position—left, if the right hand is being used for vaginal examination, and conversely—to complete the exploration.

By some it is preferred to introduce one or two fingers of the *left* hand into the vagina, while the patient is in the left lateral position. This plan allows the bimanual examination to be effectually carried out, but has the inconvenience that it requires the patient to be placed somewhat transversely on the couch or bed, and that the flexor surfaces of the fingers cannot conveniently be turned to examine the posterior half of the pelvis without changing hands.

For examination in the dorsal position, the patient should lie upon a firm, flat surface, as a hard mattress, the head, but not the shoulders, supported upon a low pillow. The knees should be flexed and abducted. When the skirts are tight, it may be necessary to slip them above the knees, whether for examination in the dorsal or in the lateral position. It is well, therefore, to have a shawl at hand, which may be thrown over the knees when required. The examining hand is then passed beneath the thigh, and the index finger, previously well lubricated,* is introduced into the vulva from its posterior aspect, the perineum being first sought for as a landmark. This is the readiest mode of at once finding the vaginal outlet, and by this means also the sensitive structures further forward, the clitoris and nymphæ, are avoided. The remaining fingers are flexed into the palm, and upon

* Carbolic oil (1 in 20) may be used, but the following is a more convenient antiseptic lubricant—Oil of eucalyptus ℥iss., paraffin ℥j., vaseline ℥j.: to be heated together, and mixed. It has the advantage over oil that it is not liable to drop about. A still more powerful antiseptic is perchloride of mercury dissolved in glycerine, 1 in 1,000.

the extent to which they can be doubled back, even more than upon the length of the finger, depends the length of reach of the examiner. In most cases it is preferable to use the index finger alone at first. If two fingers are introduced, the vaginal spasm thereby excited more than counterbalances any advantage gained by the extra length of the middle finger. With a woman who has borne children, however, and whose vagina is capacious, two fingers may be used with advantage, especially in estimating the size and mobility of the uterus by the conjoined manipulation.

As it is carried up the vagina, the finger ascertains the perviousness and capacity of that canal, and also whether its mucous membrane is in a normal condition or otherwise as to smoothness, moisture, and temperature. Any undue sensitiveness or spasm at the vulval outlet is also noted as the finger enters, as well as any other abnormal condition of the perineum or the vulva itself, such as laceration or the presence of condylomata. The cervix is then examined with reference to size, hardness, position, and direction; and the os with reference to its size, the regularity, smoothness, and consistence of its lips; and the character of secretion, as to quantity and tenacity.

In ascertaining the position and size of the body of the uterus, the conjoined manipulation is brought to aid. In the normal condition nothing can be felt of the body of the unimpregnated uterus through the posterior vaginal cul-de-sac, but a portion of it can be reached by the finger in the vagina in front of the cervix. To carry out the bimanual method, the fingers of the left hand (or of the right hand, as shown in the figure, if the physician is standing at his patient's left side), passed beneath the clothes, and laid upon the abdomen, should be pressed firmly down into the pelvis, so as to push the fundus uteri downwards and forwards (*see* Fig. 16, p. 32). They should not be applied too close to the pubes, for, in that case, the fundus is apt to be pushed backward instead of for-

ward. The manipulation is also facilitated if the cervix be at the same time pushed backwards by the finger in the vagina. The uterus is thus brought into a position somewhat of anteversion, and can be held firmly between the fingers of the two hands, and its size, shape, and any irregularities or prominences on its surface can be ascertained with much exactness. In carrying out this manipulation, it is essential to obtain the utmost possible relaxation of the abdominal muscles by causing the patient to look up to the ceiling,

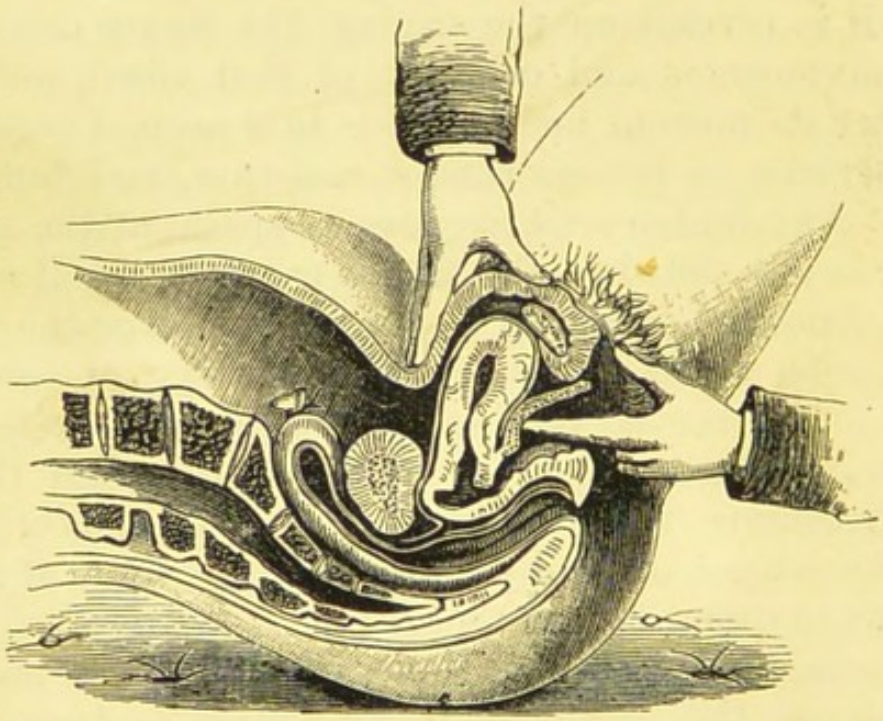


Fig. 16.—Method of Bimanual Examination. (After Sims.)

with her head firmly rested upon the pillow, and by distracting her attention with conversation. If she is directed to breathe deeply, with the mouth opened, the examiner may take advantage of each expiration to sink the hand gradually deeper into the pelvis without causing painful pressure. It is essential also that the bladder should be empty, or nearly so. A full bladder is generally readily detected as an elastic, fluctuating swelling. But in any case of important or difficult diagnosis, it is well, whenever the fundus uteri is not at once seized between the internal and external

fingers, to pass a catheter, and so ensure the bladder being perfectly empty. The size of the fundus can be most exactly estimated, if it is made to slip from side to side between the external and internal fingers. If the fundus uteri be absent from its normal position, the external fingers may be brought down close upon that in the vagina. In nervous patients, when the abdominal muscles are held very rigid, the full advantage of this method sometimes cannot be obtained without the administration of an anæsthetic. A thick layer of fat in the abdominal walls also interferes with it. But even in such cases, although the uterus cannot be actually felt by the external hand, it is almost always possible to ascertain approximately its size and position by observing up to what level in the abdomen an impulse can be communicated to the finger resting upon the cervix.

While the uterus is thus balanced between the two hands, it is easy to estimate the mobility of the cervix, and of the whole organ, both to upward or downward, and to lateral displacements. At the same time any undue sensitiveness, either to pressure upon the fundus or cervix, or to either form of displacement, is noted. The examiner then quits the uterus, and explores in the same manner the rest of the pelvis. While the internal finger explores deeply the anterior vaginal wall, and all the vaginal culs-de-sac, and searches for any tumour or any abnormal resistance or tenderness, the external hand, at the same moment, defines the upper limits, and ascertains the size, shape, consistence, and mobility of any mass which may thus be detected. If this can be fully carried out, it is scarcely possible for any swelling, however small, to escape detection. The *tactus eruditus* of the observer is called most fully into play in the estimation of slight deviations from the normal standard in the mobility of the uterus, and in the resistance of surrounding parts, which may be the only trace remaining of bygone inflammation. Thus there may be much significance in a slight

difference of resistance in the two lateral culs-de-sac; in a cicatricial band, running from one side of the cervix toward the pelvic wall; or in a deviation of the cervix, the fundus, or the whole uterus to one side, the result of the contraction of old inflammatory material. In thin persons, when the abdominal walls are not too tense, the ovaries, if in their normal position, may be caught between the fingers at a point between the fundus uteri and crest of the ilium, and distant about one and a half inches from the former. The right ovary and right half of the pelvis are best explored by using the right index finger internally, the left ovary and left half of the pelvis by the left index finger.

As a final stage, the patient may be placed on the left side, with the head and shoulders low, the knees well drawn up, and the hips near the edge of the couch. In this position the posterior portion of the pelvis can be explored most deeply by the index finger of the right hand, and this method is especially serviceable in searching for a slightly prolapsed ovary or Fallopian tube, or a small tumour behind the uterus. The physician should accustom himself to use either hand with equal facility in both positions so that, in case of serious illness, a patient may not be needlessly disturbed.

Abdominal Palpation combined with Percussion and Auscultation.—Abdominal palpation is in many cases not required. Frequently, the bimanual touch will assure the physician of the absence of any tumour or other condition upon which its employment could throw light, and thus, if the patient is dressed, the necessity of uncovering the abdomen will be avoided. If, however, the history of a case makes it seem possible that an abdominal tumour or pregnancy may exist, it is convenient to make abdominal palpation the first step of the examination. And if the bimanual touch have revealed the existence of any tumour or swelling, or any notable enlargement of uterus, a further examination will be necessary to ascertain the shape, size, consistence, and attachments of the mass.

The examination may be made through a thin garment, but ocular inspection is often desirable to observe the appearance of the skin, the state of the veins, and the presence of any dark abdominal line. With palpation should be combined percussion—which is especially necessary for the distinguishing of phantom from real tumours, and the diagnosis of flaccid cysts or free fluid in the peritoneal cavity—and auscultation, which may reveal the sounds of a fœtal heart, the uterine souffle in pregnancy or in fibroid tumours, or friction sounds on respiration in the case of ovarian or other tumours.



Fig. 17.—Uterine Sound.

Examination with the Uterine Sound. — The uterine sound is a metallic staff, marked with notches at intervals of an inch (Fig. 17), so that if, in withdrawing it, the finger be kept upon the point corresponding to the os uteri, the distance to which it has penetrated into the uterus may be at once read off by the aid of figures marked upon the stem. For the terminal three or four inches the diameter of the instrument should be less, so that this portion of it may be readily bent to any desired curve, but is yet firm enough to retain its shape while being introduced, and to be used, if required, for the replacement of the uterus. A suitable combination of firmness and pliability is attained if the instrument is made of pure copper, plated. The sound should terminate in a smooth, slightly bulbous extremity, which, for ordinary

use, should be about one-eighth of an inch in diameter —that is to say, should just pass through gauge No. 9 of the French scale. But for use in cases of stenosis of the cervical canal, it is necessary to have a sound with a diameter not greater than one-tenth, or even one-twelfth of an inch.

For introduction of the sound the patient is placed upon the left side, with the hips near the edge of the couch, and knees well drawn up. The sound should

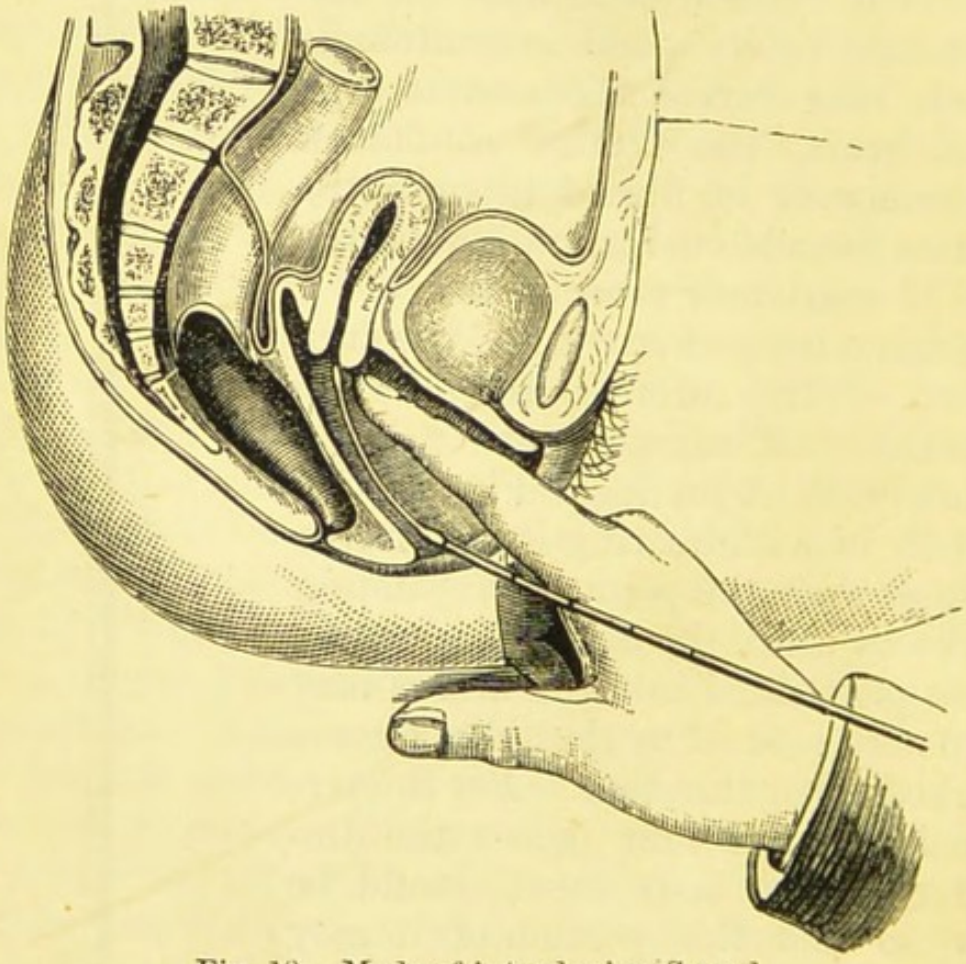


Fig. 18.—Mode of introducing Sound.

first be disinfected with solution of carbolic acid 1 in 20. There are two methods of holding the instrument during its introduction. The one which I recommend is to introduce the index finger of the right hand into the vagina, and place it upon the os uteri, while the handle of the sound is held very lightly between the thumb and one or two fingers of the left hand, so that its stem rests between the thumb and index finger of the right hand, as shown in Fig. 18. If the vagina is

moderately capacious, and the os has its normal direction, the concavity of the sound should, from the first, be directed anteriorly. The handle must at first be held well forward, close to the patient's thighs, and it is then easy, with the instrument in this position, to guide its point along the finger up to the os, and insinuate it gently into the cervical canal, and so onward to the fundus, the handle meanwhile being gradually carried backward. If, however, the vaginal orifice is narrow, and the perineum tight, as in the case of virgins, or if vaginal touch has shown that the

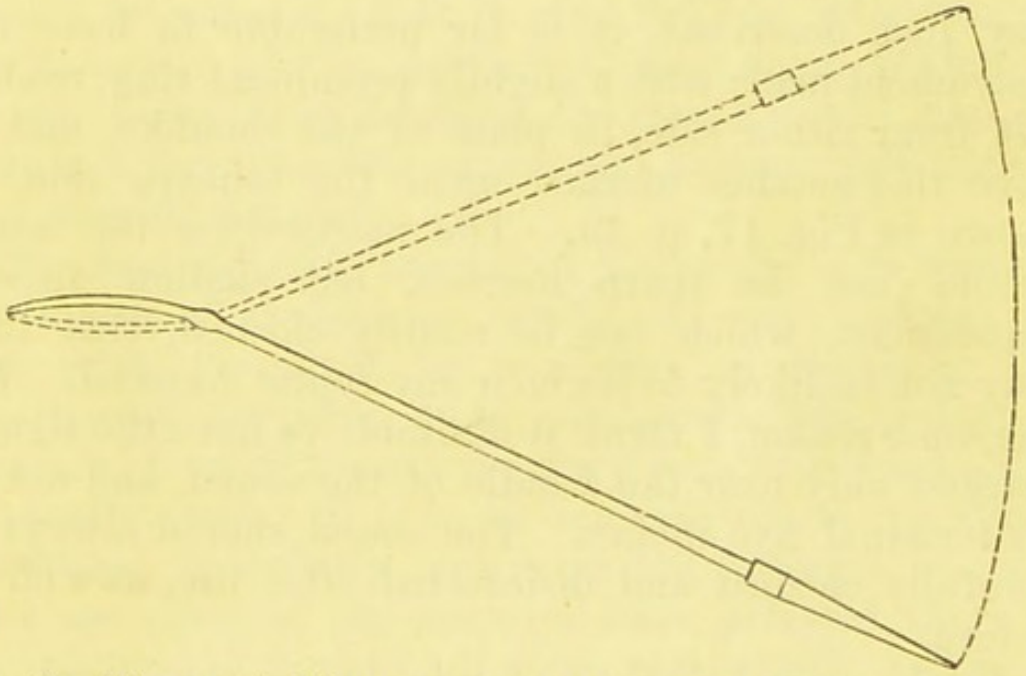


Fig. 19.—Diagram to Illustrate the Mode of Reversing the Direction of the Sound.

os looks forward, instead of looking nearly in the axis of the pelvic brim, as it normally does, it is more convenient, holding the sound in the same way, to direct its concavity at first backward. As soon as it has been passed well into the vagina, in the former case, or as far as it will go into the cervical canal in the latter, its direction must be reversed by sweeping round the handle in a rather wide semi-circle, so that the stem of the instrument describes a semi-cone, while its point does not move, but its terminal portion of two and a half inches rotates nearly on its own axis. This

manœuvre resembles the "tour de maitre" of a surgeon in introducing a catheter in the male, and is precisely the converse of that employed in introducing the sound into a retroflexed uterus (*see* Fig. 19, p. 37).

The sound is generally made with a projecting shoulder at its convex side, at a distance of two and a half inches from the end, to indicate the point which is normally just outside the os uteri, and the notches are also made upon its convex side. This shoulder interferes with flexibility, and is on the wrong side to be readily felt by the index finger of the right hand. For those, therefore, who introduce the sound in the way just described, it is far preferable to have the instrument made with a slightly prominent ring, readily felt from either side, in place of the shoulder, and to have the notches marked upon the concave side, as shown in Fig. 17, p. 35. The marks upon the sound should not be sharp notches, but shallow smooth depressions, which can be readily cleaned, that they may not be likely to harbour any septic material. For the same reason, I think it desirable to have the figures marked only near the handle of the sound, and not on its terminal five inches. The sound should always be carefully cleaned and disinfected after use, as well as before.

In the second method of introducing the sound, one or two fingers of the left hand are introduced into the vagina, and placed upon the os, while the handle is held in the right hand, the concavity of the instrument being directed forward, and the point is thus guided into the cervix. This plan has the drawback that it cannot conveniently be carried out unless the patient is so placed that her trunk is nearly transverse to the couch, a position which it is often difficult to induce women to assume. Whichever method is adopted, the physician should be able, with equal dexterity, to make use of the other hand, placing the patient upon the opposite side. The sound should not be introduced, as a matter of routine, in every case, but only when it

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is likely to afford some additional information, or to clear up some point which previously remained doubtful. Its use is, as a rule, to be entirely avoided in cases of cancer, of acute uterine or periuterine inflammation, especially peritonitis, or when pregnancy is suspected, unless the diagnosis is of such extreme importance that it is desirable to run the risk of inducing abortion. Even in chronic periuterine inflammation, it should be used only exceptionally, and with great caution. In all cases the direction of the uterine cavity should be previously ascertained, as far as possible, by bimanual touch, and the instrument should be warmed, that it may not, by its coldness, excite spasm of the cervix. If any great flexion of the uterus has been detected, the sound should first be bent to a corresponding curve, and its concavity turned in a suitable direction.

The first object in the use of the sound is *to measure the length of the uterine cavity*. If any obstacle be met with, it should be overcome by changing the direction of the point, or by very gentle and prolonged pressure, to which any temporary muscular spasm will gradually yield. It is to be remembered that a slight hindrance frequently occurs at the internal os, and that the point of the sound is often arrested there in consequence of flexion, or, much more rarely, in consequence of stenosis. Some pain is often felt as the sound passes the internal os, and frequently a sudden pain indicates the moment when the point has reached the fundus, which is more sensitive than other parts, and may be excessively so in metritis or endometritis of the body of the uterus.

A second object is *to learn the direction and course of the uterine cavity*. In this respect the information to be gained is as positive as that which an autopsy could afford, and it is by verifying by the sound the inferences deduced from the vaginal and bimanual touch that the physician is best able to acquire the necessary *tactus eruditus*. The conditions in which

this indication is most important are when there are tumours near the uterus, which might be mistaken for its fundus, when the uterus is embedded in inflammatory exudation, so that its position cannot be made out by palpation, or when it is distorted by fibroid or other tumours in its substance.

A third object is *to ascertain the permeability and diameter of the uterine canal.* The mode of doing this will be described under the head of stenosis of the cervix. Valuable information is also obtained as to the *sensitiveness of the internal surface of the uterus at its different parts*, but for this purpose the sound must be used with much caution. A further application is *to decide upon the presence or absence of any foreign body*, such as a retained ovum, polypus, or other tumour in the cavity of the uterus, and to determine its attachments. For *testing the mobility of the uterus* bimanual touch is generally sufficient, but the sound may be used to great advantage to determine how intimately the uterus is connected with an ovarian or other tumour. In the case of fixation by inflammatory adhesions alone, the use of the sound as a test of mobility is not without danger, and other means are then generally sufficient.

The use of the sound *in conjunction with external palpation* is sometimes of great value, especially when the body of the uterus cannot be defined by the bimanual touch alone, or when it is required to distinguish it from other masses felt in the abdomen, and ascertain its connection with them. For this purpose the right hand may be chosen most conveniently for external palpation, and the left for holding the handle of the sound, while the patient remains on the left side. In some cases of difficulty, however, it is preferable to place her in the dorsal position. The handle of the sound being slightly rotated, the external hand detects the corresponding movement imparted to the fundus, and observes whether any other masses in the abdomen move with the fundus or not.

That the utmost gentleness is necessary in introduc-

ing the sound, is shown by the fact that it has not very infrequently penetrated a soft uterus, so that its point could be felt beneath the abdominal wall. In some cases it may have passed along a dilated Fallopian tube, but there is no doubt that more frequently it has actually pierced the uterine wall, and sometimes an aperture has remained, through which it could be repeatedly passed. In most such cases no serious symptoms have followed, but the occurrence is not to be regarded as altogether without danger. It is most likely to occur when the uterus is softened by degeneration after parturition or abortion, or by the presence of cancer, or when its wall is extremely thin from super-involution.

The use of the sound for *replacement of the uterus* will be described under the heading of displacements of that organ.

Many American authorities have followed Marion Sims in recommending as safer than the sound the uterine probe, which is only a little larger than the ordinary surgical probe, and is perfectly pliable, being made of pure silver or copper. This is used through a Sims' speculum, and the physician gives it the curve which he supposes the uterine canal to have, and keeps altering the curve, if necessary, until he can pass it without using the slightest force. This method has the drawback that the position of the uterus may be modified to an unknown extent by the introduction of the speculum, and the evidence derived from the probe thus rendered fallacious. Moreover, there are some cases of flexions in which there is great difficulty in passing the sound, and in which the operator may derive much assistance from lifting up the fundus with his finger, and so partially straightening the uterus, making due allowance in his mind for the change in its position so produced. This assistance is sacrificed by the use of the speculum, although there is some compensation in the fact that the cervix may be drawn downward or forward by a tenaculum. The dimen-

sions of the vulva limit too much the movements of the handle of the probe to allow it to be passed through a speculum in a case of extreme flexion, the flexion remaining unreduced, while a properly made sound can be equally well bent to any desired curve. Again, when the vulva is at all narrow, and especially in the case of a virgin, the passing of a uterine sound by a skilful hand generally gives the patient far less discomfort than the introduction of a Sims' speculum.

Rectal Touch.—In the case of tumours or inflammatory thickenings behind the uterus, the rectal touch is often the most valuable of all modes of exploration. The finger can reach *per rectum* to a higher level than *per vaginam;* the magnitude of any swelling, and its relation to the recto-vaginal septum and the posterior pelvic wall, can be accurately determined, and the ovaries can often be very exactly made out, as well as the Fallopian tubes, if these are thickened or distended. The patient may be placed in the dorsal position, and the method combined with abdominal palpation, but for exploration of the posterior and lateral walls of the rectum, the lateral position is preferable. If the patient be directed to bear down as the finger is passing the sphincter, less discomfort is caused by its introduction. In the case of virgins with a very small hymeneal aperture, rectal may replace vaginal touch as a means of ascertaining the condition of the uterus, but as a general rule rectal proves much more disagreeable than vaginal exploration. An inexperienced person may be somewhat puzzled in recognizing the cervix uteri as felt *per rectum*, but if the thumb be passed into the vagina, while the index finger is introduced into the rectum, the patient being in the dorsal position, the results of vaginal are at once brought into association with those of rectal touch. The uterus may also be grasped between the thumb in the vagina, and one or two fingers in the rectum, if the fundus is at the same time pushed down by the external hand. Rectal examination may be used in conjunction with a sound in the

uterus to determine the connection of retro-uterine swellings with that organ, or in conjunction with a vesical sound in the bladder, in the case of absence or atresia of uterus or vagina, or to distinguish between a polypus and inversion of the uterus.

The scope of rectal exploration has been greatly extended by the method introduced by the late Professor Simon, of Heidelberg—namely, to place the patient under an anæsthetic, and introduce four fingers, or the whole hand, and, if necessary, a portion of the forearm into the rectum. Two or three fingers may even be passed into the commencement of the sigmoid flexure, and it is possible thus to reach as high as the lower portion of the kidneys. This method, when carried to its fullest extent, is not without danger, and has occasionally led to a fatal result. It should only be employed to establish a very important diagnosis as to the nature and connections of a tumour. As far as regards structures within the pelvis, which can be reached by two fingers, the presence of the whole hand within the rectum generally rather impedes than facilitates the delicacy of touch.

Certain special expedients, to aid the combination of vaginal and rectal touch with bimanual examination, are of use in difficult cases, particularly for making out the attachments of a tumour. Thus, if the vagina is not sufficiently capacious, it may be stretched by preliminary plugging, or the use of an air-ball pessary. Another expedient is to place the patient on the left side, seize the cervix with tenaculum forceps and draw it down as far as is possible without using undue force. The handles of the forceps being then given to an assistant to hold, one or two fingers of the left hand are introduced into the rectum, while the right hand, used externally, helps to push down the fundus if no tumour intervenes. In this way the pedicle of a tumour, or band of adhesion, may often be put on the stretch and so detected. The fingers in the rectum may also by this method reach as high as the fundus, and any

fault of development may be exactly made out. Hegar, who specially recommends this method, uses simple bullet forceps, having a catch at the handle, to draw down the cervix. The uterine tenaculum forceps shown in Fig. 20 give a more secure hold, the smaller arm of the forceps being introduced within the cervix. To carry out this plan effectually, anæsthesia is generally necessary.

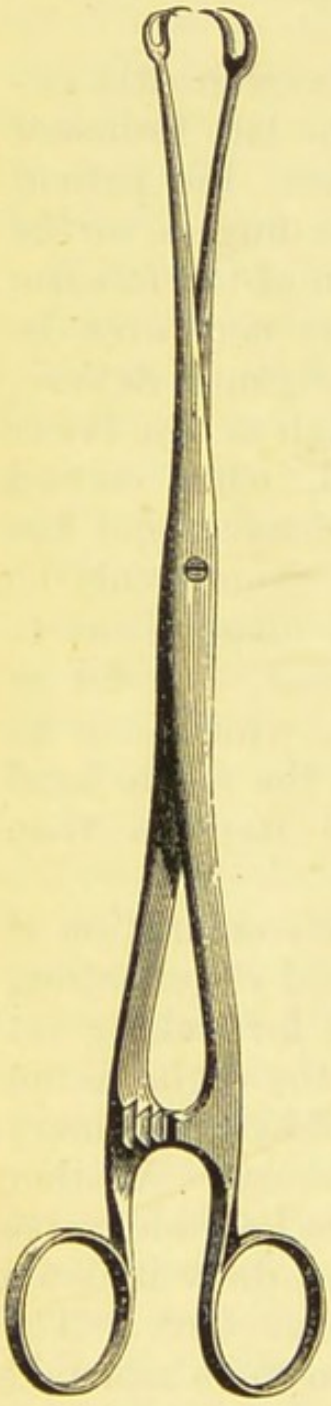


Fig. 20.—Uterine Tenaculum Forceps.

Exploration of the Bladder.—In a gynæcological examination it may be desirable to empty the bladder by catheter, or to pass a bladder sound, in order to test whether the uterus can be felt in its normal position between the sound and a finger in the rectum. The student should acquire dexterity in performing either operation by the aid of touch alone. In general, a male gum-elastic catheter may be used with quite as much advantage as the silver female catheter, care being taken not to push the instrument too far into the bladder, so as to run the risk of injuring the posterior bladder-wall. In some cases, however, when the urethra is distorted, as by the presence of tumours, the rigid metal catheter has an advantage, from the fact that its course can be more precisely directed. The use of the catheter, especially if frequently repeated, is always liable to set up cystitis, and one element in the production of this result appears often to be the introduction of germs or septic material, by means of the catheter, into the bladder. Care should be taken, therefore, that the catheter is perfectly clean, and pre-

viously disinfected by perchloride of mercury solution, or other antiseptic. Either eucalyptic vaseline (*see* p. 30) or carbolic oil, not in too great profusion, and not stronger than 1 in 20, may be used to lubricate the instrument. The best form of instrument is one which is solid beyond the eye, so that there is no cul-de-sac to retain dirt, or else one with an open end instead of an eye.

Mode of passing Catheter. — To pass the catheter, the patient should be placed in the dorsal position, with the knees flexed. A long elastic tube may be fitted on to the catheter, in order to conduct the urine into a vessel under the bed. It is generally preferable, however, to have a small vessel close at hand, for the physician can then instantly perceive as soon as the urine begins to flow, and thus be warned that he has passed the catheter far enough. A full-sized catheter, from No. 10 to No. 12, should be chosen, for the point is then less likely to catch in any depression of the mucous membrane. The guide for finding the meatus is the apex of the pubic arch. Supposing the physician to be standing at the right side of his patient, he passes his right hand beneath the thigh, and his left hand, holding the catheter, above the thigh. With the index finger of the right hand, he first finds the perineum, and then introduces the tip of the finger just within the vagina—that is to say, within the circle of the hymen, if there is one existing. The urethra can then be felt as a cord against the apex of the pubic arch. The tip of the finger is slightly withdrawn to the extremity of this cord, and feels, just in front of it, the orifice of the urethra as an obvious depression. The catheter being still held in the left hand, its point is then guided into the orifice. If the upper part of the urethra or neck of the bladder is pushed forward above the pubes, as by a tumour, or by the presence of the fœtal head, it is often useful, as the catheter passes onward, to direct its point upward, through the medium of the urethral wall, by the finger passed into the vagina.

Digital Exploration of the Bladder. — The anterior surface of the uterus and ovaries, and of any tumour in connection with them, may be very immediately reached by passing the finger into the bladder, after rapid dilatation of the urethra. For this purpose a three-bladed urethral dilator, the metallic bougies used for dilatation of the uterine canal, Hegar's uterine dilators, or Bryant's urethral speculum dilator may be used. An anæsthetic is administered, and the urethra is then stretched by means of the dilator, until first the little finger, and afterwards the index finger, can be introduced. If necessary the margins of the meatus may be slightly incised as a preliminary step. Some cystitis may be set up, and long-standing, if not permanent, incontinence of urine has occasionally followed: the plan, therefore, should only be adopted in order to make a diagnosis of great importance as regards the condition of the uterus. It is more frequently called for to ascertain the presence of growths or other diseased conditions in the bladder itself. As a rule, there is no permanent incontinence if the urethra be not dilated beyond the size of a moderately slender index finger.

The Speculum. — The use of the speculum is less important for diagnosis than to facilitate the application of remedies and the introduction of instruments, as in the operation for the cure of fistulæ. In diagnosis, it serves chiefly to reveal the appearance of the cervix, especially as to the presence or absence of any erosion or granular inflammation, the character and abundance of the secretion issuing from the os, and also the condition of the vaginal walls. Out of all the numerous varieties of specula there are four of special value, and of these each has such distinctive merits that three, at least, of them are essential to the gynæcologist for use under different circumstances.

Ferguson's Tubular Speculum. — The speculum which concentrates far more light than any other upon the os uteri, and one which commonly brings the

cervix readily into view, is Ferguson's speculum of silvered glass with bevelled extremity, and trumpet-shaped entrance, whereby the rays of light are concentrated (Fig. 21). It has the further advantage that it is readily cleaned, and is unaffected by acids or other fluids, while its sides protect the vagina from any application used, and a considerable quantity of fluid can be conveniently poured into it, if such a mode of application is desired. These specula can be obtained of toughened glass, whereby the objection of fragility is, in great measure, obviated.

For the introduction of the cylindrical or bivalve speculum, it is more usual in Britain to place the patient in the lateral, or, what is better, the semi-prone position. This has the advantage in point of

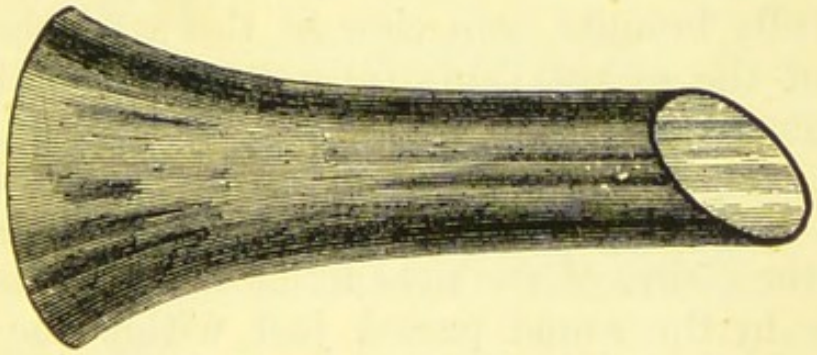


Fig. 21.—Ferguson's Speculum.

delicacy, but it is open to the drawback that it requires a nearly horizontal light, such as is not easily obtained in a ground floor room, and that the patient's legs, feet, and dress are apt to interfere with the illumination. The dorsal position has the great advantage that the effect of gravity then tends to bring the axis of the uterus more nearly into coincidence with that of the vagina, and so facilitates the exposure of the os. It should always be adopted, therefore, if any great difficulty is found in bringing the os into view, especially when this is due to anteversion of the uterus. If the uterus be retroverted, the lateral position often answers better, since the tip of the speculum can then be more easily directed forward to find the cervix.

In either case the speculum is introduced without exposure of the patient. The position and direction of the cervix are first ascertained by the index finger: then by two fingers the labia are separated and perineum retracted so that the bevelled tip of the speculum can be passed beneath it. The speculum is then gradually pushed on in a backward direction, stretching the perineum still further back, while any painful pressure on the sensitive structures on the anterior wall of the vulva is avoided. The direction finally given is regulated by the position of the cervix as previously ascertained. If the os does not at once come into view, the speculum must be drawn back somewhat, and again pushed on in a different direction. Not infrequently, when the uterus is anteverted, only the anterior surface of the cervix and anterior lip of the os are fully brought into view in this way, the whole circuit of the os not being fully seen. This difficulty may often be overcome by rotating the speculum till its projecting tip is anterior, in which position it tends to push up the fundus. Another plan is to draw the os into the centre of the field by means of a tenaculum hook, or by the sound passed just within the cervix. If this fails, the best plan is to use a bivalve or Sims' speculum.

A Ferguson's speculum is generally made about six inches long, and, when the vagina is long, or the woman very fat, some such length as this is necessary. For many purposes, however, a short Ferguson's speculum of full diameter has great advantages over a longer one, and it is well to have such an instrument in addition (Fig. 22). It should be barely 4 inches long on the longer side, and $3\frac{1}{8}$ inches on the shorter, the bevelled end being less oblique than usual, the external diameter about $1\frac{1}{2}$ inches. The outer end should have only a moderate rim, not a wide, trumpet-shaped expansion. There are two special advantages in such a short speculum. First, it allows any point of the cervix to be felt through the speculum. This is very

useful for guiding the bistoury or needle to distended cervical glands, which are often much more readily felt than seen. Secondly, by the lateral stretching of the vagina, it draws the cervix nearer the outlet, instead of pushing it farther away, and, in consequence, a probe for intra-uterine medication can be much more easily passed into the canal, than with a longer speculum. This may, indeed, be done still more advantageously with Sims' speculum, but over that the short Ferguson's speculum has the great advantage that no assistant is required.

For illumination direct daylight is far superior to anything else, and, if the patient be in the dorsal position, a descending light, if the angle with the

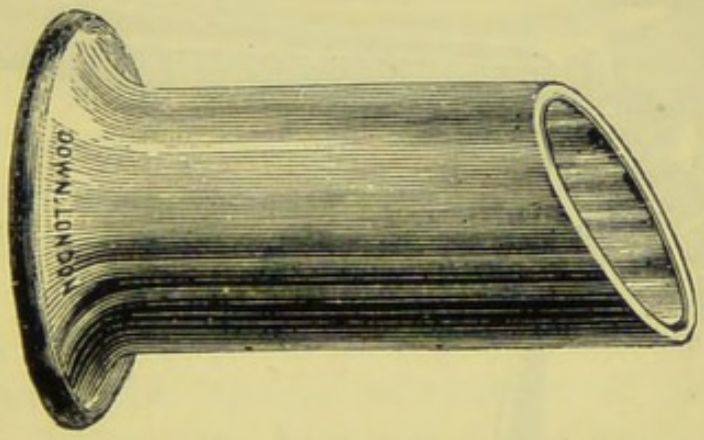


Fig. 22. - Short Ferguson's Speculum.

horizon be not greater than about 45°, answers excellently. If direct daylight cannot be obtained, it is often convenient to use a concave mirror, similar to a laryngoscopic mirror, having a rather large central aperture cut quite through the glass, and mounted upon a handle. This may be used to reflect either daylight or the rays of a lamp. A small electric lamp, mounted on a curved handle, is still more convenient when artificial light is required.

The Bivalve Speculum.—Of all valvular specula, the best is Cusco's bivalve speculum (Fig. 23, p. 50). It is very easily introduced, and, in some respects, is the most convenient of all specula, especially in the fact that it is perfectly self-retaining. Its successful action

depends upon a correct mode of introducing it. It is essential to ascertain first with the finger the exact direction and distance of the os. The speculum is tilted sideways to pass the vulva, then turned so that the blades are antero-posterior, and pushed on till their extremities are a little short of the os, but exactly in its direction, special care being taken that they do not pass beyond it into either cul-de-sac. The blades are then opened by the handles, the effect of which is that the fundus is pushed up by the anterior blade, and the antero-posterior stretching of the vagina at the same moment draws the cervix downward and forward, so

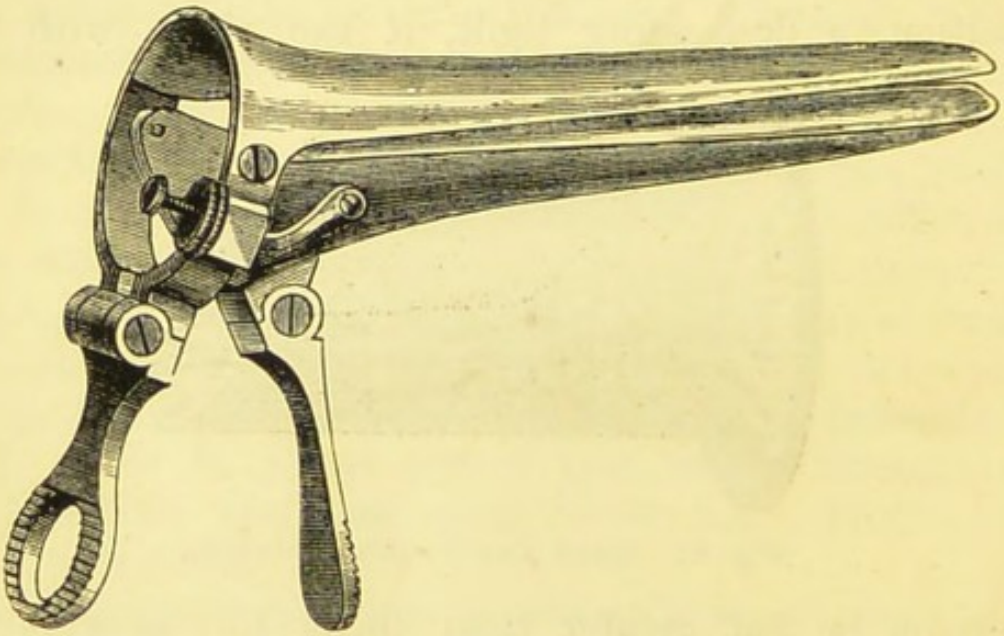


Fig. 23.—Cusco's Bivalve Speculum.

that the axis of the uterus is brought nearly into coincidence with that of the vagina. The lips of the os are also drawn somewhat apart, so that the interior of the cervical canal can be seen. As soon as the os is fully in view, the speculum is at once fixed by the screw at the side. In another form of the instrument the blades are expanded at once by a screw passing through the handle. The essential points in a good speculum are that the blades should be capable of wide separation, and that they should themselves be wide enough to prevent the lateral vaginal walls encroaching on the

field of view (for which purpose a width of about 1½ inches near the extremity is desirable). To be suitable for use with a vagina of any length, the length of each blade should be about 4½ inches. But, when the cervix uteri is at its ordinary level, and there is no excess of external fat, a shorter speculum has the same advantage which the short Ferguson's speculum has over the longer one (*see* page 48). Such an instrument should have each blade about 3¾ inches long. The blades should never be placed laterally, for then the natural tendency of the vagina to become flattened antero-posteriorly causes its walls to encroach upon the field of view. The handles may be turned either toward the perineum or toward the pubes, as is most convenient. In withdrawing the speculum, care must be taken not to allow the blades to close completely, and thereby pinch the vaginal walls. All the modifications, or so-called modern improvements, of valvular specula, in which three or four blades are employed, or the anterior blade is made much shorter than the posterior, interfere with this mechanism of bringing the uterus into a position of slight retroversion, and so do away with the special advantage of this form of speculum. There are, however, some useful, but more complicated, modifications of the bivalve speculum, in which the blades can be separated at their bases as well as at their extremities, so as to dilate the vulva, and give a wider entrance to the field of view.

Sims' Speculum.—Sims' univalve speculum (Fig. 24, p. 52) is far superior to all others for many purposes, as when it is desired to introduce a tent or probe through the speculum, or to operate upon the cervix or vaginal walls. Its drawback is that it cannot be employed without an assistant, while a skilled assistant is necessary to give its full value. The most important element in the use of this instrument is the position of the patient. To get the full benefit of the speculum, all dresses fastened round the waist should be loosened, as a preliminary step. The patient is placed

on a high and firm couch, or table, and the light must be nearly horizontal. She lies on her left side, in a semi-prone position, with the head and shoulders low, and the left arm drawn behind her, so that the sternum

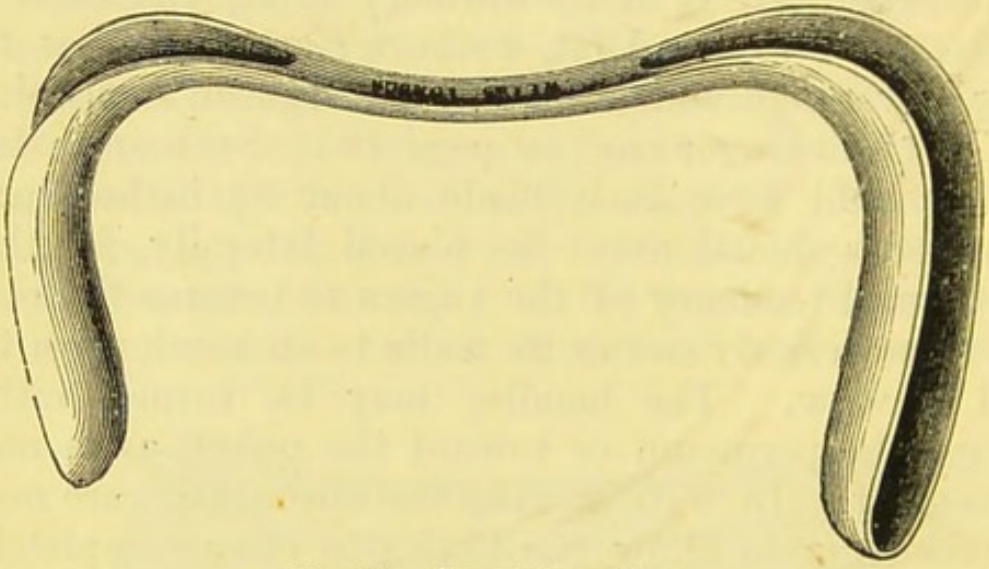


Fig. 24.—Sims' Speculum.

is rotated forwards, coming very nearly into contact with the table. The legs are flexed at right angles to the trunk, and the right rather more than the left, so that the right knee lies just above the left, in contact

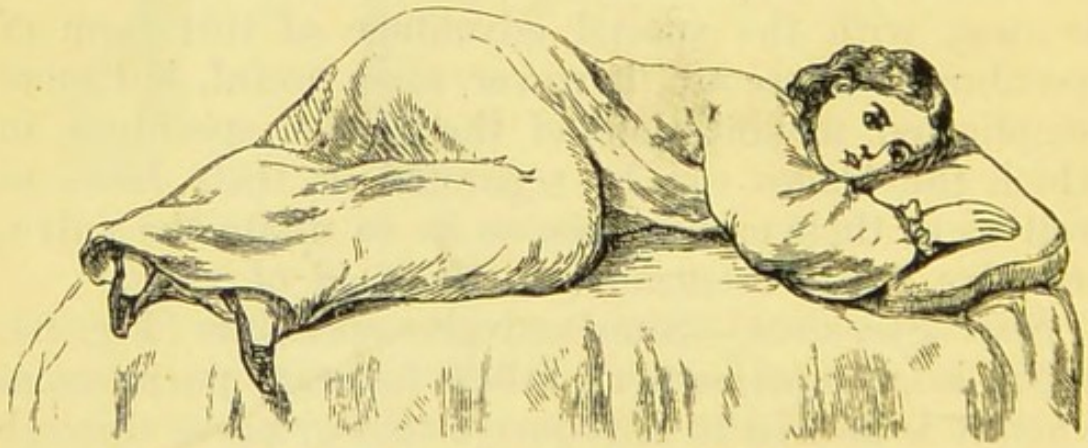


Fig. 25.—Position for introduction of Sims' Speculum. (After Sims.)

with the table (Fig. 25). The nurse or assistant stands behind her, and pulls up the right side of the nates with the left hand. The physician then introduces the speculum, guiding it with the finger into its position, behind the cervix, draws back the perineum so as to convert the vagina into a straight canal, and

gives the instrument into the hand of the assistant, who holds it firmly in the desired position, maintaining the retraction of the perineum. In any long operation the hand of the assistant is apt to become fatigued, and therefore unsteady. Steadiness will be promoted if he can keep the speculum in position by fixing his hand as a wedge between its handle and the patient's sacrum, instead of depending solely upon muscular effort.

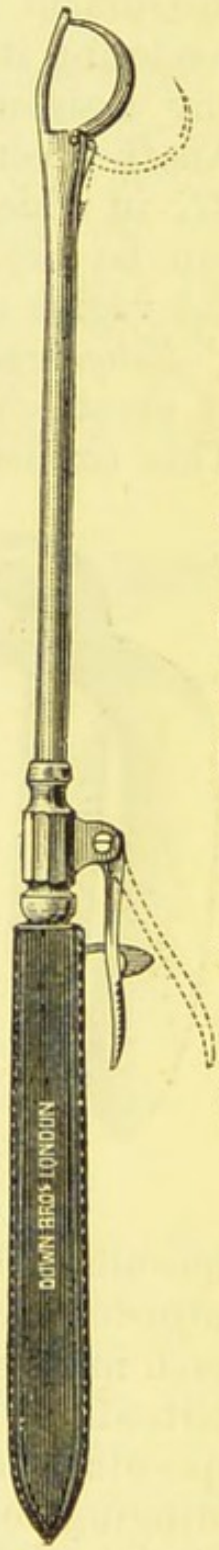


Fig. 26.—Chambers' Uterine Tenaculum.

The object of this position is to make the vulva the highest point of the vaginal canal, and allow the effect of gravity on the abdominal viscera and walls to draw the anterior vaginal wall forward, and expand the canal into an air-containing cavity, almost as effectually as if the patient were in the knee-elbow position. When, however, the vagina or vulva is narrow, the anterior vaginal wall does not fall away sufficiently to allow the os to be seen, and it is then necessary to push it back, either by the finger, or by a sound or similar instrument, or by a depressor made for the purpose. This tends to draw the cervix forward. If, however, the cervix is still directed too much backward to expose the os fully to view, or to bring it into a convenient position for the introduction of a probe or other manipulation, a small tenaculum hook is to be fixed in the anterior lip of the os. By this means the cervix is drawn forward until it is nearly in the axis of the vagina (*see* Fig. 32, p. 60). This measure causes very little pain or inconvenience, and the shank of the hook serves at the same time for a depressor of the anterior vaginal wall. A more secure hold of the anterior lip is given by the form of tenaculum shown in Fig. 26, or by the author's tenaculum

(Fig. 95). Various modifications of Sims' speculum have been invented with the object of attaching to the instrument a sacral plate and depressor, and thereby rendering it self-retaining, dispensing with the need of any assistant, and leaving the operator's hands free. Another convenient modification is that shown in Fig. 27, in which the blade of the speculum is split, and can be expanded by a screw, according to the size of the vagina and the amount of space required.

Neugebauer's Speculum.—A fourth speculum often of great service is Neugebauer's speculum (Fig. 28). This consists of two blades, each resembling a Sims'

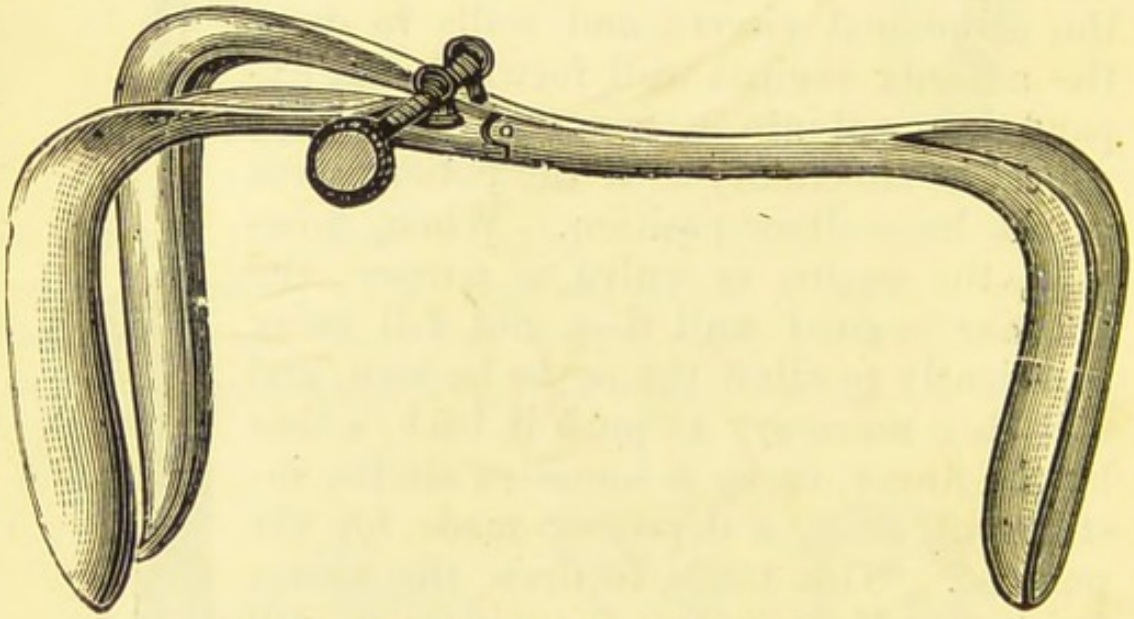


Fig. 27.—Modified Sims' Speculum.

speculum, and introduced in a similar way, but so adjusted that one blade slides within the other in such manner that the two blades in combination form virtually a bivalve speculum. It is inferior to Cusco's speculum in self-retaining power and in efficacy for bringing the cervix into the line of the vagina. Its special advantage is that it can be guided exactly into position by the finger; and thus it is generally superior to all others if a speculum has to be used in a case of cancer of the cervix, other specula being liable to set up considerable hæmorrhage. Each blade should be about four inches long, and the handles may be so

made as to clasp together in a reversed position to form a Sims' speculum (Fig. 28). Dr. Barnes has introduced a modification of this instrument under the name of the "crescent speculum." For each handle another blade of different size is substituted. Thus the two pieces make a series — three different sizes of speculum—Nos. 1 and 3 being in one piece, and Nos. 2 and 4 in the other. For the use of Neugebauer's speculum the patient may be either in the semi-prone position or in the lithotomy position, with the nates overhanging the end of table. The larger blade should be introduced first, and guided

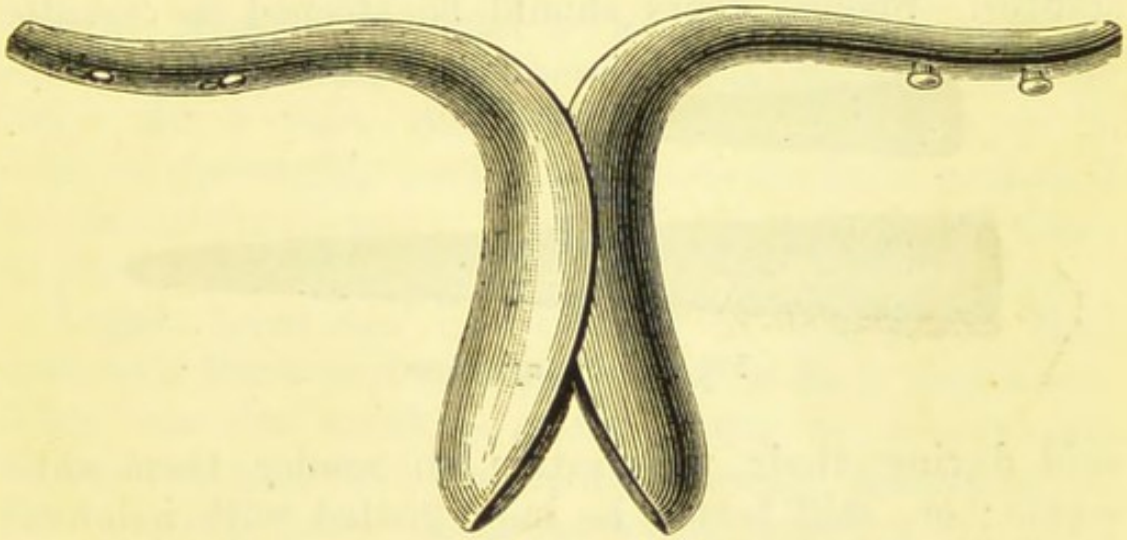


Fig. 28.—NEUGEBAUER'S Speculum, the blades of which may be united to form a SIMS' Speculum.

by the finger into its position behind the cervix; the smaller blade will then slide into position within it.

DILATATION OF THE CERVIX.—The diagnosis of morbid conditions of the mucous membrane of the uterus, and of the presence of tumours or the products of conception within its cavity, is in many cases rendered impossible by the closure of the os. Dilatation of the cervix is then the only method of detecting the disease, and is of still greater importance in allowing access for therapeutical means.

Dilatation by Tents.—Dilatation may be effected either rapidly under anæsthesia by mechanical dilators,

or gradually by means of tents. Mechanical dilators, especially Hegar's dilators, have to a great extent superseded the use of tents. But, when the cervix is rigid or indurated, especially in a nulliparous patient, it is often impossible to dilate the cervix enough to allow the finger to pass, without splitting it more or less. Under these circumstances, the use of a tent, at any rate as a preliminary, is preferable.

There are three substances commonly used for the manufacture of tents—compressed sponge, the laminaria digitata, or sea-tangle, and the root of the tupelo tree (*nyssa aquatica*), introduced from America, each of which has special advantages under different circumstances. Sponge tents should be steeped in carbolic

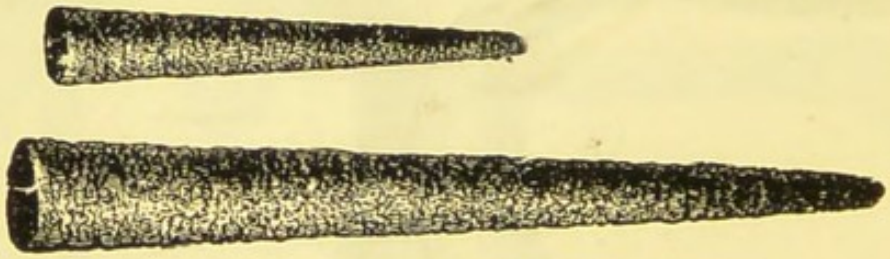


Fig. 29.—Sponge Tents.

acid during their preparation to render them antiseptic; or, still better, be impregnated with iodoform by being dipped in a solution of iodoform in ether. They should be made of a uniformly conical shape, not bulging at the centre, and the string for their withdrawal should be attached to the upper extremity, and pass through the length of the tent, since it is otherwise liable to break away, and leave the greater part of the tent within the uterus. Laminaria tents (Fig. 30, p. 59) should be perforated from one end to the other, to allow them to be fixed upon a stylet for introduction, and to render their expansion more rapid and complete.

Relative Advantages of Sponge, Laminaria, and Tupelo Tents.—A sponge tent insinuates itself very closely into the interstices of the mucous membrane, and on this account it is less liable to slip out, and forms

a more efficient plug in cases of hæmorrhage than the laminaria tent. It also causes less pain during its expansion than the harder laminaria tent. It has the disadvantage of more rapidly becoming offensive. This is obviated, in some measure, by the antiseptic preparation, provided that the tent be not left in place longer than about twelve hours. But, on account of the septic risks, sponge tents are now but rarely used.

A laminaria tent is smoother when prepared, and can more conveniently be made of small size. It is, therefore, more easy to introduce, and is more suitable to commence with, when the cervix is small. It is capable of overcoming greater resistance in expansion than a sponge tent, and a wide dilatation may be effected by packing a number of laminaria tents side by side. As a rule, therefore, when the object is to explore the uterine cavity, laminaria are to be preferred to sponge tents, unless it is desired, at the same time, to arrest hæmorrhage.

Tupelo tents can be obtained of larger size than laminaria tents, and are more rapid in their expansion. They can also easily be pared down by a penknife to any required size, and do not promote decomposition like a sponge tent. They have not, however, the same expansive force as laminaria tents, nor do they expand to so great a multiple of their original size. A tupelo tent is very convenient for use when one laminaria tent has already been employed, and it is desired to obtain a more complete dilatation of the cervix within a few hours. It may also be substituted for a sponge tent when rapid dilatation is desired, and septic absorption is to be feared, as in a case of abortion.

Mode of Introducing Tents.—In most cases a perforated laminaria tent is introduced most easily by the tent-introducer, contrived by Dr. Barnes (Fig. 31, p. 59). It consists of a wooden handle carrying a curved stem, at the extremity of which stylets of various sizes can be screwed in, and over which slides a metal or gum-elastic tube. The tent being fixed

firmly upon the stylet, the whole instrument is introduced exactly like the uterine sound, and the tube is then held steadily against the os, the disc at its lower extremity giving a point of resistance to the finger, while the stylet is withdrawn. The instrument can be extemporized by cutting off the end of a gum-elastic catheter, so that the stylet projects about an inch, and mounting the perforated tent upon this projecting end. In the case of a sponge tent, this method is less satisfactory, for the point is apt to become softened, by absorption of moisture, before it can be introduced. To prevent decomposition, and consequent septic absorption, the tent may be smeared with salicylic cream,* and then dusted over with iodoform. To keep the tent in place till it has time to swell, a tampon of cotton-wool should be placed beneath its extremity. This may also be smeared with salicylic cream and dusted with iodoform. It is generally desirable to place one or two more tampons in the lower part of the vagina, to keep the first in place.

Another method of introducing a tent is to employ Sims' speculum and the semi-prone position. For a sponge or tupelo tent, this plan is generally preferable, and it should be adopted in all cases of difficulty, even for the introduction of a laminaria tent. By the tenaculum hook or tenaculum forceps, the cervix is drawn nearly into the line of the vagina (Fig. 32, p. 60), and the direction of the uterine cavity is ascertained by the sound or probe. The tent is then guided into place either with a pair of forceps, or, more conveniently, by the tent-introducer, in the case of a sponge, or perforated laminaria tent. For a solid laminaria or tupelo tent, the forceps must be used. If laminaria tents are made about five inches long, instead of the usual length of about two inches, and are passed up nearly to the fundus, they are free from the risk of slipping out, but have the disadvantage

* Acid. salicyl. gr. lx., vaseline ℥j.

that they hold the uterus forcibly in a position of

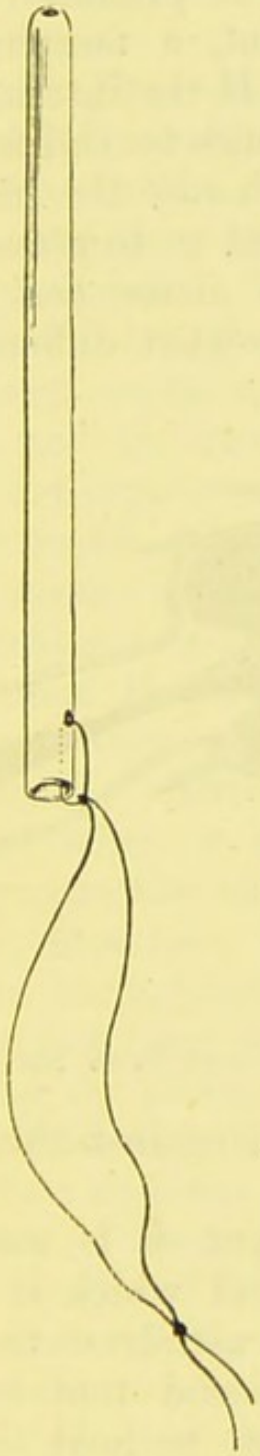


Fig. 30.
A Hollow Laminaria Tent.
(Actual size.)

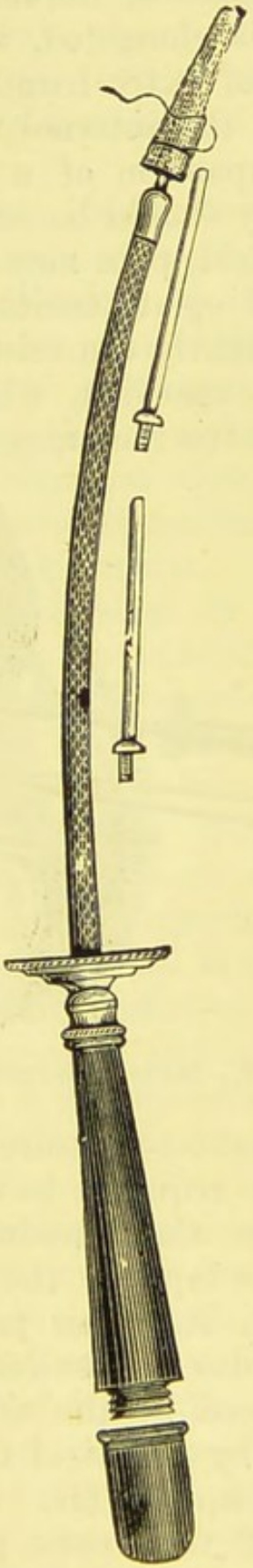


Fig. 31.
BARNES' Tent Introducer.

retroversion, and hence cause more irritation. In some cases of fibroid tumour, in which the cervical canal is elongated, it is absolutely necessary to use a tent of extra length, in order to ensure its reaching within the internal os. If pain is produced during the expansion of a laminaria tent, a morphia suppository should be administered. If the internal os is very rigid, pain may be great enough to call for more decided opiate treatment. In such case the tent may be so tightly constricted at one point as to prevent any great expansion, while it swells above and below. The extraction may then be somewhat difficult, and

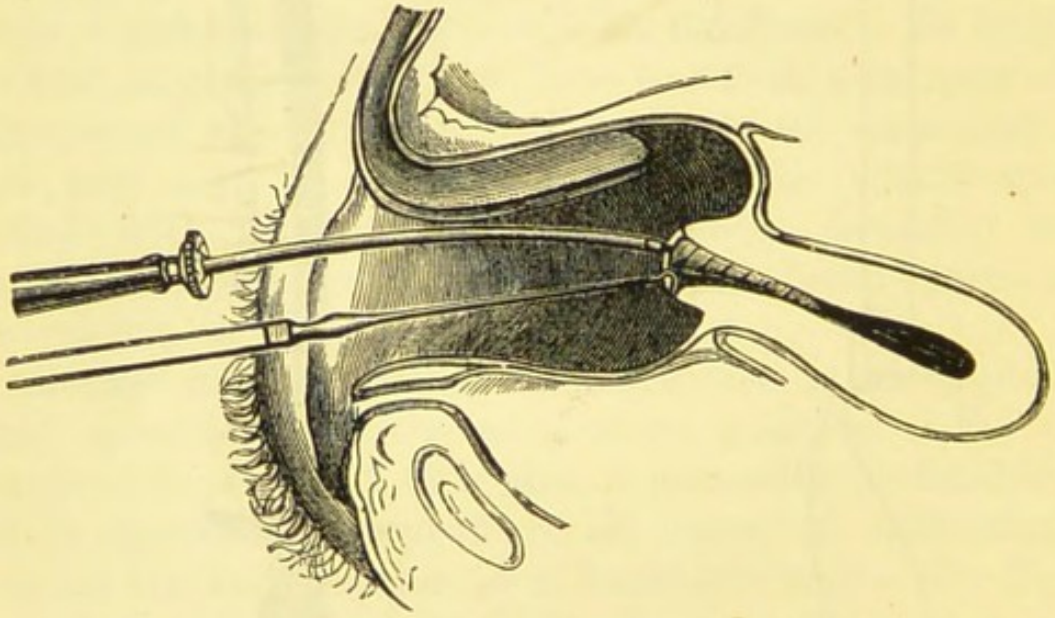


Fig. 32.—Mode of Introducing a Tent through Sims' Speculum.

firm counter-pressure by the finger against the cervix may be required to effect it.

Before the introduction of a tent, it is useful to fasten a tape to the loop of thread which is passed through it. This tape serves to withdraw the tent. It is also convenient, when a second tent is being introduced by the side of the first, to hold the first steady by means of the tape, and so prevent its being pushed up too far. Care must be taken to leave the ends of the tents projecting through the external os, otherwise the tents are apt to expand in the canal, leaving the os undilated, so that it may be impossible

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to remove them except by incising or dilating the os. For withdrawal the loop of thread is generally sufficient. If this should break away, the tent being firmly gripped at the internal os, the end of the tent must be firmly seized with suitable forceps and drawn down.

Dangers from the Use of Tents, and Precautions required.—No small number of cases is on record in which the use of a tent has been followed by metritis, pelvic cellulitis or peritonitis, or even general and fatal septic peritonitis. The chief source of danger is the absorption of septic material by the lymphatics, a consequent rapid spread of inflammation along their course, and in some cases an almost immediate conveyance of septic contagion to the peritoneum. On this account rapid dilatation under anæsthesia by instrumental means is preferable, when the cervix is dilatable. Some authorities have even altogether discarded tents in favour of Hegar's dilators (*see* p. 63). The danger may, to a very great extent, be avoided by suitable precautions. Serious effects have more frequently occurred when a series of tents has been used to effect progressive dilatation. The most important precaution, therefore, is not to employ tents more than twice in immediate succession, but if sufficient dilatation has not then been effected, to wait awhile before resuming the process, or complete it by rapid dilatation. In dilatation for the purpose of diagnosis, or gaining access to a tumour, laminaria tents are the best to use. As many of these as can be introduced without force should be placed side by side. This may be done either at the first sitting, if the cervix is not small, or after preliminary dilatation by a single tent. An antiseptic vaginal injection should be used before the insertion of a tent and after its removal, and a sponge tent should not be left in place more than twelve, or a laminaria tent more than eighteen hours. Generally six hours are sufficient to gain the full amount of expansion from a sponge or tupelo tent, and twelve from a laminaria

tent. If any rigor or rise of temperature occur, dilatation should at once be suspended. It is of the utmost importance also that the patient should be in bed when a tent is introduced, and should remain so until at least twenty-four hours after its removal. Tents should not be used, unless for extremely urgent cause, when any recent acute inflammation is present; and in cases of pelvic peritonitis, even of an old or chronic character, they should be avoided as a rule, since such an inflammation is apt to be rekindled on slight provocation.

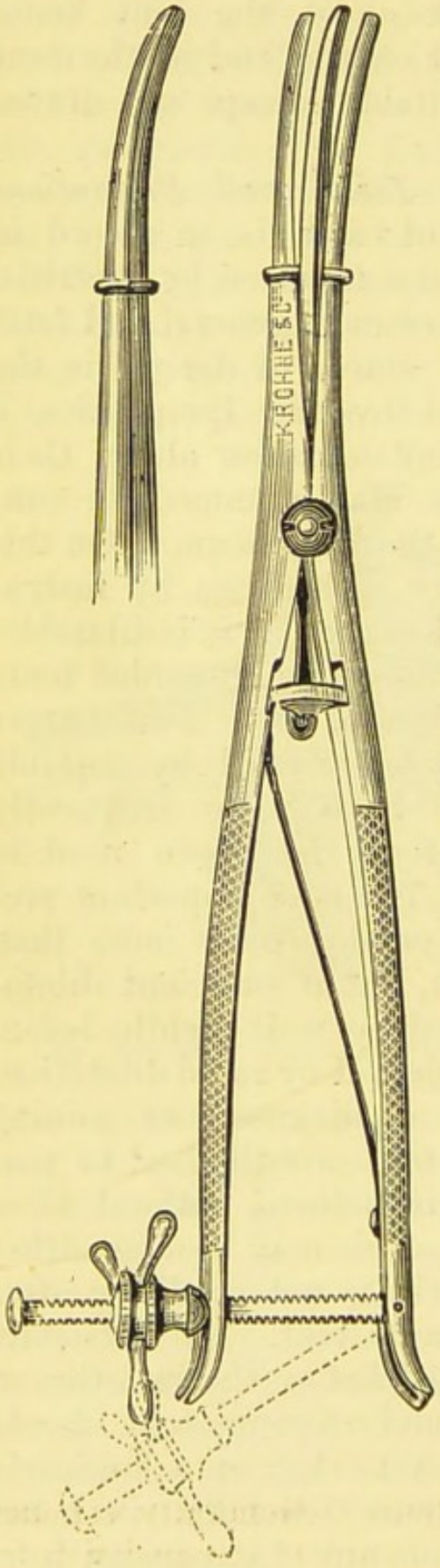


Fig. 33.—Sims' Uterine Dilator.

Instrumental Dilators.—An effective instrument for immediate dilatation of the cervical canal is that of Dr. Marion Sims (Fig. 33). This may sometimes be employed with advantage, the patient being placed under an anæsthetic, when, by previous use of tents, the cervix has been almost, but not quite, sufficiently dilated to allow the index finger to pass for exploration. It may also be used when spontaneous dilatation has occurred to a similar

degree, as, for instance, in the case of abortion, and may then sometimes avoid the necessity for the use of tents.

Hegar's Dilators.—Hegar's dilators are intended for rapid dilatation of the uterine canal, with the aid of an anæsthetic, as an alternative to gradual dilatation by

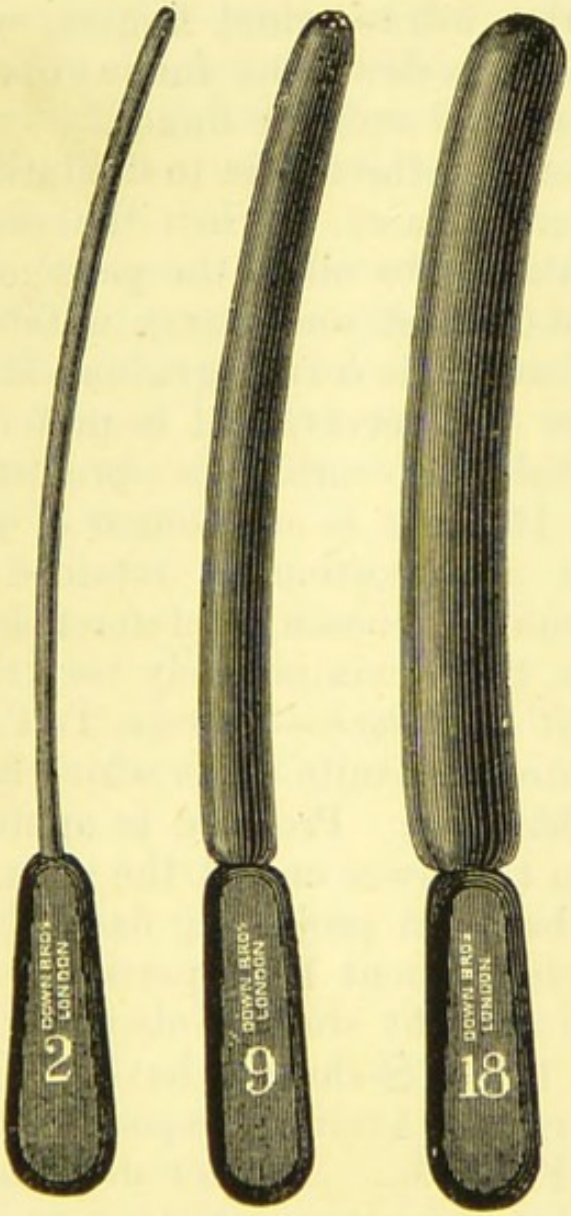


Fig. 34.

tents. They consist of a series of twenty-five slightly curved stems about five inches long, ranging in diameter from one-twenty-fifth of an inch up to a little more than one inch (Fig. 34). The stems are provided with a flattened handle. The successive sizes are passed like the ordinary sound, or with the aid of

Sims' speculum, the cervix being firmly held by a tenaculum. The latter mode is generally better. Another plan, which may be used with advantage in the case of the larger sizes, is the following. The patient is placed on her back, and the fundus grasped by the external hand. The point of the dilator is guided into the cervix, and pressed upward by the intra-vaginal fingers, while the external hand presses down the fundus over the dilator, as a glove is slipped over the finger.

The resistance of the cervix to dilatation varies very much in different cases. When the cervix is rigid, sufficient dilatation to allow the passage of the finger cannot be obtained at one sitting without the use of considerable force. As a rule, gradual dilatation causes less injury to the cervix, and is preferable in these cases, provided that antiseptic precautions can be maintained. If there is any source of septic material present, such as a portion of retained ovum, rapid dilatation should be chosen in preference; under these circumstances, the cervix is rarely very rigid.

Lawson Tait's Dilators.—Lawson Tait's dilators consist of graduated vulcanite cones which can be screwed into a straight stem. Pressure is applied by elastic bands fixed to the lower end of the stem, and attached to a suitable belt. A projecting flange below the cone prevents the instrument from passing too far into the uterus. The straight stem is obviously faulty. The stem ought to be S-shaped, having a vaginal and perineal curve, like Aveling's repositor for inversion of the uterus (Fig. 79). Another drawback to the instrument is that it requires watching and readjustment during the process of dilatation. It is therefore better suited for hospital than for private practice.

Dilatation by Iodoform Cotton.—A plan for effecting a more complete and prolonged dilatation, which may be maintained for many days, and even several weeks, has been introduced by Vulliet.* Cotton is impreg-

* "Archiv. de Tocol.," Oct. 30, 1886.

nated with iodoform by means of a 10 per cent. solution in ether. Pieces of this iodoform cotton, about the size of an almond or less, are taken, and a thread is attached to each, to facilitate its withdrawal. The cervix is packed with these, and the packing is renewed about every forty-eight hours. Strips of iodoform gauze may be used in the same manner. In this way, the contractile power of the circular muscular fibres is gradually wearied out. This plan may be tried in cases in which dilatation by tents fails to afford sufficient access to an intra-uterine tumour which it is intended to remove.

Hydrostatic Dilators.—It is to be noted that Barnes' hydrostatic dilating bags are not suitable for dilating the unimpregnated uterus. Unless the uterus is greatly enlarged by a fibroid tumour, the bag is too large to introduce; and, when it is so enlarged, a greater dilating power is required.

CHAPTER III.

PHYSIOLOGY OF NORMAL MENSTRUATION.

By the term menstruation, or catamenia, is understood a hæmorrhage from the mucous membrane of the body of the uterus, which normally recurs at regular intervals of, approximately, one month, and continues throughout the whole period of sexual activity in women, except during pregnancy and lactation. In a menstrual period there are three phenomena intimately connected together. First, active hyperæmia of the uterus and ovaries, with engorgement of the erectile tissue surrounding those organs; second, rupture of one or more Graafian follicles, with escape of the contained ovules; third, disintegration of the surface of the mucous membrane lining the body of the uterus, in degree sufficient to cause rupture of the vessels and effusion of the menstrual blood. With the latter is associated an increased secretion from the cervix and vagina. There are several points in the physiology of menstruation, and in the relation between its several elements, as to which exact data are as yet wanting. Since the connection of menstruation with ovulation, first suggested by Power in 1821, was established by the researches of Négrier, Bischoff, Coste, Pouchet, Raciborski, and others, it has generally been believed that the mucous membrane becomes tumefied during the period, that the height of hyperæmia is coincident with the flow of menstrual blood, and that the follicle

is ruptured at the same time or shortly after. It has also been thought that conception is most frequent shortly after the end of a period. Recent researches, however, especially those of Kundrat, Engelmann, John Williams, and Leopold, while differing in important points, have agreed in showing that the mucous membrane attains its greatest thickness and development, and that hyperæmia is usually at its height, immediately before the commencement of a period. Anatomical evidence has also been adduced to show that the follicle is commonly ruptured before the onset of a period, though there are also cases recorded in which it was found not yet ruptured, but apparently on the point of rupture, during or immediately after menstruation. The view thus suggested by some modern observers—which is the same as that first supported by Pouchet and Tyler Smith—is that in the inter-menstrual epoch there is a growth of the uterine mucous membrane, to render it a fit receptacle for the ovum, and that the exfoliation of mucous membrane and discharge of blood constitute already a retrogressive change, analogous to the separation of the decidua in parturition, and denoting that the impregnation of that particular ovum has not taken place. From this view would follow a conclusion contrary to that hitherto general, namely, that the fertilized ovum commonly belongs, not to the last menstrual period which occurred, but to the succeeding period which failed to appear.

Another explanation, equally consistent with the facts which have been proved as to the development of the mucous membrane before menstruation, is that the exfoliation of the surface of the mucous membrane is not an indication that any ovum has failed to be fertilized, but is exactly the condition required to facilitate the attachment of the ovum to the surface denuded of epithelium. According to this view, whatever be the date of the fertilizing coitus, or the rupture of the Graafian follicle, the implantation of the ovum on the

mucous membrane commonly takes place shortly after the end of a period.

Recent evidence has also compelled us to regard the association of ovulation with menstruation as by no means an invariable, although probably a general rule. In women whose ovaries are not developed, and in those who have been spayed before puberty, menstruation never appears. Thus it is proved that a stimulus to the nervous system, which originates in the ovaries, is necessary for the establishment of that function. A considerable number of cases has been recorded, however, in which, after removal of both ovaries, menstruation has continued more or less regularly for years. Anatomical evidence has also been found, on the one hand, of recent ovulation during a period of amenorrhœa, or even where no menstruation had ever taken place, and, on the other hand, on the absence of any sign of recent ovulation in women who had died during or immediately after menstruation. In rare cases, also, pregnancy has occurred in women who had never menstruated, though long past the age of puberty. Nevertheless, it remains true that the association of ovulation and menstruation is the general rule. After removal of both ovaries, menstruation does usually cease from the time of the operation. Some of the apparent exceptions may be explained on the ground that the ovaries were removed piecemeal, and that some small portion of their tissue may have been left, and perhaps may have maintained its vitality even on the distal side of the ligature. Thus, in two cases at least, not only menstruation, but pregnancy has occurred after the supposed complete removal of both ovaries. Again, amenorrhœa is a common result of cystic degeneration of both ovaries. Hence the probable conclusion is that the immediate source of the menstrual nisus, and of its periodical recurrence, lies rather in the nervous centres than in the ovaries, though the stimulus of the ovaries is necessary for its first establishment, and in most cases for its continu-

ance. The final development and rupture of the Graafian follicle would then be rather the effect than the cause of the hyperæmia, and the exact period of its rupture might probably vary according to the stage which it had reached when the menstrual nisus commenced. It is also probable that Graafian follicles may occasionally be ruptured in the inter-menstrual intervals, especially under the influence of the hyperæmia induced by coitus; and it is certain that the menstrual period may pass without the rupture of any follicle, if there happen to be none sufficiently near to maturity.

These facts have led some to conclude, that, as the limitation of sexual excitement to a particular epoch, usual in the lower animals, has been lost in the human subject, so ovulation is no longer exclusively associated with the same epoch, but occurs indiscriminately at any time. The preponderance of evidence, however, tends to show that the association of ovulation and menstruation is the usual, though not the invariable rule.

The view that the immediate cause of the menstrual nisus lies in the nervous system appears to be supported by the fact that there are not merely local changes in menstruation, but a monthly cycle affecting the whole organism. Sphygmographic observations have shown that arterial tension is above the average for some time before the period, and becomes lowered during the period. Jacobi and Stevenson have shown that the curve of temperature rises about half a degree above the mean for about a fortnight before the period, falling to a similar extent below it during and after the period, and also that a curve representing the excretion of urea follows a similar course

Source of the Menstrual Blood.—That the effusion of blood does not depend upon hyperæmia solely, is shown by the fact that, when the uterine mucous membrane receives the stimulus in nutrition due to the implantation of a fecundated ovum, no hæmorrhage occurs, although the hyperæmia increases to a higher

point than that of menstruation. The first step leading to rupture of the vessels is therefore a disintegration of the mucous membrane, or, at any rate, a weakening of the vessel walls, sufficient to cause them to give way; and a fatty degeneration of the mucous membrane, preceding the commencement of hæmorrhage, has been described by Williams. On careful microscopic examination of the menstrual blood, groups of cells belonging to the uterine mucous membrane may frequently be found, especially during the first two days of the period; and not infrequently minute shreds of membrane, showing the apertures of the uterine glands, generally denuded of their epithelial lining, are also seen. The completeness of the disintegration appears to vary in different persons, but exfoliation in larger pieces is a morbid condition, which will be noticed under the head of membranous dysmenorrhœa. As to the depth of the normal exfoliation, final proof is yet wanting. Of recent observers, Williams maintains that the whole thickness of soft tissue, commonly regarded as mucous membrane, is thrown off every month, leaving only the extremities of the glands embedded in the muscular coat, the inner layer of which he regards as belonging, in development, to the mucous membrane, and as being, in fact, the muscularis mucosæ. The regeneration he describes as beginning at the internal os, and extending towards the fundus. The proof is incomplete from the fact that the instances in which complete exfoliation was found were cases of death by acute febrile diseases, so that the disintegration might have been morbid, or the softened tissues might have broken down through faulty preparation of the sections. Kundrat and Leopold adduce cases to show that, even near, or shortly after, the end of a period, no more than the most superficial layer of mucous membrane was found wanting, and attribute the decrease of the thickness to diminution of œdematous swelling rather than to loss of substance. Engelmann denies any

exfoliation of even the surface. I have snipped a piece of tissue one-sixth of an inch deep out of the surface of an inverted uterus on the seventh and last day of menstruation, and have found that the whole of the portion removed was mucous membrane, the muscular wall not being reached. In Macaque monkeys, in whom a slight sanguineous discharge from the uterus occurs, Bland Sutton found the epithelium intact at the time of the flow.

The view that permanent communications exist between the blood-vessels and the uterine glands, and that these are the source of the exudation of menstrual blood, may be regarded as now exploded. The mucous membrane of the cervix normally takes no part in the outpouring of blood, and its surface remains intact. The coagulation of menstrual blood is usually prevented by its mixture with the acid vaginal secretion. If the quantity of blood is excessive, or if it is retained long within the uterus, in consequence of stenosis or flexion, clots are formed. The quantity of blood normally lost is estimated at from three to seven ounces. The amount of loss depends in great measure upon the degree of active hyperæmia, as is shown by its increase from the effects of exercise, or in consequence of coitus. The natural duration of the flow is from three to five days, but in some women it lasts habitually for seven or eight. The period of recurrence, in women who are perfectly regular, usually varies from twenty-seven to thirty days.

Period of Possible Conception.—There are two considerations which render it very difficult to draw any positive conclusions as to the stage of the menstrual cycle at which it is possible, or usual, for conception to occur: first, that the life of spermatozoa within the uterus may be prolonged for certainly as much as eight days, and possibly for longer; and, secondly, that we have no evidence, in the human subject, as to the time occupied by the ovum in descending the Fallopian tube, or during which it may retain its vitality. There

is no doubt that fruitful intercourse may occur at any part of the menstrual cycle, and that any method for preventing pregnancy by abstinence during any special period is unreliable. That abstinence shortly after the period has no such effect appears to be shown by the case of the Jews, who are, if anything, more fertile than other races. Strict observers of the Jewish law are said to practise abstinence during five days for the period, and seven days for purification afterwards, reckoning from the end of the five days, or from the last appearance of blood if the appearance lasted longer than five days—an interval which amounts to at least twelve days in all.* It is, however, one thing to lay down such a regulation in the priestly code, and another to secure its general observance. The converse fact that a single fruitful coitus may occur between four and ten days after the commencement of the flow is proved by cases recorded by Marion Sims, who considered the latter part of this period as the preferable time in order to ensure pregnancy. It can scarcely be doubted that menstruation is really analogous, in some measure, to the æstus or rut of animals; although there is the important contrast that, in animals, coitus takes place only at the time of æstus; but, in the human subject, usually at any other time except that of menstruation. The latter circumstance, however, is rather the result of civilization, and of a feeling of delicacy, for there is no doubt that an increase of sexual feeling does normally take place at the menstrual period as at that of æstus. Hence the common opinion that intercourse near the time of menstruation is more likely to prove fruitful is probably correct; but within what limits of time the uterine mucous membrane is capable of receiving an ovum remains as yet uncertain.

Commencement and Cessation of Menstruation.—The first appearance of menstruation usually coincides with the age of puberty, and the development of the breasts,

* See Leviticus xv. 19 to end.

the pelvis, and the hair on the pubes, as well as the mental changes which occur at the same time. The most frequent age is, in temperate climates, the fourteenth or fifteenth, or, somewhat less commonly, the sixteenth year; but variations between the tenth and twenty-first year are not very rare. The influence of climate is considerable, and in hot countries menstruation commences, on the average, about two years earlier, while it is, at the same time, more profuse. In Arctic climes, on the other hand, its appearance is delayed to about an equal extent, and the quantity of blood lost is very small. Cases of precocious menstruation occasionally occur in childhood, and even infancy, and are then associated with premature development of breasts and pelvis, and probably with premature ovulation. In such a case, pregnancy has occurred at the age of eight years.

The time of cessation of menstruation (climacteric period, menopause, or change of life) is, on the average, about the age of forty-eight. Women who menstruate early do not generally reach the menopause early, but the contrary, unless some diseased condition of ovaries or uterus has supervened; and, when menstruation is established late, the same ovarian inactivity often leads to an early cessation. In very rare cases true menstruation may continue, and pregnancy be possible, as late as the age of sixty.

Symptoms and Concomitants of Menstruation.—In women of robust health no premonitory signs are noticed, but in those of more impressible nervous system, for some days before the period is due the breasts often become firm, or even painfully hard, and may be the seat of neuralgic pain, a condition which generally disappears within a day or two after the commencement of the flow. At the same time there is an increased irritability of nerve-centres, which, in women subject to hysteria, epilepsy, or migraine, is shown by the greater frequency of attacks at this period. If congestion of uterus or ovaries is present, pelvic pain

precedes menstruation by some days. In cases of hernia of the ovaries, these organs have been found to become swollen and tender a little before menstruation, and continue so during the period. Vaginal touch during a menstrual period shows the uterus as well as the vagina to be turgid and soft. The soft condition of the uterus, however, is alternated with contraction, especially if any obstacle to the flow exists, and, if death occurs during a period, the muscular wall of the uterus is often found pale, from expulsion of the blood, while the mucous membrane, ovaries, and surrounding parts are highly congested. The cervix uteri, vagina, and vulva participate in the engorgement, and increased secretion from them precedes, accompanies, and follows the flow of blood. There is ofen a tendency to constipation shortly before the period is due, just as there is in early pregnancy, even before the uterus has enlarged sufficiently to produce any effect by pressure, and this constipation may be succeeded by relaxation of the bowels after the flow has commenced. Even in health, some degree of fulness, and of general lassitude, is usually felt just before, and for the first two or three days of the period—a condition expressed by the saying of women that they are "unwell."

CHAPTER IV.

MALFORMATIONS OF THE UTERUS AND VAGINA.

The Fallopian tubes, with the uterus and vagina, are developed from two distinct tubes, called Müller's ducts, which coalesce about the eighth week of fœtal life throughout that portion which forms the uterus and vagina, the point where junction should begin being marked by the insertion of the round ligaments. The graver congenital deformities of these organs depend upon a complete or partial failure either in the development of one or both of these ducts, or in their junction, and it will therefore be convenient to consider such deformities, both of uterus and vagina, in conjunction.

Absence or Rudimentary Development of Uterus.—The uterus may be completely absent, or may be a rudimentary membranous body with or without an enclosed cavity. Frequently in such cases there is a single solid cervix, and separate horns containing small cavities, a condition which constitutes the *uterus bipartitus*. The ovaries may be absent or present, the vagina absent or short, while the external genital organs are normal. When the ovaries are present, distress may arise from an unrelieved menstrual molimen. The diagnosis is generally to be made by rectal touch in conjunction with bimanual examination, and may be aided by the introduction of a catheter, or of the finger, into the bladder. When the vagina is entirely

absent, women may marry in ignorance of their deformity, and may afterwards be anxious for operative assistance. The attempt to make an artificial vagina, however, involves in these cases a risk of opening the peritoneal cavity.

The duct of Müller, on one side, may be formed normally, while that on the other is absent or imperfectly developed, and fails to coalesce fully with its fellow. This condition constitutes the *uterus unicornis* (Fig. 35). The uterus is curved to one side and terminates in a point, from which the round ligament and other appendages take their origin. The rudimentary cornu, if present, is commonly attached about

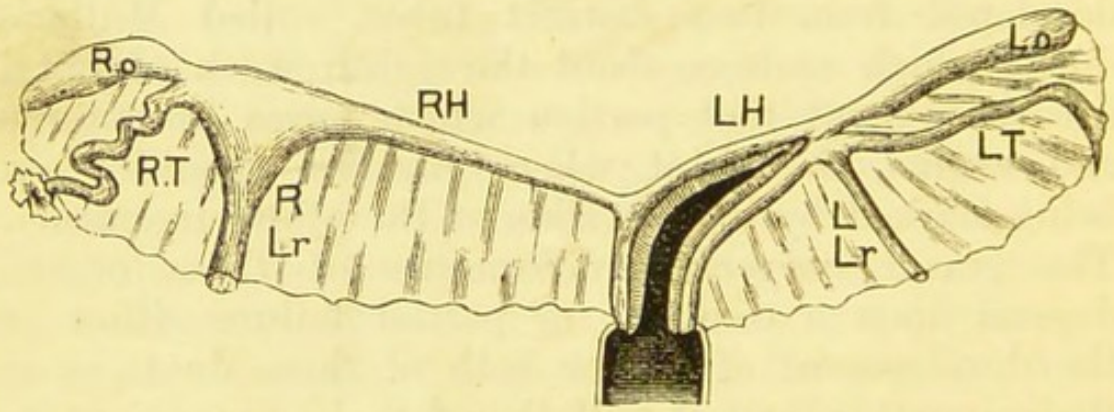


Fig. 35.—Uterus Unicornis Sinister, seen from the front.
R H, right horn, rudimentary; L H, left horn; R T, right Fallopian tube; L T, left Fallopian tube; R O, right ovary; L O, left ovary; R Lr, right round ligament; L Lr, left round ligament.

the position of the internal os, and may be pervious or not. Menstruation is usually normal. Pregnancy may occur in the developed horn, and proceed naturally. It may also take place in the rudimentary horn, and is then likely to lead to rupture, commonly before the end of the fourth month, and usually with a fatal result. The fœtus may, however, be developed up to the full term without rupture.

If both ducts are developed, but fail to coalesce completely, the *uterus bicornis*, or *uterus septus*, may be formed. In the former (Fig. 36) the body of the uterus is more or less bifid, as is the case in many

animals; in the latter (Fig. 37) the externally normal uterus is divided by a septum into two halves. The

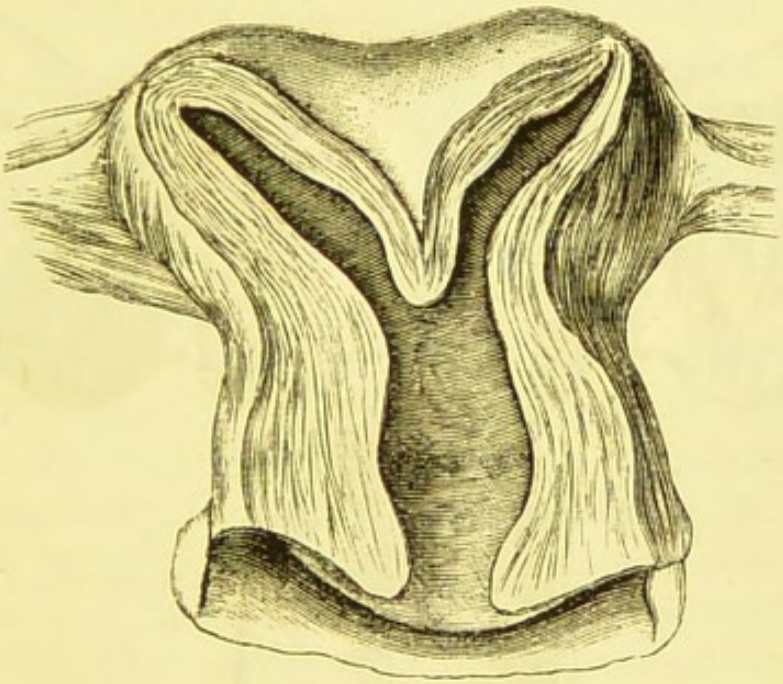


Fig. 36.—Uterus Bicornis.

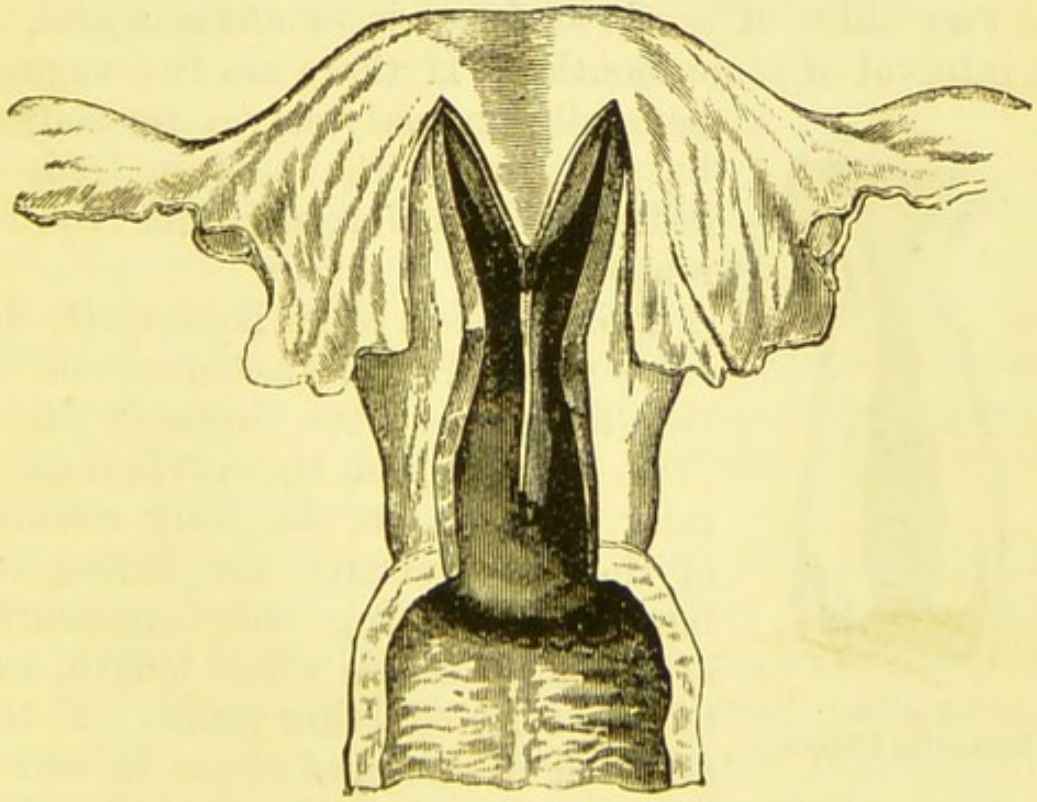


Fig. 37.—Uterus Septus.

septum may be incomplete, or may extend to the external os, and the vagina may be either single or

double (Fig. 38). Some recorded cases of superfœtation are explained by pregnancy having occurred on

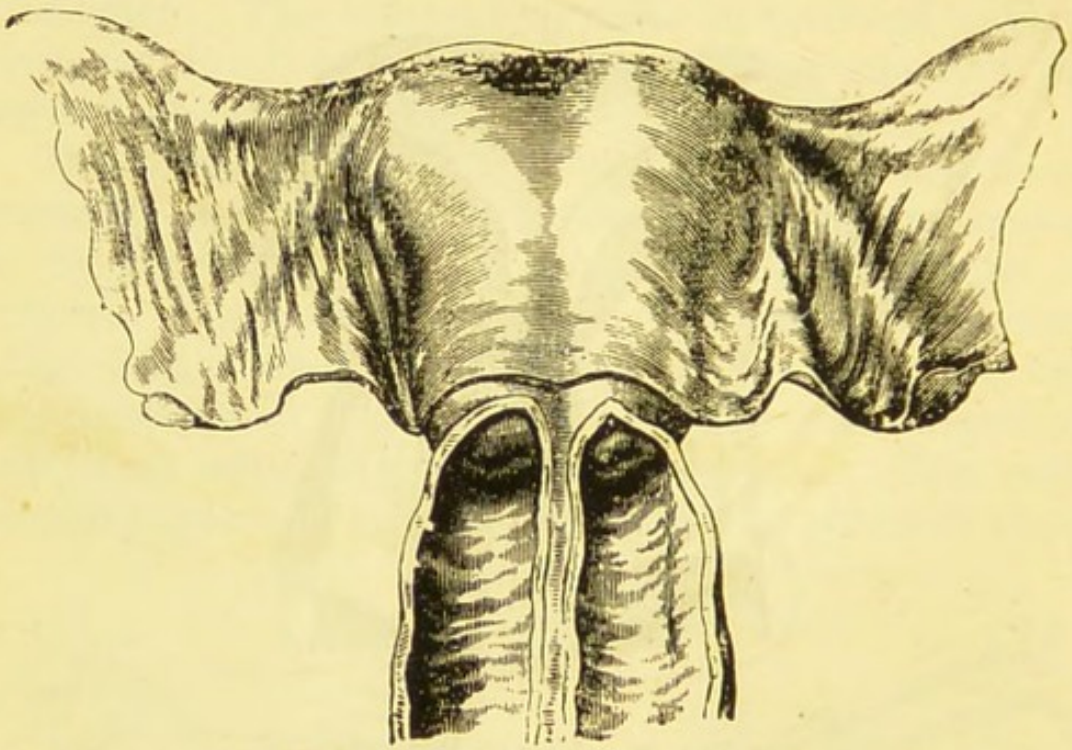


Fig. 38.—Double Uterus and Vagina.

the two sides of a *uterus bicornis*, or *uterus septus*, at an interval of some months. If there are two vaginæ, generally one only serves for coition, but sometimes the septum leads to difficulty in this respect and requires removal.



Fig. 39.
Infantile Uterus.

The uterus is often imperfectly developed, and then assumes one of two forms—(1) the *infantile uterus* (Fig. 39), in which the cervix is naturally formed, but the body remains of the same relative size during infancy, constituting only one-fourth or one-third of the whole length, and having relatively thin walls; (2) the *generally ill-developed uterus*, in which the normal relative proportion is maintained, but the whole organ is atrophic. The latter condition is often associated with stenosis of the external os and anteflexion, and will be further discussed under those

headings. When the uterus is infantile, menstruation is usually absent; when it is generally ill-developed, it is either absent or scanty. The infantile uterus may be diagnosed by bimanual examination, which reveals the small size of the body, while the sound passes only to a length of from $1\frac{1}{4}$ to $1\frac{3}{4}$ inches, and can be felt through the thin fundus with unusual distinctness. The generally ill-developed uterus is distinguished from the infantile by the small size of the vaginal portion.

Treatment.—When the uterus is imperfectly developed, nutrition should be stimulated as much as possible by nourishing diet and the administration of iron, especially if there is any tendency to chlorosis. Of still greater importance is hygienic treatment by abundance of fresh air and a suitable amount of exercise, with the avoidance of too prolonged study or sedentary occupations, especially about the age of puberty. The question of employing any local stimulus will be discussed under the head of amenorrhœa.

ATRESIA OF THE UTERUS, VAGINA, OR VULVA.

All occlusions of the genital canal, at whatever point situated, and whether congenital or acquired, have a common effect in preventing the exit of the menstrual blood, when the body of the uterus itself is developed, and so lead to a similar group of symptoms. It is, therefore, convenient to consider the several varieties of atresia together.

Congenital Uterine Atresia, apart from atresia of the vagina, is very rare, and may affect the external os, or, still more rarely, the whole cervix. Atresia may exist in one half of a double uterus. Diagnosis is then more difficult than usual, for there is generally menstruation from the patent side of the uterus, while, on the other side, the menstrual fluid is retained, and the fact that the uterus is double may easily escape detection.

Congenital Vaginal Atresia is much commoner, and may consist either in complete or partial absence of the vagina, in an imperforate condition of the hymen, or in closure of the vagina by a transverse septum, which is generally situated immediately behind the hymen, and may easily be mistaken for *atresia hymenalis*. In many cases in which there is apparently a total absence of the vagina, the lower part of the cavity distended by menstrual blood is irregular in shape, and appears to correspond partly to the cervix and partly to a portion of the summit of the vagina. No distinct external os is formed, and the cavity has thick muscular walls, like those of the uterus rather than those of the vagina.

Acquired Uterine Atresia usually affects some portion of the cervical canal. It may result from the application of the actual cautery, potassa fusa, strong acids, or even the solid nitrate of silver, from amputation of the vaginal cervix, especially when performed by the galvanic écraseur, from the presence of growths in the cervix, whether fibroid or cancer, or from any injury to the cervix. It may also be the effect of cervical catarrh, through adhesion of the granulations formed on opposite sides of the canal, especially when the passage is no longer kept patent by the flow of menstrual blood. It is not uncommon, therefore, in old women, especially when prolapse of the uterus exists. Even before the menopause, atresia may result from abrasion close to the os, produced by friction upon a prolapsed cervix.

Acquired Vaginal Atresia is usually the result of sloughing of the vaginal walls after protracted labour, or, in rare cases, after abortion. It may also be the effect of injuries, of sloughing of the vagina after fevers, or of venereal ulceration. In some cases it is combined with vesical or rectal fistula. The labia are not uncommonly adherent in little girls, but the vagina is not completely closed thereby, and the adhesion is easily separated without any need for

incision. This condition is not a fault of development, but may arise either during fœtal life or after birth.

Results and Symptoms.—Congenital atresia usually attracts no attention during childhood, but occasionally, even in early life, an accumulation of secretion has taken place behind an occluding septum. As soon as menstruation commences, the menstrual blood collects behind the occlusion, and begins to distend the genital canal from below upwards; first the vagina, if that is present, then the cervix, then the body of the uterus, and, lastly, the Fallopian tubes. Thus, in atresia of the hymen or at the lower portion of the vagina, the uterus does not participate in distension until quite a late stage, and the undilated uterus can generally be felt at the top of the elastic swelling formed by the dilated vagina. If, however, the atresia is about the situation of the external os, the whole uterus becomes dilated into a single cavity from the first, and the internal os is obliterated by distension, while the Fallopian tubes are much earlier affected than in the former case. During the inter-menstrual intervals a considerable portion of the fluid part of the blood is re-absorbed, and thus the swelling formed diminishes during such intervals, while the retained fluid acquires a thick, treacly consistence and dark appearance, but undergoes no putrefaction. The blood in the Fallopian tubes is not, in all cases, due to reflux from the uterus, but may be poured out into them under the stimulus of the morbid condition, as is proved by the fact that the uterine extremity of the distended tubes may be found quite narrow, or even occluded. Slight reflux of blood into the peritoneal cavity may occur, and the pavilions of the tubes often become adherent from this cause, but copious regurgitation does not often take place until the fluid has been partially evacuated. When the atresia is due to a thin membrane, a spontaneous termination, favourable or otherwise, may be brought about by rupture of the

membrane under some sudden strain. Eventually the Fallopian tubes, or, less commonly, even the uterus itself, may rupture, and hæmatocele or fatal peritonitis be the result.

After the menopause, the uterus may be filled by mucous fluid (*hydrometra*), a condition usually resulting from acquired atresia of the cervical canal. I have met with one instance in which the uterus became largely distended by pus in consequence of an atresia produced by cancer about the internal os.

Attention is commonly attracted to congenital atresia either by amenorrhœa continuing beyond the age of puberty, by inability to perform the act of coition, or by the effects of menstrual retention. In the last case there will be spasmodic pain, recurring more or less regularly at monthly intervals, and eventually a tumour in the hypogastrium, enlarging in association with the pain, and subsiding somewhat in the intervals. Retention of urine, and other effects of pressure, may be produced. If the septum is thin and at or near the hymen a bulging swelling will protrude at the vulva. In some cases the atresia is not quite complete, and some slight escape of menstrual blood may occur.

Treatment.—When the occlusion consists only of a thin septum, the operation for evacuation of the retained fluid is extremely easy, but in these, as well as in more difficult cases, there is a grave peril of serious symptoms, and death has not infrequently followed. The danger is in proportion to the degree of distension, and is especially great if the Fallopian tubes are involved; while, if the collection of fluid is limited to the vagina, it is comparatively slight. The accidents most likely to occur are:—(1) Reflux of blood through the Fallopian tubes, due to spasmodic contraction of the uterus, or of the tubes, set up by sudden evacuation. (2) Rupture of some adherent portion of the Fallopian tubes during the collapse of the tumour. (3) Decomposition of some of the retained fluid, which may lead to septic peritonitis,

inflammation of the walls of the cavity, or, in some cases, rupture of these walls. (4) The walls of the cavity are also liable to become inflamed, even when no obvious decomposition has occurred. This is probably to be explained on the ground that, the cavity having been congenitally shut off from the outer surface, its walls have a susceptibility, like that of serous membranes, to the influence of germs commonly or occasionally present in the air.

Opinions have differed whether it is advisable at once to make a free opening and wash out the cavity with an antiseptic. Of late, I have adopted the following plan, and have found it give excellent results. The time chosen for the operation should be the period of greatest quiescence, a few days after the cessation of the pain which indicates the menstrual period. First, the septum is opened by a free incision. The benzoline cautery knife may be used to make the incision, so that the edges may be less inclined to close up, or to absorb any septic material. The fluid is then allowed to flow away spontaneously. No pressure is to be made upon the uterus, for fear of exciting spasmodic contraction, or breaking down any adhesion of Fallopian tubes. As soon as the fluid has ceased to flow, the cavity is washed out, by means of an irrigator, with a warm antiseptic solution, the tube being passed up into the cavity of the uterus. The antiseptic used may be carbolic acid (1 in 40), iodine (tinct. iodi ʒij. ad aq. Oj.), or sulphurous acid (acid. sulphuros. ℥ss. ad aq. Oj.). A large pad of some antiseptic material, such as carbolic or sublimate gauze, is then secured to the vulva by a T bandage. The irrigation is repeated at least three times a day, and the pads frequently changed. In case of any decomposition occurring in the discharge, or elevation of the patient's temperature, the irrigations should be used very frequently, and quinine should be given in full doses.

When the whole or a considerable part of the vagina

is absent, it is preferable, if possible, to make the permanent passage in the natural situation, rather than through the rectum; and the making of an artificial vagina may be undertaken when any uterus can be detected, even though there is no collection of menstrual fluid. When, however, as is often the case, the septum is very thin between rectum and bladder, great care is required to avoid opening one of these cavities. The patient should be placed in the lithotomy position, and the knife or scissors used only to make a transverse incision through the mucous membrane just in front of the fourchette. The rest of the passage should be torn by the index-finger of the right hand, while the left index-finger is kept in the rectum, and a sound is held by an assistant in the bladder. The operator is thus guided by the sense of touch in making a passage equidistant from either cavity. If necessary, for enlargement of the canal, the finger may be removed from the rectum, and used to assist the other in the artificial passage, or a blunt instrument, such as the raspatory employed for scraping bones, may be used in conjunction with the finger. The uterus, when reached, may be pierced either by a trocar or knife, if there is no patent os externum. The artificial vagina should be made at first larger than required. A full-sized Sims' dilator of glass (Fig. 139) should be introduced at once, and must generally be worn continuously for a good many months to avoid the strong tendency to contraction which exists. This serves to check hæmorrhage in the first instance, and, under its unirritating pressure, an epithelium, like that of mucous membrane, may gradually spread over the artificial vagina. Eventually, it may be possible to substitute for the dilator a narrow Hodge's pessary. Marriage, if not already contracted, should not be advised until the patency of the new vagina has been tested for a considerable period. Should the attempt to make an artificial vagina fail, the only alternative, if menstrual fluid is poured out, is to endeavour to keep open a passage *per rectum;* and many operators have

adopted this measure from choice in the first instance. The treatment of acquired atresia is similar to that of congenital, but the risk of evacuating retained fluid appears, in this instance, to be considerably less.

STENOSIS OF THE OS EXTERNUM.

Causation and Pathological Anatomy.—Congenital stenosis of the cervical canal is situated either at the external or internal os, and extreme stenosis is not uncommon at the former orifice, while it is rare at the latter. The intervening cervical canal is comparatively free, being somewhat spindle-shaped. A small external os is usually associated with a tapering, conical cervix, projecting more than usual into the vagina. Frequently also the cervix is flexed forward, so that the os looks in the direction of the vagina, or even still more anteriorly (Fig. 57), the posterior lip of the cervix being long, and the anterior lip short. More rarely the cervix is flexed backward. In many cases this form of cervix is associated with imperfect development of the whole uterus, or of the uterus and ovaries. The uterine cavity is then rather less than the normal length, and menstruation scanty. From some associated imperfection, sterility often persists after the stenosis has been cured. The vagina may partake in the same imperfect development, and be smaller than usual, and sexual feeling is often deficient. Dr. G. Roper has adduced a case to show that an infantile form of pelvis may also be an associated condition. Acquired stenosis may arise from gradual contraction of the os externum in old age, or after the use of caustics. It is also common in old cases of prolapse of the third degree.

