

trate to the ovisacs and the corpora lutea and form a capillary network about them.  
**Veins.**—These are large, sinuous, spiroid in character, and accompanied by bands of smooth, muscular fibre

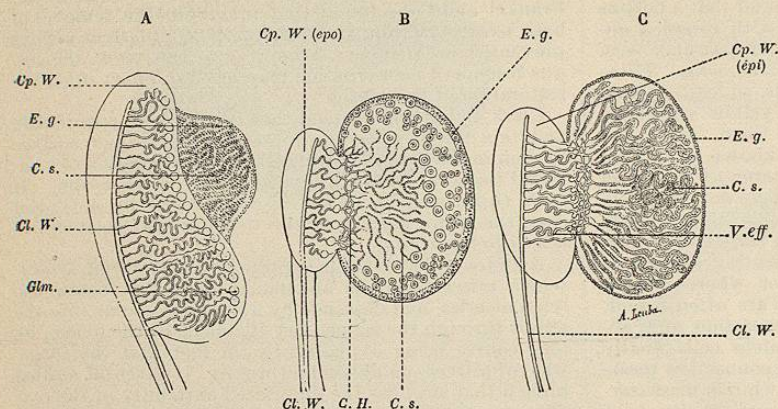


Fig. 4210—Scheme Showing the Development of the Sexual Gland and its Ducts. (Mihal-kovics.) A, indifferent stage; B, female; C, male; Cp. w., Wolffian body with the epo-phoron (epo) and the epididymus (epi); Cl. w., Wolffian duct; C. s., sexual radiations; Glm., Wolffian glomeruli; C. H., body of Highmore (rete ovarii); E. g., germinal epithelium; V. eff., efferent ducts of the testis.

like those of erectile tissue. In the hilum, mesovarium, and neighboring folds of the broad ligament the veins form a vascular protuberance called by Rouget the bulb of the ovary, and believed by him to have some function in ovulation. Leaving the broad ligament, the veins unite to form the pampiniform plexus and finally discharge into the uterine and ovarian veins.

**Lymphatics.**—These are very numerous. They originate in the stroma and about the ovisacs, some of the smaller sacs being often nearly surrounded by a lymph sinus. Converging to eight to ten trunks, they pass out at the hilum, accompany the vessels and discharge into glands situated in front of the aorta.

**Nerves.**—These are derived from a sympathetic plexus that is given off from the renal plexus and accompanies the ovarian artery. The exact terminations are imperfectly known. They have been traced to the walls of vessels, to smooth muscular fibres, to the surface epithelium, and to the tunica interna of the Graafian follicles.

**Vestigial Structures.**—There remain within the ovary, in the folds of the broad ligament and elsewhere, certain vestiges of the fetal condition of the organs that it is necessary to briefly mention. These are as follows:

The *epoophoron*, *parovarium*, or *body of Rosenmüller* (Fig. 4210, B, Fig. 4211) consists of six to twelve nearly parallel tubes containing a clear fluid, which are found within the folds of the mesosalpinx. They converge toward the hilus of the ovary, and may in young animals be traced into its substance (see Fig. 4210, B, C. s.). Toward the oviduct they end in a longitudinal canal, the remains of the Wolffian duct. They represent vestiges of the sexual part of the Wolffian

body, and are homologous with the seminiferous tubules and vasa efferentia of the male.

The *paroophoron* is a similar series of tubes found in the broad ligament nearer the uterus, and representing the unused urinary part of the Wolffian body (Glm., A, Fig. 4210). They are of a yellowish color and usually disappear early.

**Gartner's Canal.**—This is the remains of the lower part of the Wolffian duct occasionally found in the wall of the uterus and vagina. It is homologous with the vas deferens of the male.

**Hydatids of Morgagni.**—In about twenty per cent. of subjects there is found connected with the infundibulum of the oviduct, usually with the ovarian fimbria, a small hollow cyst known as the hydatid of Morgagni. Similar structures may be found in the folds of the broad ligament in connection with the epoophoron. Their homologies and origin are obscure.

**THE OVIDUCTS.**—**Etymology.**—From the Neo-Latin *oviductus*, derived from the Latin *ovum*, an egg, and *ductus*, a leading, a passage. Greek, *σαλπιγξ*, from whence many compounds, such as *salpingitis*, *salpingotomy*, etc.; French, *oviducte*, *trompe uterine*; Italian, *ovidutto*, *tromba de Falloppio*; German, *Eileiter*, *Muttertrompete*. The name was first used by De Graaf, about 1672. The older anatomists styled them *vasa deferentia*. Often called the Fallopian tubes, from Gabriello Falloppio (1523-62), professor at Ferrara, Pisa, and Padua, who compared their expanded ends to that of a brazen *tuba* or trumpet. This name was first given them by Riolanus about 1618. In the nomenclature of the German Anatomische Gesell-

