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with Dr. Renaud's for
THE HUMAN FEMALE OVARY,³

WITH REFERENCE TO

CORPORA LUTEA, BOTH TRUE AND FALSE.

BY

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IN this paper it is proposed to submit the result of four years' research, pursued independently of the writings of others, and developing facts, simply as they appeared; in order that any novelties may, by repetition, be refuted or confirmed, and that the writings of those already in print may be strengthened by corroborative testimony.

The ovary is definable as the "germ-preparing gland—its functions consisting in secreting, developing, and maturing the ovum or follicle."

Glands, when ultimately considered, are blind canals, or cul-de-sacs, within the cavities of which the proper secretions are eliminated. The secretion of the ovary is a germinal vesicle, or compound cell, which is formed within its stroma, as in a nidus, and which, when cast off, is endowed with properties enabling it to assume ultimately all the complicated mechanism of the parent animal. Some discrepancy seems to exist between the mammalian ovary and other secretory glands, in that the former has no excretory duct directly attached to it. This duct or tube of Fallopius is always contiguous, and is periodically continuous with it, the same nerves supplying both ovary, oviduct, and uterus,—viz. the hypogastric plexus, which is made up of bundles, partly sensory, and partly motory, the sensory and motory fibrillæ subdividing in the ganglia, and receiving different distributions.

Four cæcal tubes, terminating in a common vestibule, constitute at once gland and duct in the *bombyx rubi*, of the class Insecta. In the *leech*, the ovary is enclosed in the common sheath of the oviduct. Thus it appears, that in some orders of animated beings,

not only is the ovary and its duct continuous, but the reproduction of the species is completed without any uterine appendage. In the *ornithoryncus paradoxus*, the ovaries are completely embraced by the oviducts. This fact may be expressed by saying, the fimbriæ of the oviduct are so modified, that they form one common calyx, which, at all times, and under all circumstances, grasps the ovary, and constitutes, along with the tube, an outlet for the secretions of the gland. The *ornithoryncus* has no distinct uterus, but merely a rudimentary one, formed by a slight hypertrophy of each oviduct on their common junction.

In many quadruped mammalia, the oviducts, at their fimbriated extremities, exhibit no line of demarcation between their commencement and their termination in the uterus proper. Each cornu commences at a common body, and tapers away gradually, until it terminates abruptly in a fringed margin, or *morsus diaboli*. In the human female, the line of demarcation is too palpable to be misunderstood. Thus it appears, that the human female uterus may be viewed as the crown and epitome of all antecedent types; whilst the uterus being the only part wanting in the reproductive economy of some animals, it seems preferable to consider it, as found in the various classes of the animal kingdom, rather as an enlarged portion of the oviduct, than to understand the oviducts as uterine appendages.

As respects the yellow bodies found in the human female ovaries, the old terms, "true" and "false" corpora lutea, are adhered to, in order that unnecessary confusion may be avoided, through the introduction of a new phraseology.¹

Each menstrual period may be considered an abortive attempt on the part of nature to reproduce the species. In like manner, the sequelæ, or catamenial secretion, may be viewed as the perversion of an action destined for other ends, and failing in the accomplishment of them. Such an action under the stimulus of impregnation would be so far altered, as to minister towards the production of a deciduary membrane.

The periodicity of the ovaries in the different classes and orders of the vertebrate mammalians varies considerably; but is always persistent in the same animal, when its functions, general and specific, suffer no declination from the standard of health.

The excitement originated in the ovaries is naturally followed by vascular congestion, during the continuance of which the Graafian follicles progress rapidly towards maturity, and protrude from the free walls of the ovary. Thus, rupture of the tunics of the ovary, with escape of the ovum, often ensues in a manner quite independently of the menstrua, as flowing previously, although probably

¹ Dr Ritchie has recently called false corpora lutea "Corpora menstrualia," which designation is objectionable, even according to Dr Ritchie's own showing, as he observes, "the presence of the catamenia is no indispensable pre-requisite to the rupture of a Graafian vesicle."

putting a sudden period to their flow, by a cessation of the cause originally exciting them.

A study of the comparative anatomy and physiology of this subject shows, that the lower the class of animals, the greater the facility with which ova effect an escape into the ducts; whilst the reverse rule obtains in the human subject. Hence it is, that anatomists and physiologists appear to err so much, in conducting experiments upon lower animals, and thence educing hypotheses by which to account for identical phenomena in organized beings, wherein the structures no less than the functions are dissimilar.

There does not appear to exist any near sympathy between laws regulating the uterine and ovarian functions in ruminating animals and man,—the sequences common to lower mammals in respect to the generative system being only partial in their influence over the human female.

The theory that would indicate each menstrual period to be co-existent with the secretion of a small yellow body in the ovaries, requires facts much more imperative than any as yet advanced. To assert that a recent yellow body, with or without an internal coagulum of blood or fibrine, is never seen except menstrual œstrum or conception can be traced, is not proof adequate to establish as a physiological law, that menstruation never happens without its presence. If dates taken during the life-time of an individual, and pathological examinations made subsequent to death, be of any value, then all who have made special search for the appearances in question, must have remarked how small the number of them frequently is, and how very irregular they are in appearance—the presence of spurious corpora lutea being discernible longer than two months, at the lowest calculation. Rather, therefore, than be forced into the opinion, that the menstrual periods in women are of much less regularity than is generally supposed, it seems preferable to receive with caution a theory that requires so much show of ingenuity for its establishment, and which, by this very fact, demonstrates a weakness in some of its connecting parts.