Results and Symptoms.—The most marked results of stenosis of any part of the cervical canal are dysmenorrhœa and sterility. Dysmenorrhœa is, however, not invariable. If the menstrual flow is moderate and uniform, and the mucous membrane thrown off is

completely disintegrated, no obstruction or pain may result; but if the flow is more profuse, or if there are any clots or shreds of menstrual decidua (*see* p. 70) to pass, spasmodic pain is produced by the efforts of the uterus to overcome the difficulty. The extent both of the spasmodic contraction and of its painfulness depends in very great degree upon the irritability of the woman's nervous system and her sensibility to pain. Sterility is a more constant symptom than dysmenorrhœa; nevertheless it does not imply an absolute hindrance, but only an increased difficulty in the access of spermatozoa to the uterus (*see* section on Sterility). I have met with several instances of women whose os externum would not admit the smallest surgical probe, but who had never suffered the slightest dysmenorrhœa, although they were sterile. In other cases, in addition to dysmenorrhœa, endometritis is produced by irritation, due to the retention of menstrual and other secretions: and this may lead to hyperæmia and menorrhagia, although the primary condition is usually that of scanty menstruation. The uterus then becomes hypertrophied, partly from the effect of hyperæmia, partly from the muscular efforts to overcome obstruction. It has been alleged that stenosis of the cervix may lead to dilatation of Fallopian tubes and reflux of blood into the peritoneal cavity, and so may be the cause of one form of menstrual hæmatocele. Recent anatomical proof of this, however, appears to be wanting.

Diagnosis.—The external os can be seen through the speculum, and its size tested by that of the sound or metallic bougie which will pass through it. In some cases only a specially small sound, or surgical probe can be passed.

Treatment.—If the contraction is only moderate, and if the os points in the normal direction, dilatation may be effected by mechanical dilators, such as graduated metallic bougies, Priestley's dilating sound (Fig. 46, p. 95), Hegar's dilators (Fig. 34, p. 63), or any of

the two-bladed or three-bladed uterine dilators. Tents may also be used for dilatation, but their use appears to involve as much risk to the patient as an incision limited to the os and lower portion of the cervix, and the effect produced is not so lasting. If, as is often the case, the os contracts up again after dilatation, it is well to have recourse to the method of incision; and, if the stenosis is very considerable, it is desirable to adopt this plan in the first instance. The frequently associated condition of cervical anteflexion, in which the cervix is curved forward, instead of being nearly in a line with the uterine cavity (*see* Fig. 44, p. 91), constitutes a reason in favour of performing the operation of posterior section of the cervix, in place of merely dilating the orifice, so that the new os may look in a more natural direction.

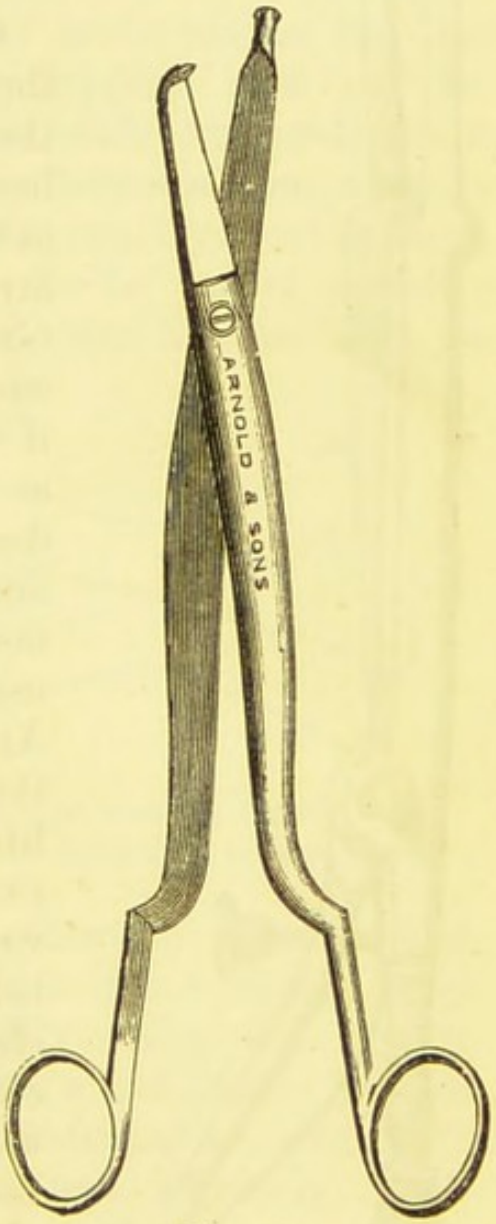


Fig. 40.
KUCHENMEISTER'S Scissors.

In the less common case in which the os looks in its normal direction, the incision, if required at all, should be bilateral. The incision may be made either by Sims' knife (Fig. 43, p. 90), by Kuchenmeister's scissors (Fig. 40), the blade of which has a point projecting at right angles to prevent retraction of the portion of cervix seized, or by any of the single or double-bladed metrotomes. If bilateral, the incision should not be made more than half-way up to the vaginal reflection, otherwise ectropion of the cervix, and its resulting

evils, may be produced. Of the metrotomes, the most widely useful is the original metrotome of Simpson (Fig. 41). This is a bistoury caché, the amount of the projection of the blade of which is regulated by a screw in the handle.



Fig. 41.
Simpson's Metrotome.

Of the two methods, the use of the scissors is most free from risk, the extent of tissue divided being less, but incision by Sims' knife or the metrotome more thoroughly lays open the lower part of the cervical canal (*see* Fig. 44, p. 91), and the risk is but slightly greater, if care be taken not to cut as high as the internal os. The operation does not absolutely require an anæsthetic unless the patient is nervous, especially if scissors be used, as the pain is very brief. An anæsthetic, however, allows the incision to be made more deliberately, and its extent more exactly regulated. An antiseptic vaginal injection should be made before the operation, and instruments and fingers should be cleansed and disinfected with the utmost care. The incisions may be made by the sense of touch alone, without using any speculum, or by the aid of Sims' speculum. If the speculum is used, the most accurate method is to make the incision by Sims' knife, in the mode shortly to be described. If the speculum is not employed, Simpson's metrotome may be used in the first instance.

If the os is too small to allow the passage of the instrument, it must first be snipped with Kuchenmeister's scissors. The metrotome is set to cut pretty widely, its extremity passed up a little short of the internal os—that is to say, for something less than an inch into the cervical canal—and it is then gradually opened as it is withdrawn, so as to cut in the line *c a* (Fig. 42). It frequently happens that the resulting incision is not quite so wide externally as is desired, and the division of the external os may then be completed by the scissors to the exact extent wished, as shown in Fig. 42. If the case be one of posterior section for cervical anteflexion, the incision may be

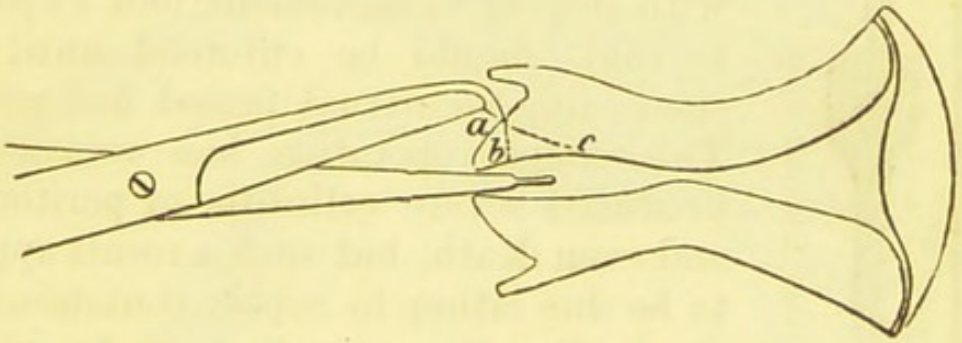


Fig. 42.—KUCHENMEISTER'S Scissors cutting Cervix.
a b, line of incision by scissors; *a c*, line of incision by metrotome.

made nearly up to the vaginal reflection, so as to throw the new aperture more nearly in a line with the upper part of the cervical canal (*see* Fig. 44, p. 91). If the incision is to be bilateral, Peaslee's metrotome (Fig. 48, p. 97), set to cut short of the internal os, affords the means of making symmetrical and precisely limited incisions.

For the double purpose of preventing primary union and avoiding the risk of septic absorption, it is a good plan to swab the incision with a solution of chloride of zinc (gr. lx. ad ℥j.). This has a mildly caustic effect upon the raw surface, and renders it less liable to absorb. If there is much bleeding, the wound may be swabbed also with a solution of perchloride or subsulphate of iron. If bleeding still continues, a small

piece of absorbent cotton, dipped in the iron solution, should be placed in the incision as a plug. It may have a thread attached, to draw it away after about twelve hours. A large tampon soaked in carbolized or iodized glycerine may be placed in the vagina, and the vagina should be syringed several times a day with some antiseptic. For a few days occasional digital examinations may be made, to prevent adhesion taking place. After that time there is little tendency to close at the external os, if the incision at first be sufficiently free. Rest in bed should be maintained at least ten days, and great caution, both with respect to movement and exposure to cold, should be enforced until the succeeding menstrual period has passed. This simple operation has occasionally produced severe cellulitis or peritonitis, and even death, but such a result appears to be due either to septic contamination at or after the operation, or to imprudence on the part of the patient, and is therefore avoidable. Out of twenty-five cases under my care in Guy's Hospital, disturbance followed the operation in one only. In this instance severe cellulitis appeared to result from contamination of the wound by a case of septicæmia in the same ward.

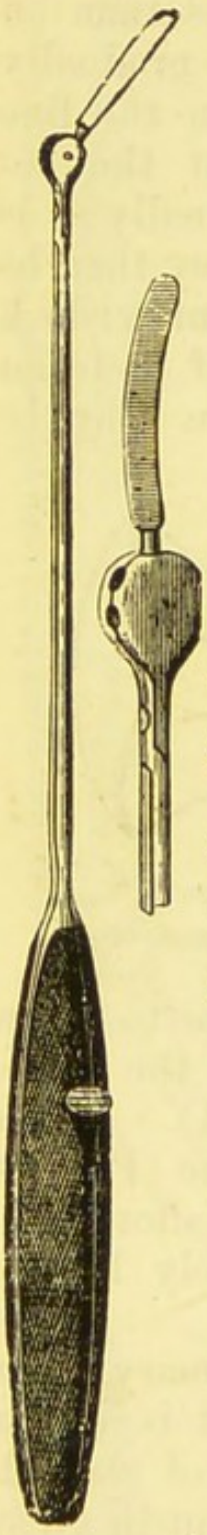


Fig. 43.—Sims' Uterine Knife.

If the stenosis is so extreme that the metrotome will not pass, and the probe-pointed blade of the scissors cannot at first be introduced far enough to make an adequate incision, it is convenient first to expand the os partially by Priestley's dilating sound (Fig. 46, p. 95), or to dilate it by a small laminaria tent. In extreme cases it may be necessary to commence the dilatation by a sharp-pointed probe, or pointed bistoury.

The method which I have most frequently adopted is that of Marion Sims, namely, to use his own speculum, and a special knife, consisting of a small razor-shaped blade, which can be fixed at any angle at the end of a long handle (Fig. 44). The scissors are first used if the os is extremely small. The uterus is then firmly held by a tenaculum-hook, the end of the knife is passed up about to the internal os, and the incision is made downward and outward in the line shown in Fig. 44. When the incision is completed, there

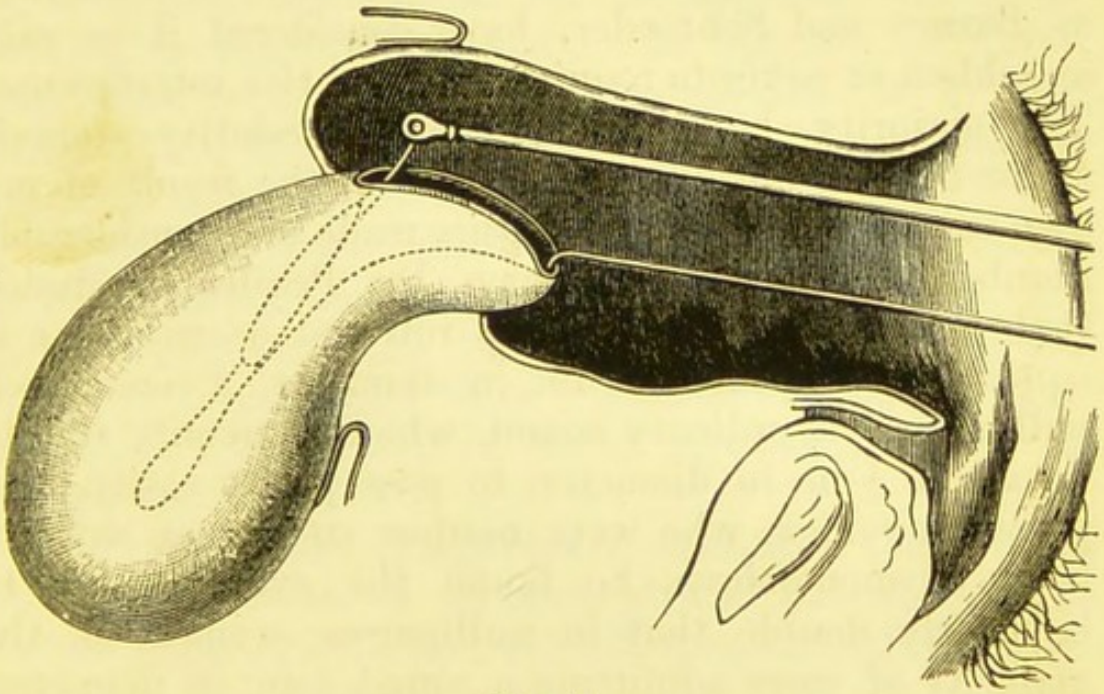


Fig. 44.
Posterior Section of the Cervix by Sims' Knife. (After Sims.)

should be room for the tip of the index-finger to enter the cervical canal. In the case of anteflexion of the cervix the incision is to be directly backward, otherwise it is to be bilateral.

In a considerable proportion of suitable cases of stenosis—that is to say, those associated with a dysmenorrhœa, shown by its characters to be obstructive rather than congestive or inflammatory*—incision of the cervix relieves the dysmenorrhœa more or less permanently. It is comparatively rare for sterility to be

* *See* section on Dysmenorrhœa.

cured by the operation. Dr. Pallen reports that out of 337 patients on whom he operated, thirteen or fourteen became pregnant afterwards, a proportion not at all greater than may be accounted for by mere coincidence.

STENOSIS OF THE OS INTERNUM.

Causation and Pathological Anatomy.—Opinions have differed widely as to the relative frequency of stenosis of the os internum, and some authorities, as Barnes and Schroeder, have considered it so rare as seldom or never to require any operative interference. The majority, however, hold that a relative stenosis at least is not uncommon, and this is the result of my own experience. From autopsies made in a considerable number of nulliparous women, Dr. Peaslee concluded that the average size of the internal os in them is equivalent to a circle $\frac{1}{7}$-in. in diameter, a size which will allow the ordinary sound, whose extremity should be about $\frac{1}{8}$-in. in diameter, to pass pretty easily. In parous* women, who were neither sterile nor suffered from dysmenorrhœa, he found the average area to be nearly double that in nulliparous women, in the majority of cases admitting a sound $\frac{1}{5}$-in. in diameter, though, in a large minority, one from $\frac{1}{8}$-in. to $\frac{1}{7}$-in. only could be passed. Hence, an internal os which, apart from flexion or spasm, will not readily admit an ordinary sound, not too large at the point, is abnormally small. Moreover, it is well known that parous women habitually menstruate more easily than virgins or the nulliparous, and that after a first pregnancy, if no morbid sequelæ remain, the probability of a further pregnancy is increased. It may be inferred that menstruation and conception may be facilitated by dilating the cervix to the average size of that in parous women. As regards dysmenorrhœa, this treatment is especially

* The word parous is used on the analogy of multiparous and nulliparous to denote one who has borne one or more children.

indicated, if the case is complicated by any flexion, by menorrhagia, leading to the formation of clots, by the discharge of shreds of membrane, by excessive hyperæmia leading to tumefaction of the cervical mucous membrane at menstrual periods, or by an irritable condition of the nervous system, owing to which a slight cause of obstruction sets up spasmodic and excessively painful uterine contractions.

It is to be remembered that the most definite sphincter in the uterine canal exists at the internal os, and that the size of the os therefore varies according to muscular tonicity. It appears, however, that, after being once completely dilated, as by parturition, the internal os does not usually contract up quite to its original smallness.

Acquired Stenosis may affect the internal os, or other parts of the cervical canal. It may result from cicatricial contraction after the use of caustics, or other operative interference, from endometritis, with hyperplasia of the cervix, or from injuries received in parturition.

The **results and symptoms** of stenosis of the internal os resemble those of stenosis of the external os, as already enumerated, and are often combined with the effects of anteflexion.

Diagnosis.—The arrest of the sound near the internal os is much more frequently due to flexion than to stenosis. Stenosis can only be inferred when a full-sized sound is arrested, but a smaller sound having the same curve will pass. For this purpose a sound not more than $\frac{1}{10}$-in. or even $\frac{1}{12}$-in. in diameter (equivalent to No. 2 or No. 1 bougie) may be required. It is very rare for the internal os to be too small to admit a sound of $\frac{1}{16}$-in. diameter, though flexion may render it very difficult to pass it. The most absolute diagnosis of stenosis is obtained if a sound with rather a marked bulbous end is used, and if it is found that there is resistance not only to its passage, but to its withdrawal. Temporary stenosis, due to spasmodic contraction of the

internal os, is distinguished by its yielding after a while to very gentle pressure. A tendency to such spasm may be associated with some primary narrowness.



Fig. 45.
Conical Uterine Dilating Sound.

For diagnosis of a degree of smallness which cannot be called in itself morbid in a nullipara, but yet may amount to a relative stenosis under the circumstances already mentioned, larger sounds are required. A convenient instrument for diagnosis, as well as for the purpose of effecting or maintaining dilatation, is a conical sound $\frac{1}{8}$-in. in diameter at the point, and enlarging to $\frac{1}{5}$-in. at the position corresponding to the internal os (Fig. 45). If this can be passed with ease, the absence of any, even relative, stenosis is assured ; and if it is arrested, the point of arrest will afford an estimate of the size of the internal os, provided that it is ascertained by the finger that the arrest is not due to the external os.

Treatment. — The choice between tents, incisions, or instrumental dilators is more difficult in the case of the internal than in that of the external os. Incision is much more likely to be followed by adhesion and contraction than in the other case, but contraction is also likely to occur after dilatation. Nevertheless, the greater average size of the internal os in parous women shows that after full dilatation it does not usually so completely close again, and I therefore think it preferable first to make trial of dilatation. If symptoms of stenosis repeatedly recur after temporary improvement, or if the cervical canal is cicatricial in acquired stenosis, incisions may be made, but, according to my experi-

ence, the necessity for incision of the internal os is extremely rare. Perhaps the safest mode of dilatation is to pass from time to time graduated metallic bougies, slightly conical (*see* Fig. 45), until the cervical canal is considerably larger than the required size, and will admit a No. 12 or No. 14 bougie, so that a considerable margin is allowed for subsequent contraction. In the case of virgins this method has the drawback that, to be effectual, it requires frequent manipulation. Dilatation by a laminaria tent avoids this difficulty, and when flexion is superadded, it is advantageous from its effect of softening the walls of the uterus, and straightening it for the time being. It must be used with due precaution (*see* p. 61). A convenient mode of rather rapid dilatation is the use of Priestley's dilating sound (Fig. 46), formed of two blades joined at the extremity, and expanded by a screw at the handle, so that the external os is stretched to a considerable, the internal os to a moderate, size; that is to say, the stretching is in proportion to the natural relative dimensions of the two orifices. The point should not be more than $\frac{1}{10}$-in. in diameter, and the blades should be capable of separation to a width of $\frac{1}{4}$-in. at the position of the internal os. The instrument should be used cautiously, and only partially expanded at first, with the view of gradually stretching the muscular fibres rather than causing any rupture. If the screw works easily, the degree of resistance in the cervix is readily estimated by the finger, and thus diagnosis as well as treatment is assisted. Other forms of mechanical dilators have been invented by Ellinger and others, in which the blades, two or three

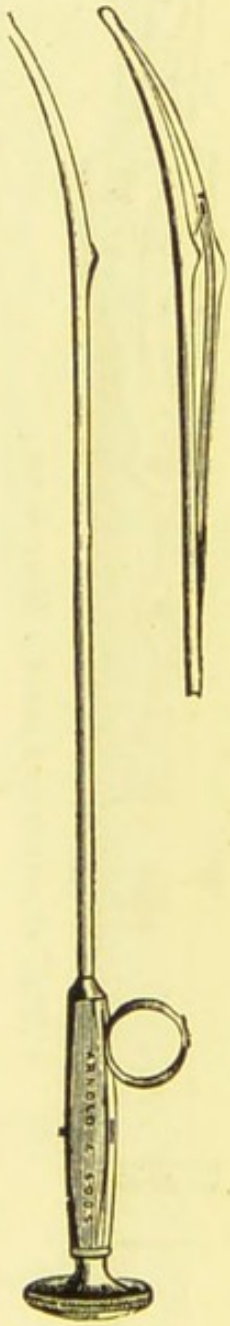


Fig. 46.
PRIESTLEY'S Dilating Sound.

in number, are free at the extremity, and are separated by closing the handles. The most powerful is that of Dr. Marion Sims, previously described (Fig. 33, p. 62). This cannot generally be introduced into a small cervix, except after partial previous dilatation by bougies, laminaria tent, or other means. Rapid dilatation with Marion Sims' dilator, with the aid of an anæsthetic, is generally followed by little disturbance, provided that antiseptic precautions are used, and the patient is kept in bed for some days. Hegar's dilators (Fig. 34, p. 63) may be used in a similar way; and, with them, the dilatation may be commenced from the beginning. This method of treatment may be adopted with advantage in cases in which repeated manipulation is thought undesirable. As a rule, the more gradual mode of dilatation appears to be preferable, at any rate in the first instance.

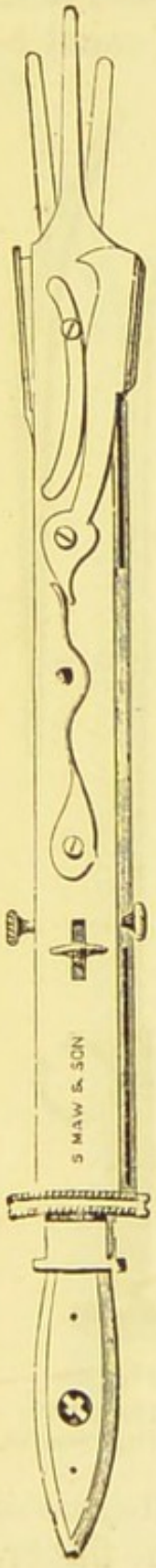


Fig. 47.—Greenhalgh's Metrotome.

Incision may be performed by Simpson's single-bladed (Fig. 41, p. 88), or by any of the numerous two-bladed metrotomes, introduced without any speculum. Much caution, however, is required in incising the internal os, since the large vessels which enter the uterus at this level are not far off, and alarming and even fatal hæmorrhage has sometimes occurred. Greenhalgh's metrotome (Fig. 47) contains an ingenious mechanism by which two blades cut outwards and downwards in a definite curve, and an adjustment for regulating the width of the incision. The incision, however, so produced, even at its smallest, is dangerously wide at the internal os, when the instrument is fully introduced, and it is preferable only to expand the blades to a slight

degree, and then cut by withdrawing the whole instrument. A simpler metrotome for use in this manner is that of Dr. Savage, in which each blade forms a shield for the other. Two-bladed metrotomes are liable to cut the two sides unequally, from asymmetry of the uterus or from a difference of sharpness in the blades. With Simpson's metrotome the depth of the second incision is also uncertain, owing to the want of firm resistance to the back of the instrument. A graver objection to both forms of instrument is that, as usually made, they are so large that when incision of the internal os is required they cannot be introduced without preliminary dilatation by a tent, after which it is difficult to judge exactly how much the canal will contract again, and therefore how deep an incision is required.

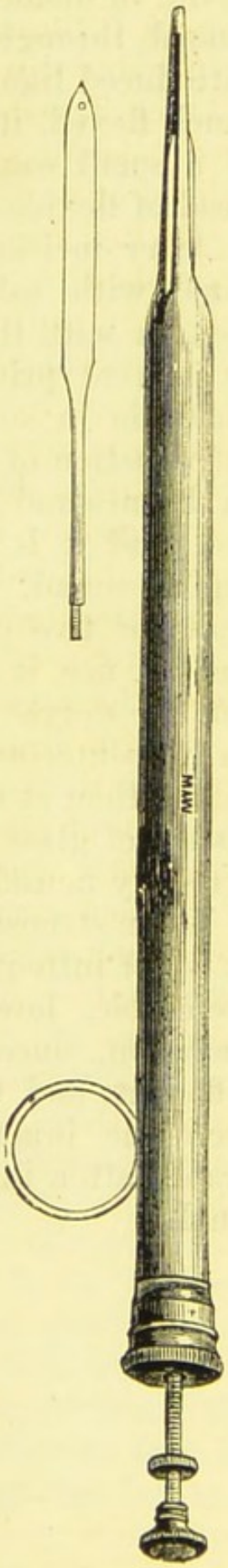


Fig. 48.—Peaslee's Metrotome.

A safe and convenient instrument, though little known in Britain, is Peaslee's metrotome (Fig. 48). This consists of a flattened tube, narrowed for its terminal two inches, in which slides a single blade, lancet-shaped towards the point, but blunted at its extremity. There are two blades for each instrument, the cutting portion of one being $\frac{1}{4}$-in., of the other $\frac{3}{16}$-in. wide. A nut and screw on the handle of the blade regulate the extent of its passage into the uterus. The narrow blade is generally sufficient for incision of the internal os. I have used a modified form of this instrument, in which the tube is made round instead of flat,

and its terminal portion of smaller size, being only $\frac{1}{12}$-in. in diameter near the extremity. It can then be passed through a very narrow cervical canal, being introduced like the ordinary sound. If the uterus be much flexed, it should first be straightened by means of a small sound, in the manner described under the head of flexions of the uterus (p. 137).

After incision, it is desirable to swab the cervical canal with solution of perchloride or subsulphate of iron, or with that of chloride of zinc (gr. xxx. ad ℥j.), to prevent primary union, and it is also necessary to maintain in some way its patency. The immediate introduction of an intra-uterine stem, as recommended by Barnes and Marion Sims, is not without considerable risk, and it is preferable to pass occasionally a large conical sound. If a stem be used at all, it is better to wait for two or three weeks before its introduction, and to use it for a limited number of weeks only. But the degree of risk which always attends the use of an intra-uterine stem is greater after incision of the cervix than at other times. If any stem is used at all, a stem of glass appears to be the safest, as being most perfectly non-absorbent.

When stenosis of the external os exists, the internal os is not infrequently also smaller than normal. It is preferable, however, not to incise both at a single operation, since the more limited incision may prove sufficient, and the subsequent dilatation necessary to keep the inner os patent is unnecessary and undesirable after incision of the external os and cervical canal.

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CHAPTER V.

DISPLACEMENTS OF THE UTERUS AND PELVIC VISCERA.

RELATIVE IMPORTANCE OF DISPLACEMENTS OF THE UTERUS.

The special attention which has been devoted by some gynæcologists to the study of changes in the form and position of the uterus has led to much difference of opinion with regard to the importance of these conditions. Thus, some authorities have gone so far as to maintain that in more than half of the patients suffering from symptoms referable to the uterus, the shape of that organ will be found to be materially altered or its position markedly changed; and, further, that in the great majority of those cases which were formerly regarded as chronic inflammation of the uterus, an alteration in the shape of the organ is the principal and the really important feature. Other authorities, influenced by a reaction against the exaggerated importance which had been attached to displacements, teach that in all displacements of the uterus, except manifest prolapse, the truly scientific principle is, to the best of our power, to take care of the general symptoms, and to leave the displacement to take care of itself. The truth would seem to lie in the mean between these extreme opinions. Few will doubt that to find in a mechanical system of uterine pathology the key to the great majority of the maladies peculiar to women is as one-sided a view as it would be to attribute a similar

importance to erosions or to lacerations of the cervix uteri. But, on the other hand, it is as erroneous to regard as of little or no consequence all displacements of the uterus, with the exception of external and obvious prolapse, as to overrate the importance of anteversion or anteflexion. Recent demonstrations of the comparative frequency of lesions of the Fallopian tubes have again established the importance to be attached not only to acute but to subacute and chronic inflammations of the uterus and their effects. In the present work, displacements are put before inflammation on account of their greater mechanical simplicity, and not because I consider them to be the essential element in the majority of cases.

Displacements of the uterus may be either the cause or the consequence of chronic hyperæmia, inflammation, or hyperplasia, and a further controversy has taken place on the question as to which is the usual sequence of events. Its most important bearing is the inference to be deduced from it as to treatment when the two conditions are found combined. There is no doubt that even when a displacement is, in the first instance, secondary to hyperæmia or inflammation, it has often a strong tendency to keep up and intensify the condition which gave rise to it; hence the general principle of action is that if the displacement is important in its degree and effects, and can be cured or alleviated by a pessary which is readily tolerated, it is best to have recourse to early mechanical treatment, in addition to other measures. This is usually the case in displacements of the uterus downward or backward. On the other hand, in the so-called anterior displacements, the position of the uterus either comes within the limits of its normal mobility, or but slightly exceeds them. Pessaries are therefore very rarely advisable in these cases.

There are some cases in which even a very acute flexion of the uterus is accidentally discovered, and in which no symptoms exist, just as there are some

instances of extreme stenosis without any dysmenorrhœa. Minor degrees of displacement exist not infrequently without producing any symptoms. When symptoms are absent, treatment is of course unnecessary; and even when symptoms are present, it must not be too hastily assumed that the displacement is the cause of them, for it may be only an accidental concomitant. There is another class of cases in which mechanical treatment is, as a rule, forbidden, namely, that in which the displacement is secondary to inflammatory adhesions or deposits, by which the uterus is firmly fixed. Palliative treatment only is here admissible, for any attempt at immediate replacement is dangerous, and a pessary generally fails to remedy the displacement, while it excites irritation by pressure.

Normal Position of the Uterus.—The uterus in a healthy and unimpregnated state is a very mobile organ, the whole of its body being free from any attachment except a very lax one by means of the broad and round ligaments—a provision necessary to allow of its expansion during pregnancy. The axis of the normal uterus varies from a straight line to a curve whose concavity looks forward, and whose angle does not exceed 45°. The maintenance of this axis during the movements of the uterus depends solely upon the firmness of the uterine tissue itself. If the tissue is firm, the uterus usually becomes anteverted when the bladder is empty; if it is lax, it becomes anteflexed. The chief supports of the uterus are, anteriorly, its attachment through the pelvic cellular tissue to the bladder, and, by its means, intermediately to the pubes, and, posteriorly, the utero-sacral ligaments, which run from nearly the level of the internal os, outward and backward towards the second and third sacral vertebræ, forming the lateral boundaries of the pouch of Douglas (*see* pp. 15—17). Laterally, the centre of the uterus is also attached to the pelvic walls by the cellular tissue at the base of the broad ligaments. By these attachments its centre is rendered comparatively a fixed point, while

the broad ligaments place scarcely any restraint upon backward or forward displacements of the uterine body, and only partially limit lateral displacements. The round ligaments have a certain function in drawing the fundus forward after displacement by distension of the bladder or otherwise, but are usually not on a stretch, and only tend to prevent extreme retroversion or retroflexion. The mean direction of the axis of the uterus is generally regarded as being coincident with that of the pelvic brim. It varies, however, considerably under different circumstances, and in different positions of the body, being inclined more anteriorly in the erect position, when the bladder is empty (Fig. 2, p. 6), and more posteriorly when the bladder is full, especially when the rectum is at the same time empty. Besides these movements upon a transverse axis passing nearly through its centre, the uterus as a whole is capable of a certain amount of upward and downward movement, in which movement the base of the bladder and the pelvic cellular tissue which forms the floor of the abdominal cavity necessarily partake. In Fig. 50, p. 106, and in the other figures illustrating displacements of the uterus and the position of pessaries, the vagina is represented, for the sake of clearness, as forming an actual cavity. This is not, however, its condition in the living woman, except when its walls have been separated by the introduction of the finger or an instrument, or unless air has entered in the prone or semi-prone position. It is normally flattened, so that the anterior and posterior walls are in contact, as indicated in Fig. 2. Its direction is nearly at right angles to the axis of the pelvic brim, and thus the anterior vaginal wall, receiving through the bladder the intra-abdominal pressure, which acts somewhat in the direction of the axis of the brim, is supported by the posterior vaginal wall. In the case of rupture of the perineal body, the lower half or lower third of the anterior vaginal wall becomes unsupported, and a tendency to bulge commences at this part.

The pressure of the intestines has an important influence in maintaining or modifying the position of the uterus. Being made up of that of the individual coils, it is not equable on all sides, like a fluid pressure, but is apt to be greatest where the coils are largest or most numerous. This is usually the case in the retro-uterine fossa of the peritoneum, which is more capacious than the space in front of the fundus (*see* Fig. 2, p. 6), and hence the intestinal pressure is an important element in maintaining the normal slight anteversion of the uterus, the bladder being empty, in reference to the axis of the brim. The uterus does not normally depend upon the vagina or perineum for its maintenance in place, and it may remain in position even though the perineal body is extensively destroyed. But there is normally a tonic muscular constriction of the vagina, especially in the lower half. This is due mainly to the action of the anterior fibres of the levator ani, which are attached to the back of the pubes in front and encircle the vagina, blending with its muscular wall (*see* Fig. 4, p. 9). This part of the levator ani forms the real sphincter of the vagina, and to it is due the normal convexity forwards of the posterior vaginal wall (*see* Fig. 2, p. 6), and the firmness of this portion of the vagina felt on digital examination. The muscle called sphincter vaginæ is weak and superficial, and has comparatively little effect. When a tonic muscular contraction of the vagina exists, it must offer a resistance to any considerable descent of the cervix. When muscular tonicity is lost, and especially when the perineal body has also been lacerated in parturition, the vagina often becomes an active agent in producing prolapse.

Causation of Displacements in General.—Displacement of the uterus may be produced by any influence which tends to increase the weight of the organ, to weaken its supports, to push or to drag it out of place, or to diminish the firmness of the uterine tissue itself, the last element coming into play specially

in the causation of flexion. Increased weight is most commonly due to the presence of fibroid or other tumours, to sub-involution or hyperplasia of the whole or a part of the uterus, to hyperæmia, or to pregnancy. Causes tending to weaken the uterine supports may be a general want of nutrition and laxity of tissue, associated with feeble health, especially if combined with a deficiency of fat. The most important, however, are the effects of pregnancy and parturition, including not only a stretching and loss of tone of all the uterine ligaments and of the vagina, but frequently also more or less damage to the perineal body. These are conjoined with excessive weight of the uterus so long as involution of that organ remains incomplete; and thus a too early getting-up, or undue exertion too soon after delivery, is the commonest of all causes of serious displacement. Among external causes are the effects of muscular efforts or falls, which may produce sudden displacement of an organ previously healthy. This, however, is comparatively rare, while a gradual effect, produced by prolonged muscular exertion in the standing position (as in the case of laundresses), or by repeated efforts of any kind, as chronic cough, or straining in habitual constipation, is much more common. Excessive intra-abdominal pressure is also produced by tight-lacing, or the suspending of heavy skirts from the waist. Among the most irresistible forces tending to displacement are those exerted by tumours, effusions of fluid, inflammatory deposits which push the uterus, or contracting adhesions which pull it, from its place.

Undue softness of uterine tissue is an important cause of flexions. It may result simply from imperfect nutrition—a condition most common in girls about the age of puberty, as the effect of insufficient or unsuitable diet, or imperfect digestion, especially when associated with a too sedentary life and lack of sufficient air and exercise. In the earlier stage of uterine hyperæmia or chronic metritis, the uterus is soft as well as increased in bulk, and therefore prone to flexion; while in the

later stage it becomes indurated. Softness of the uterus also exists after parturition, and any cause which interferes with involution also prolongs the softened state of the organ.

RETROVERSION AND RETROFLEXION OF THE UTERUS.

Pathological Anatomy.—In retroversion the shape of the uterine axis is unaltered, but the whole organ is

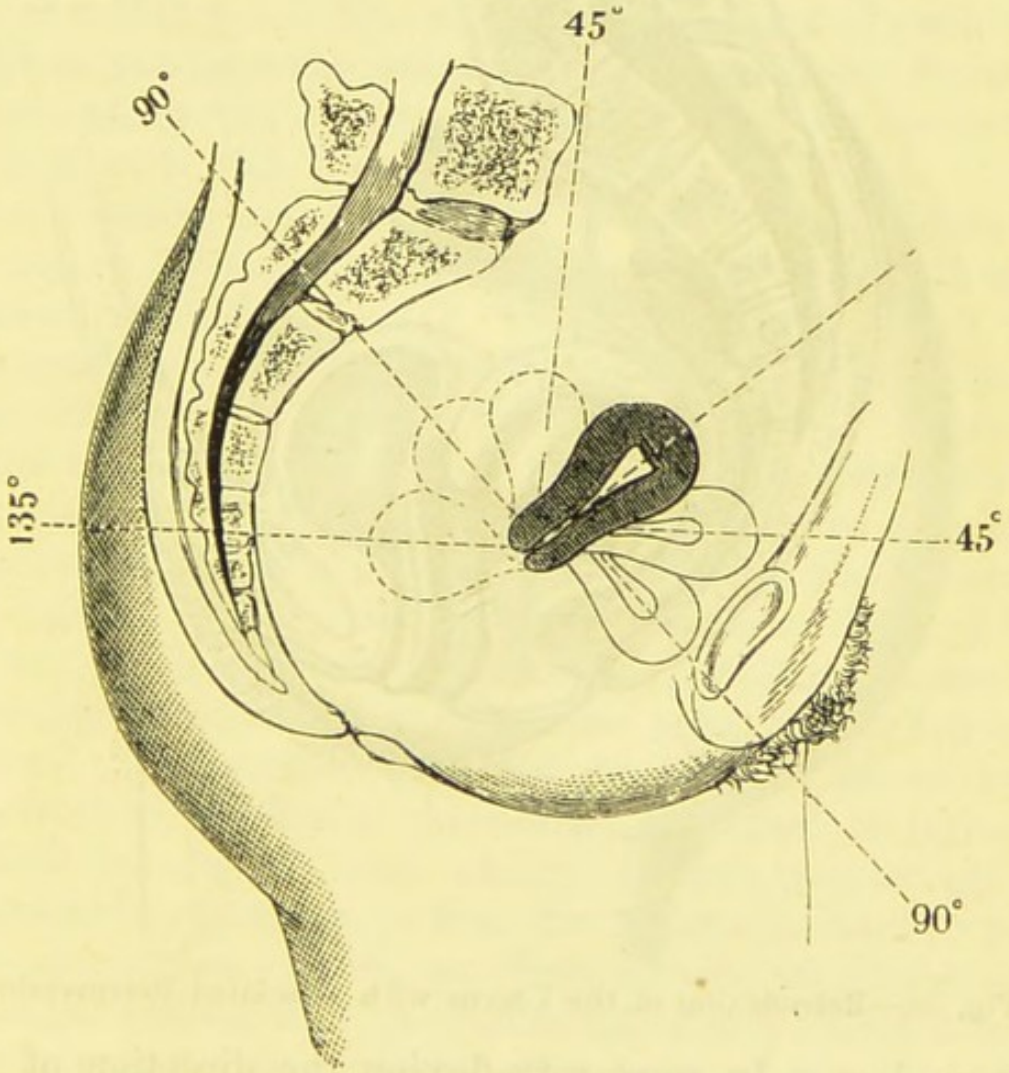


Fig. 49.—The Degrees of Retroversion and Anteversion.

tilted backward, so that the fundus is inclined toward the sacrum, and the os toward the pubes. Retroversion is possible through a very large angle, and is not infrequent up to one of about 135° (Fig. 49). In the case of the gravid uterus, at the third or fourth month, even this may be exceeded, and the angle of retro-

version almost reach 180°, so that the fundus presses down upon the perineum, bringing down with it the retro-uterine pouch of peritoneum, and distending the recto-vaginal septum.

In retroflexion the axis of the uterus is bent upon itself, so as to create a curve with its concavity looking backward. The curve is generally not uniform, but has a point of maximum curvature usually near the

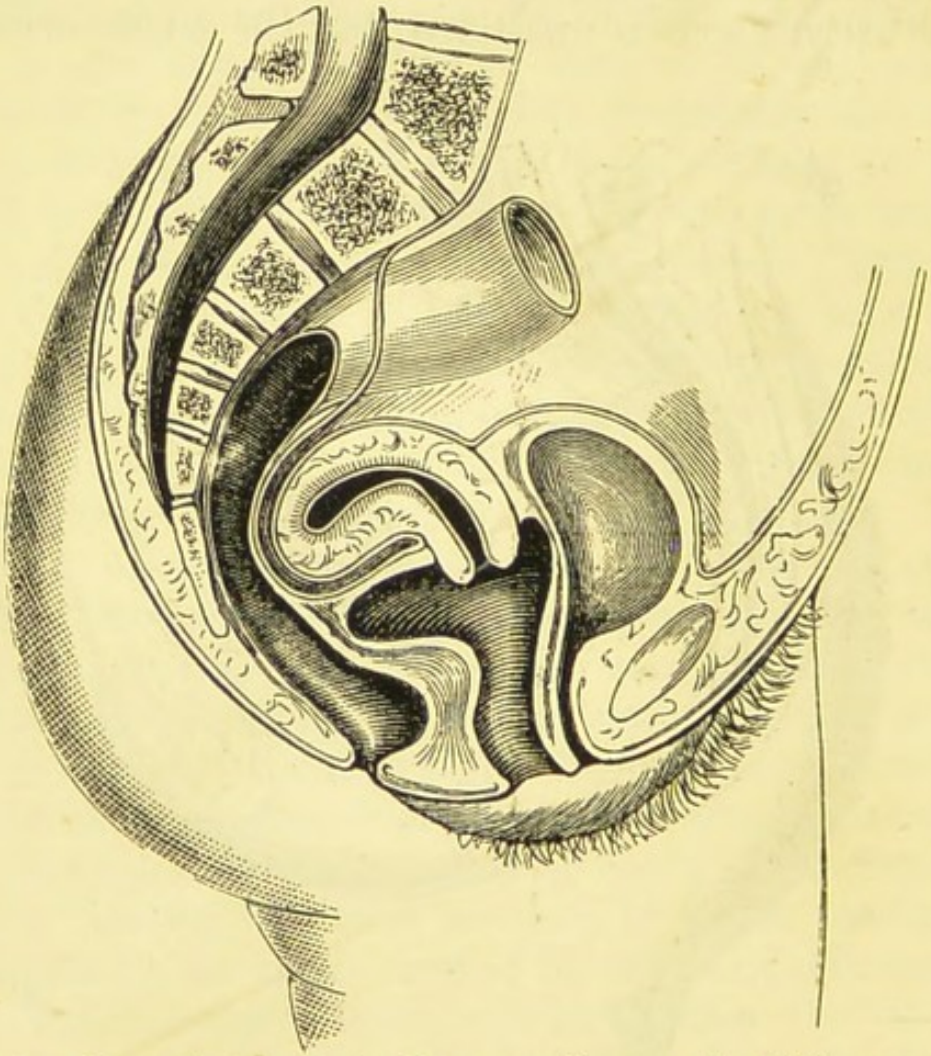


Fig. 50.—Retroflexion of the Uterus with associated Retroversion.

internal os. In pure retroflexion the direction of the os uteri may be unaltered, but more frequently retroflexion is combined with more or less of retroversion, so that the axis of the uterus is carried backwards, while at the same time the os is tilted forwards (Fig. 50). In primary retroflexion, on the other hand, the os may look too much backwards, as in anteversion. In a recent flexion of the uterus, whether backwards

or forwards, the uterine wall on the convex side of the curve becomes the thinner as the result of stretching, exactly as would be the case with an india-rubber tube. In pathological specimens from old cases of flexion, however, it is often found that it is the wall on the concave side which is attenuated. This may be the result of atrophy from the prolonged effect of pressure and interference with the circulation, or may depend upon the flexion having been in the first instance due to a failure of development in the anterior or posterior wall of the uterus. The occasional existence of such a condition explains the great difficulty sometimes found in preventing the return of the uterus to its former shape after it has been straightened.

Retroversion and Retroflexion of the Gravid Uterus will not be discussed here, since they are considered in works on midwifery.

Causation.—The predisposing causes are the same as those enumerated for displacements in general. Retroversion is especially associated with prolapse, since the uterus as it descends tends to follow the curved axis of the pelvis, the cervix moving downward in the line of the vagina, the direction of least resistance (Fig. 59, p. 141). The causes of prolapse, therefore, almost invariably produce at the same time more or less retroversion. Retroversion may also be brought about by the effect of gravity if the dorsal, or dorsal reclining position (as in an easy chair), be too persistently maintained, especially when the uterus is heavy, as after parturition. Such an effect may be increased by over-tight bandaging. A similar effect may result from the prolonged and excessive distension of the bladder to which women are especially liable, a temporary and partial retroversion being a necessary result of this distension. If a muscular effort is made under these conditions the retroversion may be suddenly increased.

Retroflexion is, in rare cases, a primary affection, being due to defective development of the posterior uterine wall, either in fœtal life or at the time of

puberty, when the organ is the subject of rapid growth. In the great majority of cases, however, it is secondary, and it is generally developed out of a partial retroversion. This may be partly the effect of gravity, and partly that of the intra-abdominal pressure acting either gradually or during muscular efforts. When retroversion exceeds an angle of about 55° the weight of the body of the uterus itself, in the standing position, begins to tend to increase the retroversion or convert it into a retroflexion, instead of tending to bring the fundus forward as in the normal condition (*compare* Figs. 49, p. 105; 59, p. 141, *with* Fig. 2, p. 6). In the sitting or reclining position this effect comes into play at a less angle than 55°, the pelvic inclination being then much diminished. Again, when partial retroversion exists, there is more room for coils of intestine in front of the fundus than behind it, and thus the intestinal pressure, which normally should keep the fundus forward (*see* p. 103), comes to act upon its anterior surface, and press it down into the hollow of the sacrum. Thus is brought about, if the uterus is rigid enough, an increased retroversion; but if it is soft, the retroversion is converted into retroflexion. Retroflexion may also be produced by the weight of a small fibroid tumour in the posterior uterine wall.

Results and Symptoms.—Versions of the uterus, unless of extreme degree, produce comparatively little effect upon the uterus itself, the symptoms being chiefly those due to dragging of ligaments or pressure on neighbouring structures, and those which belong to associated hyperæmia or inflammation. A flexion, when primary, may have little or no effect of any kind, for the uterine canal is then adapted to the curve of the uterus, and its calibre need not be diminished. When, however, a uterus, originally straight, or nearly so, becomes flexed, there is necessarily a tendency for its canal to become flattened, just as would happen with any tube of soft material. This will be more marked

if, as is often the case in acquired flexion, the curve is not uniform throughout, but sharper near the junction of body and cervix, where the muscular walls are less thick than those of the body. The flexion may then have a double effect upon the uterus. First, the exit of the menstrual fluid and mucus is rendered less free, especially if the calibre of the uterine canal is below the average. In such cases dysmenorrhœa may be produced, if the menstrual discharge is not perfectly fluid, and the uterus become enlarged from hypertrophy of muscular tissue to overcome the stenosis. Conception may also become less easy; and, on account of the retention of secretion, any endometritis which may arise is more persistent.

A second effect, to which much importance has been attached, is compression of the veins through the bending of the uterus, and consequent hyperæmia, vulnerability to slight exciting causes of inflammation, and sometimes menorrhagia. The vessels, however, do not enter the uterus and run longitudinally in its walls, so that a sharp bend near the internal os would interfere with the return of blood from the fundus. They divide into branches in the cellular tissue of the broad ligaments, and these branches encircle the uterus in horizontal loops (*see* pp. 26, 27). Thus the arrangement of vessels is such that flexion will produce the least possible effect upon the circulation. Venous return can only be interfered with at the level where the bend exists and tissue is compressed. Any venous impediment due to displacement depends, therefore, less upon flexion in itself than upon a strain or drag upon the cellular tissue of the broad ligaments. This will chiefly occur when the fundus is displaced much backward, or below its normal level.

All these effects are greatly enhanced if there be a tendency to hyperæmia or endometritis, independent of the displacement, and may be entirely absent in some cases in which the uterus is quite free from congestion, and the vessels have had time

to accommodate themselves to the altered position. Another cause for passive hyperæmia in retroflexion is that the enlarged fundus, pressed down into the hollow of the sacrum, rests between, and may be compressed by, the utero-sacral ligaments at either side. Menorrhagia is, therefore, not uncommonly associated with retroflexion, especially if the displacement is extreme in degree. Strangulation by the pressure of the utero-sacral ligaments is not, however, the sole cause of symptoms in retroflexion, for symptoms may exist, and be relieved by the use of a pessary, when the fundus can, without difficulty, be pushed up by the finger in the vagina. Since some degree of descent of the fundus below its normal level is hardly ever absent in retroversion or retroflexion, a dragging pain, from tension of the uterine attachments, is one of the most frequent symptoms. Adhesions are occasionally produced by a partial peritonitis, and the fundus then becomes tethered in a backward direction. If a retroflexed or retroverted uterus becomes pregnant, the fundus may become incarcerated in the pelvis, generally about the third month, or shortly after. Abortion may then follow, or danger may arise from retention of urine and consequent inflammation of the bladder.

Many of the other symptoms of retroversion and retroflexion are common to most uterine maladies, being due to associated hyperæmia, endometritis, or metritis. Among such are pains extending down the thighs, digestive disturbances, hysterical manifestations, or, in hysterical subjects, functional paralysis. The most marked form of pain, however, in retroversion, and still more in retroflexion, is pain over the sacrum, increased in defecation. The pain in defecation is due to pressure on the tender fundus, which, when the displacement is considerable, encroaches on the calibre of the rectum (Fig. 50, p. 106). It is often associated with rectal tenesmus and excessive secretion of slimy mucus from the rectal mucous membrane. Frequently, also, there is obstinate constipation, partly

due to the degree of mechanical obstruction existing, partly to the pain in defecation. In both forms of displacement coitus becomes a mechanical cause of inflammation, especially in retroversion of about 90°, when the cervix lies almost directly in the line of the vagina, and is usually, also, too low down (Fig. 49, p. 105 ; Fig. 59, p. 141), and so becomes exposed to a direct impact, to which it is not normally subject. The bladder is affected less in retroflexion than in retroversion, when the pressure of the cervix may cause irritability, or, if the uterus be enlarged by tumour or by early pregnancy, may lead to retention of urine, which is the most characteristic symptom of retroversion of the gravid uterus.

Diagnosis. — In retroversion the os is found on vaginal touch to be tilted forwards, often so much so as to look in the direction of the vagina, or still more anteriorly. By bimanual examination the absence of the fundus from its normal position is ascertained, the external hand coming close down upon the finger in the vagina. More or less of the body of the uterus is felt by the finger behind the os, but without any concavity or angle between it and the cervix. It may be made to move in conjunction with the cervix, unless fixed by adhesions, and, if necessary, the diagnosis may be confirmed by the sound, introduced with its concavity looking backward.

In retroflexion the os may look in the normal direction, or even too much backward, but is more frequently more or less tilted forward. The fundus is absent from its normal situation, and is felt behind the os as a rounded tumour with a concavity between it and the cervix. If rigidity of muscles, distension of the abdomen, or the presence of inflammatory or other swellings, makes it impossible to ascertain the presence or absence of the fundus in front on bimanual examination, the diagnosis becomes more difficult. It may often be effected with the finger alone, by tracing the continuity between fundus and cervix,

and their conjoint mobility, but the sound here affords decisive information. Its use, however, should be avoided, as a rule, if active inflammation be present. If the os looks in a normal direction, the sound, which has been previously bent to a curve nearly as great as that which the uterine axis is supposed to have, is introduced with its concavity at first forward, and, when it has reached the internal os, is reversed by a *tour de maitre*, the converse of that previously described (*see* Fig. 19, p. 37). It is then passed on to the fundus by carrying the handle far forward if necessary, and at the same time pushing up the fundus by the finger in the vagina. If the os is tilted forward, however, the concavity of the sound should be directed backward from the first. If the fundus be restored by the sound in the mode described under the heading of treatment, the swelling will disappear from behind the fundus. The most difficult cases for diagnosis are those in which the fundus is involved in, or adherent to, fibroid or other tumours or inflammatory swellings, and in such cases the sound alone can usually afford certain results. A small fibroid in the posterior uterine wall is apt to be very misleading, especially since it generally produces more or less retroflexion. The diagnosis must then be made by completely restoring the uterus with the sound, and then observing whether the swelling previously felt behind the cervix has entirely disappeared.

Treatment.—In the slighter degrees of backward displacement, not accompanied by much descent, especially those which occur in single women, the uterus not being enlarged, or after the menopause, when the uterus is atrophied, mechanical treatment may be unnecessary. The need for keeping the uterus in place is greater the more the fundus is enlarged, and the lower it descends into the posterior cul-de-sac. Hence, in the majority of cases of retroversion or retroflexion of any notable extent, excepting those in which the displacement is secondary to periuterine inflammation,

it is desirable to commence the treatment by replacing the uterus, and maintaining it, as far as possible, in position, after which remedies for the relief of any coincident hyperæmia or inflammation are likely to be much more effectual. This depends upon the fact that the displacement can generally be rectified in a more or less complete manner by some form of Hodge's pessary (Fig. 51), which can usually be tolerated even when the uterus is tender. The mechanical action of this pessary, which is sometimes termed the lever pessary, is two-fold. In the first place, its posterior limb stretches the posterior vaginal cul-de-sac backwards and upwards (Fig. 52, p. 114), and thereby draws



Fig. 51.—HODGE'S Pessary.

the cervix backward and tilts the fundus forward. The uterus itself may here be regarded as a lever, the fulcrum being at its centre, and the power applied to the cervix. This mechanism therefore tends to remedy retroversion, but has no direct effect upon retroflexion. The second action is that by which the posterior limb, when sufficiently long and curved upwards, directly pushes up the displaced fundus, or, more frequently, prevents its return when it has been restored by other means (*see* dotted outline in Fig. 52). The pessary is here the lever: the fulcrum is a transverse axis, somewhat above its centre, upon which it is capable of oscillating as it is grasped by the vaginal walls: the power is the pressure of the anterior vaginal wall upon its anterior limb, greatly increased during any expulsive

efforts: the weight, or resistance, is the fundus uteri, which is pushed up by the posterior limb. Some authorities have denied the latter action, and have maintained that the pessary is useful only in retroversion and not in retroflexion. If this were the case, a rather flat pessary would be the best, as most efficacious in drawing the cervix backward. Experience, however, shows that a pessary with a long and strongly-

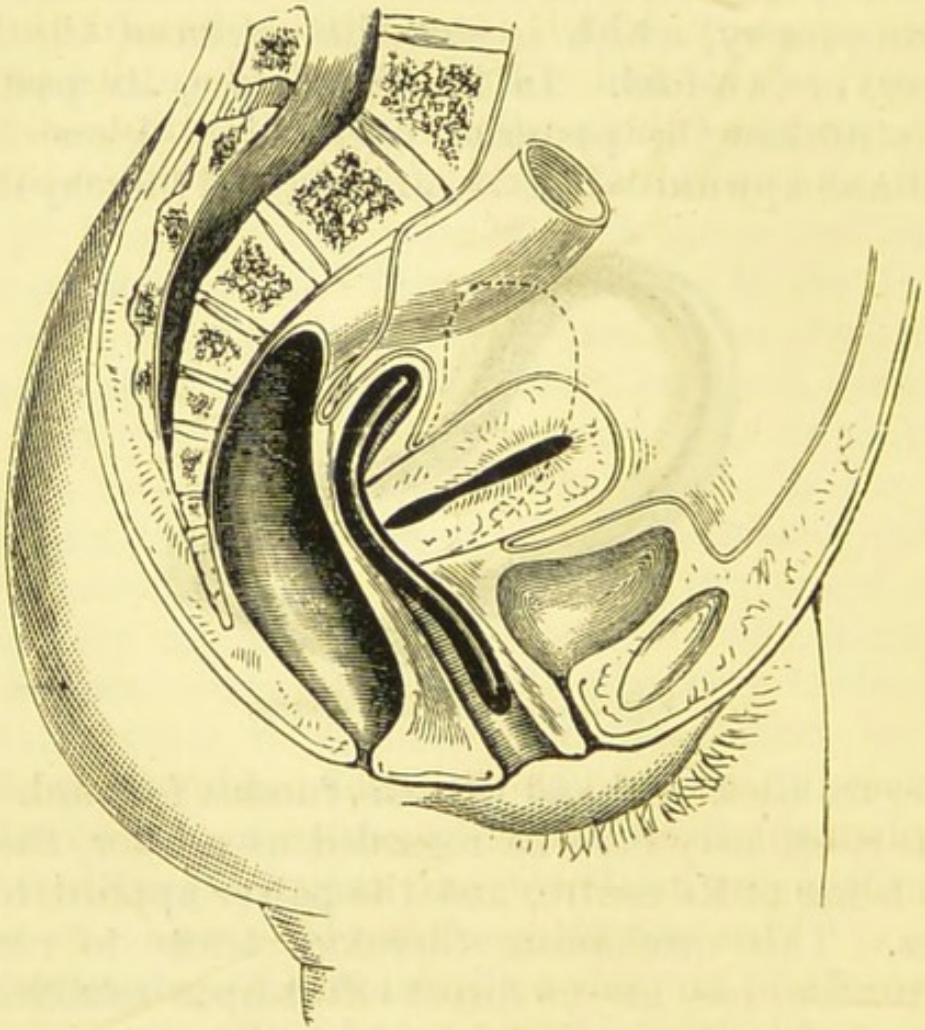


Fig. 52.—HODGE'S Pessary in position.

marked sacral curve often succeeds in retroflexion when a flatter one has failed.

The abdominal pressure does not indeed act more strongly upon the anterior than upon the posterior limb of the pessary. But, on account of the shape of the pessary, the fulcrum, where it is supported by the posterior vaginal wall, is nearer to the posterior than to the anterior end of the instrument (*see* Fig. 52),

and therefore the posterior limb presses upward more strongly than the anterior.

It is impossible, however, for the pessary directly to push up a retroflexed uterus completely into its normal position, and when it is acting in the most successful manner the fundus will be found no longer in contact with the posterior limb of the pessary (Fig. 52). This depends upon two causes: first, that the fundus can be pushed up to such an extent that the weight of the uterus itself, in the standing position, will tend to remedy instead of to aggravate the displacement (*see* dotted outline in Fig. 52); secondly, that when the coils of intestine have once been allowed to come down into the retro-uterine fossa of the peritoneum, they resume their normal function of pressing chiefly upon the posterior surface of the uterus, and so tend gradually to reduce any retroflexion. Short of this result, however, the pessary may do good by directly supporting the fundus, especially in cases of fibroid in the posterior uterine wall.

Hodge's pessary has been made in many different shapes, and various names have been applied to these. That most generally useful is shown in Figs. 51 and 52. The upper or sacral curve is considerable; the lower or pubic curve is slight, and only just sufficient to distribute the pressure equally over the anterior vaginal wall. The lower extremity is square in the centre, but well rounded at the corners. The whole instrument should be made thick, the bar being nearly $\frac{3}{16}$in. in diameter, that its pressure may be more easily borne. There is then no risk of ulceration being produced, even if the pessary is neglected, provided that the fit is suitable originally. When in place it should not rest against the pubic rami, or any bony support, but be held by the elastic vaginal walls.

It will be convenient here to speak of the materials used in the construction of pessaries in general. The best of all is vulcanite, since it is light, smooth, and

non-absorbent, and can readily be bent to any shape. The bending may be effected by placing it in hot water, not far short of the boiling-point, and afterwards plunging it in cold water after the desired shape has been given. Another method is to oil the surface, and then to move the instrument rapidly backward and forward through the flame of a spirit-lamp, till it is sufficiently softened. The latter mode is more convenient for bending one part of a pessary at a time, but a little practice is required to avoid burning the surface, and so spoiling its polish. Celluloid or xylonite is also a good material, but has one disadvantage, namely, that it cannot be moulded by the spirit-lamp, but only in hot water. Hodge's pessaries are also made of pewter tubing, which can be bent by the hand. These answer very well, but they are rather heavier than vulcanite, are apt to separate at the point where the tubing is joined, and are not quite so perfect in cleanliness. A pliable form of celluloid has also been introduced. Pessaries may be made hollow in platinum or aluminium, when the exact shape required is known, but these cannot be moulded to suit altering requirements. Of all materials gutta-percha is the worst, since it rapidly becomes roughened, and sets up irritation. India-rubber is far preferable to gutta-percha, but, being somewhat absorbent, it retains the secretions, and so is apt, before long, to become offensive, and often to produce some vaginal irritation.

The form of pessary recommended by Dr. Thomas is shown in Fig. 53. The upper part is made very thick, so as, by its actual bulk, to prevent the return of the fundus, while, at the same time, its pressure is distributed. This is an excellent device, the only drawback to it being that it greatly increases the price of the instrument. The other peculiarity is that the lower end is bent much downward, to avoid pressure on the urethra, and is nearly pointed, so as to rest between the rami of the pubes, and prevent rotation. A somewhat similar shape is preferred by Dr. Barnes,

and a pessary much used in America, under the name of Albert Smith's pessary, has also a comparatively narrow anterior limb and a strong pubic curve. The objections to this are that the pointed end forms a wedge, facilitating the escape of the pessary, and also, that owing to its strong pubic curve it forms an obstruction in the vulva, very inconvenient to married women, while the pessary shown in Figs. 51 and 52 rests completely behind and above the apex of the pubic arch. The great advantage of Hodge's pessary is that it does not prevent coitus, but may lead to conception where sterility had previously existed. It is therefore important, in married women, to see that the lower limb

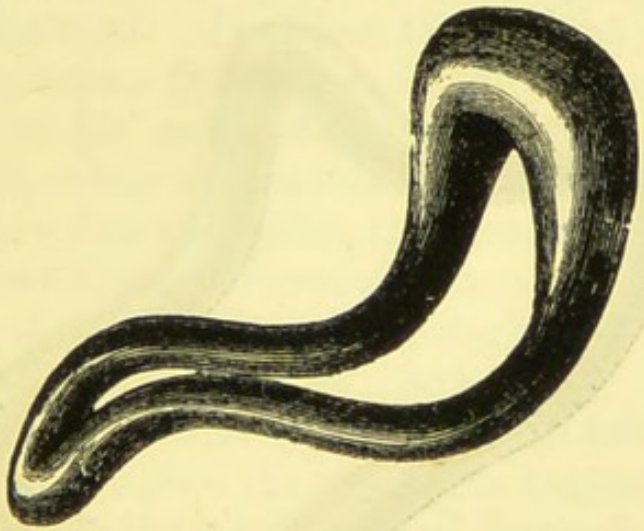


Fig. 53.—THOMAS's Retroflexion Pessary.

of the pessary lies close against the anterior vaginal wall, and, at the same time, high up, and sheltered behind the pubes. In Greenhalgh's pessary, in order to fulfil this end, the lower limb is made of soft rubber tubing, the whole instrument being of somewhat elastic wire, covered with india-rubber, so that it can be pressed together during its introduction. It has, therefore, a disadvantage in point of cleanliness, and, the india-rubber becoming very soft in the vagina, the unsupported corners are apt to press injuriously. I have met with several instances in which they had ulcerated very deeply into the vaginal walls.

In Gervis's pessary, there is a central depression of the upper curve, with the intention that this depression should receive the fundus, and prevent it from slipping to one side. This form of instrument is very useful for those cases in which the uterus can only be partially restored. But the object should always be to bring the fundus forward, away from contact with the pessary, as shown in Fig. 52, otherwise the displacement can never be cured in the sense that the pessary may eventually be discarded, and the uterus remain in place.

In some instances, where there is considerable hyperæmia, swelling, and tenderness of the fundus,

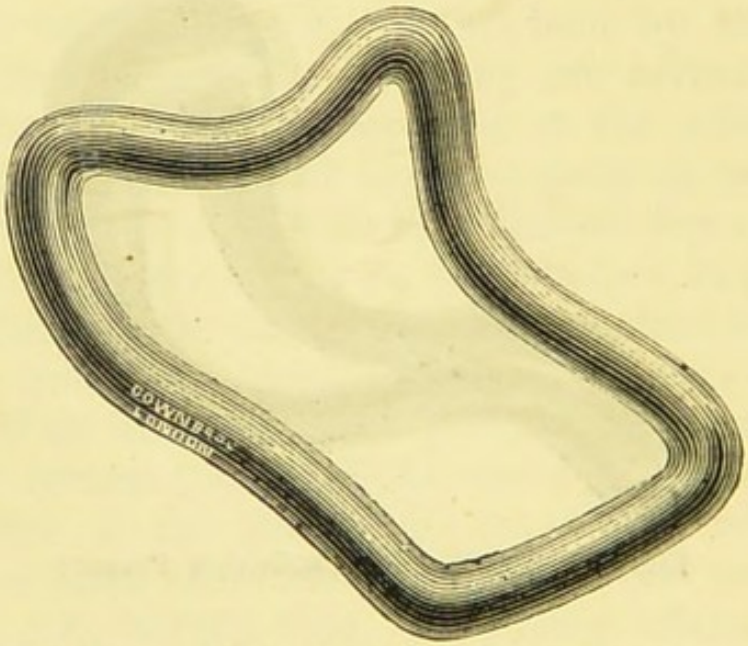


Fig. 54.—Gervis's Pessary.

as is the case more frequently in retroflexion than in retroversion, it is desirable, before attempting to use a pessary, to treat these conditions by rest for a few days in bed, with saline aperients and sedatives, and sometimes local depletion. Recourse should always be had to the same plan when a pessary has been tried, but cannot be tolerated on account of the pressure which it exerts upon the fundus.

If the Hodge's pessary, after such treatment, still

cannot be tolerated, the elastic ring pessary of watch-spring covered with india-rubber, which will be described as one of the best pessaries for prolapse, often proves useful, at least as a temporary resource. It counteracts the descent and retroversion, though it rarely completely remedies retroflexion.

Before a pessary is inserted, the uterus should be replaced, if possible, by the finger. This may be done in the lateral or, what is better, the semi-prone position. By one or two fingers, the perineum is retracted, air allowed to enter the vagina, the fundus pushed upwards, and the cervix, if it looks too much forward, is afterwards drawn backward. Sometimes the external hand above the pubes may assist in bringing the fundus completely forward. For this, the patient is placed in the dorsal position; the fingers in the vagina first raise the fundus as far as possible, then push the cervix very far back, while the external hand, pressed deeply in a little below the umbilicus, endeavours to get behind the fundus and bring it forward into anteversion. The introduction of a Hodge's pessary itself will often effect or complete the restoration of the uterus. For its adjustment, the patient is placed in the left lateral or semi-prone position, and the pessary is turned edgewise, until it has more than half passed through the vulva, the perineum being meanwhile retracted by a finger of the left hand, and the pessary directed rather backwards, to avoid pressure on the symphysis. It is then rotated into the direction which it is to occupy, having the concavity of its upper or sacral curve looking forwards. The index finger of the right hand is then introduced behind the lower limb, and passing through the pessary, hooks the upper limb backward over the cervix, and, at the same time, pushes it upward into the posterior cul-de-sac. The upper limb always tends to run up in front of the cervix, and when the pessary has a strong sacral curve, it may be difficult to overcome this tendency. It is then often useful not to rotate the pessary completely into its

destined direction, but to hold it somewhat diagonally, until the upper limb has passed behind the cervix. The pessary should cause no pain when once in position. If it does so, it is a sign that it is too large, too angular, or improperly adjusted, and it should at once be removed. A Hodge's pessary should always fit sufficiently loosely to allow the index finger to be passed without difficulty between its lower limb and the pubes.

If in a case of retroflexion the fundus can be restored to a considerable degree by these means, the pessary may be left gradually to bring about a more complete reduction, and its leverage action is more effective when the patient is up and about than when she is confined to bed. In retroversion also, such treatment will rarely fail. It sometimes happens, however, in retroflexion, either that the pessary fails to raise the uterus at all, and only exercises painful pressure upon it, or that its upper limb fits it to the concavity in its posterior surface, and merely elevates the whole organ, while the fundus remains flexed over the pessary. It is then necessary, in the first place, to restore the uterus by other means, if the bimanual method, mentioned in the preceding page, does not succeed. Of these the chief are: (1) pressure *per rectum;* (2) the postural method; (3) the use of the sound as a repositor.

(1.) Pressure by the finger on the fundus from the rectum is more effectual than by the vagina, since the leverage is greater, and it may sometimes be conveniently applied when the uterus is found incompletely restored after adjustment of a pessary.

(2.) In the postural method the object is to place the patient in such a position that the inlet of the pelvis looks vertically downward, the abdominal muscles are relaxed, and the weight of the abdominal contents tends to produce a negative pressure in the pelvis. If air be at the same time allowed to enter the vagina, by separating the labia, if necessary, the vagina

becomes distended into an actual cavity, the uterus recedes, and the fundus may be restored by this means alone, its own gravity assisting in some small measure. The recession of the fundus may also be assisted by pressure from one or two fingers in the vagina or rectum. Sometimes, however, the fundus merely recedes out of reach, the retroflexion or retroversion remaining unrectified, and the third method is then the only effectual one. This is generally the case, if the uterus is not already restored to some considerable extent, before the postural method is adopted. In carrying out the postural method, the patient may be placed in the knee-elbow or genu-cubital position on a hard bed or sofa. Care must be taken that the thighs are exactly vertical, and the chest low. In this way the axis of the trunk may be inclined as much as 35° to the horizon, the hips being higher than the shoulders—a position which will give the best result, taking the normal pelvic inclination as 55°. Some authorities reject the knee-elbow, and are content only with the genu-pectoral or knee-chest position. Most persons, however, will find, if they try the experiment of kneeling in this position on the floor, that it is impossible to touch the same plane with the chest. Moreover, to increase the inclination of the trunk beyond 35° would diminish the efficacy of the position. It is often of use, in retroflexion or retroversion, to instruct patients themselves to adopt this position once or twice a day, as well as to lie, as far as possible, in the prone or semi-prone position when in bed.

(3.) The use of the sound as a repositor is the most effectual of all methods, but is not so safe as the two already mentioned, unless both caution and dexterity be employed. Those, however, who possess the necessary skill will generally be able to restore the uterus in this way with much less discomfort to the patient than by either of the other means. The sound has its intra-uterine portion made nearly straight, and is

introduced in the mode already described, the handle being necessarily carried far forward, and the point directed backward. If it can only be introduced by giving it an increased curve, it should be withdrawn, and introduced a second or third time with a gradually diminished curve, so rendering the axis of the uterus nearly straight, and converting the retroflexion into a retroversion. The first stage of replacement is then to carry the handle of the sound backward toward the perineum, thereby partially elevating the fundus. The operator should do this with great gentleness, remembering the powerful leverage he is exercising, and any excessive resistance, as from adhesions, will then be discovered at this stage, and the attempt abandoned. It is not very usual, however, for the fundus to be tethered by adhesions without the existence of some periuterine thickening which may be detected by a skilful observer. It is more common to find a fixation which is only apparent, and due to the swollen fundus having become gripped between the utero-sacral ligaments at either side. The second stage in reduction is to sweep round the handle of the sound through a rather wide semi-circle, so that the handle and stem describe a semi-cone, and the intra-uterine portion rotates nearly on its own axis (*see* Fig. 19, p. 37). The third stage is to carry the handle again backward toward the perineum, and so bring the fundus completely forward. If the handle of the sound were simply rotated, its point would necessarily describe a circle, and press injuriously upon the fundus.

A uterine repositor has been invented, in which the handle is not rotated, but the direction of the intra-uterine portion is changed by means of a screw. The sound, however, if used in the way described, is more convenient and quite as safe. After withdrawal of the sound, the pessary may often be adjusted before the displacement has had time to recur. If, however, the fundus drops back at the moment of its withdrawal, one of two methods may be used. With great caution,

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either the pessary may be passed into position over the handle of the sound, or restoration with the sound may be effected while the pessary is in the vagina, the uterus, in both cases, being held in perfect position until the pessary is fully adjusted. If the first method is adopted, it is desirable to have an assistant, who holds the handle of the sound steady while the pessary is passed through the vulva, the left hand being employed at that moment in separating the labia and retracting the perineum.

In general, the patient herself cannot insert a Hodge's pessary. Some patients, however, may be taught to do so, if the vagina is not too contractile, and the pessary has only a slight or moderate curve. The woman simply takes the pessary by its lower end and pushes it up into the vagina, holding the lower end as much forward as possible against the pubes and anterior vaginal wall, so that the upper end may slip behind the cervix.

A Hodge's pessary, in one or other of its varieties, is found practically to be of far more value than all other pessaries put together. This is due to the fact that it alone can be perfectly adapted to the natural shape of the vagina, to which it forms a kind of splint, keeping it in its normal position, and steadying the uterus without pressing upon it.

There is another method of keeping a retroflexed uterus in place, which is mechanically the most perfect, although for other reasons undesirable, and which may be tried in some very exceptional cases if all other means fail. This is the use of an intra-uterine stem, in conjunction either with a simple Hodge's pessary, or with some vaginal support, which must not be rigidly connected with the stem. If, however, a Hodge's pessary be chosen with a posterior limb long enough and curved enough, and if sufficient perseverance be shown in the use of the sound and postural treatment as adjuncts, a stem pessary will rarely, if ever, be required. The Hodge's pessary may fail, however, when

the posterior cul-de-sac is too ill-developed, or too atrophied, to admit an instrument of sufficient length, or when the vaginal walls are so excessively relaxed as to take no grasp of even a large pessary; but in such a case, Cutter's retroflexion pessary, shortly to be described, may be tried, and is free from the danger which attends the use of an intra-uterine stem. Also, in the rare cases of congenital or primary retroflexion not dependent upon an antecedent retroversion, the mechanism of Hodge's pessary is less effective, since it can only act by direct pressure upon the fundus, and by this means can only partially elevate it. A simple straight stem of glass or vulcanite, ending in a knob, is the best to use in these cases, in combination with a Hodge's pessary, if any stem is used.

When there is difficulty in keeping the uterus in place, it is sometimes necessary to use at first a Hodge's pessary which is rather a tight fit for the vagina, but which after a while may be exchanged for a smaller one. In very obstinate cases of retroflexion, when there is great difficulty either in getting the fundus into position or in keeping it there, the following plan may succeed when other means fail. The uterine canal is fully dilated with laminaria tents, thus straightening the uterus for the time being; then an anæsthetic is given; the finger is then passed well up into the uterine cavity and used as a repositor, until the external hand can be got behind the fundus, to bring it forward into a position of anteversion. A full-sized pessary is then adjusted, while the external hand still holds the fundus in anteversion.

The action of a pessary should be observed every week or two for the first few weeks. Afterwards, patients should be enjoined to come for observation about every two months, and to use a vaginal injection twice a day.

In cases of retroversion or retroflexion in which the uterus is too tender to allow any pessary to be tolerated, it may be supported temporarily by tampons

soaked in carbolized or iodized glycerine. The best material for these is the mixture of absorbent cotton with purified sheep's wool. The uterus is first restored by one of the methods already described. A small tampon is then placed behind the cervix, to prevent the fundus again dropping backward; a second and larger tampon is adjusted in front of the cervix in such a way as to press it backward. The tampons should be changed every second day. In the case of



Fig. 55.—CUTTER'S Pessary for Retroflexion modified by THOMAS

retroflexion, however, this method rarely effects more than a very partial restoration.

The use of Hodge's pessary may be rendered impossible by the presence of one or both prolapsed and tender ovaries, pressure on which cannot be tolerated. It is then often necessary to commence with treatment directed to the ovaries, but it is very desirable in such cases to restore the uterus, since the ovaries are then elevated at the same time, and a form of pessary may sometimes be found by trial, especially a very thick pessary, or one with an expansion at the upper end like

that of Thomas's pessary, which elevates the ovary, and does not press painfully. If this is not tolerated, an elastic ring pessary may be tried.

A useful form of pessary for cases when the vagina is too lax to keep a Hodge's pessary in place, or when it is desired to effect a gradual stretching of a short posterior cul-de-sac, is Cutter's pessary for retroflexion (Figs. 55, 56). From its having an external support, this pessary is more likely to communicate shocks to the fundus;

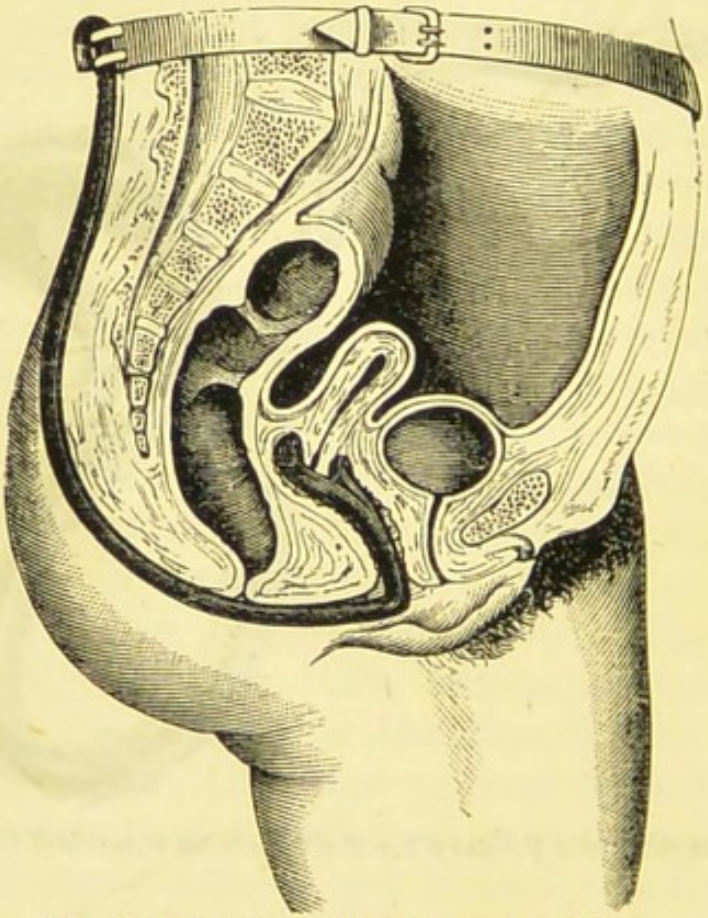


Fig. 56.—CUTTER'S Pessary, in position.

it has also the drawback that it must be introduced by the patient herself daily, and removed at night, and hence it is liable either to be pushed up in front of the cervix in introduction, unless some dexterity be used, or to slip into that position afterwards. To diminish the chance of this the vaginal portion of the instrument should have but a slight curvature. The single band of the instrument is carried backward over the perineum and attached to a waist-belt, as shown in Fig. 56.

In this figure is shown Donaldson's modification of Cutter's pessary in position. The pessary is made of wire, covered by india-rubber. The india-rubber covering is continuous with the supporting band, so that there is no joint to chafe the perineum. The upper curve is very slight, so that the pessary may be less likely to run up in front of the cervix, and the shape of the stem corresponds with the natural curve of the vagina (*see* Fig. 2, p. 6). As the instrument is passed in, the lower end should be held well forward, to ensure that the upper end passes behind the cervix. If the single posterior band is not found to keep the instrument firmly in place, the lower end of the pessary may be adapted to two bands, one anterior and one posterior.

Alexander-Adam's Operation.—This operation has been devised for drawing the fundus forward by shortening the round ligaments, without opening the peritoneal cavity, and so curing retroflexion. An incision is made over the inguinal ring. At the entrance of the ring the round ligament is sought for, seized by forceps, separated, if necessary, from its attachments within the ring, and pulled up. It is then drawn out as far as it will come, two or three inches at least, and stitched to the pillars of the ring, the uterus being meanwhile restored to position. The same process is to be repeated on the other side. The operation should be performed with antiseptic precautions. It has been found necessary to aid the maintenance of the uterus in position for a time by means of a Hodge's pessary, and even by an intra-uterine stem in addition.

This operation has not met with general acceptance. It may be presumed that the round ligaments are liable to stretch again, as other ligaments stretch which have much more power than the round ligaments to hold the uterus in place. The operation is also not without risk. In fat women it has sometimes

proved impossible to find and draw out the round ligament.

ANTEVERSION OF THE UTERUS.

Pathological Anatomy.—The normal mean position of the axis of the uterus, being nearly that of the axis of the pelvic brim, is one of anteversion in reference to the axis of the vagina. Moreover, in the standing position, when the bladder is empty, it is a normal condition for the uterus to be anteverted even in reference to the axis of the brim. A pathological anteversion, therefore, only exists when, in all positions of the body, there is a notable and persistent anterior inclination of the uterus in relation to the axis of the brim, its shape remaining unaltered. It follows from this that the angle of possible deviation from even the theoretical mean position of the uterus cannot exceed 90° at the utmost (*see* Fig. 49, p. 105), while the deviation from the limiting normal position can scarcely reach 45°. Moreover, the deviation must be more or less rectified whenever the bladder is full. Hence, in comparison with retroversion, anteversion is of very little importance.

Causation.—All the causes before enumerated for displacements in general (*see* p. 103) which, when the uterus is low in the pelvis, produce retroversion or retroflexion, tend, so long as the centre of that organ remains at its proper level, to produce rather anteversion or anteflexion. Anteversion is therefore especially associated with increased weight of the body of the uterus or excessive intra-abdominal pressure, as from tight-lacing or weight of clothing, without a proportionate relaxation of the supports which maintain the centre of the uterus in its position in the pelvis. While anteflexion is frequently primary, anteversion (like retroversion and retroflexion) is usually secondary; and the commonest of all its causes is hyperplasia of the body of the uterus. Anteversion may also be

produced by fibroid tumours in the uterine wall, or adhesions the result of peri-uterine inflammation.

Results and Symptoms.—Anteversion in itself generally produces little or no symptoms, and symptoms associated with it are most frequently due rather to the hyperplasia, hyperæmia, or inflammation which was anterior to the displacement. If, however, the displacement is considerable, and the uterus is also large and hard, especially if the enlargement is due to the presence of a fibroid tumour, signs of pressure upon neighbouring organs may appear. When the cervix especially is enlarged and indurated, and particularly when the whole uterus is at the same time far back in the pelvis, pain in defecation and rectal tenesmus may be produced. Bladder symptoms have been attributed to the pressure of the anteverted fundus. But vesical tenesmus, when it exists, is much more frequently a reflex effect from congestion of uterus or ovaries than produced by mechanical pressure.

Diagnosis.—By vaginal touch the os is found to be directed too much backward and high up in the hollow of the sacrum, so that in extreme cases it can with difficulty be reached. The anterior vaginal wall is tense, from the traction exercised by the cervix, and more than usual of the body of the uterus is felt resting low down upon it. On bimanual examination, the body of the uterus is readily defined in this position, the fundus being close behind the pubes when displacement is considerable. No concavity or angle is detected by the finger in the vagina between cervix and body. If no adhesions or tumour be present, the fundus may be pushed up by the finger through the anterior cul-de-sac until the external hand, pressed immediately above the pubes, is able to get below it, and carry it still farther back, while the finger in the vagina draws the cervix forward. In simple anteversion the sound is hardly ever necessary either for diagnosis or replacement, though it may be of use to determine the degree of enlargement, or to decide as

to the presence or absence of a fibroid tumour. It is to be remembered that when the examination is made in the dorsal position, the degree of anteversion will generally be less than that which exists in the erect posture.

Treatment.—Anteversion is generally rather the indication of increased weight of the fundus uteri than the cause of symptoms in itself. Moreover, there is no possible pessary for anterior displacements which is either so effective or so free from any injurious influence as the Hodge's or ring pessary in backward and downward displacements. Hence it is only very exceptionally that mechanical treatment is found useful in anteversion, and generally it is preferable to direct the treatment rather to the cause of enlargement. Any acute symptoms of hyperæmia should be relieved by rest in bed, aperients and sedatives, with local depletion if required. In this, as in other displacements, all tight clothing should be forbidden, and the skirts should be suspended from the shoulders.

A great variety of vaginal pessaries has been devised for the treatment of anteversion or anteflexion. Most of these have a double action, like those used for retroflexion. By pressure on the anterior vaginal wall they directly push up the fundus, and at the same time they render that wall arched, and so shorten it by bringing its extremities nearer together, and thereby draw the cervix forward. The base of the bladder, however, appears to be more vulnerable to injury from any considerable pressure than the posterior cul-de-sac. It is obvious that the fundus can only be directly elevated by such pessaries by means of pressure transmitted through the bladder; and that the bladder must suffer at least as much, if not more pressure, from the pessary as it would from the anteverted or anteflexed fundus.

Moreover, all these pessaries, occupying mainly the lower part of the vagina, form an obstacle to coitus, and are liable to extraordinary displacements in married

women. Accordingly the preponderance of experience appears to show that anteversion pessaries more often do harm than good. The usual harmlessness of anteversion in itself is shown by the fact that, when a Hodge's pessary is acting most satisfactorily for the cure of a backward displacement, the uterus is often found in a position of anteversion.

In some cases of anteversion associated with congestion, benefit is found from the use of a Hodge's or elastic ring pessary, notwithstanding that the pessary tends rather to increase the anteversion. In such a case the pessary probably does good by somewhat elevating the whole uterus, and limiting its mobility.

ANTEFLEXION OF THE UTERUS.

Pathological Anatomy.—A slight anterior curvature of the uterine axis is normal, or at any rate very common, in the nulliparous uterus, and, when the uterus is soft, an increased anteflexion, instead of merely an anteversion, of the uterus is produced when the bladder is empty. A pathological anteflexion, therefore, only exists when the curve is very considerable as a whole, or very sharp at one part of the uterine axis. Acquired anteflexion may be combined with anteversion, so that the os is tilted too much backward, the uterus having partly yielded as a whole to the displacing force, and partly undergone bending. In primary anteflexion the os is most frequently directed too much forward. Anteflexion has been divided into corporeal, cervical, or cervico-corporeal anteflexion, according as the body alone, the cervix alone, or both cervix and body, are flexed forward (Fig. 57, p. 132). Anteflexion combined with retroversion may also exist, the axis of the uterus being concave forwards, but its body displaced backwards (Fig. 57, E F). Such a condition is apt to be mistaken for pure retroversion, when a portion of the body of

the uterus is felt behind the cervix. In acquired anteflexion the curvature is generally sharper at one point, usually near the internal os, because this is the most flexible portion of the uterus, and the canal is apt to be here flattened, and so obstructed (*see* Fig. 58). In primary anteflexion the curve is generally more uniform, and the uterine tissue harder, so that there

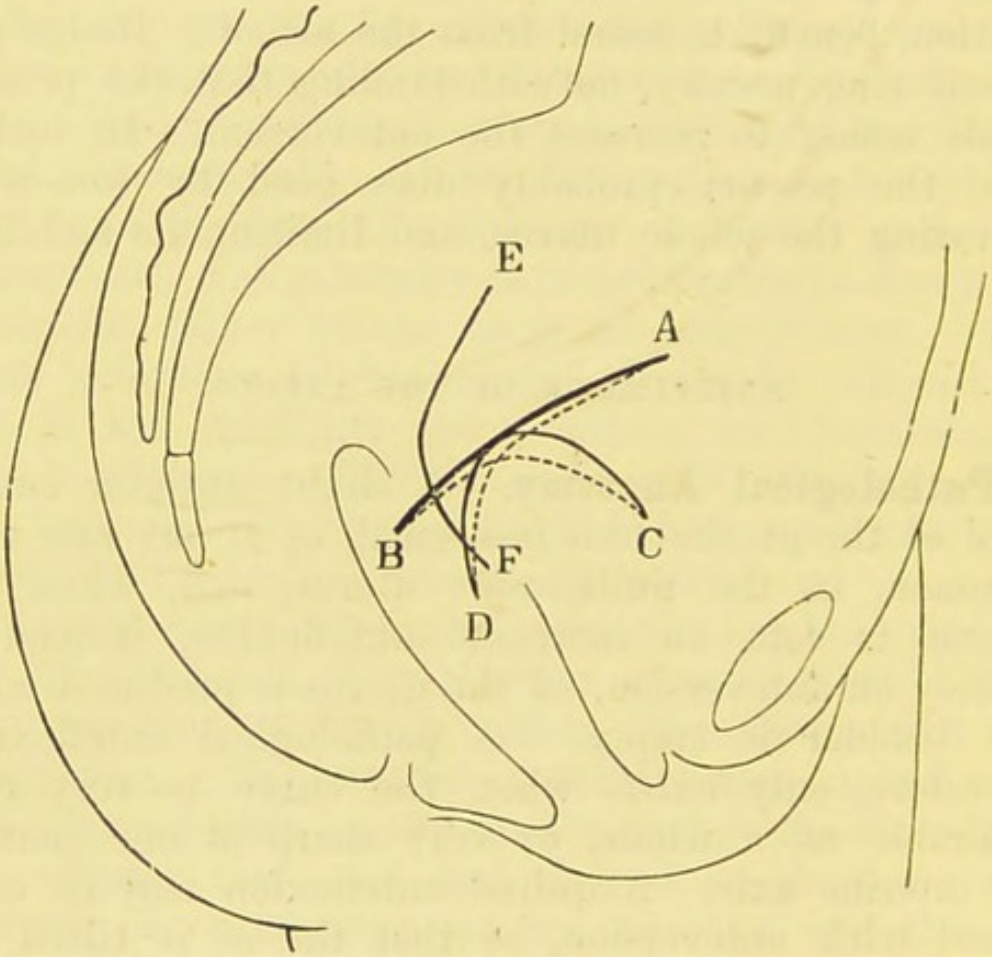


Fig. 57.—Diagram to illustrate the Varieties of Anteflexion.

A B, normal direction of uterine axis, the bladder being in a medium condition of fulness; A D, cervical anteflexion; C B, corporeal anteflexion; C D, cervico-corporeal anteflexion; E F, anteflexion with retroversion.

is not necessarily any flattening of the canal, though its diameter is usually less than normal. Statistics vary very widely as to the relative frequency of anterior and posterior displacements of the uterus. The general opinion is, however, that anterior displacements, especially primary anteflexions, are much commoner, but that of displacements of any conse-

quence, calling for mechanical treatment, descent and retroflexion are the most common. The discrepancy is explained, in great measure, by the difference between various authors as to the degree of anteflexion or anteversion which they would regard as pathological.

Causation.—Acquired anteflexion is produced by the same causes as anteversion, with the addition of softness of the uterine tissue, or it may result from morbid softness alone, such as is not uncommon in ill-nourished girls, the uterus yielding from its own

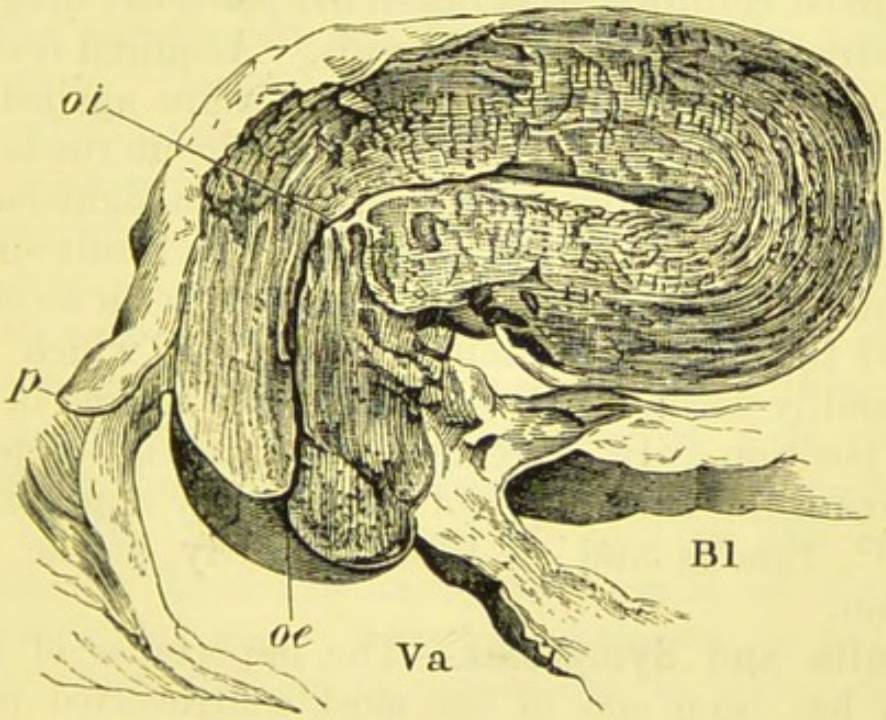


Fig. 58.—Anteflexion of Uterus.
o i, os internum; *o e*, os externum; *p*, peritoneum of pouch of DOUGLAS; B l, bladder.

weight, or from the effect of forces which are normally in action. Before the age of puberty it is normal, or at any rate very common, for the uterine axis to have a greater physiological anteflexion than it has in the adult, while it straightens itself when the uterus reaches its full development and becomes firmer. Hence anteflexion is very frequently primary, and consists in an abnormal persistence or exaggeration of a state which, in childhood, is hardly to be considered pathological. In this case the anterior uterine wall is often thinner and less developed than the posterior;

the anterior lip of the cervix is usually too short, and frequently the anterior vaginal wall is itself short. Such a condition is often associated with a conical cervix and small external os, and sometimes with general smallness of the whole uterus. Frequently there are also signs of imperfect ovarian activity; the vagina may itself be small, and even the bony pelvis may share in the want of full development. An acquired cervico-corporeal anteflexion has been ascribed to contraction of the utero-sacral ligaments, the result of localized cellulitis or *parametritis posterior*, dragging the centre of the uterus backwards. Acquired cervical anteflexion may also result from pressure against the posterior vaginal wall, when the whole uterus is displaced downward and backward, as from tight-lacing. Cervical anteflexion is also frequently the result simply of an undue length, generally associated with a conical form, of the vaginal portion of the cervix, which then most readily accommodates itself to the vagina in this flexed position. In extreme cases of cervico-corporeal anteflexion the total angle of flexion may approximate to 180°, fundus and os looking nearly in the same direction.

Results and Symptoms.—The importance of anteflexion has been one of the most controverted points in gynæcology, and the matter is still far from settled. By some this condition is regarded as a very common and important source of trouble; by others it is held that a flexion causes no impediment whatever to the uterine canal, and that a large proportion of unmarried women in perfect health have an anteflexed uterus. It appears to be evident that, while a naturally bent canal may be quite patent, any sharp bending of an originally straight or nearly straight canal of soft tissue, like that of the uterus, must tend to flatten it, and so diminish its calibre. The smaller the canal is originally, the more likely is such flattening to produce the effects of obstruction. Even when the canal is small as well as flattened, the obstruction, like

that produced by extreme stenosis, need not necessarily produce dysmenorrhœa, provided that the menstrual flow is moderate and uniform in quantity, and perfectly fluid, but only does so when shreds of membrane or clots have to pass.

The difference of opinion as to the frequency of anteflexion, apart from symptoms, may be in part accounted for by differences in the mode of estimating the anteflexion, or in the degree of curvature regarded as pathological. Statistics which have been given by different authors as to the frequency of association between anteflexion and dysmenorrhœa are very contradictory. General experience, however, appears to show that acute anteflexion is more frequently met with among women suffering from dysmenorrhœa, or dysmenorrhœa and sterility, than it is at post-mortem examinations amongst nulliparous women in general, and therefore that there is probably a causal relation between these conditions. It is true that theory does not receive the same confirmation by a therapeutic test from the successful removal of symptoms by the cure of the anteflexion as it does in the case of retroflexion from the successful results of treatment by Hodge's pessary. This may, however, be explained by the fact that it is impossible in anteflexion so effectually to straighten the uterus by any pessary except an intra-uterine stem, which, by the irritation of its presence, is apt to cause more evils than it can remove. It has been argued that flexions cannot produce any obstruction because the uterine cavity is not, post-mortem, found to be dilated. Such dilatation, however, is not to be expected. Just as, in stricture of the urethra, the bladder is found to be small, with thick walls, so in the case of the uterus, unless the obstruction is complete, the muscular walls become hypertrophied to overcome it, as is found to be the case in extreme stenosis of the cervix. The only post-mortem evidence, therefore, which obstruction of the canal would leave, is hypertrophy of the

body of the uterus, and this is not infrequently found in cases of anteflexion associated with dysmenorrhœa. An anteflexed uterus, if examined soon after puberty, is usually found to be small, and the anteflexion is probably often part of a general want of full development. But, in later years, the cavity even of a nulliparous anteflexed uterus is not infrequently found to be elongated, though the sound is very apt to be arrested by the flexion short of the full length, and so to give an erroneous impression of smallness.

Statistics have been published to show that, among women in whom anteflexion is detected during life, there is no greater frequency of dysmenorrhœa than the average. It appears at any rate to be clear that anteflexion up to a considerable angle (45° or more) comes within the limits of the normal shape of the uterus, and that only extreme degrees of it are likely to cause symptoms.

The general conclusion is that anteflexion, especially primary anteflexion, frequently exists without any symptom, and that the importance of this condition has been much exaggerated by some authors, but that an acute anteflexion, especially if acquired, may diminish the calibre of the canal, and so tend to produce, or assist in producing, dysmenorrhœa, endometritis, and probably also sterility. Practically, an acquired cannot always be distinguished from a primary anteflexion, but, if the flexion is found to be specially acute at one point, it is more likely to be acquired. If a uterus have a primary anteflexion, and the flexion be afterwards much increased, it is obvious that there may be the same tendency to flattening of the canal as in the case of a uterus originally nearly straight.

Diagnosis.—The direction of the os and cervix is readily discovered by vaginal touch. In cervical anteflexion, a considerable length of the cervix may sometimes be traced behind the os, and the use of the sound may be necessary to distinguish between cervical anteflexion and partial retroversion. In corporeal ante-

flexion the fundus is felt resting low upon the anterior vaginal wall, and may be defined on bimanual examination as described in the case of anteversion. It is found to move in conjunction with the cervix, and a concavity or angle is felt between the two. If an attempt be made to pass the sound, it is generally arrested near the internal os, and can only be carried on to the fundus either by taking the handle far back toward the perineum, by pushing up the fundus with the finger in the vagina, or by withdrawing the instrument and reintroducing it with an increased curve. The slighter degrees of corporeal anteflexion may be difficult to detect, especially in virgins when the vaginal walls are tense, and the exact curve of the uterine axis can then only be determined by means of the sound. The conditions chiefly to be distinguished from anteflexion are a fibroid in the anterior uterine wall, thickenings due to cellulitic or peritoneal inflammation, or to blood effusion, or tumours, or calculi in the bladder. All of these conditions, except calculus, are diagnosed by their fixity and ill-defined outline, but the most perfect evidence is that derived from the sound, especially in distinguishing the case of a fibroid in the anterior uterine wall. If the swelling felt anteriorly disappears when the uterus is straightened by the sound, or turned into a position of slight retroflexion, it is proved to have consisted of the fundus alone.

Treatment.—Treatment is, of course, only necessary when symptoms exist which are referable to the anteflexion. Reduction of the flexion is generally easy, but does not have a permanent effect. In the case of corporeal anteflexion, when the body of the uterus is bulky and soft, as in acquired flexions, it may sometimes be replaced with the fingers alone, by pushing up the fundus from the vagina, and then pressing it backwards by the outside hand above the pubes. Generally the sound is necessary for replacement, but it should not be employed if there is any sign of peri-uterine inflammation or acute hyperæmia. If it can

only be passed with an extra curve, it is withdrawn, and introduced a second or third time, till it can be passed with its intra-uterine portion nearly straight. If undue softness of the uterus appears to be the result of malnutrition, it is important to see that a sufficiently nutritious diet is taken, and to adopt a generally tonic treatment.

It is usually impossible to straighten an anteflexed uterus by the use of any vaginal pessary. Since, therefore, the most important mechanical effect of anteflexion is that of causing an impediment in the cervical canal, and anteflexion is often associated with a canal rather smaller than the average, it is generally desirable, especially in anteflexion of the nulliparous uterus, when the flexion is thought to be an element in the production of dysmenorrhœa or sterility, to dilate the uterine canal to somewhat above its average calibre, rather than to insert any pessary. Dilatation may be effected by metallic bougies, by the occasional use of a tent, or by the use of Hegar's or other dilators under an anæsthetic, if repeated manipulation be considered undesirable (*see* p. 94). This treatment tends at the same time to straighten the canal in some measure. In the great majority of cases of corporeal anteflexion, according to the author's experience, no further direct mechanical treatment than this is found beneficial.

In pure cervical anteflexion, pessaries are useless. In minor degrees, dilatation of the os and cervix may be sufficient. In higher degrees, when symptoms are present, such as those of obstructive dysmenorrhœa, and when the os is also small, it may be desirable, if dilatation has only a temporary effect, to incise the cervix backward, so as to convert the os into an elongated opening, more nearly in a line with the upper part of the cervical canal (*see* Fig. 44, p. 91). The mode of making the incision and the after treatment are described under the head of stenosis of the external os (pp. 86—92). For cases in which the fundus is flexed forwards as well as the cervix, Marion

Sims recommended the incision of the anterior uterine wall near the internal os in addition to that of the posterior wall of the cervix. It is impossible, however, when there is considerable corporeal flexion, to straighten in this way the cervical canal without a dangerously deep incision. Such an incision, moreover, generally tends to close again.

The most effectual means of straightening an anteflexed uterus, however, is one which has been the subject of much controversy, namely, the use of intra-uterine stem pessaries. While some distinguished authors have denounced them entirely, others have expressed apparently over-sanguine views of their efficacy. But, while the advocates of this treatment have described its results as brilliant, none of them has ever adopted the only method which, in such a doubtful matter, could establish it on a satisfactory basis—that is, to give a complete record of the results of every one of a series of consecutive cases. The objection to stem pessaries is, not that they are mechanically ineffectual, but that they always excite a certain degree of irritation and hyperplasia, while they have not infrequently produced severe and even fatal metritis and peritonitis. It might be inferred *à priori* that a mucous surface covered by a cylindrical epithelium is not likely to tolerate pressure and friction altogether with impunity, and this conclusion is confirmed by experience. Even with the most modern form of stems, and in the practice of careful physicians, fatal results after the use of these pessaries have been recorded. It is comparatively common to find that pain, or a rise of temperature, necessitates the removal of a stem before it has been long retained. Special precautions are therefore required in applying stems, and they should be used, if used at all, not as permanent supports, but as a temporary treatment, to be continued for a limited number of weeks or months, while a patient is kept under strict observation. No one should venture on the use of an intra-uterine stem who has not complete

confidence both in his own power to judge of the suitability of the case, and also in the implicit obedience of his patient to directions. Their use is not to be recommended to those who have not given special study to the diseases peculiar to women. The varieties of intra-uterine stem which have been invented will not therefore be here discussed.

PROLAPSE OF THE UTERUS AND VAGINA.

Pathological Anatomy.—The plane of cellular tissue, in the middle of which the centre of the uterus is balanced, forms a floor to the pelvis, or rather to the whole abdominal cavity, and is one of the boundaries which retains the abdominal contents. All descent of the uterus or vagina implies a yielding of this pelvic floor. All forms of prolapse, therefore, may be regarded as analogous to hernia; and in all of them there is a protrusion below their normal level, and sometimes externally, of peritoneum and of small intestines.

From the close connection of the uterus with the bladder and anterior vaginal wall, these structures necessarily take part in all downward displacements, and it will therefore be convenient to consider prolapse of the vagina in association with prolapse of the uterus. Descent of the uterus has commonly been termed prolapsus so long as the cervix remains within the vulva, and procidentia when it passes outside, although, from the derivation of the words, an opposite usage would have been more appropriate. A better classification is that into three stages of prolapsus—the first stage, in which the uterus remains entirely within the vulva (Fig. 59); the second, in which it passes partially outside (Fig. 60); and the third, in which the whole uterus is extruded beyond the vulva (Fig. 61, p. 142). As the uterus descends, the cervix tends to move in the direction of the vagina as being that of least resistance, and thus the

axis of the uterus follows the curved axis of the pelvis, and becomes more and more retroverted in proportion

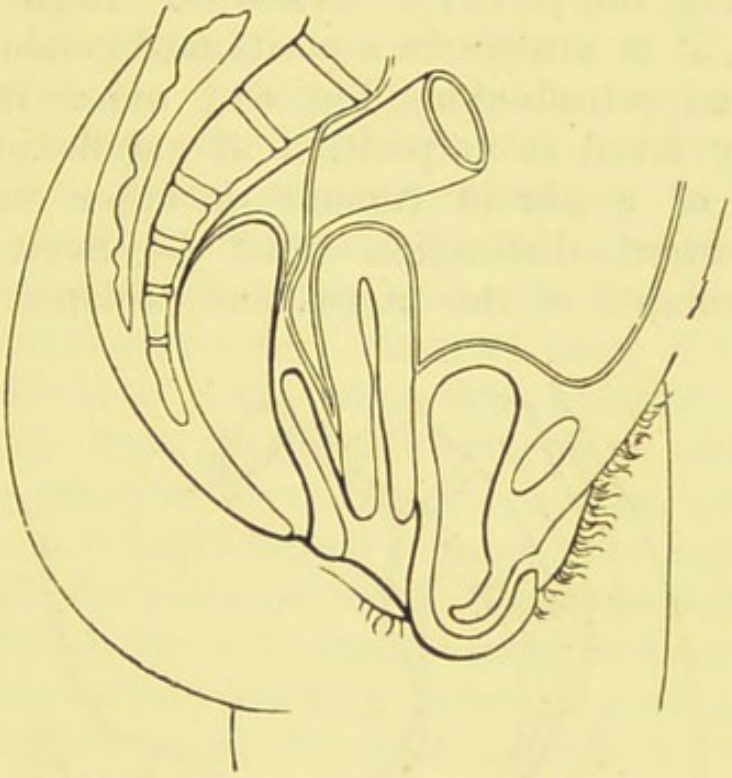


Fig. 59.—Prolapse of the First Degree.

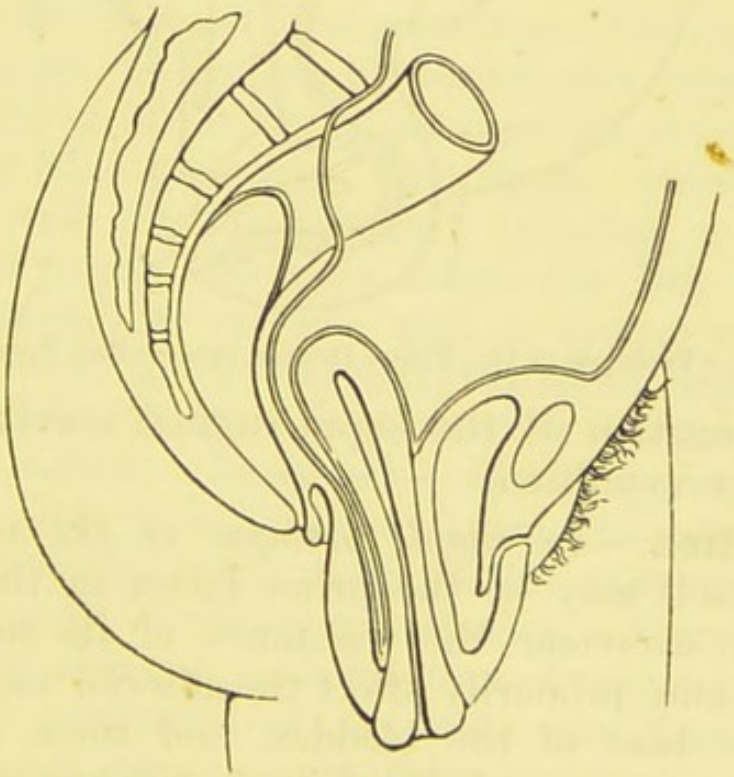


Fig. 60.—Prolapse of the Second Degree (or Procidentia).

as it becomes lower (Fig. 59). The two chief causes of retroflexion then come into play (*see* p. 108), so that

this displacement is commonly added to the retroversion, and the fundus lies low in the hollow of the sacrum (Fig. 60, p. 141). When the uterus is finally extruded, it is always in a position of combined retroversion and retroflexion (Fig. 61), unless it has been previously fixed in a position of anteflexion by the presence of a fibroid tumour or other such cause. An important distinction must be made between simple prolapse of the uterus and prolapse associated

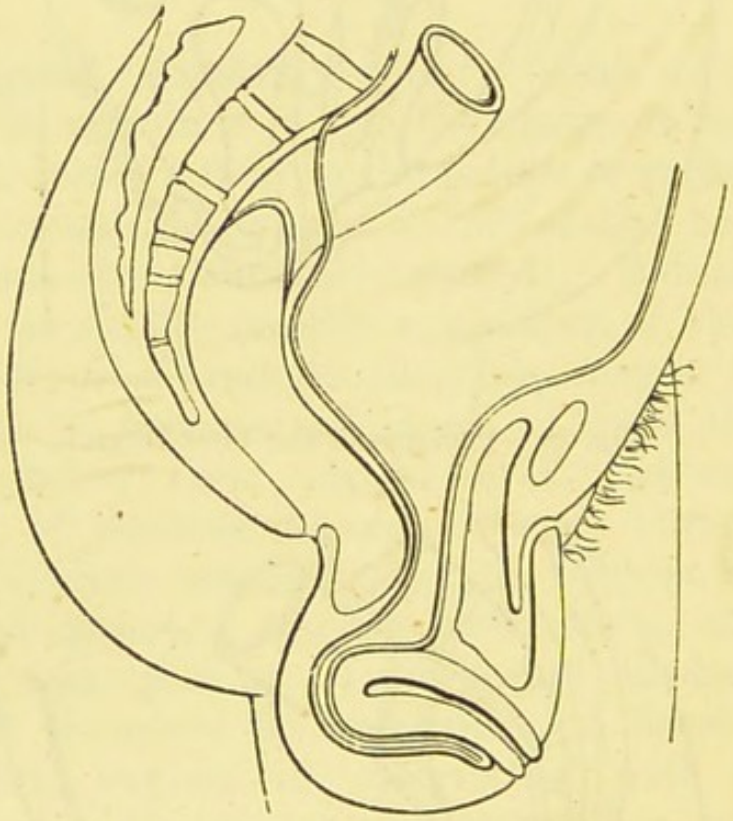


Fig. 61.—**Prolapse of the Third Degree (also called Procidentia).**

with elongation of the supra-vaginal cervix, a much commoner condition.

Causation.—In *simple prolapse of the uterus*, the uterus itself may be the prime factor in the descent, and may overcome the resistance of its supports, or prolapse may primarily affect the anterior vaginal wall, with the base of the bladder, and these may draw down the uterus. A third, and still commoner, condition is that in which the two influences are more or less combined. Whichever part of the pelvic floor is the first to yield, an excess of intra-abdominal pressure,

such as is produced by cough, straining at stool, or lifting weights, almost always plays an important part in producing the displacement. The first causation, in its most pure form, is seen sometimes in the case of virgins when the prolapse is due to hyperplasia of the whole uterus or of the vaginal cervix, to the presence of a fibroid tumour, or simply to excessive muscular exertion, without any uterine enlargement. The resistance of the vagina, and even that of an intact hymen, is thus overcome. In most cases of this kind, however, there is some antecedent relaxation of the vaginal walls from chronic leucorrhœa or other cause. Sometimes prolapse occurs in old women, even when the uterus is atrophied and considerably lighter than normal; the displacement then often arises from deficient support in the soft parts, owing to disappearance of fat. Among the exciting causes of prolapse, apart from the uterus itself, the most notable are laborious occupations, chronic cough or constipation, too early getting up after delivery, and rupture of the perineal body. In the last of these conditions the vagina not only loses its power of hindering any considerable descent (*see* p. 103), but becomes an active factor in causing the prolapse. The lower third of the posterior wall of the flattened cylinder, which the nulliparous vagina normally forms (*see* Fig. 2, p. 6), being destroyed, its anterior wall is unsupported, and bulges through the vulva, carrying down with it the bladder, while at the same time it makes traction upon the cervix. Destruction of the perineal body also takes away the direct resistance to considerable descent which the pelvic floor affords, and renders the downward path of the uterus shorter. Even without any perineal rupture, subinvolution of the vagina after delivery or relaxation of its walls may transform it from a support into an agent of displacement. Another important cause contributing to the weakening of the anterior vaginal wall is habitual or occasional over-distension of the bladder.