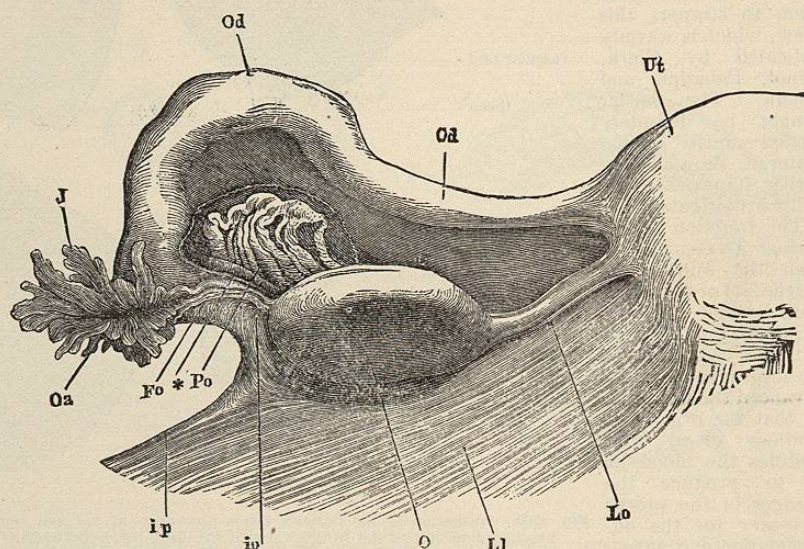


Fig. 4211.—View of Lateral Angle of Uterus with Broad Ligament from Behind. (Henle.) Ut, Uterus; Ll, broad ligament; Oa, ampulla of oviduct; Ip, infundibulum; Oa, abdominal opening of oviduct; Fo, ovarian fimbria; Po, epoophoron laid bare by removal of part of the posterior lamella of the broad ligament.

schaft they are known as the *tube uterina*. Some authors restrict the term oviduct to the genital passages of animals possessing no uterus. There seems no good reason for this.

**History.**—They were probably known to Herophilus

(335-280 B.C.). Eudemus (290 B.C.) described the fimbriated extremity. Rufus of Ephesus demonstrated them in the sheep about A.D. 50. They were generally supposed to convey the product of the ovary, the hypothetical female semen. Fallopius showed that they did not closely connect with the ovaries, and considered that "fuliginous vapors" exhaled from the uterus through them into the abdomen. Others supposed them to be spiracles through which "spirits" could pass from the mother to the fetus.

**Definition.**—Paired tubular structures, extending from near either ovary to the uterus, by which the mature ova are conveyed from the peritoneal cavity to the latter organ. They differ from the ducts of secreting glands in being detached from the organ whose products they are intended to convey.

**Form.**—The general shape of an oviduct (see Fig. 4191) is that of a gradually expanding, sinuous trumpet, extending laterally from either angle of the uterus, of which it appears to be a continuation. This is even more striking in the lower animals, in whom the fusion of the Müllerian ducts is not so complete, and who consequently possess a bicornuate uterus.

**Divisions.**—Starting from the uterine cavity we may distinguish (Figs. 4191 and 4202): (1) a uterine, intramural, or *interstitial* portion, passing through the walls of the uterus, in which the lumen of the duct is reduced to very small dimensions; (2) the *isthmus*, a narrow, comparatively straight portion, having no well-defined limit, but generally reckoned as about one-third the length of the duct; (3) the *ampulla*, an enlarged, sinuous portion which terminates by (4) the *infundibulum* or *fimbriated extremity*, a funnel-shaped expansion surrounded by a fringe-like border by which the duct opens into the peri-

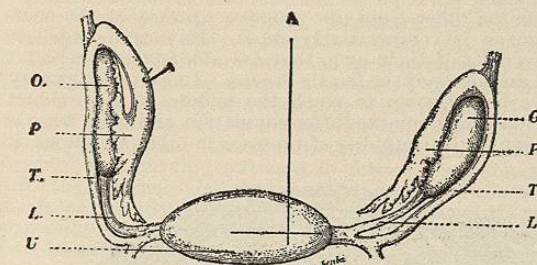


Fig. 4212.—Relations of the Ovary and the Oviduct. (His.) O, Ovary; P, infundibulum; U, uterus; L, ovarian ligament; A, ampulla of oviduct. The fundus of the uterus deviates somewhat from the median line.

toneal cavity. The junction of the infundibulum with the ampulla, sometimes slightly constricted in young persons, is occasionally called the *neck*.

The uterine orifice is small, inextensible, and often stopped by a plug of mucus. It is practically impossible to catheterize it, and fluids injected into the cavity of the uterus do not readily pass through it. The abdominal orifice is larger and extensible. It is said to be closed in tubes cut from the living, but open after death. We may, with Waldeyer, consider the oviduct according to the directions which its different parts assume. A *horizontal* portion extends from the angle of the uterus outward and a little backward to the inferior pole of the ovary, an *ascending* portion, nearly at right angles to the preceding, which mounts vertically along the pelvic wall and the mesovarian margin as far as the superior pole, and a short *descending* portion which makes an acute angle with the latter, passing downward and inward, forming the so-called tubal loop, the infundibulum embracing the internal face and posterior border of the ovary (Fig. 4212). These portions are, however, by no means of fixed dimensions, as they depend largely upon the position of the uterus and upon the various influences that may displace the ovary and the folds of the broad ligament. The oviduct, with its attached peritoneum,

often so covers the internal face of the ovary that that organ is not perceived when the pelvic cavity is opened.

