sented only by the apparently functionless organ of Rosenmüller (Figs. 4 and 5). When further survivals of them persist they are known as the canals of Gaertner, which in a few mammals,

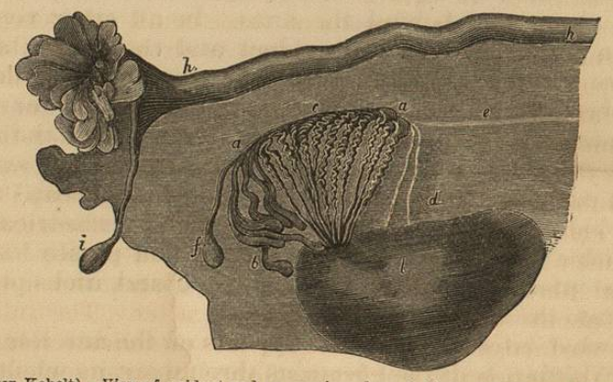

FIG. 4 (after Kobelt).—View of oviduct and parovarium from behind: *a*, *a*, inverted pyramid formed by convoluted tubules of parovarium; *b*, outer tubules, flask-shaped, and often dilated into cysts; *e*, atrophied Wolffian duct, or canal of Gaertner (lower down); *f*, terminal bulb of Wolffian duct, known as organ of Rosenmüller; *h*, Fallopian tube, or altered Müllerian ducts; *i*, terminal bulb of same, known as the hydatid of Morgagni in the male.

as the cow and the pig, retain a large size, but serve no purpose, so far as is known. They commence above, lying in close relation to the organ of Rosenmuller (*e*, Fig. 4), and run down either in the substance of the uterus, or close to it, between the layers of the broad ligament. They open into the uro-genital sinus on either side of the meatus urinarius. In exceptional cases they are found in women, and even during life their openings in the position indicated may be clearly seen.

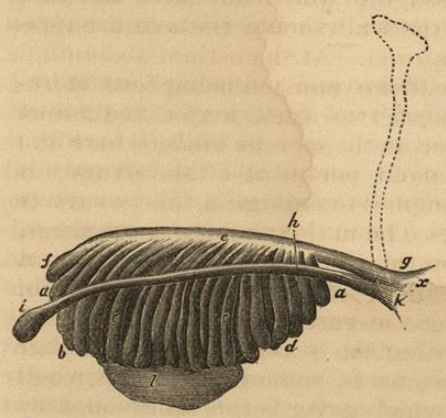

FIG. 5 (after Kobelt).—Wolffian body and ovary of embryo of the sixth week: *a*, *a*, tubules of Wolffian body; *e*, excretory duct; *f*, terminal bulb (organ of Rosenmuller); *h*, Müllerian duct; *i*, terminal bulb (*v*, Fig. 4); *x*, uro-genital sinus, into which both ducts open. The dotted outline shows bent position of Müllerian duct when it has become the Fallopian tube.

When, in the human embryo, the coalescence of the two tubes has so far advanced as to form the utero-vaginal canal, the remaining part of the tube is bent sharply downward and outward, and thereafter occupies its normal (nearly) horizontal position. It leaves the uterus at the cornu (ostium internum), at this part of its course through the uterine tissue being

