a functionally active urinary organ, and, in amphibians, carries on the duplicate function of urinary organ and genital duct. In the higher vertebrates the

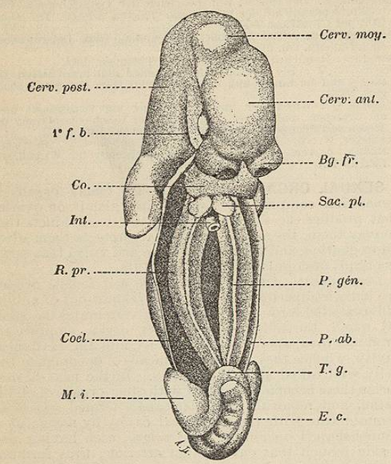

FIG. 4192.—Human Embryo during the Fifth Week. The anterior wall of the trunk has been removed; the Wolffian body exposed. (Kollmann.) *Cerv. ant., moy., post.*, Forebrain, midbrain, and hindbrain; *1° f.b.*, first branchial cleft; *Bg. fr.*, frontal process; *Co.*, heart; *Sac. pl.*, pulmonary diverticulum; *Coel.*, coelom; *P.ab.*, lateral wall of the abdomen; *M.i.* rudiment of the lower extremity; *P.gén.*, genital ridge; *R.pr.*, Wolffian body; *Int.*, intestine; *T.g.*, genital eminence; *E.c.*, caudal extremity.

urinary function is taken on by the permanent kidney and the Wolffian body, as such, atrophies, portions of it remaining, however, as ducts for removing the sexual products.

The first rudiment of the genito-urinary apparatus is the genito-urinary ridge (Fig. 4192, *P.gén.*), a thickened, longitudinal band of epithelium that appears in the em-

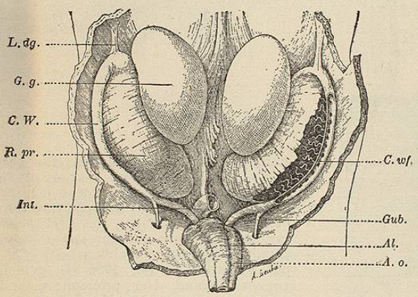

FIG. 4193.—Wolffian Body and the Genital Gland. Human embryo 17 mm. long. (Kollmann.) *L.dg.*, Suspensory ligament; *G.g.*, genital gland; *C.W.*, Wolffian duct; *R.pr.*, Wolffian body, mesonephros, or primitive kidney; *Int.*, intestine; *A.o.*, umbilical artery; *Al.*, duct of the allantois; *Gub.*, gubernaculum of the genital gland or ligamentum genitoinguinale; *C.wf.*, canaliculi of the Wolffian body.

bryo of the fifth week near the spine and the primitive mesentery. This gradually increases in size, assumes an oval form, and detaches itself from the body wall as the Wolffian body (Fig. 4193, *R.pr.*) with its excretory duct (Fig. 4193, *c.w.*). Close beside this duct and following the same general course there develops a second tubule, Müller's duct (Johannes Müller, 1801–58) (Fig. 4194, *M*). It has a nephridial character, opening into the abdominal cavity by a nephrostome (Fig. 4194, *m'*), but has no glomerulus connected with it.

In the female it becomes the oviduct; in the male it soon atrophies, only vestiges of it remaining. It is the Wolffian duct, however, that atrophies in the female, a trace of it remaining as the ductus epoophori longitudinalis, and the duct of Gärtner.

Not all of the genito-urinary ridge goes to form the Wolffian body. A portion of it, along its ventral aspect, is destined to form the genital gland proper. This portion is termed the genital ridge or fold, and is covered with large-celled epithelium (germinal epithelium) that produces the essential sexual elements, ova or spermatozoa. In mammals, the Wolffian body atrophies in large part, the genital ridge assumes an oval form and becomes either an ovary or a testis. A vestige of the upper part of the ridge becomes, in the female, the suspensory ligament of the ovary; a vestige of the lower end becomes, in the male, the gubernaculum of the genital gland (ligamentum genitoinguinale), which, in the female, becomes attached to Müller's duct where the latter crosses over it, and thus becomes divided into the ligament of the

