

the abdominal contents as well as upon the uterus, has some effect. Thus the knee-elbow position of gynaecologists throws the viscera toward the diaphragm and causes the fundus of the uterus to be directed more toward the umbilicus. The expulsive action of the muscles of the abdominal wall, by pushing downward the intestines, affects the ante-flexion and anteversion, and at the same time depresses the organ. Even the action of respiration has a slight effect. The state of tonic of the pelvic floor and the vaginal walls and the repletion of the vessels have also considerable influence.

Fig. 4223.—Situation of the Uterus during Repletion of the Bladder. (Schultze.)

Fixation.—The position of the uterus is maintained by the following connections: (1) with the vagina and bladder; (2) with the pelvic fascia by means of the parametrium and its vessels; (3) with the pelvic peritoneum by the broad ligament; (4) by special bands known as the round and utero-sacral ligaments.

The attachment of the vagina (Fig. 4216) is along a zone from 6 to 8 mm. in breadth, and is very intimate, the muscular and connective tissue and the mucous membrane of the two organs being continuous, as might be expected, considering that both were originally developed from the same tubular structure.

The neck of the uterus is attached to the fundus of the bladder by loose connective tissue containing numerous veins. The vesico-uterine fold of the peritoneum closes the connection above. This usually descends only as far as the isthmus of the uterus (Fig. 4215, B, 2), but in multiparæ is occasionally seen to reach the vagina, in which case the uterus has no immediate union with the bladder.

The pelvic fascia, or sheet of connective tissue that lines the pelvic cavity, has necessarily important relations with the uterus, since that organ is itself a portion of the pelvic floor. This fascia varies greatly in its consistency, in some situations being loose and offering but little resistance; in others being condensed into bands

and sheets that fix and restrain the organs with which it is united. It is particularly associated with the great vascular trunks, and often contains in its meshes masses of fat. Virchow proposed the name *parametrium* for the extensions of this fascia that invest and are immediately adjacent to the uterus. They reach the viscus by the base of the broad ligament, along the branches of the uterine artery, and cover its lateral edges and the supra-vaginal portion of the cervix, extending upward a varying distance under the peritoneal covering and gradually disappearing as they reach the upper part of the body.

Behind, a utero-sacral sheet can be traced along the sides of the rectum to the sacrum and the coccyx; in front a utero-pubic sheet passes to the bladder and thence to the pubis. Some thickened bands of this have been called the vesico-uterine ligaments. Laterally, through the base of the broad ligament, along the vessels and nerves that enter here and themselves constitute an elastic band, can be traced sustaining bands that have been called by Kocks the cardinal ligaments. It will be seen that the neck of the uterus is thus suspended hammock-wise in a network of connective-tissue cordage.

The broad ligaments (*ligamenta lata uteri*, Figs. 4202, 4226, 4227) are formed by reflections of the pelvic peritoneum upon the uterus and the annexa. Together they constitute a common mesentery for these organs. When spread out each has the appearance and shape of a membranous wing, which led De Graaf to style it the *ala vesperilionis*, or bat's wing; and the French anatomists still use the term *ailerons*, or little wings, for its subordinate divisions (Fig. 4202, a, b, c). The external insertion or hilum—that is to say, the line where the ligament is reflected upon the lateral wall of the pelvis—is about 2 cm. behind the transverse diameter of the superior strait, a little in front of the internal iliac artery. It passes up over the psoas and the external iliac vessels, surrounding the suspensory ligament of the ovary and the ovarian vessels and nerves, where it is lost. Waldeyer has given to this upwardly extending process the name of *mesodesma suspensorium*. Its inferior or basal insertion is broad and situated on the pelvic floor nearly in the bischiatic line (Fig. 4228). Its upper edge contains the oviduct, and, beyond the ovary, is continued upon the suspensory ligament. From its anterior surface is raised a small fold containing the round ligament (*mesodesma teres* of Waldeyer), while from its posterior surface the ovarian ligament and the ovary itself are suspended by the *mesovarium*. The portion above

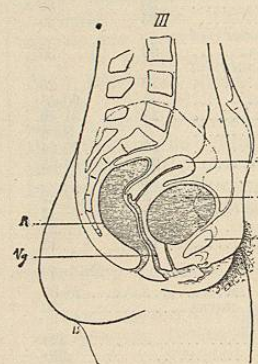


Fig. 4224.—Situation of the Uterus during Repletion of the Bladder and Rectum. (Schultze.)

insertion is broad and situated on the pelvic floor nearly in the bischiatic line (Fig. 4228). Its upper edge contains the oviduct, and, beyond the ovary, is continued upon the suspensory ligament. From its anterior surface is raised a small fold containing the round ligament (*mesodesma teres* of Waldeyer), while from its posterior surface the ovarian ligament and the ovary itself are suspended by the *mesovarium*. The portion above