of very narrow calibre. From this point it extends outward for a distance varying in the adult from three to five inches, its diameter increasing slightly as it leaves the uterus, and contracting again at the ostium abdominale, where it opens out into the infundibulum. It consists of three coats, one derived from the folding over it of the peritoneum, as already described. The greater part of its wall is therefore in direct contact with the outside surface of the peritoneum. The lesser portion of the wall is in contact with the cellular tissue, which occupies the space between the two folds of the broad ligament, at the lower aspect of the tube (meso-salpinx) (Fig. 2). The middle coat is muscular, and consists of a faint layer of longitudinal fibres externally, and a much thicker layer of circular fibres internally. The longitudinal fibres, according to my own observations, disappear entirely about the menopause, or soon after. The internal or mucous surface is thrown into a series of delicate longitudinal folds by the action of the circular fibres, an arrangement exactly similar to that which obtains in the œsophagus and urethra. The mucous surface of the tube is lined with ciliated epithelium, the movements of which are directed toward the uterus, and the function of which is certainly to prevent the passage of spermatozoa up the tube. If this were not so, tubal pregnancy would be much more common than it is. The movement of the cilia also undoubtedly aids the passage of the ovum down the tube, and prevents its adhesion to the wall should the ovum happen to become occupied by spermatozoa. At the ostium abdominale the tube expands trumpet-like, the expansion being formed by a series of fimbriæ, or laciniæ, of two sizes, major and minor. This infundibulum (known also as the *morsus diaboli*) (*a*, Fig. 1) is large enough to embrace about one-third of the ovary, and seems to have a curious tendency to enlarge as the ovary enlarges in diseased conditions. The major fimbriæ have the minor fimbriæ arranged between them somewhat irregularly, and when a Graafian follicle is nearly ready to burst, the infundibulum is said to be applied over the part of the ovary where the ripe follicle is and becomes attached to the surface by a slight cellular adhesion. If so, there must be some peculiar and wholly unknown selective influence which governs this adhesion, but it clearly is a mechanism not of universal or constant accuracy; for I have frequently, during abdominal sections, seen follicles just on the very point of bursting, over which the infundibulum was not fixed. In such a case the ovum must fall free into the peritoneal cavity, and there probably dies in the great majority of instances. There is reason to suspect, however, that, in exceptional instances, it there undergoes cystic expansion.

The infundibulum is covered by transitional columnar epithelium, and at the margin of the fimbriæ it meets the squamous epithelium of the peritoneum, forming the only instance of the union of a mucous and a serous surface—in fact, the unique instance of an opening into a serous cavity.

Under ordinary circumstances, when the tube is healthy, its cavity is occupied by a small quantity of viscid mucus, and during menstruation this is replaced by blood of the usual dark, fluid character. Inflammation may occlude both ostia, and convert the tube into a cyst, occupied by serum (hydro-salpinx) or by blood (hæmato-salpinx), or by pus (pyo-salpinx), of which conditions I have seen quite a number of cases.

Normally the tube lies loose in front of the ovary, and rather below its level, coiling around it till the infundibulum turns toward the middle line and backward toward the posterior surface of the gland. This bend of the tube may be actually below the ovary, but, as far as the structures of the broad ligament are concerned, it is, of course, above it. From the lower margin of the mouth of the tube extends the tubo-ovarian ligament, formed by one of the major fimbriæ (*d*, Fig. 1), and which seems to serve as a guide for the tube in its movement toward the ovary. From the posterior lip of the funnel depends the terminal bulb of Müller's duct, though it is by no means always present.

The parovarium is the remains of the tubular structure of the primordial kidney, or the Wolffian body. It lies between the two layers of the broad ligament, between the upper and outer margin of the ovary and the Fallopian tube. It has the shape of an inverted pyramid (Fig. 4), the apex being applied to, but not attached to, the ovary. The tubules vary much in number—from three or four to thirty. They have always cæcal extremities, and those on the outer side are always best marked, the outermost one forming the terminal bulb or organ of Rosenmüller. If a good example of the structure be carefully dissected, it will easily be determined that the tubes are lying loose in the cellular tissue of the broad ligament, and are not attached to either of its layers or to the ovary. This explains a characteristic feature of those Wolffian cysts which require operation. From the inner and upper angle of the parovarium runs the atrophied Wolffian duct—that is, when it is visible, which is not often the case. This duct is so thoroughly atrophied that I do not think any of the tubules have intercommunication, as they would have if it were not.

Of the three layers of the blastoderm which form, by various

and most curious plications and developmental changes, the many organs of the body, only two—the mesoblast and hypoblast—take part in the formation of the organs we are considering.