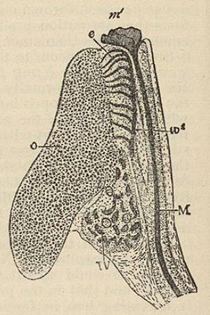

FIG. 4194.—Longitudinal Section through Genito-urinary Ridge of Human Female Embryo of about Fourteen Weeks (3.5 in. long). (Waldeyer.) *o*, Ovary; *c*, tubes of upper part of Wolffian body forming the epoophoron; *W*, lower part of Wolffian body, forming paroophoron; *w'*, remnant of Wolffian duct; *M*, Müller's duct; *m'*, its funnel-shaped peritoneal opening or nephrostome.

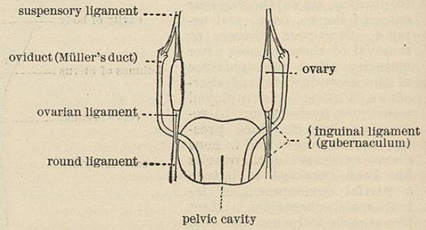

FIG. 4195.—Scheme showing the Genesis of the Primitive Broad Ligament or Mesonephridium. From a human embryo 5.5 cm. long. (Fredet.) Müller's duct should pass *over* the inguinal ligament. The mesonephridium stretches longitudinally from the diaphragm to the inguinal region on each side of the pelvic cavity, ensheathing the structures shown in the diagram.

ovary and the round ligament of the uterus, which pass respectively from the ovary to the uterus, and thence to the groin.

As the Wolffian and Müllerian ducts converge from either side toward the median line, they become united in a common cord, the genital cord, and, before reaching the cloaca, the Müllerian ducts blend in a single passage which, by enlargement and thickening of the walls, becomes the uterus and the vagina. Occasional traces of the Wolffian duct are found along the sides of these organs, forming the so-called duct of Gärtner, described by the Danish anatomist Gärtner in 1822 in the sow, but previously noted in 1681 by Malpighi in the cow.

The genito-urinary ridge, like the rest of the walls of the body cavity, is covered over with peritoneum. As the Wolffian body becomes detached it is still held to the walls by a fold of peritoneum—the *mesonephridium* of Waldeyer, which invests both the free portions of the Wolffian and the Müllerian ducts and the upper part of the genital cord (Figs. 4195, 4196, and 4197). The mesonephridia of opposite sides are therefore continuous with each other across the median line, and, as the Wolffian body atrophies and the uterus develops, there is thus formed the large transverse fold of peritoneum known as the broad ligaments of the uterus, which invest the remains of the Wolffian body, the ovaries, the oviducts, and the upper part of the uterus.

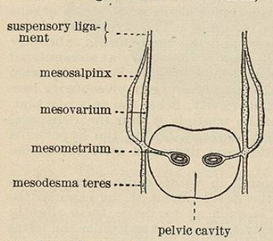

FIG. 4196.—Diagram of Section of the Mesonephridium at its Base. (Fredet.) The duct of Müller descending into the pelvic cavity forms a primitive mesometrium.

A change in the position of the ovary occurs, arising from the difference in the growth of the ovarian attachments and that of the general body. This, the "descent of the ovary," is analogous to the descent of the testis in the male, but is not usually so complete, because of the interposition of the uterus by the attachment of the gubernaculum thereto (Fig. 4197). It places the organ in the pelvic cavity. Rarely it has been known to proceed along the course of the round ligament of the uterus and reach the interior of the labium majus, the analogue of the scrotum of the male.

In the female there develop, from the deeper layers of the germinal epithelium, cells of two kinds, one of which, large, with reticular nuclei, becomes the sexual cells or ova; others, smaller and more cubical, surround the former and separate them from the invading mesodermal connective tissue. The sexual cells form, at first, chaplet-like strings known as egg columns or Pflüger's tubules (E. F. W. Pflüger, born 1829); later these are broken up, each sexual cell forming, with its investing elements, a primitive follicle or ovisac (Fig. 4198).