Very few ovaria found after death in women of the child-bearing period, fail to develope within their substance appearances referrible to vascular excitation; *e.g.* yellow bodies, with or without coagula, abortive of true conceptive corpora lutea; or yellow bodies, more diminutive in size, lined internally by a very thin black membrane; or jet black bodies, triangular or oval in shape, placed near to, and close up to the surface, with or without corresponding cicatrices; or more solid black bodies, resembling shot corns, occasionally found nearer the centre of the ovary, and without any connection with its periphery.

As respects the first of these appearances, viz. the yellow bodies, with or without coagula, there is evidence enough collected to prove, that towards each menstrual epoch a perceptible and rapid develop-

ment of the Graafian follicles occurs; and to this may be added, that they sometimes burst—the rupture or the retrocession being guided by the duration and intensity of the action within the secretory gland.

False corpora lutea differ from true corpora lutea: or, in other words, these bodies differ from each other, accordingly as they precede or follow impregnation, in the following particulars:—*1st*, In size; *2d*, In colour; *3d*, In the relative thickness of their parietes; *4th*, In the rapidity with which they arrive at perfection; *5th*, In the smaller amount of time they occupy in disappearing; *6th*, In structural peculiarities.

1. *Of size*.—After the lucid descriptions given of false corpora lutea by Dr Montgomery, M. Raciborski, Dr Lee, Dr Paterson, Dr Ritchie, and others, any further delineation of these general appearances seems unnecessary; and the more especially so, since, after all, it appears the evidence thus furnished is unsatisfactory in its result, as well as liable to error and misinterpretation. The size of spurious corpora lutea is perhaps the most uncertain of the criteria named; nevertheless, the average dimensions of these bodies are less than those of true ones at a very early period of formation. At a later date, the comparative difference is most clear, as they rapidly decrease to one-third, or to more than one-third of their pristine magnitude, prior even to losing their proper yellow colour. In true corpora lutea, the specific secretion goes on progressively increasing, until, occasionally, one-half or more of the ovary is occupied with it.

2. *Of colour*.—False corpora lutea appear always of a sulphur or chrome-yellow colour on first being secreted, depending upon the presence of an oil of a bright yellow tint. As degeneration advances, the brightness of the yellow matter fades into a paler hue. The colour of true corpora lutea is more variable, ranging from yellow-ochre to reddish-brown.

3. *Of relative thickness of parietes*.—This is no mean evidence of a difference existing between the true and false bodies. In false corpora lutea, the parietes are characteristically thin; in the true ones, they are always of relative thickness, but always more so than the spurious ones—the absolute density being in accordance with the internal arrangement of parts. The average thickness of a spurious corpus luteum of recent date is from one-third to one-half of a line.

4. *The rapidity with which they arrive at perfection*.—It is an important fact to notice, that, whereas a spurious corpus luteum comes to maturity in two or three days, the true corpus luteum goes on progressively increasing for some weeks. This assertion is based on the fact, that the walls of a false corpus luteum are thickest immediately after the cessation of the menstrua; whereas true corpora lutea, examined a month after the foetal development has commenced, are found increasing.

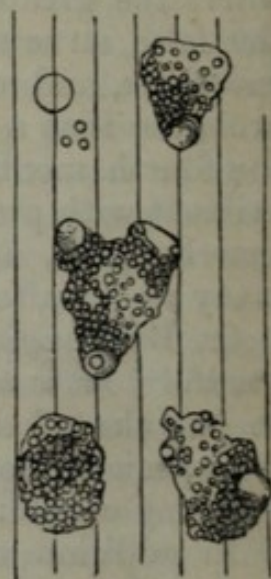
5. *The more rapid degeneration* undergone by the spurious bodies, is another circumstance, affecting any parallel, that may be attempted to be drawn between them and the true bodies. In ovaria where the greatest regularity of action may be inferred to persist, the false structures of prior monthly periods are always smaller, less thick, and more pale, according to their respective ages. It is probable that a spurious corpus luteum can be detected as late as the fourth month, but not long afterwards. In corpora lutea co-existent with pregnancy, it is well known that no such rapid declension happens, and that evidences of their presence may be seen many weeks after parturition.

6. *With reference to structural peculiarities*—it will be only needful now to state, that spurious bodies have never been known to partake of that fleshy character so well understood as belonging specially to the true conceptive bodies. The microscopical anatomy of each will be found elsewhere.

In addition to the foregoing diagnostic differences, Dr Montgomery has given one, which is no less clear in fact than universal in application, viz.:—that, whereas injections pass freely into the substance of the true corpora lutea, they invariably fail to penetrate the false ones. Having now detailed what appear to be the most striking differences between these two secretions, they must stand as apologies for the name “false corpus luteum” being retained, although in contra-distinction to the statements of some recent writers who desire a total abolition of the term. Dr Bischoff, in a letter to M. Breschet, states, that both Dr Montgomery and Dr Paterson are in error, in maintaining as they do, that there are two sets of these bodies, the true and the false, and that such views are based upon mistaken notions of the manner of their formation. M. Raciborski, in the *Comptes Rendus de l'Académie*, &c., for 1843, asserts that the anatomical characters of a lacerated Graafian follicle, at the menstrual periods, resemble altogether those that have been described by physiologists under the name of “corpora lutea after fecundation.” Latterly, Dr Knox, in a paper published in the *Medical Gazette* for 1843, has adopted similar opinions, and argues on the impropriety of tolerating the term. When the yellow secretion of the spurious corpus luteum is placed under the microscope, immediately after the cessation of the catamenia, it is seen to be made up of cells, enclosing 1, 2, 3, or more nuclei, which are of a bright and clear colour, surrounded by granules or molecular particles. The cell walls are so very tender and delicate, that on the slightest pressure, the nuclei escape on all sides, and meeting with each other, quickly coalesce, a large and shapeless mass of oil resulting. The moment these nuclei come in contact with each other, so soon do they amalgamate, an act which goes far to prove them to be fatty matter. Boiled in ether, the nuclei disappear, and the oil granules become shrivelled and empty. In shape, the cells are irregularly rounded, oblong, or oval. In most of them, the nuclei can be detect-

ed, whilst in others they either do not exist, or are obscured by the aggregation of the granules surrounding them.¹ This demonstration puts a period to speculations as to the yellow matter being altered blood, or intumescence of the vascular membrane of the Graafian follicle.