The first change consists in an arrangement of cells which, radiating from a centre which forms a lumen, is found to travel down through the mesoblast from its dorsal surface, immediately under the epiblast, just outside the protovertebræ, between them and the pleuro-peritoneal cavity. This cavity is then lined by the epithelium, which ever afterward is its marked characteristic, and which then is known as the germinal epithelium. In the chick, as early as the second day, this cellular track can be traced downward as a distinct ridge (Balfour), and it forms the primitive Wolffian duct. In other animals the changes are probably much the same, but for obvious reasons they have not been traced in sequence, and their dates are unknown. The next change is the appearance of a cell-mass outward into the pleuro-peritoneal cavity, in which the Wolffian body is formed, consisting, like the permanent kidneys, of convoluted tubules, commencing in Malpighian bodies with vascular glomeruli, and opening into the duct. Upon this cellular mass lies the germinal epithelium of the pleuro-peritoneal cavity, from which the ovary is formed on the inner side of the Wolffian body—that is, the side looking toward the splanchnopleure. The germinative epithelium retains its columnar character, and becomes thickened to several cells deep, the mesoblast below it becoming also thickened, so that a distinct eminence is formed as a fusiform white patch or streak, extending, in its early stages, along the whole length of the Wolffian body, but subsequently becoming restricted to its superior portion. In the cells of the germinal layer are found the primitive

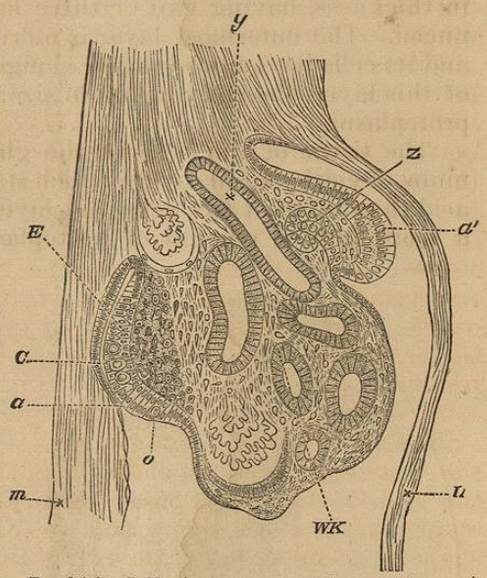

FIG. 6 (after Balfour).—*m*, mesentery; *L*, somatopleure; *a'*, portion of the germinal epithelium from which the involution to form the duct of Müller (*z*) takes place; *a*, thickened portion of the germinal epithelium in which the primitive ova (*C*) and (*o*) are lying; *E*, modified mesoblast, which will form the stroma of the ovary; *WK*, Wolffian body; *y*, Wolffian duct.

ova, developed by differentiation from the epithelial cells. This change is effected in the chick about the ninetieth hour of incubation, at which time it is quite possible to determine the difference of sex. In the human embryo the difference is not discernible till between the fifth and seventh weeks, authorities differing materially as to the exact date.

The structure of the early ovary consists of a superficial layer of the germinal epithelium (*g*, *e*, Fig. 7), and of a tissue internal to this which forms the great mass of the gland.

The germinal epithelium is a layer about 0.03 to 0.04 mm. in thickness, having two or three layers of cells with granular nuclei. The outermost layer is more columnar than the others, and its cells have nuclei rather elongated than round. The cells of this layer, though varying in size, have a larger provision of protoplasm.

The tissue of the body of the gland consists mainly of columns of epithelial-like cells, which stain more deeply with osmic acid than those of the germinal layer, having round nuclei and a more limited amount of protoplasm. Between its columns runs up vascular stroma, formed of spindle-shaped and nucleated cells (*t*, Fig. 7). This tissue continues visible through the whole course of the development of the ovary, till comparatively late in life, and during all the earlier stages it might be easily supposed to be playing some important part in the development of the ova, or to be a part of the germinal epithelium, from which it has only occasionally any well-marked line of demarcation. In this tissue and at the base of the ovary are seen a number of canals which have given rise to the view advanced by Pflüger, that the ovary was developed as a tubular gland. This view has, however, been almost universally abandoned, and, in my own researches, I have seen no evidence which entitles it to serious consideration. These tubules are clearly derived from