Prolapse associated with Elongation of the Supra-vaginal Cervix.—In the great majority of cases in which the cervix appears externally, the uterine cavity is found to be much elongated. An old doctrine was revived by Huguier, who separated this condition entirely from prolapse, and considered that the fundus usually remained at its normal level, the cervical hypertrophy being primary. Out of sixty reported cases of prolapse, in which the cervix was protruded externally, he found only two cases of true prolapse. Huguier has been followed in the main by Barnes and others. On measurement with the sound, however, it will be found that the elongated uterine cavity is frequently about 4½ inches long, and rarely much exceeds 5 inches, while the procident mass may protrude from 1 to 3 or more inches outside the vulva. A line drawn along the pelvic curve from the normal position of the fundus to a point 2 inches outside the vulva measures more than 6½ inches, and it is therefore clear, from measurement, that the fundus is almost always in these cases depressed more or less below its normal level. In the majority of cases also the sound will show the fundus to be more or less retroflexed, lying in the hollow of the sacrum (Fig. 60, p. 141). Moreover, the elongated cervix is invariably increased in length out of proportion to its breadth, and often it is actually attenuated, and has become elastic instead of being a firm muscular structure. This is a proof that the change is, in the main, the result of tension, although the hyperplasia may have been due in part to a state of hyperæmia, or subacute inflammation, with subinvolution, taking its departure from labour.

There are two ways in which tension, tending to elongate the cervix, may arise. The first is due to primary prolapse of the anterior vaginal wall with the base of the bladder, which drags the uterus downward at the point of vaginal attachment, while the uterine ligaments, attached near the centre of the organ, tend to keep it in place. In most cases, the yielding takes

place partly in the ligaments, leading to prolapse, and partly by stretching of the intervening portion of cervix. The next mode is one which is not noticed in text-books, but is capable of evoking a much greater force. It arises when the cervix, already partially prolapsed, is extruded through the vulva by any sudden effort, and is there gripped and partially strangulated, and its return prevented for a greater or less time. For it is a common experience that, notwithstanding the relaxation of the vulval outlet in these cases, some force is required to reduce the swollen cervix and prolapsed portion of vagina through this outlet. The elastic attachments, stretched for the moment, thus tend to restore the uterus and exert a tensile force on the cervix which may approximate in magnitude to the primary expulsive force of which it is the recoil, and is likely to be much greater than the mere weight of the anterior vaginal wall with the base of the bladder. This view of causation agrees with the fact that the great elongation with attenuation of the cervix is only met with in those cases in which the os uteri is generally or frequently external to the body; and that, if a case of prolapse afterwards reaches the third stage (Fig. 61, p. 142) and the uterus remains entirely external, it may again be reduced in length, and its measurement be as low as, or even lower than, normal. Some reduction of length may even take place immediately upon the uterus being restored, from the shrinking of the elastic cervix. This abnormal elasticity is due to the muscular fibres having become atrophied in conjunction with hyperplasia of the other elements of the tissue.

Primary prolapse of the *posterior* vaginal wall rarely exists, except as the sequel of destruction of the perineal body. It may occur to a considerable degree without affecting the position of the uterus. The swelling so formed may or may not carry down with it a pouch of the rectum, forming a rectocele. If the whole posterior vaginal cul-de-sac is carried

down, the pouch of Douglas generally descends with it, and in rare cases the small intestines descend into the procident mass, and form a large bulging tumour, much exceeding the size to which a rectocele usually attains (Fig. 62).

Results and Symptoms.—The chief symptoms of prolapse of the first degree are dragging pain in the back, hypogastrium, and groins from the strain upon the uterine ligaments. The anterior vaginal wall, with the base of the bladder, almost always descends

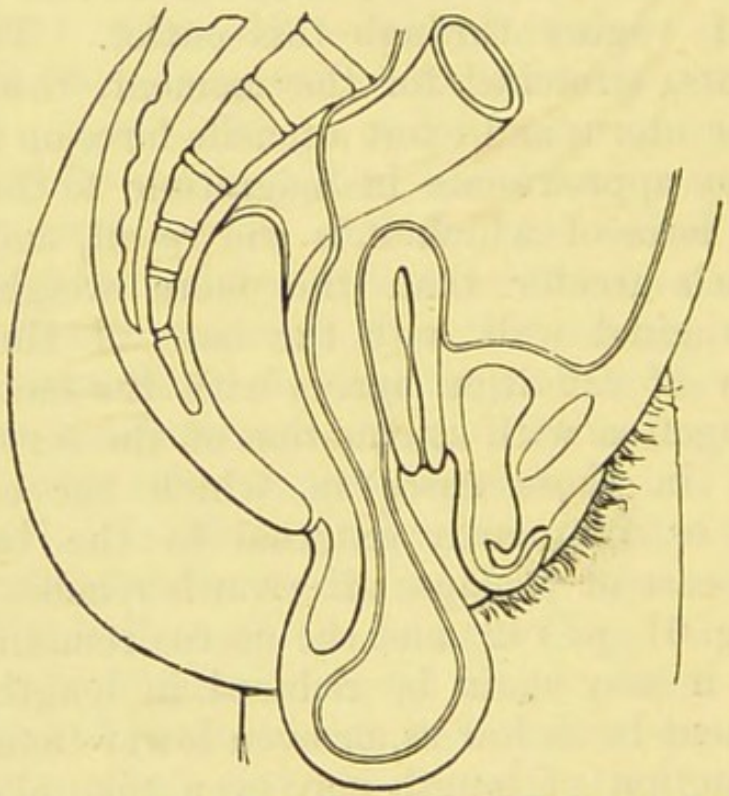


Fig. 62.—Prolapse of the Posterior Vaginal Wall with Rectocele and Enterocele.

first, even when excessive weight of the uterus is the primary cause of displacement. As this begins to form a swelling, bulging externally (Fig. 59, p. 141), it is often mistaken by the patient for the womb itself. Though the bladder is often tolerant of this displacement, some difficulty of micturition is usually produced, and sometimes tenesmus and even cystitis, from decomposition of the urine retained in the pouch. The presence of the uterus low down in the vagina causes a sensation as of a foreign body, and

tends to excite expulsive efforts, which accelerate the progress of the prolapse towards the second stage. The posterior vaginal wall, as a rule, does not, like the anterior, descend in front of the cervix, but is invaginated by it from above (Fig. 59). As the cervix protrudes externally, the anterior vaginal wall is first completely inverted, while the posterior wall for a long time maintains some duplicature posteriorly (Fig. 60, p. 141), although the inversion of this also may be complete at last. From the more loose attachment of the vagina to the rectum than to the bladder, the rectum is not necessarily carried down, and rectocele may or may not be associated with prolapse of the second or third degree, while it rarely attains to any great size.

When the procident cervix remains extruded through the vulva, it becomes swollen from the interference with venous circulation; leucorrhœa, and sometimes also menorrhagia or metrorrhagia, is excited. Frequently ulcers are formed from the effects of exposure or friction on the cervix or vaginal walls, and these may be the source of frequent slight hæmorrhage. In old-standing cases the rugæ of the vagina are lost, and the mucous membrane becomes hardened, like skin. From the effect of œdema and tension the mucous membrane also loses its close attachment to the cervix, the vaginal reflection becomes more indefinite, and the vaginal cervix may, in consequence, appear to have disappeared. In the third stage of prolapse, one or both ovaries may descend externally with the uterus. When in this position, the uterus is commonly found rather small, and the os contracted. The pouch of Douglas often descends externally even in prolapse of the second degree, but rarely contains any intestines (Fig. 60, p. 141; Fig. 61, p. 142). In recent prolapse there is ectropion of the cervix from tension of the inverted vaginal walls, but in old cases the os may be found small, and sometimes minute, even in prolapse of only the second degree. After the menopause the

cervical canal may become more or less completely occluded. Displacement of the base of the bladder may, in rare cases, produce such obstruction to the ureters as to cause hydronephrosis or other kidney lesion, and unreduced procidentia may lead to extensive and even fatal sloughing.

Diagnosis.—When the cervix is external, it is impossible, if due care be taken, to make any error of diagnosis. The vaginal fornices are depressed, both in pure prolapse, and prolapse with elongation of the supra-vaginal cervix. On the other hand, in elongation of the *vaginal* cervix, simulating prolapse, the fornices are not depressed at all, if the fundus is at its normal level. If, as is usually the case, there is some secondary prolapse associated with it, the fornices are depressed in some degree, but not in proportion to the displacement downward of the cervix. The use of the sound is generally desirable, to ascertain the length and direction of the uterine cavity, and to learn how far the fundus is below its normal level. In prolapse of the first degree, the extent of displacement can only be accurately estimated by making the examination while the patient is standing, and by testing the effect of bearing-down efforts. By the recumbent position a prolapse of the second degree may be converted into one of the first, but it is generally reproduced if the patient bears down. The existence of rectocele is detected by rectal touch, and the degree of cystocele may be estimated by passing a curved catheter or sound into the bladder, and turning its point downward into the prolapsed pouch.

Treatment. — The view here adopted as to the essentially secondary character, in the majority of cases, of cervical elongation associated with prolapse, has an important bearing on treatment. Huguier and others, accepting the logical result of their theory, have considered the only curative treatment to be excision, not only of the vaginal, but of a portion of the supra-vaginal cervix. Few authorities in Britain have

thought it desirable, for the cure of an affection not endangering life, to subject a patient to so serious an operation, although abroad operations for vaginal extirpation of the whole uterus have been performed for the cure of prolapse. If, however, the elongation be, in the main, secondary, it may be expected that, if means be found to maintain the cervix for a sufficiently long period at its normal level, and if, at the same time, any chronic inflammation present be suitably treated, the elongation will, in the end, diminish or disappear. The necessity for amputation is then limited, as a rule, to cases in which, not the supra-vaginal, but the vaginal portion of the cervix is elongated or enlarged. The treatment of these will be considered under the head of hyperplasia of the cervix.

Replacement of the Procident Mass.—After evacuation, if necessary, of the bladder and rectum, the patient should be placed in the semi-prone position, the procident mass well lubricated, and compressed steadily by both hands, so as to diminish its bulk. It may then be pressed gently upwards in the direction of the pelvic outlet, in such a way that the portion last prolapsed is returned first. The reduction is usually effected easily, but in some cases the bulk of the protruding mass may be so increased by œdema, that its return becomes very difficult. The patient should then be kept in bed for a time, in the first instance, while the swelling is supported, and treated by the application of cold by means of cooling lotions or ice, or gradual pressure by strapping or elastic bandages. In very rare cases, in consequence of inflammatory adhesions in the pelvis, especially when these are associated with some tumour connected with the uterus, the procidentia may be irreducible, and it is therefore essential to use no excessive force in attempting its restoration. For an irreducible procidentia, the only available treatment is a suspensory bandage, which may support and, by gradual pressure, eventually diminish the displaced mass.

Methods of Retaining the Uterus.—The indications for effecting a radical cure are: (1) to diminish the size of the uterus, if excessive; (2) to take away all sources of excessive downward pressure or traction; and (3) to restore the uterine supports to their normal condition. In general, however, the first two conditions can only be attained by protracted treatment, and the third only by an operation for restoration of the damaged perineal body, or for artificially contracting the vagina. In a large proportion of cases, therefore, it is desirable to use palliative means, and support the uterus by a pessary, which should be so chosen as to help and not hinder the means which may be used for radical improvement.

Prolonged rest in bed is, in all cases, of the greatest use in diminishing the size of the uterus, if that organ can be kept in place meanwhile, and this treatment should always be adopted in severe cases, if it is possible for the patient to carry it out, especially when any ulceration exists. The ulcers will then usually heal readily, but the healing process may be accelerated, if necessary, by passing lightly the solid nitrate of silver over the surface, or applying a solution of the same salt (gr. x.—xxx. ad ℥j.). If relaxation of the vagina be only moderate, and the stage of prolapse early, the use of astringents may suffice to effect a cure. Alum, tannin, iron alum, or sulphate of zinc may be used in the form of vaginal injections (℥iij.—iv. ad Oj.), but a more effective plan is to insert into the vagina daily one or two teaspoonfuls of either of these substances in powder, in a muslin bag, or wrapped in cotton-wool, while copious cold water injections are used from time to time. Benefit is also derived from the constitutional effect of cold hip-baths or sea-bathing, as well as tonic medicines, especially iron and strychnia. The administration of ergot may also give tone to the muscular walls of the vagina, as well as diminish hyperæmia of the uterus. Cough or chronic constipation is to be treated by suitable remedies. As a

preliminary measure, to bring the uterus and vagina into a suitable condition for a pessary, and to allow ulcerations to heal, it is often useful to keep up the uterus by a large vaginal tampon, retained in place, if necessary, by a perineal band. This plan is especially indicated if the uterus will not remain in place even while the patient rests in bed, but it may sometimes obviate the necessity for confinement in bed. The congestive hypertrophy of the cervix may also derive benefit from the pressure exercised by the tampon. A sponge may be used for this purpose, but, from its tendency to promote decomposition, it requires frequent removal, and the utmost care in cleansing it. It is, therefore, better to use the combination of absorbent cotton with purified sheep's wool. If soaked in carbolized glycerine, to which alum or tannin may be added, such a tampon may be left in place two or three days. A useful combination of an astringent with an antiseptic, for soaking the tampons, may also be made by dissolving forty grains of alum and ten grains of boric acid in an ounce of glycerine.

Pessaries.—The pessary which of all others has the fewest drawbacks, and which will generally prove effectual in an early stage of prolapse, if the perineal body has not been much damaged, is a Hodge's pessary of the ordinary sigmoid shape (Figs. 51, 52, pp. 113, 114). The action of this instrument is to stretch the posterior cul-de-sac backwards and upwards, and so hold the cervix at its normal level, and keep the uterus in a position somewhat of anteversion, while it forms also a kind of splint for the vagina, and prevents the descent or inversion of any portion of it. If the lower limb be somewhat square (Fig. 51, p. 113), and have but a slight pubic curve, so that it rests behind and above the pubic arch, it will also support the base of the bladder, and so prevent what is often the first step in displacement (Fig. 52, p. 114). It is generally necessary that the instrument should be rather broad, but it should not be larger than is necessary to secure

its retention. When the perineal body is very deficient, and the weight to be supported is considerable, a pessary of this form will usually be forced out. Another pessary, somewhat similar in its action, namely, the elastic ring pessary (Fig. 63), may, however, be retained. The best form of this is that made of steel spring covered with india-rubber. Owing to its elasticity, a ring of considerable size can easily be introduced by compressing it laterally. These rings are made in sizes enlarging progressively by $\frac{1}{8}$-inch. The larger sizes, from $2\frac{7}{8}$ to $3\frac{1}{4}$ inches in diameter, will be found most useful. The spring commonly used is often not stiff enough for the larger-sized rings; and

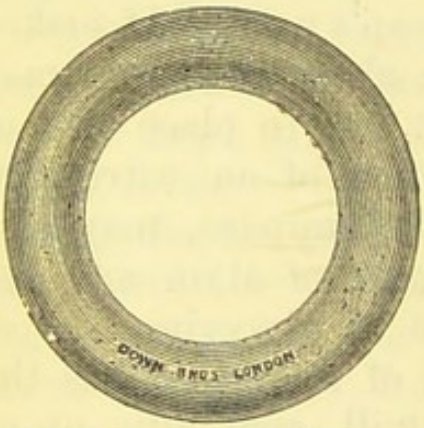


Fig. 63.—Watch Spring Ring Pessary.



Fig. 64.—Padded Ring Pessary.

the consequence is that the ring is compressed and forced out. In such a case, a pessary with stiffer spring may be retained. The diameter of the spring, with its rubber covering, should be at least $\frac{1}{2}$-inch, that its pressure may be readily tolerated. This pessary has the advantage that intelligent patients may be taught to introduce and remove it themselves, since, from its flatness, it naturally passes in the right direction, namely, behind the cervix, while a Hodge's pessary usually passes in front of the cervix, if introduced by an unskilled hand. If it is frequently removed, the disadvantages it has in consequence of the more absorbent character, and therefore inferior cleanliness, of its material are in great measure

obviated. If it is worn continuously, antiseptic vaginal injections should be used daily. With these, and other pessaries covered with india-rubber, soap should be used as a lubricant rather than oil, which injures the rubber.

A variety of this pessary is made (Fig. 64), in which the metal spring is thinner, and the pessary is filled with glycerine or gelatine. The pressure of this is still more easily tolerated. If, on the other hand, it is found that the vagina is fairly tolerant of pressure, but that the pessary is too easily forced out, a solid ring of vulcanite may be used instead of the elastic ring. The size of this must be very accurately adjusted to that which will just pass in without the use of too much force.

As an alternative to the elastic ring pessary may be used a form of pessary which will be frequently retained, when the sigmoid Hodge's pessary would fall out. This is one in which the anterior limb is bent upward, so that, viewed laterally, the instrument forms nearly an arc of a circle, about 110° in length (Figs. 65, 66). The essential point in the mechanism of this instrument is that its anterior limb rests high up above the pubic arch, distending the anterior vaginal wall, with the base of the bladder, into a pouch, and does not press against the rami of the pubes at all (Fig. 66). Its escape is thus prevented by the posterior surface of the pubes and the posterior vaginal wall, without any assistance from the vulval outlet or perineal body. I



Fig. 65.
The Author's Lever Pessary for Prolapse.

have had the anterior limb of the instrument made in the form of a cylinder $\frac{5}{8}$-in. in diameter, so that its pressure may be as widely diffused as possible (Fig. 65). If, however, the posterior cul-de-sac is not capacious enough, the pressure of the pessary may not be tolerated; and, if the vagina is so dilated that its width is nearly equal to its length, it is liable to turn round sideways. Again, the instrument fails if the

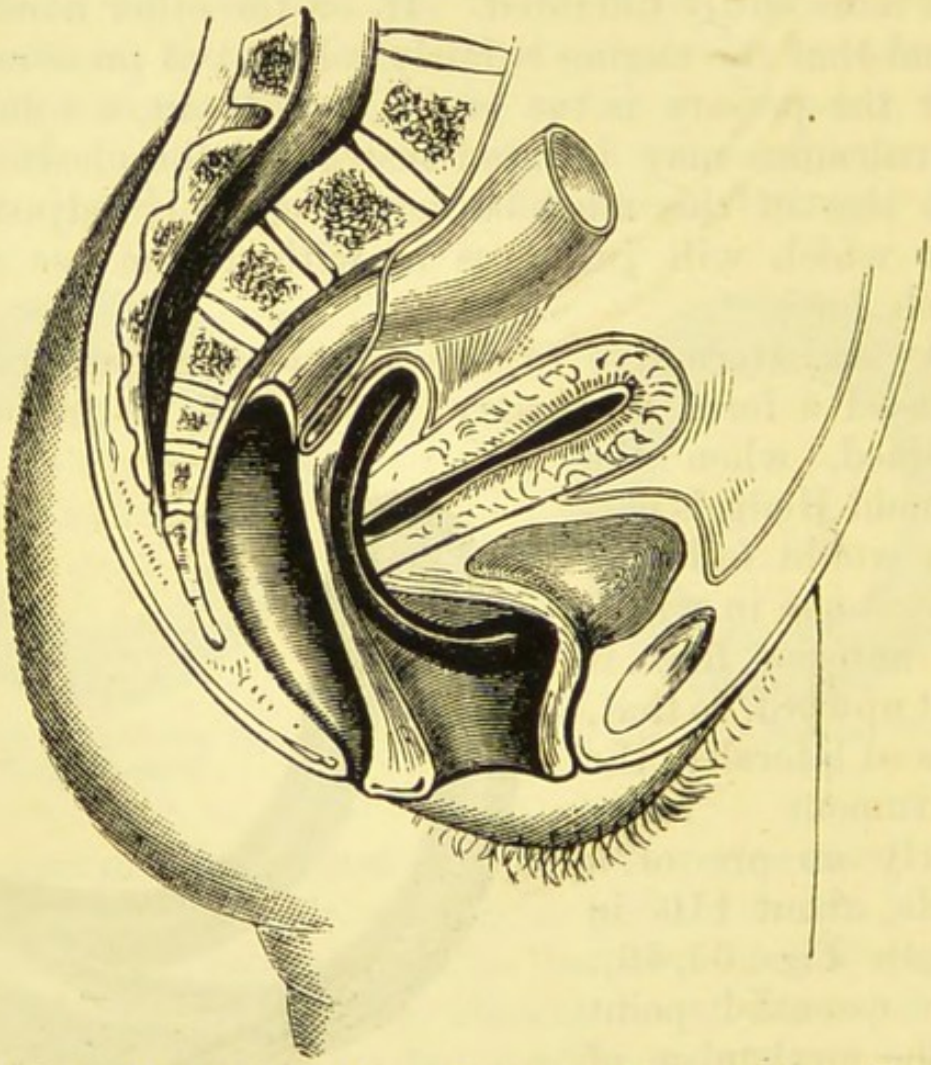


Fig. 66.—**The Author's Lever Pessary** for Prolapse, in position.

vaginal cervix is so atrophied that it does not retain the posterior limb of the pessary behind it in the posterior vaginal cul-de-sac. Under such circumstances the elastic ring is preferable; otherwise the lever pessary has the advantages that its material is more cleanly, that it does not stretch the vagina so much laterally, and that it tends to push the fundus directly upwards if retroflexed, while the ring merely draws

the cervix backwards. It is therefore specially indicated when any considerable retroflexion exists. The mode of introduction of the instrument is the same as that of the sigmoid pessary (*see* p. 119), but its shape renders it rather more difficult to hook the posterior limb backward over the cervix into the posterior culde-sac. In proportion to this difficulty is the security of its retention. With this, as with every other pessary, it is essential that it should be removed at regular intervals, in order that it may be cleaned and the state of parts observed.

If the uterus be replaced, and the cervix maintained at its normal level by any of these pessaries, it is obvious that, if the organ be elongated, it must, for the time at least, either be more or less doubled upon itself, or the fundus must be elevated above its normal height. What most frequently occurs is a combination of the two effects. The uterus most readily tends to become doubled upon itself in a position of retroflexion, and it is often necessary to correct this tendency by replacement with the sound, so as to bring the axis into a position rather of anteflexion.

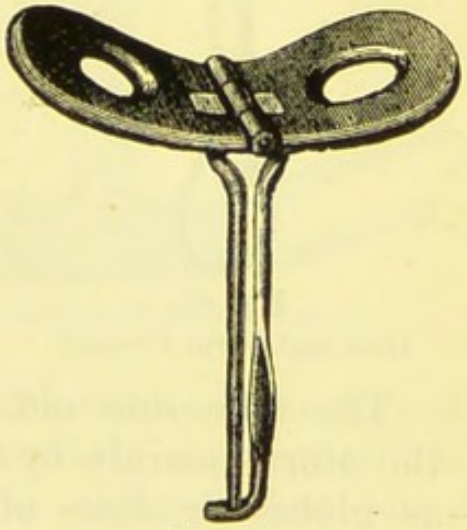


Fig. 67.
ZWANCKE'S Pessary modified by GODSON.

A form of instrument which will sometimes retain the uterus within the vulva when no other will do so except by external support is Zwancke's pessary. This consists of two plates, like butterflies' wings, hinged together, and capable of being expanded either by a screw, or by two arms which are secured by a simple catch as in Dr. Godson's modification, which is the best form of the instrument (Fig. 67). The pessary stretches the vagina laterally, and merely retains the cervix within the vulva, without tending to elevate it to its normal level, or remedy the retroversion or retroflexion.

It thus secures only a very partial alleviation, and most authorities justly denounce its principle as unsound. Some patients who have used it, however, derive from it so much relative comfort that they are not easily persuaded to change it for any other instrument. The cervix resting upon the hinge is apt to become inflamed or ulcerated, but this effect may be obviated in great measure if the pessary be so made that the hinge forms no projection. The chief advantage of the instrument is that the patient can easily remove it herself, and she should be stringently enjoined to do so every night. Through neglect of this precaution, rectal and vesical fistulæ have not infrequently been produced. On the same principle act Simpson's shelf pessary, and a modification of this praised by Dr. Matthews Duncan, namely, the disc and stem pessary, the stem of which projects through the vulva, after the disc has been introduced like a button through a button-hole; but these are less easily removed by the patient herself than Zwancke's pesssary.

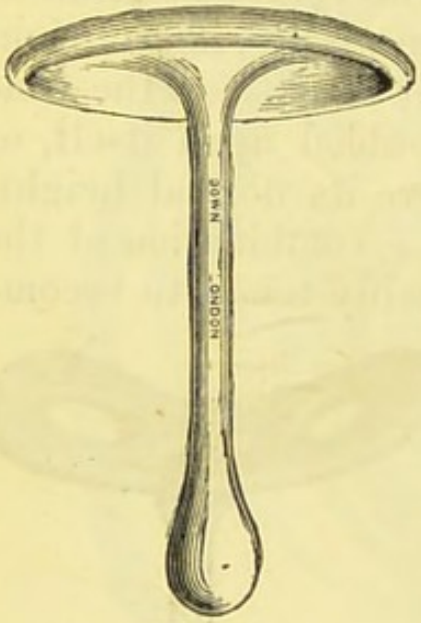


Fig. 68.
Disc and Stem Pessary.

The numerous old forms of pessary which kept up the uterus mainly by their bulk filling the vagina, such as globes or discs of wood or other materials, have properly fallen into disuse. One instrument, however, acting on this principle, is sometimes useful when, from the presence of a pelvic tumour or inflammatory swelling, neither a rigid pessary nor even the elastic ring can be tolerated, namely, the air-ball pessary. This consists of a hollow spherical ball of india-rubber. A tube is attached, through which it is inflated by means of a small air-pump, and the patient can easily introduce and remove it herself. Owing to the material used, frequent removal is necessary for the sake of cleanliness.

If the lever or elastic ring pessary cannot be retained, it is generally best, in default of a plastic operation to resort to the cup and stem pessary (Fig. 69), supported from a waist-belt by four bands. Before it is used, any ulceration present should be cured by rest. This pessary has the advantage of not stretching the vagina, and the patient will scarcely fail to remove it every night, at which time astringents may be used. The bands should be made of india-rubber tubing, not of uncleanly webbing, as in the instruments commonly sold, and the pessary itself of vulcanite. Its lower end should be fixed in the centre of a square sheet of india-rubber of suitable width, to the corners of which the bands are attached, so that they may not cross the labia, but lie in the groove at each side. They will then not produce chafing. The stem may have a pelvic curve if preferred, but the straight instrument better corrects the tendency to retroversion by pushing the cervix backward. Pessaries of the same shape, made in red rubber, are sometimes useful when much tenderness is present, but their material is less cleanly, and they will scarcely resist a very powerful displacing force.

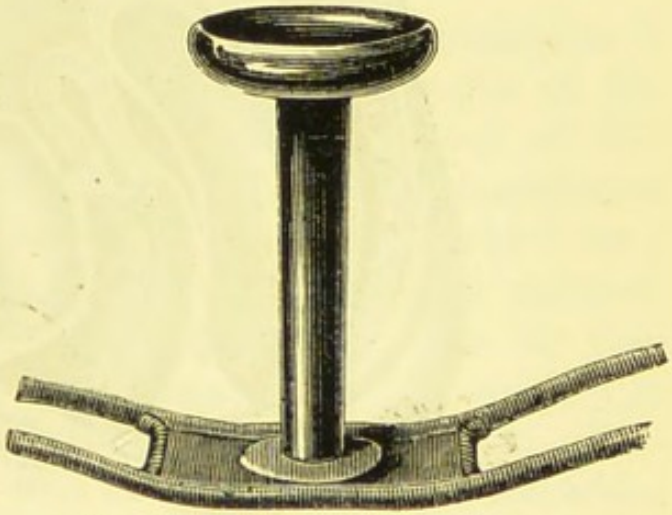


Fig. 69.—Cup and Stem Pessary.

As an alternative to the cup and stem pessary may be used the form of Cutter's pessary having a cup at its upper extremity to receive the cervix uteri. In this the stem curves backward over the perineum, and ends in a single band of india-rubber tubing, which passes backward and is attached to a belt (Fig. 70, p. 158). This instrument is praised by Thomas as the most perfect of all those resting upon external support, but

I have found it to be more liable to displacement and more apt to cause chafing than the cup and stem pessary adjusted in the manner described. The form of Cutter's pessary shown in Fig. 56 (p. 126) is preferable, as being more adapted to the natural shape of the vagina, if it will keep in place.

When a patient declines operative treatment, and objects to more effectual forms of pessary, some degree

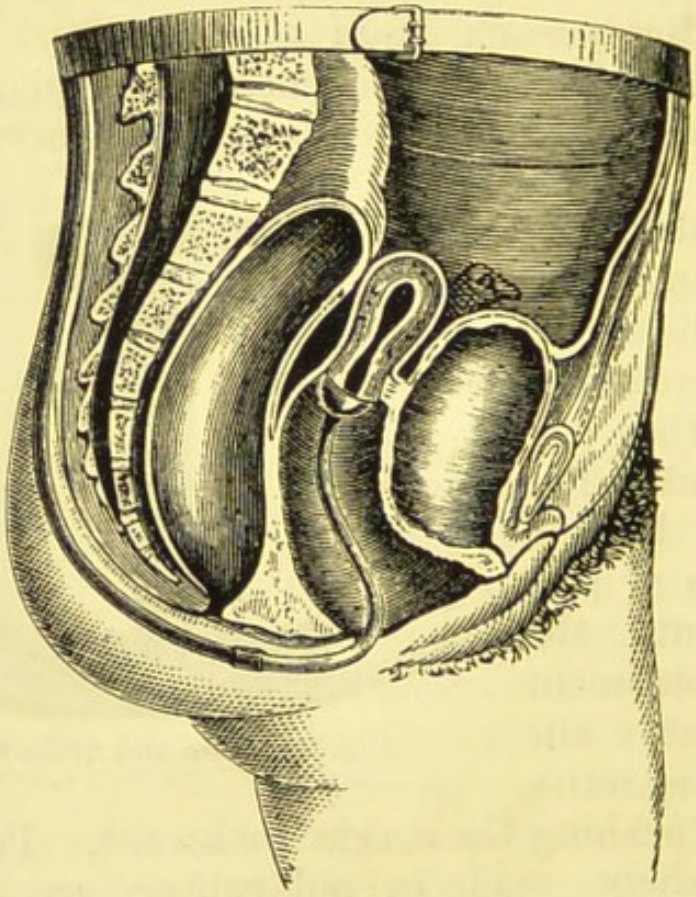


Fig. 70.—Cutter's Pessary for Prolapse, in position. (After Thomas.)

of comfort may often be attained by one of the utero-abdominal supporters which were formerly more used than at present. These consist of a belt combined with a padded metallic plate, fitted above the pubes or over the sacrum. A strap passing between the legs supports a perineal pad, which may succeed in keeping the uterus within the vulva, while the pressure of the plate tends to relieve sympathetic pains.

Operative Treatment.—If there is hypertrophic elongation of the vaginal portion of the cervix, the elongation is probably the primary cause of the prolapse, and the only satisfactory treatment is amputation. Again, if there is general enlargement of the uterus and broadening of the vaginal cervix, even without any notable lengthening, it is often useful to amputate the vaginal portion by the plastic method, bringing the mucous membrane over the stump by sutures. The alterative effect of the operation, and the rest in bed, cause a diminution of the uterus, which is afterwards more easily retained by a ring or other pessary. The operation is described under the head of hyperplasia of the cervix.

Since damage to the perineal body in parturition is generally the starting-point of the conversion of the vagina from a uterine support into a cause of displacement, the simplest operation for the restoration of that support is the repair of the perineum, which may be carried out without any need for quilled sutures. Care must be taken not merely to make a thin perineum, but to restore the triangular shape (in longitudinal section) of the perineal body. If effectually performed, this will at least render the retention of a lever or elastic ring pessary possible, although, by itself, it usually fails to effect a cure, since the new perineum dilates under the pressure of the descending uterus.

Operation for Restoration of the Perineum.—The cases of prolapse for which this operation is most suitable are those in which more or less destruction of the perineal body, as the result of parturition, is discovered, and in which the hypertrophy of the upper part of the vagina is not too extreme. The following is a convenient mode of performing the operation. The patient is placed in the lithotomy position. The need for assistants to support the thighs is avoided if "Clover's crutch" (Fig. 71, p. 160) is used. By this instrument the thighs, just above the knees, are fixed by circlet

straps at the end of an iron bar, the length of which can be regulated by aid of a screw which fixes it in any position. The thighs are then flexed to any required degree by means of a padded strap which passes from

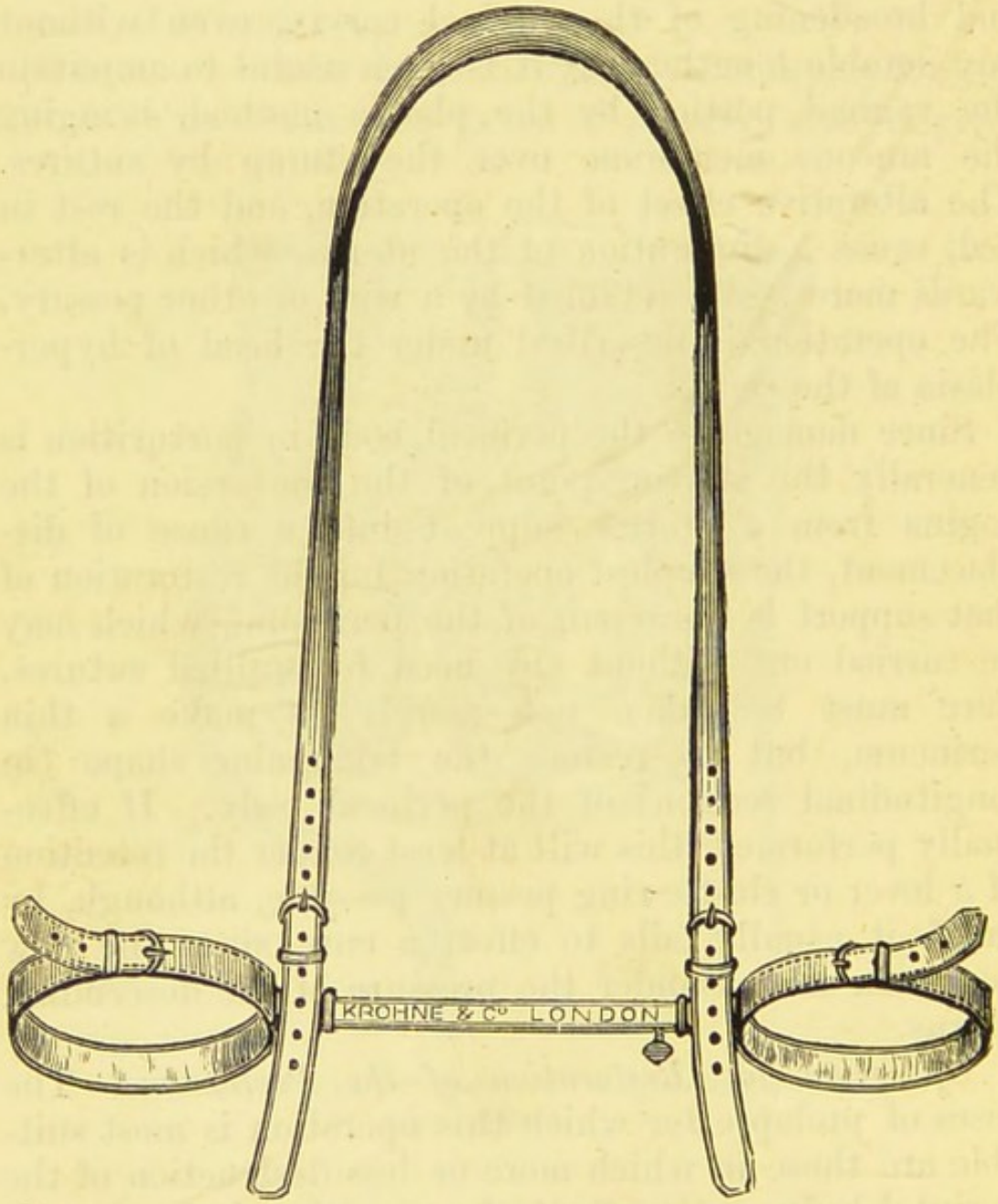


Fig. 71.—Clover's Crutch (the Inner Bar completely slid into the Outer).

one end of the bar round the neck, and is then attached to the other end. Thus the knees can be kept widely apart while the operation is performed, and brought closer together, by altering the screw, when the time arrives for tightening the sutures.

The extent of surface to be freshened is indicated, to some extent, by the cicatrix left by the rupture. It is well, however, to go a little beyond the limits of this in all directions, especially up the median line of the vagina and toward the lower halves of the labia

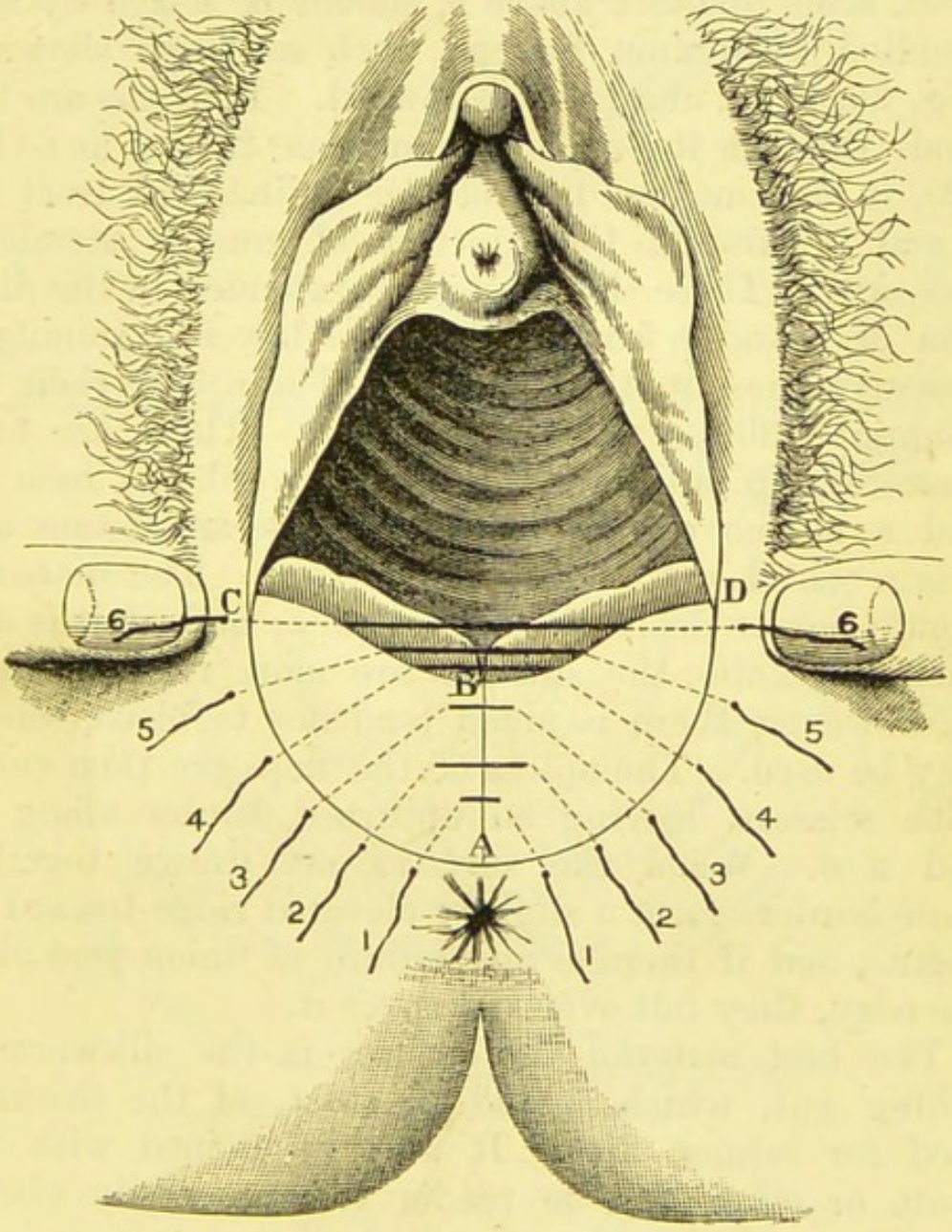


Fig. 72.—Operation for Restoration of Perineum.

majora, both in order to secure, if possible, a perineal body somewhat longer and deeper than the original one, and to allow some margin, in case the surfaces do not unite completely up to the edges. To put the mucous membrane on a stretch, an assistant at each

side places one or two fingers on the skin of the thigh and draws the vulva outwards (Fig. 72, p. 161). The skin just beneath A (Fig. 72), in front of the anus, may also be seized by a tenaculum and drawn downwards. If still the mucous membrane is not sufficiently on a stretch, from laxity of the vagina, the posterior vaginal wall, some distance above B, should be seized by long-handled tenaculum forceps, such as those shown in Fig. 20, p. 44, and pushed upward. Incisions are then made through the mucous membrane from B to A (Fig. 72), in the median line of the vagina, and from A to C and D through the junction of mucous membrane and skin. These should not be extended in the direction of C and D further than the lower extremity of the nymphæ at the utmost. There are then two triangular flaps, A B C and A B D. These are to be dissected up from the apex A toward the base B C and B D, the corner of the mucous membrane at A being seized with dissecting forceps. The dissection should not be deeper than necessary; and, if it is done with the knife, the surfaces are more ready to unite. If, however, there is much tendency to bleed, scissors may be used. The apices of the flaps are then cut off with scissors, leaving an upturned border along B C and B D. When the surfaces are drawn together, these borders form a slightly elevated ridge toward the vagina, and if there is any failure of union just along the edge, they fall over and cover it.

The best material for sutures is the silkworm or fishing gut, which should be stout, of the thickness used for salmon flies. It may be stained with magenta or other dye, to render it more easily visible. This has all the advantages of silver wire, as being non-absorbent, while, at the same time, it is easier to manipulate, and the exposed ends do not cause discomfort after the operation, like those of wire. The sutures are placed as shown in the figure. The most convenient needle is a slightly-curved one, not too thick, mounted in a handle. This is passed

in, unthreaded, rather close to the edge of skin, brought out on the raw surface, there threaded with one end of the suture, which is so drawn through. By passing the needle in the same way on the other side, the other end of the suture is drawn through. Another mode is to use a more curved needle and to

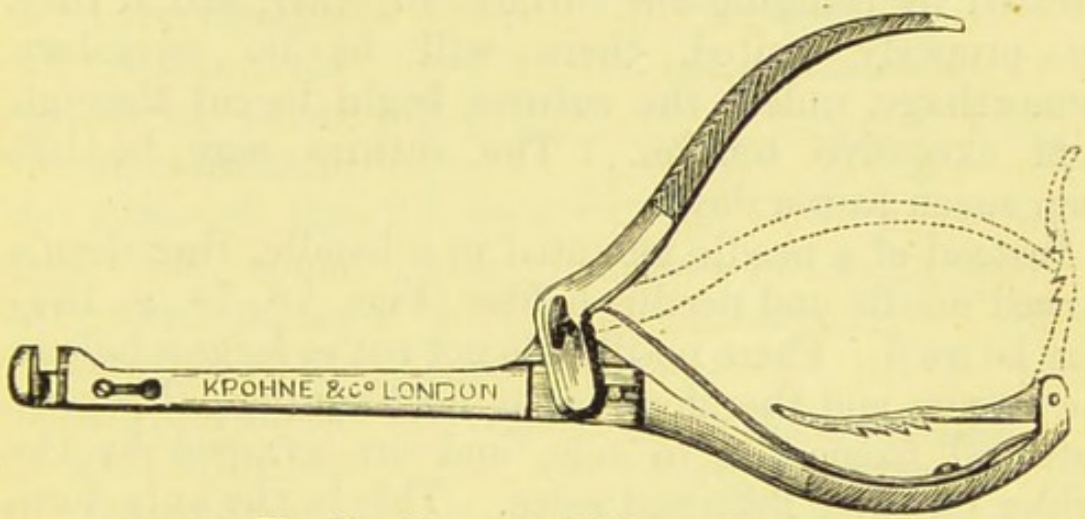


Fig. 73.—HAGEDORN'S Needle-Holder.

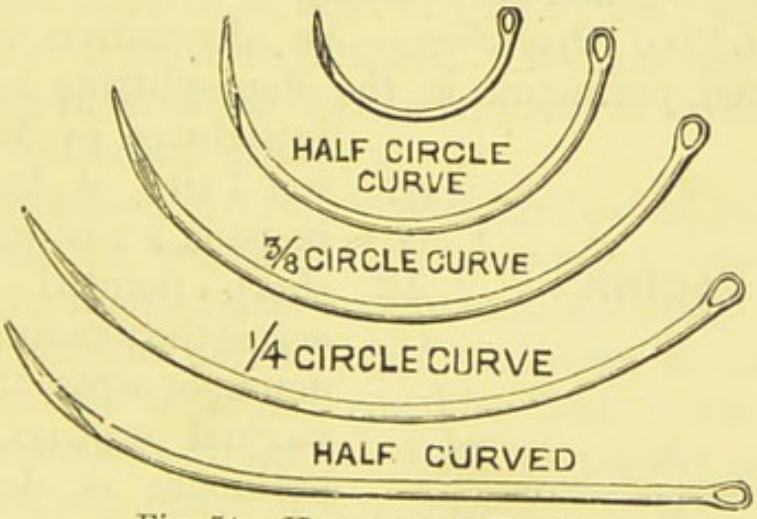


Fig. 74.—HAGEDORN'S Needles.

bury the sutures 1, 2, 3 in the tissues throughout their whole course. If, however, they are brought out in the centre for spaces alternately short and long, as shown in the figure, the surfaces are more easily brought into contact at all levels without undue tension. In passing sutures 4, 5, 6, the needle should be brought out precisely on the margin along which the borders of mucous membrane B C, B D are

turned up from the vagina, not passing through the mucous membrane itself. The sutures are then tied in the order of the numbers from 1 to 6, care being taken that the surfaces are brought just sufficiently into apposition, and that no clots or blood are left between them. The bleeding, if any continues, is arrested by bringing the surfaces together, and if they are properly united, there will be no secondary hæmorrhage, unless the sutures begin to cut through from excessive tension. The sutures may be left from seven to ten days.

Instead of a needle mounted in a handle, Hagedorn's curved needle and needle holder (Figs. 73, 74, p. 163) may be used. These needles do not cut so large a hole in the tissues, and therefore cause less bleeding. They are flattened from side to side, and are grasped by the holder on these flattened sides. This is the only form of holder which will hold a curved needle with absolute security against its twisting.

Flap-splitting Operation.—An alternative operation for ruptured perineum is the flap-splitting operation introduced by Mr. Lawson Tait. A transverse incision F F is made with sharp-pointed scissors across the remaining perineum, or across the recto-vaginal septum, if the perineum is destroyed, and carried about half an inch deep. Incisions nearly at right angles are made from the ends of this, in the lines F C, D E.

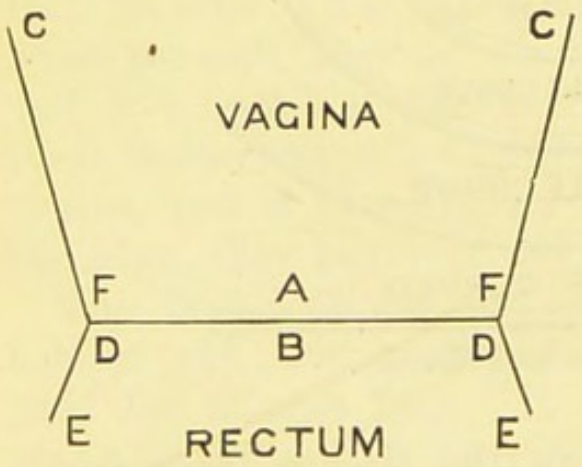


Fig. 75.—Flap-Splitting Operation. Incisions. (After LAWSON TAIT.)

The length F C is 1-in., F E $\frac{1}{3}$-in. Tenaculum hooks are then placed at the points F F, and drawn upward and outward. Two other tenaculum hooks are placed at the points D D, and drawn downward and outward. The raw surface is thus converted into the quadrangular

shape shown in Fig. 76, the angles of the quadrangle being the points F F, D D, in Fig. 75. The mode of placing the sutures is shown in Fig. 76. The points of insertion and exit are within the margins of skin, and the sutures are brought out across the middle, B C. Other operators include the edges of the skin, and some bury the sutures completely. The sides of the quadrilateral in Fig. 76 are thus brought together in a longitudinal line. The idea of the operation is that the line of tear, originally longitudinal, has healed in a transverse cicatrix. A transverse incision is therefore made along the cicatrix, but brought together into a longitudinal union.

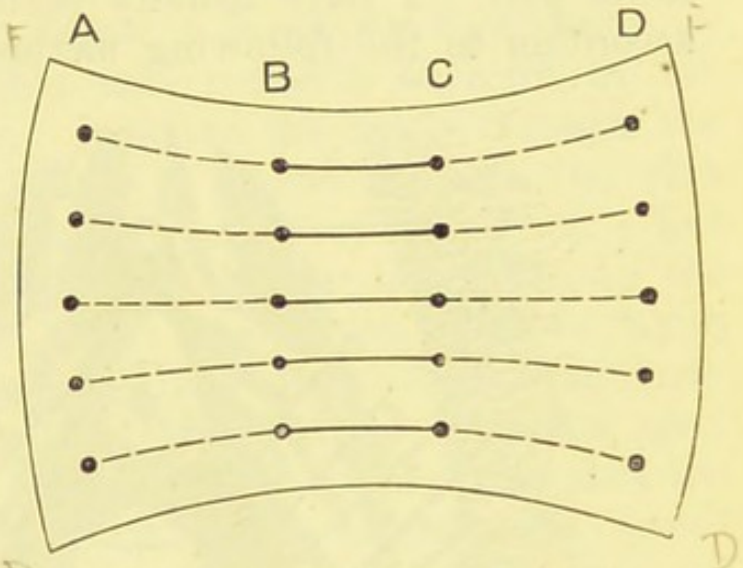


Fig. 76.—Flap-Splitting Operation. Mode of placing Sutures. (After LAWSON TAIT.)

This operation has the advantage that it removes no tissue, can be performed very rapidly, and is very effective in restoring the recto-vaginal septum. It does not, however, make so long a perineum as the paring operation, and I do not consider that it restores the original situation of the parts so completely as may be done with the latter operation by a skilful operator. For the cicatrix is generally not a transverse line, but a surface; and it is only by removal of the cicatricial surface that the original relations can be restored.

Operation of Posterior Colporrhaphy.—In those cases in which the vaginal wall has become very voluminous by hypertrophy, and those in which the prolapse does not appear to have been due to defect in the perineal body in the first instance, it is better to extend the operation, so as to make it one of posterior col-

porrhaphy, or narrowing of the posterior vaginal wall by suture. Some of the redundant mucous membrane is thus removed, and the vagina contracted in its lower part. I have usually performed this operation according to the following method, which is a modi-

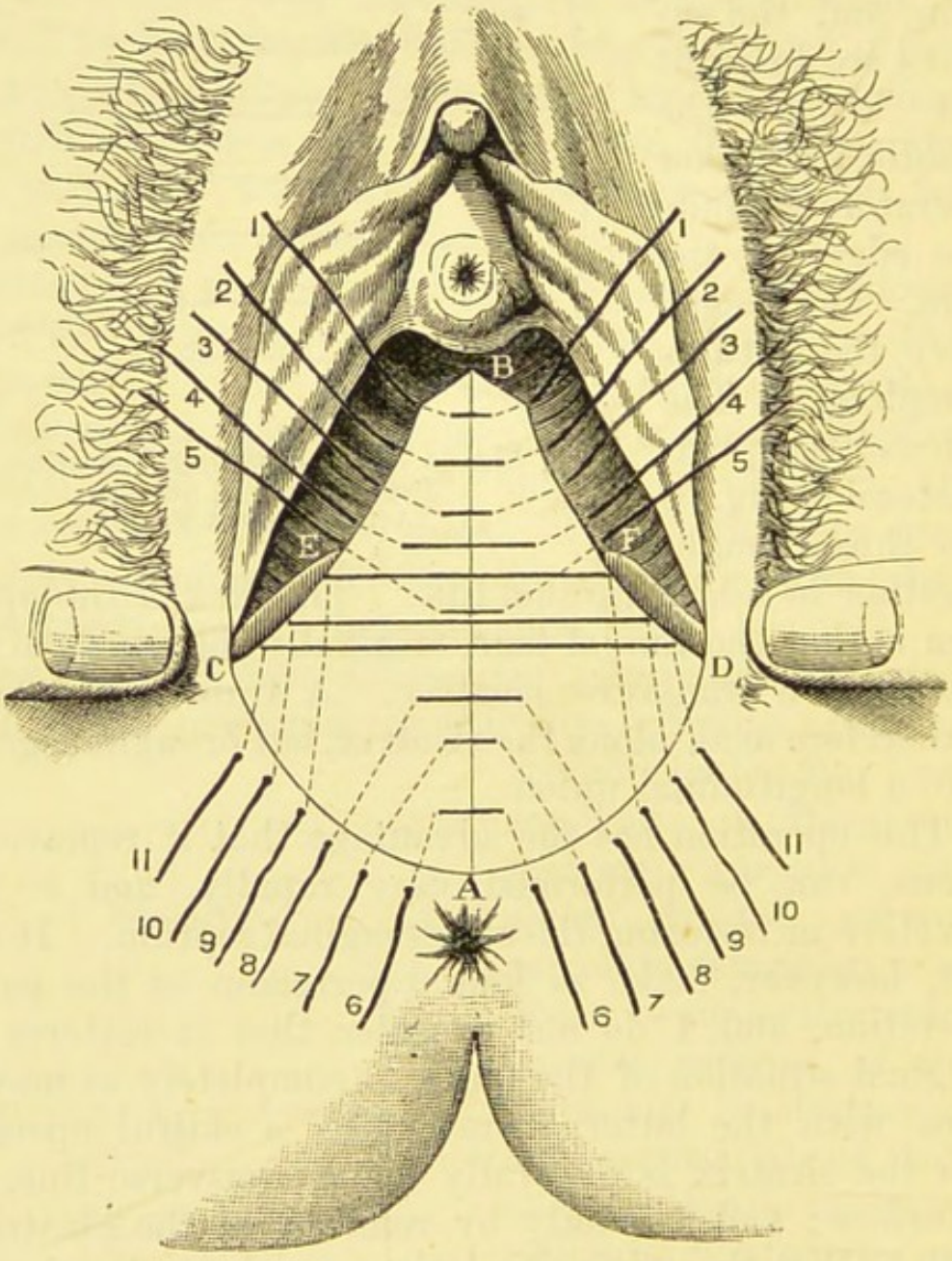


Fig. 77.—Operation of Posterior Colporrhaphy.

fication of that of Simon. If the vagina is not completely inverted posteriorly the mucous membrane is put on the stretch, as in the former case, by seizing it with long-handled tenaculum forceps above the point B (Fig. 77), and stretching it upward. If, however,

the inversion of the vagina is quite complete, the freshening may be done, if preferred, quite outside the vulva, by seizing the mucous membrane at the same point, and drawing it upward in front of the pubes. As before, the skin below A is drawn downward by a tenaculum, and that near C and D outward by the fingers of assistants. Incisions are made through the mucous membrane from B to A, and through the skin near its junction with mucous membrane from A to C and A to D; but the point B is now taken far up the vagina, so that the line A B is twice or three times as long as in the former instance. The irregularly triangular flaps are then dissected up from the apex A toward the bases B C and B D, in such a way that the freshened surface is left with a very obtuse angle toward B, as shown in the figure. In going far up the vagina it is better to use scissors, on account of the vascularity of the tissue. For the upper half of the surface, from B to E and B to F, the flaps are completely cut away; in the lower half, from E to C and F to D, a small upturned margin may be left, as in the former operation. The vaginal sutures (1 to 5) are best introduced by Hagedorn's needles and needle-holder. (*See* Figs. 73, 74, p. 163.) They are alternately superficial and deep, and are made to enter and emerge very near to the edge of mucous membrane, so that the mucous membrane is not turned in when they are tightened. The remaining sutures (6 to 11) are placed exactly in the same way as those in the simple operation for restoration of the perineum. The vagina is then replaced (if not replaced previously), and the sutures tightened and tied in the order of the numbers in the figure, from 1 to 11. Most care is required in making sure that the edges near E and F come into exact apposition. The greater the resistance to be overcome, the more numerous should be the sutures, that the tension on each may be diminished. By the plan of making the upper extremity of the freshened surface end by a very obtuse angle, as shown in Fig. 77, a sort of pouch is formed above the

cicatrix, in which the cervix may be retained, instead of gradually distending the contracted portion of the vagina.

In Simon's operation for posterior colporrhaphy, a fenestrated speculum is used—a modification of that of Sims. Through the fenestra the mucous membrane is freshened by scissors or knife over a surface $2\frac{1}{4}$ inches wide at the vaginal outlet, where the freshening is carried out upon the posterior halves of the labia majora, and extending the same distance into the vagina, narrowing slightly towards its further extremity, where it is completed by two incisions, meeting above at a very obtuse angle. The freshened surface thus forms a pentagon, and is similar to that shown in Fig. 77. Alternately deep and superficial sutures of silk are used in the vagina, and simple sutures for the perineal border. The operation of Hegar, which he calls *perineauxesis*, is very similar, except that, to freshen the mucous membrane, he draws it down externally by a tenaculum, that he uses silver sutures, and makes the freshened surface triangular.

Other operators have preferred to narrow the anterior vaginal wall, by removing a portion of mucous membrane near the cervix, an operation called *anterior colporrhaphy*. Marion Sims freshened by curved scissors, and brought together, by silver sutures, a V-shaped portion, the open arms of which, directed towards the cervix, are partly united by transverse portions, leaving a pouch of mucous membrane within. Emmet prefers to close the pouch by completing the transverse portion. Schroeder freshens the whole of an oval surface, and brings it together by alternately deep and superficial sutures. Some have proposed, in the case of old women, to close the vagina at its outlet, with the exception of a small aperture, by uniting the labia majora, or to close it completely at a higher level. Le Fort recommends that a longitudinal septum should be made by uniting the anterior with the posterior vaginal wall, so as to produce an artificially duplex vagina,

which he supposes not to interfere with coitus or parturition. The operation, however, is more suitable for the case of women past the menopause, and not living with a husband.

After any of these operations, except complete occlusion of the vagina, however perfect the result may appear to be at first, an entire relapse is apt to take place after a considerable interval. It appears preferable, therefore, not to aim at absolute cure by the operation alone, but rather at rendering it possible for a convenient vaginal pessary, of moderate size, to be used effectually. The operation indicated for this purpose is the easier and less serious one, namely, that of narrowing the vagina at its lower portion posteriorly by one of the methods already described, either simple restoration of the perineum, or posterior colporrhaphy, according to the condition of the vagina. This will always enable some form of lever or elastic ring pessary to be retained, and generally a Hodge's pessary, of sigmoid shape and moderate size. If the cervix be kept by this means at its normal level for several years, any hyperplasia of the uterus may at length be removed, and the ligaments so recover their tone, that the pessary may be permanently discarded without fear of a relapse. Such a plastic operation is generally to be recommended in the case of women not much beyond middle age, when there is so much deficiency of perineum or relaxation of vagina that none of the forms of lever or ring pessary proves efficient, in order to save them the inconvenience of wearing for many years external supports. When even a pessary supported externally fails to retain the prolapse, or cannot be borne after judicious preparatory treatment, an operation becomes the only tolerable alternative.

INVERSION OF THE UTERUS.

Pathological Anatomy.—Inversion of the uterus may exist in three stages: the first, when the fundus

is only partially invaginated and remains within the os; the second, when the fundus has passed through the os; the third, a stage very rarely attained, in which the whole of the cervix as well as the body is completely inverted, so that not even a groove remains between the inverted cervix and the vaginal vault. Fig. 78 shows the first stage of inversion commencing. Either of the two latter stages may be complicated by

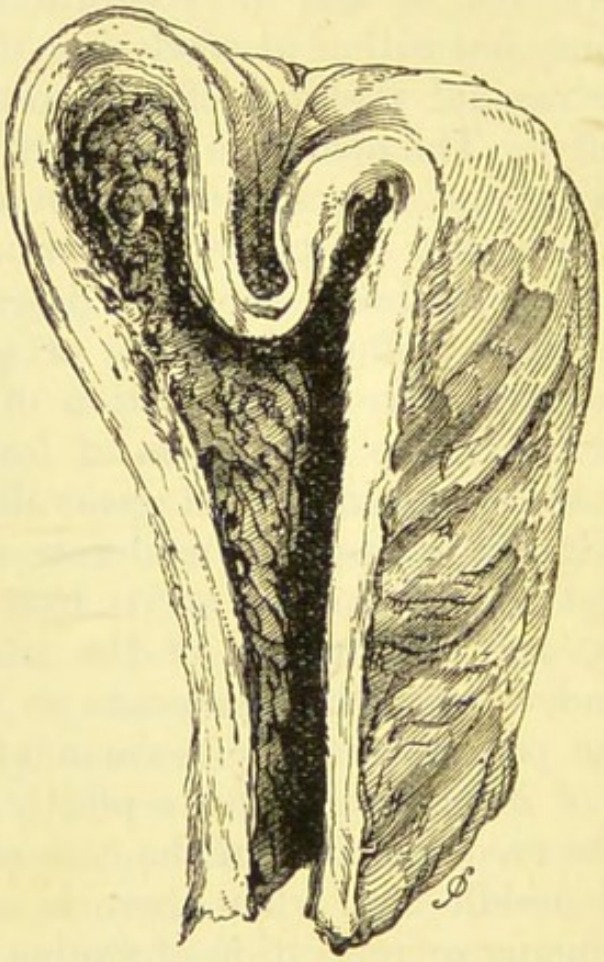


Fig. 78.—Commencing Inversion of Uterus.

extrusion of the inverted fundus outside the vulva. Acute inversion of the uterus belongs rather to midwifery, since it is generally the result of parturition. We have here to deal with the chronic stage, which may be regarded as reached, in cases occurring after delivery, when the process of involution is complete.

Causation.—The conditions necessary for the production of inversion are laxity of the uterine wall, and a force of traction or pressure applied to some part of the fundus. In the puerperal state, the force is gene-

rally that of traction applied through the funis to an attached placenta, pressure by the external hand on a relaxed uterus, or simply the weight of the relaxed and prominent placental site, with or without the placenta itself in addition. Apart from parturition, it chiefly arises through the traction of a submucous fibroid, or fibroid polypus. In either case the uterus, grasping the invaginated portion as a foreign body, is stimulated to contract, and so increase the inversion.

Results and Symptoms.—The immediate symptoms of inversion are usually severe shock and collapse, frequently accompanied by sudden and severe hæmorrhage. The uterus is felt like a foreign body in the vagina or outside the vulva, and excites expulsive efforts. In the chronic stage, menorrhagia or irregular hæmorrhage is usually a prominent symptom, and often calls imperatively for relief. The presence of the tumour gives rise to bearing down, with rectal and vesical tenesmus, and frequently it becomes difficult or impossible to retain it within the vagina. The uterine mucous membrane becomes inflamed from the irritation to which it is exposed in its unnatural situation, and thus arises muco-purulent leucorrhœa. If the tumour be protruded externally, ulceration is likely to be produced, and even sloughing may occur. Death may result from sloughing, from hæmorrhage, or from gradual exhaustion. In some cases adhesion arises between the peritoneal surfaces of the uterus, but this is very rarely found, even when the difficulty of reduction has been extreme. Inversion may sometimes persist for years with but slight symptoms, but this is usually found only in those instances in which, after the menopause, toleration has become established, and the structure of the uterine mucous membrane has been profoundly altered. In very rare cases spontaneous replacement has occurred, even after a long interval, and it is not uncommon to find reduction spontaneously completed after it has been commenced by art.

Diagnosis.—The tumour formed by the inverted

uterus will be found externally, or felt by the finger in the vagina. The most essential point in diagnosis is to distinguish between inversion of the uterus and polypus, as well as to discriminate the case in which a polypus or fibroid tumour has produced by traction a partial inversion. In the case of polypus, the fundus may be made out on bimanual examination, the finger being introduced into either vagina or rectum, while in inversion it is absent from its normal place. The readiest mode of distinction is the use of the sound, which in inversion is arrested at less than the normal length, when passed up between the base of the tumour and the os, but in the case of polypus passes to the full length, or generally to a greater distance. In rare cases the surface of a polypus may become adherent to the edge of the os at all points, but the sound can almost always be forced through at some part, without excessive pressure. The surface of the inverted uterus, unless modified by long exposure, is highly injected, velvety, and readily bleeds. It is also distinguished from a polypus by being painful, and sensitive to acupuncture, or the tightening of a ligature or écraseur wire. A crucial test is to pass a female sound into the bladder with the point directed backward. If a finger be introduced into the rectum, the point of the sound can then, in the case of inversion, be felt above the os, with only the walls of rectum and bladder intervening, at the point which would otherwise be occupied by the body of the uterus, and just above the point of junction of the diverging utero-sacral ligaments, which can readily be felt from the rectum. In some cases the funnel-shaped depression formed by the inversion can be felt from the rectum.

Treatment.—In recent cases arising independently of parturition, as well as in those resulting from labour, reduction may be effected by taxis. The patient should be placed under an anæsthetic, and the hand passed into the vagina, so as to compress the tumour, and make steady and prolonged pressure

upwards in the direction of the pelvic axis, while the other hand makes counter-pressure upon the abdomen. The effort should be to return first the part last inverted, not to indent the fundus, the effect of which would be to double the thickness of uterine wall to be passed through the constriction. If the inversion is chronic, there is considerable risk of producing laceration by attempting to reduce it immediately by forcible taxis, and it is preferable to commence by the method of prolonged elastic pressure. The best repositor is that of Dr. Aveling (Fig. 79), the stem of which has a compensating perineal as well as a pelvic curve, so that pressure can be made accurately in the axis of the uterus, even when that organ is pushed up to the level of the pelvic brim.

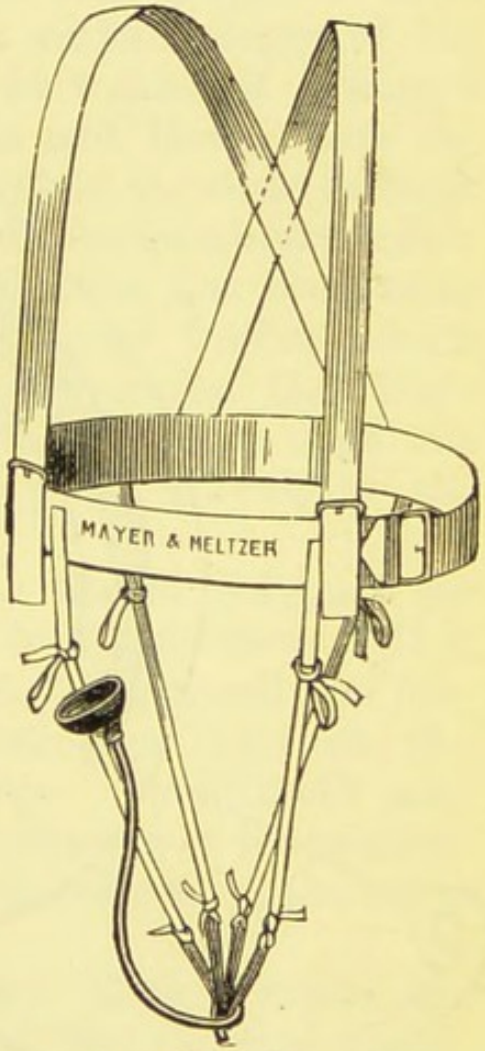


Fig. 79.
AVELING'S Repositor for Inversion of Uterus.

The repositor should be fitted with at least two terminals of different sizes, to be screwed on to its upper extremity: first, a cup-shaped disc large enough to receive the inverted fundus, for use in the earlier stage of reduction; secondly, a smaller cup, which may pass through the os, when the fundus has been once reduced inside it, and so complete the restoration. I have had the instrument modified by making the smaller terminal in the form of a cylinder, cupped at the end (Fig. 80, p. 174), since the disc mounted on a small stem is apt, when reduction is complete, to be retained within the internal os, and to cause some difficulty in removal. One improvement on the instrument as com-

monly sold is readily carried out, namely, to perforate the small cup with holes. If this is not done, the difficulty of withdrawing the instrument, after the inversion is reduced, is increased by the pressure of the air. To the lower end of the repositor are fixed four elastic bands, to be attached before and behind to

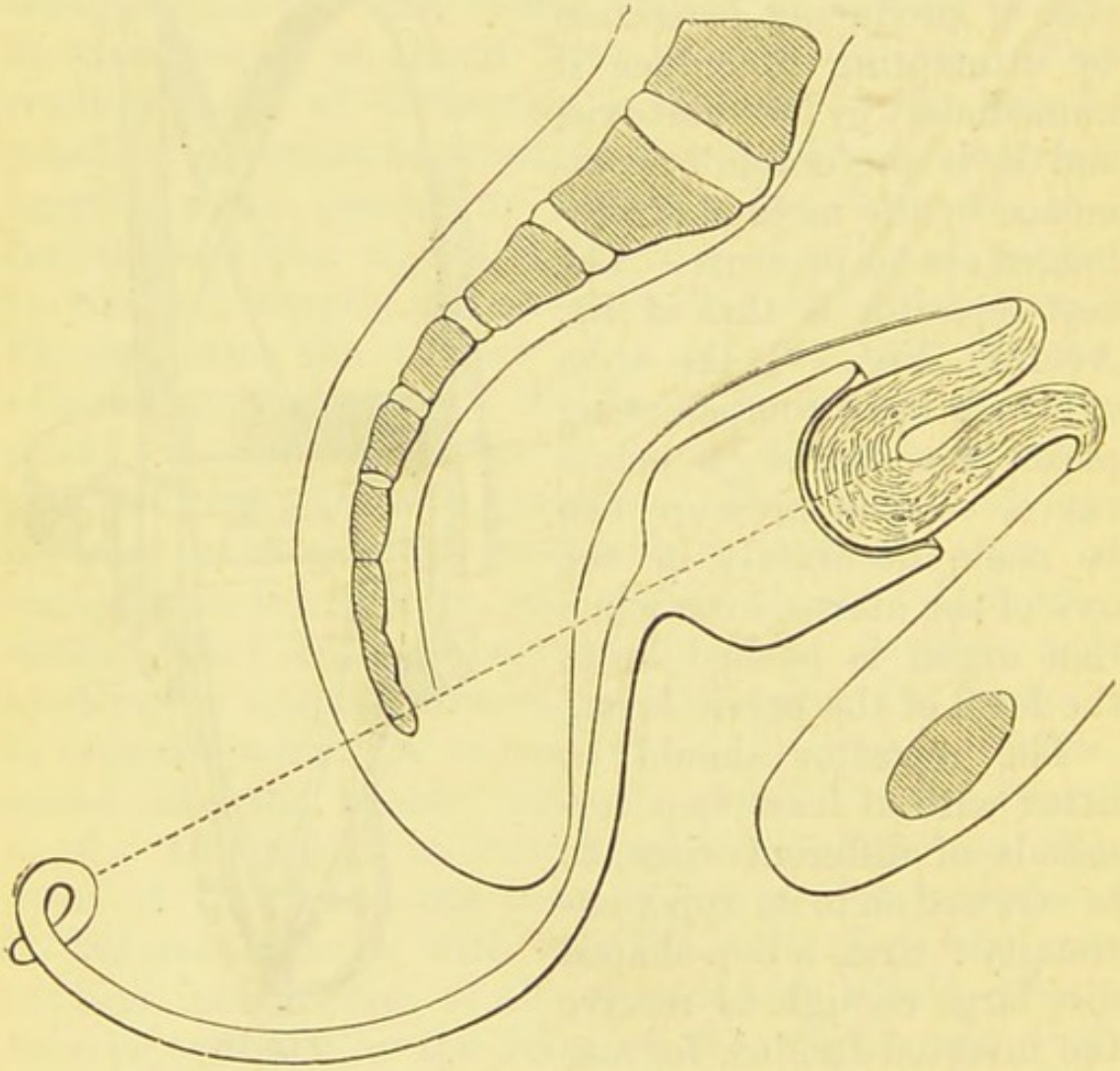


Fig. 80.—Modified AVELING'S Repositor for Inversion of Uterus Adjusted.

a waist-belt, supported by braces passing over the shoulders (Fig. 79, p. 173). By the adjustment of these the direction and force of pressure may be regulated. The patient should remain in bed, and morphia injections should be given, if necessary, to enable the pressure to be tolerated. Every few hours, the bands should be loosened, in order to observe the progress

made. As soon as the fundus is reduced to the level of the external os, the large cup should be replaced by the small one. I have not yet found this repositor fail to effect reduction within from twenty-four to forty-eight hours, even when the inversion was of several years' standing.

The following expedients have been adopted to meet difficulties which may occur at various stages of the reduction, but are not likely to be wanted if Aveling's repositor be used. Marion Sims and Barnes have recommended making two longitudinal incisions through the muscular fibres under the mucous membrane before applying taxis. When the reduction has been more than half completed, but the actual fundus resists restoration, Noeggerath has recommended that taxis should be made by pressure with one finger upon one horn of the uterus, about the point of exit of the Fallopian tube.

If the inversion is due to a fibroid polypus, the polypus should first be removed by the écraseur. If it is due to a submucous fibroid, it will generally be possible to find the line of demarcation between the tumour and the inverted fundus. The fibroid may then be removed, either by the écraseur or by enucleation, and the inversion afterwards reduced in the usual way.

If all means of reduction fail, there remains the extreme resort of amputation of the inverted organ. In future this will rarely be justifiable, and reduction will probably always be possible except in the very exceptional cases of firm adhesion between the peritoneal surfaces, in which case the risk in amputation is greatly lessened. Amputation should be performed by the galvanic écraseur, or, failing this, by the ordinary wire écraseur, an actual cautery being at hand to restrain hæmorrhage, if required. The tumour should first be drawn down, and a strong ligature passed through it above the line of amputation, in order to secure full command of the stump.

Dr. Thomas has boldly carried out the plan of opening the abdomen, in order to dilate the constricted cervix from above, and so effect reduction. Of two patients so treated, one died and the other had a narrow escape of death. The method thus appears at present to be too dangerous for imitation.

CHAPTER VI.

HYPERPLASIA AND ATROPHY OF THE UTERUS.

SUBINVOLUTION, HYPERTROPHY, AND HYPERPLASIA OF THE UTERUS.

Causation.—Of all organs of the body, the uterus is that the tissue of which responds most readily by change of nutrition to any alteration in its vascular supply, or to any form of stimulus whatever. This quality is necessary to render it capable of growing during pregnancy from a weight of about 1¼ to one of about 28 ounces, and of being restored almost to its original size during about six weeks after delivery. Moreover, during the years of active sexual life it is never at rest, even apart from pregnancy, and its mucous membrane passes through alternations of growth, swelling, and exfoliation in each menstrual cycle, accompanied by corresponding changes in the vascular conditions of the whole organ. Modifications in these changes are apt to be associated with hypertrophy, degeneration, or atrophy of its tissue.

Like any other hollow muscular organ, the uterus undergoes hypertrophy if any obstacle exists to the expulsion of its contents. Enlargement may thus be produced by stenosis or flexion, if either of these conditions produces actual obstruction to the canal. The most frequent cause, however, of enlargement of the uterus is subinvolution, or a failure to undergo a sufficient reduction in size after delivery or abortion.

For the proper performance of involution two conditions are necessary: first, a suitable diminution of the quantity of blood in the uterine vessels and of the blood-stream through them; secondly, a sufficient activity in the process of absorption and nutrition. The former is largely dependent both upon the periodical contraction of the uterus and upon the tone of its muscle during the intervals of rhythmic contraction. Subinvolution is thus promoted by muscular atony, and also by a failure to perform the function of lactation, since the suckling of the child, by reflex action, stimulates the uterus to contract. Other important causes of active hyperæmia and consequent subinvolution are retention of a portion of placenta, membrane, or clots, and inflammatory conditions of the cervix or body of the uterus or of neighbouring tissue, the commonest of these being the effects of mechanical injury to the cervix during labour. A too early return to the upright posture, to muscular exertion, or to marital intercourse has the same effect. On the other hand, a too prolonged and absolute maintenance of the dorsal position tends to passive hyperæmia, and so renders involution imperfect. An important cause of passive hyperæmia is the partial prolapse or other displacement which often arises after parturition, especially in consequence of a too early getting-up. Any local or general cause of venous obstruction tends to the same effect.

After abortion, subinvolution is still more frequent than after delivery—first, because the uterine mucous membrane, not being naturally prepared for the separation of the decidua, and in many cases having been previously diseased, is more apt to be left in an abnormal condition, or with a portion of placenta still adhering; secondly, because the stimulus of lactation is wanting; and, thirdly, because women, underestimating the importance of abortion, are more apt to neglect the precaution of resting for a sufficient time, and to return too soon to matrimonial intercourse.

After either delivery or abortion, deficiency of absorption may arise from constitutional debility or malnutrition.

Apart from pregnancy, the main cause of uterine enlargement is active or arterial hyperæmia, either reflex or associated with inflammation; but passive or venous hyperæmia also tends to cause the tissue to become infiltrated with serum, and, eventually, to produce overgrowth with degeneration. The causes of active and passive hyperæmia will be considered hereafter (*see* pp. 193, 200).

Pathological Anatomy.—In enlargement of the uterus, the result solely of obstructed outflow, the pathological condition is that of hypertrophy of the whole organ, but more especially of the muscular fibres. The muscular structure may also be hypertrophied equally with the cellular tissue in the earlier stages of a subinvolution which has arisen without the existence of any metritis, either as a cause or complication. In the great majority of cases, however, of subinvolution and other forms of enlargement, microscopic examination shows an undue proportion of fibrous tissue compared with muscular fibre. This leads at length to an induration of the tissue, which, in the early stage, was softer than normal from infiltration with serum. In the cervix especially this induration is manifest to the finger, and may lead to an erroneous diagnosis of scirrhous cancer, an error which formerly was probably often made. As might be expected from the well-known tendency of chronic inflammation to lead to induration by the production of fibrous tissue, this relative increase of cellular, as compared with muscular, elements is greatest when chronic metritis, whether of body or cervix of the uterus, is the cause of enlargement, and, in mixed cases, it is more marked in proportion to the preponderance of the inflammatory element. It may, however, be a degenerative change under the influence of venous stagnation, or due to constitutional causes of degeneration of tissue. The

anatomical state finally reached, which has been variously called areolar hyperplasia, sclerosis of the uterus, or congestive hypertrophy, may thus be brought about by different causes—either by a chronic inflammatory process, or by conditions in which there is no proof of inflammation as commonly defined. Whichever name be chosen, therefore, should be reserved for the result produced, and not applied to the process leading up to it. The increase in thickness of the uterine walls is commonly greater in proportion than that of the length of its cavity, so that, apart from cases of descent and tensile elongation of the cervix, the organ assumes a more globular form, The cavity of the uterus, as measured by the sound, is usually not longer than 3½-in. or 4-in., though sometimes it is increased to as much as 5-in., or even more.

Varieties.—In most cases the hyperplasia affects both the body and neck of the uterus, though it commonly preponderates in one or other of these, and may be confined to one portion alone. Among special forms of hyperplasia is hypertrophic elongation of the supra-vaginal cervix. This is generally due in the main to the tension of the vaginal wall, or prolapsed cervix, associated or not with causes of hyperplasia either primary or consequent upon the prolapse, and it has been discussed under the head of prolapse of the uterus and vagina. Another form is hyperplastic elongation of the vaginal portion of the cervix, to be distinguished from hyperplasia affecting the cervix in its breadth, or in all its dimensions (Fig. 81). This is a comparatively rare affection, and is more usually found in virgins or nulliparous women, being apparently in some measure a congenital condition. It generally leads to prolapse of the first or second degree; the prolapsed cervix then becomes congested or inflamed, and the hyperplasia is thereby increased.

Results and Symptoms.—Enlargement of the uterus is a very common cause of displacement, especially of prolapse, retroversion, or retroflexion, in consequence

of the increase of weight, and the softness of tissue which generally exists in the early stage. Uncomplicated hyperplasia, especially when recent, is liable to cause dragging pain in the back, hypogastrium, and loins, from the greater strain upon the ligaments. Increase of surface in the uterine cavity naturally leads to an augmented menstrual flow, except in the late stages of hyperplasia, when the tissue is degenerated and anæmic. In the early stage of subinvolution after

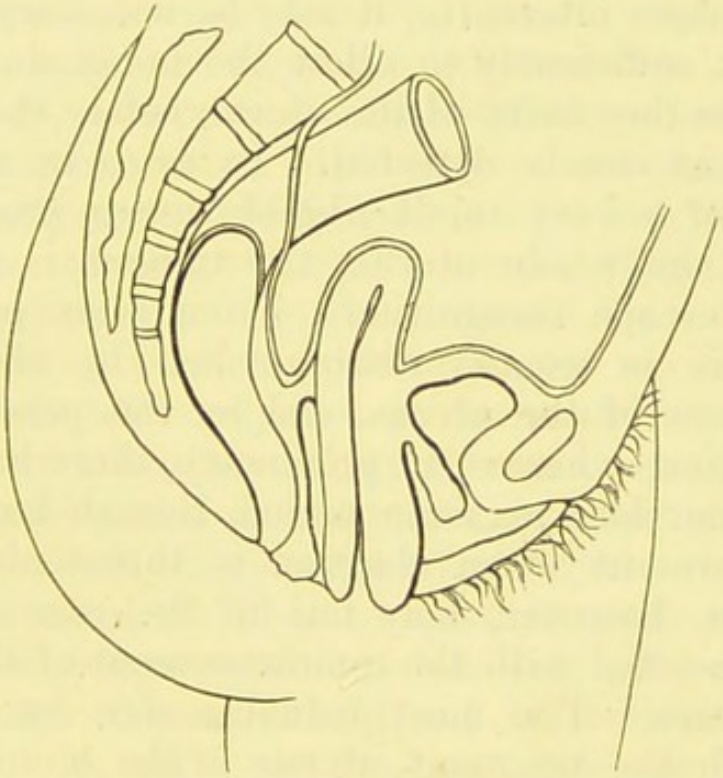


Fig. 81.—Hypertrophy of Vaginal Cervix.

delivery there is generally sufficient associated hyperæmia to lead to the recurrence of menstruation at an early period, notwithstanding the opposing influence of lactation. The remaining symptoms of hyperplasia are due, for the most part, to the hyperæmia, endometritis, metritis, or displacement, with one or more of which it is almost always associated.

Diagnosis.—Hyperplasia of the cervix is readily detected by vaginal touch, and its stage is indicated by the hardness or softness of the tissue. The differential diagnosis from cancerous degeneration is de-

scribed under the head of cancer. In hyperplasia of the body of the uterus, the enlargement is detected by the bimanual examination, and the thickening of the wall is generally found to be greater than the increase in length. The length of the cavity is revealed by the sound, if its use is not contra-indicated. The most difficult point in diagnosis is to distinguish between simple hyperplasia and enlargement due to a fibroid tumour. In the latter case, the external surface of the uterus is often felt to be irregular. If, however, the tumour bulges internally, it may be necessary to dilate the cervix sufficiently to allow the index finger to be passed into the cavity of the uterus before the unequal enlargement can be detected. In cases in which the presence of a very small fibroid causes great hyperplasia of the whole uterus, the tumour is especially liable to escape recognition. From early pregnancy, hyperplasia is usually distinguished by the greater sensitiveness of the uterus, and by the persistence of menstruation, whereas, in pregnancy, there has usually been amenorrhœa at some period, though hæmorrhage may be present when abortion is threatening. This distinction, however, may fail in the case of hyperplasia associated with the commencement of climacteric irregularities. The most valuable sign by which to distinguish the pregnant uterus is the more globular enlargement of its body as felt bimanually, and its greater softness and indistinctness, due to the chiefly fluid nature of its contents. Variation in the consistence of the uterus, due to the alternation of contraction and relaxation, may often be detected early in pregnancy, and is a very valuable sign if it exists, since it is far more marked in pregnancy than in any other uterine enlargement. In molar pregnancy, however, the uterus may never be soft or flaccid. Softening of the cervix is an important sign, if present, but it is often absent in the early stage of pregnancy in a multipara.

Hypertrophy of the *vaginal* cervix, causing the

cervix to protrude externally, is distinguished from prolapse, with or without hypertrophy of the *supra-vaginal* cervix, by the condition of the vaginal fornices. In the former the fornices are not depressed, or only slightly depressed in consequence of accompanying descent. In the latter they are depressed to a marked degree.

Treatment.—(1) *Prophylactic.*—The most important part of prophylactic treatment consists in the judicious management of the puerperal state and of abortion, in which should be included the utmost care to avoid causes of septic or traumatic inflammation. Rest for a due period, mainly in the horizontal position, should be observed, but a too continuous maintenance of the dorsal position, especially on a soft bed, should be avoided, as tending to cause venous stagnation and retain discharges. The child should be suckled, if possible, for at least from four to six weeks, even if the mother's milk requires to be supplemented. It would be of advantage if, in all cases, at the end of the puerperal period an examination could be made to ascertain that no displacement had arisen, or lesion of cervix remained. Whenever sanguineous or muco-purulent discharge continues too long after delivery, such an examination should not be omitted. After abortion in the early months, rest, more or less complete, and abstinence from coitus for as much as four weeks should be enjoined. After miscarriages between the third and sixth months, much more prolonged rest and care are usually called for than after normal delivery at full term. It is also of essential importance in the immediate treatment of abortion to secure the complete evacuation of the uterus. After abortion, and also in the case of failure of lactation after delivery, it is desirable to administer a course of ergot for several weeks to promote uterine contraction.

(2) *Curative.*—In the earlier stages of hyperplasia a cure may result from the removal of its cause. Thus, in cases of subinvolution within a few months

after delivery, great good is effected by remedying displacement, by curing cervical inflammation—one of the commonest causes which interfere with the normal process of involution—and by treating hyperæmia by suitable means. It is also of importance to remedy any constitutional debility or anæmia, which often accompanies lactation, and by which the activity of absorption may be impaired. For this purpose the most valuable drugs are iron, quinine, and strychnia.

In the case of enlargement of the uterus associated with hæmorrhage within a few months after abortion, the choice of treatment depends upon the question whether the subinvolution and hæmorrhage are common results of a piece of placenta remaining attached within the uterus. This will generally be found to be the case if the hæmorrhage has proved so severe as to produce marked anæmia; and the probability is increased if the cervix is found to remain unduly open. In some cases even the internal os may remain so much open as to admit the finger and allow it to detect the foreign body within. If it does not fully admit the finger, it should first be dilated either by mechanical dilators (*see* p. 62) or tents. For evacuating the uterus the finger is the best instrument. The necessity for giving an anæsthetic will depend upon the capacity of the vagina and the toleration of the patient. It is essential that the bladder should be completely emptied, for this allows the fundus to be brought much more easily under command of the external hand. The patient being in the dorsal position, the index finger alone is to be passed into the uterus, while the half hand is introduced, if necessary, into the vagina, the remaining four fingers being flexed upon the palm. The other hand is placed upon the abdomen, and its ulnar edge pressed in above the fundus so as to bring it close to the pubes. The uterus can then be pressed down so that, unless the uterine cavity is excessively lengthened, the finger can reach completely up to the fundus, without the necessity of passing the whole

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hand into the vagina; and very frequently this can be accomplished without passing more than one finger into the vagina, especially if an anæsthetic be given. If the uterus is at all retroverted, the finger, introduced into the cervix, may conveniently be used as a repositor, to bring it into a position of slight anteversion. It is very rarely that any other instrument than the finger is required. In some cases, however, a pair of forceps with flat serrated blades locking closely together may be useful to remove a piece of tissue which has been wholly or partially detached. Without an anæsthetic, in cases in which the abdominal muscles are at all rigid, there may be a difficulty in getting the uterus into the requisite position of moderate anteversion. Assistance may then be derived from the tenaculum forceps shown in Fig. 20, p. 44. The forceps are fixed into the anterior lip, the uterus drawn down sufficiently to allow the finger to penetrate well into the cervical canal, and the handles are then given to an assistant to hold, while the external hand obtains command of the fundus. If, however, an offensive discharge is present, it is better to avoid the puncturing of the cervix involved in this method. After the operation, full doses of ergot should be administered for a time, and complete rest enjoined. Antiseptic vaginal injections should be used, and, if any offensive discharge should appear, or febrile symptoms arise, the uterus itself should be syringed out with a weak solution of perchloride of mercury (1 in 3,000), carbolic acid, or iodine.

When the cervix is closed, and the hæmorrhage not serious in quantity, there is a probability that the case may be one of simple subinvolution. The effect of treatment by rest and the administration of ergot and other uterine styptics should then first be tried. If hæmorrhage cannot be permanently checked by this means, the cervix should be dilated for exploration of the uterine cavity.

In the case of hæmorrhage persisting after delivery

at full term, the treatment should be conducted on the same principles. The retention of some portion of placenta, membranes, or clot must be regarded as a not improbable contingency, even though it may have appeared certain that the placenta and membranes came away intact.

In the earlier stages of hyperplasia, wholly or partially resulting from inflammation, absorbent remedies may be tried in the manner described under the heading of chronic endometritis and metritis. The later stage of fibroid induration is little susceptible to treatment, and is scarcely, if at all, affected by absorbents such as mercury or iodide of potassium. A degree of tolerable comfort may, however, frequently be obtained by treating the coincident hyperæmia, or displacement, though a tendency to relapse commonly remains. It is only in exceptional cases, and after fair trial of such means, that it is desirable to have recourse to the more surgical modes of treatment to be hereafter mentioned. The most powerful of all influences in diminishing the size of the uterus is the involution after delivery, during which even fibroid tumours may sometimes disappear. All means should therefore be taken (by curing any other morbid condition which may be discovered, more especially endometritis) for removing the sterility which commonly accompanies the late stage of hyperplasia.

A process somewhat analogous to involution may also be induced by the more powerful local remedies sometimes used for endometritis, such as strong carbolic or nitric acid, introduced into the uterine cavity, and their occasional beneficial influence on the size of the uterus may be thus in part explained. A transient inflammatory hyperæmia is set up, on the subsidence of which the blood supply is contracted, and absorption becomes more active. A similar effect may result from local applications to the cervix, and thus hyperplasia associated with erosion of the cervix is sometimes more amenable to treatment than when

erosion is absent. When there is no erosion a beneficial effect may sometimes be produced by making an artificial eschar upon the cervix either by heat or by caustics. This acts most upon the cervix itself, but the body of the uterus also partakes in the nutritive changes set up.

For the application of heat, Paquelin's benzoline cautery is the most convenient means, but the galvanic cautery, or cautery irons, of the size of a small button, may also be used. It is best to employ a speculum of wood or horn for this operation, but a large cylindrical metal speculum may be used, if care be taken that it does not become overheated. The application should be made to the outer part of the cervix, to avoid subsequent contraction of the cervical canal. The potential cautery has the convenience that it does not require the presence of an assistant. The best, in most cases, is the potassa fusa cum calce. This is less superficial than nitric or chromic acid, while its action is more easily limited than that of potassa fusa or chloride of zinc. The cervix should be brought completely into the field of a cylindrical speculum, and wiped dry. A dossil of cotton-wool, soaked in vinegar and squeezed nearly dry, should be tucked beneath the cervix at the lower part of the speculum. A stick of the potassa fusa cum calce* is then fixed in a long caustic holder, and rubbed several times, for not more than a minute at each application, over a surface about the size of a sixpence on one or both lips of the cervix, away from the cervical canal. A larger tampon, soaked in vinegar, should then be applied.

Potassa fusa causes a deeper destruction of tissue, and should be used with much caution, if employed, since a too vigorous application may cause serious inflammation. It is also more liable to run on to the vaginal walls. Chloride of zinc, made into sticks, is also sometimes used to cauterize the cervix. It is a powerful and rather painful form of caustic. In its

* Potassa fusa cum calce may be made in the form of a stick by melting caustic potash with an equal part of quick-lime.

use the vagina must be protected by an alkaline solution. A second, or subsequent, repetition of the cauterization may be called for if the first has only a superficial effect. Such a prolonged treatment is specially applicable to the case of a localized induration of one lip of the cervix. When hyperplasia affects the vaginal cervix, as well as the rest of the uterus, and increases it in length as well as breadth, an efficacious treatment, in extreme cases, is to amputate a portion, either by the plastic method of Marion Sims (*see* pp. 189, 190), which is the best method, or by the galvanic écraseur, by which means not only is superficial tissue removed, but the alterative influence of the cautery is brought to bear upon the whole uterus. In the absence of the galvanic cautery, the cervix may be cut through with scissors, the actual cautery being used to stop bleeding, if necessary. After amputation of tissue or the application of cautery or caustic by any of these methods, the patient should be kept in bed for at least a week, and tampons soaked in half an ounce or more of glycerine kept applied to the cervix. Discharge is thereby promoted, and the influence of the local inflammation and reparative action on the nutrition of the whole organ is increased.

Treatment of Hyperplasia of the Vaginal Cervix.— Elongation of the vaginal, unlike that of the supravaginal cervix, is commonly, in the main, a primary affection, the cause rather than the consequence of prolapse, and hence the only satisfactory treatment is the removal of the redundant portion. The only difficulty of the operation is that of dealing with the hæmorrhage, which is apt to be considerable, especially when the tissue is soft, while the arteries cannot easily be secured by ligature or torsion. The easiest and quickest mode of amputation is that by the galvanic écraseur. To avoid the risk of opening the bladder or peritoneal cavity, the sound should be passed into the bladder to ascertain the exact limit to which it extends,

and the uterus, if prolapsed, should be returned to its place before the wire is adjusted. The stem of the écraseur is then carried up in front of the cervix, and the loop adjusted by the finger passed up into the posterior cul-de-sac, without the use of a speculum. To secure arrest of hæmorrhage, the wire must be tightened slowly. After removal of the vaginal portion, a sound should be passed into the cervical canal, to make sure that its lips are not glued together, and a large bougie should be passed at intervals for some time after the operation, to counteract the gradual contraction which is apt to occur after the use of the cautery.

In the absence of the galvanic cautery, the ordinary écraseur (Fig. 113) may be employed, but in its use there is a greater risk of lacerating bladder or peritoneum, in consequence of the extreme tension produced when the tissues are tough. It is a good plan to make an incision with the knife or scissors through the mucous membrane around the cervix at the level at which the wire is to be adjusted. A single steel wire should be used, as in the case of removal by écraseur of a fibroid tumour with thick base (*see section on Fibroid Tumours*).

The cervix may also be amputated by knife or scissors, and the hæmorrhage checked by actual cautery, or by the plan introduced by Marion Sims, namely, to unite the mucous membrane over the stump by sutures, and so arrest the bleeding by pressure. By this the advantage is gained that primary union may be procured, and the patient is then saved from the necessity of protracted suppuration and cicatrization of the stump. The resulting cervix is therefore more nearly of a normal character, and gradual contraction of the cervical canal does not occur. The operation may be carried out with the uterus in place, by means of Sims' speculum, but it is then rather tedious and troublesome. When the cervix can be drawn down externally without much force, as is generally the case under these circumstances, it is a very easy one. I have usually

performed it in the following manner:—The cervix having been drawn outside the vulva by tenaculum forceps, and the lowest point of the bladder ascertained by the sound, a strong hare-lip pin is passed through the cervix from before backward, about a quarter of an inch below this point, and another similar pin at right angles to the first. A piece of thin india-rubber tubing is then passed twice round above the pins, and tied tight enough to prevent bleeding. The cervix is then cut across transversely with scissors below the pins. The incisions may be so made that the mucous membrane is left longer anteriorly and posteriorly, but it is unnecessary to dissect off flaps, since sufficient mucous membrane to cover the stump can be obtained by pulling it down. Scissors are preferable to the knife as causing less hæmorrhage. Sutures of silkworm gut or silver wire are applied in the manner shown in Fig. 82; two at each side of the cervical canal, to unite the mucous membrane at front and back, and from one to three intermediate sutures, to unite the outer mucous membrane to that of the cervical canal. All these should be passed deeply enough to include somewhat more tissue than the mere mucous membrane. The elastic constrictor is then unfastened, to allow the mucous membrane to come together, and the sutures tightened. If the bleeding continues, or the flaps are not applied closely enough to the stump, one or more deep sutures at each side may be passed through the whole thickness

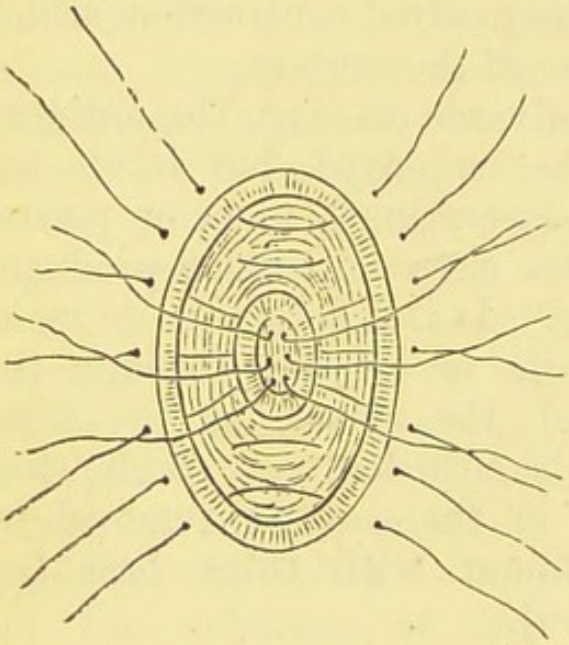


Fig. 82.—Mode of placing Sutures after amputation of the vaginal cervix. (After SCHROEDER.)

of the cervix at points intermediate to the more superficial sutures.

Of these modes of operating, the use of the galvanic cautery is the easiest, and may be adopted if the cervix cannot be drawn down. Marion Sims' mode of performing the plastic operation was merely to unite the mucous membrane at front and back, without passing any suture into the cervical canal, but the method above described has the advantage of keeping the cervical canal thoroughly open.

If the hyperplasia of the cervix is associated with eversion of its lips due to laceration in parturition, and is not too extreme in degree, the better mode of treatment is, in preference to amputating any portion, to perform the operation of trachelorrhaphy for repair of the laceration (*see section on Chronic Inflammation of the Cervix*). The hyperplasia will then afterwards generally gradually diminish.

SUPERINVOLUTION AND ATROPHY OF THE UTERUS.

The process of involution may be excessive, although this fault is very far more rare than the opposite, and instances have even been recorded in which the uterus has been so reduced in size after parturition, that its presence could not be detected. Such atrophy may occur after normal delivery in ill-nourished women, who have a tendency to premature decay, or it may be the result of general or local puerperal disease. Atrophy of the uterus may also arise gradually in ill-nourished subjects, apart from parturition, and may lead to a premature menopause. There is a greater tendency to this in women in whom ovarian activity has throughout life been below par. Senile atrophy is a normal condition after the menopause, but does not usually proceed to a considerable extent till after the age of sixty. The vaginal portion and os then become especially small, and not infrequently stenosis or even

occlusion of the cervical canal occurs. The vagina shares in the atrophy, and becomes funnel-shaped, while the external generative organs also waste.

Results and Symptoms.—The symptoms of premature atrophy of the uterus are scanty menstruation or amenorrhœa, and sterility.

Treatment.—In most cases it is preferable not to interfere, unless there are symptoms of unrelieved ovarian molimen. Otherwise, if the natural period of the menopause has not been nearly reached, and atrophy is not extreme, it may be desirable to try some of the means of local stimulus which will be described under the head of amenorrhœa. The same general and hygienic treatment as in the case of primary failure of development (p. 79) should be added.

CHAPTER VII.

HYPERÆMIA AND INFLAMMATION OF THE UTERUS.

ACTIVE HYPERÆMIA OF THE UTERUS.

As the uterine tissue is more prone than any other in the body to respond to stimuli by a change in its nutrition, so the uterus is, most of all organs, liable to physiological active hyperæmia, which readily passes into a morbid excess. Thus, hyperæmia occurs at each menstrual cycle, both during the period itself, and during the stage of growth and intumescence of the uterine mucous membrane which immediately precedes it. The tissue of the uterus and that around it are also, in a measure, erectile, and a more intense and transient hyperæmia thus arises through arterial dilatation under the influence of coitus or sexual excitement. To such forms of transient hyperæmia the term fluxion has been applied. While in the healthy uterus they are innocuous, they may become, in morbid conditions, serious sources of mischief.

The same susceptibility of the uterine vascular system to stimulus leads to a more chronic active hyperæmia, as the result of any source of reflex irritation. This may arise from any morbid condition or undue activity of the ovaries, from inflammation or other lesion of the cervix, or from more distant sources, as inflammation of the vagina or vulva, from sensitive caruncles of the urethra, or even from

pruritus vulvæ. The same effect may be produced by any social conditions, or individual peculiarity, which may lead to undue, or especially to premature, development of the sexual emotions. Masturbation especially, though it does not necessarily produce any manifest physical injury, is apt to lead to hyperæmia of uterus as well as ovaries, when excessive. Again, a fibroid or cancerous growth in one part of the uterus causes hyperæmia and consequent enlargement of the whole, and the same result may be produced by a neighbouring cellulitis or peritonitis. The persistent excess of vascular pressure leads to swelling of the tissue by effusion of serum, and eventually to hypertrophy. The pressure upon the nerves consequent upon swelling may lead, in persons of acute sensibility, to tenderness and pain, such as in them may be produced also by the fluxion of menstruation. Thus many of the conditions usually associated with inflammation may be present, while it cannot be proved that positive inflammation exists.

The fact of the hyperæmia being produced solely by reflex nervous influence does not, however, prove that it is not associated with a condition which partakes of the nature of inflammation. This is shown by the inflammation which may be produced over the field of distribution of a nerve by an injury to, or disease of, its trunk, as well as by the common phenomenon of catarrh or other forms of inflammation produced by the effect of cold. In the case of the uterus itself it is demonstrated by an occurrence which occasionally happens. There are some women so susceptible that the mere careful use of the uterine sound by a skilled hand may set up not only uterine but periuterine inflammation, the existence of which is made certain by the effusion and fixation produced. As there may be here no opportunity for septic absorption, and no perceptible injury to the mucous membrane, the case is clearly one of not merely hyperæmia, but actual inflammation, produced by an impression upon the

nerves. It can scarcely be doubted that, in such cases, some reflex influence is transmitted not only to vaso-motor, but to trophic nerves. It must therefore be admitted that from reflex nerve stimulus an indefinite gradation may arise, from simple arterial dilatation up to undoubted inflammation.

The uterus has also an anatomical peculiarity which brings chronic hyperæmia of its tissue, when induced as the reflex effect of endometritis, into close relation with chronic parenchymatous inflammation. Most mucous membranes are separated from the structures lying beneath them by a layer of loose areolar tissue; and, in such case, catarrhal inflammation of mucous membrane may exist without any perceptible implication of the muscular walls beneath, as is found to be the case in such mucous membranes as that of the intestines or of the air-passages. The mucous membrane of the uterus, however, is itself of a dense character, consisting mainly of closely-packed round or slightly elongated cells, and is intimately connected with the muscular wall, without any intervening loose layer. The extremities of the glands even dip more or less into the muscular layer; and it has been maintained, with much probability, by Dr. John Williams, that a considerable proportion of the thickness of the uterine wall really corresponds in development to the muscularis mucosæ, though in the human subject no line of demarcation can be traced. We may conclude, therefore, on anatomical grounds, that, if endometritis exists, the inflammation is not likely to be strictly limited to the mucous membrane, but will affect the uterine walls to some depth. The case may be compared to that of a sore and inflamed spot on the tongue, or on any sensitive surface, which gives rise to redness, swelling, throbbing, tenderness, and pain over a considerable region in its neighbourhood. The hyperæmia may be due mainly to reflex nerve irritation; but there is a zone of inflammation of lower degree, arising by continuity of tissue around the

inflamed point, through which there is a gradation from simple hyperæmia up to the more acute inflammation.

The relation between mere engorgement and inflammation of the uterus has given rise to more divergence of opinion than any other in gynæcological pathology. Some distinguished authorities have omitted chronic metritis entirely from their nosology, while others, and the more numerous, have regarded it, as I believe, with greater accuracy, as one of the commonest of the special diseases of women. The difference is fortunately not so much with regard to the true nature of the condition present, or its treatment, but rather as to the question of definition—within what limits the word inflammation is applicable. The strongest argument for the view that, in most cases of hyperplasia of the body or cervix of the uterus, chronic parenchymatous inflammation plays some part, appears to be the fact, universally acknowledged, that in the later stages there is almost invariably an increase of areolar at the expense of muscular tissue, and eventually fibroid induration. In most cases we may find at some stage the old-fashioned surgical criteria of inflammation, namely, pain, redness, swelling, and, if not heat, at any rate the arterial hyperæmia which, on the surface of the body, produces local heat. To these is added a cell proliferation, not leading, as in acute inflammation, to unstable products, but to products at a lower grade than the normal tissue of the part. This occurs even when there is no cause of passive hyperæmia, and no constitutional tendency to degeneration or sclerosis of the organs; whereas we might expect that, if the condition were solely one of active hyperæmia, the result would be true hypertrophy, such as occurs under the stimulus of pregnancy. Such a production of fibroid tissue is a characteristic result of chronic inflammation in other organs, as the lungs, liver, or kidneys, although in them also the distinction of inflammatory from degenerative changes has been the subject of much divergence of opinion.

Treatment.—The first effort should be to remove the inflammation which active hyperæmia reveals, or the cause which sets it up by reflex action. Of such causes, apart from endometritis proper, or inflammation of the lining membrane of the body of the uterus, the most common are ovarian irritation, and erosions, fissures, or other lesions of the cervix. Of internal remedies which have a direct influence upon hyperæmia, the most powerful is ergot, which acts in some measure by contracting the arteries, but in the main by its influence upon the muscular walls of the uterus. Half-drachm doses of the liquid extract of ergot, or of the liquor secalis ammoniatus, may be given three times a day in chronic hyperæmia, especially if associated with menorrhagia or metrorrhagia. A similar influence, though in less degree, appears to be exerted by digitalis and strychnia, and these may often be usefully combined with ergot, while the general tonic effects of strychnia are at the same time valuable. Bromide of potassium, while acting as a general vascular and nervous sedative, has a special influence on the pelvic organs, which depends, in part at any rate, upon its effect as a sexual sedative, in which respect it is more trustworthy than any other drug. It may be given in doses of twenty or thirty grains combined with ergot or not, or for long periods in smaller doses, from ten to fifteen grains. Its supposed general depressant effect upon the system is not much to be dreaded, especially if a tonic be given in combination, but in susceptible subjects it is apt to produce the bromic acne. To avoid this inconvenience the medicine may be discontinued for one week out of four; or, if this is not sufficient, five-minim doses of liquor arsenicalis may be given in combination with it. The bromides tend to diminish the quantity of the menstrual flow and lengthen the intervals, and therefore do not act so well in hyperæmia from suppression of menses, or associated with scanty menstruation. In some cases of the latter, however, they may be beneficial

when given in combination with iron. Bromide of ammonium and hydrobromic acid appear to have a similar effect to bromide of potassium, although Binz has maintained that the virtue lies in the potash and not in the bromine, and that chlorate of potash is equally efficacious. Iodide of potassium is especially useful in hyperæmia dependent upon ovarian enlargement or irritation, and in such cases it is desirable to combine it with the bromide. Quinine and the mineral acids are useful, especially in the more chronic stage, while quinine in large doses has a direct effect in promoting uterine contraction. In all cases of hyperæmia diet should be unstimulating, and alcohol should be avoided or taken sparingly.

Local Depletion.—Local depletion often gives great relief both in active and passive hyperæmia, and also in a combination of the two, especially when the hyperæmia is a sign of inflammation, or much local pain and tenderness exist. It may be performed either by puncturing or scarification, or by leeches. The former is the most convenient, and is generally to be preferred in the earlier stages of hyperæmia or metritis, while the uterus is soft. It has the advantage that it is not liable, like the suction of a small quantity of blood by leeches, to set up a renewed fluxion to the part affected. A cylindrical speculum should be used, and two or three punctures made with a sharp-pointed bistoury, spear-headed scarificator, or triangular needle held in a pair of forceps. A sponge wrung out of hot water may afterwards be passed occasionally over the cervix to prevent clotting in the mouths of the vessels. One or two ounces of blood should be abstracted, and additional punctures may be made, if necessary, till this amount is obtained.

The cases for which leeches are more applicable are those in which it is difficult to obtain sufficient blood by puncturing, as is usually the case in the later stages of hyperplasia of the cervix, and also those in which there is suppression of menstruation or too scanty a

flow, so that it is advantageous to excite some temporary fluxion to the uterus. The cervix should be brought into the field of a large cylindrical speculum and the os plugged with a small piece of cotton-wool to which a thread is attached for its removal. If this precaution be neglected, a leech may bite within the cervical canal, or crawl into the uterus and cause severe pain, although, in such a case, it is usually expelled after a time without very serious damage resulting. The cervix is first to be thoroughly cleaned, and may be slightly scarified to draw a few drops of blood. Three or four leeches should then be placed in the speculum, its lower extremity closed by a plug of cotton-wool, and the speculum watched till the leeches have ceased sucking. The whole process is generally completed within half-an-hour. Single leeches may also be applied by a long glass tube provided with a piston, or by leech forceps. In case of excessive bleeding after removal of the leeches, a plug of cotton-wool soaked in perchloride of iron may be applied to the cervix, or each leech-bite may be touched with the point of a heated knitting-needle.

Local depletion may be performed in the consulting-room or hospital out-patient room, but it is preferable that the patient should remain at rest in bed for some hours afterwards, especially if leeches are used. Several repetitions of puncturing or leeching are generally required at intervals of ten days or a fortnight. Neither should be performed within five or six days before a menstrual period is due; otherwise, its recurrence is apt to be interfered with. If, however, menstruation is scanty, and an increase of congestive pain occurs at its cessation, depletion immediately after the flow often gives relief.

A very convenient mode of causing a flow of copious secretion from the cervix and vagina, and so depleting their vessels, is the use of strong glycerine, by which the need for withdrawing blood may often be avoided. A tampon of cotton-wool is to be thoroughly soaked in

from half an ounce to an ounce of glycerine, and passed up to the cervix, a string or thread being tied round it to facilitate removal. It should be left twelve or twenty-four hours. In the case of erosion or endometritis, an astringent may be dissolved in the glycerine, but the pure glycerine produces the most copious flow. It is often used with advantage after puncturing or leeching. The glycerine in stimulating secretion acts by its attraction for water. It has been shown from observations by Dr. Herman that, as might be anticipated, it is most effective in this respect when little or no leucorrhœa existed previously; and that, where there was an abundant leucorrhœa, it has scarcely any effect.