**Dimensions.**—The following table shows the principal measurements of the oviduct:

Average length.....	12 to 14 cm.
Minimum length.....	6 "
Maximum length.....	20 "
Length of interstitial portion.....	1 "
Length of isthmus.....	3 "
Length of ampulla.....	8 "
Length of infundibulum.....	2 "
Length of ovarian fimbria.....	2.5 to 3 "
Length of other fimbriae.....	1 to 1.5 "
Calibre of uterine orifice.....	.05 to .1 "
Calibre of interstitial portion.....	.05 "
Calibre of isthmus near uterus.....	.3 "
Calibre of ampulla, maximum.....	.8 "
Calibre of peritoneal orifice.....	.2 to .3 "
Thickness of walls, average.....	.2 to .3 "

At its uterine termination the tube so gradually expands into the cavity of the superior cornu that its exact point of termination is difficult to determine.

**Attachments.**—Continuous with the angle of the uterus at its inner extremity, the oviduct lies in the superior or free edge of the broad ligament, hereafter to be described, and is attached at its lateral end by one of the fimbriae, longer than the others (ovarian fimbria, *fimbria ovarica*, Figs. 4202 and 4203), to the suspensory ligament of the ovary. The triangular fold of the broad ligament that encloses it is known as the *mesosalpinx* (Fig. 4202, d). At its extremities the duct shares the movements of the organs to which it is attached, while its intermediate portion may move independently, its freedom depending upon the length of the duct and the laxity of the mesosalpinx.

**Interstitial Portion.**—In nulliparæ the oviduct is clearly seen to be a contracted continuation of the superior cornu of the uterus, and the narrowest point is not at the uterine orifice, but a little beyond. In multiparæ, however, the orifice is the narrowest portion. While passing through the uterine wall the duct is slightly bent with downward concavity. A layer of connective tissue separates it from the uterine substance proper.

**Isthmus.**—This resembles the vas deferens in its cord-like, resistant character and cylindrical form. It lies in the para-uterine fossa of Waldeyer, the round ligament of the uterus being before and below, the ovarian ligament and tubo-ovarian artery behind.

**Ampulla.**—This portion, slightly flattened from before backward, has a thinner wall and softer consistence than the isthmus. It is slightly irregular in calibre, with flexuosities which are more marked in the young. Its loop runs in front of the ovarian vessels and its descending branch is close against the external iliac vein.

**Infundibulum.**—This funnel-like expansion (Fig. 4202, c) is cut into twelve to fifteen lacinate, fringe-like processes or fimbriae, and is hence often called the *fimbriated extremity*. The French, carrying out the similarity of the duct to a trumpet, call it the *parillon*, a name also applied to the flaring mouth or bell of a trumpet. The ancients compared its gnawed appearance to the pre-morse root of the *Scabiosa succisa*, popularly known as the "devil's bite," the legend being that the arch enemy, angered at the good done by the medicinal virtues of the root, attempted to destroy it by biting it off, but only succeeded in leaving a ragged edge showing the marks of his attack. It is from the resemblance of the infundibulum to this root, and not from any evil influence it was supposed to exert, that it was called the *morsus diaboli*. It has also been compared to the corolla of a flower with a double row of petals (Henle), to a crinoid or sea-lily (Nagle), and to a medusa head.

The single fimbriae are lanceolate, ovate, or filiform, not infrequently with irregularly notched edges, so that there may arise fimbriae of the second or third order. Sometimes they may be fenestrated or form a lattice-work. One of them, larger than the others, has already been referred to as the ovarian fimbria (Fig. 4202, 7). Attached to a groove in the suspensory ligament, it does not usually quite reach the ovary, and from its termina-

tion there may extend, along the suspensory ligament, supplementary fringes (tubo-ovarian fimbriae). The primary fimbriae are usually plicated, the folds corresponding to those of the mucous membrane of the interior of



FIG. 4213.—Cross-Section of the Oviduct near the Uterine Orifice. (Orthmann.)

the tube. In consequence of this arrangement, the abdominal orifice of the tube is not usually visible, at least in nulliparæ. It can, however, always be displayed by parting the plications, and is large enough to admit a small probe.

It is by this orifice that the ova leave the abdominal cavity, and many attempts have been made to clearly explain how they come to enter it. It was formerly supposed that at the time of ovulation the infundibulum suffered a species of erection by vascular congestion, and that then it clasped itself firmly around the ovary and prevented the escape of the ovum into the peritoneal cavity. Injection of the vessels in the cadaver does not confirm this, and, as Henle says, it is difficult to see how the infundibulum can select the exact place upon the ovarian surface where a follicle is about to rupture, or how it can be depended upon to execute such an act in view of the pressure and movements of the intestines. Others have supposed that there must exist in the ducts, in the fimbriae, or in the broad ligaments muscular fibres by which adaptation of the infundibulum to the surface of the ovary is effected. This, too, appears to be without foundation. Excitation of the muscular coat of the oviduct in living animals merely produces vermiform movements, the direction of the fibres of the muscular tissue of the broad ligament is such that they draw the ovaries together rather than bring the infundibulum to the ovary, and the existence in the fimbriae of special fibres capable of clasping the ovary cannot be demonstrated.