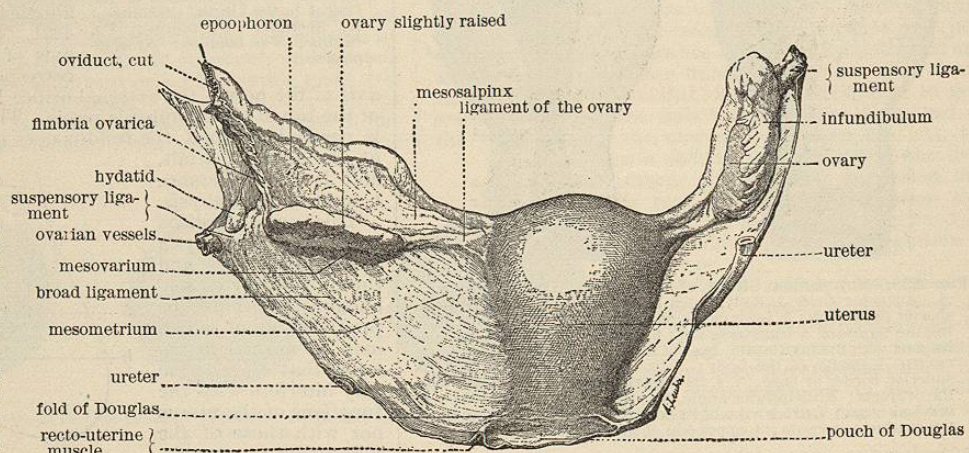


Fig. 4225.—The Uterus, Oviducts, and Ovaries, seen from Behind. (Spalteholz.)

this fold is thin, contains the remains of the Wolffian body and its ducts with but little connective tissue, and is known as the *mesosalpinx*; that below is thicker, and

since it affords the special investment of the uterus, is called the *mesometrium*. There is here found a considerable amount of loose connective tissue (parametrium),

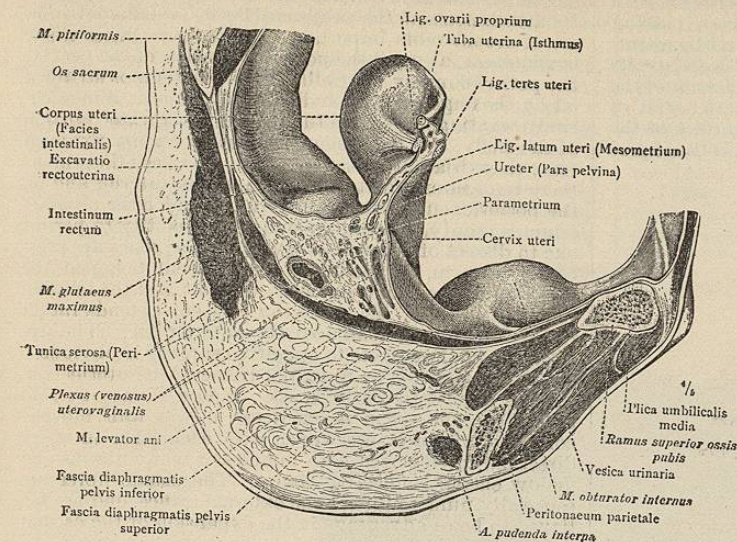


Fig. 4226.—Antero-posterior Section through the Female Pelvis 4 cm. to the Right of the Median Line. (Toldt.) The section cuts the broad ligament and shows the continuity of its two peritoneal layers with the parietal peritoneum of the pelvic floor. It also shows the parametrium, the pelvic diaphragm, and, under it, the fatty tissue of the ischio-rectal fossa. The uterus is shown more erect than normal. Made from a frozen preparation.

the uterine vessels and nerves and the ureter, besides a thin layer of smooth muscular fibres continuous with the muscular tissue of the uterus.

The ante-flexed position of the uterus bends forward the two ligaments so that they form a shelf that supports the intestines (Fig. 4225), and which, while almost vertical at the sides, is nearly horizontal in the middle. It divides the pelvis into two cavities or pockets, a recto-uterine behind and a vesico-uterine in front.

The portion of the mesometrium that immediately invests the uterus is called the *perimetrium*. Behind, it is continuous with the peritoneal covering of the rectum; in front, with that of the bladder. In the latter situation it reaches the uterus about at the isthmus, forming the *utero-vesical fold*, and is then reflected over the anterior surface of the body, the fundus, the posterior surface of the body, and the supravaginal surface of the neck, passing thence to the upper part of the vagina and then being reflected upon the rectum, forming the *recto-vaginal fold* (fold of Douglas, Fig. 4226). This fold is interrupted laterally by two bundles of smooth muscular fibres which pass from the uterus along the sides of the rectum to the sacrum. These, the *utero-sacral ligaments*, do not reach as low as the bottom of the fold, and there is consequently formed between them a well-marked pocket, lying between the uterus in front and the rectum behind, which is known as the *recto-vaginal pouch* or *pouch of Douglas* (*excavatio recto-uterina*), from James Douglas, professor of anatomy and surgery in London (b. 1642, d. 1675). This pouch is the lowest portion of the abdominal cavity, and any effusions are likely to collect there. It can easily be palpated through the vagina.