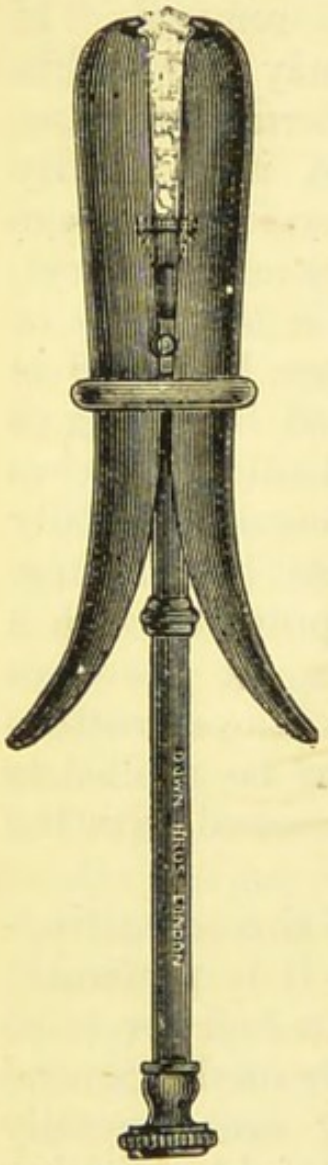


Fig. 83.—Barnes' Tampon Introducer.

The patient may generally introduce the tampon herself, by means of Barnes' tampon introducer (Fig. 83), and sometimes even without such assistance. In the latter case, however, a good deal of the glycerine is apt to be squeezed out in passing through the vulva. The glycerine may be solidified by combination with gelatine, and introduced in the form of suppositories containing each from ʒij. to ʒiv. These are useful if a patient finds a difficulty in managing the glycerine plugs.

PASSIVE HYPERÆMIA OF THE UTERUS.

Passive hyperæmia may be by itself a cause of subinvolution and hyperplasia, but is more frequently associated with active hyperæmia or inflammation, and tends to aggravate their effects. All displacements of the uterus which put a strain upon the broad ligaments

tend more or less to interfere with the return of the venous blood from that organ. Those which have the most powerful influence are prolapse of the second or third degree (*see* p. 141) with strangulation, and acquired retroflexion, which causes the veins to be compressed against the utero-sacral ligaments, as well as from the effect of the descent of the fundus uteri itself. Passive hyperæmia is also produced by general causes of venous obstruction in the heart, lungs, or liver, and by any local pressure on the veins by ovarian or other tumours, ascites, or fæcal accumulations, and is promoted by want of exercise or constipation. Any fixation of the uterus also tends to passive hyperæmia by interfering with the freedom of its motions, and, in most instances, leads to its enlargement. Such cases are frequently complicated by the effects of inflammation, but hyperplasia is brought about through fixation of the uterus even by a peritonitis which did not originate in the pelvis. Passive hyperæmia is apt to be promoted, in all classes of society, as the effect of posture: in the labouring classes by prolonged standing, with which is often associated a greater or less degree of prolapse of the pelvic viscera; amongst the wealthy, by the excessive use of the dorsal reclining position in cushioned chairs or sofas, as opposed to the recumbent posture, and by the use of feather-beds instead of firm mattresses. In the dorsal reclining position, the pelvic brim is rendered nearly horizontal, instead of being inclined about 55° to the horizon, as it should be in the upright position. The pelvis is thus exposed to the full weight of the abdominal viscera, and the return of venous blood from it is at the greatest disadvantage, while any tendency to retroversion or retroflexion is promoted by gravity. At the same time the use of soft cushions obviates the natural tendency which persons resting in a harder seat have to change their position frequently, and so assist, in an important degree, the venous circulation. In lying on a feather-bed, also, the pelvis sinks in and

becomes the lowest part of the body, whereas, upon a harder couch, in consequence of the greater width of the hips, the pelvis is somewhat higher than the shoulders.

The relation of passive hyperæmia to inflammation is that it does not, by itself, tend to produce inflammation, although it may lead to hypertrophy, and even to associated degeneration, but that it renders the tissue vulnerable to slight causes of inflammation, and makes the inflammation more obstinate when once excited, and repair more tardy. An example of this may be found in the case of ulceration of the legs, associated with varicose veins, and the same principle is largely exemplified in the case of the uterus.

Treatment.—The first indication is to remove, if possible, all direct causes of venous obstruction, general or local, and especially to cure retroflexion or prolapse. Regulation of the bowels is of the utmost importance, and the practice of at least a daily evacuation at a regular time must be enforced, much trouble often arising from mere carelessness in this respect. The greatest relief is afforded by saline aperients, such as sulphate of magnesia and sulphate of soda, and a convenient mode of giving these drugs is in the form of one of the mineral waters, as Hunyádi Janos, Friedrichshall, Æsculap, or Pullna, to be taken the first thing in the morning with an equal quantity of hot water. When hyperæmia of uterus or ovaries is associated with much pelvic pain or tenderness, it is often desirable to secure a somewhat liquid motion at least twice a day, evening as well as morning, so as to diminish as much as possible the venous pressure during the hours of sleep. For this purpose drachm doses of sulphate of magnesia may be given two or three times a day. In all cases of passive hyperæmia, postural treatment should receive due attention, since the blood-pressure in the pelvis is necessarily increased in the upright position, and the ratio of increase, compared with the total pressure, is much greater in the veins than in the arteries. Long standing or sitting

should be avoided, as well as the undue use of the dorsal reclining position on cushioned chairs, and the use of soft feather-beds. Rest on a flat couch or bed in the lateral or semi-prone, rather than the dorsal, position should be frequently taken.

Passive hyperæmia receives benefit from all external agencies which act as stimulants to the general circulation, and especially to the heart. Of these some form of cold bath, the most generally useful being the hip-bath, taken on rising in the morning, is the most powerful, and in combination with this the cold vaginal douche, administered by Higginson's syringe, often proves a valuable adjuvant, provided that no active inflammatory state of pelvic organs be present. Failing the vaginal douche, the bath speculum, a small tube with perforations, may be used by the patient. In winter the water may be warmed to about 60° or 65° F. If neither cold douche, hip, nor sponging bath can be borne, alternate sponging with hot and cold water is a milder stimulant. If there is any weakness of the heart's action, the administration of digitalis helps to diminish general venous pressure, and a suitably nourishing diet and general tonics tend to the same effect. The veins of the uterus are emptied by the influence of ergot and other drugs causing contraction of the uterine walls, though these act more especially upon the arterial supply. The use of local depletion has been already mentioned (p. 198).

INFLAMMATION OF THE UTERUS.

Inflammation of the parenchyma of the uterus is termed metritis; catarrhal inflammation of its lining mucous membrane endometritis. In the most acute forms of inflammation all the tissues of the organ take part, and body and cervix are usually involved together, the affection of the body being the most important. Acute endometritis and acute metritis will therefore be considered together as a whole. Chronic endometritis, or metritis, may affect either

the cervix alone, the cervix and body together—in which case the disease of the body is the more important—or, in rarer instances, the body alone. It has already been described how, even in chronic affections, the inflammation is never entirely confined to the mucous membrane, but extends, in greater or less degree, to the adjoining parenchyma (*see* p. 195). Inflammation of the mucous membrane of the cervix, or cervical endometritis, will therefore be described in connection with inflammation of the substance of the cervix; that of the mucous membrane of the body, or corporeal endometritis, in connection with chronic metritis.

ACUTE METRITIS AND ACUTE ENDOMETRITIS.

Causation. — Acute inflammation of the whole uterus, in its most intense form, is very rare, except as the result of septic absorption after parturition or abortion, or after operations upon the uterus, the evacuation of retained menstrual fluid, or the use of tents. Next in intensity is that produced by a traumatic cause, such as intra-uterine injections, intra-uterine stem pessaries, cauterization of the cervix or cavity of the uterus. In some of these cases absorption of septic material may also play some part. Acute endometritis, in which the whole thickness of the uterine walls also generally participates, but in a less extreme degree, is not unfrequently produced by exposure to cold, especially at a menstrual period, extension of gonorrhœal or other acute inflammation from the vagina, or excessive coitus. It may also arise in the course of specific fevers.

Pathological Anatomy.—Acute metritis is always complicated by endometritis, and in the more severe forms the inflammation extends to the peritoneal surface of the uterus, which becomes covered with lymph, to the Fallopian tubes, and sometimes also, especially in the septic variety, to the neighbouring cellular tissue. The uterus becomes hyperæmic and enlarged by infiltration of serum, while, in the most acute form

of inflammation, ecchymoses are scattered through its substance. In the septic variety, small collections of pus may be found between the muscular fibres, in the veins or lymphatics of the uterus, or still more frequently in those of the broad ligament adjoining. Purulent peritonitis may also be set up, and in cases dependent upon lymphatic absorption the affection of the peritoneum often preponderates over that of the uterus itself. Acute abscesses of notable size in the uterine wall have occasionally been recorded, but are very rare. Much more frequent are abscesses in the ovaries, or cellular tissue of the broad ligament. The disease may also end in acute or chronic pyæmia. In acute endometritis the mucous membrane is swollen, softened, and injected; that of the body of the uterus secretes at first thin serum, and afterwards mucopurulent fluid, often tinged with blood. The secretion of the cervix, normally clear and tenacious, becomes more copious, thin, and turbid. The inflammation is liable to extend along the Fallopian tubes and attack the peritoneum, even when the substance of the uterus is not involved in any great degree. If the fimbriated extremity of the tube becomes quickly closed by adhesion, pyosalpinx may result, or hydrosalpinx, in milder forms of inflammation; if it remains open, local or general peritonitis is the more prominent feature of the case.

Results and Symptoms.—In most cases of severe septic or traumatic metritis, while the uterus itself is found to be swollen and excessively tender, the symptoms of peri-uterine inflammation, especially of that of the peritoneum, preponderate over those of the metritis proper. Both septic and traumatic forms are marked by rigors and considerable elevation of temperature. In the septic variety the increase in pulse-rate is often more marked than that of temperature, and as the disease advances the pulse, while becoming small, becomes at the same time compressible. In bad cases, in which the peritoneum is extensively affected, the

abdomen quickly becomes tympanitic, and the breath acquires the peculiar sweetish odour of septicæmia.

In acute endometritis, with more or less participation of the uterine walls in the inflammation, but without any peri-uterine complication, the symptoms are pain, with a sense of weight and heat or throbbing in the pelvis, and pain also in the back, groins, and thighs. Considerable febrile action is present in the more severe cases. The pain is much aggravated by movement, or by any bearing down effort; there is often much vesical tenesmus, and the urine is generally high coloured. There may be paroxysmal aggravations of pain due to uterine contractions, and marked by their intermittent character. Occasionally there is active diarrhœa for a time, set up by reflex irritation, though, with the exception of these attacks, the bowels are generally constipated. When endometritis or metritis arises during menstruation, its immediate effect is usually the arrest of the flow. Septic metritis has a similar effect upon the lochial discharge, or that which follows abortion. In traumatic endometritis, however, especially when induced by caustic applications such as the insertion of the solid nitrate of silver into the uterine cavity, there may be profuse sanguineous discharge in the early stage. Ordinarily, at the outset of acute endometritis the discharge is scanty and serous; after a few days it becomes profuse and muco-purulent, often offensive to the smell, and sometimes tinged with blood. Usually it has an irritating effect upon the vagina and vulva, and may cause excoriation of the thighs.

In septic metritis the prognosis is always grave, and bad cases pass rapidly into purulent peritonitis and end fatally in spite of all treatment. Simple acute endometritis and metritis are apt to merge into the chronic form of the disease, and relapses are specially likely to occur at ensuing menstrual periods.

Diagnosis.—Endometritis and metritis uncomplicated by peri-uterine inflammation are distinguished by the mobility of the uterus, and the absence of any

thickening round it. Constitutional disturbance is less than in pelvic peritonitis or cellulitis, but greater than in simple vaginal inflammation. On vaginal examination, the cervix is found swollen and sensitive; its arteries often pulsating strongly, and the os patulous. On bimanual examination, the body of the uterus is found to be very tender on pressure, and still more so if movement be imparted to it. It is often distinctly enlarged, and, if its previous size be known, the degree of swelling indicates the extent to which the uterine parenchyma has taken part in the inflammation. If the speculum be used, the cervix is seen to look red and œdematous, and to contain shreds of mucus, scanty serous fluid, or muco-pus. As a rule, the sound should not be used. If employed, it causes great pain, and generally some bleeding.

Treatment.—In *septic metritis* the first indication for treatment is to get rid of the exciting cause. Any retained placenta, or clot, or decomposed polypus or other tumour, should be, if possible, evacuated at the very commencement of symptoms. When the inflammation is fully established, and the os does not admit the finger, it may be a difficult question whether artificial dilatation of the cervix is desirable. When, however, the discharge has any considerable fœtor, and it is suspected that there is something in the uterus, it is better to run the risk of interfering. It is preferable, if possible, to introduce the finger, with the aid of an anæsthetic, or to effect rapid dilatation of the cervical canal by a two-bladed, or three-bladed, dilator, such as that of Marion Sims (Fig. 33, p. 62), or by Hegar's dilators (Fig. 34, p. 63), and avoid the use of tents. If tents are used, care should be taken to dilate the cervix by a single application, and not to leave them longer in place than necessary. The uterus being sufficiently evacuated, it should be washed out at intervals with antiseptic fluid. A solution of perchloride of mercury (1 in 2000), carbolic acid (1 in 40), or a weak solution of iodine (Tr. Iodi. ʒij. ad aq. Oj.), is preferable to one

of permanganate of potash, since the latter rapidly loses its efficacy in contact with organic matter. The best apparatus to use is a funnel or other irrigator acting by hydrostatic pressure, attached by a flexible portion to a long silver or vulcanite tube with a rounded extremity, having openings on all sides. A simple syringe, large enough to hold ten ounces or more, is preferable to Higginson's syringe, since, with the latter, injections of air, together with the fluid, can hardly be avoided. It does not, however, give the security against undue pressure which is afforded by the hydrostatic method. In the absence of a special tube, a large gum-elastic catheter may be used. To avoid the introduction of air, care should be taken first to fill the tube completely, and then a clip should be placed upon the elastic portion, until the terminal part is introduced up to the fundus.

A still greater security against any fluid passing along the Fallopian tubes is attained by the use of a double-action catheter. The best form of this for injecting the uterus is Budin's catheter. A transverse section of this catheter is shaped like a horse-shoe. A groove is thus formed on the outside of the tube, which serves for the return current, and is not liable to be blocked by clots or shreds, as are the openings into the return tubes of the ordinary double-action catheters.

Quinine in full doses is generally useful, and if the temperature is very high, it is well to begin with from 30 to 60 grains, given in two or three doses at short intervals, until the temperature is markedly influenced, or cinchonism produced. If vomiting interferes with the retention of the quinine, it may be given in the solid form, combined with a full dose of subnitrate of bismuth in a mucilaginous mixture, or a smaller dose may be given subcutaneously, the kinate of quinine*

* See a Paper by Mr. Collier in the "Pharm. Journ." Sept., 1878. Hypodermic tablets, containing carbamide of quinine, are also prepared by Messrs. Burroughs & Co. These are sufficiently soluble to allow a considerable dose to be used subcutaneously.

being the best form for this purpose. Opium, or morphia, must be given in sufficient quantity to allay the pain. Locally, fomentations or turpentine stupes assist towards this object. Other internal antiseptics, such as sulphite or sulpho-carbolate or salicylate of soda, have scarcely shown themselves to be equal in value to quinine. In highly adynamic states, however, Warburg's tincture, containing quinine, with a great variety of other substances, among which are aromatic stimulants, has sometimes been found more serviceable than quinine alone. Two successive doses of half an ounce, undiluted, may be given at two or three hours' interval, brandy or beef-tea only being taken meanwhile. In a similar adynamic state, with much tympanites, turpentine, in doses of 15 or 20 minims, may be useful as a stimulant. If high temperature persist, it should be reduced by direct application of cold. For this purpose the most convenient means is Thornton's ice-water cap, or Leiter's temperature regulator, made in the form of a cap, whereby a continuous stream of ice-cold water is made to circulate round the head. Another method is to place the patient upon a water-bed, from which water is from time to time drawn off, and cold water added. It is of the highest importance to support the strength by administering such nourishment as milk, beef-tea, and eggs, at short intervals, as well as stimulants in ample quantities. If food is rejected by vomiting, recourse should be had at once to nutrient enemata. For this purpose "Derby and Gosden's fluid meat" (sold by Messrs. Savory and Moore, 143, New Bond Street), or Benger's peptonized beef jelly, is of great value. A fluid which undergoes artificial digestion in the rectum may be made by mixing thick boiling gruel with an equal part of cold milk, and adding to four ounces of the mixture a drachm of Savory and Moore's saline essence of pancreatine, or Benger's liquor pancreaticus, and five grains of bicarbonate of soda. Instead of the liquid preparations of pancreatine, Burroughs' peptonizing

powders may be used. If these nutritive fluids are not retained, solid peptone suppositories may be used instead.

In simple *acute endometritis* (with more or less implication of the parenchyma, but without peri-uterine inflammation), absolute rest in bed should be enjoined. If much fever and pain are present, from four to six leeches may be applied near the anus. This is better than applying them to the cervix, since too much disturbance of the patient is thereby involved, and increase of pain is sometimes produced. At the outset, minim doses of tincture of aconite every hour may be given to diminish the fever. Sedatives, with salines, especially the nitrate of potash, or acetate of ammonia, should afterwards be administered; or, when pain is acute, full doses of opium or morphia, either by rectum, subcutaneously, or by the mouth. Fomentations or linseed poultices, covered with oil-silk, should be kept applied to the hypogastrium. At a somewhat later stage, hot hip-baths, or copious warm vaginal injections of decoction of poppies, or of linseed or starch, with the addition of a drachm of laudanum to the pint, have a valuable sedative effect. Purgatives must be avoided in the acute stage, but the rectum should be unloaded, if necessary, by an enema. Later, saline laxatives are useful.

CHRONIC INFLAMMATION OF THE CERVIX, CHRONIC CERVICAL ENDOMETRITIS, ECTROPION, EROSION, AND FOLLICULAR DEGENERATION OF THE CERVIX.

Causation.—The majority of cases of inflammation of the cervix may be divided into two great classes—first, those in which the primary affection is catarrhal imflammation of the lining mucous membrane, and in which the parenchyma of the cervix becomes only moderately swollen, and eventually indurated; secondly, those in which the whole thickness of the cervix becomes inflamed from the injuries received in parturi-

tion, and eventually undergoes a process of extensive hyperplasia and induration, while cervical endometritis at the same time persists. The first class comprises by far the greater part of the cases which occur in virgins or nulliparous women, since in them it is rare for the cervix to undergo any great degree of hyperplasia, unless, either from congenital elongation or prolapse, it becomes subject to mechanical irritation.

Of the first variety of cervical endometritis, the predisposing causes are similar to those of catarrhal inflammations of other mucous membranes, such as general debility, and the strumous, rheumatic, or gouty diathesis. Of exciting causes, the most frequent are the effect of cold, extension of inflammation, gonorrhœal or simple, from the vagina or from the body of the uterus, excessive coitus, and direct traumatic causes, such as the use of an intra-uterine stem.

The second variety of inflammation arises from the bruised condition in which the cervix is left after labour, with numerous ecchymoses in its substance, damage to its epithelium, which is soon afterwards shed, and frequently more or less deep lacerations along its edge. The failure in the healing of these lesions, and their passing into a state of chronic inflammation, may be due to the lacerations having been too deep to heal spontaneously, or may be brought about by a too early getting up, by displacement of the uterus, or by any of the causes already enumerated which tend to produce subinvolution (p. 177), or hyperæmia (pp. 193, 200) of the whole organ.

Among the injuries produced by labour, the most important are lacerations of the edge of the cervix. If these are superficial, they may heal more or less completely ; and this also happens more readily when the laceration is anterior or posterior. If, however, there is a deep laceration at each side, especially when the frequently associated complication of subinvolution and consequent partial descent of the uterus exists, the anterior and posterior lips of the cervix roll outwards, so

as to evert the lining mucous membrane, and the condition termed *ectropion of the cervix* is thus produced. The delicate mucous membrane, turned outwards towards the vagina, is exposed to friction, and becomes inflamed. It then becomes swollen and deeply injected, and its surface granular from irregular proliferation, so that it closely resembles the surface of an erosion, or granular inflammation, at a spot originally covered by squamous epithelium. At the same time hyperplasia results in the portions of the cervix intervening between the clefts, and leads to distortion and induration. Similar results to those produced by labour may follow if the cervix is bilaterally incised to too great a depth, but generally to much less degree, since the effect is not then assisted by the enlargement of the uterus and bruising of the cervix.

A laceration on one side only may also lead to some degree of eversion of mucous membrane with granular inflammation. The deepest laceration, or single laceration, if there is only one, is more frequently on the left side, because the occiput of the child is generally directed that way. A lateral laceration, at the time of its production, often gives an opportunity for absorption, which leads to local cellulitis. From this a permanent band of thickening is apt to remain, which may be felt running from the angle of the laceration, generally on the left side.

Erosion or Granular Inflammation of the Cervix may originate simply from catarrhal endometritis. The inflammation of the cervical canal extends to the mucous membrane around the os. From the effect of irritation, the squamous epithelium proliferates and becomes softened, while it is, at the same time, macerated in the morbid cervical discharge. It is then shed, in the greater part of its thickness, either gradually or in bulk, and leaves behind a congested and slightly granular surface. Erosion, however, is found more frequently in parous than in nulliparous women, and the more severe forms of the affection are very

rarely seen in the latter. In the majority of cases it takes its origin from labour, commencing either with the shedding in bulk of the bruised and damaged epithelium, after parturition, or by its more gradual disintegration, in consequence of the inflammation which is a sequel of that event. A limited patch of granular inflammation, immediately surrounding the os, is however not uncommon even in virgins, especially those who suffer from dysmenorrhœa. It generally implies that a similar condition exists within the cervical canal.

Pathological Anatomy.—In chronic cervical endometritis, the mucous membrane is swollen and hyperæmic, the glands more especially being enlarged. The secretion is increased in quantity, and becomes more opaque and stringy, often filling the cervix with a tenacious plug. If the inflammation is more severe, it becomes muco-purulent or purulent, and has a yellow colour. In a later stage the mucous membrane becomes hypertrophied, filling the cervical canal, and protruding somewhat at the os, and considerable proliferation of the glands of the entire cervical canal may take place. The whole cervix is swollen and soft in the earlier period, but becomes indurated by areolar hyperplasia in the later stage. This change is much greater in those cases in which the disease commences with inflammation of the whole thickness of the cervix after labour, especially when its edge has been cleft by lacerations, in which case the diagnosis from carcinoma may become difficult.

When *simple erosion* arises by detachment of the squamous epithelium *en masse*, the slender papillæ, which, in the normal state, reach nearly to the surface, are carried away at the same time. The surface left is only slightly granular. In more severe forms of the affection, to which the name of *villous or papillary erosion* has been applied, the inflammation proceeds further, and the mucous membrane becomes elevated into soft, deep-red papillæ, which readily bleed. It has generally been considered that the surface becomes

entirely denuded of epithelium, more or less of the papillæ being left, and that the villous prominences are due to the overgrowth of these papillæ. According to the researches of Ruge and Veit,* however, the surface always remains covered with a single layer of cylinder-like epithelium, which is really derived from the deepest row of the original squamous epithelium. The normal papillæ are always thrown off; the cylinder-like epithelium grows inward, so as to form glandular crypts, and the villous prominences arise by growths of vascular connective tissue between these crypts. In the more severe forms the glandular crypts increase and proliferate. The pathological condition existing is, therefore, ultimately one rather of growth than of inflammation, and forms in fact a superficial adenoma of the whole of the mucous membrane affected. The very commencing stage of cancer, according to the same authors, differs from this condition only in the fact that the epithelium of the adventitious gland cavities proliferates, so as partially, or entirely, to fill up the acini.

I have found, in examining specimens excised during life, that in some instances the histological characters correspond to those described by Ruge and Veit, but in others there is actually complete loss of epithelium at some points, and the tissue near the surface is infiltrated with numerous inflammatory leucocytes, and contains many distended capillaries. The Malpighian layer of the adjacent squamous epithelium generally grows thinner as it is traced toward the inflamed surface, the horny layer being thrown off, and is destitute of the normal papillæ. Often over the apparently eroded surface, originally covered by squamous epithelium, may be seen patches of cylindrical epithelium, adjoining the glandular crypts, and alternating with patches of ill-formed squamous epithelium, only one, two, or three cells deep. In cases which were formerly described simply as villous erosion,

* "Zeitschrift für Geburtshülfe und Gynäkologie," Bd. ii. Hft. 2.

it will often be found, if the experiment be tried of taking a tenaculum hook in each hand and drawing together the two lips of the cervix within a Sims' speculum, that the villi really belong to the cervical canal, and arise by hypertrophy of the prominences naturally covered by cylindrical epithelium, not of the normal papillæ beneath the level surface of squamous epithelium. In old cases of laceration the epithelium of the exposed cervical mucous membrane may be found more or less completely converted into squamous epithelium, beneath which are often many of the glandular cysts described below.

Opinions have differed as to whether the so-called erosion deserves the name of "ulceration." It is clear that, although in the initial stage there is a loss of substance of vascular papillæ as well as of epithelium, and the process must therefore be admitted to come, strictly speaking, within the definition of the word ulceration, yet there is no progressive ulceration, the condition being rather that of inflammation with eventually glandular hypertrophy. The term "ulceration" is therefore one which is needlessly alarming to patients.

In another and less important form of erosion, which has been called *aphthous or herpetic erosion*, inflammation of the mucous membrane leads to the formation of small vesicles, which burst and leave an eroded spot. These generally heal readily without treatment.

Cystic degeneration may arise from closure of the mucous glands by swelling of the mucous membrane, and adhesion of the edges of the orifice. The glands then become distended into small cysts, known as *ovula Nabothi*. Within the cervical canal, the swelling cysts force up the mucous membrane into an elevation, and often take the form of minute polypi. Similar small cysts are often found on the vaginal surface of the cervix, but these do not so easily elevate the denser mucous membrane. They may be seen, and more readily felt, as minute protuberances beneath it (*see* Fig. 85, p. 221). According to Ruge and Veit these

are not pre-existing glands, but are formed under the influence of irritation from the *rete Malpighii* of the squamous epithelium. The distended follicles may burst if the inflammation in them is more severe, and give rise to *follicular erosion*.

Results and Symptoms.—The cervix is, in general, but slightly sensitive, as is shown by the fact that nitric acid or other strong caustic may often be applied to its inflamed and eroded surface without causing any very great discomfort. Inflammation limited to the cervix, therefore, generally causes comparatively little pain, and pain may even be absent altogether. The pain most characteristic of cervical inflammation is situated over the sacrum, and not very severe in character. If the inflammation is not limited to the mucous membrane, but has affected the whole tissue of the cervix and led to hyperplasia, pain in the back and loins is generally more marked, and is often increased by walking, while pain may also be produced by coitus. A more constant symptom than pain is morbid secretion, and thus, in many cases, the presence of leucorrhœa or "whites" may be the only indication for investigating the condition of the uterus. If, however, the discharge is thick in character, it may be retained in the vagina, and the patient may then not notice any leucorrhœa, although the altered secretion is manifest on the use of the speculum. In the slighter forms of catarrh, the discharge, as it issues from the cervix, is like the normal secretion, clear and glairy, resembling white of egg. It often becomes more tenacious than normal, forming a tough plug in the cervical canal, which is difficult to detach. When inflammation is more severe, the discharge becomes muco-purulent or purulent, and then has a yellow tinge. It may then, by its irritating effect, set up vaginal inflammation. As it escapes from the vulva, the appearance of the discharge is opaque, milky white in the slighter forms, yellowish or greenish in the severer forms of inflammation. Occasionally it may be tinged with blood. If

the discharge is profuse and long-continued, it may form a drain which tends to weaken the system. Hyperplasia of the cervix often leads to irritation of the bladder or rectum, as the result of pressure, especially if any anteversion or retroversion be present.

The cervix is more richly supplied with sympathetic than with sensitive nerves, and thus its inflammation is apt to lead to reflex congestion of the body of uterus and ovaries. When this occurs there may be more severe pain, menorrhagia or metrorrhagia, and even more distinct reflex symptoms, such as nausea, vomiting, dyspepsia, vertical headache, intercostal neuralgia, and hysterical manifestations. Such reflex symptoms are generally not so marked in inflammation of the cervix as in that of the body of the uterus, and their existence generally implies that the body of uterus or ovaries are involved in congestion, if not in actual inflammation. The whole question of distant reflex symptoms dependent upon uterine conditions will be discussed more fully under the head of endometritis. In many cases of cervical inflammation there is more or less extension, not merely of congestion, but of actual endometritis to the body of the uterus. Inflammation limited to the cervix, or erosion, may persist for a long time with but little affection of the general health, but it is often associated with dyspepsia and general failure of nutrition, which may be partly the cause and partly the consequence of the persistence of the uterine affection.

An erosion, while generally in the first instance the result of some other condition, as endometritis or inflammation of the whole substance of the cervix, itself often becomes a source of reflex irritation, and maintains a hyperæmia not only of the cervix but of the body of the uterus and the ovaries; all of which are frequently found to be enlarged and tender in conjunction with such a condition. Under these circumstances menorrhagia is often a prominent symptom, and the first thing necessary in its treatment is the

cure of the disease of the cervix. In the case of villous erosion, coitus often gives rise to slight hæmorrhage, and this may be the chief symptom which attracts the patient's attention. In cervical inflammation sterility is often produced by the obstruction to the spermatozoa formed by the plug of mucus in the os, or by the deleterious influence upon them of the cervical secretion. These obstacles do not, however, always form a bar to conception; and if pregnancy occurs the resulting hyperæmia tends to render worse any inflammation, and especially any erosion, which exists. From this cause may arise hæmorrhage during pregnancy, severe vomiting, or other reflex symptoms, and abortion or miscarriage.

The natural course, both of chronic cervical endometritis and of erosion, is a very tedious one, with but little tendency to recovery, although a cure may result by improvement of general health. They are fairly amenable to treatment, but improvement is often slow, and persistence in treatment for four or six months is not unfrequently requisite. If there is extensive hyperplasia of glands, cure can only be effected by vigorous measures. Long-standing hyperplasia of cervix, with induration, is little amenable to remedies. The granular inflammation of the mucous membrane of the cervical canal everted in cases of laceration of the cervix is very similar in its effects, as well as in its histological characters, to that of the portion of mucous membrane originally covered with squamous epithelium. In course of time, sometimes after the lapse of years, cylindrical having been replaced by squamous epithelium, the leucorrhœa and other symptoms may subside, although some degree of hyperplasia of the everted cervix is apt to remain permanently. Since cancer of the cervix is excessively rare in virgins, commoner in parous than in nulliparous women, and still commoner in those who have had many children, it appears certain that erosion or other form of inflammation may be the starting-

point of cancer in persons predisposed to that disease. This view is confirmed by the close approximation found by Ruge and Veit in the histological characters of villous erosion toward those of commencing cancer. In one or two cases I have had the opportunity of observing epithelioma supervene upon chronic granular inflammation, and frequently, at a very early stage of epithelioma, I have found the disease to be associated with a previously existing laceration, sometimes to be situated just at the angle of the laceration. Hence it is of great importance not to omit the due treatment of granular inflammation when the age has been reached at which cancer becomes probable; an age which, in the case of the cervix uteri, must not be reckoned as much beyond thirty years.

Diagnosis.—In simple cervical endometritis, vaginal touch may reveal only slight enlargement, or may fail to detect anything. The speculum will show the os to be congested, and generally either pouring forth copious clear viscid mucus, like white of egg, or filled with a more tenacious and opaque plug of similar mucus. The characteristic glairy mucus may sometimes be observed in the vagina when the os does not happen to contain any. If the plug be removed by twisting it round a Playfair's probe wrapped in cotton-wool, the interior of the cervix is seen to be red, swollen, and granular —a condition which is more manifest if the bivalve speculum (Fig. 23, p. 50) is used, and expanded rather widely so as to stretch open the os. The mucus is clear and alkaline as secreted by the cervix, but becomes opaque and acid in the vagina. This change is now attributed to the action of microbes, which are always present in the vagina. In most of the cases occurring after delivery, broadening of the cervix from hyperplasia will be detected by the finger, and frequently the clefts resulting from laceration will be felt. In ectropion arising from bilateral laceration of the cervix, the condition existing is often more manifest to the finger than to the speculum. If, however,

a Sims' speculum is used, and the lips of the os are drawn together into their original position by two tenaculum hooks, the exact relation of parts will readily be observed. As seen in a speculum, especially if a bivalve is used, the antero-posterior diameter of the cervix appears increased, as shown in Fig. 84.

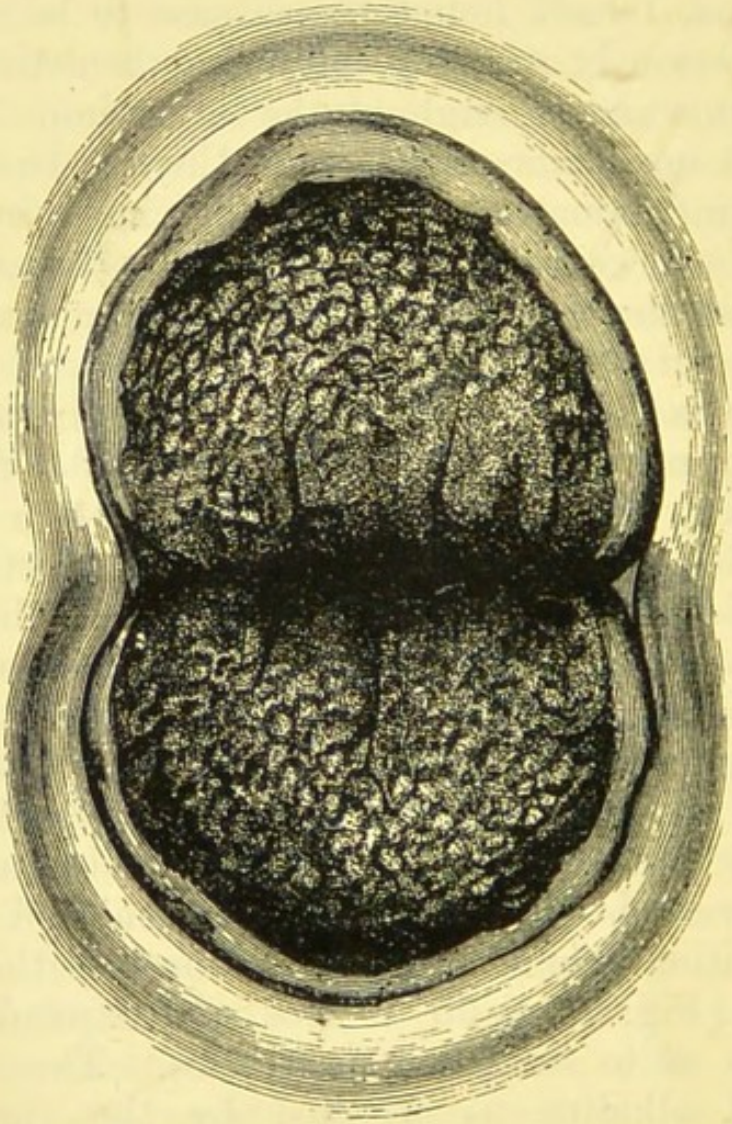


Fig. 84.—Bilateral Laceration and Ectropion of Cervix, with Granular Inflammation of Exposed Mucous Membrane.

When the two lips are drawn together through the Sims' speculum, by aid of the two hooks, the greater part, or the whole, of the apparently eroded surface, if granular inflammation exists, may be turned inward, toward the cervical canal; but this surface generally extends beyond the limits originally covered by cylin-

drical epithelium, which normally passes into squamous epithelium at a point about an eighth or a quarter of an inch above the external os.

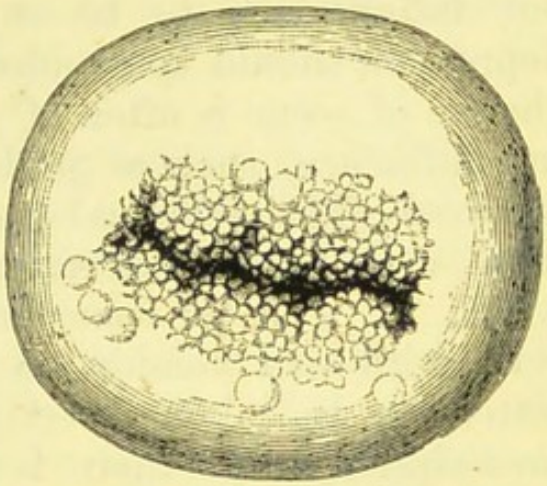


Fig. 85.
Granular Inflammation of Parous Cervix, with Ovula Nabothi.

The more severe kind of erosion, or granular inflammation, is easily recognized by the touch as a soft, villous, velvety surface. A simple erosion feels softer and more granular than the normal mucous membrane, and is almost always associated with some broadening of the cervix. In the healthy cervix a *tactus eruditus* may always determine the negative as to erosion, but there may sometimes be an uncertainty in distinguishing by touch between a slight existing erosion and one that is healed, or an irregularity due to hyperplasia or degeneration of glands. The speculum will always resolve the doubt, and show the erosion as a circumscribed, deeply red, granular, or villous surface, rather elevated above than depressed below the surrounding mucous membrane (Fig. 85). In the more severe form of erosion bleeding is readily produced by contact with the speculum; but a great proneness to bleed on a gentle touch with the finger should always raise the suspicion of the presence of commencing cancer. Difficulty is often found in introducing the sound in a case of cervical endometritis from its point catching in the folds of the swollen or hypertrophied mucous membrane, and when this is the case slight bleeding may be produced. Otherwise, if there is no complication with corporeal endometritis, the sound may be passed to the fundus without causing bleeding, or the pain which usually follows its introduction in that disease.

Treatment.—Constitutional remedies are of great importance, though local treatment is usually required

in addition. Nourishing, but not too stimulating, diet, with abundance of fresh air, and gentle exercise without fatigue, are to be enjoined. Causes of mental depression should be avoided as much as possible, and change of scene is often of great value. Any depressing influence, such as prolonged lactation, should be removed. The medicinal treatment should be of a tonic kind, with special reference to the impaired digestion which is a usual concomitant. Nitro-hydrochloric acid, with nux vomica, or strychnia, and a vegetable bitter, to be taken directly after meals, is a useful prescription.* If there is much stomach irritability, bismuth, with or without small doses of morphia, may be substituted for the bitter. When the digestive function is re-established, the liquor cinchonæ, tinctura cinchonæ flavæ, or quinine, may be given in place of a simple bitter. Iron is apt to disagree when there is any sign of liver inaction, or portal congestion, or when the case is complicated by metritis or hyperæmia with considerable tenderness of the uterus. But in the absence of these, especially in later stages, it may be usefully given in combination with a laxative.† Passive hyperæmia should be treated by the means enumerated under that heading, and any displacement of consequence rectified.

If acute pain or tenderness of the cervix is present, it is well to commence with local depletion (*see* p. 198), and if extensive degeneration of the cervical glands is detected, the depletion may be effected by scarification of the lining membrane of the cervical canal with a narrow-bladed knife. Any prominent glands on the vaginal surface of the cervix should be punctured and

* ℞ Acid. Nitro-hydrochlor. dil. ♏x. ; Tinct. Nucis Vomicæ ♏x. ; Tinct. Gentian co. ℥j. ; Aq. ad ℥j. —ter quotidie.

† ℞ Ferri et Ammon. Citrat. gr. v. : Magnes. Sulphat. gr. xxx. ; Sp. Chloroform. ♏xv. ; Glycerin. ℥j. ; Aq. ad ℥j.—ter quotidie. A formula for iron very readily tolerated, when a laxative is not required, is the following :—Ferri Tartarati, gr. v. ; Glycerini, ℥j. ; Sp. Vini Rectificat. ℥ss. ; Aq. ad ℥j.—ter quotidie.

touched with strong carbolic acid or iodized phenol, since they keep up irritation by their presence. Coitus should be prohibited while any notable tenderness exists, and placed under strict limitation at all times.

Of local applications, the simplest are vaginal injections, which should always be used at least twice a day to wash away the secretion, if for no further object.

Injections of water, for removal of secretions, should generally be used moderately warm. For relief of congestion, as will hereafter be described, hot water at 105° to 115° F., and used in large quantities, is often very effective. Emollient or alterative lotions should be used warm. If an astringent effect only is desired, the lotion may be cold in summer, and in winter at a temperature of about 60°. Syringes of pewter and glass do not contain sufficient fluid for ablution, and the latter are dangerous from the risk of breakage. Higginson's syringe (Fig. 86, p. 224), provided with a vaginal tube about six inches long, and having a central ball, by compressing which a steady stream is produced, can be used by the patient herself more effectively. For the use of water for cleansing purposes, she may be in a sitting position over a bidet or ordinary chamber utensil. But water for the prolonged application of heat or cold, and lotions for any purpose, can only be used effectually when the patient is lying down in the dorsal position, so that the fluid does not flow away immediately, but distends, in some degree, the vagina. The best receptacle for her to lie upon is the "ladies' bed-bath" (Fig. 87, p. 225), which may be provided with an elastic tube, to carry away the fluid to a vessel on the floor. In resting upon this the hips are elevated, the back being supported, if necessary, by a folded blanket or very thin pillow. In the absence of this, if a moderate quantity of fluid only be required, she may lie upon a round bed-pan, brought well under the hips, so that it is not too much tilted. A large

quantity of fluid may also be used, as in irrigation by hot water, if the patient lies crosswise on a low bed or sofa, the feet on a couple of chairs, a mackintosh being so arranged as to carry down the fluid into a foot-pan.

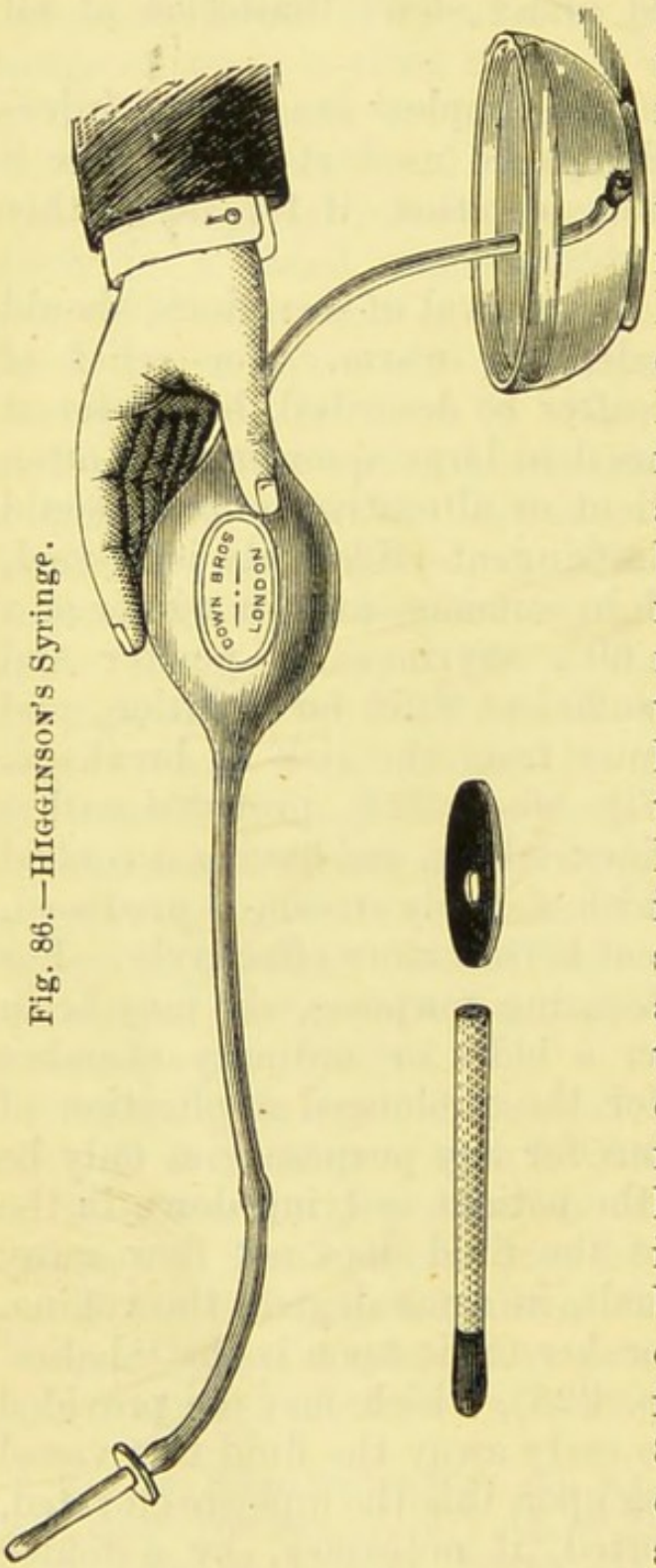


Fig. 86.—Higginson's Syringe.

In the dorsal position, the patient cannot generally work the Higginson's syringe conveniently herself. If the services of a nurse, or other attendant, are available, the best plan is for the nurse to use it. It is maintained by Emmet that, in the use of hot water, the discontinuous stream of the Higginson's syringe is more effective, in stimulating the vessels and absorbents, than the continuous stream of an irrigator. Generally, if the patient has to manage the injection herself, it is best to use some form of irrigator. The fountain irrigator (Fig. 88, p. 226) is a very convenient form of apparatus, and if made of glass, as shown in the figure, is more easily kept aseptic. The reservoir must be raised about three feet above the patient. In another form the reservoir is a bag, which can be hung upon a nail,

and which folds up, to be contained in a small tin box. For prolonged use of hot water, it is better to have an ordinary hot-water can fitted with a delivery tube attached to a tap near the bottom. In the use of either of these, the taps are first opened until the fluid begins to flow, so as to get rid of the air in the tube, and then the tap at the delivery tube is shut off, until the tube has been introduced into the vagina. By this tap, also, the rapidity of flow may be regulated. A cheaper and more portable form of irrigator than the can is the syphon irrigator (Fig. 89, p. 226), which has a weighted end, to keep it under the water, and is stiffened at the bend, to prevent its collapsing. In

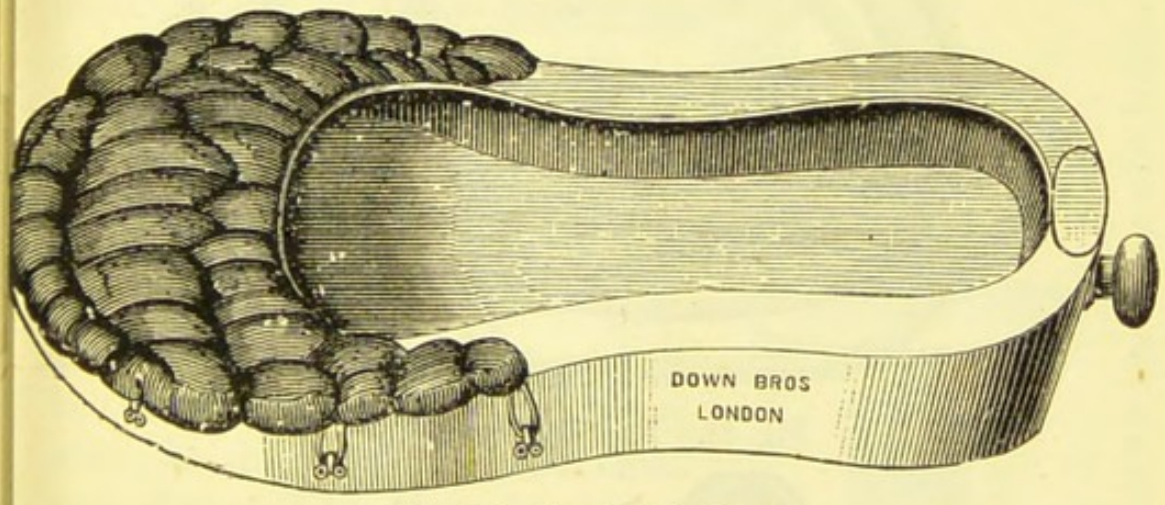


Fig. 87.—Ladies' Bed-bath.

using this, the tap is first opened, and the whole tube gradually immersed, the delivery tube last, so as to fill it all with water. The tap is then turned off, and the tube taken out of the water, except the weighted end, and the syphon is by this means formed. Another mode of forming the syphon is to open the tap, place the weighted end in the water, and then empty the bulb on the tube by squeezing it; then to close the tap and let the bulb expand.

For the employment of a small quantity of lotion a more convenient mode is to use a simple india-rubber enema syringe (Fig. 90, p. 227), containing about four or six ounces, and having a vaginal tube. If the effect of lotion only is desired, the patient may first use

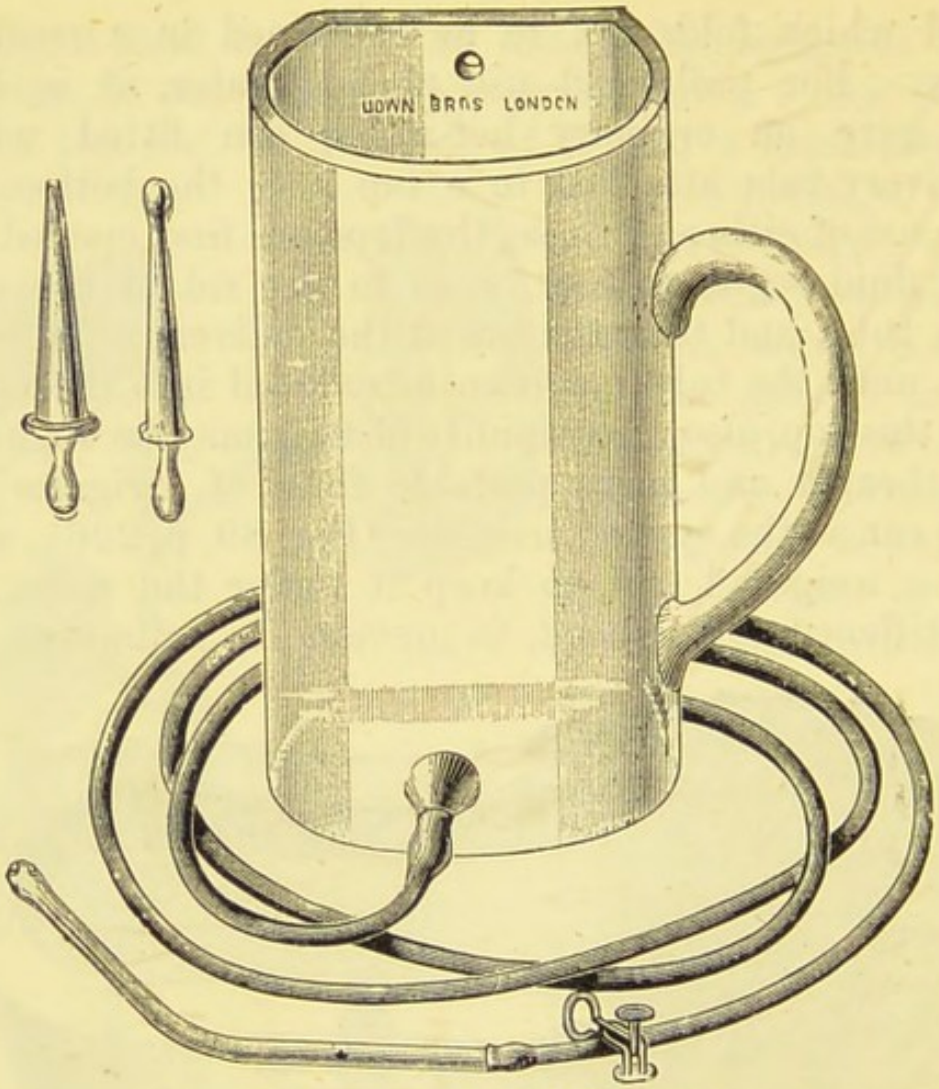


Fig. 88.—Fountain Irrigator.

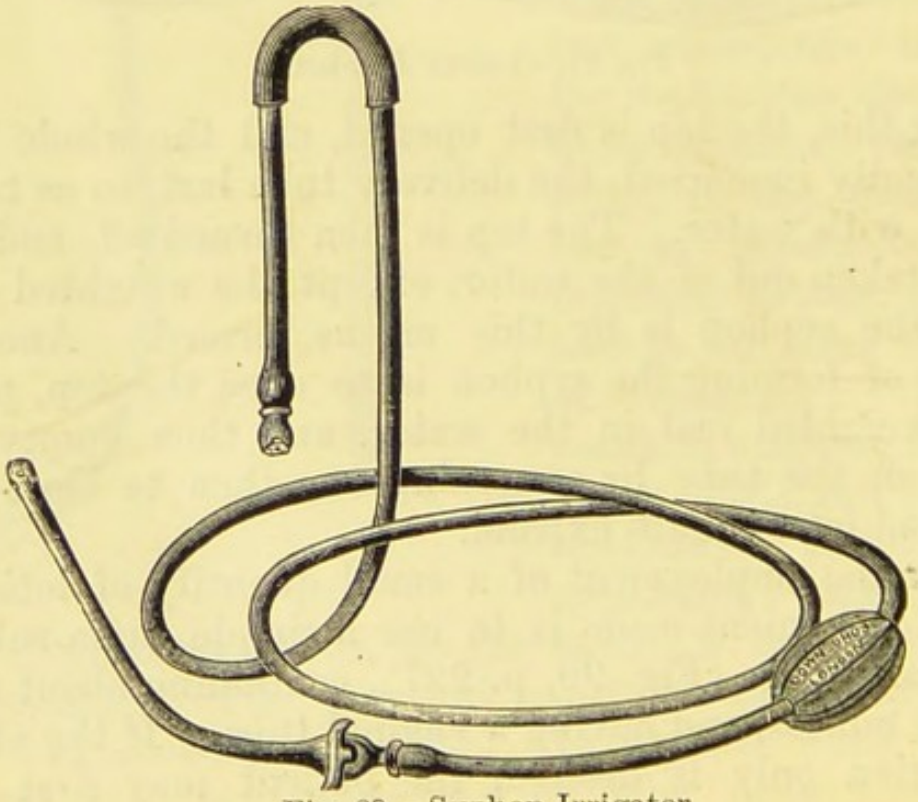


Fig 89.—Syphon Irrigator

the Higginson's syringe herself with warm water, then lie down on a bed-pan, and inject slowly one or two small syringefuls of the lotion, remaining five or ten minutes in the same position to allow the lotion to have its full effect. When she rises, the remainder of the lotion flows away. If a nurse administers the injection, before removing the bed-bath or bed-pan she should depress the perineum with one finger, and gently compress the hypogastrium, to get rid of the excess of fluid, and finally place a napkin against the vulva to absorb any that may remain.

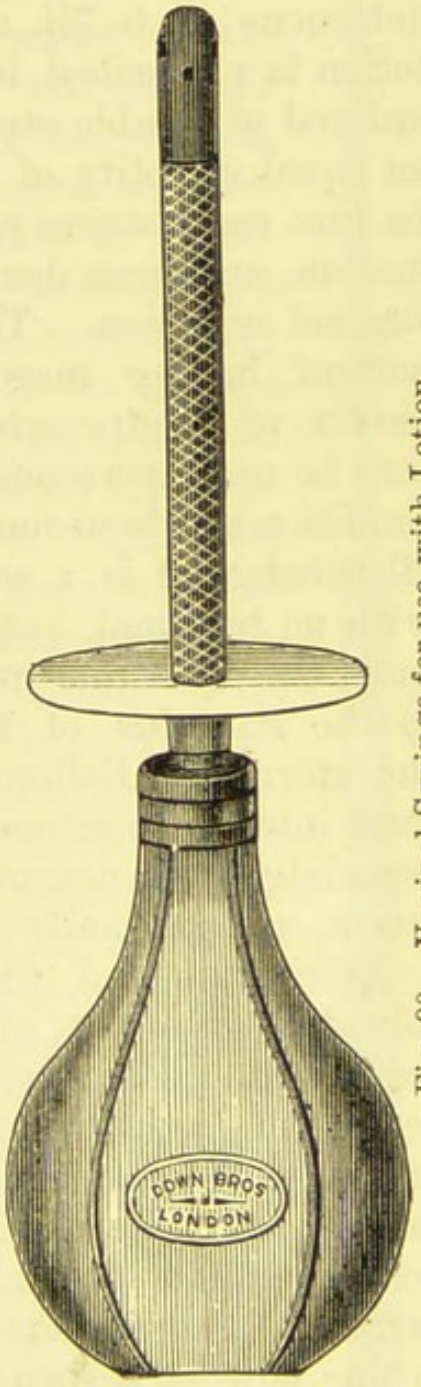


Fig. 90.—Vaginal Syringe for use with Lotion.

For an emollient effect an ounce of glycerine, or a drachm of borax, carbonate of potash, carbonate of soda, chloride of ammonium, or chlorate of potash, to the pint of water may be used; while the salts tend also to diminish the cervical secretion. The glycerine may be added in combination with them, and if a more sedative effect is desired, from one to four drachms to the pint of tincture of opium. For a more astringent effect, alum, iron-alum, tannin, or sulphate of zinc may be used. The strength should be from twenty to sixty grains to the pint in the case of sulphate of zinc, and from one to three drachms or more to the pint for the rest. The liquor plumbi subacetatis dilutus is also a valuable remedy, and is less apt to irritate than most of the astringents, but it has the inconvenience of occasionally staining the linen

brown, from formation of a sulphide. If the discharge is at all offensive, or if it is due to the extension of gonorrhœa to the cervix, antiseptic lotions are often of use. Perchloride of mercury (gr. iij. to gr. v. ad Oj.), carbolic acid (gr. xl. to gr. lxxx. ad Oj.), chloride of zinc (gr. xx. to gr. lx. ad Oj.), liquor carbonis detergens (℥j. to ℥ij. ad Oj.), may then be used. If the lotion is prescribed in fluid form for use, it should be ordered of double strength, and the patient should add an equal quantity of hot water at the time of using. In rare cases severe pain, uterine and peritoneal inflammation, and even death have arisen from the use of a vaginal injection. This has probably been due to the patient having inserted the tube into the patulous cervix of a retroverted uterus. Caution should therefore be used in recommending injections while such a condition exists unremedied; and whenever the os is at all patulous it is a safeguard to have the vaginal tube with no terminal, but only lateral openings. In some cases the disastrous result may have been due simply to the stimulus of the lotion causing contraction of the uterus and Fallopian tubes, and so forcing purulent fluid into the peritoneal cavity. It is well, therefore, especially with neurotic patients, to begin with a weak lotion, and gradually to increase the strength.

Astringent and alterative drugs may also be dissolved in glycerine, and used in the mode described at page 199. The most useful are borax, tannin, or acetate of lead, in a strength of from thirty to sixty grains to the ounce. The last is especially serviceable in the case of erosion, the astringent contracting the vessels, while the glycerine depletes the congested surface. For the same cases, fifteen grains of iodoform in fine powder suspended in three drachms of glycerine form also a very useful application. Astringents may also be employed in the form of suppositories, of which the most serviceable are those containing five grains of tannic acid or acetate of lead. As a basis for suppositories, a combination of one part of pow-

dered gelatine moistened and gently heated with three parts of glycerine, is much preferable to cocoa-butter.

Local Applications to the Cervix.—In the cervical leucorrhœa of virgins, a fair trial should be made of the means already enumerated before resorting to the speculum, which, for obvious reasons, should not be used in their case, if it can be avoided. In married women, however, the speculum may be used at once for diagnosis, and if severe erosion or glandular degeneration is detected, the necessity for stronger direct applications may be immediately recognized. The object should be to effect a cure, if possible, without leaving any cicatricial tissue, and hence, the mildest remedy likely to prove effectual should be tried first. The solid nitrate of silver, which at one time was the favourite remedy in all cases, is now less generally preferred, since it may sometimes cause considerable irritation and hæmorrhage, if vigorously applied, and, in severe cases, is not so effective as other measures. It is most suitable for a case of simple erosion, the surface of which may be touched lightly over, so as rather to form a protecting film than to have any deep caustic effect. This may be repeated two or three times at intervals of a week, but not too often. A tapering pointed stick of nitrate of silver may also be passed, on one or two occasions, into the cervical canal, when there is granular inflammation of the cervix. It is to be remembered that the solid nitrate of silver is more likely to cause cicatricial contraction than other caustics. It should therefore never be used unless the canal is patulous, and some degree of contraction is desirable.

Liquid applications may conveniently be made to the vaginal surface of the cervix with a brush



Fig. 91.—Playfair's Probe.

or small wad of compressed cotton, grasped by a holder, and to the cervical canal by means of Playfair's probe (Fig. 91). If a little absorbent cotton wool is first spread out in a thin layer and then wrapped round it by rotating the probe, it becomes very firmly attached, and may then be dipped in the liquid to be used. If the probe is notched at the sides and bulbous at the extremity, as is the case with probes frequently sold, it is a very troublesome process to remove the cotton wool, unless by burning it off. It is better to have no bulb at the end, and simply to roughen the probe slightly by rubbing it longitudinally with sand-paper. The wool is then held quite firmly enough for the application, if carefully wrapped, and yet can easily be pulled off. If there is difficulty in removing the wool, the best plan is to cut it off piecemeal with scissors, giving the probe a shake in a basin of water between each cut, so as to loosen the wool. The terminal portion of the probe should be made of aluminium, that it may resist nitric acid, and should be as much as three inches long, so that it may be used for application to the body of the uterus if desired. For the application of nitric acid, in the absence of an aluminium probe, a vulcanite sound may be used. If the sound be first wetted, and a very thin layer of dry cotton wool be wrapped closely round it with some dexterity, the bulbous extremity prevents any risk of the cotton being drawn off and left behind in the uterus. For making the application, Sims' speculum and the semi-prone position are the best, but, in the absence of an assistant, the probe may be used with any other speculum, especially a short Ferguson's (*see* p. 49), short bivalve, or Neugebauer's speculum (Fig. 28, p. 55), which may be so manipulated as to bring the uterus into a position of slight retroversion. Before any application is made, the tenacious mucus should be removed from the cervical canal by entangling it in a swab of cotton wool, or, what is better, a small fragment of sponge, not to be used a second time. This is facili-

tated if a swab of glycerine, or white of egg, is first used.

Of the milder remedies, a solution of nitrate of silver, of thirty or sixty grains to the ounce, is by some preferred to all others, but it must be applied rather frequently, namely, at intervals of from five to seven days. A useful mild application to an erosion is Richardson's styptic colloid, consisting mainly of tannin dissolved in collodion. This forms a protecting film, as well as being astringent, and may be used at intervals after one or two applications of a stronger caustic. Dr. Atthill recommends the addition to it of fifty grains of carbolic acid to the ounce. The liquor or linimentum iodi may also be used, or a saturated tincture of iodine,* which Dr. Churchill recommends to be applied once a week to the whole cervix as an absorbent in hyperplasia, after a single application of nitric acid. For an erosion which very readily bleeds, the liquor ferri perchloridi fortior may be used.

Perhaps the most widely useful of all applications, both for the cervical canal and for erosions, is strong carbolic acid, a caustic of medium strength, which leaves little pain behind, since it has a somewhat anæsthetic effect upon the tissue, and is not likely to produce contraction or occlusion of the os. It may be used either simply liquefied by the addition of a sixteenth part of water, or an equal quantity of glycerine may be mixed with this. For erosions the stronger application is preferable. Care must be taken to protect the vagina and vulva. Two or three applications may be made at about a week's interval, and then about three weeks should be allowed for healing. Another good application is "iodized phenol."† For

* Iodine, 75 grains ; iodide of potassium, 30 grains; rectified spirit, 1 ounce. Dr. Goodell recommends an application consisting of tannin 60 grains, and iodine 30 grains, or iodoform 120 grains, dissolved in an ounce of flexible collodion.

† Take of iodine, ℥ss. ; crystallized carbolic acid, ℥ij. ; water, ℥ij. Mix and combine by gentle heat. Use either pure or diluted with glycerine

severe forms of villous erosion, and for extensive cystic degeneration of the cervical canal, strong nitric acid is the best application. Recourse should also be had to the same caustic, if an erosion resists all milder remedies. While it produces a superficial eschar, its action is not deep, if it is not left very long in contact, and it does not usually produce much pain when applied to the cervix, though in some susceptible persons it evokes hyperæmia of the uterus, with reflex nervous symptoms, lasting for some days. The vagina should be protected, the swab of nitric acid should be kept in contact not more than a minute or two, and a large swab, freely soaked in water, should be applied afterwards. One application of nitric acid is often sufficient, and it should not generally be used more than two or three times, at intervals of about four weeks. It may be followed by the milder astringents, as styptic colloid or a solution of nitrate of silver. Next in value among the stronger caustics is a solution of chloride of zinc (gr. 300-450 ad ℥i). The acid nitrate of mercury is used by some in place of nitric acid, but it does not appear to have any advantage over it, and has occasionally produced salivation in susceptible subjects. Marion Sims' favourite caustic for villous erosion was chromic acid, dissolved in an equal quantity of water. He applied a drop or two on a pointed glass rod to the granulations only. Unless its action is very carefully limited it is rather a painful caustic, and occasionally poisonous symptoms have been produced by its absorption when used freely. For the treatment of the same affection Schroeder recommended the repeated application of acetic acid, poured into a cylindrical speculum.

Astringent or mildly caustic liquids are used most conveniently through a Ferguson's speculum; and this plan is especially desirable when an application to the vagina for vaginitis is required at the same time. A teaspoonful or more of the fluid, enough to cover the cervix, is poured into the speculum, the patient being

in the dorsal position. It may then be introduced into the cervical canal by a Playfair's probe or sound very thinly wrapped with cotton, and passed up to the internal os. Solutions of sulphate of copper (gr. 40-60 ad ʒi.), of nitrate of silver (gr. 20-40 ad ʒi.), and of chloride of zinc (gr. 90 ad ʒi.), are favourite ones for use in this manner. If nitrate of silver is used in this way care should be taken to protect the patient's linen from staining.

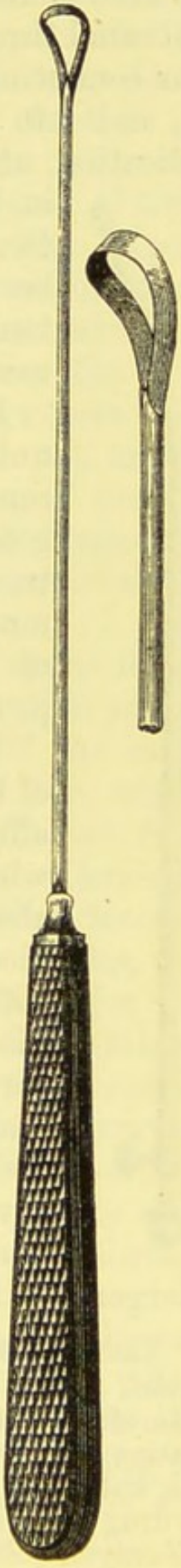


Fig. 92.—Sims' Curette.

Some cases of glandular degeneration round the edge of the os, and in the cervical canal, may resist the action even of nitric acid. The choice then lies between the use of deeper caustics, as potassa cum calce, potassa fusa, the benzoline or actual cautery, and the scraping away the diseased glands with a sharp steel curette (Fig. 92). The latter appears generally preferable, as less likely to cause contraction or occlusion of the cervix; but if the diseased condition is superficial, a single application of the benzoline cautery may suffice to cure. After the use of any of the stronger caustics it is a good plan to apply a tampon soaked in glycerine. Care should also be taken that contraction of the cervix does not arise; and, if necessary, a large metallic bougie should be occasionally passed. Occlusion has been produced by the repeated use of the solid nitrate of silver.

In the more chronic stages of cervical endometritis, the solid points of fused sulphate of zinc with alum are one of the most effective applications, but they are liable to cause a good deal of pain

and irritation when any active hyperæmia is present. The zinc point is passed for its full length into the cervical canal through a speculum, or by means of an applicator consisting of a tube provided with a piston (Fig. 93), and left there to dissolve. For the first time of application, at any rate, it is well to have the patient in bed, and to keep her in bed for a day or two afterwards. Milder applications may be made in the form of crayons containing tannin or other astringents, but these are usually less convenient than liquids.*



Fig. 93.—Tube for introducing Zinc Points into Uterus.

In some cases of cervical endometritis in nulliparous women, it is found that the os remains small, and the cervix has undergone little apparent change. Before local treatment can be satisfactorily used, the os must be dilated. This may be done by any of the methods previously described (*see* p. 55).

The inflammation of the whole thickness of the cervix, tending to hyperplasia, is little affected by internal remedies. At the stage when it is beginning to pass into induration, absorbents used locally may be of some service. A convenient application is iodized cotton, containing 20 per cent. of iodine. A pledget of this is placed in contact with the cervix, and kept in position by a tampon soaked in glycerine. Iodide of potassium and iodine may also be used dissolved in glycerine or in the form of suppositories. The treatment of the resulting cervical enlargement has been already considered (*see* p. 158).

* Tannin may be made into a crayon with glycerine alone: tannin, gr. xxx.; glycerine, ℥iij. For other drugs, fifteen parts of the drug may be used to fifteen parts of powdered gelatine and two of glycerine. The gelatine is first moistened with water and then mixed with the glycerine in a water bath, the drug being afterwards added. The mass is then rolled out into crayons like a pill-mass.

Treatment of Ectropion of the Cervix.—After slight laceration of the cervix, any exposed cervical mucous membrane has its epithelium at length converted into the squamous variety, a process which may be accelerated by the use of astringents or caustics. If, however, there is deep bilateral laceration with eversion, this condition always remains a source of irritation and consequent hyperplasia, and the exposed mucous membrane is always liable to granular inflammation. For these cases Dr. Emmet has introduced the operation of *trachelorrhaphy*, or paring the edges of the laceration, and uniting them by sutures. For suitable cases this operation is the most rapid, and the only complete, cure, though the proportion of cases requiring it would seem to have been much exaggerated by some of its enthusiastic advocates, especially in America.

Operation of Trachelorrhaphy.—If the uterus is high up, and cannot be drawn down, the operation may be somewhat troublesome and tedious, but if the cervix can readily be drawn to the outlet of the vagina, the perineum being retracted by a very short Sims' or Simon's speculum, it is a very easy one. Care must be taken, however, not to use any undue traction, especially if there is any trace of a past cellulitis, such as is often associated with a deep laceration, for then there would be a risk of rekindling the inflammation.

Dr. Emmet uses a double tenaculum with diverging points (Fig. 94, p. 236), introduced within the cervical canal, in order to steady the cervix. If, however, any considerable traction is employed, it is better to make it by means of two loops of wire or silk passed through the anterior and posterior lips of the cervix.

The tenaculum shown in Fig. 95, p. 236, may be used either, like Emmet's, as a diverging tenaculum, within the cervical canal, or a converging tenaculum, to seize one lip of the cervix. I have found the following the best mode of holding the cervix. Each lip is first seized with the tenaculum hook (Fig. 32, p. 60), and

drawn into convergence with its fellow, in the position which it is to occupy when united. A firm hold of it

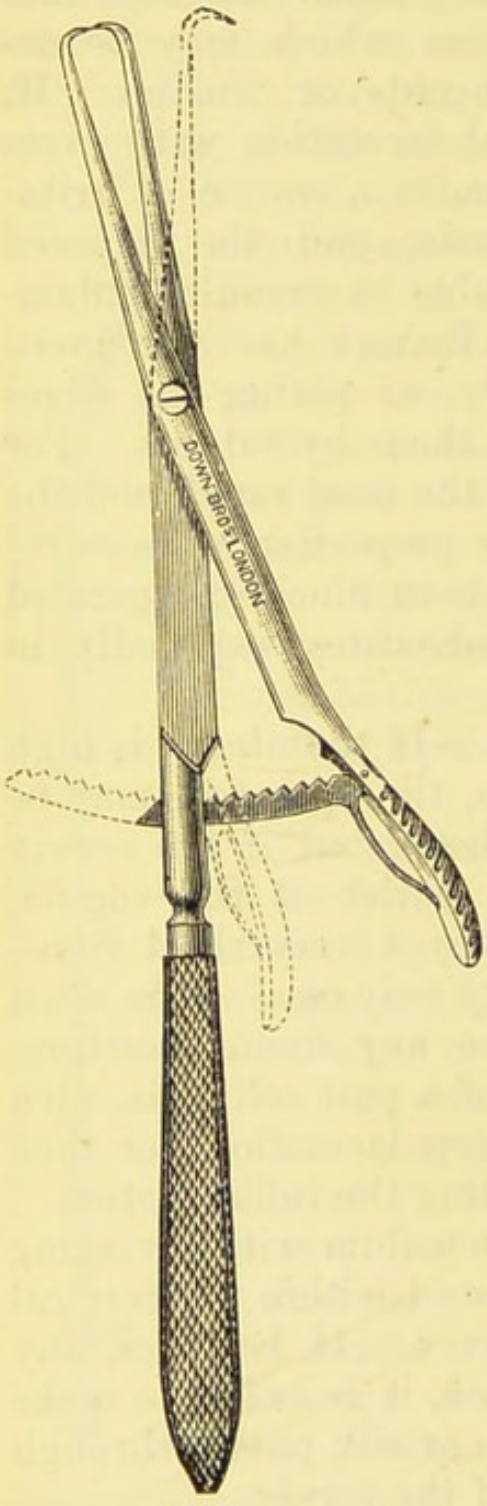


Fig. 94.
EMMET'S Uterine Tenaculum.

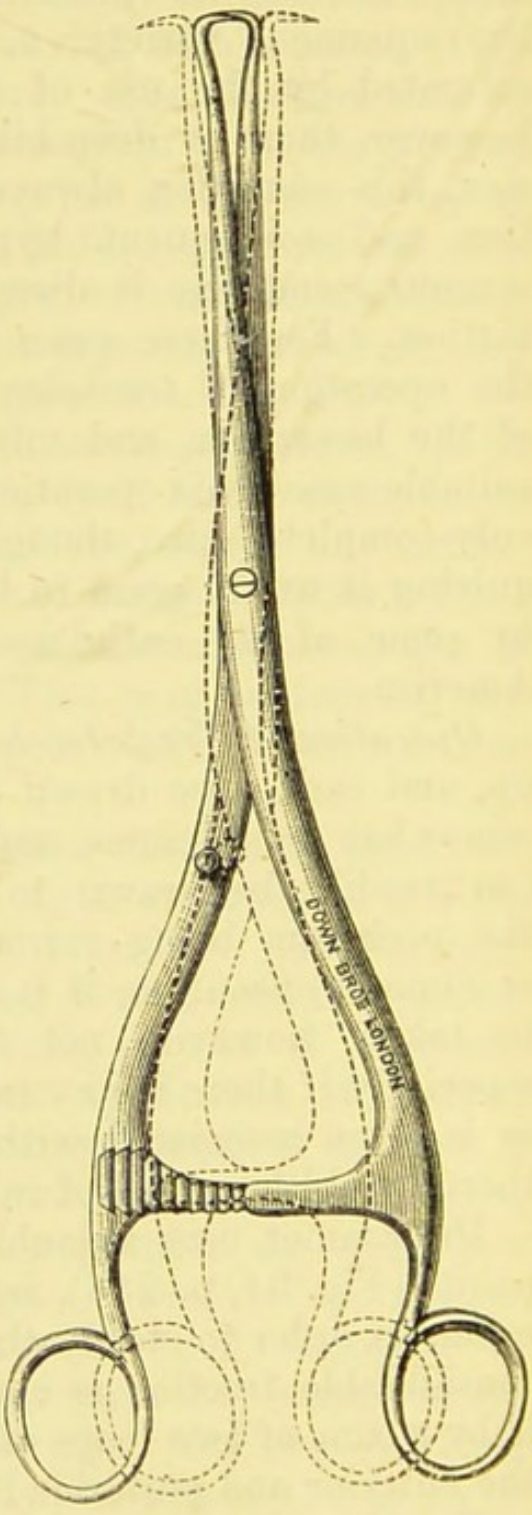


Fig. 95.
The AUTHOR'S Uterine Tenaculum.

can then be obtained with the double-pointed tenaculum (Fig. 20, p. 44), or, if the cervical canal is not very wide, with the single tenaculum (Fig. 95), which

occupies less room. The other lip is secured in the same way. Each lip can then be drawn down and made to converge or diverge as desired.

It is convenient to place the patient on the left side to freshen the right side of the cervix, and conversely. The mode of freshening the sides of the laceration and placing the sutures is shown in Fig. 96. The figure will be more readily understood if it is compared with Fig. 84, p. 220, representing the appearance of the laceration with granular inflammation. When the sutures

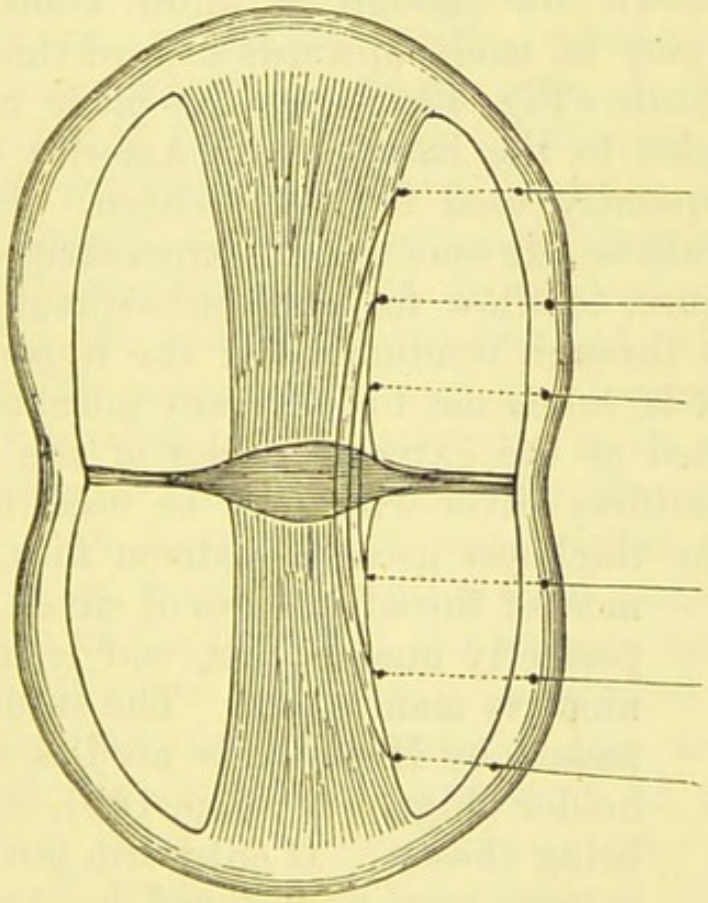


Fig. 96.—Lacerated Cervix, after denudation on both sides, and application of sutures on one side.

are tightened, the two lips of the cervix, at the top and bottom of the figure, are brought into contact. In general, two or three sutures at each side are sufficient, but for a deep laceration four or five may be required. Dr. Emmet has introduced a "uterine tourniquet," in order to constrict the cervix during the operation. The hæmorrhage, however, is very rarely sufficient to call for any such expedient, and it is always

arrested by tightening the sutures if the freshened surfaces are accurately adapted. If the cervix is drawn to the vulval outlet, it is preferable to freshen the edges with a narrow-bladed knife, such as that used for vesico-vaginal fistula. I usually transfix near the angle of laceration, and cut outward and downward, having pinched up the tissue to be removed with an artery tenaculum; then repeat the same process on the opposite side; and finally, finish off the angle, taking out the tissue removed in one piece. If the cervix cannot be drawn low enough to allow transfixing, the incisions may be made upwards toward the angle with a Sims' knife (Fig. 43, p. 90), the blade being set at right angles to the handle. In America scissors are more frequently used for the incision. The cervical canal should be left somewhat trumpet-shaped, as shown in the figure, to allow for some subsequent contraction of the os through diminution of the hyperplasia, and care must be taken not to leave any mucous membrane unfreshened at the extreme angles of the lacerations. For the sutures silver wire may be used, or silkworm gut of the thickness used for salmon flies. This has most of the advantages of silver wire, being perfectly unabsorbent, and is more convenient to manipulate. The sutures are best passed by Hagedorn's needles and needle-holder (Figs. 73, 74, p. 163), stout needles being chosen. If silkworm gut is used, the sutures may be fastened by Aveling's coil and shot (Fig. 97). The coil is made by winding silver wire very closely round a metal rod or stylet. The two ends of the sutures are passed first through a bead, then through the coil, and when tightened, are fixed by a perforated shot. The suture is then removed with very great ease, for the coil being cut through with scissors just below the shot, and coil and bead being removed, the two ends of the suture are left projecting, and can be easily seized with



Fig. 97.—Aveling's Coil and Shot.

forceps. I have found, however, that simple tying answers as well. The sutures should be removed after an interval of about ten days. They should be taken out from above downward. If any tendency to separation appears, the lower sutures may then be left two or three days longer. In cases of laceration limited to one side, the operation need be performed on the one side only.

The cases most urgently calling for trachelorrhaphy are those in which there is much eversion of the lips of the cervix, granular inflammation of the exposed cervical mucous membrane, with enlargement and tendency to descent of the whole uterus. It is not usually required if the epithelium of the exposed surface has been completely converted into the squamous variety, and there is no inflammation of the cervix. It is easiest to restore the cervix to its original shape and condition, and the operation answers best, when it is performed within a year or two of the laceration, and before the cervix has become indurated in its deformed shape from chronic inflammation, or the effect of caustic applications. In lacerations of many years' standing, there may be so much induration and resistance to approximation of the lips, that the sutures tend to cut out from the tension. This may be averted to some extent, if the anterior and posterior lips are drawn together centrally by temporary sutures of silkworm gut. In other cases, it is necessary to take a wedge-shaped piece of tissue out of the centre of each lip by transverse incisions, in order to allow the approximation.

Schroeder's Operation.—In cases in which there is much granular inflammation, with hyperplasia of glandular tissue, extending further outward than the surfaces which are turned inward into the cervical canal, when the lips are drawn together, or if the cervix is so rigid and indurated in its everted position that the lips cannot be satisfactorily drawn together, Schroeder's operation may be performed. At the base of each lip

a transverse incision, *a b* (Fig. 98), is made completely through the thickness of the mucous membrane, slanting somewhat upward. This is joined by another incision, *c b*, made from without, so that the whole of the granular surface and glandular tissue is removed in a wedge-shaped piece. Sutures are then passed as shown in the figure, so that the point *c* is brought to *a*, and *b'* to *b*. If necessary, this operation may be followed by trachelorrhaphy, or even combined with it in one operation. Schroeder performs it in cases of glandular inflammation and proliferation, even when there is no

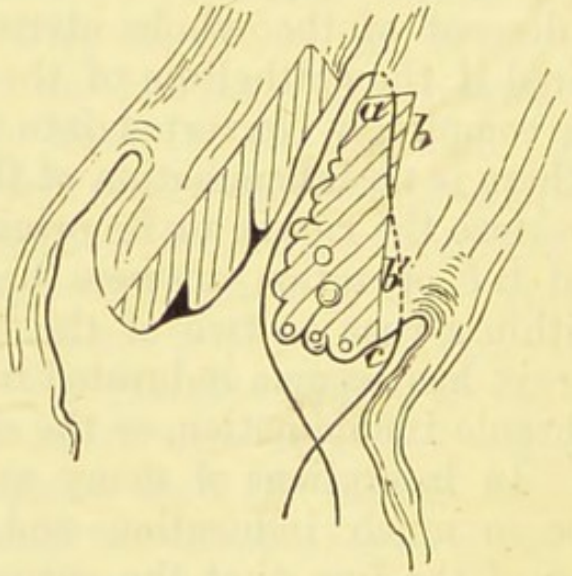


Fig. 98.—SCHROEDER'S Operation for Excision of Cervical Mucous Membrane.

laceration, first dividing the cervix laterally as far as the fornix with scissors.

If, on account of fixation of the uterus by cellulitic thickening, or for any other reason, it is decided not to operate, and there is inflammation of the exposed cervical mucous membrane, the object will be to hasten the conversion of the epithelium into the squamous variety. For this purpose one or two applications may be made, in the first instance, of one of the stronger caustics, such as nitric acid, the benzoline cautery, or even potassa fusa cum calce, or potassa fusa.

SYPHILITIC ULCERATION OF THE CERVIX.—Primary chancre may occur on the cervix, but is very rare in

this situation. The ulcer is marked by sharply-cut, indurated edges, depressed surface, and a tendency to become covered with false membrane. Mucous patches on the cervix are also rare, as also is tertiary syphilitic ulceration. The latter forms an excavated ulcer which readily bleeds, and is apt to be mistaken for an early stage of cancer. It is not generally accompanied by so much pain, or so great fœtor in the discharge, but the history of constitutional syphilis will guide much in the diagnosis. Syphilitic ulceration has occasionally even laid open the rectum or bladder. It is generally distinguished from simple erosion by its not being close to the os, in continuity with an inflamed cervical canal, but separated from the os by a bridge of intact tissue.

CHRONIC ENDOMETRITIS AND CHRONIC METRITIS.

Pathological Anatomy. — Chronic endometritis proper, or chronic corporeal endometritis, consists of inflammation of the mucous membrane of the body of the uterus. The inflammation is not absolutely limited to the mucous membrane, but extends to some extent, slight or considerable, into the substance of the organ (*see* p. 195), and is accompanied by more or less active hyperæmia of the whole uterus. Endometritis and metritis are therefore not separate affections, but the terms may be used respectively to indicate the preponderance of the disease of the mucous membrane, or that of the parenchyma, in different cases. Endometritis and metritis are frequently associated with subinvolution, of which they are often the cause, and with the effects of passive hyperæmia, which renders the tissue more vulnerable to irritating causes.

In milder and more recent cases of endometritis, the mucous membrane is swollen and hyperæmic. The inter-glandular stroma of this mucous membrane normally approximates towards the character of an

embryonic tissue, and hence it shows much less marked histological changes under the influence of inflammation than the mucous membrane of the cervix. The microscope shows more marked changes in the glands than in the inter-glandular stroma. These glands become dilated irregularly, and are filled with more or less rounded cells, instead of being lined for the greater part of their course with uniform cylindrical epithelium. The cylindrical epithelium on the surface, if retained in the microscopic section, is also seen to have become deformed and irregular. The superficial layers of mucous membrane may eventually be thrown off, and by irregular proliferation villous or polypoid masses may sprout up. This constitutes the more severe disease of *fungoid or villous endometritis*, of which hæmorrhage is the prominent symptom. In the chronic forms of this, as in the case of so-called villous erosions of the cervix, the disease shows more of the characters of growth, or glandular hypertrophy, than of inflammation; and is in fact a diffused superficial adenoma of the mucous membrane. (*See* Fig. 99.) The secretion in milder forms of endometritis is an alkaline mucoid fluid, less tenacious than that of the cervix. When the inflammation is more severe it is muco-purulent, and may become rusty from slight admixture of blood, or more decidedly sanguineous. After long-continued endometritis, especially when the parenchyma is considerably affected, the mucous membrane becomes atrophied and thin, and its cells are infiltrated with an abnormal fibrillated tissue. The menstrual changes in the mucous membrane are then interfered with, and menstruation is generally scanty.

The parenchyma is most involved in those cases which originate in the more acute forms of inflammation, septic or otherwise, of the whole substance of the uterus, especially those which originate after labour or abortion. Even when the disease does not immediately follow upon parturition, but originates in catarrhal inflammation of the mucous membrane at a

later period, after involution is complete, it tends to involve the parenchyma more in the parous than in the nulliparous uterus, on account of the looser texture of the uterine walls. In the early stage of chronic metritis the tissue is soft, red, swollen, and succulent, from infiltration of serum, and therefore prone to flexion. The uterus becomes enlarged, even when not already large from the effect of subinvolution, but

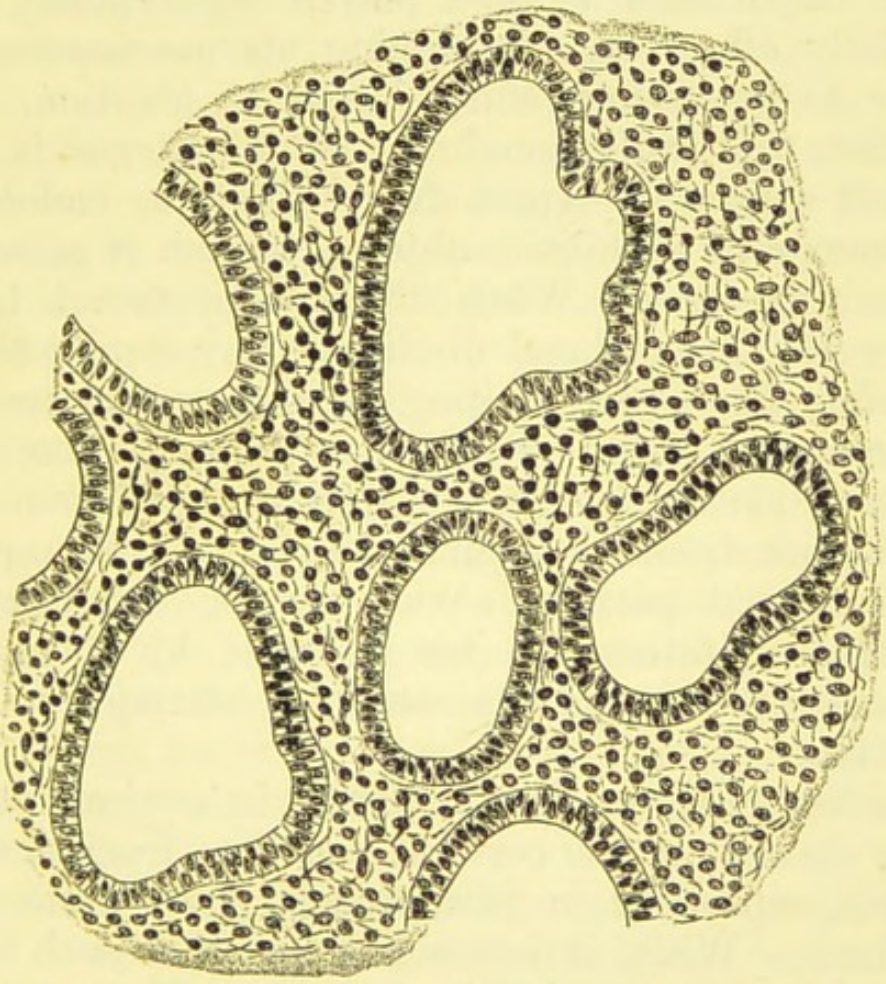


Fig. 99.—Section of a Prominence in Fungoid Endometritis.

the enlargement is more in the thickness of its walls than in its length, especially in the nulliparous uterus. At a later stage the tissue is indurated by growth of connective tissue, and the state of hyperplasia, which has already been described (p. 180), is reached. Some degree of degeneration of tissue may arise from passive hyperæmia; but, in the absence of any cause of venous obstruction, the degree of fibroid induration may be taken as a measure of the degree to which

inflammation has extended through the parenchyma. In the majority of cases, especially in the parous uterus, the cervix as well as the body is involved in chronic metritis.

Causation.—Among predisposing causes of chronic corporeal, as well as of cervical, endometritis, are general debility, mental depression, chlorosis, and a strumous, rheumatic, or gouty diathesis. A part of some importance is also played by syphilis, which specially affects the developing uterine mucous membrane in pregnancy, and so leads to abortion. After abortion the lining membrane of the uterus is apt to be left diseased. Apart from abortion, endometritis is common in syphilitic subjects, though it presents no distinctive signs. When the constitutional taint is active the leucorrhœal discharge may convey the contagion. The chief exciting causes are the results of acute endometritis and metritis, the retention of portions of placenta, clots, or decidua, extension of inflammation from the vagina and cervix, cold, especially at menstrual periods, sexual excess, and direct mechanical irritation, as, for instance, by intra-uterine pessaries, the use of the sound, or attempts to induce abortion.

Endometritis is often observed in conjunction with some obstacle to the cervical canal, as from stenosis or flexion, especially in patients who suffer from dysmenorrhœa. While it does not appear that such obstacle can by itself set up inflammation, yet the retention of secretion within the cavity of the uterus aids the proliferation of any microbes which may be associated with the inflammation, and thus retards recovery from any casual catarrh which may have arisen from cold or any other cause. This effect is increased if the menstrual blood forms clots within the uterus, from not escaping quickly enough into the vagina; or if shreds of menstrual decidua are detained.

Inflammation of the cervix, extending from the vagina, is more likely to affect also the body of the

uterus, the more acute is its character. This is especially likely, therefore, to take place in the case of gonorrhœa, although a non-specific inflammation may occur, so acute as to be indistinguishable from it. The foundation of chronic endometritis and metritis is often laid at the commencement of married life, and though this may result simply from marital imprudence, yet gonorrhœal contagion is not an infrequent cause. Dr. Noeggerath, of New York, has maintained that gonorrhœa, in both sexes, persists for life in certain sections of the organs of generation, notwithstanding its apparent cure; that this "latent gonorrhœa" may affect a healthy person either with an acute attack, or with a similar chronic inflammation, which, in women, is apt to lead not only to chronic endometritis, but to ovaritis, pelvic peritonitis, or even puerperal septicæmia. He also regards this infection from latent gonorrhœa as the commonest cause of sterility. It can scarcely be doubted that this view as to the incurability of gonorrhœa is greatly exaggerated. But it appears to be the fact that a latent gonorrhœa or gleet in the husband very frequently infects the newly-married wife with an inflammation which is not acute enough for its nature to be obvious, but is yet the starting point of chronic endometritis and consequent sterility.

Results and Symptoms.—The most constant symptom of corporeal endometritis is leucorrhœa. The discharge is of a less clear and tenacious character than that secreted by the cervix, and is more frequently muco-purulent. Very often it has an irritating effect upon the vagina and vulva. The discharge may collect for a time in the uterus, and be expelled occasionally, leading the patient to imagine that an internal abscess has burst. When endometritis is not limited to the cervix, but affects the body of the uterus, some menstrual disturbance is almost invariable. In the early stages the flow is usually profuse, painful, and often irregular, and is followed for some

days by an excess of leucorrhœal discharge, which is often rusty from slight admixture of blood. Hæmorrhagic discharges in the intervals are not uncommon. Of fungoid endometritis the prominent symptom is profuse and intractable menorrhagia or metrorrhagia. In the later stages of endometritis, when, with general induration of the whole uterus, there is degeneration of the mucous membrane, menstruation becomes scanty, and generally painful. Sterility is a common result at all stages, from the destructive effect of the altered secretion upon the spermatozoa, or from the mucous membrane having ceased to form a suitable nidus for the ovum. If pregnancy happens, the previous endometritis may merge into a decidual endometritis. Hence may arise decidual or placental hæmorrhages, abortion, or adhesion of the placenta at full term.

The more prominent general symptoms of endometritis depend upon the whole parenchyma of the uterus being affected by reflex hyperæmia, or more or less involved by extension of inflammation to the deeper tissues. They vary greatly in intensity, according to the degree of such extension and the susceptibility of the patient to reflex nervous disturbance. Dragging pain is felt in the hypogastrium and groins, often extending down the thighs, and also in the back, generally at a somewhat higher level than in affections of the cervix—that is to say, over the upper part of the sacrum or last lumbar vertebra. The pain is frequently most acute in one groin, generally the left, a circumstance sometimes, but by no means always, explained by the participation of the ovary on that side in hyperæmia or inflammation. There is usually tenderness on pressure over the situation of the uterus. Pain is greatly increased by locomotion or coitus, and the latter often leads to an aggravation of distress of considerable duration. More or less disturbance of the functions of bladder and rectum is generally produced. There is pain in micturition and defecation from the pressure upon the tender uterus

produced in any bearing-down effort, and frequently also irritability of bladder. Sometimes there is diarrhœa, from a similarly irritable condition of rectum, but more frequently, constipation, arising, in great measure, from the reluctance of the patient to make any effort.

Numerous other general symptoms are more or less directly connected with uterine disease, and gynæcologists have been accused of claiming too much importance for the local condition as a cause of such disturbances. It would obviously be erroneous hastily to assume that any nervous affection or digestive disturbance in a woman was dependent upon the uterus or ovaries, in the absence of local symptoms pointing to such a cause. On the other hand, a reflex symptom may be the subject of much more complaint than symptoms directly connected with the primary cause, especially when the latter are of a nature which women often do not mention until cross-examined on the subject. Reflex symptoms are not necessarily proportional to the intensity either of the local disease or of the local symptoms, but depend much more upon the susceptibility of the nervous centres. This is proved by such familiar instances as the vomiting of pregnancy, which may occur when there is no local distress and pregnancy is quite unsuspected, or as an attack of asthma produced by a late supper, or a headache due to irritating material in the alimentary canal, and relieved at once by a purgative. I have known the so-called hysterical knee-joint to be complained of by a neurotic woman during the few days preceding menstruation on each occasion, and at no other time, although there were no local symptoms in the pelvis. In this case the relation to the uterine system could not have been proved except by the coincidence in time. In an individual case it may be a matter of extreme difficulty to decide whether a given symptom is reflex; and the only hope of solution will sometimes lie in the therapeutic test of

treating the uterine or ovarian disorder, if evidence is found of the existence of one.

No one can doubt that chronic endometritis or metritis is capable of producing such reflex symptoms as pain in the dorsal, lumbar, or sacral regions, or extending down the thighs and legs; pain in the course of the ilio-hypogastric or ilio-inguinal nerves, not necessarily dependent upon any inflammatory change in the ovary; also pain and irritability in the bladder or rectum. To these may be added pruritus of the vagina or vulva, vaginismus, and pain and tenderness in the coccyx, apart from any inflammatory lesion of that structure, all which symptoms may arise through reflex hyperæsthesia. These pains are liable to exacerbations at or near menstrual periods, or from the effects of coitus, as well as from general causes, such as exertion or the effect of cold. As might be expected from the close sympathetic connection between the breasts and the uterus, the breasts may be affected by uterine disturbance. Neuralgic pain in the nipples or glands is not uncommon about the time of the maximum development and congestion of the uterine mucous membrane, shortly before the onset of the menstrual flow, especially in conjunction with dysmenorrhœa. In cases of chronic endometritis or metritis, the glands sometimes become enlarged, containing a mucoid secretion, and their areolæ darkened, so that a patient may often imagine herself to be pregnant, especially when tympanitic distension of the abdomen is present. Histological researches have shown that the type of scirrhous cancer of the breast corresponds to a condition which is normal at the very earliest stage of the natural evolution of the breast in pregnancy, at which stage it is the normal destiny of the epithelial cells of the acini to pass into the connective tissue stroma.* Hence it appears probable that a similar abnormal stimulus to gland activity, very pro-

* See Dr. C. Creighton's work, "Contributions to the Physiology and Pathology of the Breast."

tracted, but of a still lower intensity than that which evokes a mucoid secretion, may be a cause of cancer of the breast, not having a traumatic origin; and clinical experience appears to give some support to this view.

The close nervous connection of the stomach and other digestive organs with the uterus is equally undeniable, and is demonstrated by the vomiting and other digestive disturbances of pregnancy. Sexual excitement may produce nausea or even vomiting, when congestion or inflammation of uterus or ovaries exists. Also, in chronic congestion or inflammation of the uterus, flatulent distension of the abdomen, eructation, nausea, and vomiting are frequent results, especially in hysterical subjects, and more or less dyspepsia is almost invariably produced. The effects of ovarian irritation are very similar, and both are explained, on anatomical grounds, by the connection of the sympathetic nerve supply of the upper part of the uterus with the ovarian plexus, and through this with the upper aortic and renal, and so with the solar plexus. In accordance with physiological doctrine, irritation of the sympathetic system inhibits the secretion of gastric juice and other digestive fluids; and hence arises failure of digestion and fermentation of the food, by which catarrhal gastritis and enteritis may be subsequently set up. The failure of nutrition thus brought about is a prominent symptom of uterine or ovarian disorder, which, in this way, may be, in predisposed subjects, the starting point of phthisis.

Other general results of uterine disease are of a more indirect kind. The local malady may affect the general health, not only by its adverse influence on the digestion, but by interfering with locomotion. Owing to the pain produced by movement, the patient is deterred from obtaining sufficient air and exercise to fulfil the hygienic requirements for healthy life. It is often doubtful whether distant effects are produced in this way, or directly by reflex nervous influence, and pro-

bably, in many cases, both modes of causation are more or less combined. Among the symptoms common in patients suffering from chronic uterine inflammation, are neuralgic pains in various localities, as along the edges of the false ribs, but more especially at the top of the head or under the left breast, the last form of pain being often accompanied with palpitation. This infra-mammary pain would seem to have a direct nervous association with the tendency to pain in the left groin, rather than the right, and with the greater frequency of congestion and swelling in the left ovary. Other reflex neuroses are occasionally produced, such as asthma, or catarrh of the fauces or air-passages; but in individual cases of this kind the link of causation is very difficult to establish, unless it is proved either by a relation to menstruation, or by the effect of local treatment directed to the uterus, or of the intervention of pregnancy.

Various changes of nutrition, somewhat resembling those of pregnancy, such as dark rings under the eyes or general darkening of the skin by pigmentation, may result from chronic uterine or ovarian disorder. Eczema is not uncommon, and acne still more frequent; while the time of outbreak of these eruptions often has a relation to menstrual periods. With the general breakdown of health to which uterine and ovarian disorder often leads, are frequently seen loss of hair and failure of sight, especially a form of amaurosis depending upon chronic optic neuritis. In patients predisposed to hysteria the multiform manifestations of this disorder are an early result, and are generally aggravated at menstrual periods. In these cases, however, hyperæmia and tenderness, if not inflammation, of one or both ovaries are generally found to exist, in addition to the uterine affection. A vaginal examination, or pressure upon the uterus or ovary, will often excite a nervous paroxysm, noisy eructations, or a feeling of nausea or faintness. In patients having a different predisposition, the nervous disturbance may take the form of epilepsy,

hystero-epilepsy, or positive mental aberration, generally of the melancholic type.

Some evidence has been adduced that, in cases of uterine disturbance, attacks of articular rheumatism may be repeatedly associated with menstruation. A form of rheumatism has also been described, analogous to gonorrhœal rheumatism, but distinct from it, in that it affects chiefly the smaller joints, and arising in connection with leucorrhœa or pregnancy.* In favour of the possibility of such a connection may be quoted the prevalent theory which regards ordinary gonorrhœal rheumatism in the male sex as produced rather by reflex nervous influence than by an absorption of poisonous material approximating toward the pyæmic character. Chronic rheumatoid arthritis is much commoner in the female than in the male sex, and its subjects have often suffered from uterine disturbance, but the connection here may be merely the deteriorating effect of uterine disease upon the health.

Partial or complete paraplegia (such as occasionally arises after delivery, without any difficulty in parturition likely to cause direct lesion of nerve trunks) is another symptom which has been considered a reflex effect of uterine disease, but whose causation is difficult to trace. In most such cases the paralysis is functional, and more or less allied to hysteria. But to call a symptom hysterical is not completely to explain it. Indeed, the hysterical temperament chiefly implies that reflex, as well as emotional, sensibility is exalted, while the control of volition is diminished. Hence, in these cases of paraplegia, as in that of hysterical vomiting, it may be desirable to attempt to remove any uterine cause of irritation, although, especially in the unmarried, over-much local interference is undesirable, and moral treatment is of chief importance. Whether a reflex paraplegia, dependent upon actual chronic myelitis, can result from uterine inflammation, as the so-called reflex

* See papers by Dr. Ord, "Brit. Med. Journ." Jan. 31, 1880; by Mr. Davies-Colley, "Obstet. Journ." June, 1878.

paralysis has been supposed to result from positive and severe inflammation (rather than mere irritation) of the bladder, prostate, or kidneys, there is, as yet, no evidence to decide.

A recent endometritis, in which the parenchyma is not much involved, will generally yield to treatment; but chronic metritis, when it has reached the stage of induration, is one of the most obstinate of diseases. Untreated, it is commonly limited only by senile atrophy; and even under the most judicious treatment, only a relative degree of cure is usually attained, and relapses frequently occur.

Diagnosis.—Corporeal is distinguished from cervical endometritis by the nature of the discharge, which has not the tenacious glairy quality distinctive of the cervical secretion, but is either thin and mucoid, muco-purulent, or, what is more characteristic, has a slight rusty tint. There are also greater tenderness and enlargement of the body of the uterus, as detected by bimanual examination, and disturbance of menstruation is a more constant symptom. The sound shows lengthening of the uterus, not accounted for by cervical hyperplasia. On reaching the fundus it usually causes considerable pain, and frequently nervous disturbance. Slight bleeding often follows upon its withdrawal. The cervical canal is generally more dilated than normal, but in cases of endometritis of the nulliparous uterus without affection of the cervix it may be the opposite. The cervix may be normal in nulliparous women, but in other cases it is usually involved in the hyperplasia. In cases of doubt, whether inflammation affects the body of the uterus or the cervix only, the doubt may be resolved by the persistence of the symptoms after treatment of the cervical disease. The diagnosis of *fungoid endometritis* may be established in two ways. (1.) The cervix may be dilated by a tent, and the finger passed up the fundus in the manner described with reference to evacuation of the uterus after abortion (p. 158). The villous surface will then be felt.

(2.) The blunt wire curette of Dr. Thomas, an instrument shaped like Sims' curette (Fig. 92, p. 233), but having a loop a quarter of an inch in diameter, made simply of copper wire $\frac{1}{12}$in. to $\frac{1}{16}$in. thick, may be used as well for diagnosis as for treatment. This may be introduced without dilatation of the cervix if the canal be moderately patulous, and the cavity of the uterus gently scraped. The fungoid prominences will be brought away, and their character may be recognized by the microscope. If a sharp curette were used a fallacy might arise from the scraping away of the normal mucous membrane. But, if thick strips of mucous membrane, still more, if rounded prominences, are brought away by the blunt curette, it may be concluded that the mucous membrane is morbid. Microscopic sections may also be made from the pieces, to determine the exact condition.

Treatment.—All exciting causes, such as inflammation of the cervix, or serious displacement of the uterus, should be removed if possible. Thus, when erosion or cervical endometritis is present, local treatment should be directed to the cervix first, since it is more readily accessible to such medication. When displacements are present the most important point to decide is whether to resort at once to a pessary, or first to treat directly the inflammation. As a general rule, in retroversion or retroflexion of any important degree, as well as in prolapse, a vaginal pessary may be employed with advantage either immediately or after a short course of rest and local depletion, and the successful use of other means will then be facilitated. Even when no displacement can be detected, relief is sometimes afforded by the use of a Hodge's or elastic ring pessary, which limits the mobility of the tender uterus, keeps it in a position of slight anteversion, and resists any tendency to partial prolapse. The hypogastric belt may also give relief.

Active and passive hyperæmia are to be treated by the means enumerated under those headings (pp. 197-

202), especially frequent, but not too prolonged, rest in a completely horizontal position, the use of hot water injections, the administration of saline laxatives, bromide and iodide of potassium, ergot, strychnia, or digitalis, and when much tenderness is present, local depletion either by blood-letting or the application of glycerine. Coitus must be strictly limited, though it is not always desirable to enforce an absolute prohibition, especially when ovarian hyperæmia exists. Internal remedies have little influence upon the inflammation of the parenchyma; but when the enlargement is passing into the stage of induration, the liquor hydrargyri perchloridi may be given in doses of from thirty to eighty minims three times a day.* This may often be usefully combined with small doses of quinine, or, in the absence of general or local hyperæmia, of the tincture of perchloride of iron. Iodide of potassium may also be tried as an absorbent, or, if menstruation is scanty, tincture of iodine, in doses of from five to ten minims. The latter often acts as an emmenagogue in chronic metritis.

Every possible hygienic means should be taken to promote the general health, especially by fresh air, cold or sea bathing, sufficient mental occupation, and change of scene. A stay at a pleasant watering-place or hydropathic establishment, or a sea voyage, is thus of great service. These advantages may be combined with the effects of bromine and iodine in mineral waters, both in the form of baths and internally, at certain celebrated watering places, especially Kreuznach, the virtue of whose water depends chiefly upon bromide of magnesium. The water of Woodhall Spa, in Lincolnshire, has a similar effect, but contains a greater proportion of iodine. The imported Kreuznach salt may also be used for hip baths, or in concentrated

* For prolonged use, the mercury is most readily taken after meals in the following mixture:—Liq. Hydrarg. Perchlor. ℥lx.—lxxx.; Acid. Hydrochlor. dil. ℥x.; Syrupi ℥j.; Aq. ad ℥j.—ter quotidie.

solution, for abdominal compresses. Diet should be nourishing but very simple, in view of the so constantly attending dyspepsia. Alcohol should be much restricted, since by relaxing the arteries it promotes active hyperæmia, and, moreover, chronic uterine disease is one of the commonest causes of intemperance in women, who are led to take spirits for the temporary relief of pain, or of the feeling of sinking or depression from which they so often suffer. Taken with meals, however, a moderate allowance of alcohol may be useful as a stimulus to digestion, and a good claret or Burgundy is generally the best form to recommend. If any tendency to excess be suspected, it is better to enjoin total abstinence. The treatment by massage for cases of neurasthenia with emaciation, associated with chronic uterine or ovarian disorder, will be described under the head of Ovaritis.

In so protracted a disorder as chronic metritis, it is desirable to avoid as far as possible the administration of opium or morphia, lest the patient become dependent upon the drug. If required during exacerbations or at menstrual periods, a morphia suppository may be given *per rectum*. For soothing pain, warm hip-baths, or what are still more effective, whole baths, are a valuable resource. Vaginal douches at a temperature of from 110° to 115° F. have the further effect of stimulating absorption and diminishing the size of the uterus by the contraction of the uterine muscular fibres, and of the arterial walls, which they produce. It is well, however, to commence the injections at a more moderate temperature, and gradually to increase the heat. When sedatives are required, others than opium may be tried in the first place. Bromide of potassium, belladonna, hyoscyamus, cannabis indica, or camphor may be given internally, and chloral if required to procure sleep. Of these belladonna acts most upon the sympathetic system, and is especially valuable in vesical tenesmus, while it is often a useful addition to opium ; hyoscyamus has a greater soporific effect ; and

both of these are useful for their laxative tendency. Cannabis indica has a special influence in neuralgia and headache, besides being a general sedative. Camphor is an anaphrodisiac as well as sedative if given in doses of as much as from five to ten grains. Bromide of camphor has been recently introduced, and may be given in capsules. Iodoform may be given with advantage in a suppository containing five grains, introduced *per rectum*. Belladonna suppositories are also more effectual *per rectum* than *per vaginam*. Sedatives are also useful when introduced *per vaginam*, but must then be employed in larger doses. Absorbents, such as iodine, iodide of potassium, or iodoform, may be used in the same way (*see* p. 228).

Counter-irritants are not only valuable for relief of pain, but exercise an alterative effect upon chronic inflammation. They also appear to relieve reflex neuroses, such as vomiting, by a kind of inhibitory effect upon the nervous system. Flying blisters may be produced on the hypogastrium or groins by blistering fluid, and repeated at intervals. If, however, there is any tendency to vesical tenesmus it is well to avoid the use of cantharides, and employ some other counter-irritant, as the linimentum or strong tincture of iodine (*see* p. 231), repeatedly applied. Reflex pains may be relieved by applications to the nerve-terminations at the seat of pain, such as mustard poultices, turpentine fomentations, or a small quantity of the linimentum sinapis co. sprinkled on spongio-piline and kept applied six or eight hours. As a counter-irritant the linimentum crotonis may be applied with a sponge, or, as a sedative, equal parts of linimentum aconiti and linimentum belladonnæ may be used. In the same way comfort is afforded by plasters applied to the back, for which purpose emplastrum calefaciens or emplastrum belladonnæ may be used. Strong caustic applications to the cervix, which have been considered under the head of Hyperplasia (p. 186), may prove more effectual counter-irritants than those applied externally.