The cloaca or common passage into which the intestine and the genito-urinary ducts discharge is at first closed from the exterior by a thin partition termed the cloacal

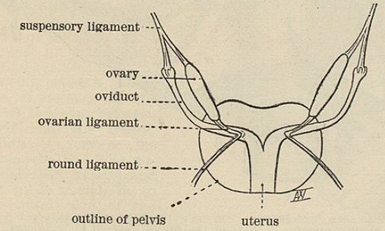

FIG. 4197.—Diagram showing Formation of the Permanent Broad Ligament. (Fredet.) The mesodesma suspensorium (peritoneum around suspensory ligament), the mesovarium, the mesodesma teres (peritoneum around round ligament), and the mesosalpinx, which form at first a continuous fold on either side (the primitive broad ligament) are drawn together and united across the middle line (mesometrium) by the union of the ducts of Müller. The oviduct should pass *over* the round ligament.

membrane, extending from the rudimentary coccyx forward, and marked by a slight depression of the exterior surface known as the cloacal fossa (Fig. 4199). In front of this there forms a conical outgrowth known as the genital eminence (*eminentia genitalis*) which increases rapidly in size and forms at its top a rounded projection (*tuberculum genitale*) that becomes, later, either the clitoris or the glans penis (Fig. 4199). Behind this occurs a slit-like depression of the cloacal membrane, the urogenital cleft (*rima genitalis*) bounded on each side by two folds, the inner genital folds (*plicæ genitales*), which finally become, in the female, the nymphæ and the frenulum of the clitoris.

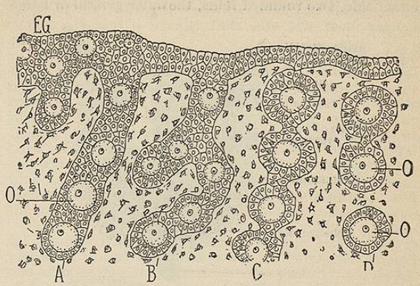

FIG. 4198.—Egg Columns or Pflüger's Tubules, showing the Divers Phases in the Production of the Ovisacs. (Duval.) *EG*, Germinal epithelium with the primordial ovisacs; *A*, egg column or tubule of Pflüger in its primitive state; *B* and *C*, tubules assuming a chaplet-like form; *D*, breaking up of the chaplet; the ovisacs become independent; *O, O, O*, ova.

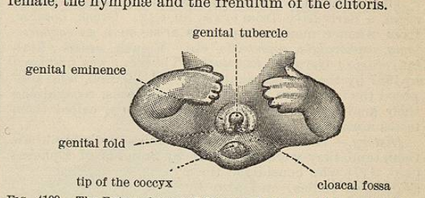

FIG. 4199.—The External Genital Organs of a Fœtus of Seven Weeks. (Toldt.) The urinary and genital canals discharge into a common opening, the cloacal fossa.

In the mean time the cloaca becomes divided, by means of a septum (*septum urogenitale*) formed by two folds that grow in from the sides, into two compartments, a ventral one, the urogenital sinus, and a dorsal one which becomes the rectum (Fig. 4200). This division affects

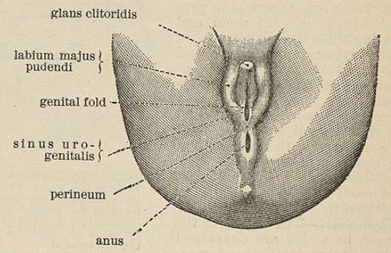

FIG. 4200.—The External Genitals of a Female Fœtus at the Middle of the Third Month (5.6 cm. long). (Toldt.) Complete separation of the anus from the urogenital sinus.

also the cloacal membrane, the ventral portion of which now closes in the urogenital cleft, and is known as the urogenital membrane. This soon thins away and disap-

pears so that the cleft opens immediately into the urogenital sinus.

There now arise, at the base of the genital eminence on either side, two rounded folds, the outer genital or labio-

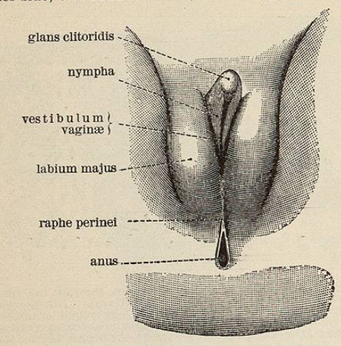

FIG. 4201.—The External Genitals of a Female Fœtus at the End of the Fifth Month (11.5 cm. long). (Toldt.)

scrotal folds (*tori genitales*), which extend backward as far as the anus and join each other in front around the genital eminence. These become the labia majora of the female or the scrotum of the male (Fig. 4201).