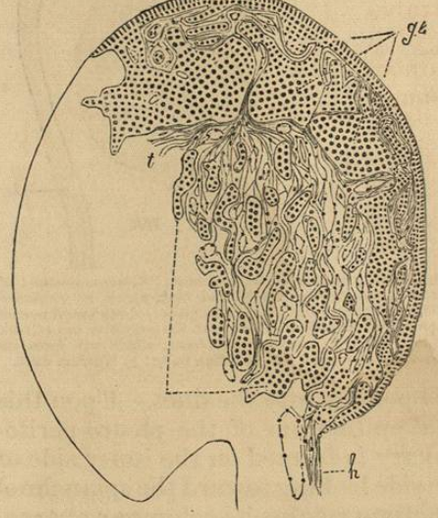

FIG. 7 (after Balfour).—*g*, *e*, germinal epithelium; *t*, trabeculæ; *h*, hilum, with canal.

the Malpighian bodies of the Wolffian structures, and are mere survivals.

The germinal epithelium grows rapidly in thickness by the division of its cells, and the vascular stroma greatly increases in quantity, so that the epithelial tissue is honeycombed by the vascular trabeculæ, which are so arranged as to divide imperfectly the epithelium into two layers, separated by a space occupied by connective tissue and blood-vessels. The outer part is relatively thin, and is formed of a superficial row of columnar cells, and one or two rows of more rounded cells, among which can be recognized the primitive ova (*p*, *o*, Fig. 8) by their size, their granular nucleus, with the characteristic reticulation, and their abundant protoplasm. The inner layer is much thicker, and formed of large masses of rounded cells, and the two layers are connected by numerous trabeculæ, the stroma between which eventually gives rise to the connective-tissue capsule, or *tunica albuginea* of the adult ovary.

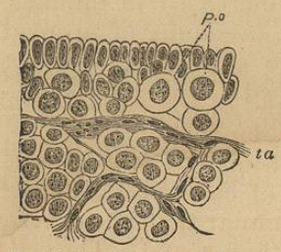

FIG. 8 (after Balfour).—*p*, *o*, primitive ova; *t a*, tunica albuginea; *c*, *e*, central epithelium.

Subsequently in the course of development the germinal epithelium becomes still more thickened to .38 mm., and becomes marked into three distinct layers (Fig. 9, *g*, *e*). These consist of an outer epithelial layer, having an average thickness of .03 mm.; a middle layer of small nests, about .1 mm. in thickness; and an inner layer of larger nests, which has an average thickness of .23 mm. In these three layers the epithelium has undergone important modifications. The greater part of the granular contents of the nuclei of the cells has become clear, the other part remaining as a mass taking the color of staining materials very darkly, and somewhat later taking a stellate figure, these two forms being spoken of as the granular

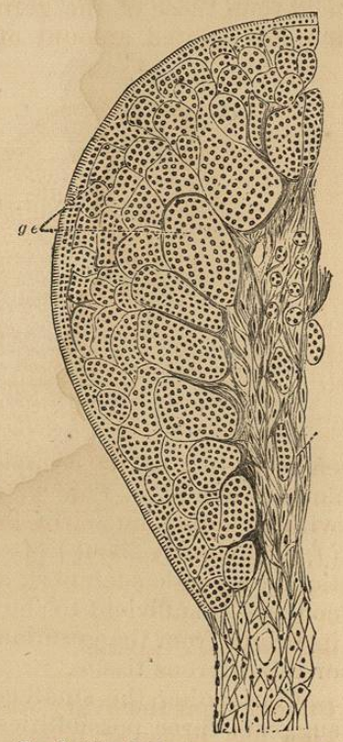

FIG. 9 (after Balfour).—*g*, *e*, germinal epithelium in three layers; *h*, hilum, with canals, *c c*.

and stellate stages of the nucleus. Still later the nuclear mass forms a beautiful reticulation, as seen in the spores of the algæ.

As already said, some of the cells enlarge, and are recognized as the primitive ova, and these are now increased in number. Others of the cells again diminish in size, becoming of an oval form, the nucleus retaining its primitive character, and not going through the changes above described. The cells subsequently form the epithelium of the Graafian follicle. They may be seen arranging themselves around the primitive ova just formed. At the hilum of the ovary the tubules (*c*, *c*, Fig. 9) have by this time almost disappeared.