Fig. 1



Furthermore, as the body is distinctly formed of cells, it follows, that it is a substance *sui generis*—a consequence of some action or actions excited in the ovary in order to its production. To investigate the mode of production of these cells, it appears most consonant with the physiology of generation to consider the changes wrought in the ovum, prior to the advent of those actions which first cause the corpus luteum to be developed. The yolk globule is originally produced from granular matters secreted by the vascular ovisac. In some instances, as in the umbilical vesicle of the embryo lizard, the most accustomed eye can detect little or no difference between it and the cells of false yellow bodies. If a fully developed ovum be placed in the field of a good microscope, the granular matter is found to be mixed up with cells, perhaps more regular in form, and much smaller, yet not essentially differing from either of the foregoing. If, then, these appearances be traceable in the unruptured follicle, it seems to follow, that, as the entire follicle is comparable to a compound cell, the fluids within it must directly or indirectly emanate from actions taking place on the inner surface of the cell wall, *i. e.* the vascular membrane of the Graafian follicle. Hence, it appears a legitimate conclusion, that the yellow matter of the false corpus luteum has its origin here also. This mode of stating the case has been observed by reason of contradictory statements having recently been published regarding the exact locality of this yellow matter—Bischoff espousing Baer's doctrine as to the secretion being found on the inner surface of the *inner* membrane of the follicle, whilst Dr Montgomery and others have asserted it to be found on the inner surface of the *external* membrane, and between the two. The following case is cited at full, to show that the yellow matter may be found lying free in the cavity of the spurious body,—an instance of departure from a general rule, rather than an illustration of the rule itself.

Isabella Smith, aged 36, took a poisonous dose of opium on the 25th May 1844. She partially recovered, but relapsed, and died on the 28th, at which time the catamenia were upon her. The os uteri is dilated and elongated laterally—the walls are hypertrophied

¹ Much similarity of form and constituent principles will be observable between these cells, and the exudation corpuscle, characteristic of inflammation:—for some good illustrations of which, *vide* "Inflammation of Nervous Centres," by Dr John Hughes Bennett, in the *Edinburgh Med. and Surg. Journ.* for 1843.

ed—a sanguineous secretion covers the mucous membrane of the uterine cavity. The right oviduct is occluded at its free extremity, and is dropsical, the pavilion being distended with nearly an ounce of straw-coloured fluid. The corresponding ovary contains a Graafian vesicle at its superior and uterine extremity, small in size, and but slightly vascular. There is also a degenerating false corpus luteum. The left oviduct is contracted in length, and twice curved on itself, the consequence of adhesive bands stretching between it and the uterus. The free extremity is tightly bound down to the broad ligaments, and with the exception of two pointing and fleshy-looking points, the fimbriæ are obliterated. The whole interior of the duct is filled and distended with coagulated blood, of a deep carmine colour, approaching to modena. The corresponding ovary is so covered with false membranes, that it requires dissecting out. Its outer portion is distended with a dropsical vesicle as large as a walnut. The portion nearest the uterus contains a spurious corpus luteum, bearing on the *inner* surface of the *internal ovisac* the characteristic yellow secretion, which, when submitted to the microscope, presents the appearance of these bodies in a perfectly recent state. The inner membrane presents traces of vascularity. There is no yellow matter between the two membranes. The substance is semi-fluid, and can be rubbed partially away with the finger. No cicatrix was observed, the ovary being much involved in false membranes.¹

A certain criterion whereby the dates of corpora lutea, both true and false, may be determined with moderate accuracy, is a desideratum in medico-legal investigations that has long been felt. The very lax manner in which the descriptions of these bodies have been detailed, and the difficulties encountered by the most cautious in making their meanings understood, as well as the incertitude surrounding the bodies themselves—all combine to call for some additional definition, whereby doubt may be replaced by certainty, and the “ipse dixit” of third parties, who may be non-professional, corroborated, or else received “cum grano salis.”

Without seeking to exalt any aid the microscope may yield in this dilemma, it certainly appears, that, by its use, certain fixed appearances are made manifest, both as to the nature of the corpora lutea themselves, as also to the same appearances in their development, persistence, and decay. The cell structure of an early corpus luteum of the false type is already figured. By having several times compared these bodies of the same date with each other, they can be referred to with some degree of confidence. One case will merely be cited from out the number, in order that others

¹ This case serves to prove, that one oviduct may be obliterated, and yet the uterine functions remain entire. Also, that to the development of a spurious body, the grasping of the ovary by the fimbriæ of the oviduct is not imperative. Furthermore, that the ovary may be partially diseased, and yet maintain a certain superficial power to perform its periodical functions.

may form an opinion as to the bodies in question, and the circumstances under which they were found.

A young woman, aged 25, who had not conceived, commenced menstruating on Monday the 31st of July 1843. The catamenia flowed regularly during the day. On Tuesday August 1, they ceased suddenly, without any apparent reason. Early on Wednesday, August 1, acute peritoneal inflammation set in, which terminated fatally within twenty-four hours.

Her death took place precisely on the third day. On post-mortem section, perforation, the consequence of chronic ulceration of the stomach, was found to have been the cause of the fatal seizure.