It has already been mentioned that the ovarian and round ligaments represent portions of the genito-inguinal ligament or gubernaculum of the genital gland, which, instead of remaining free throughout its course, has become attached to the uterus—that is to say, to the enlarged Müllerian duct (Fig. 4197). Accordingly the ovarian ligament is inserted upon the uterus behind the superior cornu, while the round ligament arises from in front of the same, a little below the insertion of the

oviduct. The round ligament then passes down between the layers of the mesometrium and the parametrium, above the ureter, the uterine, the vesico-vaginal, the obturator, and the external iliac vessels to the internal abdominal ring, lifting up the peritoneum as it passes to form a slight investment (*mesodesma teres*, Waldeyer). It then passes through the inguinal canal, sometimes surrounded by a peritoneal diverticulum, called the canal of Nuck (Anton Nuck, professor at Leyden, 1650-92) and having about the same relations as the spermatic cord of the male. Finally its fibres separate to be inserted in the subcutaneous tissue of the labium majus. The round ligaments deserve that appellation only in the middle of their course; in their upper part they are flattened, below expanded in a fan-like manner. They are 12-15 cm. in length, about 3-5 cm. broad, and are composed mostly of muscular tissue, having, therefore, no great tensile strength. During pregnancy they increase to four times their normal size.

The utero-sacral ligaments have already been mentioned. They are fibromuscular bundles that pass, from just below the isthmus of the uterus, backward along the sides of the rectum to the sacrum. Occasionally secondary *utero-lumbar* bands are seen that are inserted on the last lumbar vertebra.

Relations.—The antero-inferior surface of the body is often called the vesical surface because of its contact with the bladder. It appears normally to remain in contact with that organ, lying upon it as upon a water-bed and adapting itself to

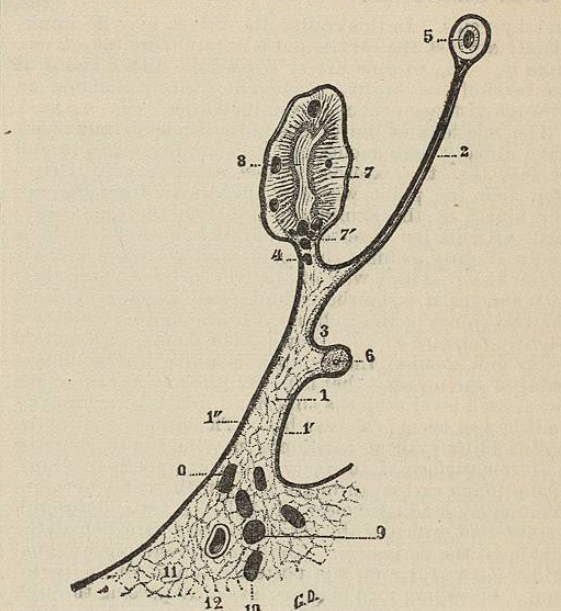


Fig. 4227.—Sagittal Section of the Broad Ligament (right side, inner surface of section.) (Testut.) 1, Broad ligament, with 1', its anterior layer; 1'', its posterior layer; 2, mesosalpinx; 3, mesodesma teres; 4, mesovarium; 5, oviduct; 6, round ligament; 7, ovary, with 7', its hilum and vessels; 8, ovisacs; 9, uterine artery; 10, uterine veins; 11, areolar tissue of pelvis; 12, ureter.

its states of repletion and depletion. Coils of intestines rarely insinuate themselves between these organs. The supero-posterior surface is called the intestinal surface

because it is covered with coils of the small intestine or of the pelvic colon. These never descend, however, into the pouch of Douglas.

The principal relations of the neck of the uterus are with the ureter and the uterine artery. The ureter, passing down obliquely through the base of the broad ligament, crosses the external border of the neck a little below its internal orifice, passes along the cervical attachment of the vagina for about 1 cm., and reaches the anterior wall of the vagina at about the level of the external orifice of the cervix. It is here surrounded by loose connective tissue

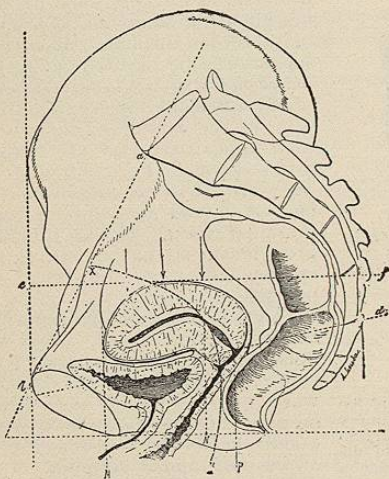


FIG. 4228.—Scheme showing the Relations of the Uterus to the Skeleton. (Rieffel.) *x, y*, Axis of pelvic cavity; *a, b*, plane of superior strait; *c, d*, line from superior fourth of symphysis to sacrococcygeal articulation; *e, f*, horizontal through union of fourth and fifth sacral vertebrae; *M*, vertical through fundus; *N*, vertical through internal orifice; *P*, vertical through external orifice.

and by veins. In this course the ureter may lie immediately against the cervix and is rarely more than 2 cm. from it. The uterine artery crosses the ureter about at the level of the vaginal portion of the cervix and at an average distance of 2 cm. from its border.