As the ovary grows, the outermost layer of the epithelial elements becomes more and more separated by the fusiform-cell stroma, and the nests of the middle layer become smaller, and finally the arrangement and formation of the Graafian follicles become completed, and in the typical epithelial nest are to be seen fully-formed follicles with the permanent ova, completely

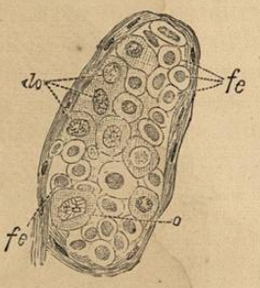

FIG. 10 (after Balfour).—Nest from middle layer, showing formation of follicular epithelium: *o*, primitive ovum; *fe*, cells forming follicular epithelium; *do*, cells which disappear.

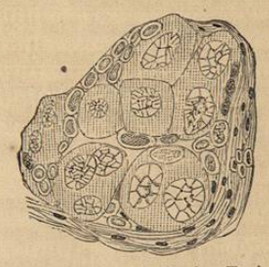

FIG. 11 (after Balfour).— Typical epithelial nest.

enclosed in a cavity occupied by fluid and lined by epithelium; smaller ova (*d*, *o*, Fig. 10) not so enclosed; smaller cells (*b*, *c*), with modified nuclei of doubtful destination; and small cells (*f*, *e*) obviously about to form follicular epithelium. The inspection of a single such nest, says Mr. Balfour—and in this I fully concur—is sufficient to show that the follicular epithelium takes its origin from the germinal epithelium, and not from the stroma or tubuliferous tissue.

Concerning the small cells with modified nuclei, Mr. Balfour suggests three possibilities, and thinks they may have all three destinations: that they become cells of the follicular epithelium, are developed into ova, or are absorbed as a kind of food by the developing ova.

The isolated follicles are now formed by ingrowths of the connective-tissue stroma cutting off fully-formed follicles from a nest. They occur only at the very innermost border of the germinal epithelium. This is in accordance with what has so often been noticed about the mammalian ovary, viz., that the more advanced ova are to be met with in passing from without inward.

In the further growth of the ovary the pseudo-epithelium is formed of a single layer of columnar cells with comparatively scanty protoplasm. In it there are present a considerable number of developing ova. A layer of connective tissue, the albuginea, exists below the pseudo-epithelium, which contains a few small nests with very young permanent ova. In the layer of medium-sized nests internal to the albuginea the ova have all assumed the permanent form, and are provided with beautiful reticulate nuclei with a nucleolus and smaller granular bodies. The majority are not provided with follicular investment, but among them are numerous small cells, clearly defined from the germinal epithelium, which are destined to form the follicle (Fig. 12).

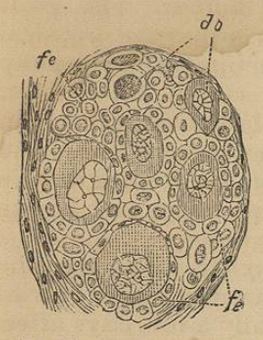

FIG. 12.—Further development of processes seen in Fig. 10.

In the innermost layer of the germinal epithelium the outlines of the original large nests are still visible, but many of the follicles have been cut off by ingrowths of stroma.

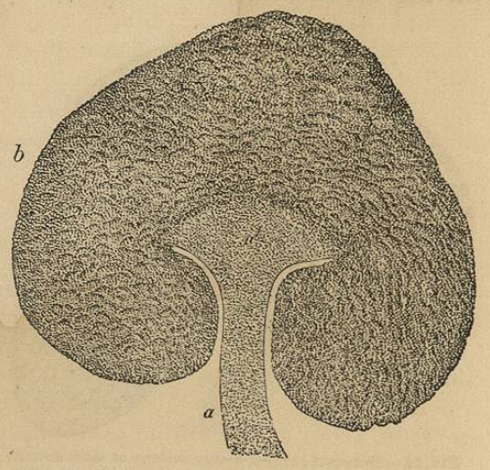

FIG. 13.—Section of ovary of human embryo at third month (after Kölliker), slightly magnified: *a*, mesovarium· *a'*, vascular stroma of hilus; *b*, gland-substance. × 50.