A vesicating effect on the cervix, followed by a flow of serum, may be produced by vesicating collodion, painted with a brush over the whole cervix, and followed by the application of a tampon soaked in glycerine. Care must be taken to protect the vagina and vulva in making the application.

Tonic treatment, such as that described under the head of inflammation of the cervix (p. 221), is generally useful in the course of chronic endometritis and metritis. Iron should not be given when there is a furred tongue, or any sign of portal congestion, till this condition has been relieved by occasional mercurial purgatives or other means. It is likely, also, to prove injurious while there is any marked hyperæmia, or tenderness of uterus. In the latter stage, however, when there is much general debility, and a flabby tongue impressed by the teeth, it is often of service, especially if combined with a laxative (*see* p. 222). In the stage of hyperplasia with induration, when menstruation is scanty, iron may be added to bromide of potassium, and, if necessary, aloes also. Bromide of potassium alone in such cases is apt to diminish the menstrual flow and prolong the intervals.

Intra-uterine Medication.—When endometritis, not complicated by any considerable degree of metritis, fails to yield to general remedies and local treatment to the cervix, the most efficacious method is to apply remedies directly to the cavity of the uterus. If there is considerable inflammation of the parenchyma, but yet endometritis is the starting point of, or forms a prominent feature in, the inflammation, it may similarly become desirable to treat the mucous membrane directly. In this case, however, more caution in the use of local remedies is necessary, and hyperæmia should in the first place be relieved as far as possible. The cases most urgently calling for intra-uterine medication are those of villous endometritis with severe hæmorrhage.

Remedies are generally most conveniently applied in a liquid form by means of Playfair's probe (Fig. 91,

p. 229), or other similar instrument, wrapped very carefully and closely in a thin layer of cotton wool, so that the cotton is not liable to slip off, or become wrinkled up. In many cases the cervix partakes in the inflammation with the fundus, and may with advantage share in the application. If it is desired to limit the treatment to the fundus, the cervix should be protected by an intra-uterine canula (Fig. 100), which also tends to prevent so much of the fluid being wiped off before it reaches the cavity of the uterus, while it renders the use of a tent unnecessary if the cervix is somewhat patulous. Dr. Atthill recommends a short platinum canula, which is introduced by a guide, and held in position by long forceps after withdrawal of the guide. It will be found more convenient, however, to have the canula fitted with a long handle as well as with a

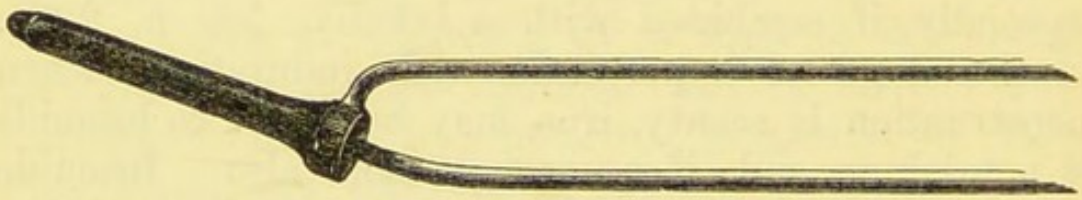


Fig. 100.—Canula for Intra-uterine Medication.

guide to facilitate its introduction. If made of vulcanite, it answers every purpose, while it is much less costly than if platinum be used. Sims' speculum and the semi-prone position should be employed for the operation. The most generally useful fluids for application are the liquor iodi, linimentum iodi, or saturated tincture of iodine (*see* p. 231), a solution of nitrate of silver of from twenty to forty grains to the ounce, the liquor ferri subsulphatis or liquor ferri perchloridi, strong carbolic acid, or carbolic acid with an equal quantity of glycerine, iodized phenol (*see* p. 231), and strong nitric acid. Of these, carbolic acid, iodized phenol, and the strong tincture of iodine are the most generally useful in ordinary cases of endometritis, while the solution of iron may be used when hæmorrhage is a prominent symptom. Strong nitric acid is the most

efficacious when a profound degeneration of the mucous membrane is indicated by profuse hæmorrhage, or by the failure of milder measures to cure. The very free application of this remedy has been especially lauded, but though ordinarily it is well tolerated, if used with care, it may sometimes excite considerable inflammation. A probe of aluminium, vulcanite, or platinum, wrapped in cotton wool, as already described, and charged with the acid, is passed once up to the fundus uteri.

A convenient mode of making a mild application of the solid nitrate of silver to the interior of the uterus is to coat with it the point of a uterine probe. The bulbous end of the probe is slightly roughened, and then, after being warmed, dipped repeatedly in the nitrate of silver, fused in a platinum or porcelain capsule, until it is sufficiently coated. It is then passed up to the fundus. A small piece of the solid nitrate of silver, or one of the zinc points, is sometimes passed into the uterus by Simpson's porte caustique—a tube provided with a piston—and left there to dissolve. The medicated crayons described at page 234 may be used in the same way. The nitrate of silver thus used is apt to cause violent uterine tenesmus, and even inflammation; and all solids excite irritation as foreign bodies, while, from their becoming coated with mucus, their action is unequal. Drugs may also be inserted in the form of ointment by a similar uterine applicator, provided with a piston. The ointment of iodide of mercury, or one containing iodoform with vaseline (℥j. ad ℥j.), may be thus used. Dr. Barnes recommends such an applicator also for the introduction of strong nitric acid, a few drops of the acid being placed upon a sponge, and inserted in the tube of the instrument. Iodoform in powder may also be introduced by means of an applicator having both lateral and terminal openings.

Another mode of acting on the uterine mucous membrane is to pass through it the continuous galvanic current by means of an intra-uterine electrode, the other electrode being one of large surface placed

outside the abdomen. The effect on the uterine mucous membrane is probably mainly due to the chemical action. The negative electrode has the most powerful caustic effect; but, in cases of hæmorrhage, it has been found most beneficial to introduce the positive electrode into the uterus as being a hæmostatic, while the negative pole is apt rather to increase hæmorrhage. It is claimed that the constant current has also the effect of relieving pain. For this purpose, comparatively weak currents, from 15 to 30 milliampères, are used, and the positive pole is applied internally.

The use of electricity as a caustic has certain advantages. Unless the cervix is abnormally small, no previous dilatation is required. If a platinum sound, which slides within a tubular insulator, is used, the cervix can be completely protected from the caustic action. On the other hand, the treatment is protracted and costly: the regular use of it two or three times a week for weeks or even months being often required to produce a decided effect. It is not, therefore, generally so convenient as the use of ordinary caustics or curetting. But, in obstinate cases, when the other means fail to cure permanently, electrolysis may be tried with advantage, especially in cases in which expense is not an object.

The method of carrying out electrolysis according to Apostoli's plan will be described under the head of fibroid tumours of the uterus. In endometritis, except in some cases of obstinate hæmorrhage, weaker currents are generally used than for the treatment of fibroid tumours. From 40 to 80 milliampères, applied for from five to ten minutes every second or third day, will generally be sufficient for a caustic effect. The current should not be strong enough to cause serious pain. This method has been highly praised by some authorities, especially in cases of dysmenorrhœa and hæmorrhage. But, as in other applications of electricity, it is probable that some reported cures partake of the nature of faith-healing.

The last mode of intra-uterine medication to be mentioned is that of the injection of fluids, and this is the most dangerous of all. The danger lies chiefly in the risk of the fluid making its way along the Fallopian tubes, either from the force of the injection, or, what is more probable, from spasmodic contraction of the uterus. This has been demonstrated by autopsy, in cases where sudden death has followed the injection of perchloride of iron, even though the Fallopian tubes were not obviously more patent than normal. The risk is not entirely obviated by securing full dilatation of the cervix—a precaution which should always be taken—for the cervix generally contracts under the stimulus of the astringent; nor by the use of a double-action catheter, for the return canal may become blocked by a clot. Intra-uterine injection cannot, however, be entirely dispensed with, and it is chiefly called for in cases of alarming metrorrhagia, when a sufficient bulk of fluid to arrest hæmorrhage cannot be applied by means of a swab, or when, from enlargement and irregularity of the uterine cavity, the swab cannot come into contact with the whole of it. The safest plan is to use Budin's double-action catheter (*see* p. 208), or, in the absence of this, rather a small tube, not larger than No. 12 catheter, so that the cervix, after full dilatation, may not so readily grasp it, and to inject only by hydrostatic pressure, applied by means of an elastic tube and funnel, elevated only very slightly. If milder fluids are used, intra-uterine injection is less dangerous, and the plan of treating endometritis by injections of a two per cent. solution of carbolic acid, after dilatation of the cervix, is highly praised by Schultze.

In fungoid endometritis the villous prominences may be destroyed either by the pressure of a sponge-tent introduced up to the fundus, by scraping the surface of the uterus by the blunt-wire curette (*see* p. 253), followed by the use of a caustic of medium strength, such as concentrated tincture of iodine, carbolic

acid, or iodized phenol, or, thirdly, by the application of a strong caustic, such as nitric acid. Of these, nitric acid has the greatest efficacy in modifying the nutrition of the mucous membrane. To obtain the influence of a tent upon the mucous membrane it should be long enough to reach the fundus, and should be rubbed down with sand-paper till it has a uniform, slightly conical shape (*see* Fig. 29, p. 56), instead of bulging in the centre, like the tents commonly sold. Of these measures the use of the blunt curette is generally the best and safest. It may be adopted in chronic endometritis, if other means fail to cure, even when it is not of the fungoid variety, and not accompanied by hæmorrhage. In the nulliparous uterus it should be preceded by dilatation of the uterus by Hegar's dilators or a laminaria tent; in the parous uterus the cervix may be patulous enough without dilatation, but here also some dilatation is generally desirable, to secure a free escape for secretion. If the mucous membrane is not softened, it may be necessary to use, not the blunt curette, but Sims' sharp steel curette (Fig. 92, p. 233), to scrape away the surface.

MEMBRANOUS DYSMENORRHŒA.

Causation and Pathological Anatomy.—In connection with endometritis may be considered the disorder called membranous dysmenorrhœa, which by some has been termed exfoliative endometritis, although it is still a matter of dispute whether its essential nature is inflammatory or not. It consists of the expulsion during the menstrual period, generally on the second or third day, of membrane either in shreds or forming a more or less complete cast of the uterus, which membrane, when examined microscopically, shows the structure of the uterine mucous membrane. Many other apparent membranes may be passed at a menstrual period, such as fibrinous clots, exfoliations from the vagina or

cervix, or mucus coagulated by astringents; but such cases have no connection with the disease under consideration. It is also to be distinguished from cases in which repeated abortion occurs at intervals of little more than a month, a condition which may be due to an excess of menstrual nisus, or, perhaps, in some cases, to an imperfect fertility on the part of the husband. Some have supposed that all cases of so-called membranous dysmenorrhœa are to be thus explained; but it has been clearly shown that the complaint may occur in virgins.

Membranous dysmenorrhœa consists essentially in a menstrual decidua being thrown off in pieces of greater or less size. This result may depend upon excessive growth, abnormal exfoliation, or an unduly fibrous character in the decidua, and the true explanation is not yet fully ascertained. The disorder may exist in any degree. If the fragments of supposed clot passed in cases of dysmenorrhœa are examined microscopically, it is not uncommon to find small shreds having the cellular structure of the uterine mucous membrane, and showing a few tubular channels, which are the gland apertures, generally divested of their epithelial lining. The comparative frequency of this condition is an argument in favour of the view, that some degree, at any rate, of exfoliation takes place normally in menstruation. From this every grade may occur up to that in which a triangular cast of the whole uterus, showing orifices corresponding to the Fallopian tubes, is passed, although the slighter degrees generally escape the attention of the patient herself. In the complete cast the whole structure of the mucous membrane is to be seen, including enlarged orifices of glands, and an undue amount of fibrillar tissue is to be found among the cells. In some cases a cast is expelled every month, in others only occasionally, while smaller shreds of membrane come away at the intervening periods. Sometimes there is a history of similar shreds having been passed since the first com-

mencement of menstruation, which renders it probable that the affection may depend upon some peculiarity in the structure of the mucous membrane in certain individuals.

Membranous dysmenorrhœa is usually associated with active hyperæmia, and other signs of chronic endometritis and metritis. There is often also true hypertrophy of the muscular walls, owing to difficulty in the expulsion of the membranes. Dr. John Williams has maintained* that the pathology of the complaint is the presence of an undue amount of fibrous tissue in the uterine walls, and that the inflammation which usually accompanies it is secondary to the irritation produced by the shreds of membrane. Excess of fibrous tissue, however, is very common as a sequel to subinvolution with chronic metritis, without leading to any such result as membranous dysmenorrhœa. It seems more probable that in membranous dysmenorrhœa there is generally a congenital excess in the fibrillation of the uterine mucous membrane, or in the degree of its exfoliation, or in both, and that this excess may be further increased from the effect of chronic endometritis.

Results and Symptoms —The symptoms of membranous dysmenorrhœa, apart from those due to the hyperæmia or inflammation generally associated with it, consist simply of the pain and tenesmus evoked by the expulsion of the membrane. When the affection exists in any marked degree it generally gives rise to sterility. It is one of extreme obstinacy, and frequently persists for many years.

Diagnosis.—The more perfect casts are easily recognized by the naked eye, and the orifices of the uterine glands may be seen in them. Generally, however, the diagnosis must be confirmed by microscopic examination. If the membrane is thin, it may simply be spread out upon the slide. If it is too thick to show

* "Obst. Trans." vol. xix.

its structure in this way, sections of it, parallel to the surface, should be made by the freezing microtome. If the cast has the structure of uterine mucous membrane, it only remains to distinguish the case from one of repeated abortion. The latter is generally characterized by irregularity in the intervals of apparent menstruation, but the most crucial test is to try the effect of temporary separation between husband and wife. The decidual cells, moreover, are developed to a greater size in the case of pregnancy.

Treatment.—The first indication is to secure a freely open and straight cervical canal of much greater dimensions than are needful in the normal uterus. By this means distress is much alleviated, and the tendency of the membrane to keep up inflammation by mechanical irritation is diminished. At the same time the hyperæmia or metritis should be treated by bromide of potassium, ergot, absorbents, purgatives, local depletion, or other suitable means. To arrest the tendency to formation of membranes, only such measures as tend to effect a profound alteration in the nutrition of the uterine mucous membrane are at all hopeful. Scraping the surface with the curette, followed by applications of iodine, carbolic acid, nitrate of silver, or nitric acid, may be tried for this purpose, but even nitric acid has failed to cure. In obstinate cases, electrolysis is worthy of trial, the negative pole being introduced into the uterus, unless there is excessive hæmorrhage, in which case the positive pole would be preferable. The administration of arsenic has done good in some cases; and this drug appears to have some selective and alterative action on the uterine mucous membrane. Pregnancy is likely to modify the mucous membrane more than any other influence. In some slight forms of the affection I have found it to be apparently cured after pregnancy and delivery, to re-appear after an interval of several years.

CHAPTER VIII.

NEW GROWTHS OF THE UTERUS.

MUCOUS AND GLANDULAR POLYPI OF THE UTERUS.

Causation.—Just as, in cervical endometritis, a single mucous gland, when its orifice has become closed, readily elevates the loose mucous membrane, and becomes a minute projection or Nabothian gland, so the same process may be exaggerated. A fold of mucous membrane containing one or more glands may take part in it, while hyperplasia of the stroma of the mucous membrane takes place, and in this way a *mucous polypus* is formed. The same process may also occur in the glands of the body of the uterus, or those near the edge of the os, or on the outside of the cervix.

Pathological Anatomy.—Mucous polypi generally vary from the size of a pin's head up to that of a hazel-nut, rarely exceeding the latter dimension. They are made up of one or several mucous follicles, with a stroma of soft and delicate connective tissue containing many nuclei, the stroma predominating over the glandular portion. The gland cavity or cavities may be occluded, and distended with thick tenacious mucus. They generally grow from the cervical canal, and the pedicle then tends to become elongated, until the polypus appears outside the cervix. Sometimes they grow within the cavity of the uterus, and then

generally do not reach the cervix. Polypi of this variety are often found unexpectedly at autopsies. Mucous polypi are covered by a thin and very vascular mucous membrane, and are generally bright or deep red in colour. Whether they grow from the cervix or body of the uterus they are often multiple, and, after the removal of one, others are apt to grow in the same individual (*see* Fig. 101). When the proliferation of the gland-follicles predominates over that of the cellular

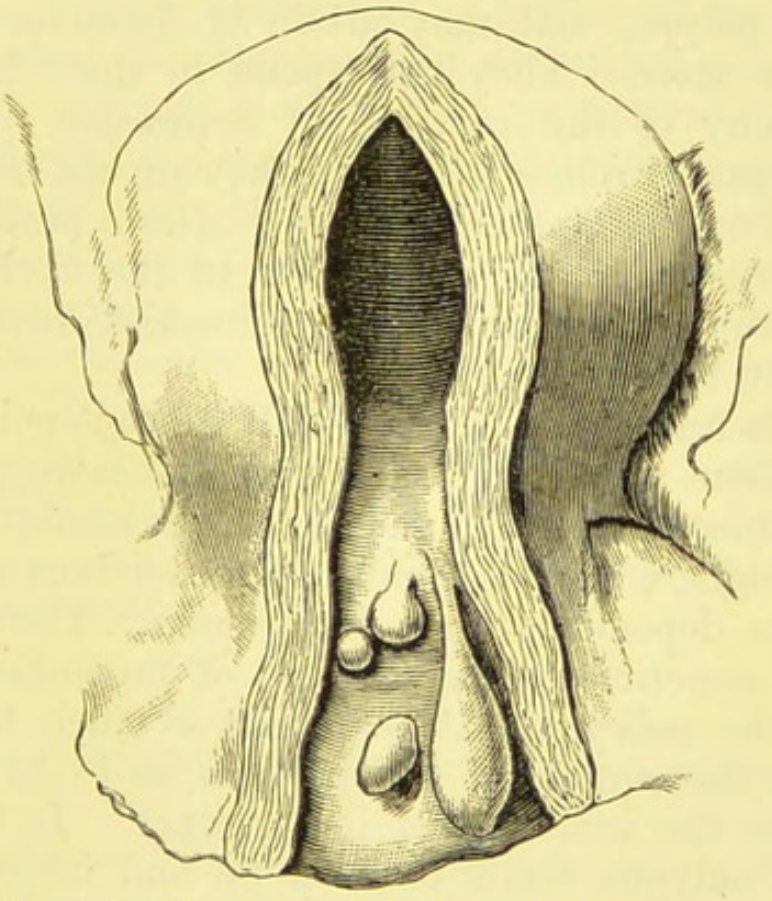


Fig 101.—Mucous Polypi within Cervical Canal.

tissue, "*glandular polypi*" are formed. These are of two kinds:—(1) The "*cystic polypus*," formed by dilatation of a single follicle. These generally grow from the cervical canal, and are sessile, or nearly so, not larger than a cherry, and very fragile, being filled with mucoid fluid. (2) The "*channelled polypus.*" These are generally attached at the lower part of the cervical canal, or outer part of the cervix. They contain large irregular cavities, communicating with

each other, and opening on the surface, often by rather large mouths. These are lined by cylindrical epithelium, and contain mucoid fluid. In other cases the cavities have no outlet, and then the retained mucus forms a larger proportion of the bulk of the polypus. The surface may be covered by cylindrical epithelium, or by squamous epithelium, if the growth has sprung from the outer part of the cervix, or again partly by squamous and partly by cylindrical epithelium. These polypi grow to a larger size than mucous polypi, and may attain a diameter of two inches or more. They correspond to the "follicular hypertrophy of the cervix" of Schroeder. If they reach or pass through the vulva they are apt to become ulcerated on the surface. In some cases a proliferating papillomatous growth springs up in the cavities, the tumour thus showing an approximation toward the malignant type.

Results and Symptoms.—Small mucous polypi may exist without any obvious symptoms, but more generally they produce leucorrhœa and sometimes menorrhagia or metrorrhagia, with occasionally dysmenorrhœa and other symptoms dependent upon hyperæmia. The hæmorrhage is sometimes altogether out of proportion to the size of the polypus. It is due not so much to bleeding from the surface of the polypus as to hyperæmia set up by the irritation of its presence. In the same way the polypus tends to keep up and increase that hyperplasia of the cervix with which it is often associated at its commencement. The symptoms are generally greater while the polypus is within the cervix than after it is extruded outside the os. As compared with fibroid polypi, hæmorrhage is comparatively rare as a symptom of mucous or glandular polypi, while leucorrhœa is more prominent.

Diagnosis.—The smaller mucous polypi, after they have passed outside the os, may sometimes escape detection by the finger from their extreme softness, but are easily recognized by the speculum. Polypi

high up in the cervix, or in the cavity of the uterus, are generally only discovered when the cervical canal has been dilated for exploration as to the cause of hæmorrhage.

Treatment.—Small and soft mucous polypi may be twisted off with forceps, and the base touched with liquor ferri perchloridi fortior, solid nitrate of silver, or nitric acid. Those of larger size are best removed by the écraseur (Fig. 113, p. 302)—écraseur and wire both being of dimensions suitable to those of the polypus. This is preferable to cutting them off with scissors, since the hæmorrhage on cutting a mucous or glandular polypus is greater in proportion than that from a fibroid polypus. If the polypus is small, the loop is most easily adjusted by the aid of a speculum. After the removal the patient should be kept in bed for a day or two. If intra-uterine mucous polypi are detected as the cause of hæmorrhage, and are not large enough to be ensnared by a small écraseur, they may be destroyed by the blunt wire or steel curette (Fig. 92, p. 233), or, if necessary, by the application of nitric acid, as in the case of the villous prominences of fungoid endometritis.

FIBROID TUMOURS OF THE UTERUS, OR MYOMATA.

Causation.—Fibroid tumours are among the commonest of uterine diseases. In most cases they date their origin to the period of active sexual life. Nothing certain is known as to their causation, but it depends in a measure upon hereditary predisposition, and they are specially frequent in the negro race. It may be presumed that all causes of hyperæmia of the uterus favour their growth, and that they may take their starting-point from any localized inflammation, the result of parturition, abortion, or any other cause. Dr. Emmet, however, gives statistics which tend to show that, taking into account the relative number of

unmarried, sterile, and fertile women, unmarried women between the ages of thirty and forty are twice as liable to fibroids as the sterile or fertile; and also that fertile women are considerably less liable than the sterile. He considers that the perverted nutrition arises from superfluous nerve-force not expended in the natural way in the sexual relations and in pregnancy and parturition, so that even marriage without conception acts in some degree as a safeguard.

Pathological Anatomy.—A fibroid tumour, more accurately called a myoma or fibro-myoma, is composed of the constituents of the normal uterine tissue, involuntary muscular fibres and connective tissue, in varying proportions, but, for the most part, in the main of muscular fibres. It is analogous to the tumours which frequently enlarge the prostate in the male sex. In most cases the tumour consists of one or more rounded masses, separated from the uterine walls around it by a capsule of connective tissue; but occasionally the tissue of the tumour is completely continuous with that of the uterus, and this is especially the case with the softer and more rapidly-growing varieties. The muscular fibres are generally larger than in the unimpregnated uterus, but smaller than in the pregnant organ, and they are larger in the softer tumours than in the encapsuled variety. The encapsuled tumours are tough on section, their substance but slightly vascular, the cut surface white and glistening. The size of each mass usually varies from dimensions only discernible by the microscope up to about the size of a fœtal head. Vessels usually enter the fibroid only at the one point at which it is continuous with the uterine wall. The arteries are generally comparatively small, although occasionally they may be of large size. These encapsuled tumours are more frequently multiple than single, and twenty or more may be present in one uterus. Sometimes several simple fibroid masses are united together within a single capsule, and thus form a conglomerate fibroid

tumour, with a lobular irregular surface. The individual masses then generally lose their spherical shape, and become distorted by pressure. In the other and less common variety of fibroid tumour, which is not encapsuled, the tissue may be loose, and become œdematous by infiltration with serum, so that the

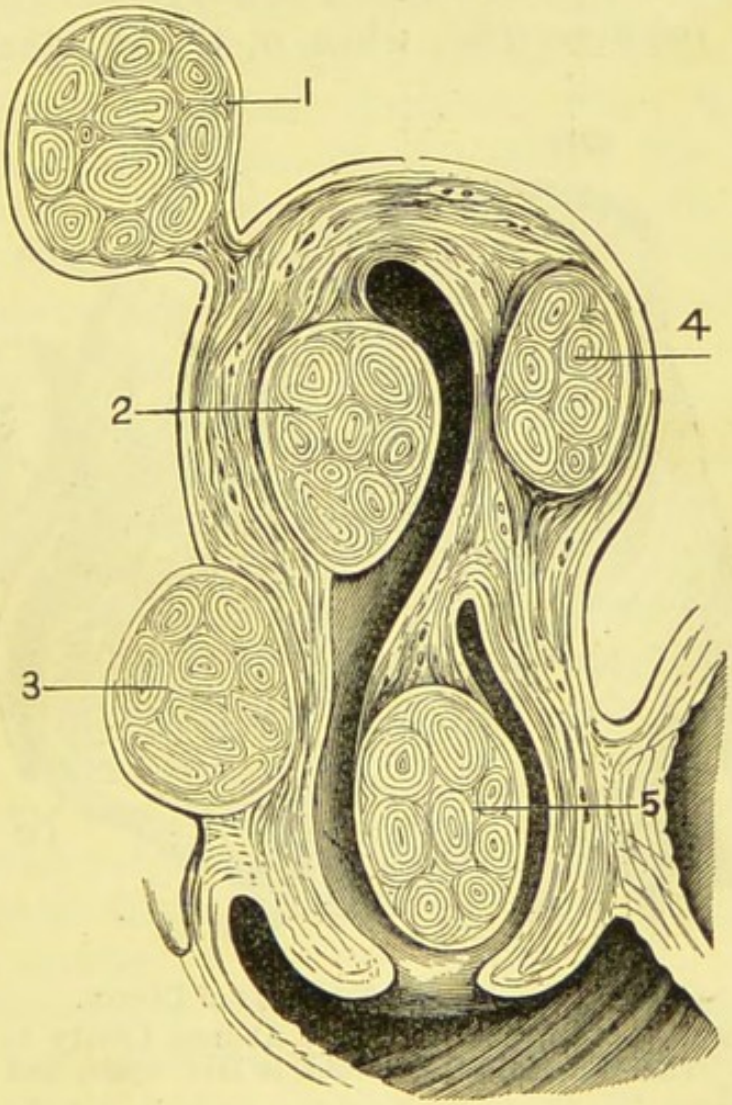


Fig. 102.—Varieties of Fibroid Tumour (Diagrammatic).
1, Subperitoneal, Pedunculated; 2, Submucous; 3, Subperitoneal of Cervix, Non-pedunculated; 4, Interstitial; 5, Fibroid Polypus.

whole is fluctuating and semi-fluid to the touch. Large collections of fluid may be formed by separation of the fibres, and in this way is constituted the *fibro-cystic* tumour. There is no cyst-wall, and the spaces are generally traversed by trabeculæ of cellular tissue.

Varieties.—The growth of a fibroid tumour commences in the substance of the uterine wall, but, by

the effect of muscular contraction, it generally tends to be squeezed out, either towards the outside or the inside, according to the position of its starting-point. Hence, according to their position, there are four varieties of fibroids, which are called *subperitoneal* or *subserous*, when projecting from the exterior of the uterus, whether pedunculated or not; *interstitial*, *intramural*, or *intra-parietal*, when in the substance of the

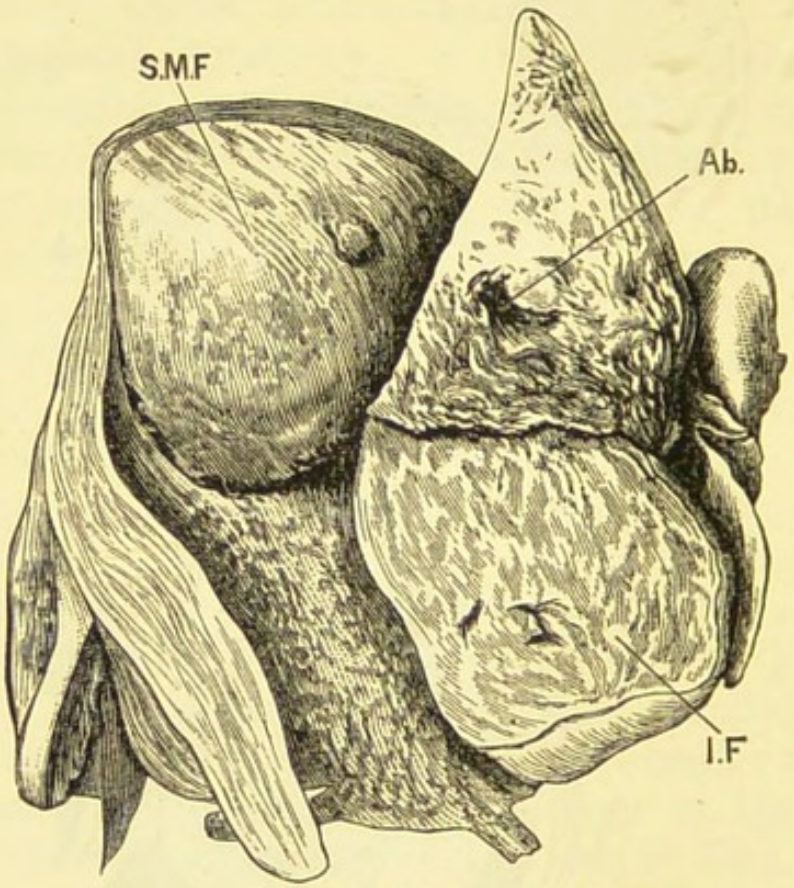


Fig. 103.—Fibroid Tumours of Uterus.

SMF, Submucous; IF, Interstitial; Ab, Abscess Cavity in Interstitial Fibroid. The Interstitial Fibroid is laid open, and the halves separated.

uterine wall; *submucous*, when they project internally; *fibroid polypi*, when they have become completely extruded on the internal surface, so as to be attached only by a pedicle (*see* Fig. 102, p. 271, and Fig. 103). As a rule, the whole uterus becomes hypertrophied, and its cavity enlarged, but in subperitoneal fibroids this is sometimes not the case, and it may even become atrophied. The subperitoneal fibroid tumours, especially, are more frequently multiple, and one or more varieties of fibroids may co-exist.

By submucous or interstitial fibroids the uterine cavity is frequently much distorted. Fibroids occasionally grow in the cervix, but much less frequently than in the body of the uterus. Small fibroids growing in the anterior wall of the fundus tend to produce anteflexion, those in the posterior wall retroflexion of the organ. The posterior wall is the commoner seat. The softer varieties of fibroid tumour, especially when uterine hæmorrhage is a marked symptom, often undergo a manifest gradual increase of size before the onset of menstruation. This reaches its maximum shortly before the flow, or within the first day or two of its continuance, and the tumour then rather rapidly decreases again.

Besides the above-mentioned classification of fibroid tumours according to their position, another important division may be made into three classes, according to the nature of the growth. These are—(1) the encapsuled fibroid, which is almost always hard, and generally multiple; (2) the non-encapsuled fibroid, which is frequently soft and elastic, with fluid in its interstices, and which is generally also single, or else enlarges the whole uterus uniformly, though it may sometimes have irregular outgrowths when increasing rapidly; (3) the fibro-cystic tumour, which is a further development of the last variety.

Not infrequently are found attached to the cervix small polypoid growths, whose tissue resembles that of the cervix itself, and is continuous with it, not enclosed in any capsule. Sometimes also the whole of one lip of the cervix becomes elongated in a polypoid manner. This condition usually results from the laceration of the cervix produced by parturition. Hyperplasia follows, and affects especially the portion of tissue intervening between two clefts, which afterwards may become constricted at its base, and so take a polypoid form. Polypi of this description, which are often associated with prolapse, have been termed hypertrophic polypi.

Results and Symptoms.—The prominent symptom of those fibroids which enlarge the uterine cavity or project into it—that is to say, of the submucous and of many of the interstitial variety—is menorrhagia. This depends partly upon the increased surface, and partly upon the active hyperæmia of the mucous membrane due to the stimulus of the growth, and the passive hyperæmia which may result from pressure. In some cases the hæmorrhage takes the form of metrorrhagia. The bleeding takes place, for the most part, from the general mucous membrane lining the enlarged uterine cavity, but that which covers the fibroid tumour takes part in it also. By the same hyperæmia is produced leucorrhœa, and often congestive dysmenorrhœa. If the exit from the uterine cavity is obstructed, as it often is, by submucous fibroids or fibroid polypi, obstructive dysmenorrhœa is likely also to result, and frequently endometritis from the irritation produced by retained clots or secretions. Dragging pain is generally produced by the increased weight of the uterus, and the frequently associated hyperæmia or endometritis. Sometimes severe spasmodic pain arises from the contractions of the uterus, excited by the presence of the tumour.

The remaining symptoms of fibroids are those due to mechanical pressure, and these are frequently the sole symptoms of subperitoneal growths. Vesical and rectal tenesmus are common, and sometimes retention of urine or extreme constipation is produced by direct pressure. In some cases this happens only when the tumour swells at or just before menstrual periods. These symptoms are specially urgent when a fibroid growing from the posterior uterine wall is incarcerated in the pelvis. Sterility is a usual result, especially from submucous fibroids, and if pregnancy occurs, there is great liability to miscarriage, and to hæmorrhage after delivery. A fibroid tumour in the pelvis may render delivery extremely difficult. Subperitoneal fibroids, however, of moderate size, if they do not obstruct the

pelvis, are not inconsistent with natural pregnancy and delivery. When the tumour grows to enormous size, as is more likely to occur in the softer and fibro-cystic varieties, the circulation, respiration, and other vital functions may be interfered with, as in large ovarian tumours. Large fibroid tumours generally remain for a long period free from adhesions. Peritonitis may, however, occur as a complication, and the tumour then becomes adherent to surrounding organs. It appears probable that the peritonitis generally arises in the same way as perimetritis in general; namely, through the medium of salpingitis and extension of inflammation from the tubal mucous membrane to the peritoneum. This may be merely a casual complication, but often the presence of the tumour will have promoted the endometritis which was the starting point of inflammation. A fibroid in a state of sloughing or inflammation may directly cause inflammation of the peritoneum covering it, but such peritonitis, due to changes in the tumour, is very much rarer in uterine than in ovarian tumours.

Natural Terminations.—In most cases the growth of a fibroid tumour is slow, and becomes limited after a certain time, so that even a very large tumour may be borne for many years without very serious result. After the menopause, growth is usually lessened or arrested, and not unfrequently the tumour tends to diminish. There are numerous exceptions, however, to this rule, especially in the case of the large and soft non-encapsuled variety of fibroid, and in the fibro-cystic tumour, which may continue to grow unchecked after the menopause. Extreme diminution, or absolute spontaneous disappearance of fibroids, has occasionally been recorded, especially as the result of involution after delivery, or when the menopause has been passed. A fibroid polypus may eventually be spontaneously detached and expelled, or may slough away. A pedunculated subperitoneal fibroid may be separated altogether from the uterus by traction, if it has become

adherent to other organs, or may even get entirely loose in the peritoneal cavity, where it remains without undergoing decomposition. Gangrene may also affect a submucous fibroid, especially after surgical interference. If the patient survive the risk of septicæmia, the tumour may in this way be got rid of, the disintegrated tissue being discharged in fragments, by the vagina. This result depends mainly upon failure of the vascular supply, although inflammation may sometimes be instrumental in starting the process. Fibroids of the encapsuled variety sometimes undergo fatty degeneration or calcification, and the resulting calcified mass has occasionally been separated and expelled. In rare cases suppuration occurs in the substance of a fibroid tumour, leading to the formation of a localized abscess. In most cases fibroid tumours do not prove destructive to life, though death may result from sloughing and septicæmia, or from hæmorrhage or exhaustion, or more rarely may be brought about by the magnitude of the tumour. Those fibroid tumours, however, which cause excessive hæmorrhage, cannot be regarded as free from grave danger to life. Not only may death occur from exhaustion without any immediate hæmorrhage, but it may be brought about by secondary accidents consequent upon extreme anæmia, such as thrombosis and embolism. Again, even a tumour of moderate size, if impacted in the pelvis, may cause pressure on the ureters, wasting or inflammation of the kidneys, and death from uræmia. In some cases fatal peritonitis has been set up by the presence of a fibroid tumour. If a very large submucous fibroid, or fibroid polypus, be expelled through the os uteri, and become incarcerated in the pelvis, death may result from the effects of pressure, or from sloughing and septic absorption. In the substance of the softer or fibro-cystic tumours, effusions of blood may take place, or abscesses be formed and lead to a fatal issue. Fibroid tumours may be invaded by the extension of cancer, and occasionally, though

rarely, they undergo malignant degeneration, generally of the sarcomatous type. One instance, at least, has also been recorded in which metastatic deposits containing involuntary muscular fibres were found in other organs, but this is of excessive rarity. The softer variety of fibroid tumour may spread by continuity between the layers of the broad ligament to such an extent as to lead to a fatal result, but without any change in the histological character of its tissue.

Diagnosis. — Subperitoneal fibroids of small or moderate size will reveal their outlines to bimanual examination, and will usually be recognized as attached to the uterus, and movable with it. If a fibroid is reached by vaginal touch, and is about equal in size to the normal uterus, the distinction between the fibroid and the uterus must be made by the sound. If a fibroid exist in the anterior or posterior wall, producing flexion, it will still be felt as a prominence after the uterus has been restored, or its curvature reversed, by means of the sound. If a fibroid is fixed by adhesion in the pelvis, the diagnosis is more difficult, since it may be impossible to make out its attachment to the uterus. From a small ovarian tumour it is usually distinguished by its hardness; from a swelling due to hæmatocele, peritonitis, or cellulitis by its rounded and defined outline, connected with the uterus, and not merging gradually into surrounding parts.

If the enlargement of the uterus from the presence of a fibroid be externally uniform, the diagnosis from early pregnancy may usually be made by its greater hardness, generally less globular form, less variation of consistency, as well as by absence of softening in the cervix, and the association, not of amenorrhœa, but usually of menorrhagia. In molar pregnancy, or retention of a dead ovum, these distinctions may fail, and even the history be delusive; but the sound will generally reveal the presence of something in the uterus, and dilatation of the cervix will clear up any doubt.

From subinvolution and hyperplasia the diagnosis of

fibroid tumour can sometimes be made only after dilatation of the cervix, the index finger being passed into the cavity of the uterus, when the localized character of the enlargement may be detected. When, however, the uterine cavity is lengthened to more than four inches, apart from pregnancy or procidentia, the existence of a fibroid is probable, and the diagnosis is confirmed if the sound shows the cavity to be distorted and displaced to one side of the centre of the uterine mass. Large interstitial fibroid tumours are generally easily distinguished from solid ovarian tumours by the fact of the tumour forming one mass with the cervix, and moving with it, and by the great elongation of the cavity of the uterus. The distortion of the cavity, however, may render it impossible to pass the sound, while, in the case of ovarian tumours, the cavity of a uterus, closely connected to the tumour, may be lengthened to as much even as five inches. Large subperitoneal fibroids may often be distinguished by their multiple character, and hard, irregular, nodular outline. Even if the tumour be single, the presumption is in favour of its being uterine, if it is solid and hard. The attachment of the tumour to the front or back of the uterus may often be made out, either *per vaginam* or *per rectum*, especially if the cervix be drawn downward, in conjunction with the bimanual examination (*see* pp. 42, 43). Uterine tumours also remain longer free from adhesion than do solid ovarian tumours.

Over a certain proportion, but only a minority, of fibroid tumours, a uterine souffle like that of pregnancy is heard. When this is detected, it appears to be positive proof that the tumour is not ovarian. Comparing fibroid tumours with pregnancy, the souffle is likely to be heard over a smaller tumour in pregnancy. If it is heard, therefore, over a mass whose size corresponds to three or four months' pregnancy, pregnancy is more probable than fibroid tumour, so far as this sign indicates.

Fibro-cystic, or soft fibroid, tumours are often very

difficult to distinguish from ovarian, but are in general of much slower growth. If their growth enlarges the whole uterus, the sound will usually decide the point. If they are subperitoneal, the chief point of distinction is that the manifest fluctuation is generally limited to special regions, while the rest of the tumour is hard or only semi-fluctuating. If a puncture be made in doubtful cases, the character of the fluid will generally decide. In the case of a vascular tumour, however, the puncture might prove more dangerous than an exploratory incision. In fibro-cystic tumours the fluid is usually clear, limpid, and yellowish, deposits spontaneously a coagulum of fibrin, contains albumen but not paralbumen, and under the microscope shows leucocytes or spindle-cells, but not the granular cells of ovarian fluid. In some cases the fluid may be blood-stained or purulent. For the characters of ovarian fluid, *see* pp. 359, 360. In some cases it may be impossible to distinguish with certainty between a uterine and ovarian tumour, except by exploratory incision. If an incision is made, the dark red colour of a uterine tumour distinguishes it from an ovarian, which is paler, or has a bluish tint. It is to be remembered, however, that if a patient is very anæmic from hæmorrhage, a uterine tumour may be nearly as pale as an ovarian, though it never has the characteristic blue tint seen in many ovarian cysts.

Diagnosis of Fibroid Polypi.—Care should always be taken that an inverted uterus is not mistaken for a polypus. The criteria are given under the head of inversion of the uterus (p. 171). Before removal of a polypus the diagnosis should always be completed by making sure that the sound will pass by the side of the pedicle up to or beyond the normal length. Difficulty may arise from the polypus having become adherent to a part or even the whole of the margin of the os, but some point will almost always be found at which the sound can be forced through by moderate pressure. From a polypoid cancer a fibroid polypus is distinguished

by its smooth pedicle, which can usually be traced up into the cervix; by its generally smooth surface, although it may be sloughing or ulcerated in parts; and by its less readiness to bleed on touching. If a polypus springs from the edge of one lip of the external os, instead of within the cervical canal, suspicion should be felt as to its possible malignancy. Portions of retained ovum or clots may resemble a polypus within the uterine cavity, or presenting through the os, and when a portion of placenta has retained a partial

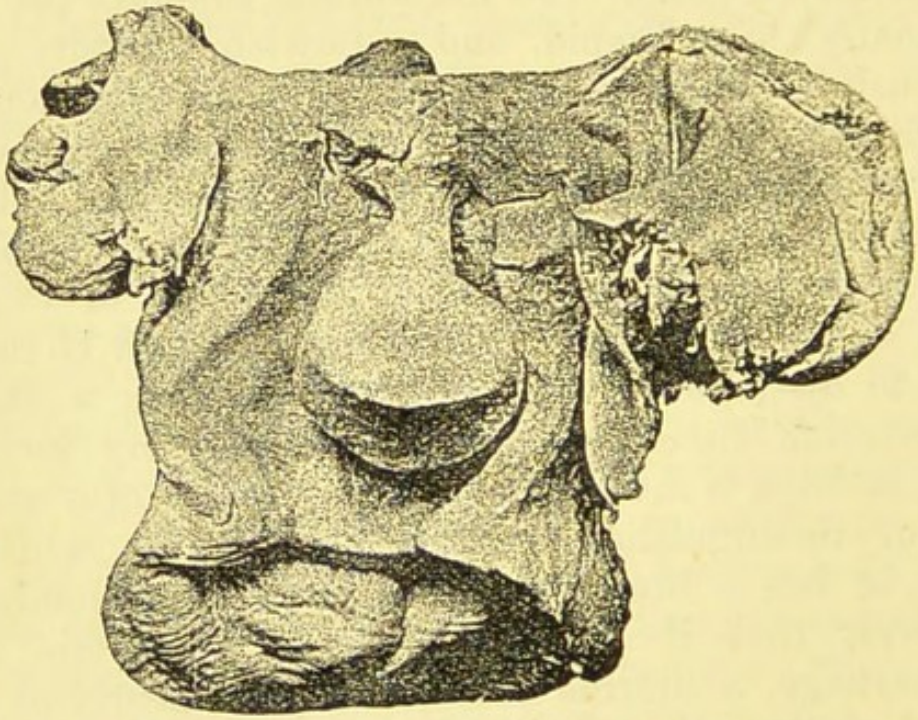


Fig. 104.—Intra-uterine Fibroid Polypus.

The polypus is laid open by an incision, and the cervix is dilated into one cavity with the fundus. (From a photograph.)

connection with the uterus it has been termed by some a *placental polypus*. These are generally distinguished by the history, and by their easy removal by the finger or blunt curette. In the case of an intra-uterine fibroid polypus (Fig. 104), it may be necessary to dilate the cervix before a diagnosis can be made.

Treatment.—In the majority of cases palliative treatment will successfully carry on a patient up to the menopause, at which time symptoms are commonly, to a great extent, relieved, although the date of its occur-

rence is often in this disease deferred for several years beyond the usual period, not infrequently as late as the fifty-fifth year. All sources of hyperæmia, active or passive, should be avoided as far as possible; and if a patient is single, and the tumour is of any considerable size, or causes any notable symptoms, marriage should be discouraged. Married women should be warned of the probably injurious effect of coitus when there is a great tendency to hæmorrhage, and in all cases special care should be enjoined at menstrual periods. Diet should be abstemious, and alcohol used very sparingly.

The objects to be aimed at by internal remedies are to alleviate the symptoms of hæmorrhage and leucorrhœa, and, if possible, to check the growth of the tumour or cause its diminution. The drugs which are most efficacious for the former purpose tend also, by restricting hyperæmia, in some degree to promote the latter, although it is only in exceptional cases that any notable diminution of the tumour can be hoped for. Those which have been found most useful are, in the first place, ergot, and, next to this, bromide and iodide of potassium. Of the two latter the bromide is more readily borne for a long period. Half-drachm doses of the extractum ergotæ liquidum, or the liquor secalis ammoniatus, may often usefully be given in combination with bromide of potassium. The most marked effects, however, of ergot are obtained when it is given subcutaneously, and in some cases a diminution in the size of the tumour may thus be obtained, while the hæmorrhage is generally more or less checked. The best forms of ergot for this purpose are the extractum ergotæ liquidum, in doses of ten to thirty minims diluted with an equal quantity of water, as recommended by Dr. Atthill; ergotinine in doses of $\frac{1}{100}$ grain; and Bonjean's ergotin, in doses of three to five minims, dissolved in four or five parts of water. The gelatine discs of ergotin for hypodermic injection may also be used, two or three discs

being employed at a time, and this preparation appears to be one of the least irritating. The great drawback to the treatment is the risk of inflammation or abscess being produced at the point of puncture, and all the preparations are liable to cause at least some local induration and redness. All solutions should be freshly prepared. The drug appears to be somewhat more efficacious if injected in the neighbourhood of the uterus, and if injected deeply into the substance of the gluteal muscles it is less likely to cause abscess than it would be in the subcutaneous cellular tissue. Hildebrandt's formula was three grains of Wernich's aqueous extract of ergot with seven and a half minims of glycerine and the same quantity of water, but the presence of the glycerine appears to increase the local irritation. The injections may be made every other day. Ergot, given in any way, but more especially by injection, often increases greatly the pain resulting from uterine tenesmus, and the patient should be warned to expect this. On this account, it often answers best to give ergot during the intermenstrual intervals only. During the period, fifteen minims of tincture of cannabis indica may be given with twenty grains of bromide of potassium every four hours, if menorrhagia or dysmenorrhœa exists. Subperitoneal fibroids are less affected by ergot than those covered by a fair thickness of the uterine wall. The softer variety of fibroid is that which is most likely to show a marked diminution in size under the influence of the drug.

Diminution of the tumour has also occasionally been obtained after the use of baths or external compresses containing bromine or iodine, in combination with the internal administration of the water, but more frequently the advantage to be thus gained is limited to mitigation of the symptoms. The waters of Kreuznach or Woodhall Spa are the most to be recommended.

In case of alarming hæmorrhage, the most effectual plug is a sponge tent, which also produces a lasting

good effect by dilatation of the cervix. Enlargement of the cervical canal is the first indication in case of persistent hæmorrhage, since it is a necessary preliminary to other means, and often by itself exercises an important influence. The full explanation of its mechanism is not quite understood, but among its uses are that it prevents any retention of blood or clots, and relieves tension, sometimes allowing the uterine action to carry on the extrusion of the tumour. It appears, also, that there is such a nerve-relationship between the cervix and body of the uterus, that dilatation of the cervix tends to produce contraction of the body, just as the expulsive action of the body is associated with physiological relaxation of the cervix. This relation has been called the "polarity" of the uterus. Dilatation may be effected either by laminaria tents, of which as many as possible should be introduced side by side, or by incision. Incision is preferable if one lip of the cervix be expanded over the surface of a tumour growing from the other side of the cervix. It may also be employed if dilatation produces only temporary benefit. After dilatation of the cervix, styptic applications may be used in the form of swabs for the arrest of hæmorrhage. Swabs sometimes fail on account of the tortuous and dilated character of the uterine cavity, and it may be necessary to have recourse to injections. For this purpose tincture of iodine, pure or diluted with one or two parts of water, may be used, or, if this fails, a solution of perchloride or subsulphate of iron. For the precautions necessary, *see* pp. 261, 262. Curetting with the blunt curette, followed by the application of iodized phenol or other caustic, is still more effectual, in those cases in which the uterine cavity is not too much enlarged or distorted to allow the whole of it to be satisfactorily reached. In cases of recurrent hæmorrhage, the application of strong nitric acid may be tried if milder means fail.

The operation of *enucleation* is one of the most dangerous in surgery when the tumour is interstitial or



Fig. 105.—Thomas's Serrated Spoon for enucleating fibroids.

its attachment to the uterine wall very extensive. The most favourable cases for its application are those in which the tumour shows some tendency to become pedunculated, so that its surface of attachment is less than its greatest diameter. As a rule, it is much more dangerous than removal of the uterine appendages; but, if successful, it has the advantage that it cures the patient without any mutilation. An indispensable condition is that the tumour should be covered by a sufficient thickness of uterine wall to allow it to be separated without risk of opening the peritoneal cavity.

Unless the vagina be already capacious, it should be expanded, by repeated plugging, or the use of dilating bags, so as to allow it to admit the whole hand, if required. The cervix should also be fully dilated by tents in the first instance, and, if necessary, by Hegar's dilators up to the largest size, afterwards. The uterus is then pressed down by an assistant, and an incision made round the base of the tumour, where this can be reached, so as to separate the mucous membrane covering the tumour from that of the uterine wall, and divide its capsule, if one exists. The best instrument for this purpose is generally Thomas's serrated spoon (Fig. 105), but long scissors may also be used, if there is space to adjust them accurately. Powerful vulsellum forceps should then be fixed into the tumour, and traction made upon it, while its base is separated from the uterine wall

by the tips of the fingers as far as possible. If bands of tissue are met with too strong to be separated by the fingers, the serrated spoon should again be used to divide them. The operation should not be commenced unless there is a reasonable prospect of removing the whole tumour. If it is only partially separated from the uterine wall, sloughing is likely to occur. The patient then runs a great risk of death from septicæmia.

As a general rule, from the uncertainty which exists as to the amount of uterine wall which may be covering a tumour, it is preferable not to attempt enucleation unless there is evidence that the uterus is attempting to expel the tumour, in the fact that spontaneous dilatation of the cervical canal from above has commenced, and that a portion of the tumour is felt presenting at the external os. For cases of this kind there is another method, specially practised and recommended by Dr. Emmet, which is particularly suitable for the case of rather large tumours. In this the chief agent is strong traction applied to the growth, the effect of which is to excite contraction of the uterus. By the aid of this the attachment is gradually stretched out, and narrowed into the form of a pedicle, which may even be found of small size by the time the operation is finished. Ergot should be first administered, and the os fully dilated. A powerful tenaculum is then fixed into the presenting part of the tumour, and strong traction made and continued for some time. The tumour is then cut away as high as it can be reached by an écraseur furnished with a strong steel wire, or by strong curved scissors, and successive portions, as they come within reach, are afterwards treated in the same manner. If the line of attachment of the tumour can be reached, it may be separated by the serrated spoon, instead of by scissors, especially if there is much tendency to bleed. In many cases there is but little hæmorrhage, if the uterus is contracting strongly. But if necessary a whip-cord ligature may be passed temporarily round the upper part of the

tumour by the aid of Gooch's canulæ. These are two straight metal tubes, through each of which one end of the cord is passed, and drawn through tightly. The ends of the tubes, united by the middle of the cord, are passed up side by side, and are then carried round the tumour in opposite directions till they meet at the opposite side, and so place a loop around its neck. Finally, the tubes can be fixed on to a stem having an adjustment for tightening the cords by means of a rack. This method is comparatively easy, if the equator of the tumour is greater than its base of attachment, so that the loop of the steel wire écraseur can be adjusted around a part of it in the first instance. When the first piece has been removed, a fresh portion of the tumour will often be forced out by the contracting uterus; and successive pieces are then removed in the same way, until perhaps the final piece can be pulled out of its bed by the tenaculum. After removal of the tumour by this method of traction, the uterus is to be syringed out with hot water, and afterwards some strong tincture of iodine injected, if necessary, to arrest hæmorrhage. Care must be taken not to produce inversion of the uterus, and then penetrate the inverted wall.

In the case of an interstitial fibroid tumour, or one having a wide attachment to the uterine wall, when surgical treatment is called for on the ground of hæmorrhage, and the alternative of removal of the uterine appendages is rejected, benefit has sometimes resulted from the plan of making an incision across the face of the tumour deep enough to divide completely the mucous membrane and capsule of the tumour. The incision may be made with Simpson's metrotome (Fig. 41, p. 88), or a guarded bistoury. Extrusion of the tumour through the opening thus made sometimes follows. There is always, however, considerable risk in interfering surgically with a fibroid without entirely removing it. This plan is, therefore, generally more dangerous than oophorectomy.

If the tumour so far approximate toward the pedunculated form that a wire loop can be securely applied around its base, the best mode of removal is by means of the écraseur, fitted with a single steel wire of fair thickness. The écraseur itself must be so strong that there is no risk of its stem bending. The wire should not be too much annealed, and if the tissue to be cut through is very thick, steel piano wire, quite unannealed, is the best to use. This is extremely strong, though rather rigid to work with. A considerable stiffness in the wire loop, however, assists the operator in passing it up over the equator of the tumour, as it regains its shape and position within the uterus. An extra supply of wire in hank must be kept ready, in case the first loop should break. A loop at one end of the wire is fixed to the moving button of the écraseur (Fig. 82, p. 266); the other end is kept long and unattached, so that the size of the loop can readily be varied as required, till it has been got above the equator of the tumour, the stem of the écraseur being pushed up as high as it will go between the tumour and the uterine wall in front, or wherever the attachment of the tumour reaches lowest. The slack of the wire is then drawn in, and the free end twisted round the crossbar of the écraseur by means of strong pliers. If the tumour is not completely cut through when the button is screwed up to the full the wire must be removed from the button, and re-attached to it after the button has been screwed down again to the bottom. If the slice removed does not comprise the whole tumour, the écraseur is to be again applied, if possible, to what remains, in a similar way, until the whole is removed flush with the uterine wall. The compound wire of twisted strands should never be used to cut through thick tough tissue, since it is much more likely to break.

The galvanic écraseur may be used instead of the ordinary écraseur, but the pliant loop of platinum wire is much more difficult to pass into position beyond the

reach of the fingers, than the stiff one of steel wire. Moreover, the batteries used for medical purposes have rarely power enough to heat sufficiently a loop of the requisite size to cut through a very thick tumour when in contact with moist tissues, and, if not heated enough, the wire will break.

It sometimes happens that a fibroid of very large size becomes partially extruded by uterine action into the vagina, or even appears at the vulva. The base of attachment may still remain large, and it will generally be impossible, after the os has become retracted, to determine its dimensions by any method of sounding. Sometimes it is not possible even to reach any point of the margin of the dilated os. This condition is distinguished from inversion of the uterus by the great size of the mass in the vagina, and by recognition of the fundus in its normal direction, but carried upwards by pressure. The functions of the bladder and rectum then become impeded, and if the pelvis is completely filled, nervous symptoms may arise similar to those resulting from impaction of the fœtal head in parturition. In any case, the patient is exposed to the risk of septicæmia from sloughing of the tumour. In this case also the tumour may be removed by the écraseur, fitted with a strong unannealed steel wire, in the manner already described. The loop is passed over the portion of tumour in the vagina, and, if possible, over its equator. It may then be possible to slip it up to its pedicle or base, the os uteri being generally so flattened out against the pelvic wall as not to offer an impediment. If not, as much of the tumour as possible must be taken off at first, and then the remainder, if necessary, in successive slices, the écraseur being passed up within the uterus.

Removal of Uterine Appendages.—In most cases the urgent symptom of fibroid tumours, namely, the hæmorrhage, can be arrested by removal of the uterine appendages. Generally, also, if the operation is successful in inducing an artificial menopause, it arrests

the growth of the tumour, and eventually leads to its gradual diminution by a process similar to the senile atrophy which occurs after the natural menopause. In some cases, however, the tumour may continue to grow, just as, exceptionally, it may grow after the spontaneous menopause. This is more likely to be the case if the tumour is of the soft, non-encapsuled variety. It was maintained at one time by Lawson Tait that it is chiefly of importance to remove the Fallopian tubes rather than the ovaries. He still holds that the removal of the tubes is essential, and that it is of little consequence whether absolutely the whole of the ovarian tissue is removed.

Others believe that the greater effect produced by removing tubes as well as ovaries is due to the ligatures being placed more deeply in the broad ligaments, and so cutting off more of the material supply to the uterus. My own experience leads me to believe that the old doctrine, that ovulation and menstruation are generally connected, is a true one, and that it is of importance not to leave any ovarian tissue even on the distal side of the ligatures, where it may retain its vitality. But it is generally agreed that a more certain result is obtained by removing both tubes and ovaries than by removing ovaries alone.

The scope of the operation has been enlarged by the improved results of abdominal surgery, and, in the hands of skilled specialists, its mortality is now very slight. When the tumour is of moderate size, not reaching above the umbilicus, the operation is generally easy and can be relied upon to check its growth. When the tumour is very large, there is a greater chance that the operator may fail to remove both ovaries and tubes; and also that the tumours may continue to grow even if they are removed. The operation appears, therefore, to be justified, even in an early stage, if the hæmorrhage does not yield to medicinal treatment, and seriously disables from the duties of life, or if the tumour is growing, even though

there be no immediate risk to life if the tumour be left alone. In general, I consider it wise if the tumour is discovered at an early stage, and ergot does not arrest its growth, to perform oophorectomy before the fundus reaches more than half way from pubes to umbilicus. A tumour incarcerated in the pelvis, so that it causes retention of urine, or is likely to obstruct the ureters, is also an indication for operation if it cannot be pushed up. Something will depend upon the position in life of the patient. If she has to earn her living and is disabled from doing so, it is right to offer her the probable cure to be obtained by removal of the uterine appendages.

The general considerations connected with the operation, and the mode of performing it, will be discussed in the section on diseases of the Fallopian tube (Chapter X.). Only those points which are special in the performance of the operation on account of a fibroid tumour will here be noted. In the case of a fibroid tumour, the guides to finding the ovaries are the broad ligaments, on the posterior surfaces of which the ovaries are to be felt for. These are generally low down at the sides of the uterus, if the whole fundus is enlarged. A small incision, not exceeding two inches in length, should therefore be made in the first instance, not too high up. If it is very difficult to reach the ovaries, the incision may have to be enlarged. To secure the ovary of one side, the fundus uteri should be pushed over as much as possible towards the opposite side.

In the case of a tumour growing into the broad ligament, the mesovarium is often found shortened and spread out, so that it is difficult to get ligatures between the ovary and the tumour. It is then of special importance to pass the needle through the ligament of the ovary. The angle of the ovary next to the ligament, which is that most closely attached, can then be safely cut away very close to the ligatures. Ovary and tube can generally be included in one liga-

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ture. In order to attain this result, the needle may be passed backward and forward through the mesosalpinx if necessary. In the case of great difficulty in finding an ovary, if the round ligament can be traced, it will be a guide to the point of origin of the Fallopian tube and ligament of the ovary. If bleeding occurs from separated adhesions, and is not fully arrested, a Keith's drainage-tube (Fig. 133), should be placed in the wound, reaching to the bottom of the pouch of Douglas, if the tumour is not too large to allow this. It may be impossible to do this, if the tumour reaches more than half way from pubes to umbilicus; and this is the great reason why the operation should be performed early, if at all. A tube bent in the arc of a circle may sometimes overcome the difficulty. But if efficient drainage is impracticable, and any considerable bleeding occurs, it is usually safer to perform hysterectomy.

Apart from removal of the uterine appendages, subperitoneal fibroids are amenable to no surgical treatment except *removal by abdominal section* or *myomectomy*, but since they are, in general, comparatively innocuous in their results, this operation should, as a rule, only be undertaken when, by their increase in size, they directly threaten life, or incapacitate from its necessary avocations. Such a dangerous increase is more likely in the case of the softer or fibro-cystic tumours. In some cases also the operation may be indicated if a fibroid tumour gives rise to ascitic effusion. When a fibroid tumour has a thin pedicle, and is free from important adhesions, it may be removed without much greater risk than that of ovariotomy; but it is often impossible to ascertain beforehand the extent of its attachment to the uterus. The operation should be performed like ovariotomy, and the pedicle or pedicles, if of moderate size, transfixed and tied with carbolized silk. For cases, however, in which the attachment is broad, the method of ligature has not proved so successful as in the case of the pedicle of ovarian tumours. The chief risk is that the tissue is apt to

shrink after a time, the ligatures to become loose, and hæmorrhage to occur. There is also the disadvantage that a broad surface is often left, to which intestines may become adherent, and thus a risk of intestinal obstruction arise. If the pedicle, therefore, is broad, soft, and vascular, it appears to be safer to clamp it in the lower angle of the wound by Koeberle's serre-nœud (Fig. 106), if the traction so produced is not too excessive. Thick, soft iron wire, or wire of delta metal, should be chosen, so that it may not readily cut through the tissue. The serre-nœud itself can also now be procured of delta metal, which has the advantage of not rusting. The loop at one end of the wire is attached beforehand to the button. The other end is passed round the neck of the tumour, drawn up pretty tight with a pair of pliers, and twisted close round the button. The screw is then turned until there is sufficient constriction to prevent hæmorrhage. After the tumour is cut away it may be tightened a little further, and if secondary hæmorrhage occur after an interval, from shrinking of the tissue, a turn or

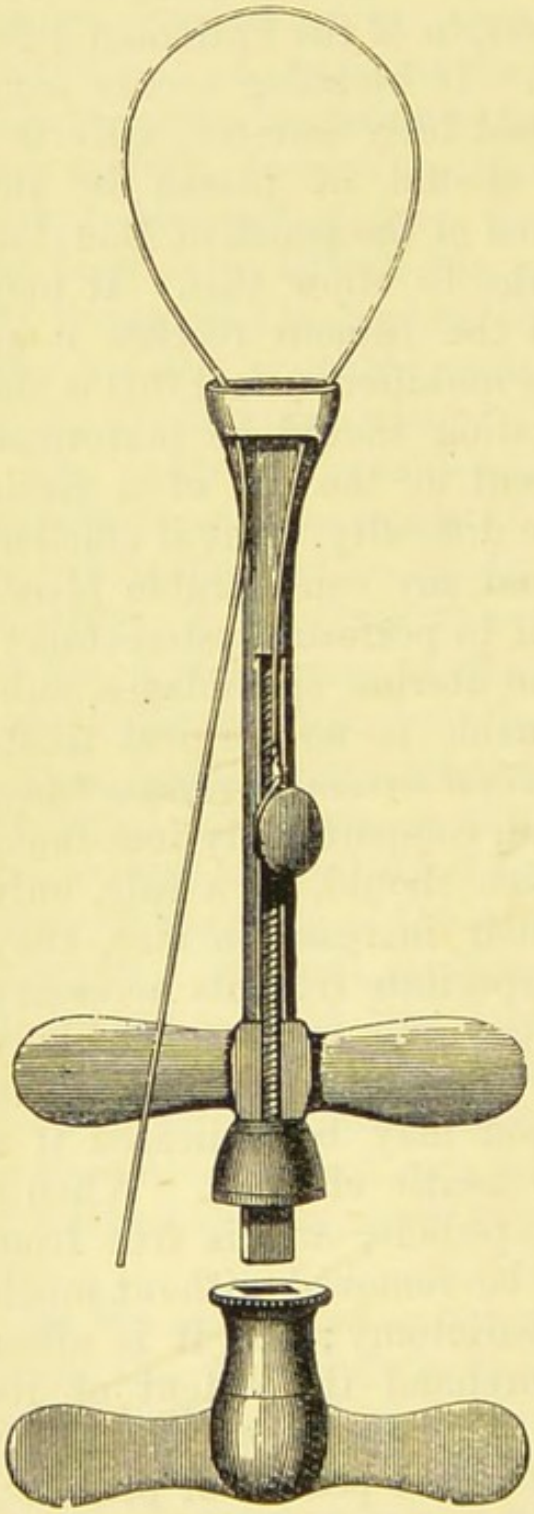


Fig. 106.
KOEBERLE'S Serre-nœud.

two of the screw will always arrest it. A long pin of delta metal, having a guard to fix on its point (Fig. 107), should be passed transversely through the stump, immediately above the wire loop, to fix it in the wound, some pieces of gauze being tucked underneath the ends of the pin. After adjustment of the serre-nœud, any redundant tissue should be cut away. The stump may be then rubbed over with solid perchloride of iron, dusted with iodoform, and covered with an antiseptic material as carbolic or sublimate gauze, or salicylic wool. Frequent dressings will be required when the stump begins to slough. The parietal peritoneum is generally united to that of the pedicle only by adaptation; but it is a good plan to place just above the pedicle a single suture of fine silk uniting the edges of the parietal peritoneum, and



Fig. 107.

Guarded Pin for fixing pedicle in abdominal wound.

including the peritoneum of the pedicle, on the proximal side of the wire, as in Hegar's operation (Fig. 110, p. 297). The upper part of the abdominal wound is united by sutures, which include the peritoneum, as in ovariotomy. Bantock's method for hysterectomy, applicable also to myomectomy, is as follows:—A temporary wire or elastic ligature is first placed, and the peritoneum divided transversely about two inches above it. The tumour is then drawn up and enucleated from the separated border of peritoneum. The permanent wire is placed between the pedicle and the peritoneum, and the separated peritoneum of the pedicle is united by fine silk sutures to the parietal peritoneum. If the intra-peritoneal treatment of the pedicle is adopted, the tumour should be cut away by a V-shaped incision. The cut surfaces above the

ligatures should then be united by two sets of silk sutures, a deep set bringing together the muscular tissue, and a superficial set bringing the edges of the peritoneum into close contact. The needle may be made to pierce the peritoneum on each side twice, so as to turn the edges into the wound and bring flat surfaces of peritoneum into contact. In some cases of hard encapsuled fibroids it has been found possible to enucleate the tumour from the external surface of the uterus without any hæmorrhage sufficient to require the application of ligatures.

Hysterectomy, or the removal by abdominal section of the whole uterus when enlarged by fibroid or fibro-cystic disease, is a much graver matter, and, until recently, has been attended by a very high mortality. The most successful operators have, however, now attained a mortality as low as 8 or 9 per cent. in cases in which it is possible to treat the pedicle extra-peritoneally. The great danger lies in the bulk and vascularity of the pedicle formed by the cervix and broad ligaments, and consequent risk of primary or secondary hæmorrhage. As the operation has hitherto been performed, the essential condition for its possibility is that a sufficient portion of the cervix should be free from the growth to be converted into a pedicle. If the intra-peritoneal treatment of the pedicle is adopted, there is a risk that septic infection may be conveyed to the peritoneum from the vagina through the cervical canal, since the ligatures inevitably become slack after some days, and are apt to produce ulceration of the cervical mucous membrane. This risk is avoided if the stump can be fixed in the wound. With any form of clamp some vessels in the broad ligaments close to the sides of the uterus are apt to be insufficiently compressed. Hence the method of circular constriction is generally preferred. A thick wire should be placed round the cervix and broad ligaments, and the stump secured with Koeberle's serre-nœud, as described for the case of the stump of

an external fibroid tumour (*see* pp. 292, 293). Unless the menopause has passed, the loop must be placed low enough to allow the ovaries to be removed with the uterus. Keith now prefers to the serre-nœud a large clamp similar to Spencer Wells' clamp (Fig. 108), originally used for the pedicle of ovarian tumours, on the ground that its use is not followed by sloughing to the same extent. Before applying the clamp he draws all the parts gently together by a thick silk ligature or by a soft wire. In this case the cervical canal should be scooped out and disinfected before the stump is treated in the manner described at page 293. The compression of the neck of the uterus often causes great

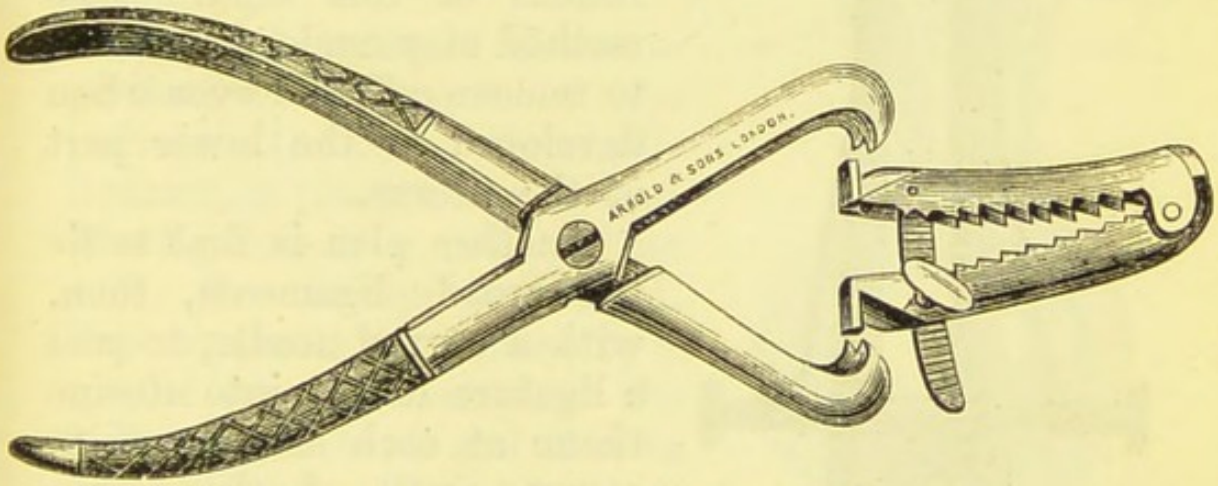


Fig. 108.—Spencer Wells' Clamp, with Forceps.

pain and collapse, so that opiates in full doses are generally required, and stimulants may be called for.

If the pedicle is very thick, the serre-nœud may be screwed home before the wire is tight enough. Clamps have been devised to avoid this difficulty (Fig. 109, p. 296). If the serre-nœud is used, a second instrument should always be at hand, which may be applied to the already constricted pedicle, and the first wire afterwards removed. The method of closing the wound is the same as that for myomectomy, described at page 293.

If the pedicle is to be dropped, it is important that it should be covered in with peritoneum. The broad ligaments may first be transfixed and tied below the

ovaries with carbolized silk, and the main branches of both ovarian and uterine arteries thus secured. The mode of dealing with the uterine stump varies. Schroeder placed a temporary elastic ligature round the lower part of the uterus, cut away the tumour by a V-shaped incision, or enucleated it if extending into the pelvic cellular tissue, and united the edges of peritoneum with deep and superficial sutures, which also arrested hæmorrhage. He reported nine deaths out of forty operations of this kind. This method may render it possible to remove a fibroid even when developed in the lower part of the uterus.

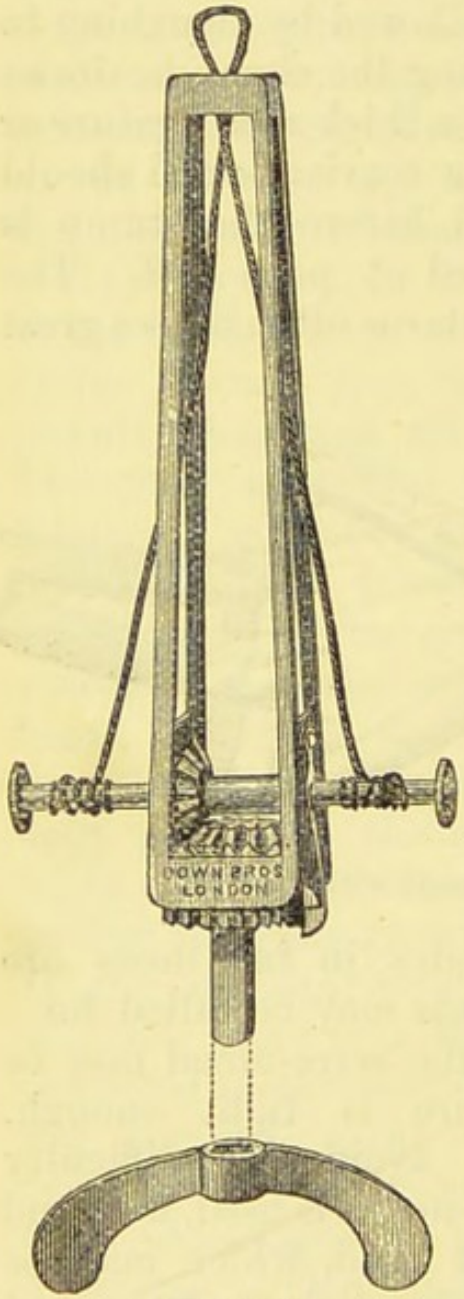


Fig. 109.
ELDER'S Endless Wire Clamp for Hysteroctomy.

Another plan is first to tie the broad ligaments, then, with a curved needle, to pass a ligature deeply into uterine tissue at each side, so as to secure some of the lower branches of the uterine artery. A temporary elastic ligature is then placed, and the uterus cut away by a V-shaped incision. The sides of the V are then brought together by continuous sutures of moderately fine silk, such as Chinese twist, No. 2. A first series unites the deeper portion, and a second the superficial portion. Finally, the peritoneal edges are united by interrupted or continuous suture of finer silk, which may be made to pierce the peritoneum twice on each side, as in Lembert's intestinal suture, and so invert its edges.

If a fibroid tumour grows into the broad ligament, provided that it is of the hard encapsuled variety, the vessels commonly enter it from the uterine wall at one spot only. It may then be possible first to make an incision through the peritoneum and capsule of the tumour, and then to enucleate it, until only a pedicle is left containing the vessels. This pedicle can be tied and dropped. Enucleation from the broad ligament is, however, a dangerous operation, not to be lightly undertaken.

Another method of extra-peritoneal treatment of the pedicle is the use of the elastic ligature, as practised by Hegar. The ligature is an india-rubber cord, five millimetres thick. The cervix is transfixed by a special needle carrying the india-rubber cord, and tied in two halves. The whole is encircled by another ligature below (Fig. 110, *b*). The peritoneum is then carefully adjusted round the pedicle in the following manner. Below the pedicle, at the lower angle of the wound, a suture is passed through the peritoneum on each side, and through the pedicle below the elastic ligature, so that the three are united together. Just above the pedicle a similar suture unites the edges of the parietal peritoneum to each other and to the pedicle (Fig. 110, *a*). The next two or three sutures unite the edges of parietal peritoneum only. The remainder

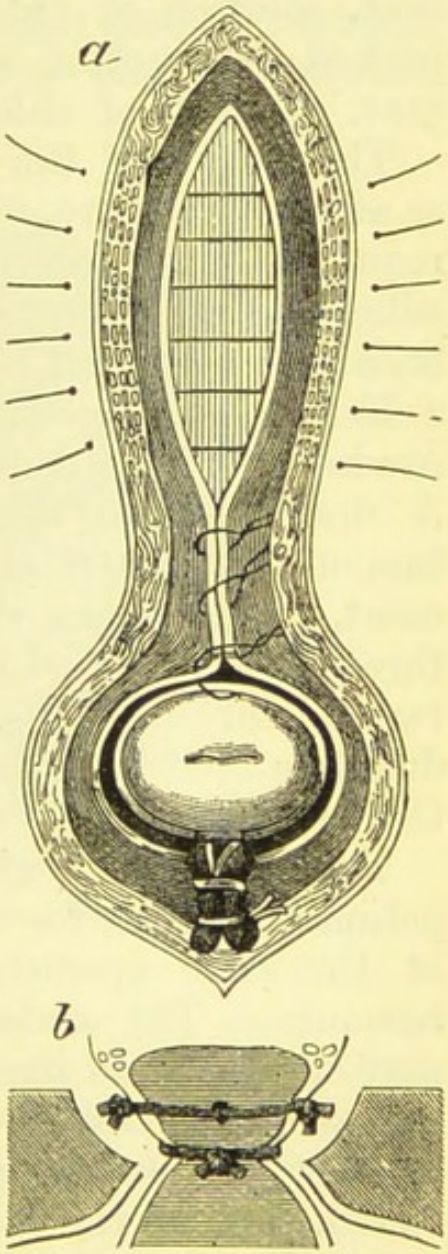


Fig. 110.

Treatment of Pedicle of Fibroid Tumour by Elastic Ligature (after HEGAR and KALTENBACH).

are passed through the abdominal walls, including peritoneum, in the ordinary way. Thus there is produced a trench surrounding the pedicle, which can be easily inspected and kept aseptic. The end of the stump is cauterized and touched with 100 per cent. solution of chloride of zinc, and the trench is packed with cotton which has been soaked in 2 per cent. solution of chloride of zinc and then dried.

The toilette of the peritoneum should be carried out as after ovariotomy. Drainage is comparatively rarely required, since uterine tumours are less frequently adherent than ovarian. But if many adhesions have been separated, and bleeding is not completely stopped, a Keith's drainage-tube (Fig. 133) should be placed, reaching to the bottom of the pouch of Douglas. A drainage-tube should also be used if a fibroid tumour has been enucleated from the broad ligament. The upper end of the tube should project through the wound, separated from the pedicle by two or three sutures. The after-management of the drainage-tube will be described under the head of Ovariotomy.

The success of vaginal hysterectomy, or total extirpation of uterus, for cancer, has led to an adaptation of the same operation to the case of large fibroid tumours. The abdomen is first opened, the upper part of the broad ligaments tied, a temporary clamp is placed around the lower part of the uterus, and the tumour cut away. The abdominal wound is then closed, the cervix is separated *per vaginam*, and the remainder of the uterus removed. The details of the vaginal part of the operation will be described under the head of Cancer of the Uterus. There are not yet sufficient statistics for comparison of the mortality of this operation with that of the ordinary supra-vaginal hysterectomy.

Electricity has been used in two ways for the treatment of fibroid tumours. First, a current may be passed through the uterus by an electrode introduced into

the interior. Secondly, electrolysis may be produced by puncturing with needles, the negative pole being used for insertion into the tumour. The method of using powerful continuous currents has been perfected by Apostoli, of Paris, who found that, by using a mass of wet potter's clay, folded in large meshed tarlatan, for the external electrode, a more powerful current

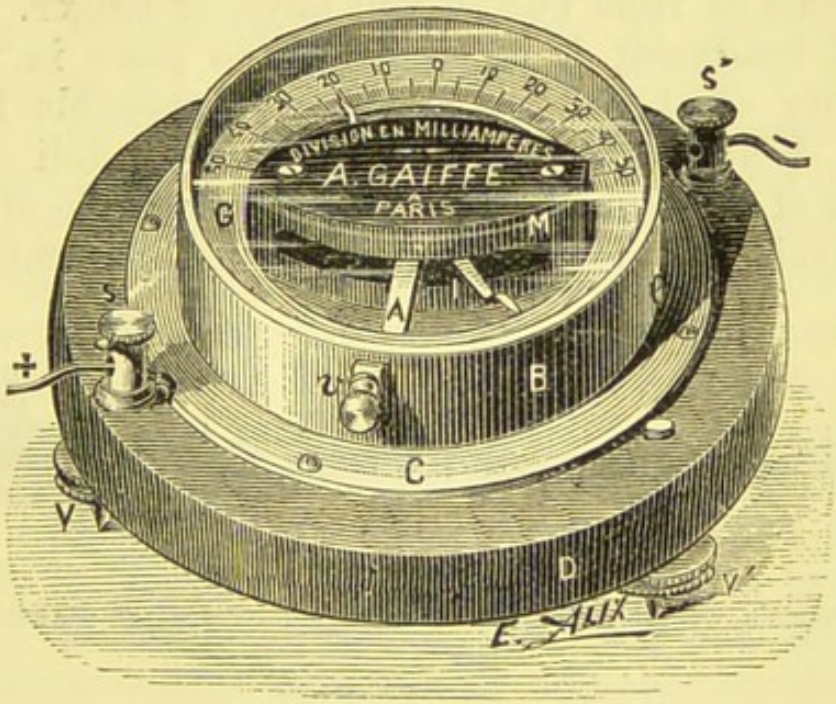


Fig. 111.—GAIFFE'S Galvanometer.

could be applied, without injury to the skin. For relief of hæmorrhage a positive electrode of platinum is passed into the uterus, the portion lying in the vagina being insulated by a sheath of celluloid. A galvanometer must be attached to the apparatus (see Fig. 111).

The external electrode is a large plate of copper, embedded in the potter's clay. The internal electrode is a sound of platinum, of which any length desired may be made to protrude beyond an insulating sheath, by which the vagina and cervix are protected (Fig. 112, p. 300). In general the positive pole is first used internally, for relief of hæmorrhage and pain. Later, the negative pole, which has the more powerful caustic

effect, may be used internally, with the view of causing reduction of the tumour; but this not infrequently causes increase of hæmorrhage for the time.

The strength of the current at the first sitting is to be increased from 20 or 30 up to 100 milliampères. Subsequently, an intensity of 200 or 250 milliampères may be arrived at. The operation may last from four to ten minutes, and may be repeated at intervals of from two to four days, or longer. This mode of treatment is adapted only to cases in which the cavity of the uterus is readily accessible to the sound. When this is not the case, Apostoli adopts the plan of puncture with a negative electrode of steel. Electrolysis by puncture appears to effect diminution

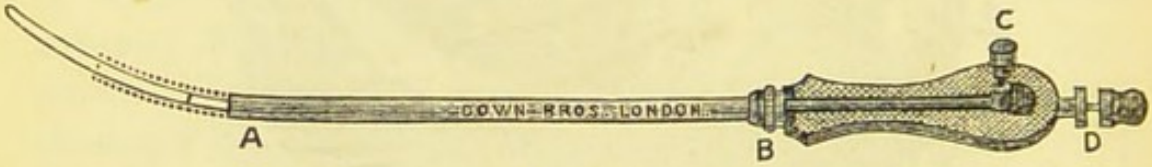


Fig. 112.

Apostoli's Uterine Electrode, modified by Inglis Parsons.

of the tumour only by causing disintegration and inflammation in it. It seems likely therefore to set up peritoneal adhesions, and to involve a greater risk than removal of the uterine appendages in those cases which are suitable for that operation.

It is claimed by the advocates of this treatment that it generally relieves or cures the symptom of hæmorrhage; that occasionally small tumours have entirely disappeared after its use, and that some reduction is obtained even of larger tumours.

The general experience is that the expectations raised by the enthusiastic advocates of electricity have not been fulfilled. In the case of large tumours, often no reduction can be obtained, and rarely more reduction than may be observed after the use of ergot, or other treatment. I have known tumours to go on

growing steadily in spite of very persevering use of electricity by its most noted advocates. It is claimed indeed that intra-polar electrolysis of the elements of the tumour takes place; but it is probable that the effect is rather that of cauterization at the pole, combined with stimulus to contraction when the current is applied. For, in the case of chemical fluids, electrolysis takes place at the poles alone, not between them; and there seems to be no sufficient proof that the case can be different with the tissues of the body. If electrolysis can be relied upon to reduce a tumour, say by one-tenth of its bulk, it would seem that a sufficient number of repetitions of the process ought to remove it almost entirely; and this is admitted not to be the case. Again, death has sometimes occurred after the use of electricity, from sloughing of the tumour and septicæmia; and there is a possibility that the use of the current may set up endometritis, and thence produce perimetritis, and peritoneal adhesions about the tubes. In general, therefore, I consider that, in cases suitable for oophorectomy, that operation is to be preferred. There is no doubt, however, that electricity is a very powerful caustic, and valuable for the arrest of hæmorrhage. It may be used for this purpose in the case of tumours of considerable size, which do not appear to justify the risk of hysterectomy.

Treatment of Fibroid Polypi.—Removal by the écraseur is preferable to cutting away the polypus with scissors, since the latter method is not absolutely free from the risk of serious subsequent hæmorrhage. The method of ligature, which involved the danger of septic absorption, is now obsolete. The écraseur itself, and the thickness of the wire, should be in accordance with the size of the polypus. It is convenient to have an instrument with a very strong stem, into which terminals of various sizes can be screwed (Fig. 113, p. 302). The écraseur may be used either with the wire-rope made up of several strands of wire twisted, or with a single wire. The single steel wire is preferable, since

it is much the stronger. The wire may have a loop at both ends, to be attached to the travelling button, or one end may be left free, to be attached to the crossbar as shown in the figure. This plan is preferable in the case of a large tumour, where there is much difficulty in adjustment. When the polypus has passed through the os, the application of the noose is generally easy, and may be managed by the fingers without any speculum. The tip of the stem should eventually be passed up within the cervix, and the slack part of the wire drawn in, if the loop is at one end only, before it is finally attached to the transverse bar of the écraseur, the loop having been previously secured to the travelling button. If a small portion of the pedicle is left, it generally shrinks up after removal of the main growth. An anæsthetic should not be given for this operation, if it is possible to avoid it, for dividing the pedicle of the polypus gives little or no pain, while pain is severe if the uterine wall be included in the loop, and thus an error may be revealed at the last moment. If a polypus is very large, difficulty may arise in its extraction, after division of the pedicle. In the absence of forceps specially constructed for the purpose, delivery may sometimes be effected by midwifery forceps, or, preferably, by passing the loop of the écraseur again over the polypus, and so dividing it into pieces. If this cannot be

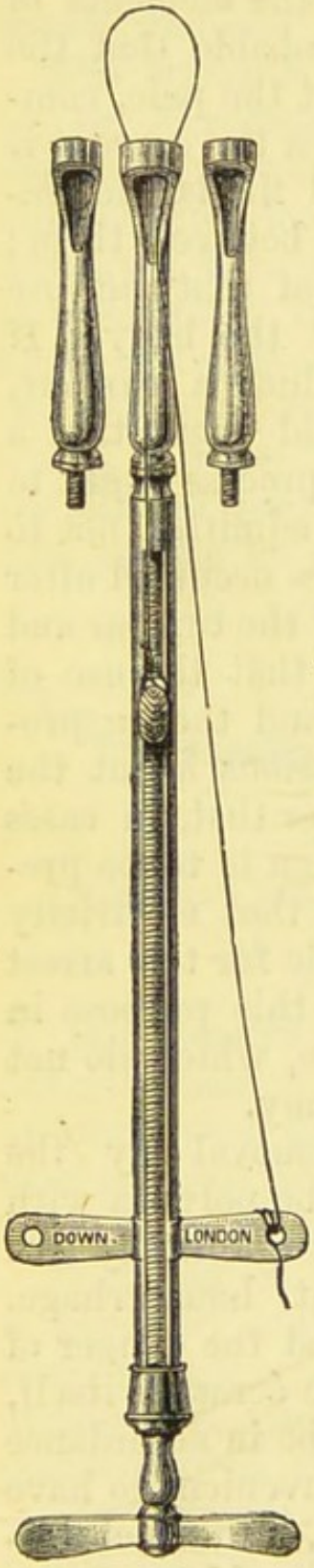


Fig. 113.—Wire Écraseur.

accomplished readily, the tumour may often be extracted, without laceration of the vulva, by the following plan. The portion presenting at the vulva is seized by strong tenaculum forceps, and an incision is made with scissors in the tumour in a spiral form, commencing near the point where it is seized, while traction upon the tenaculum is meanwhile maintained. In this way the tumour is gradually elongated and drawn through the vulva.

If the polypus is within the uterus, the cervix must be fully dilated before removal is attempted. In order to pass the loop of an écraseur over an intra-uterine polypus, it is desirable to depress the uterus as much as possible, by drawing down the anterior lip of the os with tenaculum forceps, while an assistant presses it down from above. It is often useful to fix a tenaculum in the polypus itself, make some traction by its means, and then pass the loop over the handle. Care must be taken, however, not to produce in this way partial inversion of the uterus, and the traction should therefore be relaxed before the écraseur is tightened.

Polypoid elongations growing from the os are easily removed by the écraseur, or, if their base is broad, they may be cut off with scissors, and the bleeding either stopped by cautery or by application of a styptic and plugging of the vagina.

CANCER OF THE CERVIX UTERI.

Causation.—Cancer of the neck of the uterus is a very common disease. It is more frequent even than cancer of the breast, and is the chief cause of the greater prevalence of cancer in the female than in the male sex. It most commonly occurs between the ages of forty and fifty, but a considerable proportion of cases are also met with between thirty and forty, while a few appear before the age of thirty, and others occur

even up to advanced old age. Cancer of the cervix is extremely rare in virgins, and commoner among parous than among nulliparous women, while among the subjects of it a considerable number of women are found who have had large families. From this it may be inferred that inflammation of the cervix, induced by parturition or other mechanical causes, plays an important part in the causation of cancer, and that the so-called erosion or granular inflammation near the os, or within the cervical canal, may eventually, *in predisposed subjects*, go on to malignant degeneration, although in any given case of this common affection such a termination is an improbable one. This view is confirmed by the researches of Ruge and Veit (*see* p. 214), who found that in so-called erosion a gland-proliferation takes place, and that cancer may commence with a similar proliferation with the addition of an exuberant growth of epithelium, partially or wholly filling up the acini. Laceration of the cervix may thus predispose to cancer, by giving rise to inflammatory irritation of the exposed mucous membrane of the cervical canal. At a very early stage of epithelioma it is not uncommon to find evidence of a pre-existing laceration. That constitutional predisposition is also an important element in the origin of cancer of the cervix is shown by the comparative immunity of negroes, though it is not to be inferred from this that the disease may not be purely local at its commencement. Predisposition to cancer in individual families has also some influence, although it is only in a minority of cases that a history of this can be traced.

Pathological Anatomy.—Using the word cancer in its widest sense, to signify a growth having the clinical characters of malignancy, namely, that it tends to spread by contiguity into tissues of a different character from that in which it originated, to return after removal, and to infect the glands and distant organs, we must include among the varieties of cancer affecting the

cervix—(1) true carcinoma, having a more or less alveolar structure; (2) epithelioma, or the "cancroid" of German writers; and (3) many forms of sarcoma.

Pathological Varieties.—There are three tissues in the cervix from which malignant disease may arise. (1) From the proliferation of the epithelium of glands, either primarily existing within the cervical canal or formed by ingrowth of cylindrical epithelium into

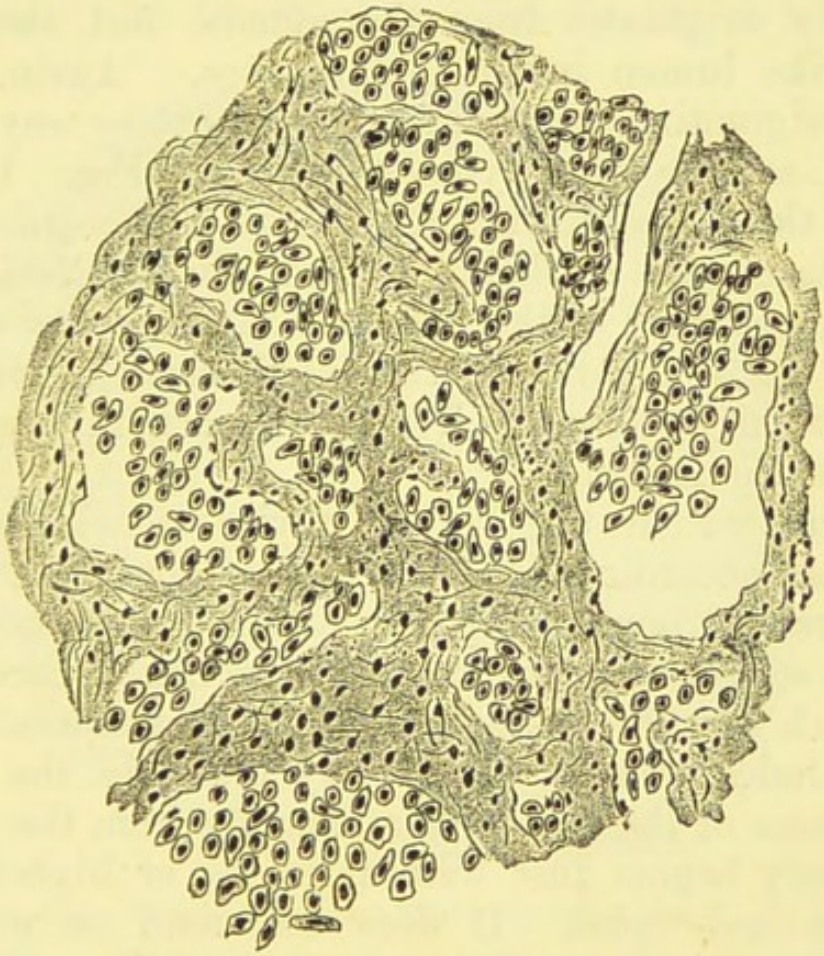


Fig. 114.—Carcinoma of Cervix Uteri.

depressions under the influence of irritation, may arise true carcinoma. As a rule this does not retain a completely glandular type, forming the cylindroid carcinoma, or adeno-carcinoma, which is the usual type of cancer commencing on the surface of the intestines, or of that of the body of the uterus, in its earlier stages at any rate (*see* Fig. 124, p. 332). It rather assumes the form of the ordinary alveolar carcinoma, consisting of epithelium-like, but irregular cells, not

cemented together, but lying apart in alveoli formed in a connective tissue stroma (Fig. 114). A true cylindroid carcinoma is sometimes found in the cervix, but is very rare in that situation, except at the very earliest stage of the growth. A form of growth is more often found, sometimes described as columnar-celled epithelioma. This consists of masses of elongated cells cemented together, the long axis of the cells generally at right angles to the long axis of the cell mass. It probably originates from the glands, but shows no gland-like lumen in the cell masses. Again, carcinoma originating in the glands does not by any means always assume the type shown in Fig. 114, in which the cells in the alveoli are uncemented. In other cases, the epithelial cells, while proliferating to fill up the lumen of the gland, or invading the cellular tissue, form apparently cemented masses, not very different in appearance from those seen in squamous-celled epithelioma.

Carcinoma in the cervix varies considerably in hardness, according to the relative proportion of cells and fibrous stroma, but approximates rather to medullary than to scirrhous carcinoma. A true scirrhous carcinoma, in which the fibrous stroma largely preponderates over the included cells, is very rarely found in the cervix. Carcinoma of the cervix, commencing from the glands, commonly begins just within the os, or higher up in the cervical canal. It does not tend so much as epithelioma to form an outgrowth into the vagina, but rather an infiltrating and subsequently ulcerating form of disease.

(2) From the ingrowth of processes of the deeper layer of the squamous epithelium originates, in the first instance, a squamous-celled epithelioma. This usually forms a growth enlarging the cervix, and projecting into the vagina. The most regular type of squamous-celled epithelioma, in its earlier stage, is shown in Fig. 115. Epithelioma of the cervix differs, however, from the ordinary epithelioma of the

skin in many important respects. *First*, the epithelial globes, so characteristic of epithelioma of the skin, are rarely seen, and that only at an early stage of the growth. *Secondly*, the cell masses proliferate much more rapidly, and hence the disease runs a more rapid course. Sometimes the cell masses constitute almost the whole growth, the connective tissue stroma being represented only by delicate trabeculæ passing amongst them and carrying the vessels. Such a growth can be broken down readily by the fingers. *Thirdly*, the cells them-

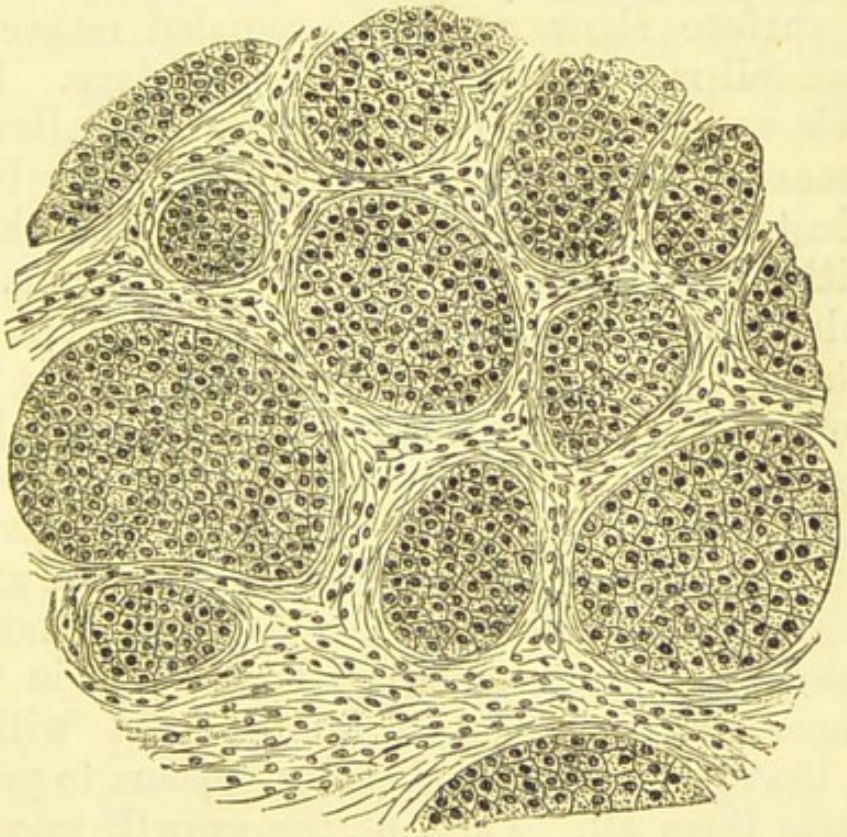


Fig. 115.—Squamous-celled Epithelioma of Cervix Uteri.

selves alter their character and no longer resemble regular squamous epithelium. They become very various in size and shape, may cease to be regularly cemented together, and often appear to be propagating by division, or to have multiple nuclei within them. Some of these included bodies may be coccidia. *Fourthly*, there is not merely a small-celled infiltration of the surrounding connective tissue, as in skin epithelioma, but the connective tissue stroma takes on an active growth of an embryonic character, as if it, as well as the cell-masses, were infected by malignancy.

It may form a considerable share of the growing mass, and I have found, in some instances, that the connective tissue stroma was so soft that, in a thin section, it fell out, leaving a framework of cell-masses. In most forms of cancer, it is more usual for the cell-masses to fall out, leaving the fibrous trabeculæ. *Fifthly*, the growth does not merely advance by the inward growth of columns of cell-masses, but the stroma around the growing border becomes infected, and fresh centres of cancer spring up in it. Thus, sections perpendicular to the surface show generally rounded rather than columnar cell-masses, even at an early stage. Later, the whole appearance of the growth becomes altered by this process. Around the growing border may be seen small clusters of cells, with large nuclei like those of the epithelial masses, isolated in the stroma. As these clusters enlarge, especially if the cells have ceased to be cemented, the growth corresponds to the definition rather of carcinoma than of epithelioma, consisting of small clusters of uncemented cells in alveoli of connective tissue. Thus, in an advanced stage, it is often impossible to say whether the growth began from squamous epithelium or from glands. A yet further stage may sometimes be reached, in which the cancer cells become so intermingled with the stroma, that intercellular substance appears to pervade and isolate them all. Parts of the growth may then be found which, taken by themselves, correspond to the definition of sarcoma rather than of carcinoma, or differ from it only by the epithelium-like appearance of the cells, and their large nuclei. As a rule, these large nuclei distinguish the carcinoma cells from those of the stroma, which have smaller nuclei, even if the stroma is growing so rapidly as to be round-celled. It is uncertain whether the infection of the stroma takes place by migration of the carcinoma cells, or by a kind of spermatic influence affecting the nuclei of the connective tissue and causing them to grow into the likeness of the carcinoma cells, or by both processes together.

(3) From the connective tissue of the cervix may originate sarcoma, which is the rarest form of malignant disease in the cervix, constituting less than one-tenth of the whole number of cases. It may be either round-celled or spindle-celled. Round-celled sarcoma forms a growth which can only be distinguished from epithelioma or carcinoma by the microscope. I have met with some cases in which it occurred even under the age of twenty, and formed a very soft proliferating growth, filling the vagina. Spindle-celled sarcoma forms a harder mass, of slower growth, and less liable to ulcerate and bleed. It is liable to be mistaken for myoma.

Clinical Varieties.—The main distinction is between growths which form proliferating tumours projecting into the vagina, and those which infiltrate surrounding tissues and ulcerate early, producing excavated or conical ulcers, having a hard border of growth, which at first may be in the tissue of the cervix itself, but later involves surrounding parts, vagina and bladder. As a general rule the proliferating growths are squamous epithelioma in the first instance, the ulcerating growth carcinoma; but this rule is not invariable. In any case a stage supervenes sooner or later in which ulceration predominates.

Of the proliferating growths, those which enlarge the extremity of the cervix uniformly convert it into a mushroom-like shape with everted edges. Those which grow irregularly have rather a cauliflower-like appearance. The term *cauliflower-excrescence* was, however, originally not applied to all of these, but limited to a sprouting papillary growth, readily bleeding, capable of being broken down by the fingers, and so soft that after its removal or after death nothing but a broken-down pulpy mass, like macerated placenta, might remain. This was regarded by some as a special form of disease, and not necessarily malignant. The papillæ have, however, the structure of squamous epithelioma, or of medullary carcinoma, consisting mainly of cell-

masses, with but little connective-tissue stroma. But a great tendency to proliferate in papillæ may be associated with but a slight tendency to infiltrate, and hence a growth of this kind may be favourably placed for eradication. Another variety is cancer commencing in the cervical canal, which may affect a considerable portion of the cervix, and even reach the cellular tissue, before it shows itself at all on the vaginal aspect of the cervix.

Directions of extension.—The disease usually spreads equally in all directions while it remains in uterine tissue. But as soon as it reaches the softer cellular tissue or the vaginal wall it spreads with much greater rapidity. Hence, in the common case in which it begins close to the external os, one lip of the cervix is commonly enlarged more than the other, and a section of the growth has a shape similar to that shown in Fig. 119, p. 320. The disease extends higher along the cervical canal than it does at the outer part of the cervix; and soon reaches above the level of the vaginal fornices; but it commonly extends to the vagina and the cellular tissue around, before it reaches as high as the internal os. The disease may commence in the cleft of a lacerated cervix, quite near to the vaginal reflection, and, in that case, it reaches the vagina and the cellular tissue at a very early stage. Cancer of the cervical canal extends outward toward the cellular tissue, as well as upward and downward. Generally it reaches the cellular tissue before it passes above the internal os, but sometimes it involves the body of the uterus first. This is especially the case with carcinoma originating in the glands, which sometimes does not spread uniformly from a central point, but affects the mucous membrane for a considerable distance along the canal. In the ulcerating stage, the cervix is eaten away, the vagina and base of bladder are involved, and the fundus is also reached (Fig. 116). Eventually vagina, bladder, and rectum may be thrown into one cloaca. The bladder is usually laid open before the rectum.

Metastatic deposits may occur in the pelvic and lumbar glands, ovaries, peritoneum, and also in distant organs, as the lungs and liver, even in the case of spindle-celled sarcoma, the least actively malignant of the various forms of growth. Mr. Arnott found metastatic deposits in the glands in 50 per cent., in other organs in 41 per cent. of his cases. The growth often interferes with the ureters, leading to wasting or

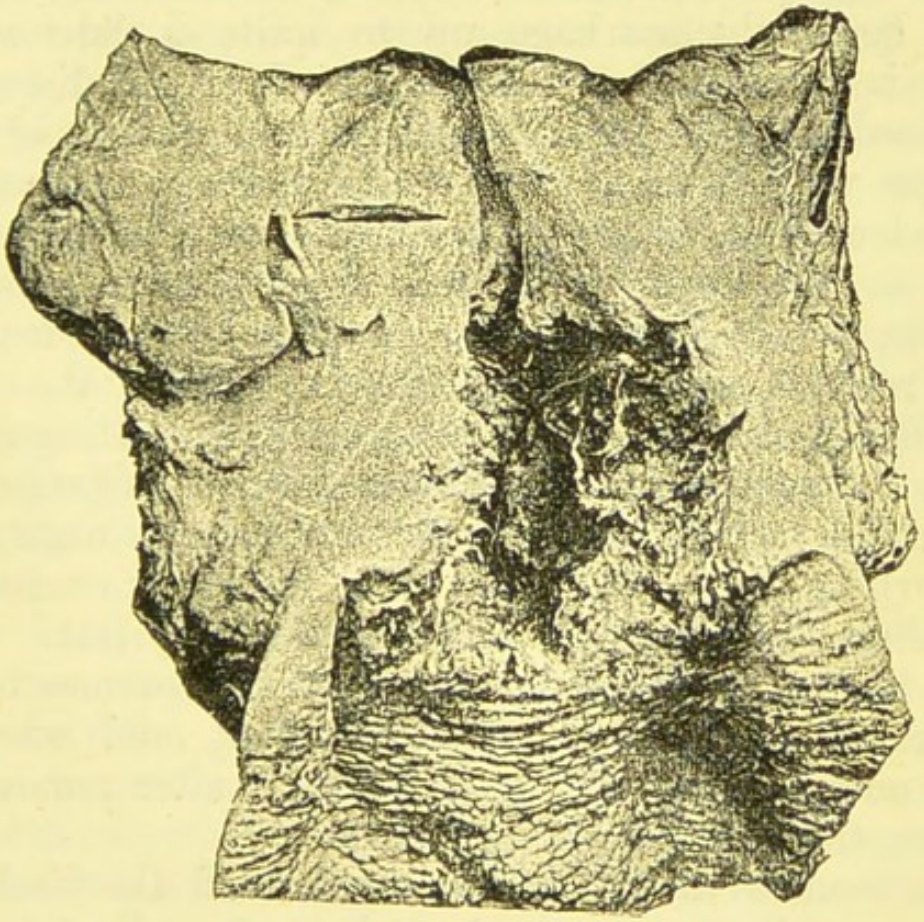


Fig. 116.
Advanced Carcinoma of Cervix Uteri, forming Ulcerated Cavity.
(From a Photograph.)

inflammation of the kidneys, and may even entirely occlude them.

Results and Symptoms.—In the early stages of cancer the symptoms are frequently so slight that the disease commonly does not come under observation until it has reached a stage at which it is ineradicable. When an early symptom occurs it is usually that of hæmorrhage, often not profuse, but irregular, and frequently recurring. Hæmorrhage on coitus is not

infrequently the first symptom. Menstruation is also increased, and leucorrhœal discharge is generally present, sometimes slightly tinged with blood. A recurrence of uterine hæmorrhage, after the menopause has for some time passed, should always lead to the suspicion of cancer, and be regarded as an imperative indication for a vaginal examination. Early symptoms are more commonly present in the vegetating than in the infiltrating forms of cancer; in the latter of which there may be no hæmorrhage up to quite a late stage. Pain is usually absent or slight while the disease is confined to the cervix, and in some cases of soft cancer very little is felt up to quite an advanced period of the disease. In most cases, however, as soon as the growth has infiltrated the tissues round the uterus, severe lancinating pain is a marked feature, and renders cancer of the cervix one of the most terrible of diseases. It may generally be distinguished from the pain of chronic inflammation or engorgement from the fact of its being felt severely at night, and disturbing sleep, while the other is chiefly evoked by standing or locomotion, and is relieved by rest. Pain may be also produced in cancer by the soreness of the ulcerated surface exposed to friction, and when of this nature it may be much relieved after removal or destruction of the diseased surface.

As soon as ulceration has commenced the discharge has generally a watery character, often tinged with blood, and soon acquires the most intense fœtor, which forms not the least among the sufferings of the unfortunate patient. Frequently shreds of gangrenous tissue come away with it. At the outset the patient may be apparently in the most florid health, but as soon as the ulcerative stage is reached cancer of the cervix very quickly induces loss of flesh and the well-known cancerous cachexia. As displayed in this form of cancer it depends, in great measure, upon the effect of repeated hæmorrhages, and upon a constant slight absorption from the foul discharges. Thus a great

improvement may be effected in the general appearance by partial removal of the growth, leading to a temporary cessation of hæmorrhage and fœtid discharge. The cachexia shows itself mainly in a sallow, yellowish tint of skin, accompanied by emaciation, but this does not present anything absolutely characteristic; and a very similar appearance may be seen in other cases, especially in those of fibroid tumour or polypus, accompanied by hæmorrhage and sloughing. Digestive functions are impeded, and nausea and vomiting are frequent, being partly the effect of the disgusting smell of the discharge. Obstinate constipation may result from mechanical interference with the rectum, while occasional attacks of diarrhœa from reflex irritation are not infrequent. Disturbance of the bladder occurs pretty early, and may be the first symptom which attracts attention. At first there may be reflex tenesmus, then difficulty of micturition as the base of the bladder and the urethra become involved, and finally incontinence, from the existence of a fistulous opening.

The duration of the disease commonly varies from one to two years after the recognition of its character; more rarely the patient survives for three or four, or even a greater number of years. Very rare instances have been recorded in which an apparent spontaneous cure has resulted after sloughing of the growth. If the growth can be removed the course of the disease is much prolonged, and it is doubtless possible to eradicate it entirely in some cases, if the operation can be performed early enough. Death occurs sometimes directly from hæmorrhage, but more frequently from gradual exhaustion and emaciation, aided not infrequently by the effects of uræmia or kidney inflammation, set up by the interference of the growth with the bladder or ureters. Intercurrent peritonitis or pneumonia may close the scene, or death may occur rapidly from occlusion of the ureters, producing complete suppression of urine, or suddenly from pulmonary embolism, usually

the sequel of thrombosis of the pelvic veins in or near the growth.

Diagnosis. — When the disease has reached the ineradicable stage, the diagnosis should be easy, although mistakes have not infrequently been made. The cervix is fixed, and dense inelastic induration may extend to the vaginal walls. In the hard mass is felt an ulcerated cavity with hard nodular edges. Its surface gives to the finger a peculiar sensation of superficial friable softness, with extreme inelasticity of the tissue beneath. Hæmorrhage is generally produced by touching the surface of the ulcer. The fœtor of the discharge is a ready diagnostic sign in the later stages. In endometritis or vaginitis the discharge may be offensive enough to annoy the patient, but the intense and nauseating smell, hardly to be removed from the fingers even by disinfectants, belongs only to cancer, and to the decomposition of the products of conception, or the sloughing of a benign tumour, such as a fibroid or polypus. The two latter conditions can usually be easily distinguished by the history and physical signs. The absence of fœtor is, however, no disproof of cancer.

In the proliferating forms of cancer, the growth often attains considerable size before the cervix becomes fixed. There is then an unequal enlargement of one or both lips of the cervix, not nearly so hard to the touch as chronic hyperplasia. The surface is more or less villous or papillary, and readily bleeds on manipulation. The whole cervix is broadened, and tends to grow into a mushroom-like shape, with eversion of its edges— a valuable diagnostic sign. By speculum a bulging, irregular, mottled, deep-red surface of more or less extent is seen, which is destitute of the normal squamous epithelium. The speculum, however, should be used with great caution in cases of cancer of the cervix, on account of the severe hæmorrhage which it may induce. When it is required for diagnosis, or the application of remedies, it is usually best to employ

either a Sims' (Fig. 24, p. 52), or Neugebauer's speculum (Fig. 28, p. 55), the first blade of which can be guided past the cervix by the finger. Nothing but the microscope can decide whether the growth is carcinoma or epithelioma, since both may have a papillary or villous surface. The exceedingly friable, villous, readily-bleeding surface of the true cauliflower excrescence can scarcely be mistaken for any other condition.