The relations of the uterus to the skeletal framework have already been mentioned. From Fig. 4228 it will be seen that the external surface of the cervix is situated near the point where a line drawn from the upper fourth of the symphysis pubis to the sacrococcygeal articulation intersects the pelvic cavity. It is really slightly behind this point and therefore a little nearer the posterior wall of the true pelvis. According to Waldeyer it is in the frontal plane passing through the two spines of the ischium. In the figure it is shown slightly forward of this plane. The fundus is about 20 to 25 mm. behind the symphysis pubis. The lowest point of the uterus—that is to say, the anterior lip of the os—is on a level with the superior third of the symphysis and the last coccygeal vertebra. The highest part of the uterus in its typical position is not the fundus but the posterior surface of the body. It corresponds to a horizontal plane carried through the fourth sacral vertebra (Waldeyer) or a little below (Rieffel). A vertical through the internal orifice of the cervix passes a little behind the middle of the perineum. Another through the external orifice passes through the posterior fourth of the perineum. According to Waldeyer, a vertical passing through the anterior part of the fundus reaches the middle of the urethro-vaginal septum. In the figure it is thrown a little forward of that. As the uterus is subject to considerable changes of position, these data can only be approximate.

Structure.—The walls of the uterus are formed of a serous coating derived from the peritoneum—the *perimetrium*; a subserous layer of loose connective tissue—the *parametrium*; a thick mass of unstriped muscular fibres—the *myometrium*; and the mucous membrane or

endometrium that lines the interior. These distinctions are of especial value in studying the pathological conditions of the organ.

The peritoneal investment has already been considered. Its attachments to the subjacent layer, or parametrium, are of considerable importance. Where the latter tissue is abundant, as upon the posterior portion of the cervix, the peritoneum can be readily lifted into folds or stripped off by the finger or the handle of the scalpel. Where entirely wanting, as on the fundus and the greater portion of the body, the peritoneum cannot be readily removed from the subjacent muscular layer. Between these areas there is an intermediate zone both on the anterior and on the posterior surfaces of the uterus, in which the parametrium is scanty, but still in sufficient quantity to permit one to dissect off the serous layer. These zones are crescentic in form, the points of the crescent being at the insertion of the round ligament in front and the ovarian ligament behind. The posterior crescent extends rather farther downward than does the anterior one. The application of these facts to operative surgery is obvious.

The *myometrium* or muscular tissue of the uterus constitutes almost its entire mass. Indeed it may be said that the whole organ is one dense, closely knit muscle, composed of fibres interwoven with each other in every direction, interspersed with bundles of white fibrous and yellow elastic connective tissue. The elastic fibres are especially numerous near the external orifice, and are believed to be of advantage in the expansion of the os that occurs during labor.

While it is not possible to make an accurate separation of the muscular tissue into sheets distinguished by the direction of the fibres, as is done in other hollow viscera, it is convenient and customary to speak of three layers. Of these the middle one is the most important, as it is distinguished by the presence of large venous trunks, the uterine sinuses, which have given it the name of the *vascular layer*. The muscle bundles surround the vessels in every direction, so that when they contract the blood is practically squeezed out, thus affording an important means of stopping hemorrhage after labor. This arrangement is particularly noticeable in the fundus, the usual seat of the placenta, and is not found upon the cervix.

The external layer is also composed of fibres having every direction; it is not, however, so rich in vessels. It is extended outward beyond the uterus proper upon the attachments of the organ: the broad, round, ovarian, and utero-sacral ligaments, the oviducts, the vagina, the bladder, and the rectum. The internal layer is thin and formed of a network of longitudinal, oblique, and circular fibres, the latter forming sphincter-like rings around the entrance of the oviducts. At the internal orifice of the cervix they form an annular bundle sometimes called the cervical sphincter.

The *endometrium*, or mucous lining, has, in the healthy uterus, a grayish-pink appearance, is soft, and easily torn. At the oviducts and vagina it is continuous with the mucous membrane lining those organs. It is composed throughout of a ciliated epithelium which is well developed only during the period of sexual activity, the direction of the ciliary wave being toward the external orifice. The epithelium is seated upon a *membrana propria*, but without any submucosa, a matter which should be remembered in the curetting of the uterus, as the instrument readily passes through into the muscular layers and may produce extensive lacerations and even perforation.

Some differences occur between the lining of the body and that of the cervix. In the body the epithelium is cylindrical, its nuclei being placed at about the middle of the cell; the protoplasm is easily stainable. The *membrana propria* is a network of connective-tissue fibres with stellate cells, and in its meshes are found cells having the character of leucocytes, so that the tissue appears to have a lymphoid character. On the surface of the membrane are seen, spaced at distances of about 0.1–0.2 mm., the openings of tubular glands, resembling in form the glands of Lieberkühn of the small intestine. These are

usually simple but sometimes branched. They are lined with ciliated epithelium, the direction of the ciliary wave being from the fundus toward the mouth of the gland. Their secretion is not, in a healthy state, very abundant, as the surface is merely moistened with mucus which has an alkaline reaction.