The general conclusions from Mr. Balfour's researches are that the whole egg-containing part of the ovary is really the thickened germinal epithelium, and it differs from the original thickened patch or layer of germinal epithelium mainly in the fact that it is broken up into a kind of meshwork by growths of vascular stroma.

It will be seen, therefore, that the formation of true Graafian follicles goes on very early in the life-history of the ovary, long before the birth of the child, a fact which was pointed out by Valisneri in 1733, but which received but little attention until the writings of Carus (1837) and Ritchie (1842) attracted attention to this most interesting subject. Since then it has been most exhaustively discussed by many observers, and finally, and, as I think, conclusively unravelled by F. M. Balfour. The great practical interest which it has for surgeons is that the dropsical distentions of these follicles produce ovarian tumors occasionally in very young children; and Mr. Cullingworth, of Manchester, has placed on record a most interesting observation where an undoubted ovarian tumor existed in a newly born child, and Virchow alludes to similar instances. By Mr. Cullingworth's courtesy I have been able to examine his specimen, and I have satisfied myself of the perfect accuracy of his description.

A most interesting observation is made by Dr. De Sinéty, who has been struck with the frequency of apparently cystic ovaries in children at the time of birth, and especially a few days after, and who has found, in the great majority of the ovaries of children near the full term, or who die a few days after mature birth, that Graafian follicles are visible to the naked eye, if sections of the ovaries are made. He also says that these large follicles, having arrived at a certain stage of development, begin to disappear, and that the processes of their retrogression and the different phases of the cicatrices which they leave behind them can be followed. He draws attention to the fact, familiar to every one, that it is no unusual thing to see slight swelling of the breasts of newly born children, not only female, but male, and the secretion of a milky fluid. This generally ceases in a few days, and the gland remains quiescent till the puberty of girls, and throughout life in boys. He thinks the ovarian activity is associated with the premature mammary effort, and he quotes Merkel ("Ueber die Entwickelung im inneren der Samenkanälchen,"

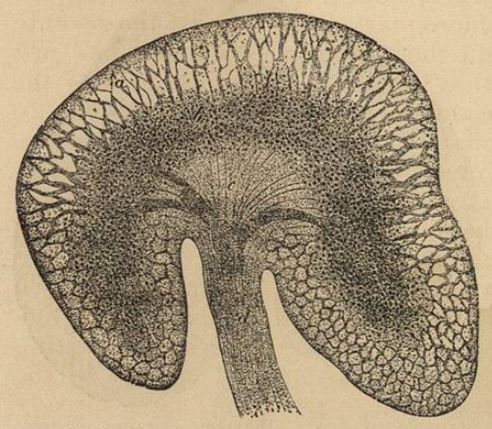

FIG. 14.—Section of ovary of human embryo at sixth month: *a*, external epithelial layer; *b*, internal epithelial layer; *c*, vascular stroma of hilus; *d*, mesovarium. × 50.

Archiv für Anatomie und Phys., 1872), to the effect that in the new-born male a considerable proliferation of the epithelium of the testicle is to be observed, together with the appearance in that organ of round cellules similar to those from which spermatozoa are derived in later life, and that these cellules disappear shortly after birth, and are not found again till after puberty. Similarly, De Sinéty has not found developed ovarian follicles in the years of childhood.

Haussman's observations, made upon eighty-four examinations, completely substantiate De Sinéty's conclusions. He found premature development of the Graafian follicles in ten per cent. of the ovaries examined, and he puts forward the important suggestion that such a condition, by exhausting the stock of the ova, or by prematurely discharging the activity of the ovaries, may be a possible and hitherto unsuspected cause of amenorrhœa and sterility.

These observations cast a most interesting light upon the parthenogenetic theory of the development of dermoid cysts which originated with Ritchie, and which I have more completely elaborated in its appropriate chapter.