Experiments upon animals have shown, however, that both ova and semen may pass from one side of the abdomen to the other, and that it does not necessarily follow that, because an ovum does not at once reach the infundibulum, it may not eventually do so. Its movement is doubtless directed by the ciliated epithelium that lines the interior of the infundibulum and the ovarian fimbria. Notwithstanding this there is unquestionably a great loss of ova owing to the lack of accurate adaptation between the mouth of the oviduct and the ovary.

**Interior Configuration.**—The interior of the oviduct is lined with mucous membrane continuous with that of the uterus, but destitute of the glands that are so prominent a feature of that organ. This membrane has a

striking peculiarity in that it is arranged in numerous longitudinal folds that form an intricate series of narrow passages—the tubal labyrinth (Figs. 4213, 4214)—affording a free though retarded passage to fluids and minute bodies that pass from the abdominal cavity to the uterus. These folds appear in the interstitial portion as two or three small crests which are, in the isthmus, prolonged and multiplied as *principal folds*, which, however, disappear on distention of the tube, and attain their greatest development in the ampulla, where they no longer disappear on distention and vary greatly in size, some passing across the lumen of the tube to the opposite side and developing on their faces secondary and tertiary folds, so that a cross-section of them resembles the arbor vitæ of the cerebellum. These folds are continued, much reduced in size, upon the infundibulum.

The arrangement seems admirably adapted for retarding the movements of the ovum and the spermatozoa, which probably meet each other at this point. It indeed seems likely that the ampulla is a *receptaculum seminis*, and that it becomes, after repeated copulations, charged with spermatozoa, which may remain there in an active state for several days, so that when a matured ovum once enters, its fecundation is practically assured.

Investigations on animals show that the ovum is from three to eight days in passing through the oviduct. Hyrtl found a human ovum in the uterine end of the duct four days after menstruation. The period of eight days cannot be much exceeded in the human species, as the ovum attains in the second week a diameter of 3-6 mm., which is greater than that of the uterine orifice of the tube.

On the other hand, the progress upward of the spermatozoa is comparatively rapid. Having a flagellate movement of their own, they are able to travel without the assistance of the female organs. In guinea-pigs they have been known to reach the middle of the oviduct within fifteen minutes after copulation, and from what is known of their rapidity of progress in other situations, it

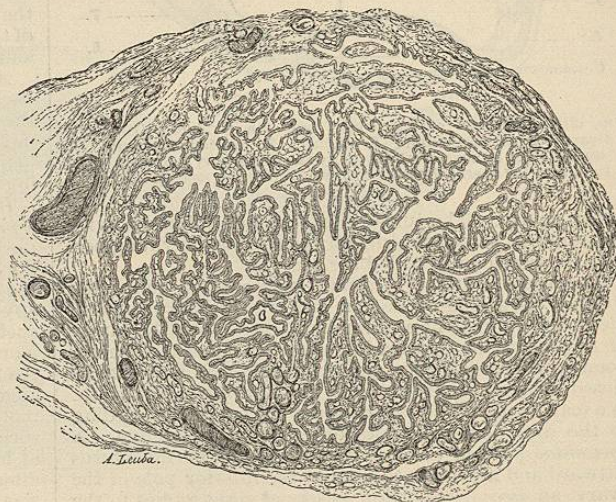


FIG. 4214.—Cross-Section of the Oviduct near the Abdominal Orifice. The folds of the mucous membrane are very numerous and complicated, forming the tubal labyrinth; the muscular coat is very thin but rich in vessels. (Orthmann.)

seems probable that in the human species they require about two hours for a similar migration.

**Structure.**—The oviduct is a muscular tube outwardly invested with a serous layer derived from the peritoneum, inwardly lined with a mucous membrane. The serous coating forms a complete investment, the vessels entering

along its inferior border through the folds of the mesosalpinx. It is continuous internally with the serous investment of the uterus, and externally is continued over the external surface of the fimbriae. A loose, subserous, connective tissue unites it to the muscular coat.

The muscular tunic is composed of smooth fibres arranged in two layers, an inner one of circular fibres and an outer one in which the fibres are arranged longitudinally. The circular layer is a continuation of the similar fibres of the uterus, is thicker at the uterine extremity, and at the infundibulum forms a sphincter-like ring. The longitudinal fibres are continuous with the transverse fibres of the uterus and are continued as a very thin sheet upon the infundibulum, one fascicle extending upon the fimbria ovarica, and constituting what is sometimes called the *musculus atrahens tuba*.