The right ovary measures one inch four lines in length. The average breadth is seven lines. The surface is partially corrugated. A slight prominence exists at the anterior and lower edge. On division, the ovary is found deep red and almost livid in colour. Corresponding with the external prominence is a body, in colour chrome-yellow, having the parietes, which are convoluted, and which enclose within their walls the specific yellow secretion. Within the external cavity lies a well-defined clot, lying free at all points, except at that corresponding to the external cicatrix. Microscopically viewed, the yellow substance is just what is seen represented at Fig. 1. The micrometer on which the cells lie is one thousand to an inch. In the same ovary are five Graafian vesicles, four of the size of peas, and one much larger. The left ovary measures one inch four lines long, and is six and a-half lines across. A longitudinal section displays three of the false corpora lutea in different stages of retrogression.

The next illustration is of a spurious yellow body, dating one month. It was taken from a young woman who died of pneumonia. The uterus and ovaries gave evidence of approaching menstruation. The mucous membrane of the uterus was reddened. The oviduct corresponding to the enlarged Graafian vesicle contained bloody mucus, and was congested. The spurious body of last month was contracted to one-half the dimensions usually observed in these bodies at the third or fourth day of their appearance. The internal ovisac was studded over with pigmentary molecules. The cells will be seen smaller in size. The nuclei are yet very distinct, but smaller than in Fig. 1; as are also the molecular granules. They lie on the same micrometer.

Fig. 2.



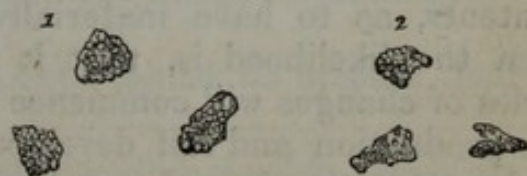
The next figure is the microscopical anatomy of a false body, fast becoming extinct. The size altogether is not more than two lines long, by half a line broad. It preserves the yellow colour in a modified degree. The date is probably three months, or even more,

calculated from circumstances connected with the woman's history. At this period it seems next to impossible to date with perfect accuracy. Every thing connected with this wood-cut
 Fig. 3.
 bespeaks a state of decline. The cells are more shrivelled—the nuclei and granules are less. The appearance becomes the more striking by comparison with Fig. 1.

Independently of these yellow bodies, there are dark spots in the ovaries, which in most cases partake of a true inky blackness. This dense colour entitles it to rank as a variety of spurious melanosis, distinct from the true melanosis, inasmuch as it has neither a tendency to cause irritation, ulceration, or disorganization of surrounding tissues. The ovaries being glandular bodies, and far removed from the centre of circulation, yet periodically, under the influence of physiological excitement, are liable to have in their proper sacs or follicles, an increase of vascularity, which is essentially capillary. Dr Carsewell, in his article "Melanosis," written for the *Cyclopædia of Practical Medicine*, says;—"black discoloration of the blood has been long known to follow as a consequence of retarded or interrupted circulation. This change is never so conspicuous as when it takes place in the extreme venous circulation, or in the capillaries. Under some circumstances, as in chronic inflammation, &c., the blood accumulates in the capillaries, and finally ceases to circulate. After a certain length of time, it coagulates, and the serum is forced out along with the salts which are absorbed. That which remains is an almost black substance, of the consistence of firm fibrine, which is probably hematosine." The black matter in the ovaries so much resembles the same, in other parts of the body, when not malignant, that it seems difficult to separate the appearances of the one from the other; whilst, if viewed conjointly or separately under the microscope, the size of the cells, the aggregation of the granular contents, the small nuclei, &c., render any diagnostic difference difficult, if not impossible, of detection. The black pigmentary matter within the ovaries is a cellular growth. If it be viewed some length of time subsequent to secretion, it may appear difficult of detection,—the exact appearances of the individual cells having undergone so much alteration, as to give them something of the appearance of a structureless mass, following the ramifications of blood-vessels. When recent, the case is markedly different, as appears from consulting the following wood-cut,



Fig. 4.



where the cells are too clearly defined, to leave any question as to their nature. They are rounded or oval, having plump walls, which are distended with

a dark, oily, and granular matter, having here and there larger spherules or nuclei, which are indefinite in numbers, (vide 1, Fig. 4.) As they grow older, the shapes of the cells have a tendency to become more and more triangular, so much so, as in many cases to be distinctly pointed at the apex, (vide 2, Fig. 4.) According to the duration of these cells, so is their increase of consistency, and by so much is the diminution in the size of the globular nucleus or nuclei determinable. They all follow out a definite direction, being arranged in semicircular or linear strata—a course not pursued by the proper secretion either of true or false corpora lutea. This appearance is as distinctly discernible in the small bodies of like nature found in the ovaries of cows—the most striking difference being, that, whereas in the human ovary, the colour is black, in the ovary of the cow it is of a dull brick-red. Not only are the cells in many instances triangulated, but the whole black body partakes of the same shape, especially when near the surface of the ovary.

So far as my observation extends, this black secretion lies within, and between the cell-walls of the ovule, and, as a general rule, does not exceed tissue-paper in thickness. The minute anatomy of this black matter differs so remarkably from any ordinary appearances of blood, that it is clearly indicative of some fresh arrangement of molecular particles, consequent on local vascular excitement, progressing to a certain extent, yet in the end abortive. Where a Graafian vesicle has attained to a considerable size, and suffered disruption, with escape of its contents, then a series of changes commence within and between the cell-walls, in many respects similar to the foregoing, but more extensive, as also colorifically different, resulting in what is commonly termed a “false corpus luteum.”

Nor is the presence of one action, causing the secretion of the black matter, incompatible with another action, terminating in the formation of the yellow matter.