THE OVARIES.—*Etymology.*—From the Neo-Latin *ovarium*, a derivative from *ovum*, an egg. Greek, *ὠοφόρον*, from whence many compounds arise, such as *oophorectomy*, *oophoralgia*, *oophoritis*, etc. French, *ovaire;* Italian, *ovario;* German, *Eierstock*. The name was first used in 1667 by the Danish anatomist, Nil Stensen, who supposed the ovisacs to be ova. The ancients, recognizing their analogy to the male genital glands, called them testes muliebres.

History.—The Alexandrian anatomists probably knew them, and they were described by Soranus of Ephesus (A.D. 117) who considered them as useless bodies, and also by Galen, who supposed them to secrete a female semen, very fluid and "cold," which was conveyed to the uterus by the oviducts. Athenæus (A.D. 69) denied this, as did afterward Fallopius. It was, however, generally held up to the time of De Graaf, who, in 1672, insisted that their proper use was to generate ova, to nourish them, and to bring them to maturity.

The ovisacs were known and mentioned under various names by Vesalius, Fallopius, Bartholinus, and others. Jan Van Horne, professor at Leyden, was the first to call them *ova*, and thus emphasize the egg-producing function of the ovary. The veritable ovum was not discovered until 1827, when von Baer described it.

Definition.—The organs of the female, in which are developed the ova, or essential sexual products. They differ from ordinary secreting glands in that they do not form new products, but merely develop and mature structures that already exist in them, in a rudimentary condition, at birth.

Form.—The human ovary (Fig. 4202, *4*) is a solid, almond-shaped body, about 4 cm. long by 2 cm. wide and 1 cm. thick ($1\frac{1}{2} \times \frac{3}{4} \times \frac{1}{2}$ in.) in the adult (Fig. 4203); in childhood and old age considerably less. It may vary from this typical form and be disc-like, cylindrical, triangular, or irregular. The right ovary is slightly larger than the left. The attached edge of the ovary is nearly straight, the free edge usually curved. Its extremities, also called poles, are distinguished as inferior, or uterine, and superior, or tubal, the latter being attached to the infundibulum of the oviduct.

Color.—This is a soft, dull, reddish-gray, like that of a mucous membrane, easily distinguished from the smooth, glistening appearance of the neighboring organs due to their peritoneal covering. The peritoneum, forming the broad ligament and the mesovarium, abruptly ceases at the attached edge of the ovary at a crenulated line (Fig. 4203, *1*, Farre's line; Arthur Farre, physician of London, *circa*, 1840), and the organ presents its bare surface in the abdominal cavity, being the only one that, in the strict sense of the word, is within the peritoneal sac. The reddish tint increases during the hyperæmia preceding menstruation and decreases after the menopause.

Consistency.—Although in youth quite dense and resistant to pressure, the development of the vascular tissue in the ovaries is such as to make them slightly spongy, and at puberty they are not as firm as the testes of the male. Their density increases after the menopause. Before menstruation the surface is smooth, but afterward the development and rupture of the ovisacs produce on the surface elevations and depressions that have been compared to those of a peach stone or to the convolutions of the brain (*ovarium gyratum*, Abel).

Weight.—This naturally varies with the size of the ovary, being 50–60 cgm. at birth, 4 or 5 gm. at puberty, 6–8 gm. in the adult, and decreasing gradually to a gram or less in old age. It is thought that a rapid increase of weight occurs from the hyperæmia of the menstrual period.

Attachments.—The cavity of the pelvis is transversely divided into two compartments by the broad ligament, a fold of peritoneum that encloses the uterus and the oviducts. The ovaries are attached edgewise to the postero-superior surface of this fold by a short peritoneal dupli-