In the cervix the epithelial cells are longer, thinner, and narrowed at the base; their nuclei are either in several rows or situated nearer the base, and the protoplasm is not readily stained. The glands here are more utricular in character and incline to be branched. They secrete an extremely viscid mucus, difficult to remove, which fills up the cervical canal, especially during pregnancy and before menstruation is established. There are not infrequently found here small retention cysts caused by

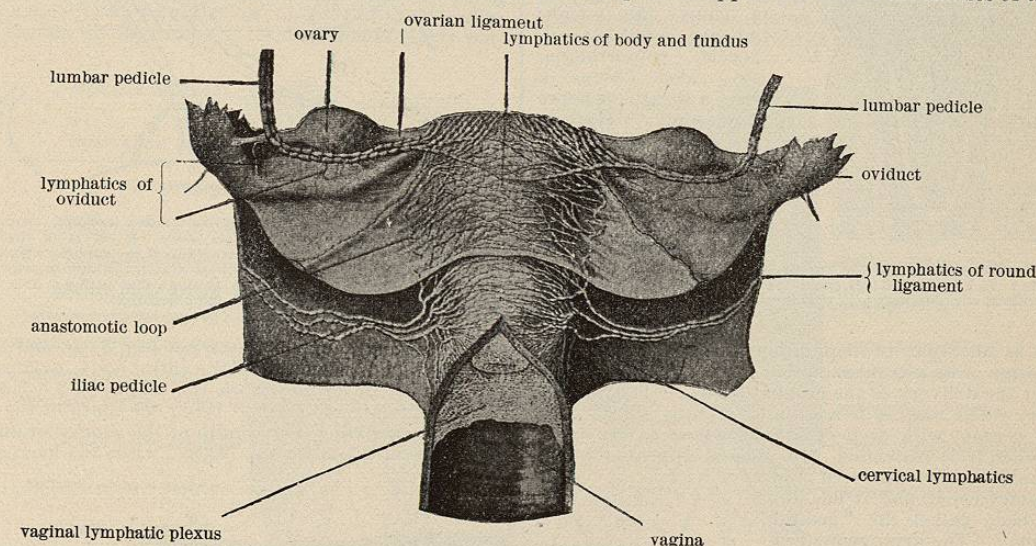


FIG. 4229.—Lymphatic Vessels of the Uterus. (Poirier.)

the closure of the blind ends of these glands. These are the so-called ova of Naboth, being described by Martin Naboth of Leipsic (1675–1721), who supposed them to be veritable ova.

Toward the cornua of the body the epithelium becomes less elongated and gradually merges with that of the oviducts. There is also a gradual transition at the internal os, between the epithelium of the body and that of the cervix. At the external orifice the ciliated epithelium disappears gradually, giving place to the many-layered epithelium of the vagina. The line of demarcation is, in the virgin, at the external orifice, but after repeated pregnancies it is found higher up within the cervix.

Arteries.—The uterine artery is the principal one that supplies the organ, but blood also reaches it by the ovarian artery and the artery of the round ligament.

The uterine artery arises from the anterior trunk of the internal iliac, often in common with the superior vesical artery. It passes down along the lateral wall of the pelvis nearly to the level of the spine of the ischium, then curves forward, enters the base of the broad ligament, and proceeds almost horizontally toward the supra-vaginal portion of the cervix. It then ascends along the lateral border of the uterus as far as the fundus, where it curves back and enters the mesosalpinx, and divides into its terminal branches. In its course it lies alongside the ureter which is on its inner side, separating it from the peritoneum. In order to reach the uterus it must cross this conduit, which it does about 2 cm. from the lateral edge of the cervix, a little below the isthmus. Its pulsation can sometimes be felt during vaginal examination. Its course along the sides of the uterus is tortuous, especially in multipare. It gives off branches to the broad ligament and to the ureter, a cervico-vaginal branch of

considerable size that descends from the upper part of the vagina, numerous branches for the cervix and body of the uterus, and finally divides into two branches, one for the fundus and one for the oviduct—the internal tubal. The free anastomosis with the ovarian artery has already been mentioned. This is so free during pregnancy that some authors have considered that the ovarian vessel gives the principal supply to the uterus.

The artery of the round ligament is analogous to the cremasteric artery of the male. It is derived from the epigastric artery and sends a small branch upward along the ligament to the uterus.

Veins.—The veins of the uterus are extremely numerous. They have very thin walls, so that on section they stand open and appear not unlike the sinuses of the dura

mater. From the vascular layer of the uterine wall they pass out as trunks of considerable size, uniting along the edge of the organ into a rich network—the utero-vaginal plexus—which extends along the entire length of the uterus and the vagina, surrounded by connective tissue and smooth muscular fibres. This discharges at the height of the external orifice into the uterine veins, which pass outward, following the general course of the artery.

Lymphatics.—The lymphatics of the uterus (Fig. 4229) arise from three plexuses: one submucous, another muscular, and a third subserous. The trunks from these all unite in the subperitoneal tissue to form a fourth plexus, from which are given off efferent trunks that reach the lumbar glands.