When ovaria are examined frequently, it occasionally appears, that both yellow and black matter are found together, the black being internal to the yellow. The rationale of this appears to be somewhat as follows:—If a vesicle be small in size, and but slightly protruded beyond the walls of the ovary at the time of menstruation, or, if the ovarian walls be much covered over with false membranes, the vascular ovisac may become congested, (the menstrual act being dependant upon changes taking place in one or both ovaries.) The ovisac being loaded with blood, may secrete the black pigmentary granular cell peculiar to it in that condition. Should the vesicle have so far advanced in size, and in its granular contents, as to have materially thinned the dense ovarian walls, then the likelihood is, that it will burst, and in rupturing, that series of changes will commence within its walls, which will end in the production and full development of a spurious corpus luteum. If, however, the time of menstruation pass away, and this vesicle do

not burst, it will, or may, have the same characteristics as appear in the smaller follicle herein before mentioned. Moreover, as the ovary is a gland liable only to periodical excitement, so it is reasonable to infer, that the follicle, having failed to rupture the walls of the ovary and peritoneum, remains stationary, or nearly so, for the next three weeks, when, the same series of changes recurring, the act of rupture may receive completion; and hence, again, the compound aspect (black and yellow colour) of the corpus luteum—the thin lamina of black secretion of the previous month, having been pushed towards the centre of the cell, and surrounded subsequently with the yellow secretion from the vascular ovisac.¹

In only one instance, have I discovered this black pigmentary matter in the oviducts. It occurred in a woman who died of chronic disease, nine months and nine days subsequent to conception. It was found near to the pavilions, had a striated appearance, and, when microscopically examined, exhibited the usual appearance of granular cells, which, on pressure, exuded a considerable portion of dark-coloured oil. It yet remains to be observed, that this melanotic matter may be secreted in the ovaries, independently of any external signs of menstruation, it being found where the catamenia can be distinctly traced as absent. The following is a well-marked case in point.

Mary Bates, aged 29, has borne nine children, and is now a widow. The youngest child is three years of age, and the mother has not menstruated for two years. She has suffered from partial imbecility, consequent on two attacks of palsy, a condition that, by rendering her sister's attendance necessary, has placed her in full possession of all the facts of the case. She died from a third attack, and her sister clearly testifies as to the absence of the catamenia. The uterus is neither large nor vascular. The tubes are pervious. The ovaries are more than usually smooth on their surfaces, although, on close inspection, several old and half-obliterated cicatrices can be seen. One ovary contains six vesicles of the size of peas, which are vascular. In the opposite ovary, there are four pigmentary bodies, none of which communicate with the surface. There is also a well-developed vesicle in this ovary, with a very thin lamina of black matter between its walls. The pigmentary cells are quite recent. The conclusions are threefold. 1st, That menstruation has been a long time absent. 2d, That to the presence of melanotic bodies, menstruation is not a *sine qua non*. 3d, That, judging from the development of the vesicles, &c., the catamenia would soon have returned, had life been prolonged.

Reasoning from analogy, I once entertained an opinion that *true*

¹ Dr Ritchie believes the dyeing of the coats of the follicle of an inky black colour, to be merely mechanical, proceeding from their contact with the contained decomposed blood.

corpora lutea were only equivocal indications of pregnancy, or conception. The lower animals present facts which render such an opinion tenable with respect to them; and, at some other time, I hope to demonstrate it as incontrovertible.

In the human female, the more closely the ovarian functions are viewed, the more conclusive does the verdict seem, that true corpora lutea are never found, except as the products or sequences of conception.

It is very necessary that those characteristics by which a true corpus luteum may be distinguished, should be defined, as well as the means by which it may be known from other substances within the ovary,—substances that, to a certain extent, bear a resemblance, and which, being found by parties unable to draw a line of demarcation, have led to interminable differences of opinion and scepticism.

As regards structural peculiarities, or the exact mode of arrangement of the solid ingredients of the true corpus luteum, the greatest latitude must be allowed. The endeavour to narrow this law has, or appears to have, ever been a failing amongst those who have attempted a definition. From a great number of illustrations taken indiscriminately, it would be difficult perhaps to state which form or general outline predominated, or whether any two bodies, when examined comparatively, presented the same appearances. Nevertheless, an approximation sufficiently near does exist, whereby a decision may be guided, which can hardly fail of being correct, if taken in conjunction with other auxiliaries.

True corpora lutea are always to be found located between the proper tunics of the Graafian follicle, or, in other words, between the two ovisacs. I have seen a specimen in the human subject where there appeared to be a third membrane; and there is in my collection a similar appearance in the ovary of a cow. Each of these tertiary membranes is extremely thin, and in texture more or less reticulated. They give the idea, of being some portion of the granular matter of the ovum, in a low state of organisation. Furthermore, they do not wholly line the cavity of the corpus luteum, nor do they exist independently of its proper tunics.

True corpora lutea are always vascular in the early months of pregnancy. Numerous vessels branch forth into the solid substance, which originate in trunks ramifying over the vascular ovisac. By reason of this vascularity, the corpus luteum has a deep reddish-yellow colour, approaching sometimes to brown. This appearance is most plain on first dividing the ovary, but it rapidly fades on being immersed in water or spirits—the whole colouring matter derived from the blood oozing out—when the body assumes a dingy-yellow, or flesh colour.

In form, the true corpus luteum is round, oval, falciform, pyriform, or reniform. These may be regarded as the standard types, from each of which there are many deviations, referrible ultimately

to the one or the other. The periphery of a corpus luteum is mostly, but not always, scalloped.