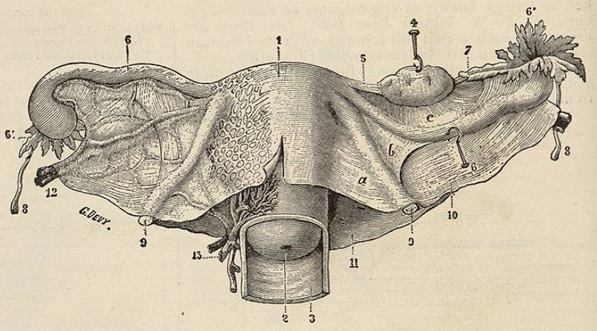

FIG. 4202.—The Uterus and Annexa seen from Before. (On the left side the oviduct is turned down to show the ovary which is slightly raised.) 1, Body of the uterus, covered by peritoneum; 2, its cervix, with the external orifice; 3, vagina, its anterior wall removed; 4, left ovary; 5, ligament of the ovary; 6, oviduct, with 6′, its infundibulum; 7, ovarian fimbria and tubo-ovarian ligament; 8, hydatid of Morgagni; 9, round ligament; 10, broad ligament, with *a*, *b*, *c*, its three divisions or "*ülerons*"; 11, posterior layer of the broad ligament; 12, ovarian vessels; 13, uterine vessels.

cature termed the *mesovarium* (Fig. 4202, *c*, Fig 4203, *2*), which is continued upward from the superior pole of the ovary as a triangular band, the suspensory ligament (Fig. 4204), containing the ovarian vessels and nerves, some unstriped muscular fibres, and a long fimbria from the

extremity of the oviduct (Fig. 4202, *7*). At the inferior pole is attached the ligament of the ovary (Fig. 4202, *5*), a fibro-areolar structure containing some muscular fibres, that extends in the folds of the broad ligament to the

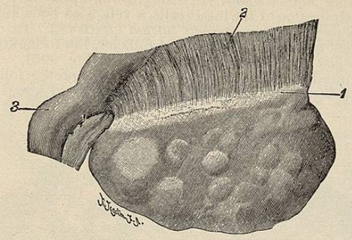

FIG. 4203.—The Human Ovary. (Nagel.) 1, Farre's line; 2, mesovarium; 3, oviduct and fimbria ovarica.

uterus. The ovary has considerable mobility, turning, hinge-like, around its mesovarian margin, and is also subject to displacement by a stretching of its attachments and the dragging of the broad ligament itself, which is affected by the position of the uterus.

Situation.—Varying greatly in weight under different normal conditions and at different periods of life, it is not surprising to find the ovaries varying also in position. This is influenced by a variety of conditions, such as posture, pregnancy, the state of repletion of the bladder and rectum, and inflammatory conditions which may cause adhesions between the ovary and the surrounding viscera. However, in the adult female, when the uterus is normally placed, the ovary, if not affected by repeated pregnancies or by pathological conditions, usually lies in a nearly vertical position (Fig. 4204) in a shallow depression, the fossa ovarica, on the lateral wall of the pelvis, in the acute angle made by the superior vesical (hypogastric) artery externally, and the ureter and uterine artery internally. Anteriorly it is sustained by the shelf-like broad ligament. The oviduct, bending around its lateral and medial surfaces and upper end, leaves a pouch-like depression of the broad ligament between itself and the ovary, which is termed the bursa ovarii. The external iliac vessels and the psoas muscle lie to the outer side of the fossa ovarica, and under its floor, covered by peritoneum and surrounded by subperitoneal fat, run the obturator vessels and nerve, these separating the ovary from the obturator internus muscle. In a standing position the mesovarian margin looks forward and outward, but is concealed by the oviduct. Its free margin looks inward and backward toward the rectum and is in relation with the ureter.

FIG. 4204.—Median, Antero-posterior Section of the Pelvis of an Adult Female. (Rieffel.) The uterus is low and very near the coccyx. The anus is gaping, the vagina open and the bladder much spread out. The peritoneum is removed in front and behind the suspensory ligament of the ovary, to show the subjacent organs. The ovary is in place.

Often the ovary is not easily seen upon casual inspection of the pelvic contents. A line connecting the two ovaries lies behind the body of the uterus when that organ is in its normal position. Therefore, when the ovary, by increasing in weight, stretches its attachments, if not adherent it usually falls into the recto-vaginal pouch.

Referred to the exterior of the body the site of the ovary is usually behind a point on the abdominal wall about two inches medially from the anterior superior spine of the ilium. The sagittal plane that cuts it is midway between the spine and the symphysis. The frontal plane tangent to the promontory either cuts it or passes close behind it, while the frontal plane corresponding to the ischiatic spines passes considerably behind it. Horizontally, it is above the lesser sciatic foramen and on a level with the infrapyriform foramen and the upper margin of the acetabulum (see article *Pelvis*).