The diagnosis of the earliest stage of cancer may be one of very great difficulty. The most valuable assistance is to be found in the fact, that it usually commences *on the surface* near the os, or just within the cervical canal, and is associated with some degree of papillary growth, which leads to ready hæmorrhage on manipulation. If bleeding is produced by a gentle touch of the os by the finger, and not merely by rough handling, or the use of the speculum or sound, the suspicion of commencing cancer should be excited, especially if any papillary surface or inelastic nodules are felt around the os. Villous erosions, however, may also sometimes readily bleed, and in a very doubtful case, the only certain method of distinguishing is to remove a portion of tissue by scissors or sharp spoon, and examine it microscopically. For any certain conclusion, the fragment should be large enough to allow it to be hardened, and sections cut from it. As seen through a speculum, cancer, at a very early stage, may sometimes be distinguished from any non-malignant ulceration or erosion by the presence of limited irregular prominences, which may be separate from the cervical canal, having a deep-red and papillary or villous surface. There may also be an excavated ulceration, with sharply cut edge, at the margin of the os. Fig. 117, p. 316, showing an early stage of the cancer, may be compared with Fig. 84, p. 220, and Fig. 85, p. 221, showing granular inflammation with laceration and simple erosion, respectively.

Hyperplastic induration of the cervix has, formerly, often been mistaken for cancer. It may be distinguished

by the fact that the cervix is movable (unless fixed by inflammation); its irregularity is due to fissures radiating from the os, and its tissue has some elasticity with its hardness, while pain is usually increased during the menstrual flow, instead of being relieved by hæmorrhage, as is commonly the case in cancer. Generally, also, there is no irregular hæmorrhage, and menstruation is scanty rather than profuse, nor is there usually hæmorrhage on gentle manipulation, unless a severe erosion exists. In hyperplasia there is commonly a

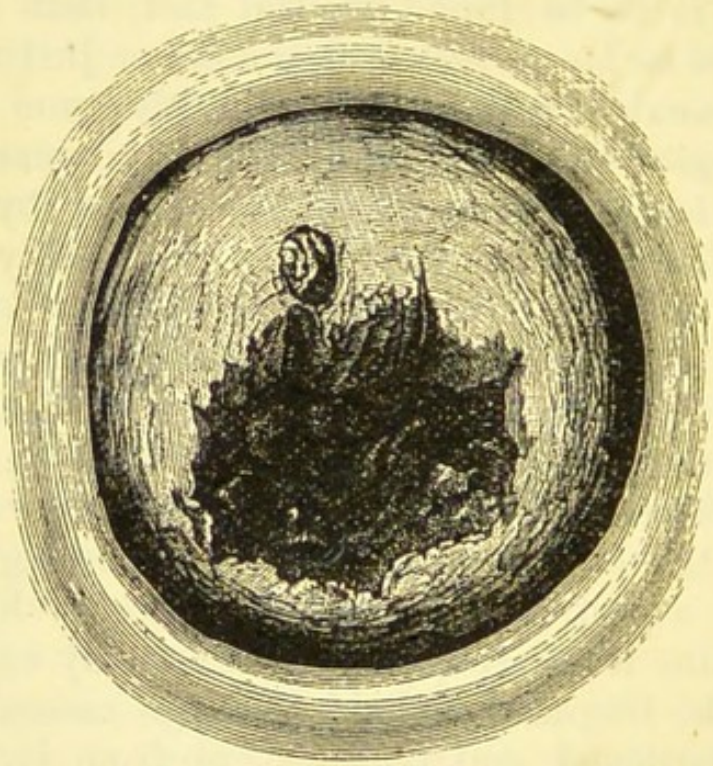


Fig. 117.—Cancer of the Cervix Uteri at a very early stage (after RUGE and VEIT).

history of symptoms referable to uterine disorder of many years' duration, while the symptoms of early cancer are not likely to have existed many months. It is to be remembered, however, that cancer may supervene upon disease of a non-malignant kind.

Treatment.—If the disease is recognized before the uterus is fixed, no time should be lost in attempting to eradicate it by removal. Even though it may recur, the patient is relieved for a considerable period from hæmorrhage and discharge, and the course of the disease is much protracted.

The method formerly adopted, for cases in which the growth forms a projecting mass, was to amputate by the galvanic or wire écraseur. This has now been superseded by the operations of supra-vaginal amputation and total extirpation of the uterus. For slicing off the cervix level with the vagina removes a very small portion of the cervical canal, and almost always leaves a portion even of growth obvious to the naked eye above the plane of section. The method is now used only for a preliminary operation, when there is a large vegetating mass which obstructs the vagina, or, by its sloughing, causes an offensive discharge. In this case it is desirable to get rid of the outgrowth as a first step, especially if the peritoneal cavity is to be opened for total extirpation of the uterus. The galvanic écraseur is preferable to the wire, because, with the latter, tissues are more apt to be drawn in which it was not intended to include. The battery should be powerful enough to heat a loop of platinum wire at least three inches in diameter, and should consist of at least six large cells. The loop is applied by passing up the stem of the écraseur in front of the cervix, as in the case of the ordinary écraseur (*see* p. 301). In some cases this operation may also be desirable to remove a vegetating or sloughing outgrowth, when no radical operation is possible.

Supra-vaginal Amputation of the Cervix.—By this operation the neck of the uterus can be removed as high as the internal os, or still higher towards its internal surface. At the front and sides of the cervix as wide a margin can be given to the growth as in the case of vaginal hysterectomy, but posteriorly this is not the case, because, in hysterectomy, a great part of the pouch of Douglas may be removed, the incisions being commenced on the vaginal wall a considerable distance behind the cervix. Even posteriorly, as wide a margin can be given in supra-vaginal hysterectomy, if the pouch of Douglas is opened freely, and the opening afterwards closed by sutures. In a considerable propor-

tion of cases, therefore, the operation appears to offer as good a prospect of eradication as hysterectomy, since it is rare for an outgrowth on the vaginal aspect of the cervix to spread up to the internal os before it has reached the cellular tissue or vagina. If, however, there is reason to believe that the growth extends far up the canal, hysterectomy should be preferred. This is especially the case in carcinoma of the cervical canal, which is generally a more infiltrating form of disease than outgrowing epithelioma, and its limits less easy to determine without microscopic sections. Again, if a growth involves the posterior lip of the cervix, and reaches or almost reaches the vaginal reflection, this will be a point in favour of hysterectomy. The choice between the two operations varies at present in different countries. The Germans generally prefer vaginal hysterectomy; the English keep to supra-vaginal amputation for a considerable proportion of cases. The thoroughness of the latter operation depends a good deal upon the operator, while a complete hysterectomy can scarcely be other than thorough.

The Operation.—The vagina is first disinfected with a solution of perchloride of mercury, 1 in 1,000. The patient is placed in the lithotomy position, and the legs secured by Clover's crutch (Fig. 71, p. 160). The perineum is retracted by a Sims' or Simon's speculum, with a broad but very short blade, so that the drawing down of the cervix is not hindered. Lateral retractors, to separate the sides of the vulva, may be used in addition. An irrigator is provided, with hot water at 115°, for the double purpose of washing away blood from the field of operation, and checking hæmorrhage by the effect of heat. The cervix is drawn down by vulsellum forceps, firmly fixed in each lip, or in the healthy lip, if one lip only is converted into a soft lacerable mass. I use the form of forceps shown in Fig. 118. The points of these are so adjusted that it is impossible to scratch the fingers with them, when the forceps are closed,

and the blades are separable for the purpose of cleaning. If both lips of the cervix are very lacerable, the uterus may be drawn down by passing the diverging tenaculum (Fig. 95, p. 236) into the cervix above the level of the disease.

The position of the bladder is first defined by means of a bladder sound, and an incision is then made with blunt-pointed scissors through the vaginal mucous membrane about a quarter of an inch in front of the cervix in a line concave toward the uterus. The bladder is then stripped off with the fingers from the front of the cervix close up to the reflection of perito-

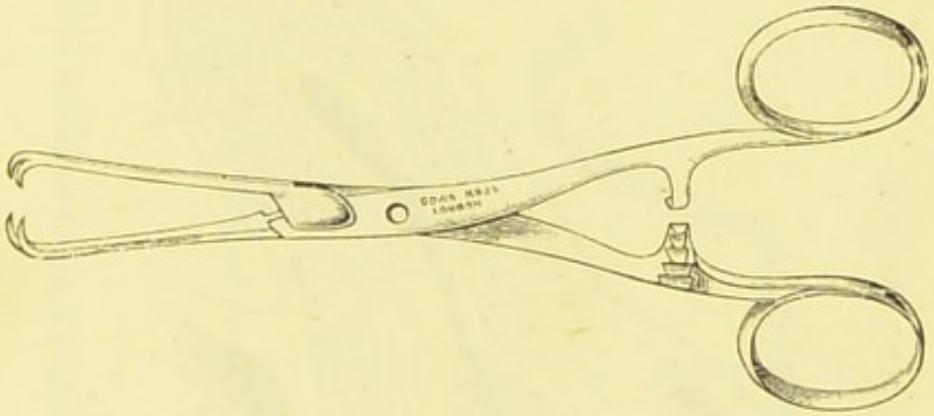


Fig. 118.—Vulsellum for supra-vaginal Amputation.

neum from the uterus to the bladder in the line *d b* (Fig. 119), the sound being still used to define the exact position of the bladder. Any bleeding arteries are secured by ligature or catch forceps.

The next step is to separate the cervix posteriorly. A similar incision is made through the vaginal mucous membrane behind the cervix, concave toward the uterus. This may be at a greater distance from the uterus, if the posterior lip is diseased, or if the growth has slightly reached the vaginal wall. The cellular tissue and peritoneum are then stripped with the fingers, or dissected, off the back of the cervix up to a level corresponding with the anterior separation in the line *c a* (Fig. 119, p. 320). Care must be taken to keep close to the uterine wall, and not go behind the pouch of Douglas. If the peritoneum is opened

accidentally, it should be closed by chromicized gut sutures.

The cervix is now left attached by the cellular tissue running into the broad ligaments at the sides, and containing the lower branches of the uterine arteries. The third step is to ligature and divide the lateral attachments. For the ligatures, Chinese twist, No. 4 or 5, may be used, and a semi-blunt, rather strongly curved, pedicle needle. For cases in which it is difficult to draw the uterus down, I have found

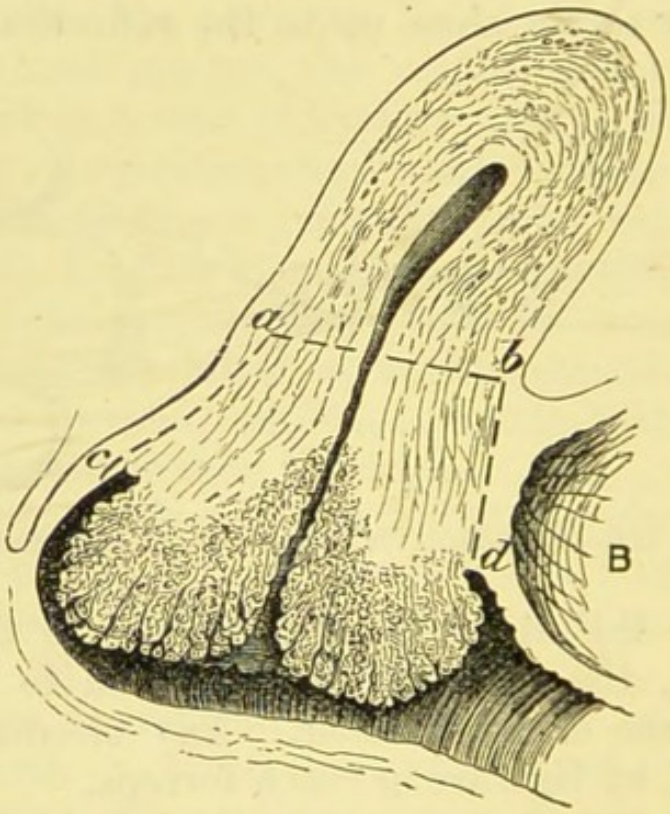


Fig. 119.—Lines of Incision in supra-vaginal Amputation.

the needle curved in a plane nearly at right angles to the handle, and shown in Fig. 121, to be useful. When the needle is passed through, the silk is caught on the other side by an aneurism needle, or small blunt hook. I generally pass the needle from before backward, but some prefer the opposite plan. The two previous incisions are first joined by a lateral one at each side, through the mucous membrane a quarter of an inch from the cervix. The needle may first be passed rather superficially beneath this incision; and

the end of the same silk again passed through at the upper limit of separation. The ligatures should not be more than a quarter of an inch from the side of the cervix, that the ureters may not be endangered. Each

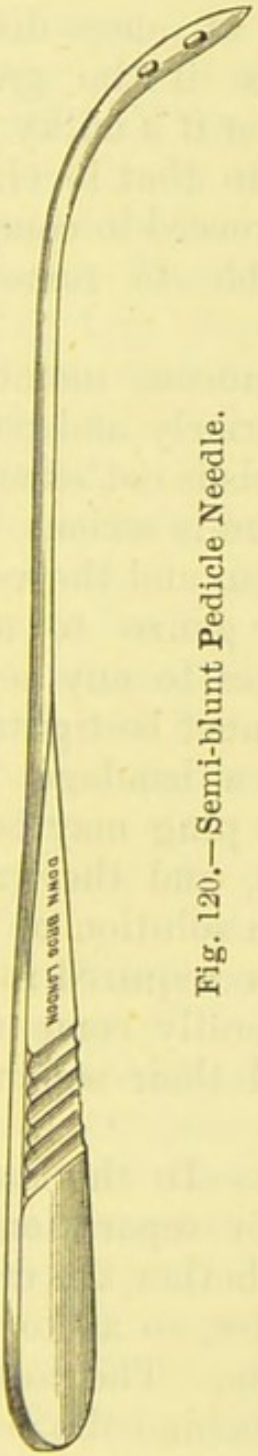


Fig. 120.—Semi-blunt Pedicle Needle.

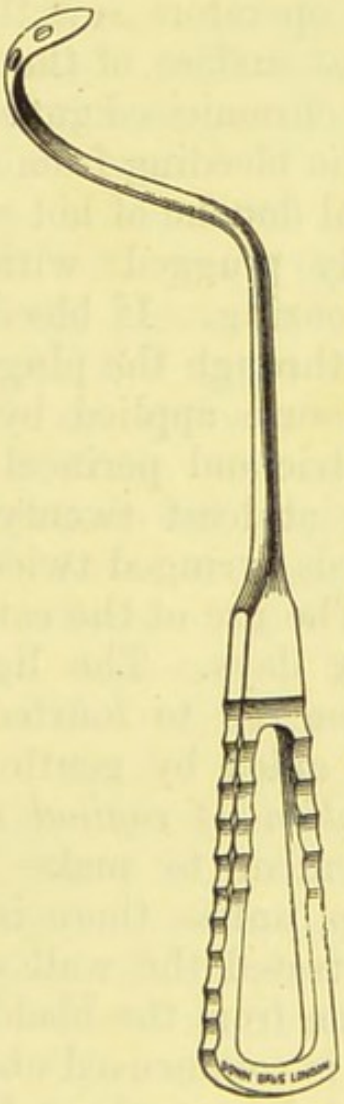


Fig. 121.—Needle for Ligaturing Broad Ligament.

side is thus secured by a double loop. The cervix is then separated laterally by scissors. If the arteries are not sufficiently secured by the ligatures, they must be seized by clamp forceps, large or small, according to

circumstances. These forceps may be left in place from thirty-six to forty-eight hours. Finally, the cervix is cut off above with scissors, transversely, or in a somewhat conical shape. The ends of the ligatures are left long.

The portion removed should be at once divided longitudinally, and examined to see if the growth extends nearly up to the cut surface, or if a milky juice can be scraped from the section up to that level. If this is the case, the operator should proceed to complete hysterectomy, unless it is practicable to remove a further portion of the uterus.

Some operators sew the vaginal mucous membrane to the cut surface of the uterus anteriorly and posteriorly by chromicised gut sutures. This is not essential, unless the bleeding from cellular tissue is serious.

A final douche of hot water is given, and the vagina is lightly plugged with iodoform gauze to arrest general oozing. If bleeding continues to any serious amount through the plug, the plug must be tightened, and pressure applied by means of a bandage, with hypogastric and perineal pads. The plug may be left in place at least twenty-four hours, and the vagina afterwards syringed twice a day with solution of boric acid. The use of the catheter will be required for the first few days. The ligatures generally come away after from ten to fourteen days, and their separation may be aided by gentle traction.

Operation of vaginal hysterectomy.—In this case, it is convenient to make the posterior separation the first step, unless there is a doubt whether the disease has infiltrated the wall of the bladder, so as to make separation from the bladder impossible. The posterior incision is commenced about an inch behind the cervix, and carried upwards and towards the uterus until the pouch of Douglas is opened. The opening may then be extended laterally by means of scissors bent at an angle in their cutting plane. At this stage any extension of cancer to the peritoneum or intestines

posteriorly would be detected and the operation abandoned.

If there is much general oozing from cellular tissue, it may be checked by stitching the cut edges of the vagina to the peritoneum by somewhat deep sutures of chromicised gut. In the same way, as soon as the anterior pouch of peritoneum is opened, the anterior vaginal wall may be stitched to that.

The anterior separation is made in the same way as for supra-vaginal hysterectomy until the peritoneum is reached. The peritoneum may be divided either by passing two fingers over the fundus uteri from the posterior opening, and using them as a guide, or by pushing a bladder sound through it, and then tearing it laterally. It is important that the separation should reach quite to the sides of the uterus.

The broad ligaments may be secured either by ligatures, or by clamp forceps with very long blades (Fig. 122, p. 324); or, again, the lower segments may be tied, and clamps placed upon the upper segments. I consider ligatures preferable on the whole, though their use may somewhat prolong the operation. Clamps must be used if the ligatures fail to control the arteries. In this case, the ligatures are passed from one peritoneal surface to the other. The broad ligaments are tied in successive segments. First the lower portions are secured, and the cervix cut from its lateral attachments. As soon as the centre of the uterus is divided from the utero-sacral ligaments, the fundus can generally be drawn down much further, and the upper part of the broad ligaments brought within reach. The transfixing and tying of this part is facilitated, if the fundus can be retroflexed and brought out through the posterior opening. If, however, the fundus is much enlarged by hyperplasia or any other cause, it must be drawn straight down. If the clamp forceps are used, care must be taken that the tips of the blades include the upper edge of the broad ligaments, but do not project far beyond it, so as to risk nipping intestine.

The irrigator is used with hot water or boric solution at 115° from time to time during the operation. The uterus having been cut away, a final douche is given to the vagina, and lower portions of the peritoneal cavity. A Lawson Tait's tube (Fig. 132) is best for this purpose.

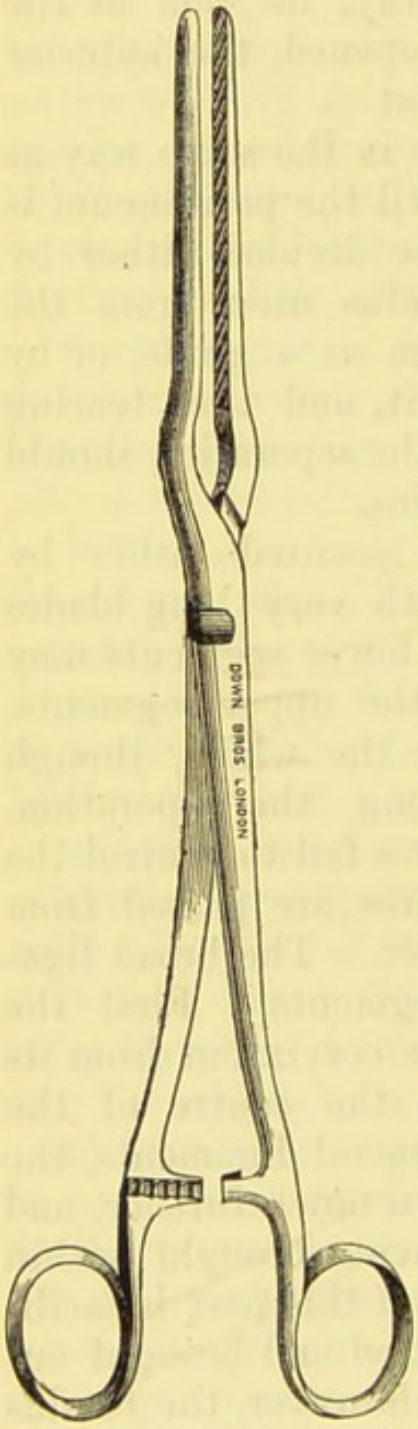


Fig. 122.—Clamp Forceps for Broad Ligaments.

If the broad ligaments are lax enough to allow the pedicles to be turned down completely into the vagina, the peritoneal cavity may be closed completely by chromicised gut sutures. If not, I think it desirable to place one or two sutures in the centre, to keep omentum or intestine from coming down into the vagina. Two long strips of iodoform gauze may be used to plug the vagina, and the upper end of each packed against the pedicle, at each side of the central stitches. As long as the patient is doing well, and the temperature is moderate, it is better not to remove the plug for three or four days, and not to use any douche for at least five or six days. Up to that time, after removal of the first plug, a small plug of iodoform gauze may be introduced daily, the end being left outside for a drain. After that, douches of boric acid solution may be used.

The mortality of both operations has improved with the increased experience of operators. A few years ago, the mortality of vaginal hysterectomy was quoted

as 29 per cent.; that of supra-vaginal amputation as 12 per cent. Recently Leopold, in a series of eighty cases of vaginal hysterectomy, had a mortality of only 5 per cent. Kaltenbach, in one of fifty-five cases, had a mortality under 4 per cent. But probably the mortality of supra-vaginal amputation will always be less, on the average, and it does not, like the other operation, involve the necessity of intestinal adhesions in the pelvis.

The rule of abstaining from operative interference when it is impossible to remove the disease wholly does not apply so much to cancer of the cervix as to that of other parts of the body, since a large part of the cachexia, whether due to hæmorrhage or septic absorption, depends upon the presence of the diseased surface in a situation exposed to friction and subjected to the influence of warmth and moisture. Whenever hæmorrhage is an urgent symptom, and a vegetating surface exists, removal of a portion of the growth will often arrest hæmorrhage and do away with the fœtor of the discharge for a considerable period. This may be carried out whenever the disease is not so advanced that a risk would be run of opening the peritoneal or other cavity. Any prominent mass round which a wire can be placed may be sliced off by the galvanic écraseur. To remove the deeper tissue the best instruments are the sharp spoons introduced by the late Professor Simon (Fig. 123, p. 326), which are made of various shapes and sizes. In scraping away the tissue by their means a selective action is exercised, since the cell-masses of the cancer are readily removed, while the normal tissue is more resistant. The selective action will not extend, however, to the infiltration of scattered cells among normal tissues outside the borders of the growth, while, for the harder forms of cancer, containing a large proportion of fibrous tissue, these spoons are less effective. Caustics may also be used, either in the first place, or, preferably, after the more friable and manifestly cancerous tissue has first been

scraped away. We may then employ either the actual, benzoline, or galvanic cautery, or chemical agents, as the potassa fusa, potassa cum calce, chloride of zinc, or alcoholic solution of bromine. Potassa fusa or potassa cum calce must be used with the precautions previously described. The solution of bromine, first recommended by Routh, and very highly lauded by Schroeder, is supposed to exert a special influence upon cancer cells, and is certainly an efficient caustic. One part of bromine dissolved in five parts of rectified spirit* may be applied on a tampon of cotton wool. This should be covered with a piece of gutta-percha skin, and a large tampon soaked in carbonate of soda placed in the lower part of the vagina to protect the intact mucous membrane by neutralizing the bromine which escapes. If the vagina be sufficiently protected, the caustic may be left in place from six to twelve hours.



Fig. 123.—Simon's Sharp Spoons for scraping cancer.

If all manifestly diseased tissue has been successfully removed by scraping, it appears best to use an indiscriminate caustic, in order to destroy all the neighbouring tissue into which outlying parts of cancer cells, or cancer germs, may have penetrated. For this purpose there is nothing better than the solution of chloride of zinc, 300 grains to the ounce. This is applied on a tampon of cotton, squeezed rather dry. A piece of gutta-

* The mixture should be made cautiously, the bromine being slowly added to the spirit, on account of the heat developed, and care should be taken not to inhale too much of the fumes, which are irritating to the lungs, and may even damage the sense of smell.

percha skin, wrapped in oiled lint, may be placed next, and then a larger tampon, soaked in solution of carbonate of soda and squeezed dry, to protect the vagina as much as possible. After about six hours, the lower tampon should be removed, and the vagina syringed with a weak solution of carbonate of soda. The cotton soaked in the chloride of zinc may be left for a week or ten days, at the end of which time it will bring away with it a white cup-shaped slough, free from smell, and a quarter of an inch or more in thickness. Opiates are generally required after the application of the caustic. Some employ an even stronger solution, namely, equal parts of the chloride of zinc and of water.

In cases in which fixation of the cervix shows that the disease has already reached the cellular tissue, and in the absence of any large vegetating growths, excessive hæmorrhage, or fœtid discharge not to be kept in check by the use of antiseptics, any active operative interference only assists the spread of the disease deeply into the cellular tissue, and thereby accelerates its most painful stage.

Palliative Treatment.—In a considerable proportion of cases of cancer of the cervix there is, therefore, no hope of benefit from even a partial removal of the growth. In the slower and more infiltrating forms of the disease, with little tendency to vegetation, hæmorrhage may often be kept in check by occasional application to the ulcerated surface of somewhat milder caustics than those hitherto mentioned, such as strong nitric or carbolic acid, or a saturated solution of chromic acid. When the disease is too extensive, and ulceration too far advanced to allow any strong caustic to be used, the condition of the surface may often be improved, and hæmorrhage and fœtor diminished, by the occasional application of the dried sulphate of zinc in powder. This may be kept in place by a tampon of cotton-wool, and left from twelve to twenty-four hours. If hæmorrhage is severe, the liquor ferri perchloridi fortior, which

acts as a caustic of moderate strength as well as a styptic, or a paste made with the solid perchloride of iron and glycerine, may be applied from time to time. A large crystal of iron alum, which the patient may herself pass up to the upper part of the vagina, is a useful means of checking any sudden onset of bleeding. Besides the stronger caustic applications, great benefit may be derived from the constant use of astringent and antiseptic solutions, by which the surface of the growth is hardened. As an astringent and antiseptic combined, from one to two drachms each of tincture of iodine and of solid perchloride of iron, dissolved in a pint of water, form perhaps the most useful lotion. As simple astringents, alum, iron alum, or acetate of lead may be used. As an antiseptic, permanganate of potash is of little avail. Perchloride of mercury and carbolic acid are the most powerful, but weak solutions of iodine or bromine, or a lotion containing two drachms to the pint of liquor sodæ chloratæ, or liquor calcis chloratæ, are also effective. A suppository, containing five grains of iodoform, with ten minims of oil of eucalyptus, may be passed into the vagina on each occasion after the use of the syringe.

Chian turpentine, introduced in 1880 by Mr. John Clay, as a cure for cancer of the cervix, has been found to fail, like other reputed cures for cancer. I have tested it in a considerable number of cases, and have not found any arrest of the growth in any one. In some cases at an early stage I have found that, over an interval of several months, the hæmorrhage and sometimes also the pain, have appeared to be diminished, and the surface of the growth has seemed to bleed less easily on touching. In other instances, the drug appears to be useless. It is probable that the benefit derived from it may be explained by its acting as a styptic, like other forms of turpentine, and diminishing the blood-supply. The Chian turpentine is likely to be best absorbed if given in emulsion rather than in pills. It may be dissolved in ether or hot rectified

spirit, and the solution added to a mucilaginous mixture, flavoured with syrup of lemons or syrup of ginger. Mr. Clay recommends eight grains for each dose.

As regards the general treatment, total sexual abstinence should be strictly enjoined, diet should be light, and stimulants should be avoided, or used sparingly. Internal remedies do not exercise much control over hæmorrhage, but ergot and gallic acid may be of service, in conjunction with local measures. In most cases, as the disease advances, the most urgent indication is to alleviate pain. In the earlier stages, hyoscyamus with camphor, cannabis indica, especially in the form of chlorodyne, belladonna, or conium may be tried, but generally their effect is not to be compared with that of opium and its alkaloids, and their chief use is for those cases in which the latter are not well tolerated. If opium and morphia are not well borne when taken by the mouth, they will often answer in the form of suppositories or subcutaneous injections. Battley's liquor opii sedativus or nepenthe is generally the most suitable form of opium for protracted use. The dose should not be increased too quickly at first, but, in a fatal disease, there should not be too much reluctance to establish an opium habit, and very large doses may be required before the close. Care should be taken, at the same time, to regulate the bowels, and secure that the fæces are soft. The general cachexia may be combated in some degree by tonics, especially quinine and iron, and gastric remedies are often required to alleviate indigestion.

Rodent ulcer of the cervix uteri is a very rare disease. It is distinguished from cancer by its slow progress, lasting over many years, and by the absence of any cancerous deposits in the ulcerated surface. On microscopic section, only infiltration with inflammatory cells is seen. The disease may, like cancer, lead to destruction of a large part of uterus and vagina, and ulceration into bladder or rectum. Its true pathology is uncertain. Some forms may be identical with the

so-called lupus of the external genitals. John Williams regards two cases described by him as senile gangrene, due to kidney disease, and calcification of the iliac arteries.

Treatment —In the early stage, free destruction of the surface with the benzoline cautery or potassa fusa appears to hold out some hope of cure.

CANCER OF THE BODY OF THE UTERUS.

Causation.—Cancer of the body of the uterus, while very much less frequent than that of the cervix, is yet not extremely rare. It does not show the same preference as cancer of the cervix for married women and those who have had many children, but is, on the contrary, more common in the nulliparous. True carcinoma of the body of the uterus occurs later in life than that of the cervix. It is rare under 40, and commoner between 50 and 60 than between 40 and 50. Sarcoma, however, occurs with a relatively greater frequency during the period of sexual activity.

Pathological Anatomy.—There are two chief forms of cancer of the body of the uterus, namely, true carcinoma and sarcoma. The round-celled sarcomata have clinically all the characters of malignancy, although their course is generally not so rapid as that of medullary carcinoma. Even the spindle-celled sarcomata, though much slower in growth, and deviating less from benign tumours, may lead to metastatic deposits in distant organs. Of sarcoma of the body of the uterus there are two varieties. The first, which is more frequently of the spindle-celled kind, arises in the muscular walls of the organ, often from degeneration of a fibroid, but is never encapsuled. It may grow into a polypoid form, and be only distinguishable from an ordinary fibroid polypus by its microscopic structure, and by the fact of its recurrence. Such tumours are described by the older writers under the name of "recurrent fibroid." More

or less muscular tissue may be contained in them, their structure being that of myo-sarcoma, or fibro-myo-sarcoma. The second variety of sarcoma grows from the internal surface, and is usually of the round-celled kind, probably having its origin in the round or elongated connective tissue cells of the mucous membrane. It rapidly assumes a fungating character, and readily breaks down, leading to hæmorrhage and fœtid discharge, and so assuming an obviously malignant character. Carcinoma generally commences in the form of cylindroid or adenoid carcinoma. At first there is merely exuberant proliferation of glands lined with cylindrical epithelium, infiltrating the muscular wall, commonly over the whole surface of the body of the uterus. Later there is more or less deviation from the normal aspect of gland tissue. The gland cavities are very irregular, and divided into loculi by up-growing septa. The epithelium no longer forms a regular lining, but grows into masses which may fill up the lumen of the gland. Eventually these masses grow into the stroma around, or similar epithelial masses are formed in the stroma (Fig. 124, p. 332). The character of the growth may thus merge into that of medullary carcinoma, but generally some relic of glandular appearance is visible in it. The whole organ becomes enlarged, and its walls greatly thickened as the cancerous infiltration progresses, while the surface is broken down and ulcerated. More rarely, carcinoma appears in the form of more or less isolated nodules in the uterine walls, but generally it affects a great part, or the whole, of the surface, as shown in Fig. 125, p. 333.

Remarkable cases sometimes occur in which, generally after the menopause, the uterus becomes distended into a globular cavity containing pus, without any obstruction to the outflow through the cervix. To this condition, as well as to that in which the uterus is filled with pus with occlusion of the cervix, the name of *pyometra* is applied. To the naked eye, at any rate, the appearance is that simply of inflammation of the

uterine walls, but the cases are apt to run an apparently malignant course, and to end by perforation of the uterine wall, and the formation of a sloughy cavity among the intestines. In two cases I have found that, although microscopic sections showed for the most part merely infiltration with inflammatory cells, yet here and there evidences of malignant growth, sarcoma or carcinoma, in the uterine wall, could be detected. It would seem probable that in many, at any rate, of

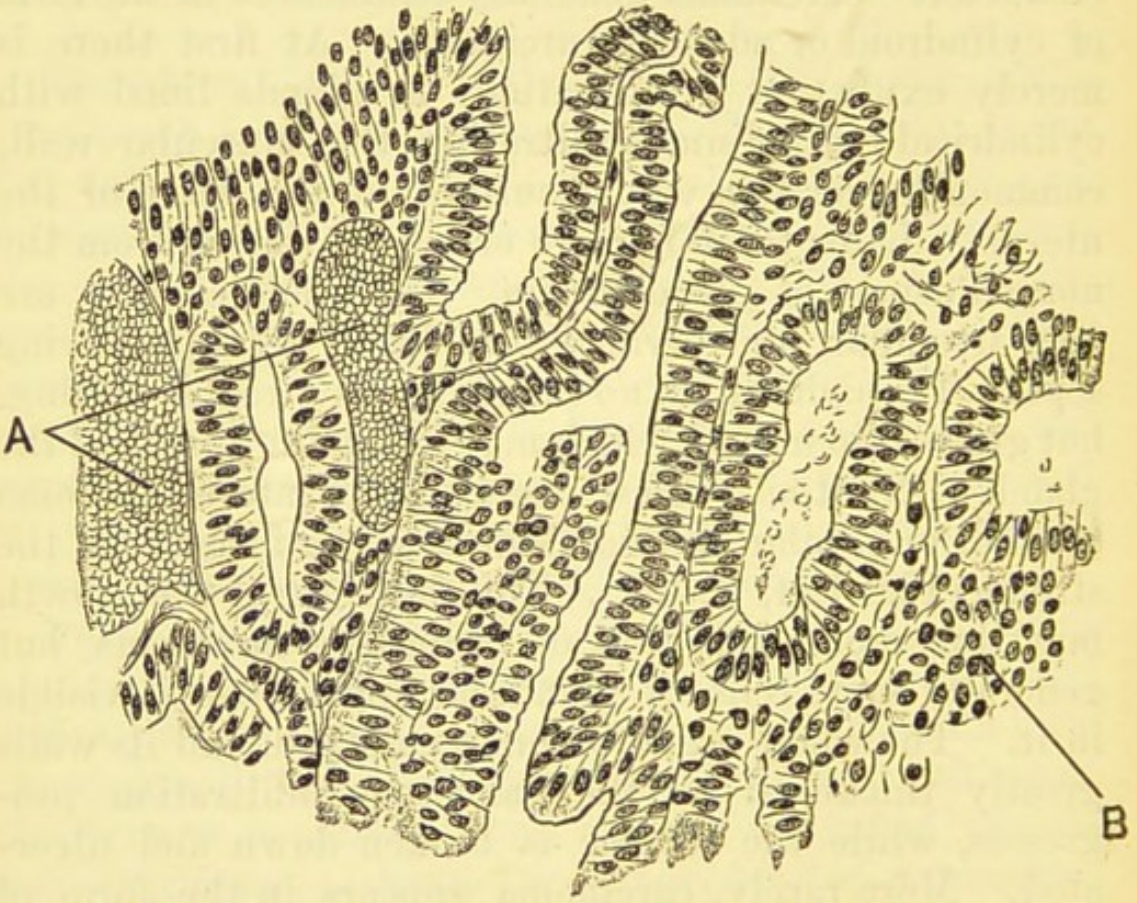


Fig. 124.—Adenoid or Cylindroid Carcinoma of Fundus Uteri.
A, vessels; B, epithelial masses invading stroma.

these cases the inflammatory condition is set up by the presence of cancer, although the symptom of hæmorrhage is absent.

Results and Symptoms.—In all forms of cancer of the body of the uterus the main symptom is usually hæmorrhage. Fœtid discharge occurs in carcinoma and round-celled sarcoma when disintegration of the surface has taken place, but is more usually absent in spindle-celled sarcoma, except at quite a late stage. Severe

spasmodic or lancinating pain is an early symptom in many cases, but in others it is absent throughout or up to a late period, though usually present when surrounding organs are becoming infiltrated. In the latter stages cancerous cachexia becomes marked. The cancer may extend to the cervix, to all neighbouring organs, and by metastasis to different parts. It is liable also to break down into cavities which may penetrate the uterine wall, so that cyst-like spaces are formed, with

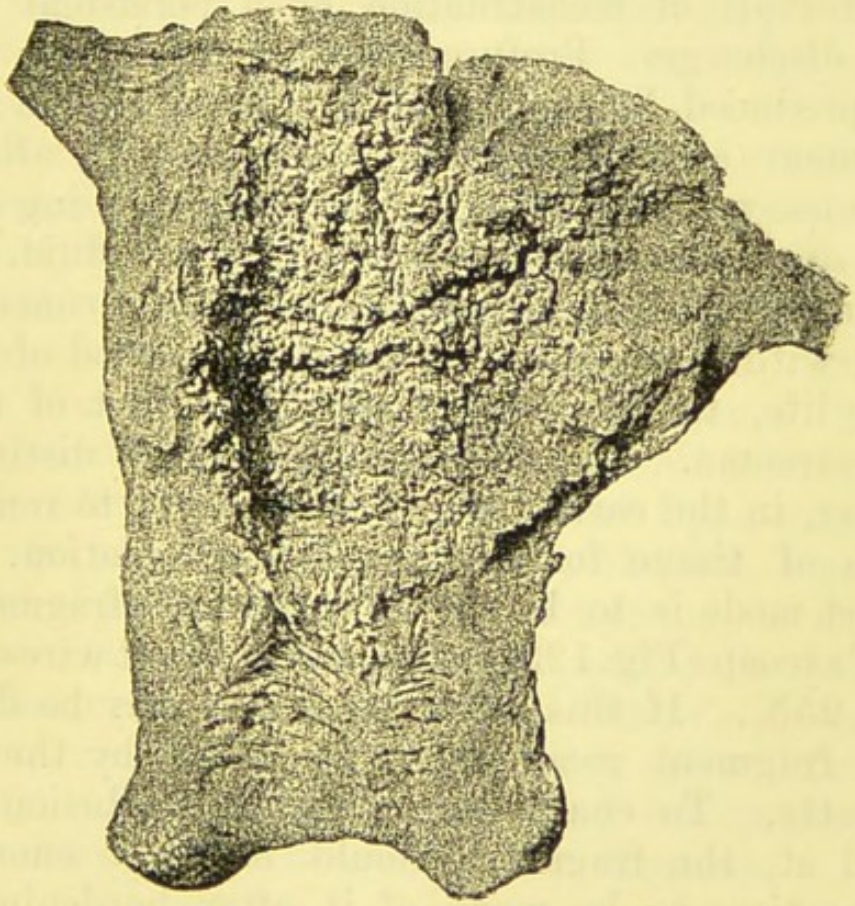


Fig. 125.—Carcinoma of Fundus Uteri.
(From a Photograph.)

gangrenous or semi-purulent contents. These may at first be limited by false membranes, but are apt to lead to perforation into the peritoneal cavity and fatal peritonitis. Otherwise death may be brought on gradually by hæmorrhage and exhaustion. The fatal result may also be due to peritonitis without perforation, or to septicæmia.

Not infrequently the disease runs a somewhat pro-

tracted course, extending perhaps to four or five years, and exceeding the average duration of cancer of the cervix. The symptoms are then for a long time limited to hæmorrhage, with perhaps some pain.

Diagnosis.—The disease in its early stage is very apt to be mistaken for a fibroid tumour, especially for a fibroid tumour complicated by fixation due to peri-uterine inflammation. The differentiation may sometimes be made by the fact that in cancer there is generally a frequent recurrence of hæmorrhage during the intervals of menstruation, or a persistent blood-tinged discharge. Profuse hæmorrhage is also likely to be produced by the use of the sound. The fact of the tumour commencing or growing rapidly after the menopause would also be in favour of its being malignant: so, too, is the presence of ascitic fluid. If a soft fungoid mass, not being the product of conception, is felt within the uterus during the period of active sexual life, the probable diagnosis is that of round-celled sarcoma. The only certain mode of distinction, however, in the earlier stages of cancer is to remove a portion of tissue for microscopic examination. The simplest mode is to bring away a small fragment by Simon's scoop (Fig. 123, p. 326) or the blunt wire curette (*see* p. 253). If this fails, the cervix may be dilated, and a fragment removed by finger, or by the scoop or curette. To enable any positive conclusion to be arrived at, the fragment should be large enough to allow sections to be made of it, after hardening, and the observer should have had experience in examining sections of uterine mucous membrane, healthy and diseased. In a late stage induration and fixation of surrounding parts take place, and nodular masses like glands may be detected. In the early stage of cylindroid carcinoma, the decision may be difficult. For there is proliferation of glands to a considerable degree in fungoid endometritis, and the diagnosis can only be made by the degree of deviation from the normal character of the glands.

Treatment.—If the diagnosis can be established while the uterus is quite movable, and there is no infiltration in the broad ligaments, total extirpation of the uterus through the vagina affords a fair prospect of cure. As the disease often progresses rather slowly, more slowly than cancer of the cervix usually does, and may be long before it reaches the external wall of the uterus, it may remain for some time amenable to this treatment. Supra-vaginal amputation by abdominal section would probably not remove the whole of the diseased tissue, since the attachment of the uterus to the bladder generally reaches up to or above the position of the internal os.

Vaginal hysterectomy is performed in the same way as for cancer of the cervix (*see* pp. 323—325), except that it will generally be impossible to retroflex the fundus through the posterior opening, and the uterus must be drawn straight down. The broad ligaments will be broader, and may require, to secure them, a greater number of loops, which should all interlace.

If the uterus is fixed, or the broad ligaments infiltrated, the treatment can only be palliative, especially for relief of pain. Severe hæmorrhage may be checked by occasional applications of nitric acid, or by scraping away the proliferating surface by Simon's spoons, or the sharp curette, the cervix being first dilated if necessary. Any polypoid masses of sarcoma or carcinoma should be removed by the écraseur.

TUBERCULOSIS OF THE UTERUS.

Tuberculosis of the uterus is rare, and is almost always associated with the same disease in other organs. Tubercle is deposited in the mucous membrane, and is transformed into a cheesy material, which breaks down and leads to ulceration. The whole interior of the body of the uterus may thus be converted into a ragged cavity, the disease generally not

extending to the cervix. The Fallopian tubes are commonly affected in the same way, and tuberculosis of the peritoneum and ovaries is also frequently associated.

The affection often escapes notice in the more important disease of other organs. The local *symptoms* are purulent discharge, with occasionally hæmorrhage, but, as a rule, amenorrhœa rather than menorrhagia. The uterus is found uniformly enlarged, and may also be fixed. The *diagnosis* is assisted by evidence of tuberculosis elsewhere, especially tubercular peritonitis. The *treatment* can only be palliative.

CHAPTER IX.

DISEASES OF THE OVARIES.

MALFORMATIONS OF THE OVARIES.

The ovaries may be congenitally absent, but this defect is almost always associated with absence of the uterus, and generally with want of development of the vagina, vulva, and breasts. More frequently, while the uterus is absent, the ovaries are developed. In the absence of the ovaries, a childish condition is generally perpetuated in the whole body, and the stature remains small, but in some cases there may be an approximation towards the male type. Sexual feeling is always absent or deficient.

Imperfect development of the ovaries is of much greater frequency. It may be associated with a rudimentary condition of the uterus, or, more frequently, with a small anteflexed uterus, and small vagina, while occasionally the uterus is well formed. Menstruation and the general changes associated with puberty are either deferred, or entirely fail to appear. Menstruation, when it does commence, is scanty and irregular, and is liable from slight causes to be arrested for a long period or permanently, while the menopause generally occurs early. General development frequently either does not proceed much beyond the childish stage, or the body is muscular, with a tendency to production of hair on the chin and legs, and frequently a harsh voice. The pelvis is often

uniformly small or of a childish or masculine type. There is also usually a deficiency of sexual feeling, which may lead to unhappiness in married life.

Even if the development of the ovaries is only so far imperfect or retarded as to lead to the postponement of menstruation more than three or four years beyond the usual time, a serious permanent result may follow. If the growth of the pelvis does not receive that stimulus, which it usually derives at puberty from the development of the ovaries and uterus, until the age has passed at which the growth of the bones in general ceases, it is apt to retain permanently the childish type, and hence parturition may be obstructed if pregnancy ever subsequently occurs.

It is often very difficult to make an absolute diagnosis of imperfect development of the ovaries, for although defective development of the breasts, and of the feminine characteristics in the body generally, frequently coexists, yet this is not always the case. Even in the absence of such defects a probable diagnosis may be made in cases of prolonged amenorrhœa for which no other cause can be discovered, especially if there is a total absence of the periodical feelings of uneasiness in the pelvis, breasts, and system generally, which are termed the menstrual molimen, and if there is evidence of sexual indifference. The ovaries may sometimes be felt bimanually, especially if the patient is thin, or displaced into the pouch of Douglas, and may be found to be smaller than usual.

Complete absence of the ovaries is difficult to distinguish from imperfect development, but may be diagnosed with probability if, in a not very stout woman, no trace of the ovaries can be felt on bimanual examination with the aid of an anæsthetic, if sexual feeling is entirely absent, and if, after a fair trial, all treatment fails to induce menstruation. All further treatment should then be abandoned.

Treatment.—Since imperfect development of the ovaries is generally only a probable diagnosis to

account for prolonged or permanent amenorrhœa, its treatment will be considered under the head of amenorrhœa.

ATROPHY OF THE OVARIES.

The physiological atrophy of the ovaries, which usually happens about the menopause, may occur prematurely, and lead to cessation of menstruation. This may be the result of acute ovaritis, or of pelvic peritonitis or cellulitis, more especially of peritonitis, from the effect of which the ovaries may be bound down in an abnormal position, and the natural liberation of the ovules prevented. Sometimes, also, it occurs without any local affection as the sequence of a serious illness, or from the effect produced upon the nervous system by a deep sorrow or other strong emotion. This is more likely to occur if the ovaries are from the first somewhat imperfect in development.

Treatment.—The treatment of atrophy, like that of imperfect development of the ovaries, will be described under the head of amenorrhœa.

PROLAPSE OF THE OVARIES.

In a normal condition, the ovary rests as far forward as its attachments will allow it, although posterior to the plane of the broad ligament, being kept in position by the pressure of the intestines, which fill the fossa behind it. Its most notable displacement is one in which it drops below its normal level, and too far backward, descending into Douglas's pouch, and at the same time, owing to its attachment to the angle of the uterus by the ovarian ligament, is necessarily brought nearer to the middle line. The causes of this displacement are—(1) increased weight of the ovary due to hyperæmia, hyperplasia, or commencing degeneration of a cystic or any other kind; (2) laxity of the meso-

varium, or of the broad ligament generally; and (3) retroversion, retroflexion, or prolapse of the uterus. By these displacements of the uterus the ovaries are necessarily carried backward and downward, and the coils of intestine which normally keep them in position are displaced.

Results and Symptoms.—Ovaries in this position are almost invariably affected by chronic hyperæmia or ovaritis, and not unfrequently they become fixed by inflammation of their peritoneal covering. The displacement, by rendering the ovary more exposed to pressure or traumatic influences, tends to promote or maintain the inflammation. Thus the symptoms of ovarian hyperæmia or inflammation are present, often in an acute degree, those specially intensified by the displacement being pain in defecation and pain on coitus.

Diagnosis.—When thus prolapsed the ovaries can be reached more or less easily by the finger in vagina or rectum. When the prolapse is slight the examination must be made in the lateral position, and the finger, with its flexor surface towards the sacrum, must be carried as high as possible posterior to, and a little to one or the other side of, the cervix. The ovaries are recognized by their size and their shape, somewhat globular, but having often nodular irregularities. They are generally also more or less movable, and have a peculiar tenderness, analogous to that of the testicle. Often sickening pain, and not unfrequently hysterical manifestations, are produced when they are pressed. The ovarian ligament can often be recognized as a tight band running from the angle of the uterus to the ovary. Sometimes the Fallopian tube, especially if thickened, can be felt as a worm-like loop in the vicinity. In carrying the fundus uteri forward with the sound the displaced ovary is elevated to some extent. There may sometimes be a difficulty in distinguishing a prolapsed ovary from the retroflexed body of the uterus. The distinction may be made by

restoring the uterus, if retroflexed, completely with the sound. An ovary, if present, will then still be felt posteriorly to the cervix, although generally elevated to some extent by the replacement of the uterus. If both ovaries are prolapsed, the double tumour makes the diagnosis more obvious. It is, of course, necessary to be careful not to mistake a mass of scybala in the rectum for a prolapsed ovary. In any case of doubt, digital exploration of the rectum will decide the point; and, if an ovary is only just within reach, it may often be more readily touched by this mode of examination than *per vaginam*.

Treatment.—When any degree of retroversion or retroflexion of the uterus is present it is important to remedy that displacement, if possible, but the presence of the tender ovary frequently renders it difficult to adapt any pessary which can be tolerated, even after hyperæmia has been treated by rest and local depletion. In many cases, however, a Hodge's pessary may be found by trial, which will restore the uterus and elevate the ovary in some measure. A thick instrument should be chosen, or one having a broad cylindrical expansion at its posterior part, like that of Dr. Thomas (Fig. 53, p. 117). If this cannot be tolerated, an elastic ring pessary (Fig. 63, p. 152) may prove useful. The general treatment should be that of ovarian hyperæmia and inflammation (*see* p. 351), special care being taken to render the fæces soft.

The question of removal of the ovary will be considered under the head of ovaritis. An operation has been performed under the title of oophorrhaphy, for stitching the ovary up to the broad ligament, abdominal section having been performed as for the removal of the uterine appendages, and so keeping it in place. It is doubtful whether the result is likely to be permanent. At present, therefore, if abdominal section is justified at all, it appears to be wiser to remove ovary and tube altogether.

HERNIA OF THE OVARY.

The ovary may descend into a hernial sac, generally of the inguinal kind. A congenital, but very rare, form has been described in which one, or usually both ovaries descend by a fault of development into the labium majus, or into a pouch of peritoneum which remains open in the inguinal canal, just as the testis descends into the scrotum in the male sex. The descended body is then generally irreducible, and other malformations of the genital organs often exist also. Acquired hernia of the ovary is generally associated with hernia of intestine or omentum, and is more likely to occur soon after delivery, when the attachments of the ovary are loose. The ovary is apt to become inflamed and degenerated in its abnormal position. In the case of an apparent hermaphrodite, a body of doubtful nature is more likely to be a testicle than an ovary. This holds true even if the external genital organs and general type are entirely feminine. Such cases appear to be usually instances of the rare condition of "transverse hermaphroditism," in which the external organs are female and the internal male. Thus, doubtful bodies congenitally placed in the inguinal canals or labia may be assumed to be probably testicles, unless either they are found to undergo regular enlargement at monthly intervals, or an unequivocally developed uterus is discovered.

Treatment.—An acquired hernia may be reduced, if possible, and its return prevented by a truss. In congenital or irreducible hernia, the ovary should be protected by a concave shield. If the ovary becomes inflamed, and causes very severe distress, it may be excised, an operation which has been found necessary in several recorded cases. The operation should be performed with antiseptic precautions.

ACUTE OVARITIS.

Acute ovaritis (or oophoritis, as it has been called with greater philological propriety) is a rare affection. In its most severe form, leading to the formation of abscess, it is generally the result of septic absorption after delivery or abortion, and forms part of an acute inflammation of the broad ligaments and adjacent peritoneum. It may also, apart from parturition, be associated with pelvic peritonitis or cellulitis, especially, but not exclusively, with that of septic origin. An abscess in the ovary may also follow operations on the uterus, intra-uterine application of caustics, or the use of intra-uterine stems. An abscess originating in ovaritis may in very rare cases run a chronic course and present signs similar to those of a small cystic tumour. It is much more common, however, for suppuration to occur secondarily to cystic disease. An abscess of the ovary may burst into the peritoneal cavity and lead to fatal general peritonitis.

A somewhat less acute ovaritis, not usually ending in abscess, may result from the extension of acute endometritis, especially that of gonorrhœal origin. The infection appears to extend directly to the ovary when it is embraced by the Fallopian tube at a menstrual period. The ovaritis may also arise through the medium of pelvic peritonitis, which is itself a common result of gonorrhœal inflammation. Cases of acute ovaritis have been traced to exposure to gonorrhœal infection, even when there has never been any manifestation of acute vaginal inflammation. Acute ovaritis, not usually leading to suppuration, may also occur in the course of specific fevers, such as small-pox. As the result of acute ovaritis the tissue may be so disorganized that ovulation ceases, and permanent amenorrhœa is the result. The sub-acute forms are apt to leave a chronic ovaritis behind, and sterility is a common consequence of the peritoneal adhesions which remain around the ovary.

Diagnosis. — The symptoms of acute ovaritis are often merged in those of the septicæmia, peritonitis, or cellulitis, with which it is associated, and this is almost always the case in the most severe forms of the disease. In cases, however, in which the ovaritis is the prominent feature, a diagnosis may be made from the localization of pain and tenderness, and from the recognition, on bimanual examination, of a rounded swelling, not usually movable, in the position of the ovary.

Treatment.—In the septicæmic form no special treatment can be directed to the ovary. In simple inflammation, when acute ovaritis forms the chief part of the affection, perfect rest should be enjoined, and leeches may be applied to the groin, round the anus, or to the cervix uteri. Poultices or fomentations should also be applied, and opiates may be given with iodide of potassium. If an abscess is suspected special care should be taken to avoid any movement which might lead to rupture into the peritoneal cavity. A positive diagnosis of abscess limited to the ovary and not spreading in the broad ligament would justify abdominal section and removal of the ovary, but this can very rarely, if ever, be made in the acute stage. An abdominal exploration is, however, justified in most cases in which there are general symptoms pointing to suppuration, and a localized rounded lump in the region of the uterine appendages.

HYPERÆMIA OF THE OVARY AND CHRONIC OVARITIS.

Causation.—Since the ovaries, like the uterus, are naturally subject to a periodical active hyperæmia, this hyperæmia is easily rendered excessive by various causes, and may pass into actual inflammation. It is still more difficult than in the case of the uterus to draw any positive line between hyperæmia and inflammation, the ovaries being less accessible to observation.

The tendency to ovarian hyperæmia is often a constitutional peculiarity of the individual, and is probably associated with excessive development of the organ, or of the sexual emotion on its mental side. It is generally found in women of an emotional and hyper-æsthetic temperament, with frequently a predisposition to hysteria. Such women begin to menstruate early in life, and their menstruation is habitually profuse, until after marriage and parturition, by which it is often rendered more normal. Unless brought on prematurely by some cause of uterine or ovarian degeneration, the menopause generally occurs late.

The most important causes of reflex ovarian hyperæmia are morbid conditions of the uterus, which is more liable than the ovary to displacement, and to disturbances of menstruation dependent upon malformation, and is more exposed to traumatic influences. Chronic ovaritis may probably also be a sequel of chronic endometritis by direct extension of inflammation from the uterus along the Fallopian tube, without the occurrence of any acute ovaritis. When symptoms of obstructive dysmenorrhœa have existed from puberty, it is by no means uncommon for symptoms of congestive dysmenorrhœa, apparently ovarian in character, or those of chronic ovaritis, to be added after some years. In such instances it is impossible to determine whether reflex nervous influence only comes into play, or whether there is direct extension of inflammation from the chronic endometritis which generally exists. Ovarian hyperæmia may also be produced by sexual excitement or excess. Masturbation is undoubtedly one of the causes of hyperæmia, both of uterus and ovaries. A similar effect may result from imperfect coitus. This may be dependent either upon premature emission on the part of the husband, the result of former habits of masturbation or other causes, or upon relative sexual frigidity or want of general vigour on the part of the wife. Again, if

women have masturbated in childhood, a too exclusive sensibility is apt to be cultivated in the clitoris. Vaginal coitus then frequently fails to produce the sexual orgasm, unless additional excitation to the clitoris is supplied. By the failure of the natural orgasm (analogous to the orgasm of emission in the male) on the part of the woman, which failure is by no means uncommonly habitual, the normal sedative to sexual excitement and congestion is removed. From such a cause, not only does local congestion arise, but, more especially, hysteria is apt to be produced. Celibacy must be reckoned among the causes of ovarian hyperæmia, since after marriage menorrhagia, congestive dysmenorrhœa, and other signs of ovarian irritability are often relieved, even if pregnancy does not occur. But on the other hand chronic endometritis or metritis with sterility is often associated with ovarian hyperæmia or ovaritis, due in part to the want of that physiological rest to the ovary which is afforded by pregnancy. Swelling and tenderness of the ovaries are not infrequently also found in women who have had children, sometimes apparently as the result of childbirth. They may then be the sequel of laceration or inflammation of cervix, retroflexion, partial prolapse, or other lesion of the uterus which may be the consequence of parturition. In these cases the affection does not usually show the extreme obstinacy which it often manifests in nulliparous women.

Passive Hyperæmia of the ovary is produced by general causes similar to those which lead to the same condition in the uterus, especially by constipation. When the ovary has once become prolapsed its venous circulation is further interfered with, and it becomes more exposed to direct causes of irritation. Passive hyperæmia renders the organ more vulnerable to causes of inflammation, and tends to produce hyperplasia and enlargement. From induration of the superficial tissue the normal rupture of follicles may be interfered with, and inflammation thus secondarily

set up, or the foundation of cystic degeneration laid. The importance of passive hyperæmia as a predisposing cause of chronic ovaritis is shown by the preponderance of that affection on the left side. This, like the usual occurrence of varicocele on the left side in the male sex, must depend upon the presence of the rectum and sigmoid flexure on the left side, whereby pressure upon the veins is liable to be produced, and upon the more indirect course of the left ovarian vein, opening into the renal vein instead of directly into the vena cava.

Inflammation of the ovary may result simply from an intensification of the reflex irritation which leads to active hyperæmia, or it may be produced indirectly by the hyperæmia leading to an excess in the normal slight effusion of blood on the rupture of a follicle. The results of this may be irritation and inflammation either directly in the ovary, or primarily in the adjacent peritoneum, and secondarily in the ovary. Chronic ovaritis is also frequently the sequel of acute or subacute ovaritis, especially that of gonorrhœal origin. It is a common result again of pelvic peritonitis, either by direct extension of inflammation, or from the obstacle to normal ovulation which thus arises, and the interference with the venous circulation. Inflammation may also be set up by irritation due to the presence of follicles, either simply distended with limpid fluid or in a state of commencing cystic degeneration. Dr. Matthews Duncan declares his belief that the most frequent cause of chronic ovaritis is the use of alcoholic liquors, even when not taken to excess; and says that this view of the causation of the disease is frequently corroborated, if not proved, by the cure which follows upon the adoption of teetotal living.

Pathological Anatomy.—That organic change in functionally active ovaries, passing beyond the stage of mere hyperæmia, is very common, is shown by the frequency with which, after death, signs are found of

a very limited local peritonitis, apparently having had its origin in those organs. The ovaries themselves also are often enlarged and nodular from irregular hyperplasia, and in such places frequently contain small cysts containing limpid fluid, and formed by enlargement of the Graafian follicles, probably often the consequence of a previous fibroid degeneration of the stroma. When the ovaries have been removed by oophorectomy, on account of extreme nervous symptoms, dependent upon ovarian irritation, they have frequently been found degenerated, and enveloped in adhesions, even though no pelvic peritonitis had ever been diagnosed. Still more frequently they have been found full of the small cysts containing clear fluid, already mentioned, to be distinguished from the ovarian cystoma, containing glairy fluid, which more generally goes on to the formation of large ovarian tumours. It would seem that cysts of the former kind not very infrequently increase to such a size as to enlarge the ovary into a tangible globe, from two to three inches in diameter, and that this condition may undergo spontaneous cure by rupture of the cyst, without the production of any serious symptoms. Distinctions have been made between follicular and interstitial ovaritis, but they cannot practically be clinically separated, although inflammation of the follicles is doubtless generally the primary change, except in the acute septic forms of the disease. In the advanced stage of fibroid degeneration the ovary is small and contracted, and Graafian follicles, in any advanced stage of development, are scarce or absent. In some cases the surface is specially indurated, so that it feels like a hard shell when a section is made of the ovary.

Results and Symptoms.—Pain in one groin does not necessarily indicate ovaritis, but is a common result of uterine disease. But in ovarian hyperæmia or inflammation pain in the groin, and extending down the thigh, is a marked symptom, while there is also tenderness in the ovarian region, and the muscles

on the affected side are rigidly contracted to protect the tender spot. Menorrhagia is a usual symptom, except in the later stage, when the ovary is atrophied, or when it has been severely damaged by acute inflammation. In other cases, however, the uterus may be imperfectly developed, or be in the cirrhotic stage of chronic metritis, and then menstruation may be scanty, while the insufficiency of the flow is in part the cause of the ovarian hyperæmia. A more extreme hyperæmia has sometimes been observed in cases of entire absence of the uterus. The pain in the ovarian region is usually aggravated in connection with menstruation, and the aggravation generally commences a few days or a week before the period. It is often relieved by the flow, provided that no cause of obstructive dysmenorrhœa coexists. If there are prolapse and enlargement of the ovary, pain on coitus is often a marked symptom, and in this case defecation also is apt to be specially painful. In accordance with the physiological function of the glands of the cervix uteri, increased secretion of these glands, without any altered quality of the secretion, may be produced by ovarian irritability or undue sexual emotion. Such a condition, therefore, may be a cause of leucorrhœa, without any morbid change in the uterus itself.

The reflex nervous symptoms enumerated under the head of corporeal endometritis and metritis (*see* pp. 247, 248) are still more marked, in susceptible subjects, in the case of ovarian hyperæmia or chronic ovaritis. The chief effects produced are nausea, vomiting, flatulence, or other gastric neuroses, pain under the left breast or at the top of the head, and, above all, hysteria. Hysteria, while largely dependent on constitutional proclivity, is commonly due, in the first instance, to some actual source of pain, which, in predisposed subjects, leads to such a state of irritability that after a time the slightest stimulus of a physical or mental kind is sufficient to evoke hysterical manifestations. The prime source of irritation is not

necessarily in the sexual system, since hysteria may sometimes be induced before the age of puberty, or after the menopause, from the effect of a wound or injury. But in the hysteria of young adults, some source of irritation in uterus or ovaries, or some mental condition connected with the sexual emotions, such as a disappointment in love, or, in married women, an absence of perfect satisfaction in the marital relations, appears to be the commonest cause. In the extreme forms of hystero-epilepsy with hallucinations recorded by Professor Charcot, the connection with the ovary is reported as being a constant one. It is probable also that, when uterine disturbance is the prime factor, reflex ovarian irritation is often an intermediate step in causation. Thus, in the not uncommon case of retroflexion and engorgement of the uterus, with prolapse of the ovaries, in a hysterical subject, nervous manifestations are usually more easily produced by pressure upon an ovary than by that upon the uterus. Hysteria is not necessarily the result of sexual excitement or sexual abstinence, for it may occur for the first time in a married woman as a sequel to uterine displacement, resulting from parturition, or to peri-uterine inflammation, as well as from causes altogether independent of the sexual system. But in the strong emotional susceptibility of hysterical subjects, the sexual emotion usually takes part; and this is often the case in a special degree when ovarian hyperæmia is the starting-point of irritation.

Diagnosis.—Pain and even tenderness on external pressure in the ovarian region is not sufficient ground for positive diagnosis. If a vaginal exploration be made very gently and carefully, it will be found that, although a general hyperæsthesia often exists, a special and extreme tenderness is manifested when pressure is made upon the ovary. If the ovary is more or less prolapsed, so as to be reached by the finger in the vagina somewhat behind the cervix, this tenderness is easily recognized, and the ovary is often felt to be

enlarged and nodular. If not, the ovary may often, on bimanual examination, be caught between the two hands in its normal position, and made out to be enlarged and tender but generally movable. Sometimes the rigidity of muscles prevents this, and, unless an anæsthetic be given, nothing more than increased resistance and excessive tenderness localized in the ovarian region can be detected. Frequently rectal exploration allows the finger to reach the ovary more fully than is possible by vaginal touch.

Treatment.—All postural causes of passive hyperæmia, such as prolonged standing or sitting, should be avoided. Long-continued practising on the piano, and still more, playing on the harmonium, or the use of the treadle sewing-machine, are especially injurious. Any sources of undue emotion should be removed as far as possible, and rest practised in moderation. It is of importance to relieve the portal system and render the fæces soft by saline laxatives, and it is often of advantage to secure an action of the bowels in the evening, that there may be no source of venous congestion during the night. In the case of married women, strict moderation in coitus should be enjoined, but in ovarian hyperæmia temperate use of the sexual function is generally more salutary than total abstinence, provided that no sufficiently acute inflammation is present to cause distress in intercourse. If local pain and tenderness are severe, they may be relieved by depletion of the cervix uteri, and, in this case, leeching is more effective than puncture. The effect, however, is not so direct as in the case of hyperæmia of the uterus; and the depletion should not be too often repeated, lest it have deteriorating effect upon the general health. Counter-irritation is usually preferable to depletion, and may be carried out by the application of blistering fluid to the groin over the tender regions, repeated at intervals. In milder cases the linimentum iodi may be painted repeatedly over the same spot of skin, as long as it can be tolerated. Dr. Barnes

recommends, as a still more efficacious counter-irritant, the application of caustic, such as the potassa fusa cum calce, to the cervix uteri (*see* p. 187). Counter-irritants often tend also to relieve reflex nervous symptoms, such as vomiting, the second impression having apparently an inhibitory effect upon the primary irritation. To relieve reflex vomiting it is often best to apply the counter-irritant over the epigastrium.

Of internal remedies, the most valuable for curative effect are the iodide and bromide of potassium. The former, when long-continued in sufficient doses, tends to cause atrophy and absorption of ovarian, as of other glandular tissues. Bromide of potassium relieves active hyperæmia of the pelvic organs in general, and acts also as a sexual sedative. It is also better tolerated for a long period than iodide of potassium. Bromide of strontium is recommended for cases in which bromide of potassium is found too depressing. Bromide of ammonium is also useful in these cases. When gastric and intestinal neuroses are present these drugs may be combined with bitter stomachics and laxatives.* Small doses of perchloride of mercury, administered for a long period, may also be tried as an absorbent (*see* formula, p. 254).

In the more chronic stage, a general tonic treatment is desirable, especially for the cure of the nervous or hysterical symptoms, which often persist after the prime irritant cause has, in great measure, been removed. Cold baths are specially efficacious, and when aided by the change of scene afforded by a course of treatment in a hydropathic establishment, have often an additional effect. Sometimes sea-bathing, or the addition of salt to the baths, prove still more beneficial. Cinchona or quinine may be combined with bromide or iodide of potassium. Iron must be avoided if any considerable menorrhagia, or active hyperæmia, is present, but for

* The following is a useful formula :—℞. Magnesiæ Sulphat. gr. xxx. ; Potass. Bromid. gr. xx. ; Tinct. Gentianæ co. ℥j. ; Aq. ad ℥j. ter die.

the cure of nervous symptoms it is of great value, and it is specially useful if menstruation is scanty. It is often better borne if combined with bromide of potassium, and a laxative should be added if necessary. Alcohol should be used sparingly, and all sedatives, and especially opiates, should be reserved as much as possible for paroxysmal attacks, when they may be used in the manner described under the head of congestive dysmenorrhœa. Great relief, at such times, is afforded by warm hip-baths, and still more efficacious is the whole bath, in which the patient should remain for a considerable period. Poultices or fomentations may also be employed when pain is acute. The use of alcohol for the relief of any nervous symptoms, or at any other time than with meals, is specially to be discouraged.

Massage.—In some cases of chronic disorders of uterus and ovaries, but more especially of ovaries, the neurotic element largely preponderates. With an amount of local disease which would not be more than sufficient to cause slight discomfort to an ordinary person, a woman may be totally disabled from active life, and may even spend years as a bed-ridden invalid. In this condition of so-called "neurasthenia," loss of appetite and failure of nutrition are often marked symptoms. A patient may become excessively emaciated, and may even die from exhaustion, if some slight ailment supervenes. In such cases the treatment by massage and feeding, introduced by Weir Mitchell, has often given good results. It is most successful where the prominent feature is loss of appetite and emaciation. If the nutrition of the body is once restored, the tone of the nervous system may then be permanently regained. It is less successful in hysterical cases, where there is little or no loss of flesh, though it may sometimes do good even in these. But not infrequently the patient is merely fattened for a time, and eventually relapses into her old condition.

The principle of the treatment is to ignore all local

pelvic maladies. The patient is removed from all her friends, and placed in the charge of an experienced nurse, and of a masseuse. She is kept in bed during the greater part of the treatment, which lasts from six to eight weeks, and all working or reading is forbidden. The whole body is shampooed for an hour or two twice a day, and Faradization may be used in addition. The object is to stimulate appetite and nutrition by the passive exercise thus given to the muscles. Nourishing food is given at short intervals, and a rapid increase of flesh is generally obtained. After the completion of the course, a month should be spent at the seaside with a nurse; and an effort made to cast off invalid ways. For details of the treatment, Weir Mitchell's book, "Fat and Blood and How to Make Them," and Playfair's "The Systematic Treatment of Nerve Prostration and Hysteria," should be consulted.

Oophorectomy.—Removal of the uterine appendages for chronic inflammation of the ovary, as well as for that of Fallopian tubes, has been recently much practised. In the hands of practised specialists, the operation is now one of very slight risk, and its scope is therefore with justice extended; but it can hardly be doubted that it has often been performed without adequate reason in cases of dysmenorrhœa, or complaint of severe pain in hysterical women. The simplest case is that in which there is prolapse of one ovary, with enlargement, and symptoms and signs of chronic inflammation of the displaced organ. If other treatment fails to give relief, and the patient is a chronic invalid, or for a long time seriously disabled for the duties of life, the affected ovary, with the corresponding tube, may be removed. It is, however, a drawback to the operation that removal of one ovary appears to have a tendency to produce congestion of the opposite ovary. The results of the operation, particularly in this respect, have not yet been fully tested by experience. If inflammation of the ovary only forms a part of

disease of the tubes and chronic pelvic peritonitis, these latter conditions generally outweigh it in importance, and it is upon them that the question of removal of the uterine appendages should depend. It is but rarely that removal of both ovaries and tubes is justified in the case of chronic ovaritis, not complicated by pelvic adhesions or distension of the tubes. It may be so in some extreme cases, in which the usefulness and enjoyment of life are entirely destroyed by symptoms which are believed to be referable to morbid ovulation, especially if the patient is in such a position that she has to earn her own living, and is disabled from doing so. If a woman is single and no longer very young, and it is reasonable to suppose that her chances of marriage are remote, the considerations which should generally tell against complete removal of uterine appendages are of less weight. The mode of performing the operation for removal of uterine appendages, and the general conditions which are required to justify it, will be described under the head of diseases of the Fallopian tubes.

CYSTOMATA, OR CYSTIC TUMOURS OF THE OVARY.

Causation.—Cystic tumours are the most frequent and important of new growths in the ovaries. The origin of cysts in this situation, as in other places, has been attributed by some to the formation of a space in the interstices of the stroma, or to the enlargement of a single cell. The special frequency, however, of cysts in an organ which normally contains physiological cysts, namely, the Graafian follicles, and the rarity of the commencement of ovarian cysts except during the years of active sexual life, are sufficient to indicate that, in the great majority of cases at any rate, the cysts originate from abnormal growth either of the actual Graafian follicles, or of the embryonic structures from which they are developed, and are therefore a form of

adenoma. In multilocular tumours the ovum or its remnant has actually been detected by Dr. Ritchie and others in many of the smaller cysts, the size of which does not exceed that of a cherry, and the contents are a limpid fluid, and thus the mode of origin of the cysts is demonstrated as regards these instances. In the larger cysts, and those having colloid contents, the ovum can never be detected, and even the smallest cysts differ from the more developed Graafian follicles in the fact that their lining epithelium consists of a single layer of cells. It is maintained by Waldeyer and also by De Sinéty and Malassez that ovarian cystomata are not developed from Graafian follicles at all, but from ingrowing epithelial processes or tubes derived from the surface epithelium of the ovary, from which epithelium the ova themselves are developed. It is supposed that many cystomata have their origin in fœtal or very early infantile life by a deviation from the normal process of formation of Graafian follicles out of epithelial processes of this kind, and that there may be also an abnormal development of processes from the surface epithelium in later life. De Sinéty and Malassez describe the ingrowths as having a glandular form, resembling cylindroid carcinoma (*see* p. 331). I have found a similar glandular growth commencing from Graafian follicles, every stage being visible from that of a single pouch or diverticulum in the wall of the otherwise spherical follicle. It would seem, therefore, that cystomata may originate either from a very early stage in the development of Graafian follicles, as is probably the case with cysts containing mucoid or colloid fluid, or from somewhat more advanced follicles. Small colloid cysts may be found in the ovary even at birth, but appear usually not to undergo enlargement before the age of puberty. Nothing certain is known as to the cause of commencement of cystic growth, but it is probable that in some cases it is due to fibrous hyperplasia of the ovary—usually the result of previous hyperæmia or ovaritis—

preventing the maturation or rupture of the follicles, or to their becoming developed too far from the surface to allow of their reaching it. It is possible that the premature death of the ovum, by preventing maturation of a follicle, may lead to cystic degeneration. In the normal condition, however, many follicles become atrophied without ever having ripened, and this cannot therefore be the sole condition present. It is possible, again, that the failure of the follicles to rupture may be the result of an insufficient menstrual hyperæmia in the ovary, such as occurs in chlorosis and other forms of anæmia.

Pathological Anatomy.—An important practical distinction is to be made between tumours consisting mainly of one, or of a very few, large cysts, and those made up of a great number of small ones. It is very rare, however, for a true ovarian cyst to be actually unilocular, and the two classes are rather to be termed paucilocular and multilocular cysts. At an early stage of degeneration the cysts are almost invariably multiple, and the large cyst generally arises by the breaking down of the partitions between a number of smaller ones, or by the growth of one cyst at a very much more rapid rate than the rest. Thus a large number both of paucilocular and multilocular tumours are merely aggregations of simple cysts.

From these are to be distinguished the *proliferous cysts*, in which there is a further departure from the normal conditions of growth, and an approximation towards malignancy. In these tumours secondary cysts are formed all over the walls of the primary cysts, instead of being merely developed out of the primary ovigenous layer. The growth is at first of a glandular character, and constitutes a *cystic adenoma*. The epithelial lining dips into the cyst wall in the form of crypts, and these become closed cavities which are afterwards distended by secretion. Some describe the glandular formations as commencing in the form of a closed cavity, beneath the superficial epithelium.

In another variety of proliferous cyst the proliferation takes the form of a growth of papillary processes from the cyst-wall (Fig. 127, p. 366). These are covered at first with cylindrical epithelium, which becomes irregular and multiform in its proliferation, and is often heaped up in projecting masses, like bunches of grapes, which are easily detached. On rupture of the cyst, either from excessive papillary growth or any other cause, the exuberant epithelium becoming detached may convey cancerous infection to the peritoneum. This form of growth has been called *cystoma proliferum papillare*. At the same time the depressions between the papillæ generally tend to invade the tissue beneath in the form of branching glandular crypts. Thus is formed a tissue resembling cylindroid carcinoma, identical with that which appears to be the first stage in the formation of proliferous cysts. It may either be sharply limited, or may invade deeply the connective or sarcomatous tissue between the cysts. It is probable also that the acini may be totally filled by proliferation of the cells, and the adjoining cellular tissue infected, so as to constitute a true carcinoma. It has been supposed by some that the secondary cysts are generally formed by the union of adjacent papillæ, and this view was maintained by Dr. Wilson Fox. But the probability would be greatly against papillæ so uniting as to form a completely closed cavity, and practically cysts containing papillary growth are markedly distinct from those containing glandular or cystic growth. According to Doran, the papillary cysts are generally either parovarian, or originate in the hilum of the ovary to which the vertical tubes of the parovarium extend. The fluid contained is usually thin and clear, not thick and glairy. If a papillary cyst ruptures or is tapped, there is risk of malignant infection of the peritoneum.

The cyst-walls of an ovarian cystoma are covered on their peritoneal surface with an epithelium like that of

the peritoneum, and internally generally by cylindrical epithelium, which in the larger cysts is often converted into a single layer of flattened cells, or of cubical cells in cysts of intermediate size. The structure of their substance is of the connective tissue type, and varies from a fibrous or areolar tissue with few nuclei, such as is found in the walls of large and slowly growing cysts, to a more vascular and imperfectly formed tissue, which must be regarded as sarcoma, generally of the spindle-celled variety. By rapid growth of this tissue the thickness of the cyst-walls may become great in proportion to the dimensions of the cysts; and when the proportion of this solid matter is considerable, the tumour becomes a *cysto-sarcoma*. In proportion to the relative amount of solid material is the tendency towards malignancy in the tumour, and this is more manifest if the tissue has anywhere the character of round-celled sarcoma. Such form of growth frequently affects both ovaries together, and it tends to invade other tissues, when adhesions have occurred, and to recur in the pedicle, or by metastatic deposits, after removal. That, in comparison with other sarcomata, it does not earlier show a malignant character, and that it may be eradicated if removed early enough, probably depends upon the isolated position of an ovarian tumour, while free from adhesion.

The contents of the cysts vary from a gelatinous or colloid substance, which will not flow through a canula, to a clear and limpid fluid. In most cases the fluid is somewhat viscid, and its colour is often brownish or greenish. In the multilocular, and especially in the proliferous cysts, the fluid is usually more gelatinous. Frequently it varies greatly in the different cysts of the same tumour, and generally it is more viscid or gelatinous in the smaller cysts than in the larger. The more viscid fluids contain albumen and its derivatives, also paralbumen, metalbumen, and peptone. They also contain a considerable proportion of mucin. This is distinguished from the albuminous series of

substances by its not being precipitated from its solution by tannin or by neutral metal salts, and by its swelling up in water. The so-called *colloid* tumours are made up of a number of very small cysts containing colloid or mucoid fluid. In some cases cysts filled with gelatinous material rupture even while comparatively small, apparently from the tension produced by the abundant production of such material, which may then be found free in the peritoneal cavity. When this is the case secondary colloid degeneration in the omentum and other parts is apt to result. In some such instances gelatinous material is found not only in the cysts but among the fibres of the cellular tissue of the tumours, a condition which seems to be a further indication of a tendency toward malignant infection of adjacent parts. A clear limpid fluid, of specific gravity below 1010, containing only a trace of albumen, may be found in a true ovarian cyst, and even, in rare cases, in the several cysts of a multilocular tumour. If, however, a cyst containing such fluid is unilocular, it is more likely to be of parovarian, or broad ligament origin (*see* p. 361).

In some instances the fluid of a cyst has escaped through the uterus, and such a discharge may happen on repeated occasions. In such cases the cyst is generally a *tubo-ovarian* cyst, which is described as originating in the following manner:—A Graafian follicle ruptures while the point of rupture is enclosed within the pavilion of the Fallopian tube, adherent at its margins to the ovary; the communication between the follicle and the tube fails to close, and the follicle undergoes cystic dilatation; the pavilion, or a portion of the canal, of the tube then contributes to the formation of the resulting cyst, and the tube generally allows the passage of fluid only occasionally. A pseudo-cyst may also be produced by adhesion of the pavilion of the tube to the ovary, and distension of the cavity by serum or pus, or an ovarian cyst may rupture into the dilated extremity of the tube, adherent to the ovary

previous to the formation of the cyst. In all these cases the tubo-ovarian cyst is situated at the end of the tube. When, however, an ovarian cyst begins to form while the tube is free from adhesion, the fimbriated extremity of the tube is always turned outward. If the tube afterwards becomes occluded and distended, and a communication is formed between it and the ovarian cyst, another pattern of tubo-ovarian cyst arises, in which the communication from the ovary to the tube is a lateral one. A dilated tube, taking the shape of a retort, when the outer end of the tube is much more dilated than the inner, may simulate a tubo-ovarian cyst. A few cases have been recorded in which simple cysts containing limpid fluid have been found attached to the peritoneum without connection with the ovary, and these have been ascribed to cystic growth of an unimpregnated ovum, which had become attached to the peritoneum like the ovum in abdominal fœtation.

Ovarian tumours generally become pedunculated as they enlarge. The pedicle, which may be long and slender, or short and broad, contains a portion of the broad ligament stretched out, the ligament of the ovary, the ovarian vessels, and the Fallopian tube, which is generally much enlarged, and extended, more or less, over the surface of the tumour. In some cases, however, a cyst, having all the characters of an ovarian cyst, occupies the same position as the so-called "cysts of the broad ligament," having no pedicle, but descending deeply between the folds of the broad ligament. This condition may arise from a follicle having made its way, not to the surface of the ovary, but through the mesovarium into the broad ligament.

Parovarian Cysts, which constitute the most important variety of what have been called cysts of the broad ligament, are formed by distension of one of the tubules of the parovarium, or organ of Rosenmüller, a small body which is the relic of the ducts of the

Wolffian body, and is situated in the thickness of the broad ligament, between the outer extremity of the ovary and the Fallopian tube (*see* Fig. 7, p. 15). Their growth is slow, and they often do not increase beyond a small or moderate size, but sometimes they grow large enough to distend the whole abdomen. They are generally found in young women. The contained fluid is limpid, like water, of low specific gravity, generally below 1005, and contains only a trace of albumen, which is usually precipitated only by nitric acid, and not by heat alone. The cysts are almost always unilocular, but rarely may be made up of several, having thin septa, more than one tubule having become dilated. The cysts, in the majority of cases, become pedunculated, but are more likely than true ovarian tumours to descend deeply between the layers of the broad ligament. The ovary is often found distinct, with its mesovarium intact. The Fallopian tube is usually more extended over the cyst than in the case of a true ovarian cyst, and may reach over three-fourths of its semi-circumference. The cyst-wall contains involuntary muscular fibres, which are not usually found in the wall of true ovarian cysts; it is generally separable into two layers, is often lined by ciliated epithelium, and often has papillary growths on its inner wall. Parovarian cysts are sometimes cured by tapping, but this probably means that the aperture made by the trocar remains open, fluid continuously escapes into the peritoneal cavity and is absorbed. There is then risk of malignant affection of the peritoneum, if there is papillary growth in the cysts.

According to Doran, many cysts formerly regarded as parovarian, which contain clear limpid fluid, but are destitute of papillary growths, are not really parovarian, but originate in the broad ligament near the Fallopian tubes. The anatomical relations of these cysts, when they have attained considerable size, are similar to that of parovarian cysts as above described—

that is to say, they generally stretch out the broad ligament, so as to form a good pedicle, but are more likely than ovarian cysts to descend deeply between its layers. Fig. 126 is a diagrammatic representation of the various sites at which the different forms of cyst in the ovary and broad ligaments may arise.

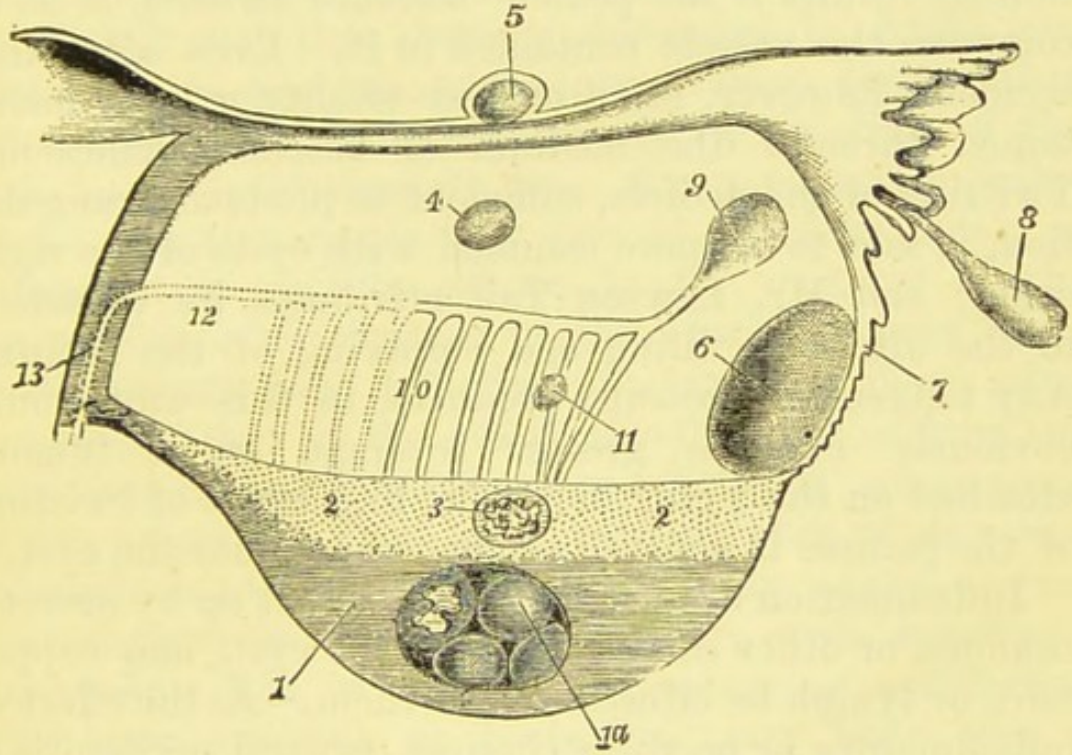


Fig. 126.—Diagram of the Structures in and adjacent to the Broad Ligament (DORAN).

1*a*, Multilocular cystic tumour, developed in 1, parenchyma of ovary; 3, papillomatous cystic tumour of ovary in 2, tissue of hilum of ovary; 4, simple broad ligament cyst, independent of parovarium, 10, and Fallopian tube; 5, a similar cyst in broad ligament above tube, but not connected with it; 6, a similar cyst close to 7, ovarian fimbria of tube; 8, hydatid of Morgagni: this appears never to form a large cyst; 9, cyst developed from horizontal tube of parovarium; 11, cyst developed from a vertical tube: cysts of this kind form the papillomatous tumours of the broad ligament; 12, 13, track of obliterated duct of Gärtner: papillomatous cysts are said to be developed along this track.

Results and Symptoms.—Ovarian cysts, as they grow large, are liable to become adherent to surrounding parts, especially to the omentum and abdominal walls, but sometimes also to the pelvis, intestines, and even the liver and stomach. The more solid tumours generally acquire adhesions more readily than those

consisting mainly of a few large cysts. Nutrition of ovarian cystomata is apt to fail, especially in the case of multilocular tumours, and the cysts then undergo a partial necrosis, but without putrefaction, so long as air is excluded. The walls of the cysts may become softened, and the fluid within them may contain shreds of broken-down tissue. More complete death of the tumour results if the pedicle becomes twisted, so as to compress the vessels contained in it. Even after this accident, however, more or less vitality may be maintained through the medium of vascular adhesions. Twisting of the pedicle, sufficient to produce strangulation, is said to be more common with cysts of the right ovary, and Mr. Lawson Tait attributes its causation to the alternate filling and emptying of the rectum. Any tangential pressure produced in this way would obviously exercise greater leverage on a tumour attached on the right side. The first effect of twisting of the pedicle is generally hæmorrhage into the cyst.

Inflammation in the tumour may be set up by necrotic changes, or other causes, and then the cysts may suppurate, or lymph be effused within them. As the effect of inflammatory or necrotic changes, general peritonitis is apt to be set up, and the surface of the tumour may then become completely adherent to all the surrounding parts. Without the occurrence of any acute peritonitis, more or less ascitic fluid is often poured out by the peritoneum in consequence of the irritation caused by the presence of the tumour, and occasionally this fluid is copious though the growth is only of small size. In some cases, the walls of a thin cyst give way from distension, or from the effect of some strain or violence. If the contained fluid is bland, it is absorbed by the peritoneum, and in this way a spontaneous cure sometimes results, while, in other cases, the fluid again collects after a time. If the fluid has undergone inflammatory or necrotic change, or if it is from any cause irritating, as the thicker fluids are apt to be, severe peritonitis is set up, and often proves quickly fatal. In rare cases,

after inflammation and suppuration of a cyst, it may discharge either into the intestine (generally the rectum) or externally. Adhesions form in the first place, and perforation afterwards occurs at some adherent spot. Still more rarely discharge takes place into the vagina or bladder. After admission of air, as by tapping, or in consequence of communication with the intestine, septic inflammation of a cyst may be set up, and it may then become distended by fœtid gas. Hæmorrhage may take place into ovarian cysts, either after strangulation of the vessels by twisting of the pedicle, or spontaneously from the papillary growths. Death may then result from loss of blood, or shock, or inflammation may be set up in the cyst, or in the peritoneum after rupture of the cyst. In rare cases death occurs from intestinal obstruction, ileus being produced either by the effect of adhesions, or from the intestines having simply become twisted in consequence of the pressure. Cure of an ovarian cyst, of any considerable size, by absorption probably never occurs, though tumours diagnosed as ovarian cysts sometimes disappear. But, in those cases, rupture or perforation may have occurred, or the tumour may have been a pseudo-cyst (*see* p. 373).

In the earlier stages of an ovarian tumour, menstruation is often irregular and painful, and sometimes excessive. In the later stages it is often diminished, and amenorrhœa is common if both ovaries are affected. The general symptoms are often slightly marked, and frequently nothing is noticed except the increase of size. While the cyst is small and remains in the pelvis, trouble in defecation and micturition may be produced by pressure. These are relieved when it rises into the abdomen, but progressively increased if it happen to become fixed by adhesions while still small. In other cases more or less pain is felt in the tumour, and attacks of pain may also indicate the occurrence of local adhesive peritonitis set up by its presence, though such a local peritonitis often runs a very latent course. A

cyst, even while quite small, may suppurate, become adherent, and discharge through the rectum or elsewhere. A chronic sinus is thus apt to remain.

As the tumour becomes very large, its pressure interferes seriously with vital organs, especially the heart and lungs. There is general wasting, and the face acquires a peculiar expression of combined emaciation and anxiety. The urine becomes scanty from pressure on the renal vessels, and sometimes albuminuria may be produced, although usually not till a very late stage. In some cases, especially when extensive

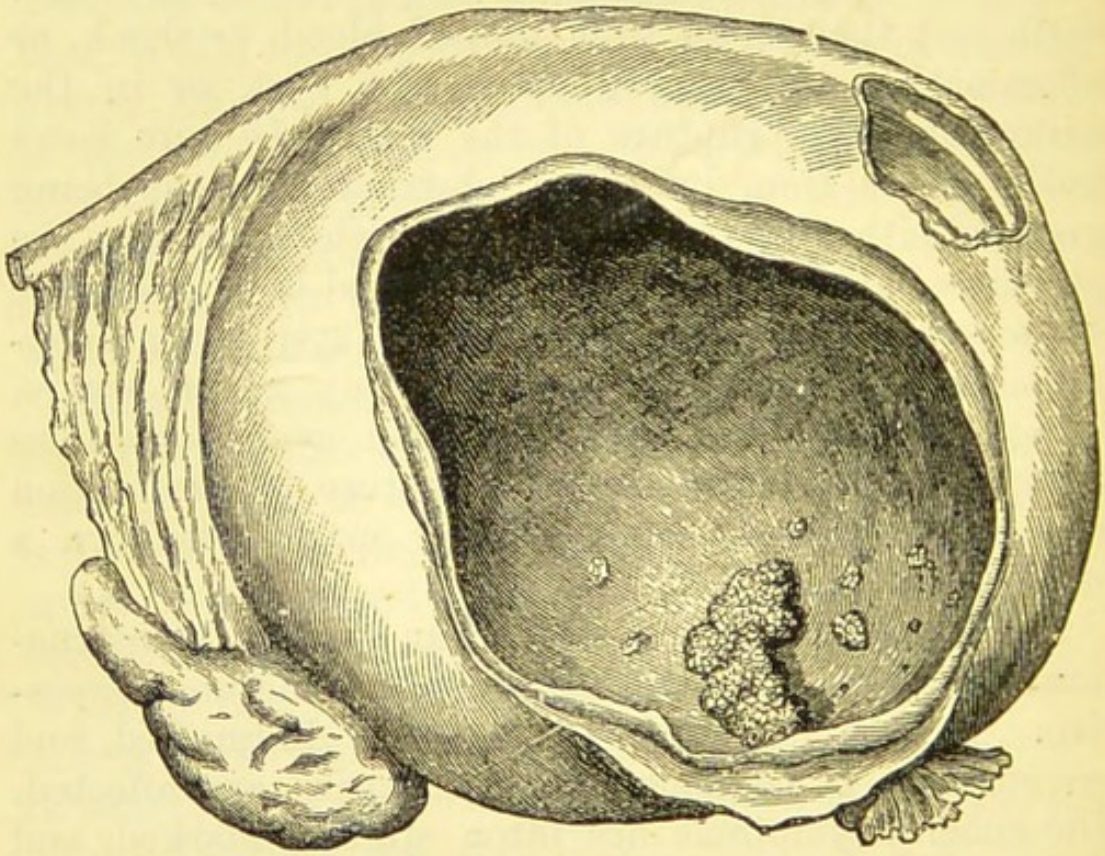


Fig. 127.—Papillomatous Cystic Tumour of Ovary (Doran).

pelvic adhesions exist, there is pressure upon the ureters, and consequent damage to the kidneys. Swelling of the legs is frequently produced by pressure, and the œdema may extend to the abdominal walls and back.

When inflammation or necrotic change has occurred in the tumour, hectic fever of an irritative kind is set up. The occurrence of such fever, in the absence of

sufficient pain and tenderness to indicate acute general peritonitis, is an evidence of changes in the tumour, and an indication for early removal. When pregnancy occurs in conjunction with an ovarian tumour, considerable increase of danger arises, if the tumour is large, from the excessive distension, and also from the risk of strangulation by twisting of the pedicle. If the tumour is small it is apt to occupy the pelvis, and impede delivery.

All varieties of ovarian tumours may grow to an enormous size. In the majority of cases of considerable tumours, not subjected to curative surgical treatment, death occurs within three years, although small or moderate tumours may remain quiescent for a long period. Exceptionally even in the case of large tumours the course may be protracted for many years, and in some instances the operation of tapping has been repeated very many times.

Diagnosis.—When the presence of an abdominal tumour is suspected, the patient should be placed on her back on a hard couch, the head on a low pillow, the skin of the abdomen uncovered, and the knees drawn up so as to relax the abdominal muscles. The examination should be made first by abdominal palpation and percussion, afterwards by bimanual exploration.

Phantom Tumours, due to flatulent distension of intestines, deposit of fat in the abdominal walls, omentum, and mesentery, or muscular contraction, are generally easily distinguished by the resonance of the abdomen, and by no tumour being felt between the hands on bimanual examination. In most of these cases, if relaxation of the muscles be obtained by distracting the patient's attention by conversation, or by the administration of an anæsthetic, the hand may be pressed down sufficiently to feel the promontory of the sacrum, and the absence of a tumour ascertained. When there is a great deposit of fat, the percussion note may be partially dull, but not absolutely so. In

such cases the layer of subcutaneous fat can be grasped with two hands and lifted; and the umbilicus is depressed. Whether or not any other tumour is discovered, special care should be taken to discover the presence or absence of *pregnancy*, by looking out for all the signs of that condition, particular regard being paid to the consistency of the cervix, the condition of the breasts, and the size of the uterus.

When an ovarian tumour is of great size, and of the multilocular variety, but contains one or more large cysts, diagnosis is generally easy. The outline of the tumour is more or less irregular, both to the eye and the touch, and the irregular prominences are often found to move downward on deep inspiration. There is dulness over the whole tumour, and resonance in the flanks, while the margins of the tumour can often be felt by pressing the hand flat upon the surface. If one hand be laid upon the abdomen, and a gentle flip be given by a finger of the other hand, a fluid thrill can be felt over some part of the tumour, but not throughout its whole extent, while over the area not reached by the thrill, more resistant portions, or solid masses, can often be felt. This vibratile thrill is conclusive of the presence of fluid, while mere fluctuation may sometimes be transmitted by an elastic semi-solid tumour.

When a considerable tumour consists mainly of one large cyst, so that a uniform fluid thrill is felt over the whole of it, and no firmer portion can be detected, the essential point is to distinguish it from *ascites*, and the differentiation is sometimes a difficult one. In most cases the diagnosis may be made from the shape of the abdomen and the results of percussion. In ascites the abdomen spreads out more laterally, while in ovarian cysts it is more prominent in front, and tends to overhang the symphysis pubis. In ascites there is dulness in the flanks in the dorsal position, and resonance in front, while the areas of dulness and resonance alter according to position, so that, in the

lateral or upright position, the portions of the abdomen uppermost at the time become resonant, and the dependent parts dull. In a large ovarian cyst there is dulness over the whole centre of the abdomen, and resonance only very far back in the flanks, coming further forward on the side opposite to that on which the tumour originated. When an ovarian cyst, after entry of air, contains gas as well as fluid, there will be resonance in front, but this condition is easily distinguished by the succussion splash produced on shaking the patient.

Exceptions to the usual rule occur in the case of ascites when the intestines are bound down by adhesions, or the mesentery shortened, so that they cannot reach the surface, and also when the abdominal distension is very extreme, in which case also the abdomen becomes more prominent in front, so that its shape resembles that usual in the case of ovarian tumour. More or less resonance may also be produced by the large intestines fixed in either flank, and then the signs correspond almost exactly to those usual in the case of an ovarian cyst. Again, in an ovarian cyst a coil of intestine may be adherent in front, and so give resonance in that position; but as a rule this is only found when inflammation has occurred after tapping. In order to solve the difficulty an attempt should be made to detect the upper margin of a tumour, by laying the hand flat upon the surface at about the upper limit of dulness, and pressing it in during expiration. Trial should also be made, whether on deep inspiration any inequality can be seen or felt moving downward beneath the abdominal wall, or any friction sound heard. When the fluid is within an ovarian cyst, it is generally possible to reach from the vagina the lower segment of the cyst, most frequently in front of the cervix, and feel an impulse transmitted from above. By an ovarian cyst, the uterus is generally drawn somewhat upward, and its mobility more or less impaired, while in ascites it is low down and movable. In

ascites the fluid thrill extends further round toward the back, over the area in the flanks where partial resonance may exist, while in ovarian dropsy it is limited at the same line as the dulness, unless ascitic fluid is present in addition to the cyst. In some cases the only certain test is a preliminary tapping, or exploratory incision. If there is any reasonable probability that the disease is ovarian, or any form of removable cyst, the latter should be chosen, for the risk of an exploratory incision is but slight, while tapping renders the prognosis of subsequent ovariotomy less favourable.

The difficulty of diagnosis between ascites and ovarian dropsy is especially likely to arise in the case of cancer of the peritoneum, in which the intestines are apt to be held back by shortening of the mesentery, and solid masses may be felt in the abdomen, somewhat resembling the firmer portions of an ovarian tumour, but usually more movable in the fluid, and felt only by dipping for them. In peritoneal cancer hard masses are also often felt behind the cervix, and may usually be distinguished from the lower portions of an ovarian tumour by their nodular character and fixation to the pelvic wall.

Distinctions between Ovarian and Ascitic and other Fluids.—The varying physical characters of ovarian fluid have already been mentioned (*see* p. 359). The dark ropy fluid of high specific gravity (1018 upwards) is found only in ovarian cysts. Ascitic fluid is limpid and yellowish, containing a considerable quantity of albumen, and having usually a specific gravity of from 1010 to 1015—characters which distinguish it from most ovarian fluid. It may also be generally recognized by its property of depositing fibrin spontaneously in a very delicate layer upon the surface of the glass, though fibrin is occasionally found also in ovarian fluid, after inflammation of the cyst. Ovarian fluid, which physically resembles ascitic fluid, may be distinguished by the chemical character that it contains

paralbumen* as well as albumen, while, in the more viscid kinds of ovarian fluid, mucin (*see* p. 359) may also be detected. Ovarian fluid may also generally be recognized by its microscopical characters. It usually contains epithelial cells of various forms, cholesterine, leucocytes, and often large granule masses. But of special importance are cylindrical epithelium and the granular ovarian cell (Fig. 128, *a*), described by Dr. Drysdale, of Philadelphia, as being pathognomonic of ovarian fluid. This contains a number of fine granules, but no nucleus, and is regarded as being a degenerated

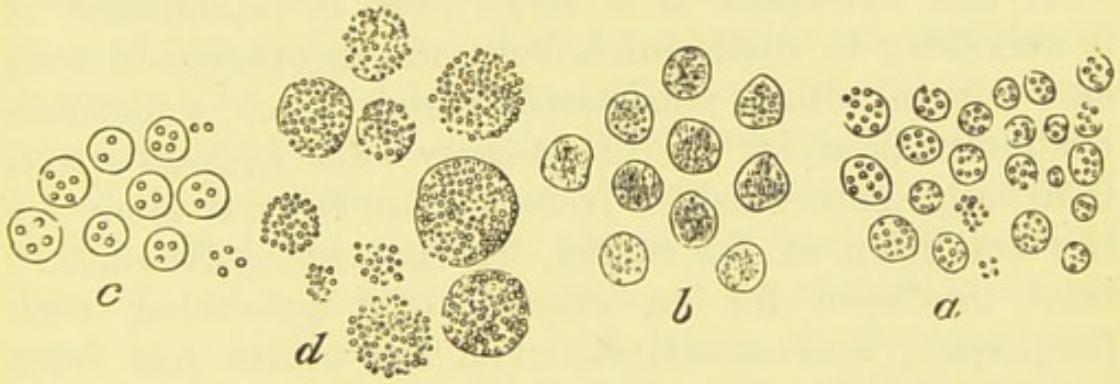


Fig. 128.—Microscopic Characters of Ovarian Fluids.

a, granular ovarian cell of Drysdale; *b*, leucocyte before addition of acetic acid; *c*, leucocyte after addition of acetic acid; *d*, compound granular cell or inflammatory corpuscle of Gluge.

epithelial cell. Its size varies from $\frac{1}{5000}$ to $\frac{1}{2000}$ inch, but the size commonly met with is about that of a leucocyte. From a leucocyte, however, it is distinguished, according to Dr. Drysdale, by the addition of acetic acid. This renders the leucocyte very transparent (Fig. 128, *c*), and nuclei, varying in number from one to four, become visible, while the ovarian cell is simply rendered rather more transparent, and its granules

* Add nitric acid to form a precipitate; shake up the fluid, and then boil it with about an equal quantity of acetic acid. Boil another portion similarly with a like quantity of water for the sake of comparison. If the precipitate by nitric acid is partially dissolved, or gelatinized, by the acetic acid the presence of paralbumen is shown.

more distinct. From the larger granule masses it is distinguished by being unaltered on the addition of ether. Dr. Drysdale is said himself not to fail in diagnosis, but other observers have reported similar cells found in fluids not ovarian. Ascitic fluid under the microscope generally shows only cells of the peritoneal endothelium, leucocytes, and fibrin. For the characters of the fluid of a fibro-cystic tumour, *see* p. 279; for those of parovarian fluid, *see* p. 362. If the fluid is found purulent, when no previous tapping has taken place, it is more likely to come from a dermoid cyst.

If the existence of a large cyst is established, it is necessary to distinguish between an ovarian tumour and several other conditions which have sometimes been mistaken for it. *Pregnancy with hydrops amnii* is usually distinguished from ovarian tumour alone by the condition of the cervix, but has not infrequently been mistaken for an ovarian cyst associated with pregnancy, and sometimes even the uterus has been punctured owing to a mistake in diagnosis. It may be possible to make out the body of the uterus as distinct from the cyst on bimanual examination; but this may fail if distension is extreme. The varying consistency of the tumour of hydrops amnii, from alternate contraction and relaxation of the uterus, will be distinctive, if observed, but this also sometimes is absent, if the hydrops be very excessive. The cervix uteri in hydrops amnii is generally more pervious to the finger than in the earlier months of normal pregnancy, and its condition may be an important aid in diagnosis. It should also be ascertained whether the lower segment of the uterus, felt through the anterior vaginal wall, has the characters usual in normal pregnancy. A *distended bladder* is distinguished by the use of the catheter, which should always be employed if an apparently central and unilocular cyst of moderate size be discovered. *Hydronephrosis* and *pyonephrosis*, as well as solid tumours of the kidney, generally malig-

nant, have led to mistakes. The tumour formed by any of these commences from the region of the kidney, pushes the colon in front of it, and rarely completely fills the abdomen towards the opposite groin, or comes into close relation to the uterus. The fluid of hydronephrosis may sometimes, but not always, be recognized by the presence in it of urea or creatin. In renal tumours a history of disturbance in the urinary system, or the presence of albumen, pus, or blood in the urine, may sometimes guide to a diagnosis. *Hydatid tumours* would more often lead to error, but for the fact that they very rarely occur in the pelvis, and generally commence from the region of the liver or the upper part of the abdomen. The best test is an exploratory incision, or, if a specimen of fluid is obtained for examination by the hypodermic needle, or tapping is performed, the microscopical examination of the fluid, which, from its physical character, may be mistaken for that of a parovarian cyst. I have met with one case in which the cyst had none of the tenseness usual in hydatid tumours, and no sign of hydatids was discovered on microscopical examination of the fluid. The cyst afterwards suppurated, and was eventually removed. It was still thought to be parovarian, until, at the autopsy, its association with smaller hydatid cysts was discovered. In a case under my own care, the cyst, having become inflamed, closely simulated a large ovarian tumour, and a thick brownish fluid was evacuated by tapping. Decomposition then occurred, and hydatids escaped when the cyst was laid open. The patient recovered after insertion of a large drainage tube, and frequent injections with a weak solution of iodine. Multiple hydatid cysts of the omentum may also closely resemble a multilocular ovarian tumour.

Encysted Serous or Purulent Fluid may closely resemble an ovarian cyst. Such a collection may attain to considerable size, especially when due to cancer or tuberculosis of the peritoneum. Sometimes large

encysted collections of pus are formed in a late stage of septic peritonitis. I have met with one case in which a large pus-containing cyst behind the uterus, and reaching as high as the umbilicus, was secondary to cancer high up in the rectum. The resemblance will generally be to an ovarian cyst associated with peritonitis, and fixed by adhesion. If the pseudo-cyst is irregular in shape, sending prolongations among the intestines, it may often be distinguished by the fact that the fluid thrill extends beyond the area of dulness; but, in general, the diagnosis must be made in great measure by the history and course of the affection. When the effusion is serous, and due to simple peritonitis (the serous perimetritis of Dr. Matthews Duncan), it may be distinguished by its sudden appearance in connection with acute inflammatory symptoms, and by its gradual diminution and disappearance. If the fluid be drawn off, it will generally be found to contain flakes of lymph, and will spontaneously deposit a coagulum of fibrin. *Retro-peritoneal cysts* have occasionally been found, and are to be distinguished by their place of origin, and want of connection with the uterus. If such a cyst is of large size, and descends into the pelvis, it may be impossible to distinguish it from an ovarian cyst, until an operation is undertaken. A cyst of small or moderate size may be a distended Fallopian tube. The differential diagnosis, which is not always possible, is described under the head of diseases of the Fallopian tubes. *Advanced extra-uterine fœtation* will be recognized by a history of pregnancy not ending in delivery. The hard parts of the fœtus will be felt in the midst of the fluctuating cyst, or the fluid will have been absorbed, and the whole tumour be firm and irregular.

When a considerable tumour exists, but no manifest fluid thrill can be felt over any large part of it, the point requiring most care is the diagnosis whether the tumour is *uterine or ovarian*. For this a careful exploration by the sound of the position of the uterus

and its mobility, with an exploration of the mode of attachment of the tumour to the uterus, is necessary. The method of diagnosis has already been described (*see* pp. 39, 278). *Cancer springing from the omentum* or elsewhere in the abdomen, or even medullary cancer of the kidney, may form a large tumour, sometimes reaching into the lower part of the abdomen, and forming deposits in the pelvis. Such a tumour is not fluid, though it may be soft and semi-fluctuating, and is often associated with ascites. Some portion of it is generally fixed by adhesion. If the ascitic fluid be examined, it may indicate the presence of blood, obviously or by spectroscope, or show the clusters of cells described at page 378. The age of the patient, and the amount of emaciation and cachexia present, will greatly aid the diagnosis. *Leukæmic enlargement of the spleen* may form a tumour, which becomes displaced into the lower part of the abdomen, but is generally easily recognized by its sharp hard border, generally broken by a depression, and usually looking upward, or upward and toward the right, the convex surface of the spleen having rotated downward. The distinctive edge, however, may be obscured to a great extent, or even entirely, if the growth in the central part of the spleen has assumed a spherical form. In case of doubt the blood should be examined for excess of white corpuscles. *Fæcal accumulations* are distinguished by their position, unconnected with the uterus, by their doughy feel, and by the effect of purgatives and enemata.

Diagnosis in the Early Stage.—In the early stage of an ovarian tumour, while it is smaller than a fœtal head, the method of diagnosis is somewhat different. If the tumour is free from adhesion, the diagnosis is usually easy. A well-defined, globular, and elastic tumour is felt, on bimanual examination, behind, in front, or at one side of the uterus, movable to some extent, but tethered to that organ. A parovarian cyst, or hydrosalpinx, may be confounded with an ovarian cyst, and can hardly be distinguished except by explor-

atory operation or examination of the contained fluid. *Pyosalpinx* is also difficult to distinguish, but is accompanied by signs of local peritonitis. A *subperitoneal fibroid of the uterus* is generally known by its hardness, and by its mode of attachment to the uterus, especially if the examination be made by finger in the rectum, the patient being placed under an anæsthetic, and the cervix drawn down by tenaculum (*see* pp. 43, 44). If a small ovarian tumour is surrounded by adhesions, especially when it lies behind the uterus, it may be very difficult to distinguish it from *hæmatocele*, or a swelling due to pelvic peritonitis. The best guide is the history and course of the affection. With *pelvic cellulitis* an ovarian tumour is less likely to be confounded. In *extra-uterine fœtation in the early months* there will usually be a history of amenorrhœa for a time, with general signs of pregnancy, although sometimes there is no interruption of menstruation. In any of the forms of tubal pregnancy, the amenorrhœa, if any occurs, is apt to be followed by irregular hæmorrhage and violent spasmodic pain, while pain sometimes exists from the very first. The uterus will be notably enlarged; and strong arterial pulsation will be felt near the cyst, which usually occupies the retro-uterine fossa. Sometimes ballottement in the cyst, or signs of fœtal life may be detected, or the diagnosis may be decided by the expulsion of a decidua from the uterus. After the death of the fœtus, the tumour tends to diminish in size, and to become harder. *Small hydatid cysts* in the pelvis are very rare in Britain, and can scarcely be diagnosed, except by examination of the fluid.

Diagnosis of Adhesions.—The general mobility of a tumour of moderate size may be tested by grasping it with both hands through the abdominal wall, and moving it from side to side. In the absence of adhesions in front, if distension is not very great, the abdominal walls can be freely moved over the tumour, and also lifted up, to some extent, from its surface.