A central cicatrix has always been associated with these bodies. This criterion is most just, and if always attended to, would obviate many erroneous descriptions, having reference not only to tubercle, but also to malignant deposits, which, to a certain extent, simulate them, but which are devoid of these central cicatrices. These cicatrices may be divided into groups. In some corpora lutea, the cicatrix does not present until a late period, and then results from the apposition of the sides of the contracted ovisac. In others, it is present from a very early period, and depends upon the specific secretion obliterating the internal cavity. Some have the cicatrix so diffuse, as to be at first difficult of detection, and capable of being traced only under a lens. A large cavity is not unfrequently found in the centre of the body, the inner walls being so moulded as to accord with the external shape. This, however, is not an invariable rule, as it has been known in more instances than one to push the solid matter to one side more than to the other, or even exclusively to one side. The proper substance is sometimes found both external to, and within the internal ovisac. This is readily explicable, on recollecting that the internal ovisac may recede from the outer one, whilst the secreted matter may find ingress through the aperture caused by escape of the ovum. These cicatrized bands partly depend on the puckering in of the ovisacs, and partly on the cellular tissue accompanying the blood-vessels throughout the substance of the body.

These points of difference may be inferred to depend on the greater or less size of the follicle originally; or the greater or less thickness of the internal ovisac; or the greater or smaller quantity of the matter secreted between the two ovisacs; or the amount of blood-vessels running into the yellow body.

Four types with their accompanying variations, may perhaps express the whole of the foregoing remarks.

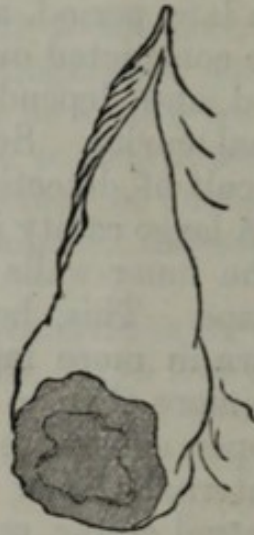
1st. When the inner wall of the corpus luteum originates a cavity, the sides of which may be smooth, or scalloped, or lobulated.

Fig. 5.



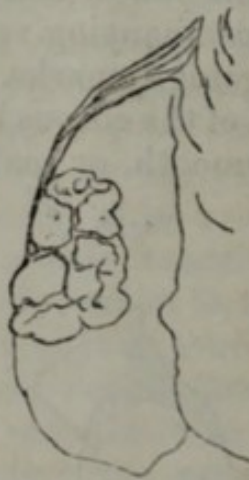
2*d*. When the whole substance is solid throughout, but where also, the internal ovisac is visible as a minor circle, the space within it being occupied with the proper substance of the corpus luteum, instead of containing serous or granular fluid.

Fig. 6.



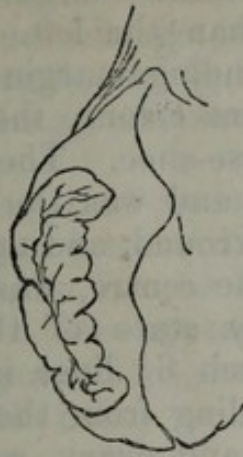
3*d*. When the centre of the corpus luteum is the seat of a stillate or radiate cicatrix, branching off on all sides towards the circumference. These stellæ may be both regular and irregular in form, and as a variety, more than one nucleus or centre of a ray may exist.

Fig. 7.



4*th*. The interior may be generally and irregularly striated; or, in other words, the septa of the two ovisacs may permeate the yellow body without having any one point of meeting in preference to another.

Fig. 8.



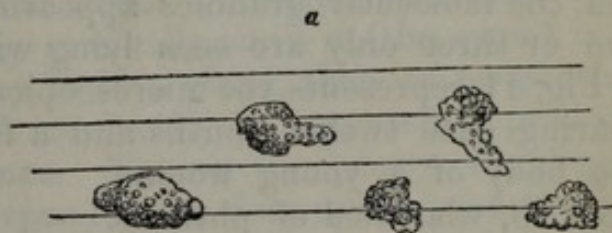
In each of these divisions, one law is persistent, viz., that one ray of the cicatrix extends to that point of the surface of the ovary, that has undergone rupture in consequence of the escape of the ovum or germ. This ruptured point is seldom found patulous,—few opportunities offering themselves for making an examination sufficiently early. Sir Everard Home found the orifice pervious in his “Case.” I have twice seen the same thing in the ovaria of cows, the opening being large enough to admit the end of a blow-pipe. Dr William Hunter remarked, “that in the cases he had seen, no bristles would pass; it appeared to be an obliterated duct or passage grown together;” and Montgomery’s extensive experience is the same.

The microscopical appearances of true corpora lutea are somewhat different from those of the false,—sufficiently so probably to establish a diagnosis. The cells of a true body examined at the various periods have not presented the large nuclei or oil spherules, so constantly observed in the false corpora lutea. They are nucleolated, but the nuclei are much smaller.

The figure represents the cell growths of a corpus luteum, found in connection with an ovum of one month’s date. The case is as follows:—A woman, of irregular habits, presented all the symptoms of delirium tremens, — remained incoherent, — and

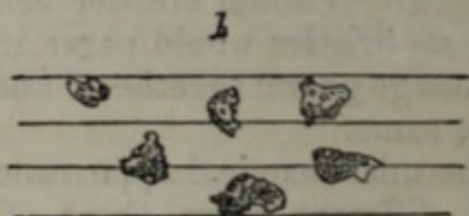
died on the third day. On opening the body, the uterus was found enlarged, and fluctuated beneath the fingers; it measured 3 inches and 3 lines from the os to the summit;—was 3 inches across;—the neck was 8 lines long;—and the os, which was flaccid, measured $6\frac{1}{2}$ lines across, and contained a thin mucus. A deep and red injection of the superficial vessels was seen for the

Fig. 9.