The ovary may be reached by both vaginal and rectal examination. In the vaginal method the patient is placed in dorsal decubitus with the thighs flexed, and one or more fingers, pushed into the posterior cul-de-sac of the vagina, explore the pelvic wall. With the other hand the surface of the abdomen is depressed over the region above described as the site of the ovary. The internal border of the psoas may usually be made out as a rounded ridge, and the ovary will be found to the inner side of this, and may usually be grasped between the internal and external fingers.

Structure.—A section of the ovary (Figs. 4205, 4206) shows that besides its investing epithelium (derived from the germinal epithelium of the embryo) its substance, or stroma, may be divided into an external, cortical, or ovigenous layer, crowded with small round bodies, varying in size from that of a mustard-seed to that of a pea; and a medullary layer rich in vessels and nerves, with spindle-shaped connective-tissue cells, some elastic fibres and plain muscular tissue. The round bodies are the ovisacs (Figs. 4205, 4206, 4207—Graafian follicles, from the Dutch anatomist, Regnier de Graaf, 1641–73), already mentioned

as derived from the epithelial layer. The smaller ones (primordial ovisacs, *AAA*, Fig. 4206; *A*, Fig. 4207) contain no fluid, but the larger ones are distended by an al-

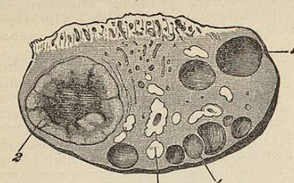

FIG. 4205.—Section of a Human Ovary. (Nagel.) 1, Ovisac; 2, corpus luteum; 3, corpus albicans (several such are seen on the surface of the section).

buminous liquid, the *liquor folliculi* (7, Fig. 4207). Within each ovisac is a large sexual cell or ovum, surrounded by a layer of smaller cubical cells that form an epithelial investment termed the membrana granulosa. The larger ovisacs have a distinct connective-tissue investment (*theca folliculi*) derived from the stroma and richly supplied with blood-vessels. This consists of two layers, the *tunica externa* and *interna* (4, 5, Fig. 4207). The former blends with the surrounding stroma; the latter is composed of cells resembling those of embryonal connective tissue, many of which are large, rounded, and infiltrated at maturity with yellow granulations (4′, Fig. 4207). These have been termed lutein cells, and are believed to be connective-tissue cells transformed for the nutrition of the follicles.

The liquor folliculi is secreted from the membrana granulosa, whose cells multiply and come to be arranged in several layers, surrounding the ovum, which remains single, always attached to the side of the follicle by an accumulation of the cells (*cumulus oophorus*, Fig. 4207, 6.) The ovisac continues to swell, both by the multiplication of the granulosa and by the increase of fluid, and thus gradually pushes its way outward and appears on the surface of the ovary as a fluctuating vesicle. Blood-vessels ramify abundantly on its walls, except at a superficial pole called the *stigma*, where they are wholly wanting. It is at this spot, and probably from some increase of vascular tension, that the vesicle finally ruptures. Preceding this the granulosa attaching the ovum to the wall of the vesicle becomes softened, probably by invasion of lutein cells, and, at the rupture, the ovum with a portion of the cumulus adhering to it is thrown out of the sac. Some slight hemorrhage from ruptured capillaries occurs into the empty sac. This act is known as *ovulation*.

At birth the ovary is crowded with primordial ovisacs. Waldeyer estimates their number at 100,000, while some observers place it much higher, Sappey noting a case in which they exceeded 1,000,000. Most of them degenerate, however, there being not more than 30,000 or 40,000 at puberty, and but few of these ever come to maturity. Olshausen could find but from 50 to 100 follicles visible to the naked eye in an adult female. They entirely disappear after the menopause.