Nerves.—These are derived from the hypogastric and ovarian plexuses of the sympathetic and from the third and fourth sacral nerves of the cerebro-spinal system. The fibres are mostly of the non-medullated variety, though a considerable number of medullated fibres appear, most of them fine but some of considerable size. They unite near the vaginal junction to form the utero-vaginal plexus, which contains a plexiform ganglion, the cervical ganglion, or ganglion of Lee (R. Lee, 1842). Other ganglia are said to occur near the uterine attachment of the ovarian ligament. Rein found, in rabbits and guinea-pigs, numerous small ganglia about the cervix, and was led to believe that no nerves reached the organ without passing through a ganglion. This has not, as yet, been shown in the human species. As to the endings of the nerves, Gawronsky and Kalischer saw rounded and plate-like endings in the epithelium and the muscular tissue, and Herlizka describes medullated fibres that end with free dendrites in the uterine wall. These

would appear to be sensitive, cerebro-spinal nerves, required for reflex action.

THE VAGINA.—*Etymology.*—From the Latin *vagina*, a sheath or covering, particularly the scabbard of a sword.

It was only occasionally and figuratively used to indicate the sexual passage. The older anatomists did not use it in this sense, but designated the organ as the *collum uteri*. Its modern use was established by De Graaf. Greek, *κόλπος*, a sinus, the womb; whence *colpitis*, *colpocoele*, *colporrhagia*, etc.; also *ἐλτρον*, a case, a sheath; whence *elytrotomy*, *elytrotosis*, *elytrotasty*, etc. French, *vagin*; Italian, *vagina*; German, *Scheide*, *Mutterscheide*.

Definition.—The dilatible, musculo-membranous conduit that extends from the uterus through the pelvic floor to the vulva. It serves as an organ of copulation, as a passage for the evacuation of menstrual and other fluids from the uterus, and for the delivery of the child at term.

Form.—The vagina is a collapsible tube whose walls are in contact with each other, and whose cavity exists only when it is distended. In general appearance it is not unlike some parts of the alimentary canal, and it has, indeed, been called the "genital intestine." The arrangement of the apposed walls is affected by the neighboring organs. Above, where they surround the os uteri, a transverse section shows the tube to be nearly circular; at the middle, where the muscular walls of the ureter in front and of the rectum behind impinge upon them, a section has the form of a transverse slit with vertical branches at either end, like a letter H with a long transverse bar (Fig. 4230); at the lower end, where the tube unites with the antero-posterior cleft of the vulva it becomes stretched in a sagittal direction, and in virgins is usually partially closed by a fold of mucous membrane termed the *hymen*. In children the tube may present a stellate appearance on section, and after frequent parturition it may become quite irregular.

When distended the cavity tapers slightly from above downward, being narrowest at its lower extremity. The widest part is, however, a little above the middle.

Division.—The upper part of the vagina, where it encircles the cervix (Fig. 4216), is known as the *forix* or vault. This extends higher behind than in front, owing to the anteverted position of the uterus. It is usual to designate the different portions of this ring-like space as the *anterior*, *posterior*, and *lateral* fornices

or *culs-de-sac*. The main portion of the tube is called the *body* of the vagina (*corpus vaginae*); its widest part is the *ampulla*, and the entrance, visible when the labia are separated, the *external orifice* or *introitus*.

Dimensions.—Measured from the introitus to the external orifice of the uterus, the average length of the vagina

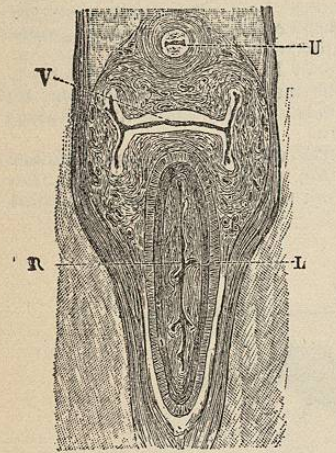


FIG. 4230.—Cross-section of the Vagina. (Henle.) L, Levator ani; R, rectum; U, urethra, cut obliquely; V, vagina.

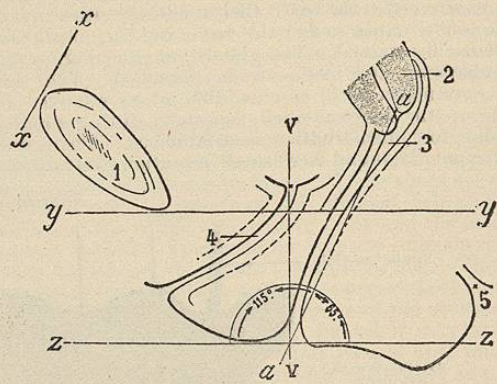


FIG. 4231.—Direction of the Vagina (frozen subject, twenty-four years.) (Testut.) 1, Symphysis pubis; 2, cervix of uterus; 3, vagina; 4, urethra; 5, anus; x, x, plane of the superior strait; y, y, subpubic horizontal; z, z, horizontal drawn through inferior orifice of vagina; v, v, vertical drawn through that orifice; a, a, axis of the vagina, inclined about 60° to the horizontal.