breadth of an inch, running from cervix to summit. The same appearance was observed around the uterine orifice of the left oviduct. The oviducts were neither large nor injected. The right one was slightly more so than the left. The surface of the right ovary presented at its depending margin in front, a discoidal protuberance, of a dingy modena colour, the centre of which was yellow, and shaped like a horse-shoe. The yellow portion measured two-thirds of a line across, and was the protruding surface of the corpus luteum beneath. Around, and upon the yellow substance, were minute vessels. In the centre, was an elongated and bluish substance, being the early state of the superficial cicatrix.—The ovary measured 1 inch $6\frac{1}{2}$ lines in length, and 9 lines in extreme breadth. Proceeding from the fold of broad ligament, found between the oviduct and ovary, were a number of tortuous arteries and veins, converging to pierce the gland. A section through the centre of the cicatrix developed an orange coloured corpus luteum, of a reniform shape, (vide Fig. 8,) the convexity corresponding with that of the ovary. The ovary was very vascular. Ether dissolved the yellow substance, by disintegrating the oily cells. The embryo was semiflexed, and in this position did not measure more than $2\frac{1}{2}$ lines in length. The extremities appeared as leaflets; the divisions of the vertebræ were perceptible; and the chorion was just beginning to branch out and subdivide. The annexed

Fig. 10.

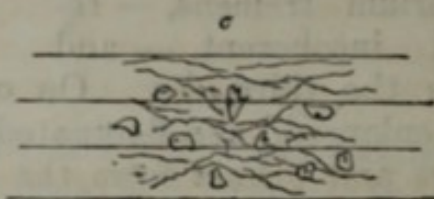


cut represents the microscopical anatomy of a corpus luteum, dating between the 4th and 5th month. It was obtained from the body of a woman who aborted whilst suffering from fever. She died a few days afterwards. The cells are somewhat smaller than those of the corpus luteum bearing date one month,

So far as my observation extends, corpora lutea do not begin to retrograde, much before the 4th month; after which period, they slowly and gradually decrease in size, the cells becoming smaller, and the molecular granules appearing less and less distinct, until two or three only are seen lying within the shrivelled cell-walls.

Fig. 11 represents the microscopical anatomy of a corpus luteum, bearing date twelve months and a few days. It was taken from

Fig. 11.



the body of a young woman, aged 23, who died of phthisis, three months and fifteen days after delivery at the full period. This and several other preparations came into my possession through the courtesy of Dr Francis. The corpus luteum has a lobulated circumference, and is as large as a small horse bean. The colour approximates

closely to that of the ovary. The granulated corpuscles will be seen to measure very little more than the 1-2000th of an inch in diameter. They are greatly shrivelled. Some contain the remains of nuclei, whilst others are simply granular. The ovary measures 1 inch 8 lines in length, and $5\frac{1}{2}$ lines in breadth, thus, not exceeding much the average measurements of ovaria without corpora lutea.

Dr Montgomery observes, that he is unable to state the exact period at which the corpus luteum disappears, but that he has found it distinctly visible, so late as the fifth month after delivery at the full period. The appearances, as regards average size of degenerating corpora lutea, are variable in the extreme, some of the ninth month being as small as others of a date three or four months later.

But notwithstanding the discrepancy with regard to common appearances, the cell structure appears to preserve a fixed standard of decrease.

I think I have seen a true corpus luteum existing as a dense capsule, as late as the seventh month after delivery. This occurred to a soldier's wife, who became a patient in hospital in September 1843. She was mother of four children. After recovering from an acute febrile attack, dropsy set in from granular disease of the kidney, of which she died on January 2, 1844. On the upper and depending surface of the right ovary, there existed a button-like protuberance, bearing in the centre a triangular cicatrix, and measuring $3\frac{1}{2}$ lines in diameter. It was whiter than the remainder of the ovary. Blood-vessels were yet seen ramifying on the upper surface of the prominent body. Beneath the cicatrix was a cavity, capable of holding a pea, bounded by a dense, white, and corrugated capsule, about one-third of a line in thickness.

The microscope seems especially valuable in deciding those dubious cases, where spurious bodies resemble somewhat degenerated true ones; and *vice versa*.

Corpora lutea are frequently styled glandular bodies. By Hunter they are said to be "tender and friable, like glandular flesh." Sir Everard Home states them to be "glandular structures which form the ovum, disappearing gradually when it (the ovum) is expelled." Premising the ovary to be a gland, then its proper function is secretion; and a gland can hardly be supposed to produce a gland within its own substance. Taking the proper signification of the word "gland," the corpus luteum does not appear to be at all glandular, but merely a collection of cells secreted by a gland, sometimes nucleated, and sometimes filled with molecular oily particles.

The only plausible hypothesis that seems adducible, to account for the difference in structure, &c., of true and false corpora lutea, rests in the changes effected in the impregnated ovum prior to its

escape from the ovary. These changes, together with the appearances put on by the ovisac, are fully detailed by Dr Martin Barry, in the *Philosophical Transactions*.

Tubercle, and cerebriiform cancer, are perhaps the structures most readily mistaken for corpora lutea. In the former, however, the matter is seen located *within* the proper tunics of the Graafian vesicle, and *not between* them. Added to this, the structure of the specific substance is homogeneous, and not separated into lobuli by cicatrices. There is also an absence of the external cicatrix, which is ever present in true corpora lutea.