The mucous membrane is composed of a layer of ciliated epithelium seated upon a submucous connective tissue containing some round cells resembling those of the uterus, and which are believed to assist in forming a decidua in the case of tubal pregnancy. It possesses no glands. The epithelium increases somewhat in thickness toward the abdominal orifice. The direction of the ciliary wave is toward the uterus, and experimental injections of minute bodies into the abdominal cavity show that it is an efficient cause of the progression of the ovum through the duct. The epithelium lines the interior of the infundibulum and becomes continuous at the edge of the fimbriae with the peritoneum. Upon the ovarian fimbria or along the suspensory ligament it is continued as far as the ovary, becoming continuous there with the cubical epithelium of that organ.

**Arteries.**—From the anastomotic loop formed by the ovarian and uterine arteries three branches are given off for the supply of the oviduct. These are, respectively, the *external tubal*, derived from the ovarian, which passes in front of the fimbria ovarica and ascends along it, supplying it and sending a branch to each of the other fimbriae, and ending by anastomosing with the middle or internal tubal; the *internal tubal*, derived from the uterine, supplying the interstitial portion and isthmus of the oviduct, and curving outward to form by anastomosis with the external tubal the *infratubal arch*; and the *middle tubal*, usually given off from the uterine a little farther out. It passes in front of the ovary and divides into two branches, which anastomose with the external and internal tubal, forming a second *infratubal arch*.

**Veins.**—These also form a vascular arcade with more frequent anastomoses. They discharge into the uterine and ovarian veins. One branch runs along the round ligament of the uterus and communicates with the epigastric vein.

**Lymphatics.**—These take origin from the mucous membrane, from a subperitoneal network, and discharge into two or three trunks which extend along the oviduct, unite with others coming from the uterus, and ascend along the suspensory ligament to the lumbar glands.

**Nerves.**—These are derived from the ovarian plexus and are closely connected with the uterine nerves. They unite under the peritoneum to form what is called by Jaques the *fundamental plexus*, from which finer fibres penetrate between the muscular layers, forming a second or *intramuscular plexus* which supplies the muscle fibres; from this again fibres are distributed to the epithelium.

**THE UTERUS.**—**Etymology.**—From the Latin *uterus*, the womb, probably connected with *uter*, a skin bottle or bag. The later Latin appellation, *matrix*, is also sometimes used. This originally meant a breeding animal. Greek, *μήτρα, μήτρα* (the last, the uterus being the last organ that presents in the pelvis), whence come many modern derivatives, such as metralgia, metritis, metrorrhagia, hysteria, hysterectomy, etc. Another Greek appellation, used by Hippocrates, was *δελφίς*, whence are derived several terms used in zoological classification, such as Monodelphia, Didelphia; Ornithodelphia. French, *uterus, matrice*; Italian, *utero, genitura*; German, *Gebärmutter, Mutter, Fruchthälter*. The Talmud-

ists called the uterus "the sleeping chamber," of which the cervix was "the porch."

**History.**—It was probably known to the ancients from an early period, though it would seem that at first no very clear distinction was made between it and the vagina. The Greek physicians supposed it to be movable, ascending upward toward the diaphragm when excited and thus producing a variety of disorders. Plato calls it a wild beast which never follows reason, and which, through non-satisfaction of its desires, roams about in the body and also excites inordinate lust. That this view existed also among the Hebrews may perhaps be inferred from Prov. xxx. 15, 16. Soranus first showed that its attachments were such that this movement was impossible, yet the error did not disappear from medical science

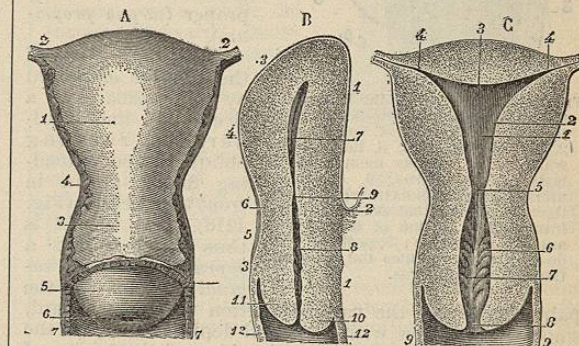


FIG. 4215.—Virgin Uterus of Twenty-two Years. (Sappey.) A. Anterior face—1, Body; 2, 2, superior angles; 3, cervix; 4, isthmus; 5, intravaginal portion of cervix; 6, its external orifice; 7, vagina. B. Median section—1, 1, Profile of anterior face; 2, vesico-uterine cul-de-sac of peritoneum dividing this face into two nearly equal parts; 3, 3, profile of posterior face; 4, body; 5, cervix; 6, isthmus; 7, cavity of body; 8, cervical canal; 9, internal orifice; 10, anterior lip of the os uteri; 11, posterior lip; 12, 12, vagina. C. Frontal section—1, Cavity of body; 2, its left lateral border; 3, its superior border; 4, 4, its lateral angles; 5, its inferior angle forming the internal orifice; 6, cervical canal; 7, arbor vitae of its posterior wall; 8, its lower extremity; 9, vagina.

until the practice of dissection became general. Galen, considering that the female should possess all the organs of the male, supposed it to be the homologue of the penis, withdrawn from sight in accordance with the colder nature of the sex. The muscular character of the uterus was first demonstrated by Arantius (1530-89).