This ovarian activity seems to cease about the third month, for after that time, though mature Graafian follicles can be discovered by microscopic examination, they rarely are large enough to be visible to the naked eye; the bands of connective tissue, with the fusiform cells or nuclei, increase in size, and the tunica albuginea becomes more marked, so that by the seventh month the ovary presents all the appearances which it has just before puberty, and up to that time little else can be said of the history of the gland. The only point which yet remains to be settled, and for the settlement of which I have not come across any evidence, is whether or not the premature Graafian follicles ever rupture and discharge their nucleus into the peritoneal cavity. There is some probability that they do, for reasons that I shall give when speaking of wandering ova.

That most of the Graafian follicles thus produced—that, in fact, a very large number of those produced in adult life, including many which reach almost to maturity—die without rupturing and discharging their egg-nucleus, is rendered certain by the observations of every writer on the ovary, and I have already indicated, from Balfour's writings, the possibilities of their ultimate fate.

In a very remarkable paper by Dr. Creighton, of Cambridge, published in the thirteenth volume of the *Journal of Anatomy and Physiology*, that author sets himself to answer the question, What becomes of Graafian follicles within which the ovum has

decayed? The conclusions he comes to are not such as I can yet see my way to accept, for among many hundreds of sections of the ovaries of various animals in my possession I cannot find in one indications of the structures which he describes, and the appearances he figures seem to me to be such as may arise from

FIG. 15 (after Creighton).—Obsolescence of Follicles, various stages.

peculiarities in the preparation of the sections, and in their direction. I can, for instance, easily accept the appearances at A, B, C, and D, Fig. 15, as being sections, or slices off the top of a Graafian follicle, and the drawing at G may similarly be a slice out of a corpus luteum, as may also be the figure at F; but I

must say that I completely fail to follow the reasoning which would bring us to regard these forms as being homologous in any way with the cortical substance of the supra-renal body figured at H. The paper itself is well worthy of perusal, as being full of information of undoubted value, and it may be that some of Dr. Creighton's conclusions may receive a fuller acceptance than I can give them; wherefore, in order to draw attention to them, I give the following summary of them, so far as they deal with the fate of the decaying Graafian follicles:

"The substance of the ovum, including vitellus, germinal vesicle, and spot, disappears, and the zona or vitelline membrane is found more or less empty and collapsed, as a strong, thick-walled vesicle, of homogeneous structure, yellowish color, and either ovoid in shape or somewhat folded. This tough membrane evidently resists the influences that cause the vitellus and germinal vesicle to disappear, and it is difficult to discover what eventually becomes of it. At all events, in later stages of obsolescence of the Graafian follicle, it is no longer to be seen, and the place of the follicle is marked only by the persisting belt of follicular epithelium. The fate of the enclosing zone of epithelium is in marked contrast to that of the ovum within it; in proportion as the latter shrivels and collapses, the former assumes certain determinate and fixed characters, by which it may be always easily recognized in the midst of the ovarian stroma. The follicles drawn in Fig. 15 illustrate various stages in the process of obsolescence. The follicle A exemplifies one of the most fundamental changes. The ovum is wanting in the centre, and the zone of follicular epithelium persists on one side; the point that it is of importance to observe is the form of the epithelial cells.

"The follicular epithelium does not, in the earlier periods of life, present the usual characters of an epithelium; the cells are round and almost nuclear, or without cell-substance. Under ordinary methods of preparation, and under a moderate magnifying power, they look like naked nuclei, just as the lymphoid cells of a lymphatic gland do under the same circumstances. As the follicle becomes riper the epithelium becomes more cylindrical; it is at the two poles of the nucleus, and not uniformly all round, that the protoplasm collects. This elongation of the epithelium, which is never very pronounced in the follicle destined to extrude its ovum in the ordinary course, becomes quite obvious where the ovum decays within the cavity. The cells are then seen (as in A, Fig. 15) to be greatly elongated, cylindrical cells. In B and C the elongation of the epithelium, and the corresponding shrivelling of the ovum, are seen together; at *a*, in