The appearance of these bodies in the ovaries, after a successful intercourse, is so remarkable, that it is impossible to contemplate their structure and nature without being led to ask the question, *Cui bono?* The disruption of the ovarian stroma, caused by escape of the germ, might simply terminate in a cicatrization, and the cavity might easily be obliterated without the formation of this post-product. The idea that it is present to facilitate the passage of the ovum through the ovary, by contracting upon the fluid posteriorly, is an opinion too hypothetical, and too little substantiated by facts, to be received as a solution. The testis brings to perfection its spermatozoon, which is evacuated: the ovary is its analogue in the female, and secretes the ovum. Both are glands, and the function of the one is no more remarkable than that of the other; yet on the casting off of the vital germ, other phenomena arise terminating in the production of a new substance. A series of well-conducted observations, on any sympathy that might exist between premature abortions, and the accelerated decline of the corresponding corpus luteum, would be a valuable addition to the facts already collected. The bodies are too evanescent to leave any permanent impression on the surface of the ovaries; and as yet, observations are wanting whereby they can be shown to have any direct association with the healthy development of the intra-uterine foetus. Their simple presence in the ovary, when considered intrinsically, or as unassociated with ulterior purposes or functions to the economy, appears so unnecessary, so little connected with the integrity of the gland in which they are found, and so remote from any presiding action that can be inferred to occur during the months of child-bearing,—that physiologists have neither attempted an explanation of their presence, nor ventured upon any hypothesis concerning them.

The human female ovaria are large in comparison with the ovaria of other animals. Thus I have found the average size of the ovary in the cow, when quite free from corpora lutea, to be 1 inch $4\frac{1}{2}$ lines long, and 8 lines broad. In the human female, taking the same calculations, they average 1 inch 4 lines in length, and from $6\frac{2}{3}$ to 7 lines in breadth. The following is a table of the measurements of forty-three ovaria, chosen when the persons were all above pu-

berty, and in the child-bearing period of life. No ovary is measured containing corpora lutea of the true type.

No.	Condition of Ovaria.	Length.		Breadth.	
		Inches.	Lines.	Inches.	Lines.
1	Woman of middle age who had borne children, .	1	3	...	4
2		1	4	...	4
3	Woman had borne four children, and was aged 27	1	3	...	7
4	years,	1	4	...	7½
5	Woman, aged 20, who was unmarried, and died of	1	5	...	6
6	phthisis,	1	6	...	6½
7	Young person dying of pneumonia, and unmarried,	1	2	...	8
8		1	6½	...	8
9	Woman dying of fever, after abortion—opposite	1	6	...	6½
10	ovary contains the corpus luteum,				
11	Young person, aged between 20 and 30,	1	4½	...	6
12	.....	1	8	...	7
13	.....	1	8	...	6½
14	.....	1	7	...	7
15	Woman, age averaging between 20 and 30,	1	3	...	6½
16	Woman, borne three children, and dying of phthisis,	1	4	...	7
17		1	2	...	5
18	.....	1	3	...	7
19	Woman who had borne children,	1	3	...	7
20	.....	1	2	...	8
21	Woman unmarried, and aged 25 years,	1	4	...	7
22	.....	1	4	...	6½
23	Young unmarried woman,	1	8	...	8½
24	.....	1	6	...	6½
25	Middle aged person, whose pregnancies are doubtful,	1	9	...	9
26		2	0	...	8
27	Woman, aged 33, dying during pregnancy ; opposite	1	2	...	7
28	ovary has corpus luteum,				
29	.....	1	3	...	7
30	Woman who has borne four children,	1	4	...	7½
31	.....	1	2	...	5½
32	Woman, aged 33; opposite ovary has corpus luteum,	1	2½	...	7
33	Woman, aged 34, who had borne seven children,	1	7	...	8½
34	and died of phthisis,	1	7	...	9½
35	.....	1	1	...	6
36	.....	1	8	...	5½
37	Woman, aged 23, dying of phthisis,	1	2¾	...	5½
38	Woman, aged 23, dying of phthisis,	1	7	...	6¾
39	.....	1	5½	...	6½
40	A girl, aged 19, dying of phthisis,	1	0	...	5½
41	.....	1	0	...	5
42	Woman aged 35,	0	9½	...	6½
43	.....	1	1	...	6
44	Woman aged 29, who had not menstruated for 2 years,	1	2½	...	6½
45	.....	1	3	...	8

As the child-bearing period passes away, and the procreative powers decline, so in proportion is the glandular system, appropriated to these purposes, seen to decline also. The ovaries shrivel, but the shrinking is nearly all lateral. Cicatrices are seen, but longitudinal striæ or depressions are mixed up with them, giving

the ovary an appearance as if gashed with a knife. This is caused by the lateral contractions of the gland, which go on for some time, until an ovary once measuring seven lines across, will frequently be no more than two lines.

The aptitude for child-bearing at puberty is associated with a rapid increase and development of the ovary and its specific secretion. The first design in the animal economy appears to be a retardation of the generative or super-system of parts, so that time may be allowed for all the organic functions immediately affecting life, to be either fully constituted, or to be rapidly advancing towards completion, in order that collision of action, with consequent blight to both, may be avoided:—for, as Dr Walker expresses the fact, in his work on intermarriage, “a premature development diminishes both strength of body and vigour of mind—deteriorates all moral qualities, and is extensively fatal to life, and its permanent enjoyment.”

In like manner, the ovaria preside over the decline of the reproductive functions. This may be a part only of a general system of decay, manifested more particularly in the glandular system; or, it may be urged that the powers of absorption, at this exact period, predominate over those of secretion, and therefore, as the development of Graafian vesicles pre-supposes an action diametrically the reverse, they can no longer be protruded—whilst those already advanced will undergo gradual degeneration. Hence the small puckered cysts or ovisacs, of a white colour, so commonly found about this period.

Moreover, as during the entire child-bearing period, the vital energies and functions of the female may be counted as in the ascendant, and indeed excessive, so, at the critical period it is that the balance is struck, and an equilibrium constituted, which shortly gives place to a gradual decline, the vital powers becoming more and more taxed to maintain the integrity of the organism. Thus, as the reproduction of the species is a function altogether superimposed on the physiological organisation of the parent, when the parent organism shows signs of decreased vitality, the reproductive system may be inferred to be that most likely first to become inoperative, and to suffer decay.

JUNE 30, 1845.

10, PICCADILLY, MANCHESTER.