**Definition.**—A single, hollow, median, and symmetrical structure, peculiar to mammals, situated in the cavity of the pelvis between the rectum and the urinary bladder. It is formed by the thickened confluence of the Müllerian ducts, and serves as the organ of gestation and parturition. It receives the impregnated ovum, maintains it during embryonic and fetal development, and expels the fetus at maturity.

The function of child-bearing, which appears to be the most important one of the female economy, has a remarkable effect upon the organ that contains and nourishes the developing embryo, affecting profoundly its size and its anatomical organization. It is also subject to a series of rhythmic changes, habits impressed upon it as a periodical preparation of gestation and known as menstruation. This function of gestation, and in a minor degree that of menstruation, entail anatomical variations greater than are found in any other organ of the body.

**Form.**—The nulliparous uterus (Fig. 4215) has the shape of an inverted flask, flattened and slightly bent, from behind forward. The older anatomists compared it to a *cucurbitula* or cupping glass, so called because of resemblance in shape to a small gourd or cucumber. Indeed, the shape of the uterus is quite accurately represented by that of a short cucumber, slightly larger at one end than at the other, and bent near the smaller end.

**Divisions.**—Its expanded upper portion is the *body* or *corpus*, its narrower, lower part the *neck* or *cervix*, while

the slight constriction between these is the *isthmus*. From either side of the organ, at its upper part, are given off the so-called *annexa*: the oviduct, the round and ovarian ligaments, which latter connect with the ovaries (see Fig. 4202). The part of the uterine body above the plane passing horizontally through the insertions of the annexa is termed the *fundus*, and the part below that plane is sometimes distinguished as the body proper (*corpus proprium*).

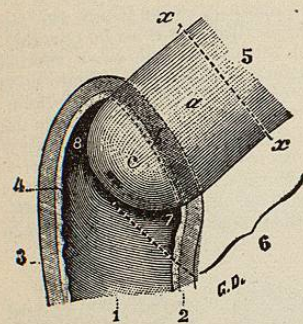


Fig. 4216.—Junction of the Uterus and the Vagina, showing the Segments of the Cervix. (Testut.) 1, Vagina, with 2, its anterior wall; 3, its posterior wall; 4, its mucous membrane; 5, body of the uterus; 6, cervix of uterus, with a, its extravaginal portion; b, its vaginal portion; c, its intravaginal portion of os uteri; 7, anterior cul-de-sac; 8, posterior cul-de-sac; x, z, separates the body and the neck of the uterus.

The lower part of the neck is embraced by the vagina, like a sleeve, the line of adherence running obliquely and extending farther down in front than behind (Fig. 4216). The cervix is thus divided into a *supravaginal* and a *vaginal* portion. To the palpating finger the vaginal portion feels like a hard, smooth projection with a central depression or slit, the *orificium externum*, or external orifice of the cavity of the uterus. Its peculiar shape and consistence led Lieutaud to call it the *museau de tanche*, the tench's muzzle, or, in Latin, *os tincae*, which has become by usage *os uteri* or *os uteri externum*, the mouth of the uterus. It will be perceived that this term applies to the entire vaginal portion of the cervix rather than to the orifice itself. This orifice is rounded in nulliparæ, and in those who have borne children is a short, transverse slit, often with somewhat irregular edges, the *lips* or *labia* (Fig. 4217). The anterior lip is the thicker and the lower. Both lips are in contact with the walls of the undistended vagina (Fig. 4218).

From the sides of the uterus its peritoneal investment is continued laterally in the form of the broad ligament, between whose layers are the vessels and nerves for the supply of the organ, which thus penetrate at what may be called its lateral edges.

The body comprises about two-thirds of the entire organ. Its upper end, the fundus, is free and covered by closely adherent peritoneum. It is smooth and glistening, and the superincumbent coils of intestine glide over it with a minimum of friction. In nulliparæ it has but little convexity, but after repeated pregnancies it becomes markedly rounded both antero-posteriorly and

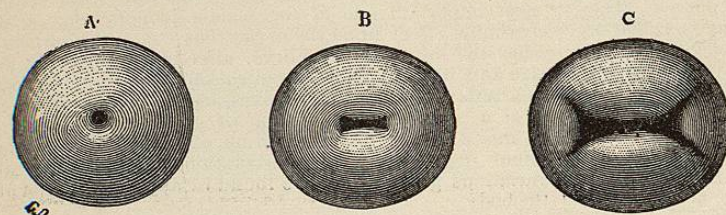


Fig. 4217.—The Os Uteri and its Orifice. (Testut.) A, In the virgin; B, in a primipara; C, in a multipara.

from side to side (Fig. 4219). By its continuity on either side with the oviducts are formed the *angles* of the uterus. In most lower animals these angles are much more marked owing to a less complete fusion of the Müllerian ducts. In the human species also a bicornuate uterus is occasionally seen. The posterior surface of the body,

rounded and smooth, can be seen from above when the pelvic cavity is opened and the intestines are removed; the anterior surface, however, is not visible, it being in contact with the bladder, which imparts to it a slight flattening.