Corpora Lutea.—Some of the follicles that thus abort acquire a certain degree of development before disappearing, and, without rupturing, form, apparently by a multiplication of the lutein cells, a yellowish body known as a *corpus luteum* (*corpus luteum atreticum*). In completely matured and ruptured follicles, the formation of a corpus luteum is much more marked (Fig. 4208). It is produced by a hypertrophy of the walls of the follicle, these becoming imbricated and vascularized about the

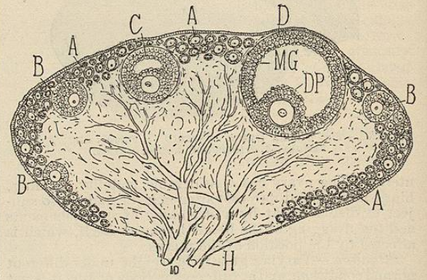

FIG. 4206.—Diagrammatic Section of the Ovary showing its Cortical or Ovigenous Layer, Formed of Ovisacs in various Stages of Evolution. (Duval.) *A*, *A*, *A*, Primordial ovisacs; *B*, *B*, *B*, ovisacs further developed; *C*, ovisac approaching maturity; *D*, ripe ovisac with its proligerous disk (*D P*) containing the ovum; *M G*, membrana granulosa; *H*, hilum of ovary.

central clot, which contracts. The folds finally become united with each other and a yellowish body is formed, having a size considerably greater than that of the original ovisac. If pregnancy intervenes after the discharge of the ovum, the corpus luteum persists during a greater part of the period, and usually attains a great size (*corpus luteum graviditatis, corpus luteum verum*); but if there is no pregnancy it begins to atrophy, and disappears in the course of two or three weeks (*corpus luteum menstruationis, corpus luteum spurium*). It was formerly believed that certain information regarding a pregnancy could

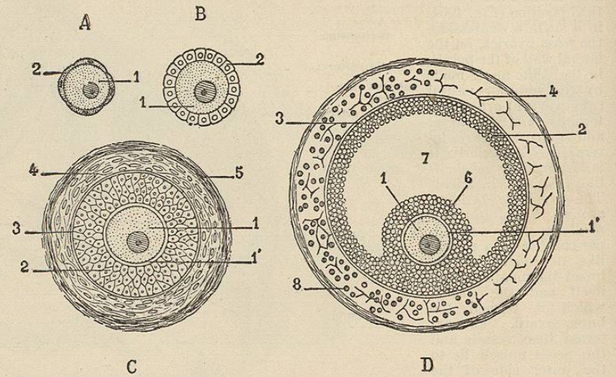

FIG. 4207.—Ovisacs. *A*, Primordial ovisac; *B*, *C*, *D*, ovisacs at various stages of their development (diagrammatic). (Testut.) 1, Ovum; 1′ (*C*), vitelline membrane; 2, membrana granulosa; 3, membrana propria; 4, tunica propria; 4′ (*D*), reticular tissue replacing the tunica propria; 5, tunica fibrosa; 6, cumulus oophorus; 7, liquor folliculi; 8, leucocytes in the reticular tissue (shown only at left of *D*).

be obtained from examination of the corpora lutea, but this is not strictly correct, for the structure of the two is identical, and cases have been noted in which the corpus luteum of menstruation equalled in size that of pregnancy.

On microscopic examination it is found that a corpus luteum is made up of very large cells with rounded angles, having an appearance very like that of liver cells. These are lutein cells, so called from granules of a yellow substance found within them, associated with fat and known as lutein. The tunica externa of the theca remains, and there develop from it radiate septa that extend throughout the body to a central nucleus, representing the site of the original clot, where crystals of hæmatoidin are often found. By fatty degeneration and absorption the lutein cells finally disappear; the connective tissue contracts to a whitish mass (*corpus albicans*), and finally to a fibrous remnant (*corpus fibrosum*), which is at last also removed by hyaline degeneration.

FIG. 4208.—Diagrammatic Section of a Recent Corpus Luteum. (Baïbiani.) *a*, Ovarian stroma; *b*, tunica fibrosa or external layer of the ovisac; *c*, internal tunic hypertrophied and folded; *d*, remains of the membrana granulosa. *e*, vessel supplying the ovisac.

Observers are not fully in accord as to the origin of the lutein cells. Sobotta, after very careful observations on the mouse, concludes that they are of epithelial origin, arising from a hypertrophy of the granulosa (Fig. 4209), and in this he is supported by Bischoff, Pflüger, and many others. Another view, is that they are of connective-tissue origin, arising from the cells of the tunica interna, and that the granulosa wholly disappears. Observations on abortive ovisacs seem to support this view, which is warmly defended by Clark, Minot, Paladino, and others. The matter cannot be definitely settled until human material, showing the earlier stages, is more fully investigated.