Frequently parts of the tumour may be observed to glide downwards under the surface on deep inspiration. All these signs are more easily detected in multilocular tumours, or those containing solid matter, than in those which are nearly unilocular. Measurements should be made of the distance of the umbilicus from the anterior superior spines of the ilia, and from the edges of the ribs on each side. Any marked inequality in these distances, not accounted for by the shape of the tumour, renders the existence of adhesions in front probable. A friction sound on respiration indicates the absence of any firm adhesion over the area where it is heard, and is generally due to roughening of the peritoneum from an early stage or slight degree of peritonitis.

If a portion of the tumour descends into the pelvis behind the cervix or elsewhere, and cannot be pushed up, it may either be adherent or simply fixed by pressure. The degree of fixation is estimated by observing whether the mass yields at all to pressure from the vagina or rectum. If the whole pelvic roof is indurated, and the uterus fixed, firm adhesions in the pelvis are indicated. If the uterus cannot be moved by means of the sound separately from the tumour, it may be inferred that the tumour, if ovarian, is closely connected with the uterus; and this presumption is increased if the uterus be much drawn upward, and its cavity elongated. In estimating the attachment of the tumour to the uterus, rectal exploration should be used, and it is often of advantage to put the attachments on the stretch by drawing down the cervix (*see* p. 43). The probability of intestinal and other adhesions posteriorly can only be inferred from a history of peritonitis. Omental adhesions cannot be diagnosed, but are of little consequence.

Diagnosis of Malignancy.—The greater the proportion of solid material in a tumour, the greater is its tendency towards malignancy likely to be. The age

of the patient is a useful guide, and valuable evidence is afforded by a cachexia and emaciation out of proportion to the size and duration of the tumour. A very large amount of ascitic fluid, in combination with a comparatively small and firm tumour, renders probable at least some approximation towards malignancy. If signs of pelvic adhesion are found, with much solid matter at the base of the tumour, and nodular masses like glands behind or around the cervix, and if much cachexia is also present, the evidence of malignancy is very strong. If grape-like clusters of cells, of very varying shape, many of which have multiple nuclei, are found in fluid withdrawn from a cyst, they indicate that proliferating papillary growths are present, and that the tumour should be immediately extirpated, if possible. If similar groups of cells are found in ascitic fluid, they indicate that cancer or papilloma has reached the peritoneum from the ovary, or from some other source, and that ovariotomy will probably be too late to prevent recurrence. Patients have, however, recovered, and remained free from disease for years, even when extension of papillary growths to the peritoneum has been found at an operation, especially if the papilloma has started from the Fallopian tubes. A similar indication of probable malignancy is given if blood is detected, either obviously or by spectroscopic or other evidence, in ascitic fluid.

Treatment.—The great success of ovariotomy has reduced the treatment of ovarian tumours, in the large majority of cases, to ovariotomy as a curative, and tapping as a palliative measure in the rare cases in which removal of the tumour is impossible.

Indications for Ovariotomy.—It was formerly considered preferable not to operate until the tumour had attained some considerable size, and had begun seriously to inconvenience or disable the patient, or to tell upon her general health. But in the hands of skilled specialists a simple case of ovariotomy, with a tumour

of small or moderate size, now involves a very slight risk. At any stage in its course an ovarian tumour may have its pedicle twisted, or may undergo necrotic change and set up inflammation. The safest plan for the patient, therefore, is to remove the tumour as soon as it is positively diagnosed. In any case the operation should be performed before there is sufficient distension to embarrass the lungs, heart, or kidneys, or produce œdema of legs and abdomen. If symptoms of inflammation or partial necrosis of the cyst supervene, its removal should not be delayed. Sometimes the occurrence of hæmorrhage into a cyst, or the commencement of inflammation or necrosis in it, due to twisting of the pedicle, is indicated by the onset of severe pain in the tumour, or pain followed by vomiting and, generally, the symptoms of peritonitis around the tumour. Ovariotomy should then be performed immediately. If acute peritonitis occurs it may be desirable to wait awhile, until the symptoms have subsided; but ovariotomy, if practicable at all, should generally be performed within a few weeks, before the adhesions have become so firm as to render their separation very difficult. If there is an indication by any of the signs previously enumerated (p. 378) that the tumour is of a kind tending towards malignancy, the reasons for early removal are the stronger.

The chief *contra-indications* are signs of malignancy in the tumour, accompanied by extension of the growth to surrounding parts. Evidence even of very firm pelvic adhesions, accompanied by solidity in the lower part of the tumour, is scarcely now considered as a contra-indication, unless the patient is so nearly moribund as to be unable to survive a difficult operation. Coils of intestine are sometimes recognized as adherent in front of the cyst, especially when a previous tapping has been followed by peritonitis; and this condition would indicate the probability of extensive visceral adhesion in other parts also; but this would not necessarily deter a practised operator from performing

ovariotomy. Elongation of the uterus, and its close connection with the tumour, render it likely that the operation will be difficult, but do not contra-indicate it. Adhesions to the abdominal wall are of comparatively little moment. In doubtful cases the age and general condition of the patient, and the state of the kidneys and other viscera, are elements in the decision.

The complication of an ovarian tumour with pregnancy often proves a serious one; since the growth of the tumour is apt to be stimulated, distension may become so great as to necessitate some interference, and, moreover, the pressure of the growing uterus occasionally produces twisting and strangulation of the pedicle. Ovariotomy during pregnancy has proved remarkably successful, and abortion is by no means a necessary sequel of the operation. If the case is otherwise suitable for ovariotomy, that operation may be performed, at any rate in the earlier months. I have once successfully removed an ovarian tumour about the middle of the sixth month without miscarriage following, but in most recorded cases which had passed beyond the fifth month, miscarriage has followed sooner or later; and this adds to the risk, if it happens shortly after the operation. In the case of adhesions near the uterus, bleeding is likely to be formidable in the later months, and if the case has advanced much beyond the fifth month, it is perhaps preferable, supposing interference to be necessary, and ovariotomy likely to be difficult, to induce labour first, and remove the tumour some weeks later.

The Operation of Ovariotomy.—The room where the operation is performed, as well as the operator and his assistants, should be perfectly free from septic contamination, and no one should be present in it who has within the last few days attended any post-mortem or dissecting room, or seen any case of infectious disease, especially erysipelas, septicæmia, or pyæmia. The room should be warm, but need not be overheated.

The patient is placed in the dorsal position, close to a good light, the shoulders being slightly raised. In a private house two dressing-tables may be conveniently used, one of which is placed crosswise, to support the head and shoulders. The abdomen should be washed with soap and water, and afterwards with perchloride of mercury 1 in 1000. The umbilicus should be cleared out with liquor potassæ. The hair on the pubes should be shaved, to facilitate the close application of antiseptic dressings, and the bladder should be evacuated. A belt or bandage should be passed over the knees and secured under the table, in order to prevent movement if the patient should partially recover from the anæsthetic. For cleanliness it is convenient to cover the abdomen with a piece of mackintosh, in which an oval aperture of sufficient size has been cut, and its edges spread with adhesive plaster to attach it at all points to the skin. In this way all fluids are conducted into the vessel ready to receive them.

Most operators have now given up the use of the carbolic spray in abdominal sections, but, in all other respects, the strictest antiseptic precautions should be adopted. The operator and all assistants and nurses should disinfect their hands, after careful cleansing, with perchloride of mercury 1 in 1000. Operator and assistants should remove their coats, roll up their sleeves, and wear mackintosh aprons, reaching from neck to feet.

The silk or gut for sutures should be wound upon reels, and with the instruments should be kept immersed in trays filled with carbolic solution, at first 1 in 20, afterwards diluted to 1 in 40. Sponges, after disinfection in carbolic solution (1 in 20), are to be kept immersed in one of the strength of 1 in 40. As an anæsthetic, Sir Spencer Wells prefers the bichloride of methylene, administered by Junker's inhaler, as being safer than chloroform, and least likely to cause vomiting. Mr. Keith chooses ether, with the object of avoiding

vomiting, but it is apt to irritate the lungs if any bronchial complication exists. Others prefer the mixture of alcohol one part, chloroform two parts, and ether three parts. Chloroform is apt to depress the pulse, if the operation prove long and difficult. Ether preceded by nitrous oxide answers well, unless the patient is suffering from, or subject to, bronchitis. It has the advantage that the anæsthetic sickness rarely lasts much over twelve hours. With bichloride of methylene there is perhaps a better chance of avoiding sickness altogether. Besides the assistant who administers the anæsthetic, one other at least is required, who stands on the left side of the patient opposite the operator, and is ready to protect the intestines with soft sponges, and prevent their protruding. There must also be nurses to wash sponges first in plain warm water, then in warm carbolic solution (1 in 40), and hand them back to the operator. Sponges and hæmostatic forceps should be counted before and after the operation, to ensure that none are left in the abdomen. No sponge should ever be torn or divided during the operation.

The incision is to be made in the linea alba. It should be at first of moderate length, not exceeding four inches, nor passing above the umbilicus. It may afterwards be extended upwards, if required. Sir Spencer Wells has found the mortality to be notably less when the tumour could be extracted through an incision not exceeding these dimensions. It is preferable, however, to extend the incision rather than to separate out of sight adhesions to omentum or intestines, which are likely to cause subsequent hæmorrhage. Bleeding from vessels in the abdominal incision should be checked before the peritoneum is incised. For this purpose, Sir Spencer Wells' hæmostatic pressure-forceps, having a catch at the handle, or one of their modifications, are very convenient, and the operator should be provided with a considerable number of them. These are left attached while the operation proceeds. In

the modification, shown in Fig. 129, the blades are separable, and, therefore, more readily cleansed; the form of joint is improved, and is not readily broken; while the shape of the ends makes them convenient for use in applying ligatures, if desired. Ligatures of fine carbolized or chromicized gut may also be used, if necessary. After the superficial fat has been divided, the fibrous structure of the linea alba is incised, and the line of division of the recti sought for. These are then separated throughout the length of the wound; next the subperitoneal fat is cut through, and the peritoneum pinched up and divided. When

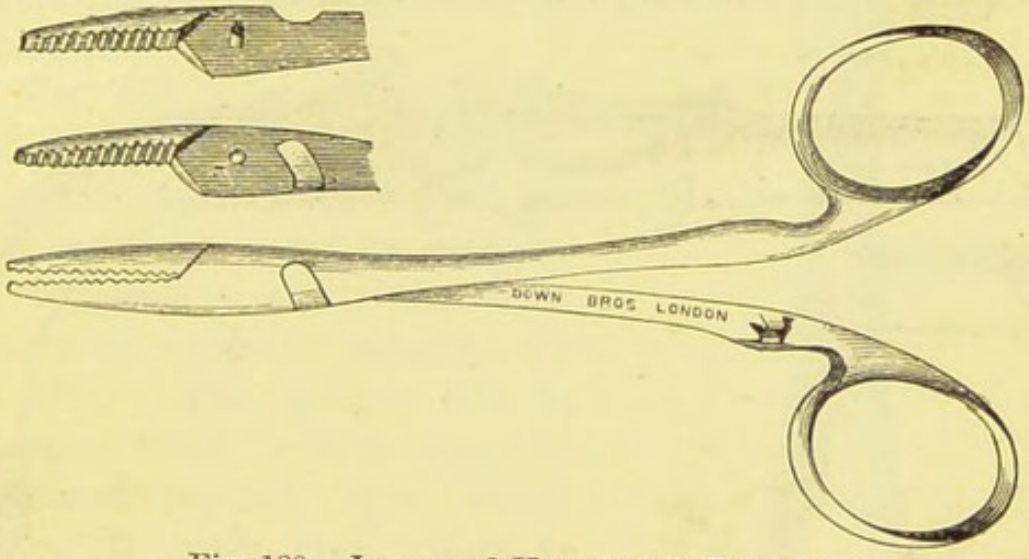


Fig. 129.—Improved Hæmostatic Forceps.

the peritoneal cavity has once been opened, two fingers may be introduced as a director, and the incision through the peritoneum prolonged upward and downward. There is thus less risk of injuring the bladder than if a director were used. The cyst is generally recognized by its bluish appearance, but when it is firmly adherent to the abdominal wall, difficulty may be found in ascertaining when the peritoneum has been divided, and the operator may peel off the parietal peritoneum, mistaking it for the cyst wall. In case of great doubt the best method to follow is to ascertain whether the supposed cyst-wall can be peeled off at the situation of the umbilicus. This will be impossible, if it is really parietal peritoneum.

Before tapping the tumour, the fingers may be introduced between it and the abdominal walls, and swept round on all sides, to separate any adhesions existing in front. If, however, the adhesions be found very firm, and especially if the cyst-wall be thin or friable, it is better first to empty the tumour. A large trocar (Fig. 130), having claws attached, to fix the cyst-wall to it, is now plunged into the tumour. In case of a multilocular tumour the spot should be chosen where the largest cyst appears to be situated. After puncture of the cyst the inner tube is pushed forward to guard the point of the trocar. Care must be taken to prevent the fluid entering the peritoneal cavity. A large

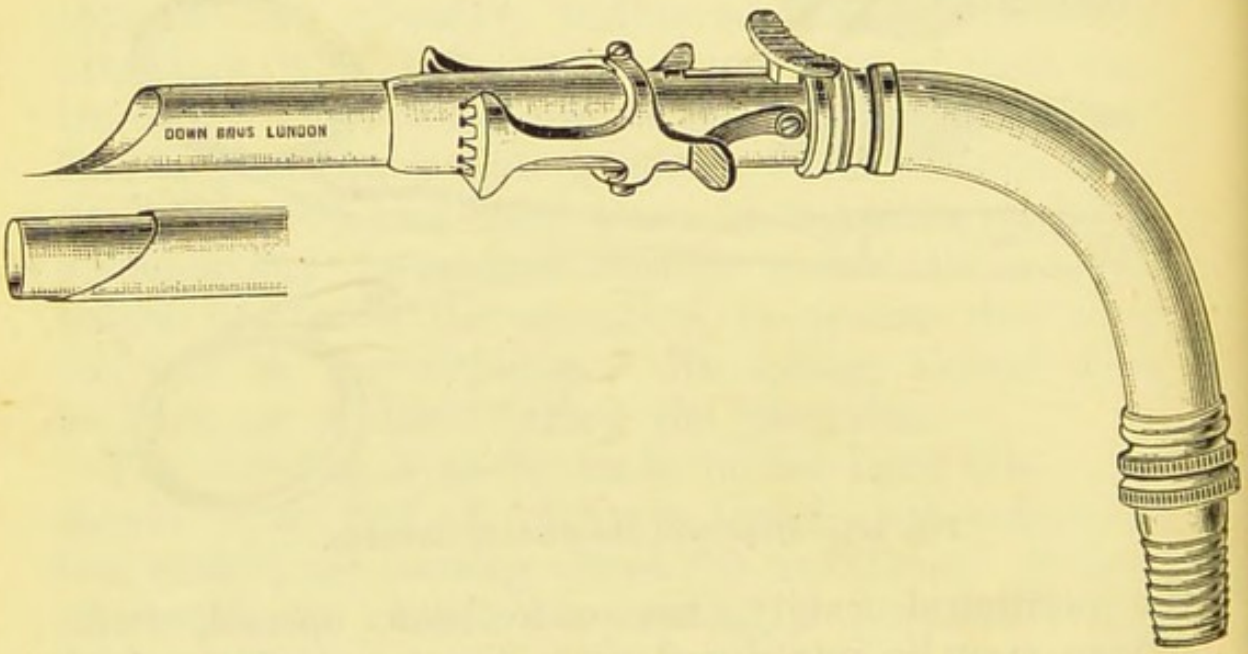


Fig. 130.—Spencer Wells' Ovariotomy Trocar.

rubber tube may be attached to the canula, to carry the fluid down to a footpan. If the nature of the tumour still remains doubtful, after its exposure, a small trocar should be used in the first place. A slender long trocar, like that used for puncture of the bladder per rectum, should also be chosen if the tumour is very small, not reaching into the abdominal wound. As the tumour empties, it is drawn forward in the grasp of the claws of the trocar, so as to bring the opening outside the abdomen. If secondary cysts remain large enough to prevent the withdrawal of the

tumour, it is best to remove the trocar, enlarge the opening, and fix at each side of it a pair of cyst-forceps (Fig. 131) to hold it forward. The fingers are then introduced through the opening, and the secondary cysts broken up or the trocar guided to tap them. Two fingers of the other hand, passed on the outside of the tumour, ascertain the position of the secondary cysts, and make sure that the outer wall of the tumour is not broken through.

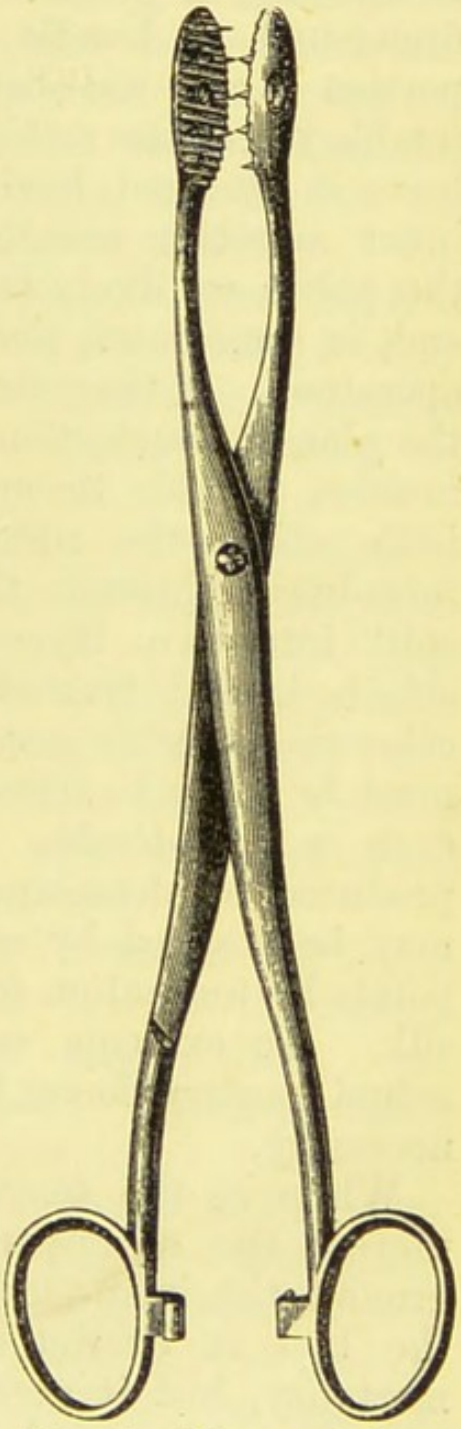


Fig. 131.—Nelaton's Cyst Forceps.

For the ligature of bleeding vessels or bands of adhesion silk should be used which has been carbolized by soaking it for twelve or twenty-four hours in carbolic solution (1 in 20). The proper silk is Chinese twist, which may be obtained wound upon small vulcanite reels, and which is very strong in proportion to its thickness. For small vessels or adhesions the thickness No. 1 should be used; for thicker bands of adhesion, No. 2 or No. 3; for the abdominal wall, either No. 3 silk or silkworm gut; for the pedicle, No. 4 silk, or No. 3, if the pedicle is not bulky. Special care is required to guard against subsequent hæmorrhage in the case of omental adhesions; and, if there is a broad surface adherent, it is a good plan to divide it into sections, and tie each separately before dividing the omentum with scissors. Other strong bands of

adhesions may be tied before division in a similar manner. Adhesions to intestine, stomach, or liver require special caution in their separation, which should be effected, if possible, by gentle traction, or by the finger-nail, or handle of the knife. If, however, a portion of cyst-wall be very firmly adherent, it is preferable to cut the rest of the tumour away from it, and leave it attached, having first enucleated from it the inner secreting membrane. Firm adhesions within the pelvis are likely to lead to the greatest difficulties, and, in some cases, render it impossible to complete the operation. If they cannot be separated by the fingers, the plan of enucleation should be tried. A transverse incision is made through the outer wall of the cyst, a little above the adherent surface; the fingers are introduced through the opening, and the cyst-wall split into two layers, of which the outer is left attached, and treated as a pedicle, by ligature or otherwise. After removal of the tumour, minute care must be taken to arrest all hæmorrhage. Oozing from even a considerable vascular surface, such as that produced by detachment of an adhesion to the uterus, may be stopped by successively seizing the bleeding points by tenaculum forceps and tying them with fine silk. In extreme cases the galvanic, benzoline, or actual cautery have been used, but are very rarely necessary.

While in the *treatment of the pedicle* of a fibroid uterus, the extra-peritoneal method still holds its ground, the intra-peritoneal method is established as the best in ovariotomy. It not only gives a less mortality, but it greatly shortens the healing of the wound, and avoids leaving a weak point in the abdominal wall such as may afterwards give rise to ventral hernia. A sharp pointed pedicle needle, mounted in a handle, and with rather a large eye, should be used, threaded with a long piece of No. 4 silk. By the following method, the broadest pedicle may be secured by a double loop. The needle is first passed through

the ovarian ligament if that is visible, or, if not, near the inner border of the pedicle. It is then passed again through the central part of the pedicle once or twice, according to its width. Finally, it again transfixes the pedicle close to its outer border near the ovarian vessels. Care is taken to avoid puncturing any large veins which may be visible. Some recommend tying the ovarian vessels separately, but this is not necessary if the plan described above is followed. The pedicle is then tied in two sections, the first hitch of each knot being a double one. If the pedicle is at all bulky, the whole of it should afterwards be encircled by one of the ligatures, and the ends are then cut short.

When the ligatures have been tied, the pedicle is seized just above them by a pair of catch forceps at each side, while the tumour is cut away about half an inch from the ligatures. The pedicle is then kept under control till it is certain that no bleeding takes place from it. The division of the pedicle by cautery was found by Dr. Keith to give excellent results, but this method has now been abandoned.

If the cyst is found to descend between the layers of the broad ligament, below the level of the fundus uteri, it is difficult to make any pedicle. An attempt should be made to place ligatures below the base of the cyst, by means of a semi-blunt pointed needle, with rather a strong curve (Fig. 120, p. 321). This is facilitated if ligatures are first placed deeply on the outer part of the broad ligament, beyond the cyst, and between the cyst and the uterus, and the broad ligament is then divided between the cyst and the ligatures down to the level of the base of the cyst. Otherwise the cyst should be enucleated, if possible, and all vessels which bleed should be tied. It is undesirable to leave any part of the secreting surface of the cyst. If it cannot be avoided, the base should not be tied as a whole, but only separate vessels.

There is another alternative if a cyst is completely

unilocular, as for instance a broad ligament cyst, or if no secondary cyst can be detected in its lower portion. The walls of the cyst, after the upper part has been cut away, may then be stitched in the lower part of the abdominal wound, and the cyst treated by drainage, after which it will shrink up. This plan may be adopted if the cyst-wall cannot be split into two layers for enucleation. The greater the experience of the operator, the more rarely will this method be required. But there are some cases in which it is the only resource, as, for instance, when a cyst of the left side burrows deeply underneath the sigmoid flexure.

Before the abdominal wound is closed all parts of the peritoneum, especially its dependent portions, must be thoroughly cleansed by a succession of soft sponges, wrung out of warm carbolic solution, from all fluid, blood, or clots; and upon the effectual performance of this "toilette" the success of the operation largely depends. Another mode of cleansing the peritoneal cavity, introduced by Mr. Lawson Tait, is to wash it out with a stream of hot water at a temperature of from 100° to 110° F. If there is much oozing of blood from separated adhesions, the higher temperature is of advantage as tending to check the hæmorrhage. The best plan is to have the hot water in a glazed earthenware pail, which can be raised by a pulley, and is connected by means of a syphon with a Lawson Tait's irrigating tube (Fig. 132), of not too small a size. This tube can be directed into the various dependent portions of the peritoneum so as to wash away clots. Irrigation should always be used, if there is likely to be bleeding enough to require a drainage tube, or if any ovarian fluid or pus has escaped into the peritoneal cavity. After irrigation, I always use drainage for at least a few hours, but some operators close the abdomen and leave the remains of the fluid to be absorbed. Antiseptic solutions are sometimes used, such as a saturated cold solution of boric acid, with hot water added, or tincture of iodine, ℥j ad Oj. I prefer plain

water in ordinary cases; boric solution if pus or septic fluid has escaped into the peritoneal cavity.

While the sutures are inserted into the abdominal wound, a large flat sponge, previously selected for the purpose, should be placed beneath it, to prevent any blood from the punctures entering the abdomen, and to avoid any risk of the intestines being wounded. The sutures may be of carbolized silk, or, for greater security against their producing any irritation, of silkworm gut. Sir Spencer Wells' plan is to thread a silk suture with a straight needle at each end, and, holding the needles in forceps, to pass them from within outwards, including about a quarter of an inch of peritoneum, and bringing them out rather close to the margins of the wound. The needle should take up the peritoneum, avoid the rectus muscle, take up the sheath of the rectus, and the tissues superficial to it. In this way flat surfaces of the peritoneum are brought into contact, and unite quickly. If there is any suppuration in the abdominal wound, it does not reach the peritoneal cavity. Silkworm gut may very advantageously be used in the same way, the only disadvantage being that the pieces are necessarily somewhat too short for convenience. The edges are thus often

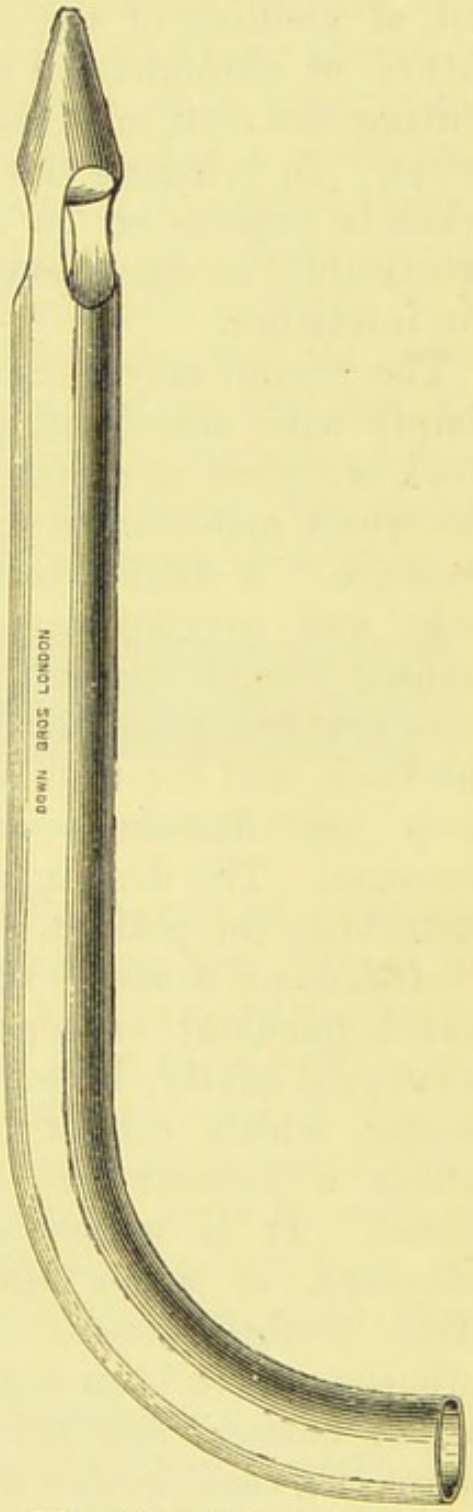


Fig. 132.—Lawson Tait's Irrigating Tube.

accurately adapted without any superficial sutures, but such sutures should be added if necessary, to bring the edges of skin into perfect union. To diminish the risk of yielding of the cicatrix in future, a continuous suture of chromicized gut may be used in addition, uniting the recti muscles, their sheath, and the peritoneum. In bringing the wound together, care must be taken to express air as completely as possible, and, if practicable, to draw down the omentum so as to cover the intestines.

The wound may be covered simply with iodoform, or simply with absorbent, gauze. A large pad of cotton wool, wrapped in a piece of gauze, is then placed over the whole abdomen in order to maintain equable elastic pressure. A flannel belt, long enough to go round the body and overlap across the front of the abdomen, divided at each end into four or five tails, should have been previously prepared. This is now passed under the back, and the tails secured by safety pins, so as to keep the dressings in place, and make moderate pressure. The dressings can then be changed without disturbing the patient.

Abdominal drainage should be adopted in all cases in which purulent or septic fluid has escaped into the peritoneal cavity, in which there is much sanguineous oozing which cannot be sufficiently arrested, or in which a tumour has been enucleated from cellular tissue. It is unnecessary when the tumour is not adherent, or when adhesions have been but slight. More doubtful cases are those in which extensive adhesions have been separated, but in which no bleeding of moment continues. Under such circumstances, there is a considerable difference between the practice of different operators. When there is a doubt, I think it safer to incline in favour of drainage.

Keith's drainage tube is shown in Fig. 133. It should be chosen of such a length that its lower extremity rests at the bottom of the pouch of Douglas, the upper end projecting through the wound between

two of the sutures as near to its lower angle as can be arranged. An extra suture through the abdominal walls, at the position of the tube, may be placed ready, so that, when the tube is removed, it can be tied, and the opening by this means closed. The tube should be managed as follows. A sheet of thin pure india-rubber, about eighteen inches square, has a small hole cut in its centre, by means of which it is fitted tightly over the upper end of the tube. At first, a cup-shaped sponge, wrung out of carbolic solution (1 in 20), is placed over the top of the tube, and the india-rubber sheet wrapped over it. After the first day, the sponge may be replaced by shreds of carbolic gauze. Every few hours, at first every half hour, the serum is sucked out of the tube by means of a piece of



Fig. 133.—KEITH'S Drainage Tube for Ovariotomy.

india-rubber tubing attached to the nozzle of a syringe. This can be done without disturbing the rest of the dressings. The tube should be kept in until the serum is clear and free, or almost free, from blood. This will generally be after an interval of from one or two to five or even seven days. If the fluid becomes thick, purulent, or offensive, the glass tube must be replaced by a rubber drainage tube in about seven days, and this tube only gradually shortened as the sinus closes from the bottom.

If drainage is not used the dressings may generally be left undisturbed until the seventh or eighth day, when the sutures are removed. If, however, there is much fat in the abdominal walls, it is preferable to leave the sutures in for ten days. There is an advantage in having some superficial sutures that, since they have no tension upon them, these may be left in several days after the deep sutures are removed, and prevent

any separation at the surface. If a drainage tube has been used, the sutures next to it should be kept in until several days after its removal. Towards the end of the first twenty-four hours a little milk or barley-water may be given; but, if vomiting is troublesome, recourse should be had early to nutrient enemata, and the stomach left at rest. Morphia or opium is to be given by the rectum or subcutaneously in sufficient amount to keep pain in check after the operation. As a rule it is not required, except to secure sleep at night, and the less given the better. In case of considerable elevation of temperature—a condition generally due to peritonitis of septic origin—advantage has often been found from the use of Thornton's ice-water cap, whereby a current of cold water is kept constantly circulating round the head. Leiter's temperature regulator, in which tubing of soft metal is arranged in the form of a cap, may be used in the same way. In case of abdominal distension, with rise of temperature, symptoms which appear to threaten peritonitis, Lawson Tait's treatment appears to be often beneficial, namely, to give turpentine enemata, and saline laxatives, such as a seidlitz powder, until the bowels act, or even a dose of calomel.

The Operation of Paracentesis.—Paracentesis should be performed with antiseptic precautions. Trocar and canula should be disinfected with carbolic acid, 1 in 20 : the abdomen, and the hands of the operator with perchloride of mercury, 1 in 1,000. The instrument used should be about ¼-in. in diameter, and may be either an ordinary trocar and canula, or Sir Spencer Wells' syphon canula, which has a bevelled extremity, and a cutting edge for half its circumference, so that it cuts a valvular opening. The latter instrument diminishes the risk of any fluid escaping into the peritoneal cavity during the momentary interval between the puncture and the withdrawal of the trocar.

For the operation the patient should be placed on

her side, with her head rather low, to avoid the occurrence of faintness from sudden diminution of abdominal pressure. One or more pails must be provided to receive the fluid. A small incision should be made with a scalpel just through the skin, before the trocar is inserted. A long india-rubber tube should be previously attached, either to the syphon canula, or to a short tube which is fitted into the ordinary canula at the moment when the trocar is withdrawn. In this way the entry of air is rendered less probable, and the syphon action assists the evacuation of the fluid. If a large amount of ascitic fluid is present, in addition to a tumour, it is better to make a small incision through the abdominal wall with a scalpel, until the peritoneum is just divided, and then to pass in through the opening a large gum-elastic catheter, which should be a new instrument and thoroughly disinfected with solution of perchloride of mercury. In this way there is no risk of wounding the tumour or intestines; the ascitic fluid is drawn off first, the outline of the tumour can then be exactly explored, and it also can be afterwards tapped, if necessary.

Paracentesis generally leads to the formation of adhesions near the puncture, and often over a considerable surface. Hence it should never be performed as a preliminary to ovariotomy, unless distension is so great as to require immediate relief before ovariotomy can be arranged; and then ovariotomy should not be long delayed afterwards.

Other Modes of Treatment, in the present day, are to be thought of only when ovariotomy is judged impracticable, or when, after exploratory incision, it is found that the tumour cannot be removed. In the case of a unilocular cyst, or one containing no secondary growths in its lower part, if it is found, after incision, that the cyst is inseparably adherent in all directions, the opening in the cyst may be sewn to the edges of the abdominal wound, and the cyst treated by drainage. If the upper part of the cyst can be removed, its

lower part may be sewn to the abdominal walls in a similar way. The more experienced the operator, the fewer will be the cases in which he is compelled to leave the operation incomplete. If there are secondary growths in the lower part of the tumour, nothing short of complete removal is of any use.

DERMOID CYSTS OF THE OVARY.

Pathological Anatomy.—The term dermoid cyst, though not a strictly appropriate one, has been applied to cysts of the ovary whose inner surface is a structure resembling skin, generally containing sebaceous and sometimes sweat glands, and often provided with numerous hairs growing in hair-follicles. In the cellular tissue beneath, true bones are often found, frequently having teeth, and sometimes more or less resembling some definite bones of a fœtus. Teeth may also be found separately in the tissue, or be cast off into the cyst, within which a large number of them may be accumulated. They are sometimes well formed, but more frequently rudimentary. In rare cases, striated muscular fibre or grey nerve-substance has been found in the cyst wall. The cyst is generally single, or appears to be divided into compartments by the growth of septa from its walls. The contents of the cyst are generally a thick gruel-like material, made up of sebaceous secretion and cast-off epithelial cells, with the addition frequently of cast-off hairs, sometimes to a considerable amount. Cholesterine may also be present in large quantity.

Causation.—The far more frequent situation of these cysts in the ovary than anywhere else shows that they cannot be the produce of an included twin ovum, for such an ovum would be attached to some more external part. Moreover, a dermoid cyst has sometimes contained far more than 32 teeth. The occurrence in them of structures other than epithelial, as well as their

situation, distinguishes them from cysts formed by abnormal epidermic involution, like the dermoid cysts of the orbit. Their origin can only be ascribed to an abnormal formative energy of one of the ovules in the ovary, constituting an imperfect degree of parthenogenesis, or development without impregnation, of fœtal structures from an ovular cell, or from other cells of the parent organism. In comparatively very rare cases,

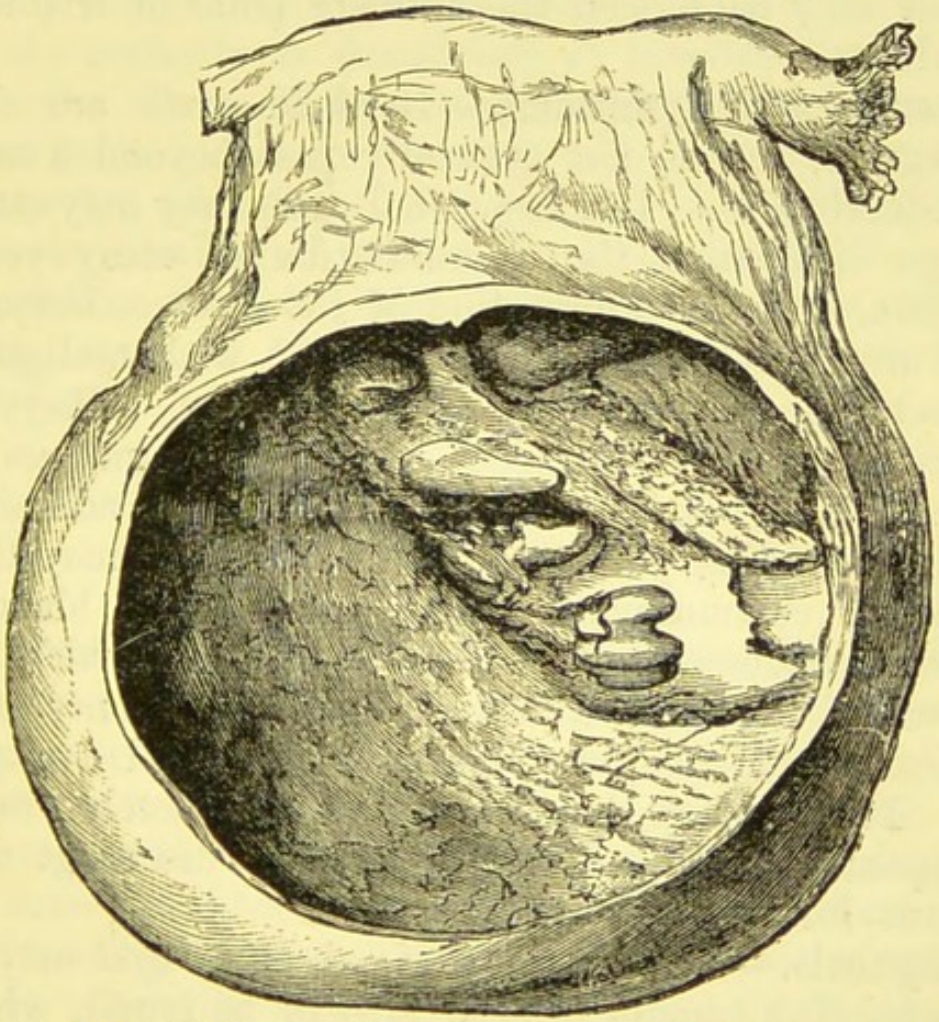


Fig. 134.—Dermoid Ovarian Tumour, bearing Teeth and Bone. (DORAN.

similar tumours have been formed by erratic development of tissue in other parts of the body. They have been found especially in the testicle of the male, and this circumstance appears to be a confirmation of the view that cells specialized for the purpose of reproduction are most prone to such an abnormal development.

Dermoid cysts of the ovary have often been found in very young children, but they more frequently come under observation within a few years after the

age of puberty. It is probable that, in at any rate a large proportion of cases, the tumour commences in fœtal life or soon after birth, while formative energy is specially active, and that it takes on a more active growth when the ovary becomes developed at the age of puberty. Dermoid cysts are occasionally found associated with ordinary ovarian cystomata, and it is possible that, in such cases, the presence of the dermoid tumour may have been the starting point of irritative stimulus.

Results and Symptoms.—Dermoid cysts are slow in progress, and do not generally pass beyond a small or moderate size. In exceptional cases they may attain a large size, from the accumulation of many years' secretion, or from suppuration of the cysts. Dermoid cysts are rather apt to be associated with malignant degeneration of some part of the tumour. They are also more prone than ovarian cystomata to undergo inflammation and suppuration, and to contract adhesions with surrounding parts. Fistulous openings may then be found, communicating with the rectum, bladder, surface of abdomen, or other parts, through which the contents of the cyst, with hair, teeth, and bones, may be discharged. Rupture into the peritoneal cavity is rare. It is seldom that the cyst is completely evacuated spontaneously, but suppuration and discharge may continue for years.

Diagnosis.—The existence of a dermoid cyst may be suspected if a tumour of slow growth be found, which first attracted notice soon after the age of puberty, or has existed indefinitely, especially if hard masses like bone can be felt in parts of it, while no very manifest or superficial fluid thrill can be detected. A similar opinion may be held if, in a tumour like that just described, signs of inflammation appear, while the tumour rapidly increases and fluctuation is developed. Positive diagnosis can generally only be made after spontaneous or artificial evacuation of some of the contents.

Treatment.—If a swelling is detected which is thought likely to be a dermoid cyst, it is important, in view of the changes to which such a growth is liable, to remove it as early as possible by ovariotomy. Operation especially should not be delayed if any signs of inflammation appear. Ovariotomy may even be undertaken after a fistulous opening has existed for a long period. In general, if a fistulous opening has been formed, the plan of enlarging the opening and evacuating the contents as completely as possible should first be tried. Tufts of hair may be extracted by a small blunt hook. A large drainage tube should afterwards be inserted, and the cavity washed out regularly with a weak solution of iodine or other antiseptic. Dr. Barnes recommends light cauterization of the interior of the cyst, to alter its character and cause it to contract.

FIBROID TUMOURS OF THE OVARY.

A true myoma or fibro-myoma having its origin in the ovary is very rare, although it has occasionally been observed. In some instances, tumours of this structure, which appear to belong to the ovary, may be outgrowths from the uterus, or may originate in the muscular fibres spreading out from the uterus into the broad ligaments. The proportion of muscular fibres is less when the growth is of ovarian origin than in uterine tumours: and, in some instances, fibrous tissue largely preponderates. Some solid tumours of the ovary belonging to the sarcomatous group also consist mainly of fibrous tissue, and do not show malignancy, but these are also rare.

Treatment.—Non-malignant solid tumours of the ovary are generally slow in progress, and in many cases it will be impossible, without an exploratory incision, to distinguish such a growth with absolute certainty from a fibroid outgrowth from the uterus.

If a probable diagnosis is made that the growth is ovarian, ovariotomy is indicated, especially since it is impossible before operation to be certain whether such a growth may not be malignant or semi-malignant.

CANCER OF THE OVARY.

The ovary occupies a rather exceptional position among organs of the body, as being a not infrequent seat of secondary, as well as of primary cancer. Primary cancer of the ovary is rarer as an independent disease than in conjunction with, or as a complication of, cystoma. When it occurs it often affects both sides, and sometimes appears in early life. Primary growths in the ovary, which are clinically malignant, may have the structure either of sarcoma, originating in the stroma, or of carcinoma, which probably in most cases, if not always, has its origin from the Graafian follicles. Sarcoma is the commonest, and it is even held by some that all primarily malignant growths in the ovary are of this character. The sarcoma may be of any variety, from the spindle-celled to the round-celled encephaloid form (Fig. 135), the round-celled being the most frequent, while myxomatous or myxo-sarcomatous tissue is occasionally seen. The degree of malignancy varies according to the structure, but, in most cases, the prognosis is similar to that of carcinoma. True carcinoma of the ovary is generally of the encephaloid form, but occasionally the scirrhous variety occurs, sometimes consisting almost entirely of fibrous tissue, only a few cell-masses being discoverable here and there. All solid growths in the ovary, whether fibroid, sarcomatous, or carcinomatous, commonly enlarge the whole organ equally.

When malignant degeneration takes place, as it frequently does, in the ordinary cystic adenoma, the form of disease is generally adeno-carcinoma in the first instance. Later the glandular type may be

entirely lost, and the structure may be that of medullary carcinoma.

Diagnosis.—The solid character of a growth in the ovary should always excite the suspicion of its being malignant; and the suspicion is increased if both ovaries are affected, if pain is severe, if the growth is rapid, if a large quantity of ascitic fluid is present, or if the cachexia and emaciation of the patient, or local or general œdema, are greater than can be accounted

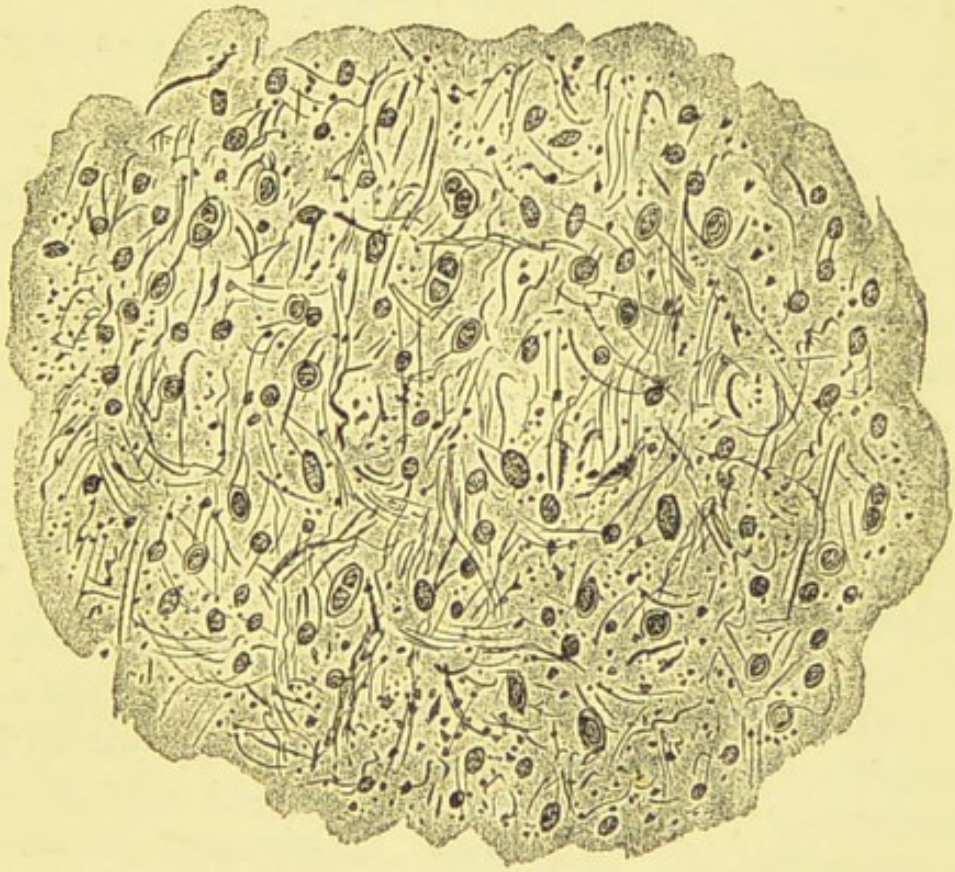


Fig. 135.—Sarcoma of Ovary.

for by the size of the tumour. The patient's age is also an element in diagnosis. If the tumour becomes fixed to the uterus and surrounding parts, and nodular masses are felt in its neighbourhood, the diagnosis becomes pretty certain. Examination of the ascitic fluid may also give distinctive signs (*see* p. 378).

Treatment.—While the character of a solid ovarian tumour is only suspicious, and while it remains apparently free from inseparable fixation, it is desirable to remove it by ovariotomy, and the prognosis will be

more favourable if it turns out to be sarcoma and not carcinoma. If the growth has become fixed, with invasion of surrounding parts, palliative treatment only is admissible.

Tubercle of the Ovary is very rare, and is almost always associated with tubercle elsewhere, especially in the uterus and Fallopian tubes.

MEDICAL DEPARTMENT,
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CHAPTER X.

DISEASES OF THE FALLOPIAN TUBES.

The Congenital Anomalies of the Fallopian tubes dependent upon imperfect development of Müller's ducts have been considered in connection with those of the uterus (*see* p. 75). Another congenital anomaly is the formation of one or more supplementary openings into the peritoneal cavity, which have each a fringe of fimbriæ. These are of little practical importance.

Salpingitis, or Inflammation of the Fallopian Tube, commonly arises by extension of inflammation from the lining membrane of the uterus. Acute inflammation, proceeding to the formation of pus, is generally the sequel either of acute septic inflammation in the uterus, puerperal or otherwise, or of extension of gonorrhœal contagion. A collection of pus in the Fallopian tube is liable to lead to sudden and rapidly-fatal peritonitis, either through extension of inflammation by continuity to the ostium abdominale of the tube, through the outflow of pus by the same orifice, or through escape of pus after ulceration or rupture of the tube-wall, if the fluid is at first retained through want of patency in the tube. In other cases, the inflammation becomes limited by adhesions, and a localized intra-peritoneal abscess is formed in the neighbourhood of the tube. Peritonitis may probably also arise by transmission of inflammation, or by transudation of the fluid under pressure,

through the walls of the tube. The more subacute or chronic form of inflammation in the tube is also very likely to set up a local peritonitis and consequent adhesions.

Dilatation of the Fallopian Tube, without occlusion, in slight degree, may result from chronic inflammation of its lining membrane, which may produce also narrowing at other parts. In more considerable amount, it is apt to be associated with the stretching out of the tube over uterine or ovarian tumours, or its fixation by old adhesions. Such an abnormal patency of the tubes constitutes the great danger which attends the injection of medicated fluids into the uterus. By allowing reflux of the menstrual blood, it is also believed to be one of the causes of peri-uterine hæmatocele. A considerable number of cases has been recorded, in which it has been concluded that the uterine sound could be passed for two inches or more along the Fallopian tube. In some instances this has doubtless occurred, but some supposed cases are probably open to the explanation that the sound was first passed through a soft uterine wall, and that the opening remained for some time patent, so as to allow the sound to pass repeatedly in the same direction.

Distension of the Fallopian Tube, Hydrosalpinx, Pyosalpinx, Hæmatosalpinx.—When inflammation of the adjacent peritoneum is set up by escape of irritating secretion from the Fallopian tube in salpingitis, agglutination and closure of the fimbriated extremity of the tube readily take place. At the same time the inflammation may lead to contraction and even closure of that part of the tube which passes through the uterine wall. The part of the tube between the two points of obstruction then becomes distended. There are two forms of closure, in one of which tubal inflammation is the main cause, in the other peritonitis. The former is called salpingitic closure, and is characterized by great thickening of the tube wall, and retraction of the

fimbriæ within the ostium. The latter is called peritonitic closure. It does not follow that the exit into the uterus is absolutely barred; and, in fact, it is generally found that there is no absolute obliteration of the canal. Some of the fluid may escape, generally in gushes at intervals. *Hydrosalpinx*, or distension of the tube by watery or mucoid secretion, is the result when the inflammation is comparatively mild in degree. This may occur without more perimetritis than is just sufficient to seal up the tube, and without any general and complete fixation by adhesions of tube and ovary. It is believed by some that hydrosalpinx may also be the final condition in a long standing case of pyosalpinx; the pus having been absorbed. In the majority of cases the distended tube, either in hydrosalpinx or in pyosalpinx, does not exceed an inch and a half in diameter. In rare cases, however, a dilated tube may attain the size of a fœtal head, or even be still greater. In one case, I have found thirty-six ounces of pus in one tube, and twenty-four in the other; the case simulating one of double ovarian tumour. In another case, an enormously distended pyosalpinx, with thickened muscular walls, had separated the layers of the broad ligament, and occupied a position like a broad ligament cyst, burrowing under the sigmoid flexure. In other cases, again, when there is extensive matting of the tubes and ovaries by perimetric adhesions, the tubes are found but slightly dilated by hydrosalpinx, the lumen not exceeding the diameter of a No. 12 catheter, the fimbriated extremity sealed. This condition comes within the definition of hydrosalpinx, but the hydrosalpinx is of trivial importance compared with the general effect of the adhesions.

Pyosalpinx, or distension of the Fallopian tube with pus, is the result of a more acute inflammation than hydrosalpinx, and, on that account, it is generally associated with more extensive peritoneal adhesions. The swelling formed by the dilated tube does not so

often attain a great size as does that of hydrosalpinx. In some cases the fluid is intermediate in character, and may be slightly tinged with blood; so that it is difficult to say whether hydrosalpinx, pyosalpinx, or hæmatosalpinx is the most appropriate term.

The commonest causes, both of hydrosalpinx and pyosalpinx, are gonorrhœa and puerperal endometritis. Next to these comes inflammation of the uterus, which occurs as a complication of specific fevers, such as scarlatina. Even a simple catarrhal endometritis, such as may arise from cold, especially cold at a menstrual

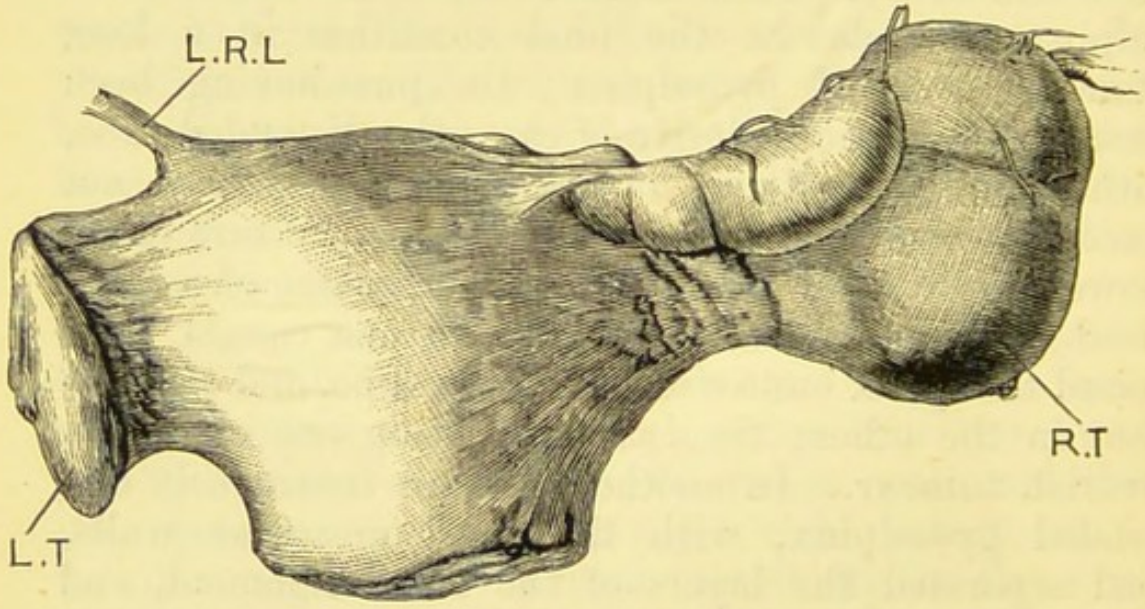


Fig. 136.—Distended Fallopian Tubes: Hydrosalpinx on Right Side, Pyosalpinx on Left.

R T, right tube; L T, left tube; L R L, left round ligament.

period, may also lead to perimetritis, hydrosalpinx, and even to pyosalpinx, which is occasionally found in virgins. Traumatic causes, such as operations on the interior of the uterus, or an intra-uterine stem pessary, may have a similar effect. Congenital imperfections of the uterus are also regarded by Lawson Tait as a cause. Tubercle of the tube wall may also be a cause of suppuration and distension.

Hæmatosalpinx, or distension of the tube with blood, may be a late result of atresia of some part of the genital canal, and retention of menstrual fluid. The

tubes only become distended when the distension of the uterus is considerable and long-standing. Probably the first effect is a little escape of blood by reflux into the peritoneal cavity. This sets up slight perimetritis, which seals the ends of the tubes, and the tubes then become distended. Sometimes the tubes have been found distended with blood in atresia of the genital canal, although the opening into the uterus appeared to be closed. It does not seem, however, that normally there is any discharge of blood from the Fallopian tube in menstruation. Hæmorrhage may occur into the Fallopian tube when inflamed, or when already distended by pus or serum. The majority of cases of hæmatosalpinx have an inflammatory origin of this kind.

Frequency.—The operation for removal of the uterine appendages in chronic inflammatory disease of the tubes, introduced by Mr. Lawson Tait, has shown that distension of the tubes is commoner than had been supposed. The results of post-mortem examinations confirm this to some extent, now that attention has been directed to the matter. Dr. Kingston Fowler found within three years, in the post-mortem room of the Middlesex Hospital, ten cases of pyosalpinx and five of hydrosalpinx. In eight of the fifteen cases the state of the tubes had been indirectly the cause of death, but in only two did this occur through rupture into the peritoneal cavity, one of these being a case of cancer. Five out of the fifteen were cases of cancer of uterus, ovary, or rectum. Dr. Lewers found seventeen cases of distension of tube, including five of pyosalpinx, in one hundred autopsies at the London Hospital. In two of these the pelvic condition was the cause of death. This proportion of cases is probably greater than the usual average, especially as regards the relative frequency of pyosalpinx. At Guy's Hospital during three years, 1884–1886, during which time the attention of the pathologists had been especially directed to diseases of the Fallopian tubes,

there were three hundred and two autopsies of women above the age of puberty. Among these there were only two cases of pyosalpinx, including one case in which the tubes were dilated into two large symmetrical suppurating sacs, resembling, at first sight, ovarian tumours. There were eight cases of hydrosalpinx, including two in which the distension was trivial in amount, the tubes not being larger than a lead pencil. There were two cases of hæmatosalpinx, thus making twelve cases in all of distension of the tubes. There were fourteen cases of chronic adhesion of tubes and ovaries, without any distension of tubes. The pelvic condition was indirectly the cause of death in both the cases of pyosalpinx, in one case of hydrosalpinx, and in four cases in which there was only adhesion of tubes, without distension. There were three cases of tubercle of the tubes. In these three hundred and two cases, therefore, tubercle of the tubes was commoner than pyosalpinx. Chronic inflammatory disease or adhesion of tubes was found in nearly 9 per cent. of all the autopsies. There was no case of rupture of distended tube. The average age of patients with distended tubes was forty-one; of patients with adhesions only about the tubes, forty-three.

Results and Symptoms.—Hydrosalpinx in many cases appears to cause but slight symptoms, provided that there is no very extensive matting of surrounding parts from perimetritis. The swelling caused by the distended tube can often be recognized as less tender than a prolapsed ovary, when the two are separable. In other cases, however, when the distension of the tube is considerable, or when there is much matting around from adhesions, there may be severe and chronic pelvic pain. This is usually aggravated by menstruation, and the menstrual flow is often irregular, sometimes profuse. The patient may be rendered a chronic invalid, or suffer from frequently-recurring attacks of illness. In pyosalpinx the symptoms are generally more severe. Some rise of temperature is

more common, and frequently there are repeated attacks of perimetritis. Metrorrhagia is not uncommon. A pyosalpinx may rupture and cause fatal peritonitis, but this appears to be uncommon. Death may also occur from chronic perimetric suppuration, ulceration, or obstruction of intestines. The fact that, in the post-mortem room, distended tubes are often found in women who have passed the menopause, while the average age of patients on whom the operation for removal of appendages is performed is under thirty, appears to indicate that a quiescent condition or a relative cure is attained in many cases. This applies especially to hydrosalpinx; but even in pyosalpinx, the pus may eventually escape by the uterus, or become dried up. The mortality, however, in the series of cases at Guy's Hospital quoted in the last paragraph amounts to 28·8 per cent., as compared with the number of cases of chronic adhesion, and 2·3 per cent. as compared with the total number of necropsies. This appears to show that, although the primary perimetritis is rarely fatal, death from the result of tubal inflammation is by no means so rare as some have supposed. The fatal disease does not appear as perimetritis simply, but rather as general peritonitis, burrowing pelvic abscess, or, occasionally, as septicæmia, or apparent tumour.

Diagnosis.—A distended tube, when of considerable size, is difficult to distinguish from a small ovarian cyst. The distinction may sometimes be made by the fact that the swelling caused by a distended tube is retort-shaped, with the broad end curved downward, or apparently pyriform, with the smaller end next the uterus. During life the broad end of the retort is commonly nearer to the side of the uterus, and to the pouch of Douglas, than appears in Fig. 136, which shows the specimen somewhat drawn out laterally. In rare cases, the distended tube lies more forward, and may even overlap the anterior face of the broad ligament. The diagnosis will also be assisted if similar swellings are felt on both sides. In smaller degrees

of distension, it is not always possible to distinguish whether the tube is distended, or only fixed and surrounded by adhesions. A swelling is felt, generally more or less fixed, often somewhat posterior to, and lower than, the normal position of the Fallopian tube. In the case of hydrosalpinx, the ovary, somewhat prolapsed, may often be distinguished separately, and the tube recognized as an elastic elongated body, curving round it. In pyosalpinx it more frequently happens that the tube is surrounded by such a mass of adhesions that the presence of fluid cannot be positively recognized by the finger, unless its quantity is considerable. In either case there may be more or less general induration of the pelvic roof from perimetritis. The diagnosis of chronic inflammatory disease of the uterine appendages is confirmed, if there is a history of a probable cause, in the shape of gonorrhœa or a febrile disturbance after delivery, and if one or more attacks of perimetritis have previously occurred.

Treatment.—The operation for the removal of the uterine appendages in chronic inflammatory disease of the Fallopian tubes has rendered a cure possible for patients who might otherwise remain chronic invalids for many years. The operation should not be performed for the effects of a recent attack of perimetritis, since very great amendment, if not absolute cure, may then be attained by time. It is chiefly indicated when a patient has for years been a chronic invalid, sterile, and suffering from dyspareunia, especially if recurrent attacks of perimetritis occur, and if the symptoms are greatly aggravated by menstruation. If there is reason to believe that the disease is pyosalpinx, rather than hydrosalpinx, there is greater reason for performing it. Thus, if there are constitutional signs pointing to suppuration, and an elastic swelling diagnosed as a dilated tube, it is better not to delay operation. In many cases of hydrosalpinx, in which the distension is not very great, it appears to be unnecessary. In any given case, the amount of present suffering should be balanced

against the risk of the operation, and the possibility of inconvenience from the physiological effects of oophorectomy. In some cases, it may be sufficient to remove the appendages on one side only. More often both sides are found affected; and Lawson Tait contends that, even if this is not so, it is better to remove both tubes, on account of the probability that the second tube may become affected afterwards by another extension of endometritis. Complete removal of both ovaries is generally followed by an artificial menopause. This is accompanied by nervous disturbances like those of the normal menopause, and sometimes more intense, but these are not repeated at the usual age.

The operation is often spoken of as a mutilation; but this is only true in reference to pregnancy, and, in most cases in which the operation is justifiable, pregnancy is already impossible. As regards sexual power, as a rule, there is no material change, except that the enhancement of sexual feeling which accompanies menstruation is abolished. In a few cases complaint has been made of a diminution of sexual power. In an action brought against a surgeon for the alleged unnecessary removal of the uterine appendages, a claim for damages has been made on this score. Sometimes, however, sexual feeling is increased after the operation. If the existing disease is producing dyspareunia, a woman is much more likely to gain than to lose in this respect.

Short of operation, the treatment is that for perimetritis in its chronic stage (*see* Chapter XI.), especially hot water injection, moderate rest, counter-irritation over the seat of pain, and the administration of absorbents, such as perchloride of mercury, in small doses (*see* formula, p. 254).

The Operation for Removal of Uterine Appendages.—The patient is arranged as for ovariotomy. An incision not more than two inches long is made in the median line half-way between umbilicus and pubes,

bleeding being arrested by pressure-forceps. Opening the peritoneal cavity is often more difficult than in ovariotomy, if there is much thickness of superficial and subperitoneal fat. If this is the case, it is of use to seize with a pair of pressure-forceps at each side, and draw up toward the surface, as the parts are successively divided, first, the aponeurosis of the recti; next, the edges of the recti themselves when separated; then the subperitoneal fat, and, finally, the peritoneum. The peritoneum being divided to the same length as the external wound, two fingers are introduced to search for ovaries and tubes. If there is general adhesion, it may be necessary to divide the omentum, otherwise it should be slipped upward. The fingers are passed down behind the abdominal wall to the top of the bladder, and thence to the uterus, which is recognized by its firmness. The posterior wall of the uterus guides to the posterior face of the broad ligament, where the ovary will be felt, if free. If adhesions exist, they must be separated. The ovary is seized between the fingers, and drawn up into the wound. The tube will then also be within reach, if previously separated from its adhesions. If the tube is greatly distended, it may be tapped, before being drawn up, by means of a trocar like that used for puncture *per rectum*, guided down to it by the fingers.

In case of very firm adhesion, it is best to clear the back of the uterus down to the bottom of the pouch of Douglas, and thence to work outwards and upwards at each side, thus freeing the ovaries and tubes from the posterior face of the broad ligament, to which they are adherent. If the position of the tube is doubtful, it may be traced outward from the angle of the uterus.

A sharp needle, mounted in a handle, is threaded with carbolized silk No. 3 or No. 4 Chinese twist. It is best to pass the needle first from before backward through or close to the Fallopian tube near its origin

from the uterus, next through the ovarian ligament, then once or twice backward and forward through the combined mesovarium and mesosalpinx, finally bringing it out just beyond the attachment to the broad ligament of the fimbriated extremity of the tube. The ovary, and the whole of the tube except the portion close to the angle of the uterus, can thus be usually included in one ligature. The Staffordshire knot, used by Mr. Lawson Tait, is shown in Fig. 137. An inexperienced operator will do wisely to tie the ligature again round the whole pedicle. It answers equally well to tie the pedicle in two halves, and then again encircle the whole. The whole of the ovary should be removed, if possible. In cutting it away a pair of pressure forceps is placed on the tube just beyond the ligature to secure the pedicle, and the ovary is cut quite close to the ligatures at the point where the ovarian ligament has been transfixed, and where ovarian tissue runs closest to the broad ligament. The appendages on the other side should be examined, and removed also if not found healthy, or, according to Lawson Tait, in any case. If there is much bleeding and many clots in the peritoneal cavity, or if any pus or decomposed fluid has escaped into it, it is best to wash out the peritoneum with hot water at 110° F., in the manner described under the head of ovariotomy (*see* p. 388). This tends to check the bleeding. Unless adhesions are very slight, and all bleeding completely arrested, a Keith's drainage tube (Fig. 133, p. 391) should be placed at the bottom of the pouch of Douglas, projecting through the abdominal wound, between two of the sutures. Some large pads of cotton, enclosed in gauze, may be placed over the abdomen, and secured by a tailed bandage, fixed with safety pins. If there is

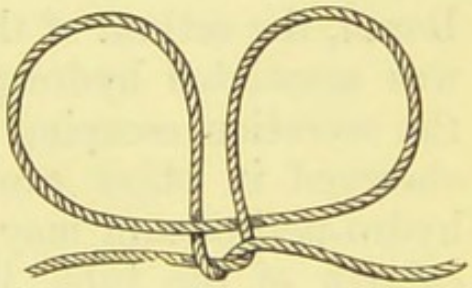


Fig. 137.
The Staffordshire Knot.
(After LAWSON TAIT.)

considerable oozing of blood, firm pressure should be made at first. The mode of management of the drainage tube is described under the head of ovariotomy (*see* p. 391).

Papilloma of the Fallopian Tube.—In some cases of chronic inflammation of the tube, especially when dilated, some degree of papillomatous growth arises through proliferation and division of the longitudinal ridges of the tubal mucous membrane. A few rare cases have been described of papilloma distending the tube and forming a tumour projecting from the ostium, or contained within. In one instance, described by Doran, the ostium of the tube remained open, and there was associated hydro-peritoneum, probably set up by the secretion escaping from the tube. This has been observed in other cases also. It is suggested that hydro-peritoneum may similarly be set up by chronic catarrh of the tube, if the ostium remains unsealed. The papillomatous growth, which may have a cauliflower-like appearance, is covered by cylindrical epithelium, and is associated with glandular cavities beneath the mucous membrane from which it grows. Hence Bland Sutton contends that it should rather have the title of adenoma. Papilloma of the peritoneum, which does not necessarily run a malignant course, appears sometimes to have its starting point from the tubes.

Papilloma of the tubes has not hitherto been diagnosed. It may be suspected if a solid tumour is felt in the situation of the tube, associated with hydro-peritoneum. The proper treatment would be removal by abdominal section.

Tubal Fœtation will not be discussed here, since it is included in works on Midwifery. Tubercle of the Fallopian tube is generally associated with tubercle in the uterus and elsewhere in the body, especially in the lungs. Small Fibroid Tumours are sometimes found in the walls of the tube; and Cysts may also occur in the wall of the tube, or in close connection with it.

Primary Cancer of the tube has been recorded, but is very rare.

Tubo-ovarian Cysts have already been described (*see* p. 360). If the ovary is simply spread out and lost upon the wall of the dilated tube, the term "tubo-ovarian cyst" is not correctly applied.

CHAPTER XI.

DISEASES OF THE UTERINE LIGAMENTS AND OF THE ADJACENT PERITONEUM AND CELLULAR TISSUE.

Inflammatory and other affections of the uterus and its appendages are apt to give rise to inflammation of the cellular tissue in the vicinity of these organs, especially in the broad ligaments of the uterus, where it exists most abundantly, and also to inflammation of the peritoneum covering the inflamed tissues. In the very acute and septic form of metro-peritonitis, inflammation extends to the whole peritoneum, and is often rapidly fatal; in the much more frequent cases, however, in which inflammation is less severe, it generally remains limited to the peritoneum of the pelvis and its vicinity. We have thus a pelvic or periuterine peritonitis and a pelvic or periuterine cellulitis. The terms of "*perimetritis*" to denote the former, and "*parametritis*" to denote the latter, have been introduced by Virchow, and widely adopted. The former was suggested by the analogy of the word pericarditis, signifying inflammation of the serous covering of the heart, in contra-distinction to which Virchow proposed the terms paracarditis, paratyphlitis, paranephritis, and parametritis, to denote inflammation of cellular tissue near the heart, cæcum, kidney, and uterus respectively.

Neither pelvic peritonitis nor pelvic cellulitis often exists altogether independently of the other affection, for inflammation of the peritoneum extends more or

less to the cellular tissue immediately beneath it. Again, the lymphatics bear an important part in all inflammation of cellular tissue, and these communicate freely with the peritoneal cavity. Not only, therefore, does cellulitis usually extend to the peritoneal covering of the part immediately affected, but, especially when of septic origin, it is apt to kindle a peritonitis which passes beyond that limit. The terms are, therefore, to be applied, not in an exclusive sense, but according as the affection of one or other structure is predominant.

Very diverse opinions have existed as to the relation and relative frequency of pelvic peritonitis and cellulitis. It was formerly assumed by many authorities that, when a swelling was detected on vaginal examination the existence of cellulitis was established. It was proved, however, by Bernutz, from the evidence of numerous autopsies, not only that a localized swelling, tangible *per vaginam*, may be due to the effusion of lymph or serum and gluing together of intestines produced by peritonitis, but that this swelling may be situated at one side or in front of the uterus. Evidence derived from autopsy affords, however, no information as to the relative frequency of the two affections, since peritonitis is much more likely to prove fatal than cellulitis. Bernutz also went to an extreme in almost denying the occurrence of periuterine cellulitis, except in the form of phlegmon of the broad ligament. It is now, however, agreed by most authorities that, apart from parturition or abortion, or operations upon the cervix uteri, pelvic peritonitis is much more common than cellulitis, and that, in a large proportion of the cases which do not end in suppuration, inflammation of the peritoneum is the preponderating element. In many instances, however, the characters of the two affections are largely combined. The modern frequency of abdominal section in pelvic inflammation, and verification by this means of diagnosis made from physical signs, has led to much

greater certainty than formerly existed as to the interpretation of those signs.

PELVIC PERITONITIS, OR PERIMETRITIS.

Causation.—Pelvic peritonitis may originate by contiguity from inflammation of the uterus, ovaries, or Fallopian tubes, or may be secondary to cellulitis. It is frequently the sequel of suppression of menstruation, due to the effect of cold, in which case the primary condition is an acute or subacute endometritis and metritis, of which the arrest of menstruation is the consequence, while the inflammation extends along the Fallopian tubes to the adjoining peritoneum. Another frequent cause of inflammation spreading from the uterus along the lining membrane of the tubes to the peritoneum is gonorrhœa, whose frequency as a cause amongst all non-puerperal cases of pelvic peritonitis has been estimated as high as 50 per cent. Thus prostitutes almost invariably suffer, at some time, from this disease, which generally renders them permanently sterile. Next to gonorrhœa, septic endometritis, following parturition or abortion, appears to be the most common cause of a pelvic peritonitis which leaves a permanent adhesion of the Fallopian tubes as its sequel. Amongst other causes of pelvic peritonitis are replacement of the uterus by the sound, in some cases even the simple introduction of a sound which is not aseptic, the use of an intra-uterine stem pessary, applications to the interior of the uterus, and operations upon the body of the uterus. Peritonitis may also arise through septic absorption by the lymphatics, and thus may be the consequence of the use of tents, or operations upon the cervix or vagina; but, in this case, the inflammation is more likely to become general.

From menstrual disturbances pelvic peritonitis may result, not only through the medium of endometritis,

but by direct reflux of blood through the Fallopian tubes, when the outlet of the uterus is obstructed in consequence of stenosis or flexion, especially if menorrhagia co-exists. In the same way intra-uterine injections may be an exciting cause. Escape of blood or other fluid from any other cause, as from an early extra-uterine fœtation, from rupture of a vein, of an over-congested Graafian follicle, or of a cyst in the Fallopian tube or ovary, may equally set up peritonitis. External violence, cold, and sexual excess act mainly through the medium of the inflammation which they may produce in uterus or ovaries. In puerperal cases the starting point is usually an inflammation of the uterus or cellular tissue, due to a traumatic or septic cause, or a combination of the two. The peritonitis may, however, be kindled into activity by the effect of cold, of premature exertion, or of emotion. In other puerperal cases again, the peritonitis is part of a general peritonitis, due to some septic, zymotic, or other form of blood-poison. Ovarian tumours frequently set up peritonitis; fibroid tumours do so less frequently; cancer or tubercle of the uterus or ovaries is sooner or later accompanied by such a result. A pelvic peritonitis may also be a part of a general peritonitis not originating near the uterus, and may then lead to the same results with respect to the pelvic viscera as the localized disease. Thus the signs of pelvic inflammation may attract attention in cases of tubercular or cancerous peritonitis.

Pathological Anatomy.—In the active stage of inflammation, plastic lymph is poured out on the surface of the peritoneum, and leads to adhesion between the pelvic viscera. In acute cases there is also an effusion of serous, of sero-purulent, or, in the septic forms of peritonitis, of purulent fluid. In the majority of cases, however, the peritonitis is mainly or solely of the adhesive form. The semi-fluid lymph tends to gravitate into the pouch of Douglas, where it forms no tangible swelling so long as it remains fluid

and free, but is generally converted into a firm mass, fixing the uterus, as the lymph consolidates. Within spaces formed by adhesion between coils of intestine, or between intestines and other viscera, serum may be poured out in considerable quantity, and a limited and rounded swelling may thus arise, which sometimes very closely simulates a true cyst (*see* p. 373). This constitutes encysted perimetritis. Suppuration may also take place in similarly limited spaces, though much less commonly than in the case of cellulitis. The pus thus collected may remain quiescent for a considerable time, and rarely escapes into the general peritoneal cavity. As a rule, the abscess perforates sooner or later, opening in most cases into the rectum or sigmoid flexure. Perforation into the vagina is less common, and that into the bladder still more rare. Perforation on the external surface is also comparatively uncommon. When it does occur the most frequent site is the neighbourhood of the umbilicus. Sometimes the abscess opens at more points than one. In some instances, especially after labour, but much more rarely than in the cases of pelvic cellulitis, the inflammation may subside near the uterus, but at some more or less distant point go on to the formation of serum or pus, or the production of an apparent tumour by agglutination of intestines. This condition Dr. Matthews Duncan describes by the name of remote perimetritis. In the later stage of the more common affection, or adhesive peritonitis, the lymph becomes organized into bands of adhesion. As time goes on, after subsidence of the inflammation, these are generally partially absorbed, and become lengthened and attenuated, especially in those situations where most motion naturally takes place. Some degree of distortion and fixation of the parts involved is, however, generally permanent in some situations, especially about the Fallopian tubes and ovaries; hence sterility is a common sequel. The common effect of occlusion of the fimbriated extremity of the Fallopian tube has

already been described. The Fallopian tube, which was the source of the disease, often remains permanently in a morbid condition, either thickened, with an inflamed or hypertrophied lining membrane, or less frequently distended into a hydrosalpinx, pyosalpinx, or hæmatosalpinx. The uterus is apt to be fixed, temporarily or permanently, in any abnormal position it may have had at the outset of the inflammation, and it is also liable to distortion gradually produced by traction, in consequence of the shrinking of plastic lymph.

Results and Symptoms.—In the more acute forms of pelvic peritonitis, the symptoms resemble those of general peritonitis, and differ only in the fact that the pain and tenderness are more or less localized in the lower part of the abdomen, and that the general symptoms are less intense in degree. Frequently there is a rigor at the commencement, and pain may be severe at first, accompanied by extreme tenderness in the hypogastrium. The pulse becomes rapid, and acquires more or less of the peritonitic quality. There is often a considerable rise of temperature, but its elevation is generally less in proportion than that of the pulse, and sometimes even a normal temperature exists in severe septic forms of inflammation, so that the temperature alone is an unsafe guide as to severity. Frequent micturition, with severe vesical tenesmus, is a common symptom. The bowels are usually constipated (except in septic forms of general peritonitis), and there is much pain on defecation. The abdomen is frequently tympanitic, and it is not uncommon to find a transient tenderness over its whole surface, which may shortly subside, and leave only localized symptoms. Rigidity of the abdominal muscles over the region of tenderness is almost invariably present. In the more severe forms of inflammation, nausea and vomiting are common, and the features become pinched and anxious.

Cases of adhesive peritonitis, however, are not

infrequent in which the inflammation is chronic and almost latent from the first, especially when the exciting cause is some continuous, but not very intense, source of irritation, such as endometritis or ovaritis, or when the attack is a recurrence of some old-standing inflammation. This may happen even in the gonorrhœal form of the disease, although, under such circumstances, the attack is commonly more acute. In the chronic cases the symptoms are extremely insidious, and the patients may go about their occupations as usual, suffering only from a gradually increasing pain in hypogastric or inguinal regions. In some instances, the only complaint made is that of bladder irritation, although, on examination, the whole pelvis is found to be filled with inflammatory induration. The pulse, in these cases, is usually found to be rapid, often from 100 to 120, although elevation of temperature may be slight or absent.

The sequelæ of the disease are of an extremely chronic kind, and those who have once suffered from it are generally liable to relapse on slight provocation, especially from the effect of cold, or imprudence at menstrual periods. In many cases the uterus eventually recovers its mobility, and almost all remnant of swelling in the pelvis disappears. When, however, the whole roof of the pelvis has become hardened into a board-like mass, and no sign of commencing absorption appears within the first few months, this condition may remain a permanent one. More frequently a swelling permanently remains posteriorly on one or both sides, consisting of tube and ovary matted together by inflammation, with or without distension of the tube by serum or pus. Years may elapse before the utmost degree of relative cure which can be hoped for is attained, and patients may remain invalids for, at any rate, the remainder of the period of active sexual life. After an attack of peritonitis, the recurrence of menstruation is frequently deferred. The ensuing period is apt to rekindle inflammation,

but, if this does not happen, it is often followed by relief. Protracted, or even permanent amenorrhœa, or scanty menstruation, is, however, a frequent sequel. Dysmenorrhœa is also commonly produced from the interference with the functions and vascular supply of uterus, tubes, and ovaries caused by the adhesions.

Diagnosis.—In the more acute forms of the affection, the symptoms readily show the existence of peri-uterine inflammation, and the chief point of difficulty is to determine whether peritonitis or cellulitis is the main element. Assistance may be derived from the consideration that, when there has been no antecedent parturition, abortion, or operation on the cervix, and when the exciting cause lies in the body of the uterus, ovaries, or Fallopian tubes, rather than in the cervix, especially if that cause be gonorrhœa, the inflammation is more likely to be peritonitic. In peritonitis, also, tenderness is more acute, and vomiting and other symptoms pertaining to the digestive functions are more likely to be prominent than in cellulitis with little or no complication of peritonitis. In cellulitis, on the other hand, the initial rigor and elevation of temperature are more marked, in proportion to the other symptoms. In cellulitis the patient may lie with one leg flexed, in peritonitis both legs will be flexed, if the inflammation is severe.

On vaginal examination in the earliest stage, while the exudation is still fluid, merely tenderness and slight increase of resistance will be discovered around the cervix. The uterus will be very tender on pressure, and still more so on displacement. After consolidation of the exudation, one of two conditions may be found :—

(1) In the first, the inflammation, while limited to the pelvis, is general throughout that region. This constitutes the most typically recognizable form of pelvic peritonitis. The cervix uteri is then central, or slightly pushed forward, low down in the pelvis, and firmly fixed, not displaced to either side. Induration

extends all round it, and forms a complete roof to the pelvis, of uniform hardness, feeling as if plaster of Paris had been poured into the pelvis, around the uterus. At the posterior part, where lymph gravitates into the pouch of Douglas, it descends somewhat lower, and forms a more distinct mass. The recognition of the lower margin of this on rectal examination as a transverse ridge, at about the level of the external os, is very characteristic. The posterior vaginal fornix is thus depressed. The lateral fornices may also be depressed, but in less degree. Frequently the ovary and tube on one or both sides can be recognized as forming a focus of inflammation, felt as a lump in one or both posterior quarters of the pelvis, behind the plane of the broad ligaments. The induration can be reached from above the pelvic brim, but does not form an apparent tumour rising into the abdomen, or extending into the iliac fossa, nor does it descend so low upon the vaginal walls as that formed by cellulitis sometimes does. On rectal examination, the transverse ridge already mentioned, corresponding to the pouch of Douglas, can be felt, but the upper limit of the induration can scarcely be reached. If there is accompanying parametritis, the induration may extend at the sides of the rectum to the pelvic wall.

(2) The second, but much rarer condition is that of encysted perimetritis, which may extend or not above the pelvic brim. Serum or pus is poured out into a space surrounded by adherent intestines, and a cystic tumour may thus be simulated. If the adherent intestines contain impacted fæces, the tumour may appear to have solid portions, and the same impression may be given by indurated lymph felt *per vaginam* at its base. The commonest situation for encysted peritonitis is behind the uterus. The uterus is then pushed forward and upward, and a swelling may be formed which can be felt above the pelvic brim lying behind the fundus uteri. The physical signs are then very similar to those of retro-uterine hæmatocele. If the swelling

does not descend into the pouch of Douglas, or push the uterus forward, but is situated elsewhere, the resemblance may be rather to an ovarian cyst, complicated by inflammation. The swelling due to encysted perimetritis may generally be distinguished by its fixity, and by the history of its first appearance after the onset of acute inflammatory symptoms. It may rise as high as the umbilicus, and is often nearly central, while the swelling produced by parametritis is generally on one side, tending toward the iliac fossa, and rarely rises more than two or three inches above Poupart's ligament.

Other varieties of plastic perimetritis occur, in which the uterus is not symmetrically situated, but the inflammatory mass is more on one side, and the uterus is pushed in the other direction. This is especially the case, when the perimetritis is associated with a distended tube, or a small ovarian cystoma. Such a form of perimetritis is distinguished from parametritis by the fact that the main lump is not in the broad ligament but generally behind it, and does not extend to the pelvic wall as in parametritis.

A peritonitis affecting the pelvis which forms a part of cancerous or tubercular peritonitis, or originates in perityphlitis, is distinguished by recognition of the signs of the primary disease. An induration produced by diffused cancer of the pelvis may closely resemble that of pelvic peritonitis, and may be only distinguishable by the amount of cachexia present, and by the course of the case, especially by the absence of inflammatory symptoms at the outset, and a downward course afterwards. The diagnosis may be assisted by the age of the patient, and sometimes by the detection of nodular masses, like enlarged and indurated glands, or outlying portions of growth, to be detected especially on rectal examination. The discovery of the slight increase of resistance or diminution of mobility of the uterus, which may be the sole remnant of a bygone pelvic peritonitis, often requires a highly practised touch.

Treatment.—In the acute stage, when pain is severe, provided that the patient is not already anæmic, from six to twelve leeches may be applied to the groin or hypogastrium. Perfect rest is to be maintained, and hot linseed poultices or fomentations kept applied to the abdomen. Some prefer the plan of making a cold application at the outset, by means of an iced-water coil over the abdomen; but this is not so effectual in relieving pain. Sufficient opium or morphia should be given to keep the pain in check, and may conveniently be administered by the rectum or subcutaneously. Care should be taken not to cause, by means of the opiates, a fæcal accumulation, which leads to increased pain. An evacuation of the bowels should be secured every other day at least by gentle laxatives or enemata. Opinions differ widely as to the use of mercury. It appears to be of little value as an antiphlogistic in the early stages, but in severe prolonged cases, not of a septic or purulent character, it may be tried if the disease appears not to yield to other remedies, care being taken to keep short of salivation, and not to act upon the bowels. The plan adopted by some is to give three grains of hydrargyrum cum cretâ, with five grains of Dover's powder, in pill or powder two or three times a day. It is generally preferable, however, to use the mercury locally in the form of ointment, equal parts of mercurial ointment and belladonna ointment being applied on lint over the seat of inflammation. It is recommended by Dr. Thomas that all other drugs should be avoided, and opium or morphia given in large and repeated doses, frequently as much as half a grain of sulphate of morphia being administered every two or three hours for a considerable time. Milk and beef-tea may be given as diet, ice being added to the former, if vomiting is urgent. Vomiting is often relieved in these cases by subcutaneous injection of morphia. The treatment of severe septic forms of inflammation has been considered under the head of metritis (*see* p. 207).

In less acute forms of pelvic peritonitis, opium or morphia in smaller doses may be given at first in combination with salines, as citrate and nitrate of potash, or acetate of ammonia. In the later stage, iodide of potassium, in doses of from five to ten grains, is useful as an absorbent, and may often, with advantage, be combined with quinine or other tonic. After all febrile symptoms have passed, absorption is not promoted so effectually by the administration of any drug as by securing the best possible condition of general health, and by all ordinary means which tend to promote the activity of processes of nutrition. Small doses of perchloride of mercury may, however, in some cases be tried (*see* formula, p. 254), since this drug appears to be much more effective as an absorbent, in removing inflammatory products, than as an antiphlogistic during the acute stage of inflammation. As the inflammation is subsiding, repeated counter-irritation is of great value. Vesication by blistering fluid, over a surface about four inches square, may be repeated at intervals of about ten days, or a blister may be kept open by savine ointment. A milder remedy is the linimentum iodi, painted daily over the same surface, as long as the skin will tolerate it. Absorption is also stimulated by hot vaginal injections or irrigations, used in the manner previously described (*see* p. 223). The heat should be moderate at first, and should be increased gradually up to about 115° F. Hot hip-baths, or, still better, whole-baths, are also of value, and are efficacious to relieve pain. When the absorption of inflammatory material does not proceed satisfactorily the use of salt water often proves efficacious, from its greater stimulating power.

When a case has reached the chronic stage, or is chronic from the commencement, complete confinement to bed is not advisable. Sufficient air and exercise to maintain the general health should be allowed, especially carriage exercise, if the motion can be borne without pain. A large amount of rest, however, should be

taken in the horizontal position, and cold or exertion should be specially avoided at menstrual periods. Marital intercourse is to be forbidden in acute stages or while it produces pain, and should be greatly restricted for a long period. It is not, however, always desirable to prohibit it entirely, especially if there is any ovarian engorgement or inflammation, such as often results from the hindrance to the function of the ovary produced by adhesions. Recurrent pain, accompanied by tenderness of the uterus, may be relieved by hot water irrigations, or by a few leeches applied occasionally to the cervix. At this stage tonic treatment, especially the administration of iron and quinine, is beneficial, and change of air, or a seaside residence, often proves useful. If relapses are found to occur from the effect of cold, spending the winter in a warm climate is to be recommended. Iodine waters, such as those of Kreuznach or Woodhall Spa, are often found efficacious in promoting absorption.

An abscess should not generally be opened until it is clear in what direction it is tending, spontaneously, to point. The most favourable condition for opening an abscess *per vaginam* is that in which a swelling is felt behind the cervix, and in which the constitutional signs indicate the probable formation of pus. The presence of pus is first verified by an aspirator needle or small trocar. Then a small incision is made through the vaginal wall; a grooved director is pushed into the abscess, and the opening is enlarged by introducing a pair of dressing forceps and separating the blades, according to the method recommended by Hilton for the evacuation of deep abscesses. If the discharge becomes offensive, or signs of constitutional irritation continue, a drainage tube should be introduced, and the cavity washed out regularly with a weak solution of iodine (Tr. Iodi ʒj. ad Aq. Oj.).

If an abscess is pointing externally it should be opened antiseptically, and a drainage tube inserted according to Lister's method, the end of the tube

being cut off level with the skin, and secured by two loops of carbolized silk, passed through the end of the tube, and laid flat upon the skin beneath the gauze dressings. If an abscess has spontaneously opened externally, or has been opened without antiseptic precautions, and pus continues to be poured out from an extensive cavity, a large drainage tube should be inserted to the full depth of the cavity. The end of the drainage tube may be immersed in carbolic lotion, and the cavity may be washed out by means of a funnel with a weak solution of iodine (Tr. Iodi ʒj. ad Aq. Oj.) or sulphurous acid (Acidi Sulphurosi ʒij. ad Aq. Oj.). Antiseptic dressings may be used, although it is difficult to render aseptic a large and irregular cavity. Carefully adjusted pressure by pads of cotton wool may assist in causing the cavity to close. If the abscess-cavity is found to descend close to the vagina, it may in some cases be desirable to make a counter opening at its lowest point by cutting from the vagina upon the point of a probe passed into the abscess. This should not, however, be done until the plan of using a large drainage tube and antiseptic irrigation has had a full trial.

In encysted serous perimetritis, it is generally better to leave the serum to be absorbed spontaneously. Sometimes, however, the constitutional symptoms produced are very marked, and may simulate those of abscess. Unfavourable results have sometimes followed the use of an aspirator. It appears to be better, if a puncture is made at all, to follow it up by making a free opening, and washing out the cavity by means of a drainage tube if necessary. Thornton advises puncture by Cock's trocar with immediate washing out.

The chronic effects of pelvic peritonitis, consisting of adhesions around the Fallopian tubes and ovaries, and, in some cases, distension of the Fallopian tubes by serum or pus, have of late been treated in many cases by abdominal section and removal of the uterine appendages. The operation has already been discussed

and described under the head of diseases of the Fallopian tubes. Simple matting of the tubes by adhesion is commoner as a sequel of pelvic peritonitis than distension of the tube, and, unless the distension is considerable, it is not always possible to ascertain, without an exploratory operation, whether there is distension or only adhesion. Even when there is no distension, the operation for removal of the uterine appendages is justified in some cases. If, however, there is very general and firm adhesion of uterus and intestines, indicated by a firm induration of the whole of the pelvic roof, felt on vaginal examination, it may be difficult or impossible, even for an experienced operator, to separate and remove the tubes and ovaries. For the pelvis may be found covered in with adherent intestines, so that even the uterus cannot, without great difficulty, be reached as a guide. The operation should not be performed on account of the effects of a single and recent attack of pelvic peritonitis, for a great if not an absolute degree of cure may be attained spontaneously in course of time. It is chiefly indicated in cases in which a patient has been an invalid for years, or suffers repeatedly from recurrent attacks of pelvic peritonitis, in which the symptoms are distinctly aggravated by menstruation, and in which a lump, more or less fixed, can be felt in the situation of tube or ovary. It is to be remembered that the intestinal and other adhesions resulting from pelvic peritonitis may be a source of considerable pain, especially in neurotic subjects, even after the removal of tubes and ovaries.

PELVIC CELLULITIS, PERI-UTERINE CELLULITIS, OR PARAMETRITIS, WITH PELVIC LYMPHANGITIS.

Causation.—The chief causes of pelvic cellulitis are parturition, abortion, applications of caustic to, or operations on, the cervix uteri or vagina, inflammation

of the uterus, especially the cervix uteri, and inflammation of the ovaries or Fallopian tubes. In a very large proportion of cases the cause is parturition, and the mode of origin may then be, in whole or in part, directly traumatic, from the pressure and bruising to which the cervix and cellular tissue are exposed, or from lacerations of the cervix. Thus puerperal cellulitis is much more common on the left side, on account of the usual direction of the occiput toward the left and the common deviation of the fundus uteri toward the right, both which causes tend to make the pressure greater on the left side of the pelvis. In the majority, however, both of puerperal and non-puerperal cases, the main element is septic absorption from some cut or lacerated surface, or from an abrasion, such as may be produced by the use of tents. Not only the loss of epithelium, but the injury to the tissues predisposes to septic absorption. For the damaged tissue, having its vitality lowered, does not, like healthy tissue, resist the entry and multiplication within it, even of organisms which may be generally or frequently present in the lochial or vaginal discharge. Thus an inflammation set up mechanically by very difficult instrumental delivery often acquires a more or less septic character, apart from any special conveyed contagion. The determining cause of the acute outbreak of inflammation is often the effect of cold, mental emotion, or premature exertion after parturition, or after some operative interference. Cellulitis may result from menstrual disturbances, but much less frequently than peritonitis; and, when it does so, it is probably for the most part by extension of inflammation from the ovaries or Fallopian tubes into the adjoining tissue, while there is commonly a complication with a notable degree of peritonitis. Cellulitis may also be set up by sexual excess or external injuries, especially if any previous disease of the uterus or its appendages exist. A similar inflammation of cellular tissue, again, may take its origin from cancerous or

syphilitic ulceration of rectum or vagina, or from disease of the bladder.

Pathological Anatomy. — Pelvic cellulitis is an inflammation or phlegmon of the areolar tissue in the pelvis, in the vicinity of the uterus or its appendages. This areolar tissue is most abundant in the broad ligaments. It also exists in plenty in front of the lower half of the uterus between it and the bladder, for a smaller space at the posterior part of the cervix (*see* Fig. 2, p. 6), as well as around the vagina, bladder, and rectum, and in the sheaths of the psoas and iliacus muscles and the muscles of the abdominal wall. Between the uterus and its peritoneal covering at front and back, areolar tissue is so scanty that cellulitis can scarcely occur there. The term "peri-uterine cellulitis" has been used in a sense limited to inflammation, immediately adjoining the uterus at its sides, front, or back. An abscess after parturition, however, may appear at a distance from the uterus, as in the groin or abdominal wall, while no remnant of inflammation can be detected round the uterus, and the wider term of "pelvic cellulitis" or "parametritis" therefore appears preferable. Those cases, however, are to be distinguished in which inflammation merely extends into the pelvis from outside, as in a psoas abscess.

In the majority of cases, especially those of puerperal origin, the inflammation is chiefly situated in one or the other broad ligament, whence it tends to spread into the iliac fossa, and along the sheaths of the muscles to the groin and the adjoining portions of the abdominal wall, the peritoneum being stripped up from the psoas and iliacus muscles by the inflammatory products. This form of cellulitis has been distinguished by the name of "*phlegmon of the broad ligament.*" In other cases, however, especially those arising from lesion of the cervix, the tissue in front of, or behind, the uterus may be chiefly or solely affected, and the inflammation may also descend along

the walls of the vagina or rectum, or may occupy chiefly the tissue at the base of the bladder.

Since septic absorption is so generally an element in cellulitis, the lymphatic vessels play an important part in it, as in all inflammations of cellular tissue. In some cases enlarged lymphatic glands in the pelvis may be detected as rounded masses in the midst of inflammatory thickening, and these may form foci of inflammation or abscess formation.

In the earlier stages of cellulitis a swelling is produced by effusion, first, of serum, and, secondly, of lymph in addition to serum, into the areolar tissue. This may end in resolution, or in the formation of an abscess, which is a much more frequent result than in peritonitis. It is commonest in puerperal cases, and has been estimated by some authorities as occurring in more than 50 per cent. of these; but this is probably too high an average, if mild as well as severe cases are included. By far the most frequent spot for the abscess to open is the groin or iliac region, most frequently above Poupart's ligament, the pus generally making its way mechanically along the course of the psoas and iliacus muscles. It may also open externally above the pubes, beside the anus, or, very rarely, pass through the sciatic or obturator foramen. Internally, discharge into the rectum and that into the vagina are about equally common; that into the bladder is also frequent, but rather less so. Discharge into the peritoneal cavity is fortunately very rare. Internal evacuation is commoner in non-puerperal cases, in which the abscess is generally nearer to the uterus, or, in rare instances, it may be situated between uterus and bladder.

The following are other varieties of parametritis less common than the ordinary :—

Remote Parametritis.—When an abscess resulting from parturition appears at a distance from the uterus, as in the inguinal canal, in the sheaths of the abdominal muscles, or near the sacro-iliac joint, and the vicinity of the uterus is found free, the explanation is,

probably, for the most part, that the inflammation has terminated in resolution near the uterus, and has proceeded to suppuration at a distant point only. In some cases, however, the distant abscess may be due to conveyance of septic material by lymphatics, without any perceptible intermediate inflammation. To this manifestation of inflammation at a distant point, which is not extremely uncommon, Matthews Duncan has given the name of remote parametritis.

Bilateral Parametritis.—This may result after parturition from absorption at lacerations on both sides of the cervix, but it is more frequently due to tubal inflammation on both sides with perimetritis. The uterus is central or nearly so, and the swelling occupies both broad ligaments.

Posterior Parametritis.—This form is also generally secondary to tubal inflammation. It involves especially the tissue around the utero-sacral ligaments, and leads eventually to contraction of these, dragging of the centre of the uterus backwards, and sometimes anteflexion of the uterus in consequence. While the exudation is present it may be felt from the rectum as a horizontal shelf running backward on one or both sides to the pelvic wall.

Anterior Parametritis.—In this form the inflammation extends from the anterior parts of the broad ligaments to the cellular tissue surrounding the bladder and lying behind the pubes. A swelling may be formed rising two or three inches above the pubes, and extending all across the hypogastrium. If suppuration occurs the abscess generally opens externally above the pubes, or into the bladder.

Results and Symptoms.—The onset of the disease is acute in the great majority of cases, and a decided rigor and elevation of temperature (often reaching or exceeding 103° or 104°) more generally occur than in the case of pelvic peritonitis. The fever is accompanied or quickly followed by pain, which is not always very acute, and often depends in great measure

upon implication of the peritoneum. Vesical tenesmus and pain on defecation are frequently added. If menstruation is present at the time of onset, the flow may be increased, except in cases in which the inflammation is complicated by any considerable degree of acute endometritis or metritis, the effect of which is usually to arrest either the lochial or the menstrual discharge. In some puerperal cases the inflammation commences more gradually, and is only kindled into activity after the patient leaves her bed. More rarely the symptoms are limited to slight pelvic pain, and trouble in micturition, with feverishness and debility, and the exudation may only be discovered on examination at a considerable interval after delivery. More frequently a swelling appears within a few days in the groin or iliac region, or extending to the hypogastrium. Flexion and abduction of the thigh, which are often enforced in consequence of the pressure of the exudation, are characteristic symptoms. In the course of a few weeks, in the majority of cases, the disease either ends in suppuration, or resolution has commenced. Thickening in the cellular tissue, however, is only slowly absorbed, and a certain amount of induration may be permanent. Lameness on the affected side is often slow in disappearing. The uterus may be drawn to one side by contraction of the inflamed tissue in a late stage; but complete fixation of the uterus, with sterility, and other permanent sequelæ, when they occur, are commonly due to associated peritonitis. Suppuration probably most frequently commences within a few days, when it takes place at all, but the period of bursting of the abscess commonly varies from two weeks to three months.

Thrombosis of the veins is a common result of inflammation in the cellular tissue surrounding them, and involves a risk of pulmonary embolism. This is one reason why protracted rest should be enforced after even a slight attack of cellulitis. If thrombosis extends to the iliac or femoral veins and lymphatics,

phlegmasia dolens may be a sequel, especially in puerperal, but sometimes also in non-puerperal cases. In some instances an abscess burrows extensively in the pelvic cellular tissue. Suppuration may then be protracted, especially if the abscess opens by a long fistulous track, or an opening exists in two directions simultaneously. The patient may thus be greatly reduced by hectic fever, and even a fatal result follow. In very rare cases there is extensive sloughing of areolar tissue. From such a cause, fatal hæmorrhage into the abscess-cavity has sometimes occurred. The mortality, however, of uncomplicated pelvic cellulitis is in general small, and much less than that of pelvic peritonitis.

Diagnosis.—In the typical form of pelvic cellulitis, namely, that of phlegmon of the broad ligament, in which the cellular tissue of the broad ligament is the chief focus of inflammation, the diagnosis is generally easy. On vaginal examination, a considerable and immovable swelling, shading off into the pelvic wall, is felt on one side of the cervix, and rather low down. The cervix itself is pushed toward the opposite side, and its mobility, although diminished, is often not entirely destroyed. Some thickening may also extend round the front and back of the uterus, but, in general, one lateral vaginal fornix only is depressed. The lateral swelling can be reached by the external hand above the groin, and on bimanual examination is felt as a considerable mass between the fingers. The thigh on the affected side is frequently retracted. Unless the extent of inflammation is very limited, it forms a swelling in the inguinal and iliac region either prominent and readily tangible, or, at any rate, sufficient to give rise to a feeling of resistance, and partial or complete dulness on percussion. A cellulitic swelling, however, rarely extends higher than two or three inches above Poupart's ligament, or is liable to be mistaken for a tumour, except in the rare case of a large abscess between uterus and bladder, which may

rise as high as half-way between pubes and umbilicus. For the differential diagnosis of a swelling in the abdomen due to peritonitis, *see* p. 421. The symptom of retraction of the thigh, with pain upon any attempt to extend it, may persist for a long time after delivery, and may be the only local sign to indicate the presence of inflammation or abscess about the psoas and iliacus muscles, when no swelling can be detected.

The swelling is somewhat wedge-shaped, with the broad end outward, reaching to the pelvic wall, and corresponding to the shape of the broad ligament. At the height of the exudation it is convex in all directions. As absorption is commencing it may become flattened, or angular, or even concave, as felt from the vagina.

If an examination is made months or years after, when absorption has taken place, the uterus will probably be found somewhat drawn toward the affected side, and often a thin cicatricial band will be felt, running to the pelvic wall, and starting from the angle of the laceration, which was the starting point of inflammation.

The special characters of bilateral, posterior, and anterior parametritis have been already mentioned.

From a fibroid or ovarian tumour, a cellulitic swelling is distinguished by its fixity, and by the fact that no sign of tumour had existed before the onset of inflammatory symptoms. For the differential diagnosis of extra-uterine fœtation, *see* p. 376, and for that of hæmatocele, *see* p. 442.

Treatment.—The local and general treatment is similar to that of pelvic peritonitis (*see* p. 424). The use of leeches is, however, less frequently desirable, since the affection often occurs from a septic cause in anæmic patients, or those debilitated by hæmorrhage. If used at all, they should only be employed quite at the onset. From the frequent presence of a septic element, quinine, or other internal antiseptic, in large doses, combined with opiates, is often given with advantage until the temperature is reduced.

For opening an abscess it is not necessary to wait until there is reddening of the skin or distinct pointing, but only until it is clear in what direction the abscess is tending, and there is sufficient swelling and induration to make it clear that the peritoneum will not be opened. Delay beyond this point only allows the abscess to burrow more extensively. The most usual spot is about an inch or an inch and a half above the centre of Poupart's ligament. The presence of pus should first be verified by the hypodermic syringe. Then an incision is made through the skin, the abscess is opened, according to Hilton's method, by director and dressing-forceps, the finger is passed in to make sure that the opening is free, a good-sized drainage tube is introduced, and antiseptic dressings are applied.

When the pointing takes place by vagina or rectum, artificial evacuation requires more caution, and is more frequently superfluous. If a distinctly fluctuating spot is felt from the vagina, aspiration with a fine trocar may first be employed, and a larger opening made if pus is found. The incision should be made in the manner already described for the case of a peritonitic abscess (*see* p. 426). If the abscess fails to close for a long period, and a large abscess-cavity is found to exist, it should be treated by the use of a large drainage tube, antiseptic irrigation, and pressure as already described (*see* p. 427) ; or in exceptional cases a second opening may be made at the most dependent point.

Some authorities have recommended puncture by an aspirator or small trocar, as soon as the formation of pus is suspected. Such a puncture, however, rarely evacuates the whole of the pus, or averts the further formation of pus, and subsequent discharge. In general it appears to be better to wait until the puncture can be immediately followed up by making a free opening.

Lawson Tait and others have treated some cases of pelvic abscess by abdominal section, opening the abscess from above, free washing out, stitching the opening in the abscess to the abdominal wound, and placing a

glass drainage tube in its cavity. For such treatment, the abscess should extend above the brim, so that it may be possible to bring the opening in it into contact with the parietal peritoneum. Only an operator experienced in abdominal surgery should venture on this proceeding.

PELVIC HÆMATOCELE.

By pelvic or peri-uterine hæmatocele, in its wider sense, is understood a limited collection of blood wholly or partially in the pelvis, and contained within the peritoneal cavity. An effusion of blood while still free within the peritoneum should not receive the name of hæmatocele, though its causes may be the same, and though it may form an antecedent stage to that affection. The term hæmatocele was formerly extended also to an effusion of blood into the cellular tissue, but the name of *pelvic hæmatoma* is now commonly applied to this.

Causation.—As regards the *immediate mechanism* of hæmatocele the following causes have been assigned—(1) Reflux of menstrual blood through the Fallopian tubes, due either to atresia or obstruction of the cervix or vagina, to a morbid condition of the tubes themselves, or to excessive menstruation; (2) excessive hæmorrhage on rupture of a Graafian follicle; (3) rupture of a vessel in the broad ligament or elsewhere; (4) hæmorrhage from inflamed peritoneum, or from vascular pseudo-membranes; (5) hæmorrhage from the lining of a diseased Fallopian tube, generally dilated, but with open ostium; (6) rupture of a cyst in the ovary or broad ligament; (7) rupture of a hæmatosalpinx; (8) rupture of the sac of an early extra-uterine fœtation, or a fœtation in a rudimentary uterine cornu. Of these the first five are generally menstrual forms of hæmatocele.

The results of recent abdominal surgery appear to show that, in retro-uterine hæmatocele, the cause is,

more frequently than had been supposed, the rupture of an early extra-uterine fœtation. The bleeding may be due either to primary rupture of the tube, or to secondary rupture of the sac, after the tube has already ruptured into the broad ligament and formed an intra-ligamentous fœtation. In the extra-peritoneal variety, or pelvic hæmatoma, the mechanism is generally that of the rupture of a vessel, either into the surrounding tissue, or into a pre-existing cyst. This, like the first five varieties of the intra-peritoneal effusion, is generally a menstrual form of hæmatocele. It may also arise from an early tubal fœtation, ruptured into the broad ligament.

Some of the causes above given have been accepted rather on *à priori* grounds, and are perhaps open to doubt. The following, besides extra-uterine fœtation, have been demonstrated on abdominal section—hæmorrhage from inflamed peritoneum, as a complication of perimetritis; hæmorrhage from the lining of a dilated Fallopian tube without any evidence of tubal gestation. In some of the latter cases it is very difficult to determine whether there has been a tubal gestation or not.

The *predisposing causes* are the presence of menstruation; active or passive hyperæmia of the uterus and adjoining parts, by whatever cause produced; previous disease within the pelvis, especially pelvic peritonitis, obstruction of the cervix uteri or vagina, morbid conditions of the Fallopian tubes or ovaries, or varicose distension of veins; the hæmorrhagic diathesis; and diseased conditions of blood, such as those produced by zymotic diseases, jaundice, purpura, or scurvy.

The *exciting cause* is most frequently external violence; muscular strain; coitus, especially during menstruation, or the effect of cold or mental emotion in producing a sudden increase of hyperæmia during the same condition. When the bleeding results from extra-uterine fœtation, the immediate cause of the rupture is often some slight strain or exertion.

Pathological Anatomy.—Pelvic hæmatocele is not

excessively rare, but yet undoubted instances of it form a very small proportion to cases of pelvic cellulitis or peritonitis. In the great majority of fatal cases in which an autopsy has been made, the effusion of blood has been reported as being intra-peritoneal, although it has often proved extremely difficult to determine positively the true position of the peritoneum. Again, when an effusion of blood has been found on abdominal section, it has been intra-peritoneal in the majority of cases. It is probable that, in a considerable number of cases which are not distinguished from pelvic cellulitis or peritonitis, the starting point of inflammation may have been a slight or moderate effusion of blood. On the other hand, retro-uterine hæmatocele is apt to be diagnosed, when the real condition is serous perimetritis, or perimetric abscess, forming a swelling behind the uterus.

Blood effused into the peritoneal cavity tends to gravitate into the retro-uterine fossa, but does not form a tangible swelling there while it remains fluid. When clotting has taken place, there may be a mass to be felt behind the cervix; but the uterus will not be displaced more than it is when the lymph effused in pelvic peritonitis gravitates into the same position. An induration of this kind, but no more, may be formed by gravitation into the pelvis of blood effused, not within the pelvis itself, but elsewhere in the peritoneal cavity. When, however, the amount of blood effused is not sufficient to cause death, it is soon enclosed by false membranes, which separate it from the intestines which it has displaced from the retro-uterine fossa. If further hæmorrhage now takes place within the enclosed space, the uterus is pushed forward and upward, the rectum flattened against the sacrum, and a retro-uterine tumour formed, which may extend upward as high as the umbilicus (Fig. 138, p. 440). This condition, which constitutes the most typical and recognizable form of hæmatocele, and the one which specially deserves the name of retro-uterine hæmatocele,

thus implies, in most cases, either a slow and gradual hæmorrhage or one repeated at intervals. A similar result is produced if the primary hæmorrhage is the sequel of pelvic peritonitis, and takes place into a space limited by previous adhesions.

An intra-peritoneal hæmatocele situated in front of

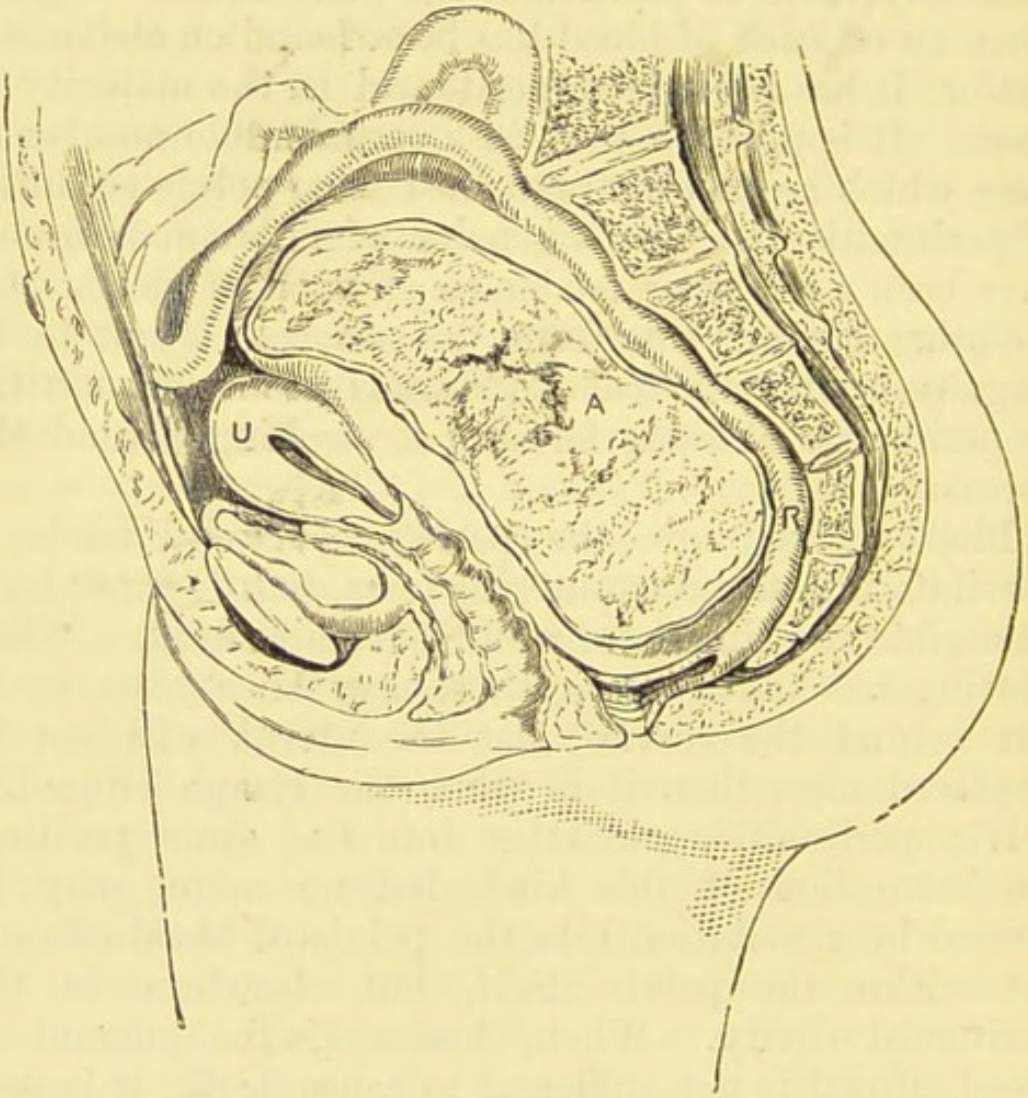


Fig. 138.—Retro-uterine Hæmatocele (after BARNES). U, The uterus pushed forward. A, The hæmatocele filling the cavity of the sacrum, bounded above by plastic effusions and the small intestines. R, The rectum compressed by the hæmatocele.

the uterus has occasionally been observed, but it is scarcely possible for it to be confined to that position, unless the retro-uterine fossa has previously been occluded by false membranes.