The cervix is of a nearly cylindrical form, slightly enlarged at the middle in nulliparæ, much less or not at all in those who have had repeated pregnancies.

The vaginal (intravaginal) portion of the cervix or os uteri is a rounded projection, having under physiological conditions a rosy color and a firm consistence. Its base is circular in virgins, slightly elliptical in those who have borne children (Fig. 4217). The external orifice varies much in shape and in the appearance of its lips. Rounded in the virgin, it becomes a slit in the primipara, and after repeated pregnancies is gaping, irregular, and puckered, the lips often presenting scars or fissures. In these cases the cervix undergoes considerable absorption.

**Cavity.**—The walls of the uterus are from 10 to 15 mm. thick in nulliparæ (Fig. 4215, B, C), somewhat greater in multiparæ (Fig. 4219, B), diminished a little at the neck and at the orifices of the oviducts. This thickness nearly obliterates the lumen, but there is a virtual cavity divisible into two parts: an upper, triangular, transversely placed cleft, the *cavum uteri*, belonging to the body of the uterus; and a lower, fusiform portion, the *cervical canal* (*canalis cervicis*) belonging to the neck. A contracted pass, the *internal orifice* (*os uteri internum*), unites the two.

The shape of the *cavum uteri* is triangular, or, more accurately, it is formed by three slender triangles united by their bases; the two upper ones, the *cornua*, leading to the orifices of the oviducts, the third leading downward to the internal orifice. In multiparæ this shape is somewhat modified, the *cornua* enlarging at the expense of the lower triangle. Traces of the primitive union of the Müllerian ducts can usually be found in young persons, either as a marked raphe or as a triangular depression on the anterior and posterior walls. Sometimes the entire cavity is divided and the uterus thus becomes bilocular like that of rodents. Among the older, fanciful views with reference to generation, was one that male children were developed on the right side of the uterus, females on the left, the male seeking the warmth of the liver (Galen). It has been suggested that the rare cases of superfetation that have been noted can be explained by an anomalous, bilocular condition of the uterus.

The internal orifice, often called the internal os, is really a passage 4 or 5 mm. in length, corresponding to the isthmus of the uterus. It frequently is smaller than the external orifice, and offers more resistance to the probe. The columns of the next section are prolonged into it.

The cervical canal expands somewhat on passing from either end toward the middle. The mucous membrane of its anterior and posterior surfaces presents series of remarkable folds, constituting the *arbor vitæ uterina* of the older anatomists (Fig. 4220). Running axially along each wall is a slightly elevated ridge or *columna*, from which arises a series of

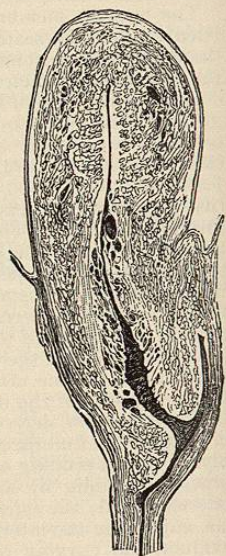


Fig. 4218.—Section through the Middle of the Uterus and Upper Part of Vagina. (Henle.)

penniform folds, the *plicæ palmatæ*, which may divide and subdivide, the whole presenting an appearance somewhat like the ribs of a leaf. The folds are so arranged that those on opposite sides of the neck fit into each other.

The capacity of the cavity of the unimpregnated nulliparous uterus is but slight, the walls being for the most part everywhere in contact or separated by a thin layer of mucus. It is estimated at from 2 to 5 c.c., or fl. 3 ss. to fl. 3 1/2. In multiparæ it increases to from 5 to 8 c.c., or fl. 3 1/2 to 2 1/2 (Guyon).

**Dimensions.**—The following table represents averages from measurements made by Rieffel, Waldeyer, and others.

	Nulliparæ. Millimetres.	Multiparæ. Millimetres.
Total length	60	70
Length of body	35	45
Length of neck	25	25
Length of vaginal portion of neck	10	10
Breadth between insertions of oviducts	40	45
Breadth at isthmus	20	30
Breadth at middle of cervix	25	30
Thickness (antero-posterior diameter) of body	20	30
Thickness (antero-posterior diameter) of neck	20	25
Total length of cavity	55	60-65
Length of cavity of body	25	31-40
Length of cavity of isthmus	5	3-5
Length of cavity of neck	25	20-24
Breadth of cavity between oviducts	24	30-35
Breadth of cavity at isthmus	4	
Breadth of cavity at middle of cervix	8	9
Depth (antero-posterior diameter) of cavity	8	12
Thickness of walls of body	10-15	20
Thickness of walls of neck	8-10	15

	Millimetres.
Total length of uterus of child	25-35
Total length of senile and atrophied uterus	30
Pregnant uterus in the last month:	
Greatest length	300
Breadth of body	250
Thickness of body	240
Length of cervix	45-50

As a general, rough estimation it may be said that the adult, nulliparous uterus is three inches long by two inches wide and one inch thick.