The function of the corpus luteum has been the subject of much discussion. Born, struck with the resemblance of its structure to that of the suprarenal capsule, advanced the hypothesis that the organ is a ductless gland that modifies the blood so as to produce the changes in the uterus necessary for the encapsulation and subsequent nutrition of the ovum. He argued that the corpus luteum is much larger than would be necessary for the mere restoration of the ovarian tissue, and that the growth of the uterus during pregnancy is not due to distention by the growing ovum, but is accompanied by profound structural changes, which may be initiated without the ovum being in the uterus at all, as in the well-known case of extra-uterine pregnancy. Further, mammals that have a placenta which becomes firmly attached to the uterus have a well-developed corpus luteum, while the aplacental mammals (monotremes, marsupials) have only a rudimentary one or none at all. Fränkel and Cohn found that in rabbits the removal of both ovaries within six days after copulation always prevented pregnancy. According to this view, the corpus luteum of menstruation may have an effect upon the restoration of the uterus.

Clark and others contend that the organ is required to maintain the peripheral circulation and proper surface tension in the ovary by preventing the formation of cicatricial tissue at the point of discharge of the ovum. If each rupture of an ovisac were followed by a typical scar, the entire surface of the ovary would soon be reduced to inactivity.

Arteries.—The ovary is supplied by the ovarian artery, which arises from the abdominal aorta just below the renal arteries, and descends by a flexuous course into the pelvis through the suspensory ligament of the ovary, its long course being explained by the fact that the ovary was primitively an abdominal organ. It gives off a tubal branch that supplies the fimbriated extremity of the oviduct, ten to fifteen ovarian branches, and is continued to make a free, anastomotic loop with the uterine artery. During pregnancy, when it is greatly enlarged, it is an important supplementary source of supply for the rapidly growing uterus. The small ovarian branches penetrate the ovary along its attached border, the place of entrance, which also serves for veins, nerves, and lymphatics, being called the hilum. Their course is helicine or corkscrew-like, not only in the broad ligament,

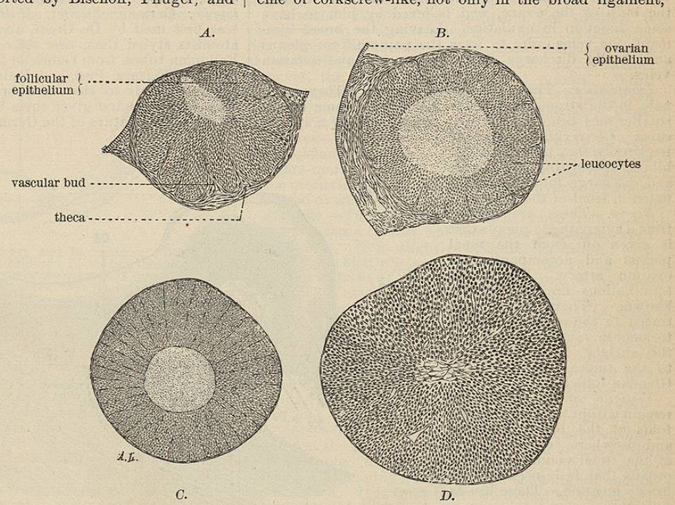

FIG. 4209.—Formation of the Corpora Lutea according to Sobotta. Four successive stages in the mouse. *A*, Vascular budding of the tunica interna invading the hypertrophied follicular epithelium; *B*, the vascular buds converge toward a central cavity. Between them the follicular cells, which are rapidly multiplying, are arranged in columns. Among these cells leucocytes are found. *C*, A more advanced stage; the columns are now narrower and the trabeculæ more numerous. *D*, The central cavity is now occupied by a gelatinous connective tissue; the trabeculæ, by anastomosing with each other, have destroyed the columnar arrangement of the lutein cells.

but also in the substance of the organ. In the medullary portion they form the rich anastomoses which cause this to be named the vascular zone; and at the confines of the cortical and medullary portions they form imperfect arcades from which arterioles are given off which pene-