Results and Symptoms.—In a marked case of hæmatocele of the menstrual variety, where the effusion

of blood is considerable, a patient, generally during a period of profuse menstruation, and often from the effect of one of the exciting causes before mentioned, is suddenly attacked by pain, which is quickly followed by faintness, and often collapse, with nausea or vomiting. The loss of blood may be sufficient to produce pallor. The external menstrual hæmorrhage is generally considerably diminished, or may be arrested altogether, although frequently it continues to some extent. In other cases, the onset of the attack takes place while menstruation is imminent, or after its suppression, or after partial or temporary suppression, from the effect of cold or emotion, or from early pregnancy. After a while, symptoms of pressure in the pelvis arise—a feeling as of the presence of a foreign body—with vesical and rectal tenesmus. A swelling may also appear in the hypogastrium, and extend upward toward the umbilicus. At first the temperature may be subnormal, but within two or three days a febrile reaction generally occurs, with symptoms of pelvic or general peritonitis, which may be of greater or less intensity. When, however, the hæmorrhage is slight or gradual, the onset of the attack may be little marked. When the cause is a rupture of the sac of an extra-uterine fœtation, the occurrence more frequently takes place apart from menstruation, and the signs of hæmorrhage are generally more severe. In most cases, there will have been a cessation of menstruation for a short time, with general signs of pregnancy, followed perhaps by irregular bleeding and pain, with possibly the passing of a decidual membrane.

A recurrence of hæmorrhage at succeeding menstrual periods is not infrequent, and in this way the tumour may undergo repeated increase in size; otherwise it diminishes and becomes harder by absorption of the serum. Sometimes its contents again become softened in consequence of decomposition or suppuration, and constitutional symptoms of septicæmia may then super-

vene. In some cases spontaneous evacuation, before or after suppuration, takes place by rectum, or, more rarely, by vagina. In others the tumour becomes very slowly and gradually absorbed. In rare cases rupture into the general peritoneal cavity occurs. Death may occur from this cause, or from septicæmia or peritonitis; and the prognosis is always grave when the effusion is of enormous size or when decomposition takes place in it.

Diagnosis.—The diagnosis is easy in a typical case of retro-uterine hæmatocele when the onset has been sudden and well marked. A characteristic history, such as that already described, and a recently acquired appearance of anæmia, afford valuable evidence. On vaginal examination a large mass is felt, pressing down the recto-vaginal septum by distension of the pouch of Douglas, and encroaching upon vagina and rectum. The cervix is displaced forwards, and generally upwards, much more considerably than is usual in pelvic peritonitis or cellulitis, except in the case of encysted perimetritis behind the uterus. The fundus uteri is pushed forward against the abdominal wall, so as to be much more readily tangible than usual (*see* Fig. 138, p. 440). On bimanual examination, a mass is felt behind, and generally above, the fundus uteri, continuous with that behind the cervix, and sometimes reaching as high as the umbilicus. Such a tumour may be recognized within two days of the first hæmorrhage. The mass is at first somewhat soft and yielding, but becomes gradually very hard and nodular, though it may afterwards again soften. It may generally be distinguished from an ovarian or fibroid tumour behind the uterus by its being more irregular and less globular, as well as by the history.

When the history is not clear, when the amount of effusion is moderate, or when the case is only seen at a late period, there may be much difficulty in distinguishing hæmatocele from other masses which may exist behind the uterus. Such masses may be formed

by a retroflexed fundus uteri, pregnant or not, by pelvic peritonitis or cellulitis, especially by a perimetric abscess, or serous perimetritis, fibroid tumours, ovarian tumours, parovarian cysts, hydatid cysts, dermoid tumours, extra-uterine fœtation, a distended Fallopian tube, malignant disease, outgrowths from the pelvic wall, or fæcal accumulations. The distinction is most likely to be difficult between hæmatocele and perimetric effusions, cystic or dermoid tumours of the ovary, fibroid tumours, or extra-uterine fœtation. The sudden appearance of the tumour of hæmatocele is its chief distinction. For the distinctive signs of extra-uterine fœtation, *see* p. 376. In estimating the value of enlargement of the uterus as a sign of this affection, it must be remembered that a uterus may be elongated when adherent to a hæmatocele. A retroflexed uterus will be distinguished by bimanual examination and the use of the sound if necessary.

When the hæmatocele is of small size, and does not descend low in the pelvis, or when it is situated laterally or anteriorly, the diagnosis may be very difficult, and it may be impossible to distinguish it from pelvic peritonitis or cellulitis, except by means of exploratory puncture, a proceeding generally not to be recommended. In such cases a positive diagnosis is of little consequence as regards treatment. Sometimes the case is cleared up by spontaneous evacuation.

Treatment—If there is reason to believe that rupture of an early extra-uterine fœtation is the cause of hæmorrhage, and the case is seen at an early stage, abdominal section, ligature and removal of the ruptured tube, and removal of all blood and clots, are the best treatment. Otherwise, as soon as symptoms of the primary hæmorrhage are detected, perfect rest in the horizontal position, or with the pelvis somewhat raised, should be immediately secured, and ice may be applied over the hypogastrium. The best hæmostatic, and at

the same time stimulant, is a hypodermic injection of morphia. Ergotin and gallic acid may also be given in the form of pill, or ergot may be administered subcutaneously (*see* p. 281), if the heart is not too feeble. Alcohol and ether should be absolutely avoided, unless there appears to be imminent risk of death from syncope.

When the febrile reaction occurs, the case should be treated like one of pelvic peritonitis (*see* p. 424), except that there will be no occasion for leeching. Special precautions should be taken at recurring menstrual periods, particularly by the observance of absolute rest. All early surgical interference in the way of puncture or evacuation of blood is undesirable, and is especially dangerous before there has been time for the effusion to be shut off completely by adhesion from the peritoneal cavity. There is also risk that fresh hæmorrhage may occur if the blood is drawn off early. At a later stage, however, if suppuration or softening has occurred, and symptoms of septicæmic fever appear, the hæmatocele should be evacuated. A free opening should be made, by the vagina if possible, and clots may be cleared out so far as they can be reached by the finger, care being taken not to break down the limiting adhesions. The safest way to avoid hæmorrhage in making the opening is to use the galvanic or benzoline cautery. It will generally be desirable to wash out the cavity repeatedly with disinfectants, and a drainage tube may sometimes be useful. If diminution of the tumour is taking place, however slowly, interference should be avoided. In general, apart from decomposition or suppuration, the contents should be evacuated only when the tumour is of such large size as to cause great inconvenience by pressure, and shows no tendency to become absorbed. If comparatively early evacuation is demanded in order to relieve extreme pressure, the aspirator, or a trocar and canula, may be used. If spontaneous perforation takes place, the evacuation may generally be left to nature.

Abdominal section has been performed with success for hæmatocele, even when not due to extra-uterine fœtation, and the question is not fully settled what are the limits of its applicability. When the date of probable hæmorrhage has passed for some time and matters appear quiescent, it is not always necessary to open the abdomen, even if extra-uterine fœtation has been diagnosed as the cause. If, on the other hand, the mass is enormously large ; still more, if it is increasing, it is generally advisable to perform abdominal section, even though there is no proof as to the source of hæmorrhage. If a tube or tubes are found to be the source of hæmorrhage they should be removed. The peritoneum should be washed out ; and, if the clot is adherent and cannot be very completely removed, it will be desirable to use a drainage tube.

PELVIC HÆMATOMA.

By pelvic hæmatoma is signified an effusion of blood within the cellular tissue of the pelvis. It is rarer than pelvic hæmatocele.

Causation.—Probably the most important cause of pelvic hæmatoma is rupture of the sac of an early extra-uterine fœtation into the broad ligament. It may also arise through the rupture of a vessel in the broad ligament from violence, or in consequence of any of the general causes of pelvic hæmorrhage described under the head of pelvic hæmatocele.

Pathological Anatomy.—This effusion is generally situated in one broad ligament, and distends it somewhat like the effusion of parametritis. If small, it may be limited to the neighbourhood of the uterus. If large, it may extend toward the iliac fossa. I have met with a case in which, by a pelvic hæmatoma, originating from tubal fœtation, the peritoneum was stripped off the back of the uterus, and the posterior face of both broad ligaments. A large tumour was

thus formed, which could not be distinguished from retro-uterine hæmatocele till the abdomen was opened. In a similar way, the peritoneum might be stripped off the anterior part of the pelvis.

Results and Symptoms.—The effusion, unless of very unusual size, is pretty sure to be absorbed ultimately, and is less likely to break down or suppurate than a hæmatocele. It is possible, however, that secondary rupture may occur into the peritoneal cavity. The symptoms will be those of hæmorrhage and pressure. Febrile disturbance is less likely to follow than in hæmatocele.

Diagnosis.—The diagnosis must be made by a history similar to that of hæmatocele, and the finding a swelling, generally not behind the uterus, but in the position of one broad ligament, resembling the swelling of parametritis. Diagnosis is generally more difficult than in the case of hæmatocele. In the rare case, mentioned above, of hæmatoma behind the uterus, the swelling differed from that of hæmatocele in being more globular and elastic, simulating an ovarian cyst. A case has been recorded in which a hæmatoma which stripped the peritoneum off the uterus formed a movable tumour attached to the uterus, simulating a fibroid tumour.

Treatment.—There is more reason than in the case of hæmatocele for leaving matters to nature, in the confidence that the effusion will be ultimately absorbed. Even if the abdomen has been opened for exploration, and a hæmatoma found in the broad ligament, it will be better to leave it alone, unless it is enormously large, or secondary rupture has occurred, or unless there is ground for supposing it to be an extra-uterine fœtation. If the mass suppurates or breaks down it must be evacuated either through the pelvis, if this is practicable, or by abdominal section.

CHAPTER XII.

DISEASES OF THE VAGINA AND VULVA.

VAGINITIS.

Inflammation of the mucous membrane of the vagina is called vaginitis, or, with stricter etymological propriety, "colpitis."

Causation.—Acute catarrhal inflammation of the vagina most frequently arises from gonorrhœal contagion. Vaginitis may also be produced by cold, sexual excess, parturition, the presence of a pessary or other traumatic cause, too hot or too cold injections, the irritation of acrid uterine discharges, or may arise in the course of zymotic diseases, as measles or scarlatina. It is promoted by want of cleanliness. Occasionally a simple vaginitis, produced by one of these causes, is so severe as to be indistinguishable from the specific form, and it may then resemble it in its power of carrying contagion to the other sex, or exciting purulent ophthalmia if any of the secretion comes in contact with the eye. Chronic catarrh is most frequently the sequel of more acute inflammation, or the result of irritating uterine leucorrhœa. It may also arise from any of the causes already mentioned, acting in a less acute degree, and is especially liable to exist in debilitated women, or those of strumous, gouty, or rheumatic diathesis.

Pathological Anatomy.—At the onset of acute

catarrhal inflammation, the mucous membrane is swollen and congested, and its secretion diminished. After a day or two the secretion is increased and becomes purulent or sero-purulent. There is then great injection of the mucous membrane, especially upon the summits of its folds; and small ecchymoses may be formed in its substance, or superficial abrasions upon its surface. The gonorrhœal form of vaginitis is more frequently limited to the lower portion of the canal, and is more apt to extend to the urethra and vulvo-vaginal glands. In chronic catarrh, the secretion contains a large quantity of epithelial cells, with a variable proportion of mucous and pus corpuscles. When there is any admixture of pus, the "trichomonas vaginalis," an infusorium possessed of one long cilium, is often present. In gonorrhœal inflammation a micrococcus, generally occurring in pairs, which has been termed gonococcus, is found. It is questionable, however, whether this microbe is absolutely distinct from the similar diplococci which are found in other forms of suppuration. From long-continued catarrh, the vaginal walls become relaxed, and the mucous membrane thickened. The term "*granular vaginitis*" is given to a chronic form of inflammation, in which the mucous membrane feels rough to the finger from the existence of numerous minute elevations. These are attributed to hypertrophy of papillæ. In both acute and chronic vaginitis the vulva commonly takes part in the inflammation, and very frequently the redness of the mucous membrane is greater at the lower part of the vagina and at the vulva than in the upper part of the canal. This may often depend upon the secretion becoming more irritating through exposure to air. In other cases, especially those in which the vaginitis is kept up by uterine discharge, the upper part of the vagina, around the cervix, is most affected.

In some cases of very severe inflammation of the mucous membrane, as those produced by pessaries or

other foreign bodies, by highly acrid discharges, by exposure and violent friction in consequence of prolapse, or more especially in septicæmic conditions following any lesion, the epithelium may be thrown off, and adherent diphtheroid exudations may be formed upon the surface. Adhesion of the vaginal walls or cicatricial contraction is then apt to follow. The vagina may also be affected by true diphtheria.

Results and Symptoms.—In acute catarrh there may be some febrile disturbance. Burning, aching, and throbbing are felt in the vagina. After the first day or two the discharge is profuse, and yellow or greenish. Often it is offensive, and by its acrid quality excoriates the vulva and surrounding parts. Generally there is vesical tenesmus, and smarting on micturition. The vulva and vagina are very tender, so that even the careful introduction of a single finger produces much pain. In the chronic form there may be the same symptoms in milder degree, or the presence of discharge may be the only one noticed.

Diagnosis.—The degree of inflammation of the mucous membrane is best judged of by inspection with the aid of the speculum, or without it, if there is so much tenderness as to render its introduction painful. The speculum will also show how much of the discharge is coming from the cervix. If necessary, microscopic examination will distinguish the epithelial cells, or epithelial cells mixed with pus, of the vaginal discharge from the mucoid or muco-purulent secretion of the uterus. The chief difficulty in diagnosis is to distinguish gonorrhœal from simple inflammation. The chief characters of gonorrhœa are its sudden onset; the markedly yellow or greenish colour, offensive smell, and irritating quality of the discharge; the smarting on micturition produced by extension of inflammation to the urethra; the occurrence of inflammation or abscess in the vulvo-vaginal glands, the ducts of which often become distinguishable as injected points just in front of the hymen or its remnant; the

communication of contagion to the male; and the presence in abundance of diplococci. The occurrence of marked œdema of the vulva, buboes, or consequent peritonitis, furnish still stronger evidence of gonorrhœa. A conclusion based upon all these signs, or the majority of them, would be right in ninety-nine cases out of a hundred; but, since a simple vaginitis may possibly have the same characters, it is never safe to pronounce an absolute affirmative opinion as to origin from gonorrhœal contagion. On the other hand, a chronic or recurrent gonorrhœa often presents no sign, except its contagious quality, and perhaps the presence of diplococci, by which it can be distinguished from an ordinary form of simple inflammation.

Treatment.—In the very acute stage, warm hip-baths, and injections with emollient and sedative fluids, as decoction of poppies, or a weak decoction of linseed or starch, with the addition of a drachm of laudanum to the pint, should be used, the patient being placed in the dorsal position for the injections. If the patient can bear it, these medicated injections may be preceded by the injection of a large quantity of hot water between 100° and 110°, as hot as the patient can comfortably bear it, either by the Higginson's syringe or irrigator, in the manner described at page 223. The hot-water injections may be repeated at intervals of a few hours. Complete rest in bed also affords relief.

A little later a warm solution of borax, chloride of ammonium, bicarbonate of soda, or acetate of lead (ʒj. ad Oj.), or the liquor plumbi subacetatis dilutus, may be used. Tampons of tamponite (cotton with sheep's wool) soaked in glycerine containing a small proportion of carbolic acid (1—200) may be placed in the vagina in the intervals, and the vulva may be protected from the irritating effect of the discharge by vaseline or cold cream. After subsidence of the more acute symptoms, the injections may be made more astringent by alum, tannic acid, or sulphate of zinc (ʒj.—ij. ad Oj.). A

lotion containing forty grains of carbolic acid and the same quantity of sulphate of zinc, or forty to sixty grains of sulpho-carbolate of zinc to the pint, is also very useful, especially in gonorrhœal forms of inflammation. In gonorrhœa, other antiseptic lotions are also useful, especially chloride of zinc (gr. xx.—xl. ad Oj.), perchloride of mercury (gr. iij.—vj. ad Oj.), and liquor carbonis detergens (℥ss.—ij. ad Oj.). All these should be used very weak at first, and afterwards increased in strength. Of these injections the tannic acid and lead lotion have the disadvantage of often staining linen indelibly. For the mode of administering injections effectually, *see* pp. 223—228.

In the acute stage, laxatives and salines, especially the citrate or acetate of potash, should be given. With these may be combined drachm doses of tincture of hyoscyamus in camphor water, or infusion of uva ursi, if there is any urethral or bladder inflammation. Alcohol and spices must be absolutely avoided. If the inflammation is becoming chronic, or injections fail to relieve it, a tampon, large enough to keep the vaginal walls separate, and soaked in glycerine containing acetate of lead, sulphate of zinc, or tannic acid (gr. xx.—lx. ad ℥j.), may be introduced from time to time, and left from twenty-four to forty-eight hours. Suppositories containing the same drugs are also useful (*see* p. 228). In the intervals, warm water injections should be freely used to wash away secretions, and warm water should also be employed before using the medicated lotions. It is also serviceable to apply occasionally to the whole vaginal walls a solution of nitrate of silver containing ten or twenty grains to the ounce, or, in more obstinate cases, to apply, at longer intervals, one containing from thirty to sixty grains to the ounce. The most convenient mode of doing this is to pour the solution into Ferguson's speculum, while the patient is in the dorsal position. By altering the direction of the speculum, and finally withdrawing it very slowly, the liquid is brought into contact with

every part of the vagina. When the outlet is reached, the fluid is poured out by tilting up the speculum, or mopped up by a tampon of absorbent cotton. Carbolic acid (ʒij.—iv. ad glycerini ℥j.), or even in obstinate cases the strong carbolic acid, may also be applied with a mop of cotton to the whole of the vaginal walls through Ferguson's speculum. In using the stronger applications, the sensitive structures of the vulva should be avoided. But when the weaker one (such as nitrate of silver gr. x.—xxx. ad ℥j.) is used, and there is vulvitis as well as vaginitis, the solution may afterwards be applied thoroughly with a swab of cotton to the vulva. Meantime, any cause of passive hyperæmia which tends to promote excessive secretion should be removed as far as possible. In debilitated or anæmic patients, tonic remedies, and especially iron, should be given. Chronic forms of vaginitis can frequently only be cured by treating the cervical or corporeal endometritis which keeps them up.

Malformations, Displacements, and Atresia of the Vagina have been considered in connection with the corresponding conditions of the uterus.

Cicatrices of the Vagina, producing contractions or partial atresia, are generally the result of injury in labour, sloughing after parturition, or the incautious use of caustics. If they cause great inconvenience superficial incisions should be made in them, followed by dilatation. The vagina should be plugged for a few hours immediately after the incisions, or, if possible, a Sims' dilator of glass (Fig. 142, p. 496) should be at once introduced, and worn either continuously, or for some hours daily. Care should be taken to use frequent antiseptic injections, and to keep the patient in bed for a few days. To prevent the tendency to subsequent contraction, a Hodge's pessary may often be used with effect, if the cicatrices affect the posterior cul-de-sac, or upper part of the canal. If the upper part is free, and the lower part only contracted, a Sims' dilator of vulcanite may be

substituted for that of glass, after the incisions have healed, and worn daily for at least some hours.

Fibrous or Sarcomatous Growths occur in rare cases in the vaginal walls, or assume the form of polypi. In the latter case they may easily be removed by the écraseur.

Vaginal Cysts are found more commonly than solid growths. They generally contain a clear, glairy fluid, and appear to result from a gland-like invagination of the mucous membrane, or from occlusion of glands which may occasionally occur in the vagina. Sometimes they are multiple, and very numerous. If small, they may be dissected out entirely. If larger, the superficial part may be excised, and, if there is bleeding, the vaginal mucous membrane may be stitched to the remnant of the lining of the cyst, which will eventually be converted into squamous epithelium. Cystic cavities elongated longitudinally are sometimes found, especially near the upper part of the vagina, either on the posterior or anterior wall. In the former case, they may simulate a vaginal hernia, carrying down the pouch of Douglas. They appear to be congenital abnormalities, and may sometimes arise from Gärtner's ducts. The cavity should be incised, and the septum between it and the vagina cut away.

Primary Cancer of the Vagina is very much more rare than that of the cervix uteri or vulva. It may have the form either of carcinoma or epithelioma. The former sometimes appears in an infiltrating form in old women, commencing most commonly at the anterior vaginal wall, and producing contraction of the canal, with induration of its walls. Epithelioma may occur in comparatively young women, and more frequently commences in the posterior vaginal wall. The symptoms are similar to those of cancer of the cervix, but hæmorrhage is not usually so considerable. In infiltrating carcinoma difficulty in micturition and lancinating pain may be the chief symptoms. In

epithelioma, or ulcerating forms of carcinoma, the first symptom is frequently pain and hæmorrhage on coitus. In an early stage the disease may possibly be confounded with syphilitic ulceration. Cancer is distinguished by its friable surface, with hard base and edges, by its greater proneness to bleed on touching, and also by its resisting syphilitic remedies.

Treatment.—Epithelioma in the early stage should be removed, if possible, by the knife or the galvanic or benzoline cautery, or it may be excised with the knife or scissors, and the cautery applied afterwards. In general, however, the disease rapidly spreads in the loose cellular tissue beneath the vaginal wall, and extirpation becomes impossible. In the more advanced stage, if there is much hæmorrhage or fœtid discharge, some relief may be afforded by the use of the sharp spoons, cautery, or caustics, in the mode described under the head of cancer of the cervix uteri (*see* p. 325).

Urethrocele and Urethral Diverticula.—A cyst communicating with the urethra may form a swelling which presents at the vaginal outlet, causes pain and tenderness, and forms an obstacle to coitus. The urine stagnates in the pouch and becomes decomposed. Hence arises inflammation, sometimes suppuration, of the walls of the pouch, and the mixed urine and secretion retained in it may become offensive, the more so the smaller is the opening. One of two conditions may exist, both of which are mainly due to pregnancy and parturition—(1), urethrocele, in which the urethra is itself dilated into a pouch; (2), a urethral diverticulum which arises through a cyst bursting into the urethra, and generally communicates with it by a small opening. In the former case, a large sound in the urethra can be passed freely into the pouch at any point; in the latter, there is only one point of entrance (or sometimes two), and frequently only a small sound can be passed through the opening. A urethrocele appears to arise from an injury to the floor of the

urethra in the first instance, followed by stretching. The cyst which gives rise to the urethral diverticulum may have various origins. It may be a retention cyst from an urethral gland, a sac arising from an abscess, or from a small hæmatoma breaking down into an abscess. In some cases fat has been discharged from the cyst, and the cyst has been supposed to be a congenital dermoid inclusion cyst.

Treatment.—In urethrocele, the redundant portion should be excised, the edges united by silver or fishing-gut sutures, and a self-retaining catheter kept in the bladder for a week or two. Emmet, however, treats urethrocele by making a button-hole opening, stitching the vaginal to the urethral mucous membrane, and irrigating through the urethra till the sac has contracted.

In the case of a urethral diverticulum the sac should be dissected out, with the aid of a sound in the urethra, and the opening closed as before by silver or silkworm-gut sutures. A self-retaining catheter should be used, the best form, in both cases, being that variety of Skene's catheter, in which the bulbous end which retains the instrument has two large openings. Some recommend that when cystitis exists the opening in the vagina should only be partially closed by sutures, so as to allow drainage of the sac.

Vulvitis. — Catarrhal inflammation of the vulva, gonorrhœal or simple, is commonly associated with a similar inflammation of the vagina, and has been already considered in connection with vaginitis. When the vulvitis forms the prominent part of the affection, it is useful, except at the very acutest stage of the inflammation, to keep a sedative and astringent lotion in constant contact with the inflamed parts by means of a dossil of lint, placed between the labia.* The vulva may also be painted with a weak solution of

* The following is a useful formula :—Ext. Opii, gr. iv. ; Glycerini, ℥j. ; Liq. Plumb. Subacet. dilut. ad ℥j.

nitrate of silver (gr. x. ad ℥j.) every other day; or, in obstinate cases, with a stronger solution (gr. xl.—lx. ad ℥j) at longer intervals.

Either after subsidence of vaginal gonorrhœa or other forms of acute vaginitis, as a sequel of marriage, or, occasionally, even in virgins, a very chronic and obstinate inflammation of the vulva may exist, generally most acute at its posterior part, affecting especially the hymen or its remnant, and extending to the fourchette. It may be associated with superficial excoriations or fissures, and is the condition which most commonly gives rise to the symptoms of vaginismus (*see* p. 492). In its treatment care should first be taken to cure any irritating uterine or vaginal discharge. When this has been done, the solution of nitrate of silver applied at intervals to the vulva, as already described, is often effectual, but if milder means fail, the mucous membrane may be brushed over with equal parts of strong carbolic acid and glycerine. Dr. Matthews Duncan describes, as one cause of vaginismus, a form of obstinate and recurrent superficial excoriation, which he regards as analogous to lupus, finding it occasionally to be associated with small tubercles. This he finds to be curable only by application of the actual cautery, or strong caustics, such as nitric acid. In chronic vulvitis, constitutional treatment, especially by saline purgatives, abstinence from alcohol, and a somewhat sparing diet, are of much importance. This is especially so in the case of gouty subjects, who are liable to an obstinate form of the complaint. A somewhat severe form of vulvitis may be the result of diabetes, and it is important to look out for the presence of this disease, especially in women rather beyond middle life.

The form of purulent catarrh common in weakly or strumous children, which sometimes gives rise to a suspicion of contagion, is usually confined to the vulva. Probably it may often arise from accidental contagion. It is often promoted by uncleanliness or the irritation of thread-worms. It should be treated by frequent ablu-

tions, and mild astringent lotions, or an ointment containing acetate of lead. At the same time, good diet and tonics, especially cod-liver oil and iron, should be given.

Adhesive Vulvitis. — Not infrequently in young children, the inner surfaces of the nymphæ and posterior portions of labia majora are found adherent. The outlet is not occluded, but the union may extend far enough forward to interfere with the stream of urine. This arises from a vulvitis, which has produced an erosion of the surface. If neglected in childhood, it may appear as a firmer union in the adult.

Treatment.—The adhesion should be separated by a blunt instrument, such as a bladder sound, passed behind from the front, and the mother or nurse directed to prevent adhesion taking place again.

Follicular Vulvitis is a chronic form of inflammation, in which either the mucous or sebaceous glands of the vulva may be inflamed and enlarged. In the former case, the vestibule is chiefly affected; in the latter, the enlarged follicles are seen most on the nymphæ and internal surface of the labia majora, and the parts may be covered with an offensive cheesy secretion. This affection may be the cause of severe pruritus or vaginismus. The *treatment*, local and constitutional, is similar to that of chronic catarrhal vulvitis. An ointment made with vaseline or lanoline, and containing acetate of lead (gr. x.—xxx. ad ℥j.), to which hydrocyanic acid or morphia may be added, is often useful.

Gangrene of the Vulva occurs in cachectic children in the form of noma, and also occasionally appears in some forms of puerperal septicæmia, or in severe zymotic diseases. Sporadic cases in adults, of doubtful causation, have also been recorded.

Cystic Dilatation of the Vulvo-Vaginal Glands arises from occlusion of the duct of the gland (the opening of which is situated just in front of the hymen),

and is generally the consequence of vulvitis. A fluctuating swelling is thus formed, which may enlarge to the size of a small hen's egg, lying behind the labium majus (Fig. 139). It contains a clear, glairy fluid. The chief symptom is usually that of pain or inconvenience on coitus. The *treatment* is to incise the cyst freely, and cut out a portion of its wall. The interior may be swabbed with tincture of iodine, but this is not essential. Cysts at the vulva may occasionally also be formed by obstruction of an ordinary mucous gland.

Inflammation and Abscess of the Vulvo-Vaginal Gland is commonly a sequel of gonorrhœa, but may

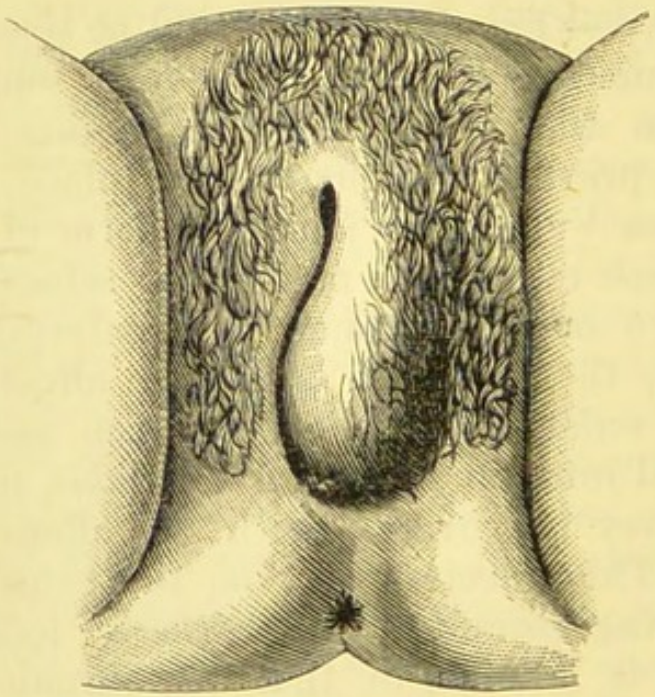


Fig. 139.—Cyst of Vulvo-vaginal Gland.

arise from simple vulvitis, especially when combined with want of cleanliness. A cystic dilatation of the duct may also suppurate. The *treatment* consists in rest, the application of poultices, and free incision from the mucous surface as soon as fluctuation is discovered.

Abscess of the Vulva may arise from other causes than inflammation of the vulvo-vaginal gland, and then usually affects the whole tissue of one labium, not specially its lower part. The commonest exciting

cause is violence or injury of some kind, but sometimes the causation is obscure. Irritative vaginal secretions or vulvitis may be the starting point. Furuncles may also originate in the sebaceous glands of the labium, and extend to form small abscesses. In either case the *treatment* is evacuation, as soon as pus has formed.

Varicose Dilatation of the Veins of the Vulva is generally the result of pregnancy, but may occur apart from that condition, or persist afterwards. The *treatment* should generally be limited to bathing with cold water, administration of laxatives, and rest. Fatal hæmorrhage may occur from puncture of these veins by a sharp instrument, or rupture by a blow or kick. Rupture has even occurred in coitus, or in straining at stool. If the hæmorrhage is detected, it may always be arrested by pressure.

Hæmatoma, or Thrombus of the Labium, is chiefly of importance in relation to pregnancy and parturition, but may result from violence or puncture by a pointed instrument, even in the non-pregnant condition. In non-puerperal cases it is rarely necessary to evacuate the swelling. This should not be done unless decomposition or suppuration occurs in it, or its size is so enormous that no progress is made in its absorption.

Eruptions. — Of the eruptions which may occur about the vulva, as elsewhere, the most frequent are lichen, acne, furuncles, and especially *eczema*. Eczema of the vulva is often the source of extreme distress from the soreness of pruritus which it occasions. It usually commences on the outer surface of the labia majora, and extends to the adjoining skin of the thighs and abdomen, as well as to the mucous membrane of the vulva. When chronic, it causes loss of hair, and considerable thickening of the skin and mucous membrane. The point chiefly to be noted about eczema in this situation is its frequent association with the presence of sugar in the urine, often without any loss of flesh or general symptoms of diabetes sufficient to attract attention. The eruption

is not solely due to local irritation from the urine, since, as Dr. Braxton Hicks has pointed out, eczema not infrequently occurs in other parts of the body in the same cases. Eczema also occurs from the irritation of a leucorrhœal discharge, from incontinence of urine in gouty subjects, or from the excoriation consequent upon excess of fat.

When the urine is saccharine, constitutional *treatment* suitable to diabetes should be employed, and the genitals should be washed with water after micturition. The local and constitutional treatment is otherwise similar to that of eczema in other parts. In obstinate cases it may be necessary to modify the condition of the skin by brushing over it caustic fluids, as a solution of nitrate of silver (ʒj. ad ℥j.), strong carbolic acid, or a solution of caustic potash ʒss. ad ℥j.), or by rubbing over it the solid nitrate of silver.

Vascular Caruncle of the Urethra is a growth of connective tissue, springing from just within the orifice of the urethra, generally at its lower or lateral border. Its size may be from that of a pin's head up to that of a hazel nut, or more rarely that of a cherry, and it is frequently pedunculated. In most cases the growth is very abundantly supplied with vessels and nerves, covered by an extremely thin epithelium, so that it is excessively sensitive, and readily bleeds. Its histological structure is therefore that of angioma. It is sometimes single, but not infrequently there are a number of small growths extending some distance within the urethral orifice. The more sensitive variety of caruncle has a bright cherry-red colour, and the tendency to bleed is generally in proportion to the sensitiveness. It is usually so friable that it can scarcely be grasped by forceps. The less sensitive variety of caruncle may be in colour like the surrounding mucous membrane, and is not so friable.

The *causation* is obscure, but the growth may sometimes originate in inflammation of the vulva and urethra; any cause of passive hyperæmia also tends to

promote it. It is more common in married women, but is found not very infrequently even in young virgins, and is not rare in the old. The *symptoms* are generally pain on micturition, which is often extreme, and excessive tenderness to any sort of contact, so that coitus is usually impossible or very painful, and even walking may give distress. Hence it is always desirable to examine visually the orifice of the urethra when great hyperæsthesia at the vulval outlet is found on digital examination. Sometimes bleeding occurs in micturition or at other times. Frequently severe hysterical symptoms are the result of the affection, and the mind sometimes becomes affected by serious depression. The *treatment* is to administer an anæsthetic, and remove the growth by the benzoline or

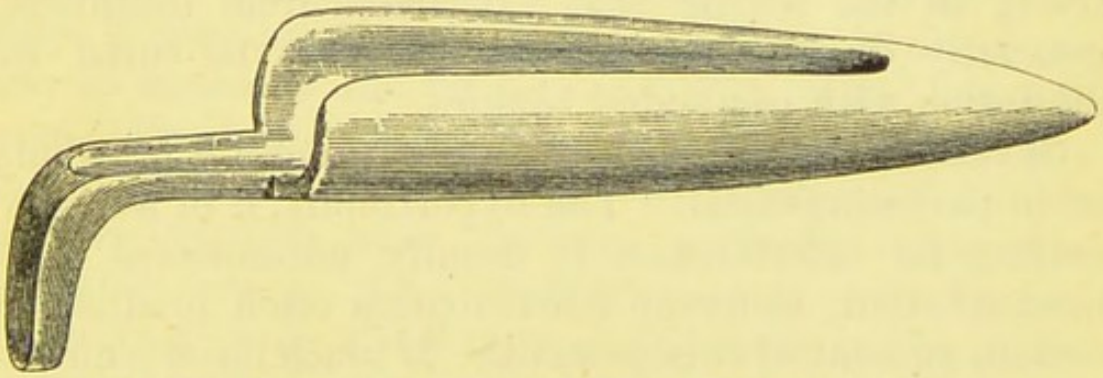


Fig. 140.—Bryant's Urethral Speculum Dilator (actual size).

actual cautery. Lead lotion, with the addition of opium or morphia, may afterwards be applied. If the growths are sessile, they should be destroyed by cautery. When they extend up the urethra, Mr. Bryant's urethral speculum dilator of ivory (Fig. 140) may be used with great advantage, both to expose them and to allow convenient access. The use of the cautery appears to be the most effectual means of guarding against recurrence of the caruncle, to which there is a strong tendency.

Granular inflammation of the urethral outlet, or extending some distance up the urethral canal, sometimes persists after removal of a caruncle, or may exist independently of any caruncle, especially in old women.

The surface is then intensely red, may have the same extreme sensitiveness as a caruncle, and often readily bleeds. This condition may be treated by the application, with the aid of Playfair's probe (Fig. 91, p. 229), of equal parts of carbolic acid and glycerine, or a strong solution of nitrate of silver (gr. xl.—lx. ad ℥j.), or by the repeated application of the undiluted liquor plumbi subacetatis at intervals of two or three days.

Prolapse of Urethral Mucous Membrane with hyperplasia may occur in children or adults. If the swelling so produced is highly sensitive, and causes dysuria, it may be excised with scissors, and the urethral mucous membrane stitched to that of the vestibule.

Stricture of the Urethra is very rare comparatively in the female sex. It arises from urethritis, generally due to gonorrhœa. It may be cured by dilatation with graduated bougies.

Hyperplasia of the Clitoris is generally in whole or in part congenital. The hypertrophy, if of a degree calling for interference, is usually unconnected with masturbation, although masturbation often produces a certain amount of enlargement. If much inconvenience is caused, amputation of the organ may be called for, and is most conveniently performed by means of the galvanic écraseur or benzoline cautery.

Hyperplasia of the Nymphæ.—The nymphæ may be elongated into long flaps, either congenitally or from the effect of masturbation. They may then form an impediment in coitus, or may become irritated from the contact of the clothes in walking. If, in a virgin, both clitoris and nymphæ are enlarged, so as to project visibly between the labia majora without separation of the thighs, masturbation in childhood may be suspected. The inference is stronger if the right nympha is specially elongated. Masturbation does not, however, necessarily produce any physical change whatever. If they appear to be a source of irritation, the hypertrophied nymphæ may be partially or wholly removed.

Elephantiasis of the Vulva is very rare except in Eastern countries. It generally commences in one labium majus, and may form an enormous pedunculated tumour. The disease is now known to be due to obstruction of lymphatic vessels by the filaria sanguinis hominis. If the growth is pedunculated or localized, it may either be excised, and its vessels tied or twisted, or it may be amputated by the galvanic écraseur, or by the knife of the benzoline cautery. Syphilitic hypertrophy of the vulva may take a form approximating in appearance to elephantiasis.

Fibroid or Sarcomatous Tumours in rare cases have their origin in the labia.

Cancer of the Vulva is not infrequent, especially at the clitoris and margin of the labia. It generally commences in the form of epithelioma. At an early stage it may be *treated* by free excision, in the same way as cancer of the vagina, and with more hopefulness. The knife of the benzoline cautery is generally the best instrument to use. An ulceration due to tertiary syphilis may, in some instances, somewhat resemble cancer. In a doubtful case, it will be distinguished by its yielding to syphilitic remedies. The so-called *rodent ulcer* in this situation is probably a superficial form of epithelioma.

Lupus of the Female Genitals has long been recognized as a disease characterized by slow ulceration, associated with hypertrophic nodules. It has of late been more fully described by Matthews Duncan,* but it is not yet certain that there is a real unity of nature among all the conditions which have been included under the term. It is not the same disease as lupus vulgaris of the face, for the two are rarely, if ever, associated together, and the microscopic characters are different. It affects most frequently the vulva, especially the vestibule, nymphæ, or clitoris, rarely the mons veneris. It may affect also the vagina, the cervix uteri, and possibly even the interior of the uterus.

* "Obstet. Trans.," vol. xxvii.

There are several varieties of the disease, but, in all of them, the course is apt to be one of many years. In *lupus minimus* there are superficial but intractable ulcers, not generally reaching beyond the mucous membrane. These may occasionally heal spontaneously, or heal at one margin while spreading in another direction. They may cause severe dyspareunia or vaginismus when inflamed, even when of very small size, but in other cases may be nearly painless.

In *lupus maximus* the ulceration extends to neighbouring parts, cellular tissue and skin, and is more destructive. In rare cases it has caused extensive destruction of tissue, uniting vagina and rectum into one cloaca. It is then clinically distinguished from cancer chiefly by the fact that it lasts for years without killing the patient. The ulcers of lupus do not bleed readily and freely on touching like cancer, but they may bleed to a certain extent, and that sometimes spontaneously. In *hypertrophic lupus* there is hypertrophy of cellular tissue, associated with ulceration either upon or adjacent to the hypertrophied parts. The nymphæ are especially liable to be affected by this. This form of lupus is regarded by Hutchinson and others as really only a sequela of syphilis. The histological characters, however, are described by Thin as being uniform in character and different from those of syphilis. They consist chiefly of a development of fibrous tissue, and an inflammatory small-cell infiltration on the surface, or under the epithelium.

Treatment.—Hypertrophic portions should be freely removed, especially when the nymphæ are affected. The best mode of treating the ulcers appears to be to cauterize the surface with the benzoline cautery. Scraping with sharp spoons, or the application of caustics, such as potassa fusa, may also be tried. The patient should be well fed, and treated by tonics.

Rupture of the Perineum in almost all cases occurs in parturition, although, in a few instances, it may be produced in the extraction *per vaginam* of a large

tumour, such as a fibroid. Cases of rupture of the perineum may be divided into two great classes: first, incomplete ruptures, in which the sphincter ani is not divided; secondly, complete ruptures, in which the sphincter ani is divided, and therefore more or less of the recto-vaginal septum destroyed. In both cases the primary operation ought always to be performed at the time of the rupture, and is much easier than the secondary operation, since no freshening of surfaces is required. This primary operation will not, however, be considered here, since it is described in text-books of midwifery.

The effect of incomplete rupture of the perineum is to deprive the anterior vaginal wall in its lower part of the support which it normally receives from the perineal body (*see* Fig. 2, p. 6), and so to facilitate the production of prolapse of the vagina, and consequently of the uterus, when the causes exist, such as laborious occupation, or excessive abdominal tension, which favour descent. The use of the vagina in coitus may also be impaired, from the laxity at the outlet which is so produced. When the rupture is at all extensive, reaching up to, or nearly up to, the sphincter ani, it is desirable to operate for its cure without waiting for prolapse to be produced. The time for such operations, supposing the primary operation to have failed, or not to have been performed, should not be less than two months after delivery, so that the effects of the puerperal state may have completely passed away. It is also convenient if the infant can be weaned before the operation, that the patient may not have the disturbance of suckling while the union is taking place; but this is not absolutely essential. The mode of performing the operation for incomplete rupture has already been described in the section on prolapse of the uterus and vagina (p. 159).

The effect of complete rupture is, in addition, to destroy or impair the power of retaining the contents of the bowel. This may vary from complete in-

continence of fæces to a diminished power of retaining flatus or liquid motions when the bowels are loose. The main object of operation in this case is to restore the functions of the sphincter, and the operation is a failure if this is not attained, however strong a perineum may be produced. When the sphincter ani is torn through, its two ends separate, and, instead of being a circle, it becomes nearly a straight line in the position E F (Fig. 141). Thus, in such cases, the radiating folds of skin indicating the sphincter are seen at the lower margin only of the bowel orifice, and the sphincter itself can be felt by the finger under the skin as a straight or nearly straight ridge, the ends of which have retracted away somewhat from the edges of the cicatrix at E F. The most important point in the operation is so to regulate the freshening and placing of sutures that the ends of the sphincter are brought together again.

Operation for Complete Rupture of Perineum.—The following is the mode in which I generally perform the operation. Beforehand the rectum must be washed out by enema, and, at the time of operating a sponge, tied by a tape, is passed just within the bowel, to prevent fæcal matter coming down. The thighs are then secured by Clover's crutch (*see* p. 160), and the fingers of assistants put the mucous membrane on the stretch by drawing the skin of the thigh outward near C and D (Fig. 141). A point B in the median line of the vagina, a sufficient distance above the apex of the rent in the septum, is taken, and an incision through the mucous membrane is made from B to G, and from G to E and F along the edges of the septum, between the rectal mucous membrane and the cicatrix. Incisions are also made through the skin from E to C and F to D, so that the freshened surface may extend somewhat beyond the limits of the cicatrix left by the rent, C and D not to be higher than the lower extremities of the nymphæ. The quadrilateral flap E G B C is then seized at E by

dissecting forceps, and dissected up with the knife from the angle E, and afterwards from the angle G, towards the base B C. While this is done, the parts are kept on the stretch by an assistant drawing down

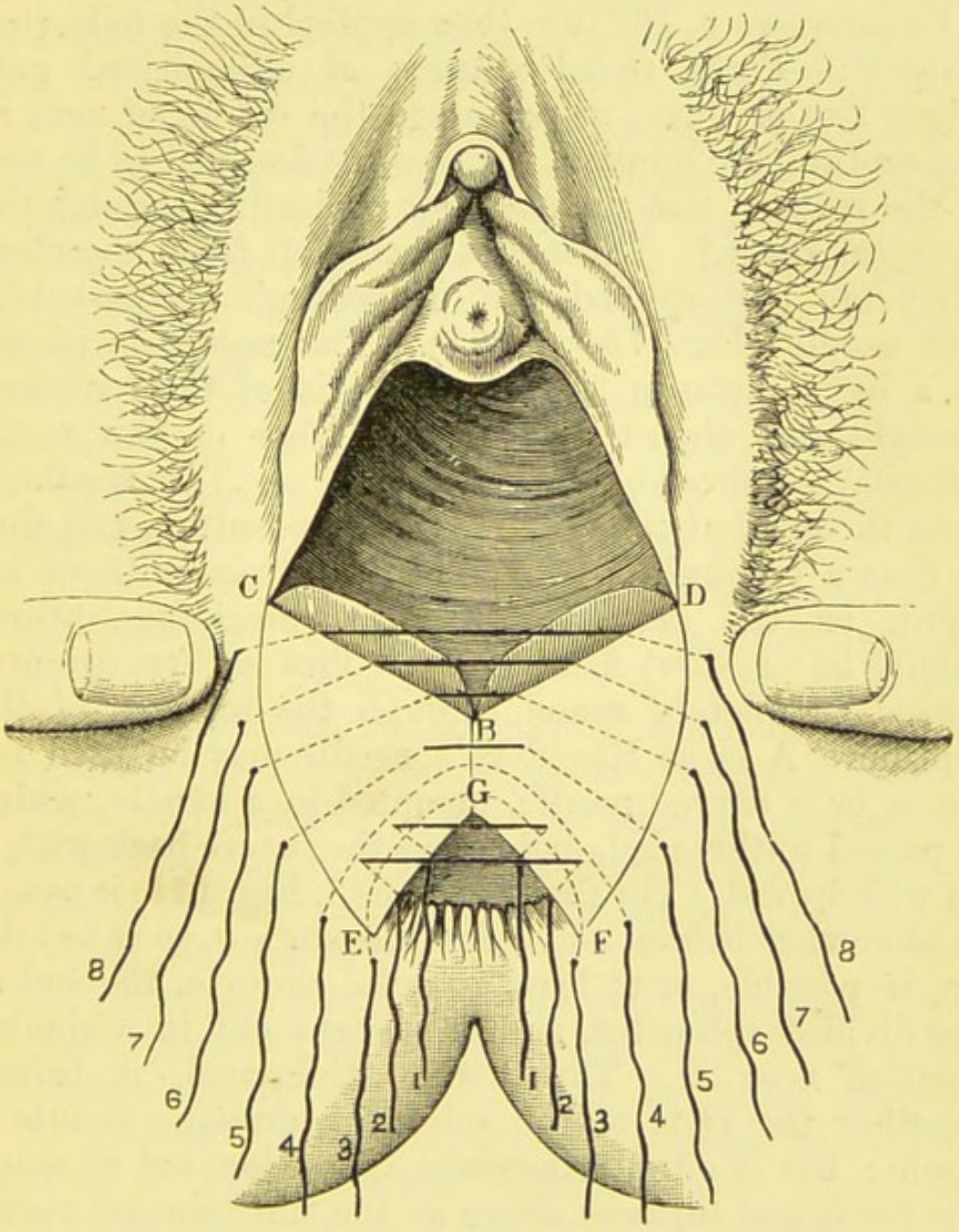


Fig. 141.—Operation for Complete Rupture of Perineum.

the skin below E with a tenaculum. The flap is then cut away with scissors, except an upturned border, which is left along B C. The flap F G B D is treated in a similar manner. If, as is usual, the ends of the sphincter at E and F have retracted from the margins

of the cicatrix, it is well to cut away with the scissors a narrow strip of rectal mucous membrane, generally somewhat everted, a short distance from E and F toward G, so as to bring the freshened surface up to the ends of the sphincter.

Sutures (*see* p. 162) are then applied in the following manner:—First, rectal sutures of chromicized gut, either two or three, according to the extent of rent in the septum, are applied. These are destined to be tied in the rectum, and the ends left projecting through the anus cut short.* These sutures are left to be absorbed. They are best applied with Hagedorn's needle-holder and needle (Fig. 73, p. 163). The needle is passed in a little distance from the margin of the rent, and brought out almost at the very edge of the rectal mucous membrane, on the line G F. The needle is then threaded at the other end of the suture, and that is drawn through in the same way from without inward, on the margin E G. The remaining sutures should be of stout fishing gut. Two sutures are first passed completely round through the remnant of the septum. A large Hagedorn's needle may be used for these, or a curved needle, mounted in a handle, which is passed unthreaded, and draws the suture back with it on withdrawal. The first of these (3, Fig. 141) is passed in somewhat behind and below the angle F, so as to take up, if possible, or at least go quite close to, the end of the divided sphincter, and is brought out in a similar position near E. Thus, when tightened, it brings together the ends of the sphincter, drawing it into a circle: but it often brings into apposition, not so much the freshened surfaces above as the unfreshened rectal mucous membrane. This serves as a barrier to keep out fæcal matter, while the next suture (4, Fig. 141) aids the rectal sutures in uniting the freshened surfaces. The remaining sutures are passed as shown in the figure (5—8, Fig. 141) by a Hagedorn's needle, in the

* The use of rectal sutures has been adopted by Dieffenbach, Simon, and Bantock.

same way as in the operation for incomplete rupture (*see* p. 161). The needle is passed in pretty close to the edge C E or F D, is brought out (except in the case of suture 5, Fig. 141) on the line where the margin C B or D B is turned up. On the opposite side it is passed in a similar way from within outwards. The effect is, that, when the sutures are tightened, the margins B C, B D are turned up into a slight ridge toward the vagina, and afterwards fall over and cover any portion of the vaginal border which does not unite quite up to the edge. Suture 5 (Fig. 141) may either be buried throughout, or brought out for a very short space near the median line B G.

When all the sutures are in place, the sponge is removed from the rectum, and the rectal sutures are tied first. Care must be taken to draw up the whole of the slack in the centre, and bring the edges E G, F G perfectly together. This will approximate the ends of the sphincter to a great extent, and the approximation is completed by tightening suture 3. The remaining sutures are then tied in the order of the numbers, care being taken to allow no clots or blood to remain between, and to tighten them just enough to bring the surfaces into contact. The ends of each perineal suture should be tied together, and left rather long, so as to be less likely to prick the skin.

The perineal sutures are removed in seven days. By this operation the anus is generally much more completely restored than by the use of quilled sutures, or the plan of making deep lateral incisions to relieve tension. If there is much resistance to bringing the surfaces together, the only thing required is to use more numerous sutures, so as to diminish the tension on each.

The *flap-splitting operation*, described at page 164, may also be used for complete rupture of the perineum. In this case, the splitting is carried out in the remnant of the septum. Besides the perineal stitches one, two, or three septal stitches may be used. These are carried

from the edge of the vaginal mucous membrane to just within the rectal mucous membrane, and are tied on the vaginal side.

In some cases, by the primary operation after labour, only superficial union is secured, and a recto-vaginal fistula is left above the part united. The best plan is then to cut through the bridge of union at the time of the operation, and then proceed as in the case of complete rupture. This is the only way to secure a firm and thick perineum, and is less likely to fail than an operation on the fistula alone.

CHAPTER XIII.

FUNCTIONAL AND SYMPTOMATIC DISORDERS.

AMENORRHŒA.

Amenorrhœa, or the absence of the menstrual flow within the limits of age during which it should naturally continue, is to be distinguished from occlusion of the genital canal, and consequent retention of menstrual fluid, which gives rise to an apparent only, and not a real, amenorrhœa. Amenorrhœa, besides being a natural physiological condition in pregnancy and lactation, is a result common to a large number of constitutional and local pathological conditions. It has already been mentioned as a symptom of absence or imperfect development of uterus and ovaries, and of cystic or other form of degeneration affecting both ovaries; also as a sequel of severe inflammation of the pelvic organs, especially of acute ovaritis or pelvic peritonitis. The chief varieties are *primary amenorrhœa* (*emansio mensium*), in which menstruation has never appeared at all; and *secondary amenorrhœa* (*suppressio mensium*), or suppression of menstruation.

The age at which menstruation commences may vary in different persons by a considerable number of years without calling for any special medical interference; but the longer its onset is deferred beyond the normal age, the more likely is constitutional disturbance to attend the change. The difference depends partly on the general vigour and development of the whole body,

partly on the relative development and activity of ovaries and uterus. Thus in girls of deficient intellect puberty is commonly much retarded. The occurrence of any serious illness within a few years before the natural date for the commencement of menstruation often has the effect of considerably deferring its appearance. Primary amenorrhœa may be due to absence or imperfect development of uterus and ovaries, and imperfect development of either or both organs strongly predisposes to the production of secondary amenorrhœa, or a premature menopause, by comparatively slight causes. Sudden suppression of menstruation during the period of flow may be produced by cold or by mental emotions, even when the suppression is not a symptom of actual inflammation; and this may be the starting-point of secondary amenorrhœa of considerable duration. Long-protracted and even permanent amenorrhœa may be the sequel of acute diseases or strong depressing emotions, or the menopause may come on prematurely without obvious cause. Sometimes superinvolution of the uterus after labour is a starting-point. Towards the natural period of cessation, it is common for considerable periods of amenorrhœa to alternate with an occasional and sometimes excessive flow. Any chronic and wasting disease, and more especially phthisis, may induce primary or secondary amenorrhœa, according to the age at which it makes its appearance. Again, amenorrhœa may be produced by repeated loss of blood, as from hæmorrhoidal tumours. The same effect may result from a simple anæmia and failure of nutrition, due to insufficient diet, indigestion, or a too sedentary life. A sudden change in the mode of life, such as often occurs in the case of girls on going to school, is especially likely to interrupt menstruation, when combined with any other of the above-mentioned causes. Amenorrhœa also sometimes comes on shortly after marriage, even without any pregnancy; and is still more likely to occur after illicit intercourse, when

there is a strong reason to dread the possibility of pregnancy.

Among all the causes of amenorrhœa there is none more frequent or more important than *chlorosis*, the relation of which to menstruation is a somewhat complex one. The important significance of this relation is shown by the fact that the disease is almost limited to the female sex, and to an age not far removed from that of puberty. Chlorosis is a disease largely dependent upon congenital predisposition, and frequently associated with imperfect development of the heart and narrowness of large arteries. It has also a close relation to the nervous system, for it is often characterized by the symptoms of nervous depression or irritability, and frequently owes its origin to a powerful depressing emotion, such as disappointment in love or bereavement. As regards the condition of the blood, chlorosis differs from other forms of anæmia chiefly in the fact that the deficiency in hæmoglobin is far more than proportionate to the deficiency in number of the red corpuscles. This circumstance accounts for the extreme degree of the pallor of the skin, and its greenish tint.

Chlorosis may come on before the age of puberty, and give rise to primary amenorrhœa. In other cases, the commencement of menstruation is the starting-point of chlorosis, the extra demand which thus arises having proved too much for the feeble powers of the system. In more rare instances, the same effect is produced by a menstruation which in the first instance was excessive, although it becomes scanty, or is entirely interrupted, after the chlorosis is established. In general, therefore, the amenorrhœa of chlorosis is secondary to the condition of the system generally, and that of the blood. It is probable, however, that in many, if not in most, cases, the deficiency of the stimulus to nutrition furnished by ovarian development and activity contributes to the disease. Thus the tendency to the production of fat at the expense

of muscular tissue, so often characteristic of ovarian torpidity, is frequently observed in chlorosis. Again, cases are not very infrequent in which the amenorrhœa appears to be primary, and to be associated at first with plethora, while anæmia and the signs of chlorosis only come on after an interval. The same inference may be drawn from the cases of chlorosis in which benefit is derived from marriage, or from direct emmenagogue treatment.

Contrasted with cases of chlorosis are those in which primary or secondary amenorrhœa is associated with an appearance of plethora and symptoms of general disturbance, similar to those which frequently attend the menopause, such as headache, flushing of the face, constipation, hepatic derangement, and a tendency to morbid nervous and mental conditions. Ovarian inactivity may then generally be inferred, and this may be due either to a congenital condition, or to a sedentary life, with too good living. To these symptoms may be added hæmorrhages from various parts, as the lungs, stomach, nose, or rectum, or even sometimes from a wound or ulcer. These are sometimes spoken of as ectopic or vicarious menstruation. It is very rarely, however, that the vicarious hæmorrhages have any monthly periodicity, but they indicate an excess of vascular pressure which does not find its natural relief.

Diagnosis.—In primary amenorrhœa it is desirable to make a local examination, if periodical pain, or any other symptom, suggests the suspicion that atresia may exist; if the appearance of menstruation is delayed many years beyond the normal time; if signs of general or local plethora coexist with amenorrhœa; or if marriage is projected. If a girl is subject to leucorrhœa, it may safely be assumed, without examination, that there is no absence of uterus or vagina. In secondary amenorrhœa special care must be taken to decide the question as to the possibility of pregnancy. If, in a healthy-looking young woman, menstruation, having been previously normal, has ceased

suddenly without the occurrence of any illness, pregnancy is naturally the first cause which suggests itself. In a suspicious case, an inspection of the breasts will often indicate the necessity for a more complete examination. Special care should also be taken to seek for signs of any bygone inflammation of the uterus or surrounding parts, especially in the form of pelvic peritonitis. Chlorosis is generally manifest in a patient's face. Even in the slighter degrees of anæmia there are usually characteristic symptoms in the shortness of breath, debility, neuralgic pains, or indigestion, while anæmic murmurs are often to be heard over the heart and large arteries. If there is no manifest chlorosis, or other sufficient cause, signs of phthisis or other constitutional disease should be carefully searched for. The diagnosis of the conditions of uterus and ovaries associated with amenorrhœa has already been considered (*see* pp. 75, 337).

Treatment.—If amenorrhœa is a symptom of any constitutional disease, such as phthisis, the treatment should be directed solely to the primary disease; and if it is the sequel of pelvic inflammation, the inflammation must be treated in the first place. In all forms of anæmia, but especially in chlorosis, iron is the great remedy, and in chlorosis it should be given in large doses. It is necessary, however, in the first place, to see that the digestive organs are in a condition to bear and to assimilate the iron, and it is often desirable to give first vegetable bitters with salines, or combined with acids or alkalies, according to circumstances. Dr. Barnes recommends iodide of potassium as preparatory to, or in combination with, the iron. The syrup of the iodide of iron may often be used with advantage. If digestion is weak, the iron should be given in the most easily assimilable form, as the ferrum redactum, or one of the vegetable salts. It is often of use to combine it with aloes, especially if any tendency to constipation exists. The aloes and iron may be given in pill, or the decoctum aloes co. may be combined in

a mixture with the ferri et ammoniæ citras. Permanganate of potash, given in pill or solution, in doses of two or three grains, is sometimes effectual as a remedy for functional amenorrhœa when iron has failed. Other tonic medicines, as quinine, strychnia, and especially arsenic, also sometimes prove useful. Cod-liver oil is beneficial, except in cases where there is a tendency to corpulence. Hygienic treatment is still more important than medicinal. It should comprise nourishing diet, especially an ample allowance of fresh meat, abundance of fresh air, judiciously regulated exercise (the most effectual form of which is riding on horseback), cold fresh, or still better, salt water baths, and change of air and scene. A stay at the seaside or watering-place with chalybeate springs is especially useful. A carefully regulated gymnastic course, such as the Swedish exercises, often succeeds when other means fail. If the appearance of menstruation be deferred several years beyond the usual time, it is of special importance to guard against a too sedentary mode of life, overmuch study, or unsuitable diet; for if the commencement of ovarian activity be too long deferred, the natural development of the pelvis at puberty may fail (*see* p. 338), and menstruation itself is more subject to disturbance when it commences much too late. In all cases of amenorrhœa associated with anæmia, especially in the young, careful watch should be kept for the appearance of any sign indicating the onset of phthisis. A warm seaside residence in winter, when circumstances allow it, has often a beneficial effect on the menstrual functions, even apart from any question of delicacy of chest. In amenorrhœa or scanty menstruation associated with apparent plethora rather than anæmia, the diet, while nourishing, should be rather sparing, and should consist more of the nitrogenous than of the fat-forming elements of food. A greater amount of exercise is desirable than in anæmic cases, and occasional purgatives are often called for. In all cases in which the development of

uterus or ovaries, and not the general health, is at fault, marriage generally has a beneficial effect, especially when it is ovarian activity which is defective; and, if pregnancy occurs, menstruation is usually afterwards more natural.

If menstruation is arrested by cold or any other cause in the midst of a period, without the occurrence of actual inflammation, and the arrest is followed by headache or other symptoms of general congestion, an attempt should be made to restore it by the use of hot hip-baths or foot-baths, with the addition of mustard, by hot applications to the hypogastrium, and the administration of acetate of ammonia with ether, or (with caution and moderation) of the domestic remedy of gin in hot water. Similar treatment should be repeated at ensuing periods, if menstruation does not come on normally. In all cases of amenorrhœa not dependent upon anæmia, but associated with general or local congestive symptoms, a similar mode of stimulation may be employed for three or four consecutive days in several succeeding months, either at the period of menstrual nisus, if that is revealed by any sign, or at intervals of about four weeks. The hip-bath may be taken at night, followed by a hot linseed or bran poultice to the hypogastrium, and the hot foot-bath with mustard may be used in the morning, while a pill of aloes and myrrh is taken every night. Stimulating liniments may be employed to the inner surfaces of the thighs; and hot vaginal injections or enemata may also be tried. If there are symptoms of plethora, such as headache, with flushing of the face, it is sometimes of use also to apply about the same time three or four leeches to the inner surfaces of the knees or thighs, or, when there is pain indicating local congestion, to the labia, or, in married women, to the cervix uteri. This measure tends to induce a periodical fluxion towards the pelvic region, and is especially indicated in primary amenorrhœa of long standing, associated with signs of plethora, or when vicarious hæmorrhage has occurred.

There are some cases in which, after full trial of measures of this kind, it may be desirable, but generally only in married women, to use direct means of stimulus to the uterus or ovaries. Such treatment should generally be limited to cases in which there is no constitutional condition to account for the amenorrhœa, but an imperfect development of the uterus, not too extreme in degree, is discovered, or deficient development of the ovaries is inferred, and in which, also, either there is reason to believe that the absence of menstruation is affecting the health injuriously, or vicarious hæmorrhages occur. It is to be remembered that women themselves are very apt to attach an exaggerated importance to amenorrhœa, and that, in the absence of any evidence of injurious effect from plethora, they may be advised not to concern themselves too much about this condition. Supposing that a sufficiently urgent reason exists for adopting local treatment, a Faradic current may be passed through the uterine and ovarian regions every day or every other day. The electrodes may be placed, one over the sacrum, the other over the ovarian regions alternately, or one rheophore may even be introduced into the uterus. Of forms of stimulus applied directly to the uterus, the least hazardous is to pass occasionally a metallic bougie, so as slightly to dilate the cervix. The most powerful means of all is the introduction of an intra-uterine stem, and especially of the galvanic stem of Simpson, the upper half of which is made of zinc, the lower of copper. The effect of this is rather that of a chemical than an electrical stimulus, owing to the constant slow production of chloride of zinc, although doubtless a weak galvanic current over the surface of the uterine mucous membrane is produced. A modified kind of galvanic pessary, in which the zinc and copper are arranged side by side, in the form of a spiral coil of wire, is more readily tolerated, since it allows the uterus more mobility. I have never met with a case in which I considered the dis-

advantages of amenorrhœa to be so great as to warrant the risk which is incurred by the use of intra-uterine stems. If a stem is used at all, a simple stem of glass or vulcanite is probably safer than the galvanic stem, and should be tried first. If a galvanic stem is used, it should not be left more than about three weeks at a time, on account of the corrosion and consequent roughening of the zinc. It should be an indispensable condition that the general health be such as to make it quite certain that the cause of amenorrhœa is solely local, that there has been no previous inflammation, and that the patient can be kept completely under control. When amenorrhœa or scanty menstruation is the result of pelvic peritonitis, cellulitis, or acute ovaritis, the use of the sound or any other local treatment to the uterus must be avoided. When atrophy of the ovaries is inferred to have taken place, a cautious trial of the milder kind of local treatment may sometimes be desirable, if the condition is recent, but should not be prolonged if not soon successful.

Besides aloes, which influences the uterus from the sympathy of that organ with the rectum, some other drugs have the repute of being direct emmenagogues. Of these the most effective appear to be oil of savine, in doses of from five to ten minims, and the tinctura hellebori, in doses of twenty or thirty minims. Ergot is also reputed to act as an emmenagogue in certain cases, as well as a hæmostatic in excessive menstruation. All these drugs, however, are apt to prove disappointing, and can hardly be expected to produce any effect when the development of Graafian follicles is altogether wanting. In amenorrhœa or scanty menstruation resulting from chronic metritis, or from periuterine inflammation, tincture of iodine, in doses of from five to ten minims, sometimes acts as an emmenagogue.

In chlorosis and other forms of anæmia, direct emmenagogues should not be used until full trial has

been given to treatment by iron, with other tonics, and hygienic measures. In obstinate cases, stimulation by heat and external applications every four weeks may be tried, or the Faradic current may be passed through the ovarian regions.

Scanty Menstruation generally depends upon causes similar to those which produce amenorrhœa, but acting in lesser degree. It is to be treated in a similar manner.

Menorrhagia and Metrorrhagia.—By the term menorrhagia is meant an excessive loss of blood from the uterus at menstrual periods; by the term metrorrhagia, a loss during the intervals, or of such an irregular kind that no monthly periodicity can be detected. The following are the main causes of menorrhagia and metrorrhagia:—(1) A morbid condition of blood, such as is found in Bright's disease, in some forms of simple malnutrition, and in febrile affections, especially those of a zymotic kind. (2) A general undue relaxation of the vessels or diseased condition of their walls, the result either of hæmophilia, of general debility, of the effects of a hot climate, or any other cause. (3) General active hyperæmia, the result of constitutional plethora or excessive arterial pressure. (4) Passive hyperæmia, whether general, as from obstructive heart, lung, or liver disease, or local, as from the pressure of a tumour, or from displacement of the uterus. (5) Want of tone in the muscular walls of the uterus, by the contraction of which the circulation through the organ is normally regulated and controlled. This may result from defective general nutrition, or from a morbid local condition. (6) Local active hyperæmia. This may depend upon the retention of a portion of placenta or membranes within the uterus; upon inflammation of, or the presence of new growths in, the uterus itself, whether body or cervix, the ovaries, or adjoining parts; upon ovarian irritability or congestion; or upon mental or mechanical causes, such as sexual excitement or sexual excess.

(7) Increased surface of the mucous membrane, resulting from enlargement of the body of the uterus. (8) A diseased condition of the uterine mucous membrane, whether due to inflammation, villous or glandular degeneration, or to new growths, especially to those in a state of ulceration.

Another practically useful classification of menorrhagia and metrorrhagia is to divide them into those forms due to a general systemic cause, and those depending upon some morbid condition of the sexual organs. The first of these classes comprises the first, second, third, and a great part of the fourth and fifth of the above-mentioned divisions, while the second includes the remainder.

The amount of blood lost in menstruation varies considerably in different individuals, the difference depending in great measure upon the development and activity of the ovaries. When the ovaries are more active than usual, menstruation commences early in life and continues late, while the flow is considerable in amount, sexual feelings are strong, and there is a liability to menorrhagia or metrorrhagia, especially soon after the first establishment of the menstrual function, as well as to active hyperæmia of the sexual organs.

Diagnosis.—In menorrhagia, some estimate of the degree of the affection may be obtained from the number of diapers used. If more than a dozen are required throughout the period, the flow may generally be regarded as above normal. When excess is great, women may find it necessary to wear several diapers at a time. Passage of large clots also indicates excess. As a general rule, the symptom of menorrhagia or metrorrhagia is one which calls for local examination. In the case, however, of menorrhagia of only moderate degree in an unmarried girl soon after the age of puberty, such as is a common result of a somewhat excessive ovarian activity, it may be desirable in the first place to try the effect of general treatment. In investigating the cause of the disorder all available

means of examination should be used, not only vaginal touch, but bimanual examination, the sound, and, except in the case of virgins, the speculum. If the source of the affection is not otherwise discoverable, and if it does not yield readily to treatment, the cervix should be dilated, to allow exploration of the cavity of the uterus.

Treatment.—The curative treatment of the various disorders of the sexual organs, of which menorrhagia and metrorrhagia are symptoms, has already been considered. It remains only to speak of the immediate and palliative treatment, and of the management of those cases in which no local cause is discoverable. Menorrhagia has occasionally actually produced a fatal result in cases in which no morbid condition could be detected even at an autopsy, and hence the primary indication is often simply to arrest the hæmorrhage.

In the first place, all systemic causes should be treated, as far as possible, and any general passive hyperæmia relieved, especially by saline purgatives if any constipation is present (*see* p. 202). If hæmorrhage is at all severe, perfect rest in the horizontal position, or with the pelvis raised, should be secured, and all hot drinks or alcohol must be avoided. The most efficient hæmostatic is ergot. Half-drachm or drachm doses of the liquid extract, or of the liquor secalis ammoniatus, may be given in cases of moderate severity. In more serious ones, drachm doses of the powdered ergot, in the form of fresh infusion, are to be preferred, or subcutaneous injections may be given, either of gelatine discs, or of some other preparation of ergotin (*see* p. 281), especially if a rapid effect is required. Next to ergot in value comes digitalis, given in rather full doses (such as half a drachm of the tincture), and strychnia, either of which may be combined with the ergot. Quinine acts as a hæmostatic if given in very large doses. Cannabis indica, in doses of fifteen or twenty

minims of the tincture, is also useful, especially when the hæmorrhage is associated with pain. Full doses of bromide of potassium are of value, particularly when there is excessive ovarian activity. This drug may often be usefully combined with cannabis indica. In very severe hæmorrhage, full doses of opium should be given. Cold has been employed to check menorrhagia, but it is now considered that the application of heat, by means of hot water, is equally or still more efficacious for this purpose, and more free from risk. Injections of hot water at a temperature of 110° or 115° F., into the vagina, or, by means of an irrigator, into the uterus after dilatation of the cervix, may be employed. If the loss is alarming, the vagina should be plugged. In plugging the vagina, it is best to use long strips of iodoform gauze, a piece of tape being attached to those first introduced to facilitate their removal. The strips are to be introduced, one by one, through a Sims' or cylindrical speculum, the speculum being gradually withdrawn meanwhile, until the vagina is fully distended. The plug should not be left more than twenty-four hours, but may be renewed if necessary. If bleeding still recurs after dilatation of the cervix, the cavity of the uterus should be swabbed with a styptic fluid, such as the tincture of iodine, the liquor ferri perchloridi, or liquor ferri subsulphatis.* If even this fails, styptic intra-uterine injections may be used as a last resort, and with due precautions (*see* p. 261).

After relief of the hæmorrhage, special precautions, particularly with regard to rest, are to be used for

* The liquor ferri subsulphatis of the United States Pharmacopœia, or Monsell's solution, is prepared in a similar way to the liquor ferri perchloridi of the British Pharmacopœia, but the ingredients are so proportioned that the result is a basic ferric oxysulphate. The proportions are (by weight)—Sulphate of iron, 5,760 grains; sulphuric acid, 510 grains; nitric acid, 780 grains. Water is added to make up 12 fluid ounces. A less irritating fluid than the liquor ferri perchloridi may also be made by dissolving the solid perchloride in water.

several ensuing periods, while any local cause of hæmorrhage should receive suitable treatment. Cold bathing during the inter-menstrual intervals is generally beneficial. In menorrhagia dependent on debility or an impaired quality of blood, or that associated with anæmia, provided that there is no active pelvic engorgement or tenderness, prolonged administration of iron in an astringent form, such as the tincture of the perchloride of iron, in combination with ergot, is often of value. In mild cases when no organic lesion is discoverable, the administration of mineral acids, with cinchona or quinine, may complete the cure.

Dysmenorrhœa.—Dysmenorrhœa is in many cases a symptom of some definite morbid condition. But in some instances it forms the substantive complaint. The subject of it is free from discomfort at other times, and there is no very manifest lesion of the uterus or other pelvic organs to be discovered.

The following are the chief varieties of dysmenorrhœa which have been described. The varieties have no claim to form a scientific classification, since they are not mutually exclusive, and are not based on any one feature, either the cause, or the clinical features of the malady, or the organ chiefly affected.

Membranous Dysmenorrhœa is the only variety which has a definite pathology, and this has already been described (*see* p. 262).

Congestive and Inflammatory Dysmenorrhœa can hardly be separated from each other, for the pain is caused by the flux of physiological congestion coming upon an inflamed or damaged organ. It might indeed be supposed that the mere excess of physiological congestion due to the presence of a fibroid tumour, or excess of sexual or ovarian activity, might suffice to cause the pain. But it is doubtful whether physiological congestion, even if greater than normal, would cause pain in tissues quite free from inflammation, although the inflammatory change may not be readily discoverable. This group is probably the most

numerous and important of all, and there are several kinds of inflammatory dysmenorrhœa specially to be noted. As a sequel of perimetritis, when adhesions have formed about the uterus and appendages, dysmenorrhœa is commonly produced. This may be due to interference with the movement and expansion of the pelvic organs, as well as to interference with ovulation, and the descent of the ovum. Again, if there are inflamed or distended Fallopian tubes, the menstrual flux will cause them to be painful. In metritis, with induration of uterine tissue, pain will be caused by its tenderness, and resistance to expansion. Probably the most common cause of dysmenorrhœa in unmarried women is endometritis. Girls who suffer from dysmenorrhœa frequently have leucorrhœa, and not uncommonly, if a speculum be used, a slight granular inflammation is seen around the os, indicating that a similar condition extends up the uterine canal, and an excess of cervical mucus is observed.

Inflammatory or congestive dysmenorrhœa generally does not exist from puberty, but is acquired later. The character of the pain is continuous rather than intermittent. If it is uterine in origin, the most severe pain is felt centrally in front. The pain is generally not limited to the flow, but begins beforehand; sometimes several days before, and may continue after. Not infrequently some pain or discomfort is felt in the menstrual intervals also.

Ovarian Dysmenorrhœa is a special variety of congestive or inflammatory dysmenorrhœa. The pain has the usual locality of ovarian pain, in one or both groins, radiating down the thighs and upwards towards the mammæ. The pain begins some days before the flow, is not specially increased by the flow, sometimes is even relieved by it. Some patients suffer from a peculiar intermediate pain, at a fixed date about midway in the menstrual interval, lasting several days, and accompanied by an increase of mucous secretion. This is probably really a form of ovarian dysmenor-

rhœa, and may indicate a rhythm of ovulation different from the ordinary one.

Neuralgic Dysmenorrhœa.—This occurs in hysterical or neurotic subjects, and the main element in it is nervous hyperæsthesia. Probably there is also in most, if not in all, cases, some element of congestion, inflammation, or obstruction, as a basis for the pain. This class comprises the most intense forms of dysmenorrhœa. The pain often produces vomiting, and prevents any food being taken. The patient may be quite unable to keep still, and writhes about in agony. It may be impossible to relieve her, except by morphia or opium. The pain frequently begins from puberty, but is liable to increase as years go on, in the absence of marriage and parturition. The pain may be limited to the flow, is generally much more intense with the flow, but may also begin somewhat beforehand.

Spasmodic Dysmenorrhœa.—This is allied to neuralgic dysmenorrhœa, and it is doubtful whether it ought to be separated from it. By some authorities it is considered to be the most typical form of dysmenorrhœa, and is regarded as a neurosis consisting of painful contractions of the uterus, analogous to the painful intestinal contractions in colic, and not the result of an obstacle to the menstrual flow. In this case the pain is intermittent and intense, and generally occurs with the flow. It is to be noted, however, that the paroxysms generally last much longer than a uterine contraction in labour or abortion, and also that there is usually a continuous pain in addition to the paroxysms. It does not seem therefore certain that, in all cases, the intermittent pain means uterine contraction, since a true neuralgia, like toothache or sciatica, may also be paroxysmal.

Obstructive Dysmenorrhœa.—In this case there is obstruction to the outflow of the menstrual discharge from stenosis or flexion. The pain is either spasmodic, due to the uterine contractions, or continuous from the irritation to the tender mucous membrane,

caused by the retained products. There are many cases, however, of very narrow uterine canal without any dysmenorrhœa. It appears clear therefore that pain is only produced if the menstrual flow is not perfectly fluid, and if either the canal is impeded by tenacious mucus, or shreds of membrane or clots, small or large, are discharged with the flow. Thus membranous dysmenorrhœa is one form of obstructive dysmenorrhœa, although the canal may be of normal size. Moreover, in cases not obviously belonging to membranous dysmenorrhœa, small shreds of membrane will often be found, if carefully looked for.

In obstructive dysmenorrhœa the pain is limited to the flow, and the patient is well in the intervals, unless some congestive or inflammatory element is added. It is often more or less spasmodic. The dysmenorrhœa often begins from puberty, but becomes aggravated as years go on. Often it has at first the character of purely obstructive dysmenorrhœa, but after a course of years symptoms of congestion or inflammation are added.

Obstructive dysmenorrhœa is not to be separated altogether from neuralgic or spasmodic dysmenorrhœa; but often it is a question of interpretation which is the preponderating element in any given case. Sometimes this can only be decided by the therapeutic test. The best clinical evidence of obstructive dysmenorrhœa is the expulsion of clots, combined with a flow which is scanty, or never at any time exceeds the normal. This shows that the blood is retained long enough in the uterus to allow clots to be formed, before it becomes mixed with the vaginal secretion. The evidence is still stronger, if the patient observes that a paroxysm of pain precedes the passage of clots. Some authorities deny the existence of obstructive dysmenorrhœa, although they recommend dilatation of the uterus for the relief of the pain. I have on several occasions produced dysmenorrhœa by removing rather too much tissue in the operation of trachelorrhaphy, and so nar-

rowing the cervix, and afterwards cured it again by the use of dilating bougies. This appears to be as positive evidence of obstructive dysmenorrhœa as can be expected.

Treatment.—The treatment of the various morbid conditions, inflammation, fibroid tumours, and the like, which may cause dysmenorrhœa, has already been described. It only remains here to discuss the palliative treatment during the attack of pain, and the treatment of those cases in which no very definite lesion, except perhaps a slight leucorrhœa, can be discovered. The former will first be considered.

An essential point is to enjoin the avoidance of all exertion, and, if pain is severe, the horizontal position should be maintained during the period. In congestive dysmenorrhœa saline purgatives should be given just before the period, at which time there is often a tendency to constipation, and full doses of bromide of potassium are useful. In all cases the hot hip-bath, or the whole bath, in which the patient should remain for as much as half an hour, affords much relief. Hot applications to the hypogastrium have a similar effect, and hot water with mustard to the feet, followed by rest and warmth in bed, is also useful. Cold should always be avoided, and the wearing of woollen drawers is generally desirable, if the patient is not kept to her bed. Considerable alleviation may also be procured by diffusible stimulants and the milder sedatives. Among the former may be mentioned ether and ammonia, one or both of which may be given with the liquor ammoniæ acetatis.* One of the most efficacious is the favourite domestic remedy of gin in hot water, which tends to increase the flow, as well as to diminish pain, but, for obvious reasons, much caution is necessary in recommending it. Essence of ginger in hot water may be used as a substitute. Among the most useful sedatives are antipyrin, hyoscyamus or belladonna,

* ℞ Sp. Ætheris Sulphurici, ♏xxx.; Sp. Chloroformi, ♏xv.; Liq. Ammoniæ Acetatis, ℥ss.; Aq. ad ℥j.

hydrocyanic acid, chloral, camphor in five or ten-grain doses, or bromide of camphor in capsules. Cannabis indica is very useful, especially when the flow is profuse, but it has the disadvantage of being uncertain in its quality and effects. Small doses should, therefore, be given at first, and increased up to about thirty minims of the tincture, or two grains of the extract. Phenacetin is also highly spoken of. Asafœtida may be given by enema, if there is much hysteria. Opium and its alkaloids are, of course, the most effectual remedies for the pain, but they should be avoided, as far as possible, in all chronic conditions. They are required, however, in severe cases, especially when dysmenorrhœa is the sequel of peritonitis. They may often conveniently be given in the form of suppository or enema.

The tendency to neuralgia and nervous hyperæsthesia should be treated in the intervals of menstruation by tonic and hygienic remedies, with cold bathing, air and exercise, and sufficient occupation. The same treatment tends to promote the formation of a more healthy menstrual decidua if menstruation is scanty as well as painful. Marriage is generally beneficial in primary congestive dysmenorrhœa, the result of ovarian irritation without any serious organic lesion. Mild forms of obstructive dysmenorrhœa are also often cured by marriage, followed by parturition. If, however, the marriage prove sterile, as is likely to be the case when the obstruction is considerable, the condition is frequently rendered worse.

Climacteric Disturbances.—The cessation of menstruation at the menopause is frequently accompanied by constitutional disturbances of a well-known character, which often last over a period of several years. These are to be attributed, not only to the cessation of the periodical active hyperæmia and discharge of blood to which the system has been accustomed for some thirty-five years, but to that of the expenditure of nervous energy in a particular direction. The chief

phenomena, therefore, are signs of plethora, with transient vascular disturbances, inducing flushings of the face, or feelings of heat, chilliness, or sinking in the epigastric region and other parts. Vicarious hæmorrhages from the nose and rectum are frequent; the liability to cerebral hæmorrhage is also increased. Any previously existing congestion or inflammation of pelvic organs is liable to undergo a temporary aggravation, after which, as a rule, it tends to subside. In many cases, especially when any previous uterine disturbance has existed, the diminution of menstruation is not gradual and progressive, but long periods of amenorrhœa are interrupted by profuse and often prolonged hæmorrhage, which may arouse a suspicion of the existence of cancer.

Irregular discharges of nervous energy are usual, and may take the form of headaches, of epileptiform or apoplectiform attacks, or of hysterical manifestations, in those predisposed to that disorder. In other cases the nervous disturbance takes the shape of irritability or depression, which, when there is a constitutional proclivity, sometimes develops into insanity. Sometimes, again, women seek refuge in alcohol from low spirits, or from the pain produced by pelvic disorders or by indigestion, and the foundation of intemperance is not infrequently laid about this time of life. With the diminution of sexual activity is associated a tendency to corpulence and to deposit of fat about internal organs, which is apt to lead to neglect of outdoor exercise. To this cause are partly to be ascribed the digestive disturbances which often form the most prominent feature of the general condition. They consist mainly of constipation, inactivity of liver, and distension of the abdomen by flatus, with frequent spasmodic and painful contractions of the intestines.

Treatment.—No emmenagogue treatment should be adopted, unless the menopause appear to be coming on at a period very long anterior to the normal age; nor,

on the other hand, should the intercurrent hæmorrhages, which often afford a natural relief, be checked too suddenly, unless signs of anæmia appear. Local examination should, however, always be made in case of undue hæmorrhage, lest there should be commencing cancer, or an erosion of the cervix, which at such an age is more likely to form the starting-point of cancer, and therefore calls the more urgently for treatment. Diet should be rather sparing, and patients should be urged to take a due amount of outdoor exercise. The allowance of alcohol should be diminished; beer, porter, and spirits are to be avoided, and claret or other light wine alone taken. Occasional venesection has proved useful, but is hardly an available remedy in the present state of popular opinion. If, however, epileptiform or apoplectiform attacks occur, or very severe headache is associated with an appearance of plethora, leeches to the temples, or cupping, may be employed. Occasional mercurial purgatives are often useful, and saline laxatives, especially the Hunyadi Janos, or other mineral water, are to be taken daily if required. For the nervous disorders, the bromides form the most useful remedies. For the digestive disturbances, alkalies, with a vegetable bitter, taken before meals, or ammonia with aromatics, and a small dose of rhubarb,* are most generally useful. When, however, there is much general debility, mineral acids, combined with tonics, are to be preferred; and nux vomica is often of value for stimulating the muscular walls of the intestines (*see* formula, p. 222).

Pseudo-cyesis. — By the term pseudo-cyesis is denoted spurious or imaginary pregnancy. This is not uncommonly one of the neuroses of the climacteric period, and its starting-point is then the enlargement of the abdomen by fat and flatus, combined with the

* ℞ Ammon. Carb. gr. ij.; Tinct. Rhei, ♏xxx.; Sodæ Bicarb. gr. x.; Syrup. Zingiberis, ℥j.; Aq. Menth. Pip. ad ℥j.—ter quotidie.

arrest of menstruation. The movements of the distended intestines are often mistaken for the movements of a child, even by women who have the experience of former pregnancies to guide them. The mental condition may be of any degree, from that of a not unnatural mistake, which is at once dispelled by a medical opinion, to that of a delusion amounting to monomania, which is proof against all assurances, and may even persist for a far longer period than the normal duration of pregnancy. The delusion may also occur at other times, especially soon after marriage, or after illicit intercourse. It may be entertained even though menstruation continues normal, or is merely diminished in quantity, the mistake in such cases being generally based upon corpulent or flatulent enlargement of the abdomen, and imaginary fœtal movements. The breasts, in some cases, are actually developed, and secrete a mucoid fluid, as in pregnancy, though in others the supposed enlargement is simply due to fat. The apparent enlargement of the abdomen is often increased by arching of the back and rigidity of the abdominal muscles.

The diagnosis is generally easily made by the recognition of the small size of the uterus on bimanual examination, and by resonance of the abdomen, although this may be, in some measure, diminished by great thickness of fat. The administration of an anæsthetic will clear up any doubt, and the formality of this proceeding, combined with that of a consultation, is often of use in dispelling the patient's illusion.

Dyspareunia and Vaginismus. — By the word dyspareunia is signified pain or difficulty in sexual intercourse. This symptom is frequently that which leads patients to seek for medical relief, although often they do not mention it until questioned on the subject. It is, therefore, generally desirable in the case of married women to make inquiry on the point when any condition is discovered likely to lead

to such a result. A vaginal examination will generally reveal whether any obstruction exists, due to a rigid or imperfectly ruptured hymen, to narrowness, cicatricial contraction, or spasm of the vagina; also whether the vagina is unduly short, or the uterus displaced, and whether the tenderness which causes the symptoms is situated at the vulval outlet, the urethra, the vagina, the cervix or body of the uterus, or the ovaries, or is due to periuterine inflammation or tumour. If the tenderness is found to be at the vulval outlet, a careful visual examination with a good light should be made as to its cause, which may be found in some vulvitis, erosion, fissure, lupoid ulceration, or urethral caruncle, which would escape detection by the finger. The treatment will depend upon the cause which may be discovered, and should, in almost all cases, include abstinence from any attempt at intercourse for a considerable period. It should be especially remembered that any partial retroversion of the uterus, by which its canal is brought nearly into a line with that of the vagina, exposes the cervix to a direct impact to which it is not normally liable, and that this effect is increased if there is any concomitant prolapse.

The word vaginismus denotes a spasmodic contraction of the sphincter vaginæ with the anterior fibres of the levator ani, which takes place upon any attempt at intercourse, and renders intromission difficult or impossible. The same effect is frequently produced by the introduction of the index finger, or even by touching the vulval outlet with a camel-hair brush. In severe cases the spasm does not only affect the local muscles, but the muscles of the whole body are thrown into intense energy of resistance by the mere idea of any contact with the vulva, so that intercourse could only be accomplished by absolute violence. In some women who have an excessive nervous dread of the consummation of marriage, even the first attempt at intercourse may be thus prevented. In the great majority of cases, however, two causes are present—a

local cause of irritation at the vulva, and a hyperæsthesia of the nerves of that region, almost invariably associated with an extreme general reflex susceptibility, dependent upon, or closely allied to, the hysterical temperament. Women who suffer in this way are often by no means destitute of sexual desire, but rather the opposite. The spasm of vaginismus is indeed an exaggeration of the contraction of the sphincter muscles normally produced by sexual excitement or pressure on the clitoris, but associated with painful sensitiveness of the mucous membrane on which the spasm causes pressure. The most characteristic cases of vaginismus are those which show themselves from the commencement of married life. The mental distress which is apt to follow often leads to great depression of spirits and impairment of general health. Usually there is no suffering apart from coitus, but sometimes the vulva becomes so hyperæsthetic that sitting and walking are painful, and the patient is reduced to a complete invalid life. The condition most commonly found as a cause of vaginismus is a vulvitis, most intense towards the posterior part of the vulval outlet, affecting especially the anterior surface of the hymen or its remnant, and sometimes associated with fissures or erosions. This may arise from some original disproportion of parts, or awkwardness on the part of the husband; not infrequently there is in addition a communication of contagion from a latent gonorrhœa; while in other cases there was a vaginitis or vulvitis existing before marriage, often dependent on the irritation of a uterine leucorrhœa. Oversensitiveness of the mucous membrane, and of the nervous system generally, induced by masturbation, may in some instances be a cause.

Vaginismus may also be set up by follicular vulvitis, by lacerations of the vaginal or vulval outlet resulting from parturition, by urethral caruncles or other growths at the vulva, or by granular inflammation at the meatus urethræ. The form of superficial ulceration

described by Matthews Duncan as a cause of the affection has been already mentioned (*see* p. 456). Lawson Tait describes as a frequent cause of vaginismus, in women over forty, a local atrophy of the mucous membrane, producing red spots which are excessively tender in consequence of the exposure of nerve-fibres through atrophy of the other tissues. This is said to be incurable, to lead to gradual contraction of the vulva, and to be only capable of palliation by occasional applications of strong carbolic acid.

Treatment.—In all cases of vaginismus, and in many of those of dyspareunia even without vaginismus, the introduction either of cold cream or other oily substance or of glycerine into the vagina before intercourse is a valuable palliative, since whenever there is pain on intercourse, or even a mere absence of sexual feeling, the natural lubricating secretion, poured out abundantly under the influence of emotion, is apt to fail. A little glycerine of starch is perhaps better than any oily preparation, since it increases the natural secretion of the glands, and mixes with it. In mild cases this plan, together with temporary sexual abstinence, and the treatment of vulvitis or vaginitis by the methods already mentioned (*see* pp. 450, 456), will prove sufficient. In a more severe case, the patient should be placed under anæsthesia, and unless the vaginal outlet is then found to be capacious, it should be fully stretched by the fingers until the largest size of Ferguson's speculum can be introduced, and a full-sized Sims' vaginal dilator of glass (Fig. 142, p. 496) should be introduced. This should at first be worn all day, if possible, the patient being kept in bed; afterwards it may be worn for some hours each day, while the treatment of any vulvitis, fissures, or erosions is continued. If this plan fails to effect a cure, after all erosions or lacerations have healed, a careful examination by probe or camel-hair brush should be made, to discover which are the sensitive points. If these prove to be chiefly the remnants of the hymen, Sims' operation should be per-

formed. This consists in dissecting away completely with scissors the whole circuit of the hymen, whether inflamed or not. After the operation the glass dilator should be immediately introduced, and worn for some time. In severe cases of vaginismus, when the hymen is inflamed and very sensitive, it is well to have recourse to this operation without delay. After the removal of the hymen, the vaginal secretion escapes more freely, and any vaginitis is more readily cured. The most hopeless cases are those in which little or no inflammation can be discovered, but the condition is one of *hyperæsthesia of the vulva*, affecting not only the hymen, but the nymphæ, vestibule, and clitoris, and apparently depending upon a perverted character

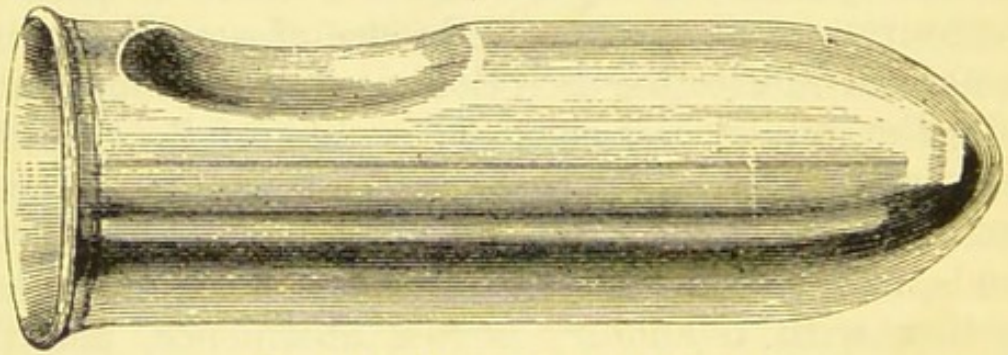


Fig. 142.—Sims' Vaginal Dilator.

of the nerves of sexual feeling. This state may produce incurable dyspareunia, even when there is no vaginismus, and may resist not only Sims' operation, but repeated parturition, the application of strong caustics, and even the dissecting off of the whole of the sensitive mucous membrane. Generally those cases are curable in which the vaginismus arises from inflammation, or in which the hyperæsthesia is limited to the hymen, although many months of treatment and of sexual abstinence may be required. Sometimes parturition may effect a cure by effectually dilating the vagina, but severe forms of the affection generally persist notwithstanding.

Absence of Sexual Feeling, apart from any dyspareunia, is so dependent upon emotional conditions as

to be little amenable to medical treatment. When primary it is often the result of individual peculiarity, but treatment is more frequently sought when it is secondary and acquired. If not associated with a premature menopause, it is more often dependent upon constitutional debility, anæmia, anxiety, or overwork, than upon local causes, and the only remedy is to be found in the removal of these conditions as far as practicable. Among local causes may be mentioned an undue relaxation of vagina, due to subinvolution of that canal after delivery, or to rupture of perineum or prolapse of uterus or vagina; and a want of muscular tone in its walls, associated with chronic leucorrhœa. These causes may be capable of removal. The extractum damianæ liquidum, given in doses of ʒj., appears to deserve in some measure its reputation as a tonic in these cases; but nevertheless it frequently fails.

STERILITY.—For the occurrence of conception with the greatest possible facility, it is necessary not only that there should be no deficiency on the part of the male, no dyspareunia or vaginismus, that the ovum should be properly formed and conveyed by the Fallopian tube, and that the uterine mucous membrane should be in a fit state to receive it, but also that the cervical canal should have its normal patency, straightness, and relative direction, should not be obstructed by a plug of mucus too tenacious to be displaced during coitus, and that neither the vaginal nor uterine secretion should have undergone any change rendering it adverse to the life of the spermatozoa. As a rule, the spermatozoa live only for a few hours in the acid vaginal secretion, while in that of the cervix or body of the uterus they may remain alive for a considerable number of days. The direction of the cervical canal should be nearly at right angles to that of the penis, and it is probable that frequently the semen makes its way for a considerable distance into the cervix almost at the moment of emission, not through any active

suction by the cervix, nor by exact apposition of the os uteri to the male urethra, nor even by the force of emission, but through the intermittent pressure on the cervix while it is turgid and tense with blood, so that its canal is probably rendered more circular than usual. Hence the occasional failure of vaginal injections after coitus as a prophylactic against pregnancy —a failure which appears to be more frequent in the case of women of emotional temperament. If the direction of the os is changed, as in the case of retroversion or cervical anteflexion, so that it does not dip into the pool of semen in the posterior cul-de-sac, or if the external os is very narrow, or the canal plugged by mucus too tenacious to be displaced by pressure, this mechanism is interfered with. It has been asserted that there is a wide gaping of the os and cervix in the sexual orgasm, but this is not the fact.

These causes of sterility, as well as stenosis or flexion near the internal os, do not render conception impossible, but only diminish its probability. In some cases spermatozoa have effected impregnation by making their way even from outside the vulva through an intact and narrow hymen, or by passing an almost complete atresia of the vagina. If, however, they have not free access to the cervix, there is greater probability of their perishing in the vagina before they can enter it, especially if the vaginal secretion is more adverse than usual to their life. The occurrence of the sexual orgasm on the part of the woman is not necessary to conception, but probably favours the entrance of the semen into the cervical canal. Thus I have known an instance of a woman who had been married for many years to two husbands in succession, and who, when over forty years old, experienced the sexual orgasm in coitus for the first and only time, and became then for the first time pregnant. There is no evidence to show in what proportion of cases a rapid ascent of semen within the cervix forms an element in the physiology of conception. It is probable that, in

most cases, deposition of semen within the vagina is sufficient, provided that there is no morbid condition of the vaginal secretion.

It has been said that a narrow cervix cannot cause sterility because the spermatozoa have to pass through the uterine orifice of the Fallopian tube, which is normally much narrower. It is not known whether the Fallopian tube expands in the sexual orgasm, though the probability appears to be against its doing so, the uterine wall being at that time tense. But even if it does not, the spermatozoa, maintaining their life and activity within the uterus, have ample time to pass the Fallopian tube singly through their own movements. There is quite space enough to allow this, but the probability of its happening must be greater if semen penetrates *en masse* into the safe refuge of the cervix, than if each spermatozoon has to travel from the vagina or from some still more external part. As a rule, acid solutions are injurious to the vitality of spermatozoa, and saline and very weakly alkaline solutions may tend to promote it, while of injurious fluids few have a more fatal influence than plain water in sufficient quantity. Hence, if the vaginal secretion has an acrid quality, a vaginal injection before intercourse of a solution containing 1 per cent. of common salt and $\frac{1}{10}$ per cent. of caustic soda or potash may tend to promote conception. It is generally assumed that the spermatozoa pass along the Fallopian tube, and there meet the ovum, on the analogy of the lower mammalia, in whom spermatozoa have been found in the oviduct, and on the surface of the ovary, shortly after coitus. It is maintained, however, by Lawson Tait and others, that, in woman, the fertilization of the ovum normally takes place in the uterus, and that the Fallopian tube only allows spermatozoa to pass when it has lost its epithelium, whose cilia naturally produce a current towards the uterus.

Among the commonest conditions associated with primary sterility is an imperfectly developed uterus,

with a small external os and cervical anteflexion. In this case the sterility often persists even after the canal has been made patent, a result which is probably due to some other congenital imperfection less easily remedied than the shape of the cervix. Other frequent causes are vaginismus, or any other form of severe dyspareunia, displacements of the uterus, fibroid tumours, stenosis of external or internal os, vaginitis, and cervical and corporeal endometritis. One of the most important causes of incurable sterility is distortion, obstruction, or atresia of the Fallopian tubes, due to adhesions resulting from pelvic peritonitis. Gonorrhœa has thus a very important influence as an indirect cause of sterility through the medium of peritonitis as well as through that of vaginitis and endometritis. The views of Noeggerath as to the incurable character and important sequelæ of gonorrhœa have been already mentioned (*see* p. 245). Besides the causes of sterility depending upon the wife, it may happen that spermatozoa are absent in the semen, even though there is no apparent impotence in the male, and probably the vitality of spermatozoa may vary in different cases. There is also evidence to show that there may be a relative sterility between husband and wife, each being capable of procreation with another person.

The frequent failure of attempts to cure sterility appears to indicate that, in a large proportion of cases, it depends, not upon any mechanical or other obvious cause, but on some inscrutable imperfection in ova or spermatozoa, or in their relation to each other, depending on want of vigour in either parent, or on an unknown cause. This is confirmed by the analogy of animals and plants. Animals in confinement, or in an uncongenial climate, may be sterile, even without any other sign of want of vigour. Plants may be so also, under domestication, or in unfavourable localities. In the human race it has been noticed that heiresses, who are often only children or members of small

families, are more apt to be sterile than the average of women. The imperfect fertility which results in animals from breeding in-and-in, or from self-fertilization in plants, is another instance of the obscure causes which influence propagation. Another instance of sterility not due to any discoverable local conditions, but rather to the general state of the system, is the usual cessation of child-bearing as women advance in years, some considerable time before the cessation of menstruation, and, probably, before that of ovulation.

Treatment.—The treatment will generally, in this country, be limited to the removal, when possible, of any of the above-mentioned curable causes, the existence of which may be detected, especially vaginitis, cervical and corporeal endometritis, displacements of the uterus, or stenosis of the cervical canal. Inquiry should also be made as to any sign of impotence on the part of the husband. If children are desired, coitus should not take place too often, and any vaginal injection, except that of a saline solution like that already mentioned, should be avoided for at least a day afterwards. Conception may follow insemination at any period of the menstrual cycle, but is believed to be most probable either just before or shortly after a period; which of these occasions is most favourable is not yet determined.

For a complete investigation of causes, it would be necessary to adopt the method of Marion Sims, namely, to examine microscopically the cervical mucus for spermatozoa on the day following coitus, and, if none are then found alive, to repeat the examination at shorter intervals, and, if necessary, immediately after that act. In this way may be established the absence of spermatozoa, their immediate expulsion by the vagina, their rapid death either in the vagina or in the cervix, or their failure to penetrate into the cervix. The method of intra-uterine injection of semen has not had sufficient success to outweigh its difficulties and other obvious drawbacks. Out of fifty-five trials

made by Marion Sims on six women, conception followed in one case only.

The treatment of sterility is not very hopeful unless the patient comes under observation while still young, and within a few years from the time of marriage, for, at a later stage, the cause of sterility, whatever it may be, is apt to have led to other alterations, not easily removed. It must be admitted that the treatment of sterility is the least successful part of gynæcological therapeutics, since a complete study of its origin is generally forbidden by a sense of delicacy. Those causes of sterility which consist in some obscure condition of the general system, impairing its reproductive vigour, lie almost entirely outside the domain of therapeutics, although a large proportion of the cases may be influenced by them. Prolonged change of air and scene, however, sometimes appears to have a favourable influence on conception, and pregnancy has sometimes occurred unexpectedly after a long separation between husband and wife.

Pruritus Vulvæ.—Either associated with vulvitis, simple or follicular, or with any morbid condition of the uterus or vagina, an irritation, itching, or burning at the vulva is a frequent and often a very distressing symptom. Sometimes it is combined with a general hyperæsthesia, especially of cutaneous nerves. It is not uncommon in pregnancy or as a symptom of commencing cancer, and is promoted by all causes of active or passive hyperæmia of the sexual organs. It is also common in diabetes, or may be dependent upon a gouty diathesis. Any eruption around the vulva, pediculi about the pubes, the acarus scabiei, or threadworms wandering from the rectum, are also among its causes. The itching may extend to the vagina, the anus, and the adjoining skin. It is generally much aggravated by warmth, and hence may render sleep at night almost impossible, while the effect upon the nervous system of the constant or frequently recurring torment is often very severe. In other cases the

sexual irritability which results is a source of great annoyance, or may give rise to the habit of masturbation. The scratching excited by the itching aggravates the malady, and is apt to produce vulvitis, if none existed previously. Pruritus vulvæ thus partakes, in great measure, of the character of a neurosis, but in a considerable proportion of cases it is excited by some discharge, either uterine or vaginal, which either sets up actual vulvitis, or at least irritates the terminations of the nerves.

The **Treatment** consists in the discovery and removal of the cause. Endometritis is to be especially sought for, if no other is readily discoverable. In all cases, diet should be sparing, alcohol and spices should be avoided, and extreme cleanliness observed. As a temporary palliative, warm hip-baths at intervals of a few hours are of use. If uterine or vaginal leucorrhœa is the exciting cause, very frequent vaginal injections, used in an effectual manner (*see* p. 223), are to be recommended, and a tampon soaked in glycerine containing acetate of lead or borax may be kept constantly in the vagina. Especially, when the irritation is not limited to the vulva, but extends to the vagina, frequent douches with warm infusion of bran are useful. The vulva, if not itself much inflamed, may be protected by unctuous applications, of which the best is vaseline or lanolin, to which may be added acetate of lead (ʒj. ad ℥j.), with acetate of morphia (gr. x. ad ℥j.), chloroform (ʒss. ad ℥j.), or dilute hydrocyanic acid (ʒj. ad ℥j.). An ointment of quinine in vaseline (gr. xxx. ad ℥j.) often gives much relief. If there is actual inflammation of the vulva, it is preferable to keep between the labia a pledget of lint soaked in a lotion containing glycerine (ʒj. ad ℥j.), and carbolic acid (gr. iv. ad ℥j.), to which may be added acetate of morphia (gr. ij. ad ℥j.) or dilute hydrocyanic acid (ʒss. ad ℥j.), or a combination of the two. Carbolic acid and glycerine may also be combined with the liquor plumbis subacetatis dilutus. A solution of per-

chloride of mercury (gr. iv. ad ℥j.) is also a remedy of repute. Infusions of tobacco may be used both as a vaginal douche and for external application. Any constitutional disorder must be treated, saline laxatives being generally of use. Bromide of potassium in full doses is often valuable, and opiates, or chloral, must be given to secure sleep in severe cases. When the neurotic element is predominant, quinine or arsenic may be of service.

Coccygodynia.—By coccygodynia is meant pain in the situation of the coccyx. It is generally accompanied by tenderness, and is greatly increased by any movement of the sacro-coccygeal joint, or the muscles attached to the coccyx. It is thus usually most acute on defecation, and on sitting down, or rising from the sitting posture. Sometimes pain is also felt on walking or while sitting. Coccygodynia is either a symptom of disease of the coccyx or of its articulation, or it may be, like pruritus vulvæ, a neurosis depending on any source of irritation in the sexual organs, anus, or rectum. In the former case it is generally either the result of injury during parturition, or one received from without, as by horse exercise. In the form of a neurosis, the affection is not uncommon in single women. For diagnosis, the coccyx should be explored between one finger in the rectum and another used externally. The detection of actual inflammation of the coccyx itself or of its articulation respectively will be assisted by the degree of tenderness of the bone itself on pressure, or of the pain produced by moving it. When there is no history of any cause likely to have produced inflammation, careful search should be made for a source of reflex irritation.

Treatment.—In the neurotic form of the affection, the chief object is to cure the primary cause. Subcutaneous injections of morphia over the coccyx afford relief. When any local inflammation is diagnosed, leeches may be applied over the seat of pain, followed by repeated counter-irritation. In very obstinate cases

a tenotomy knife may be introduced at the tip of the coccyx, and the bone severed from its attachments posteriorly and along its lateral border by subcutaneous incision. If this fails, the whole bone may be excised. The latter plan is preferable if the pain is a sequel of actual dislocation, fracture, or ankylosis of the bone. It is only in exceptional cases, however, that surgical interference is desirable.

The following symptoms are sometimes the subject of questions in oral examinations :—

Retention of Urine.—The most important cause of this condition to be looked out for is retroversion or retroflexion of the gravid uterus. The symptom is usually first produced from the third to the fourth month of pregnancy. It is to be noted that no displacement of the normal unimpregnated uterus can ever produce retention of urine. The organic cause next in importance is fibroid tumour of the uterus, especially a fibroid situated low down in the wall of the fundus, or in the cervix. In these cases the retention usually first occurs near the time of commencement of a menstrual period, or a little before it. Ovarian tumours within the pelvis or other tumours outside the uterus, such as hæmatocele, less frequently cause retention. Other organic causes are pressure of the fœtus in labour, a calculus impacted in the urethra, cancer invading the urethra, and stricture of the urethra of inflammatory origin, which is very rare in the female. Of non-organic causes the most frequent is hysterical retention. Retention may also occur in very severe diseases, such as typhus or enteric fever, and after parturition.

Incontinence of Urine.—In complete incontinence of urine, where the urine flows away continuously, one of the varieties of urinary fistulæ should be looked for. The chief varieties are vesico-vaginal, urethro-vaginal, vesico-utero-vaginal, vesico-uterine, and utero-vaginal fistulæ, vesico-vaginal being by far the commonest. These fistulæ usually arise from

sloughing after prolonged pressure through retention of the fœtal head in the vagina or cervix uteri during labour, and are first manifest at an interval of some days after delivery. More rarely they are produced by direct laceration in instrumental delivery, and then become manifest immediately. Other causes of fistulæ are cancer, and, in rare cases, syphilitic ulceration. Fistulæ may also be produced by operations on the cervix uteri or vagina, and are sometimes made intentionally for the cure of cystitis.

Complete or partial incontinence of urine may also be a neurosis in hysterical or quasi-hysterical subjects, or may result from over-distension of the urethra for exploration of the bladder. Partial incontinence may arise from pressure due to pregnancy or tumours, or from weakness of sphincteric muscles, generally combined with some source of reflex irritability or of pressure, such as cough.

Painful Micturition.—The chief causes are urethritis and vulvitis, especially if of gonorrhœal origin, cystitis, calculus (very rare in women), vascular caruncle of urethra, and any inflammatory conditions of uterus or ovaries, or elsewhere in the pelvis, which cause a bearing-down effort to be painful. Among these are specially to be noted perimetritis, and parametritis affecting the cellular tissue around the bladder. Frequent micturition, when not due to cystitis or kidney lesion, is commonly reflex, from some inflammation or congestion of uterus or ovaries.

Leucorrhœa, or whites, in the strict sense of the term, is synonymous with catarrh of the cervix uteri, and has been described under that head. The discharge escaping through the vulva is milky white, or slightly yellowish, sometimes mixed with flakes or strings of tenacious glairy mucus. Other discharges more or less resembling leucorrhœa proper may be produced by vaginitis or vulvitis, or by excessive secretion of the glands of the vulva, especially the vulvo-vaginal glands. In the former case, the discharge is purulent, in the latter it is clear and mucoid.

Offensive Discharges.—An intensely fœtid character in the discharge from the genital canal, such that the smell clings to the fingers, and can scarcely be removed from them by disinfectants, is produced by cancer in the stage of sloughing, by decomposition of the products of conception, or of a sloughing non-malignant tumour, such as a fibroid tumour, or from a long retained pessary, especially when it has produced ulceration. Minor degrees of offensiveness in the discharge may occur in cases of endometritis, vaginitis, and vulvitis, chiefly when the discharge is purulent, and, most of all, when it is gonorrhœal. These are much promoted by want of cleanliness.

Swellings at the Vulva.—The following are the chief which have to be distinguished:—Phlegmon or abscess of the cellular tissue, distension or abscess of the duct of the vulvo-vaginal gland, inguinal hernia, hydrocele, growths (epitheliomatous, fibroid, sarcomatous, fatty), syphilitic hypertrophy, lupus, elephantiasis.

Swellings behind the Cervix Uteri.—The following are the commoner causes of swelling in this position:—Exudation in the pouch of Douglas (which may be lymph, serum, pus, or blood), clotted blood forming hæmatocele, rarely hæmatoma outside the peritoneum, fibroid tumour of uterus, retroflexed fundus uteri, gravid or non-gravid, ovarian tumour, ovary enlarged by inflammation or abscess, distended Fallopian tube, extra-uterine fœtation, cancer of peritoneum, cancer, cellulitis, or syphilitic induration around rectum, scybala in rectum, outgrowths from posterior pelvic wall.

THE END.

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