is 7 cm. (2 3/4 in.), varying between 4 or 5 cm. and 14 cm. This is one-fifteenth that of the entire body, exclusive of the limbs. In the new-born the length is 2.5-3.5 cm., which is relatively greater, being one-ninth of the body length (Luschka). The length of the shorter or anterior wall is from 6.5 to 7.5 cm. (2 1/2 in.) while the longer, pos-

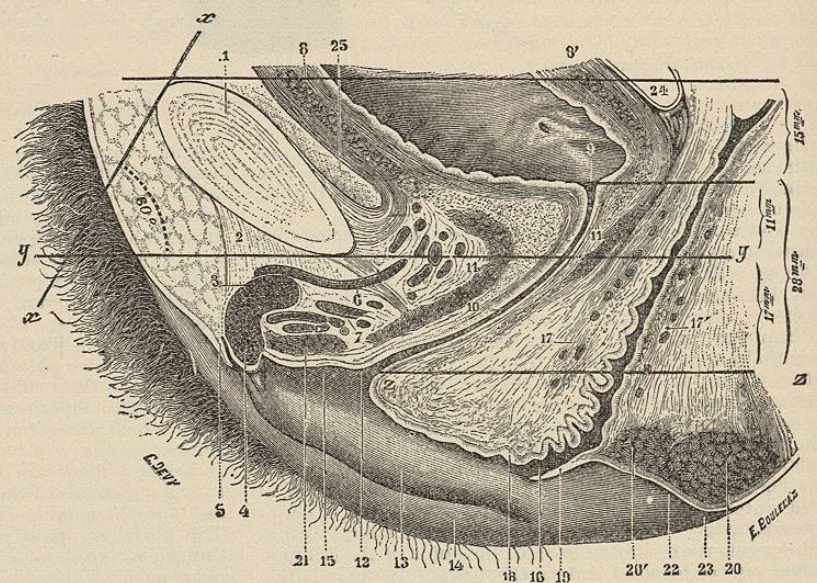


FIG. 4232.—Median Section of the Female Pelvis (subject frozen, twenty-four years old.) (Testut.) 1, Symphysis pubis; 2, suspensory ligament of clitoris; 3, corpus cavernosum of clitoris; 4, glans of clitoris; 5, prepuce of clitoris; 6, dorsal vein of clitoris; 7, intermediary plexus; 8, 8', anterior and posterior walls of bladder; 9, neck of the bladder; 10, urethra; 11, external sphincter of urethra; 12, meatus urinarius; 13, nymphæ; 14, labium; 15, vestibule; 16, inferior orifice of vagina; 17, 17', anterior and posterior columns of the vagina; 18, vaginal tubercle; 19, hymen; 20, external sphincter of anus; 20', constrictor of the vulva; 21, fascicles of this muscle between the clitoris and the urethra; 22, fossa navicularis; 23, fourchette; 24, vesico-uterine cul-de-sac; 25, prevesical space; x, x, plane of the superior strait; y, y, horizontal drawn through lower border of symphysis; z, z, horizontal drawn through meatus urinarius.

terior wall is from 8 to 8.5 cm. (3 1/4 in.). In girls of thirteen years Symington found the anterior wall to measure 5.5 cm., the posterior 6.5 cm. The anterior cul-de-sac is shallow, being only from 2 to 5 mm. in depth, while the

posterior cul-de-sac is much deeper, being from 10 to 25 mm. The vagina is susceptible of enormous dilatation without injury, enlarging sufficiently to permit the passage of the fetal head during labor. Its calibre is somewhat greater in those who have borne children.

Situation and Direction.—In its passage through the pelvic floor the vagina lies between two other great conduits: that for urine, represented by the bladder and the ureter, being in front; the alimentary canal, represented by the rectum, behind. Divergent below, these approach each other above (Fig. 4231). The vagina is usually bent backward a little below and forward above, having a course like a much elongated reversed italic S. It does not depart widely from the axis of the pelvic cavity, but at least half of its length is extrapelvic, being below a line drawn from the lower border of the symphysis to the tip of the coccyx. Its direction is nearly par-

allel to the plane of the superior strait, varying somewhat with the state of repletion of the bladder and the rectum. Its axis makes nearly a right angle with that of the uterus when that organ is in its typical anteverted position and the bladder is not more than half full (Fig. 4232).