the centre of each follicle, is the thick, structureless zona of the ovum, which appears to be as if compressed or encroached upon by the lengthening radial cells of the follicular epithelium. At the same time the ends of the cylindrical cells that abut upon the zona appear to have acquired a common bond of union, like a basement-membrane. At D is represented a belt of follicular epithelium, broken at the upper side, and without any traces of the ovum within it. The follicle E exemplifies perhaps the most common appearance of the belt of epithelium surviving after the abortion and disappearance of the ovum; the originally circular belt (in section) has become almost straight, and the shrivelled zona of the ovum lies toward its under surface and almost clear of it. The different forms of the belt of follicular epithelium depend partly on the plane of section; but there is little doubt that the originally circular belt (as it appears in section) unbends, and becomes a slightly curved cylinder, the shallow concavity of which corresponds to the original central space where the ovum lay. At F is shown the belt of epithelium doubled up, and with a stalk of connective tissue issuing from its concavity. These various surviving conditions of the follicular epithelium appear to belong to follicles which had not become greatly expanded; the ovum had filled the central space exactly, and there had been no development of *liquor folliculi*. There are, however, aborted follicles of a much wider circuit, such as that represented at G; in this case the extensive belt of epithelium is thrown into folds, and it is further noticeable that the elongation of the epithelial cells is hardly perceptible, and that there is no uniform basement line either on the outer or inner surface of the belt.

"The peculiar cortical structures of the supra-renal bodies, and their position relative to the rest of the organ, may be readily made out in any good section of a well-prepared supra-renal of the horse. Fig. 15, H, is a low-power view of such a section, made perpendicular to the surface. The outermost stratum is a zone of connective tissue of considerable thickness. Next to that comes the zone of peculiar structures above referred to."

These peculiar cortical bodies of the supra-renals Dr. Creighton regards as homologous to the remains of Graafian follicles in the ovary, from which the ova have not been discharged, but have decayed. His conclusion is that "the morphological resemblance between the ovarian and the supra-renal structures is not only close, but it is complete." I must, with all due deference to the work of an observer of so much distinction, say that, so far as I can see, this position has yet to be proved.

The Ovaries at Puberty.

What has already been said about the growth and ripening of Graafian follicles before puberty constitutes one of the many arguments in favor of the view that menstruation and ovulation are wholly distinct processes, and abundant examples can be given of them being carried on each independently of the other. The statement made by Dr. Robert Barnes, that, if the ovaries are extirpated or become atrophied, menstruation does not reappear, is not accurate; and equally incorrect is his assertion that the first ovular dehiscence corresponds with the first appearance of the menses. It is perfectly certain that ovulation is by no means a periodic process, in the sense of being monthly, and the fact that a periodic flow from the uterus is almost confined to the human race is sufficient to show that it is not in the ovaries that we have to look for the cause of this curious and objectionable phenomenon, for which no one has ever yet suggested a useful object. Where this cause does exist we do not know, but it is quite certain that, as it continues for months, in some cases, after the removal of both ovaries, it cannot be in those glands. Nor is it in the uterus, for in most cases removal of both ovaries arrests the function immediately; and in the somewhat short experience I have, up till now, had of the removal of small ovaries, this has been always immediately effected, and completely, when I have been obliged to remove the tubes as well. I have, therefore, a growing suspicion that we shall find in the monthly movement of the tubes, or in their structures, at any rate, the real source of the monthly discharge from the uterus.

It is perfectly certain that no one has yet recorded one instance in which the tube has been seen fastened on to the ovary before or after the menstrual period of life, as it is during that period. Yet ovulation goes on before puberty and after the climacteric freely. The change in size and vascularity of the tubes at puberty, and their diminution at the climacteric, and the beginning and cessation of their movements, form the most curious of all the remarkable features of those functional changes, and are quite enough to show either that the tubes are most markedly under the same periodic influence as that which produces the menstrual flow, or that they themselves are its cause. Finally, I have, during the last few years, had the opportunity of seeing the ovaries of a number of women, whose abdominal cavities I have had to open for various conditions not connected with diseased ovaries, and I have always found that