**Weight.**—According to Rieffel the weight of the nulliparous uterus averages 40 gm., ranging from 32 to 50.

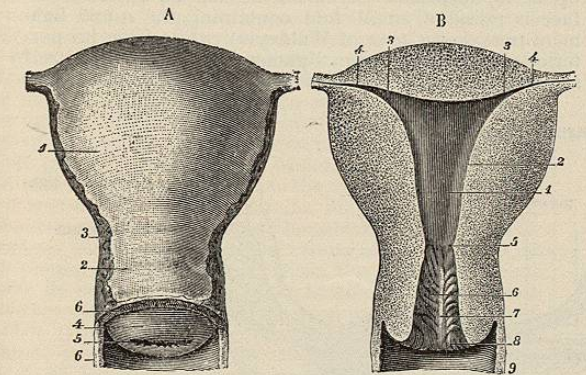


Fig. 4219.—Multiparous Uterus of Twenty-six Years. (Sappey.) A, Anterior face—1, Body, much longer than cervix; 2, cervix, shorter than body; 3, isthmus; 4, os uteri; 5, external orifice, having the figure of a transverse slit; 6, 6, upper end of vagina continuous with the neck at the base of the os uteri. B, The uterine cavity—1, Cavity of the body; 2, its left lateral border; 3, 3, its superior border or base; 4, 4, its superior angles, continuous with the oviducts; 5, its inferior angle, forming the internal orifice; 6, cervical canal; 7, arbor vitæ of its posterior wall; 8, posterior lip of the os uteri externum; 9, upper end of the vagina.

The weight of the multiparous uterus is considerably greater, averaging 55 gm. and varying from 48 to 70. Waldeyer reports the weight of the uterus during the last month of pregnancy as from 900 to 1,300 gm. Roughly speaking, it may be said that the weight of the uterus varies from one ounce avoidupois in the unimpregnated

female to two pounds in the parturient one. The specific gravity of the uterine substance is 1.052.

**Consistence.**—During life the uterus is soft, depressible, and flexible, especially at the isthmus. This is more marked in nulliparæ. After death, from cadaveric rigidity and the emptying of the vessels, it becomes more firm and unyielding.

**Position.**—The uterus, not being rigidly bound, is subject to a wide range of variations in position, many of which are compatible with health. Thus it may, as a whole, be turned forward, backward, or sideways (anteversion, retroversion, latero-rotation); it may, as a whole, be displaced in the horizontal plane (ante-position, retro-position, latero-position); it may be raised or lowered (elevation, depression); it may be bent upon itself (ante-flexion, retroflexion, latero-flexion), the bending usually occurring at the isthmus; or it may be twisted upon its own axis (torsion). Several of these displacements are often combined. It is not surprising, therefore, that there should have been much discussion as to the normal position of the organ. Nagel, Waldeyer, Rieffel, and most recent writers hold that the typical position of the uterus, as derived from a study of its embryonic development and general tendencies, is as follows:

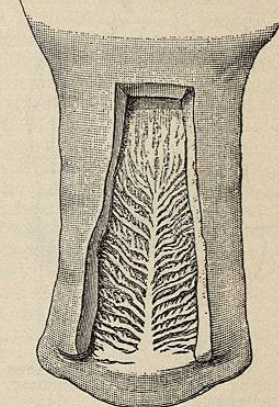


Fig. 4220.—The Arbor Vitæ or Plicæ Palmatæ of the Wall of the Cervical Canal shown by Cutting a Section from the Wall. (Nagel.)

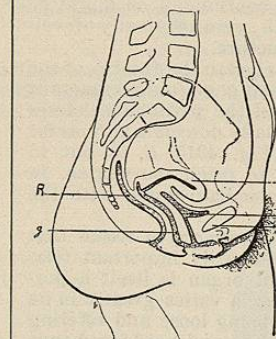


Fig. 4221.—Normal Position of the Uterus in the Virgin. (Schultze.) R, Rectum; U, uterus; V, vagina; Vb, bladder; S, symphysis.

axis of the pelvis, the external orifice being at the height of the top of the symphysis pubis. The axis of the body is nearly horizontal, the fundus does not reach the plane of the superior strait, and is some distance behind the symphysis.

This typical position may be altered by a variety of causes and thus a number of secondary positions be produced, all of which may be normal in the sense that they in no way interfere with the functions of the uterus nor with those of the surrounding organs.

Thus it may be pushed backward by a distention of the bladder (Fig. 4223), or forward by a distention of the rectum, or considerably elevated by a distention of both at the same time (Fig. 4224). The posture of the subject, acting upon

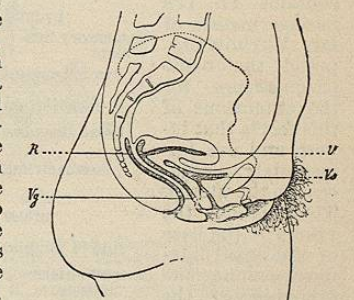


Fig. 4222.—Normal Position of the Uterus in a Multipara. (Schultze.)