Relations.—The anterior wall may be divided into a detachable, vesical portion above, connected with the fundus and trigone of the bladder, and a non-detachable, urethral portion below. The vesico-vaginal septum is about 3 cm. long and wedge-shaped in vertical section, being 6-7 mm. thick below and increasing upward. Exploration for stone is readily made along this wall, and it is here that vesico-vaginal fistula forms, usually from injuries received during labor. The upper part of this septum, composed of loose areolar tissue containing numerous veins, is continuous above with the cervico-vesical septum and like it can be easily separated into two layers corresponding to the related viscera. It has already been remarked that, after repeated pregnancies, there may be

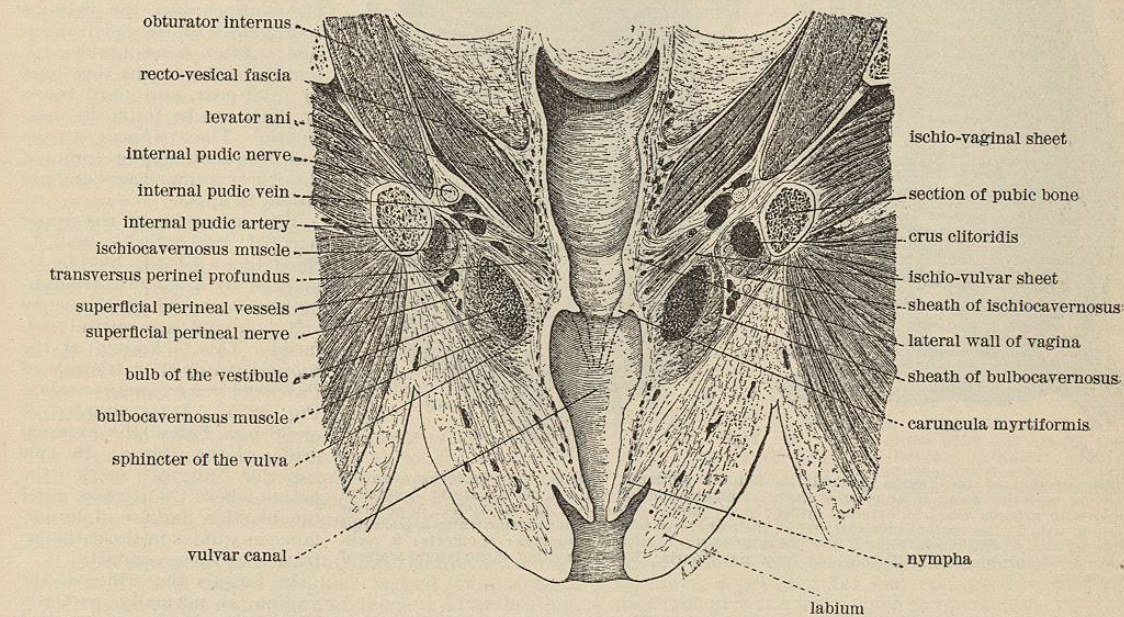


FIG. 4233.—Lower Part of a Vertical Transverse Section of the Female Pelvis, showing the Urogenital Diaphragm, the Vagina, and the External Genital Organs. (Farabeuf.) The former position of the hymen is indicated by dotted lines.

allel to the plane of the superior strait, varying somewhat with the state of repletion of the bladder and the rectum. Its axis makes nearly a right angle with that of the uterus when that organ is in its typical anteverted position and the bladder is not more than half full (Fig. 4232).

Fixation.—The vagina penetrates both the pelvic diaphragm (levator ani and coccygeus with associated fascia) and the genito-urinary diaphragm (triangular ligament with associated muscles) and receives support from both.

The upper part has much the same suspensory apparatus as has been already described for the cervix of the uterus. In addition, muscular fibres pass from the vagina to the sacrum behind and to the pelvis in front. Its adherence to the bladder is quite firm, but to the rectum much less, owing to the intervention of the pouch of Douglas.

The levator ani descends from the sides of the pelvis funnel-wise (Fig. 4233), and its fibres pass along the vagina, without becoming attached to it, to be inserted upon the rectum. They thus limit, to some extent, the displacements of the tube, without interfering with its distention.

Both sheets of the triangular ligament are firmly inserted upon the vaginal walls, affording them a fixed support. In addition, the lower part of the vagina is united to the rectum by means of the perineal body and

sufficient separation to permit the vesico-uterine fold of peritoneum to extend as far down as the upper part of the vagina. Over the trigone the tissue is denser and separation becomes more difficult, while along the urethra the two canals are so closely united that anatomical isolation becomes impossible. The urethro-vaginal septum is from 5 to 12 mm. thick.

The posterior wall is divisible according to its relations into three portions: *peritoneal*, above; *rectal*, in the middle; and *perineal* below. The peritoneal portion is from 10 to 15 mm. in vertical extent and comprises the part in contact with the pouch of Douglas. This may contain convolutions of the intestine, or a prolapsed ovary or oviduct. The recto-vaginal septum is about 4 cm. long and 3-4 mm. thick, and contains veins and lymphatics. The two tubes are readily separable. Below this portion of closest contact the rectum bends sharply backward to end in the anal canal, leaving between itself and the vagina a space triangular in section, about 25 mm. in length from above downward, and the same in thickness. This is called the perineal body and is composed of the external sphincter of the anus, the transversus perinei superficialis muscle, and the thin muscular bands called the constrictor vaginae, all being intimately united.

Laterally we may also distinguish three portions: *pelvic*, above the levator ani; *intramuscular*, where it passes through that muscle; and *perineal*, below it. The pelvic