Observations on corpora lutea. Part 1 [-2] / By Robert Paterson, M.D., physician to the Leith Dispensary.

OBSERVATIONS

ON

CORPORA LUTEA.

Part I.

By ROBERT PATERSON, M. D.

Physician to the Leith Dispensary.

(From the Edin. Med. and Surg. Journal, No. 142.)

On examining into the appearances which the ovaries present at different periods of life, and more especially during that period when the functions of these bodies are in a state of activity, a variety of appearances present themselves, some evidently the result of disease, while others are the result of natural processes, connected with the function of menstruation or the evolution of the ovule.

In the last mentioned process, the evolution of the ovule, it is well known, that a yellow-coloured substance is formed in the place from which the ovule escaped. Many other bodies, however, which have also a yellow colour are formed in the ovaries; and hence have arisen the difficulties of medical men in distinguishing the bodies, which are the result of impregnation alone, and are consequently to be considered true *corpora lutea*, from those objects which

are so frequently to be found in the bodies of children and of virgins, and which have therefore been denominated false or virgin *corpora lutea.*

It is my intention in the following communication to consider, *first*, The appearances presented by the true *corpus luteum* in its early stages, anatomical position, and time and mode of disappearance; *secondly*, The different kinds of false *corpora lutea.*

The great practical question of the means of distinguishing these bodies will fall to be considered under the latter divison of my subject.

Part I.—True Corpora Lutea; external appearance of the impregnated Ovary.

The ovarium in the unimpregnated condition and during the child-bearing period of life is a small white flattened oval body. It is composed internally of dense cellular tissue, containing numerous imbedded vesicles, and is covered externally by two tunics, the proper cellular tissue of the ovary and the peritoneum. Upon impregnation occurring, a greater quantity of blood than usual is sent to the ovary, which has been the seat of conception. Around the Graafian vesicle about to discharge the ovule, the vessels become numerous and gorged with blood, and in the vesicle itself is commenced a processs by which its contents are increased, and its walls thickened. This process, we shall afterwards have reason to believe, is of the nature of inflammation.

The result of this general turgescence of the ovary, the increased quantity of fluid in the Graafian vesicle, and the formation of a substance around it, is the gradual pressure of it against the external coverings of the ovary, through the coats of which, as well as those of the vesicle itself, a small aperture is formed for the purpose of permitting the escape of the ovule. Upon the occurrence of this event, an effusion of blood immediately takes place, which fills up the now more or less partially emptied cavity of the Graafian vesicle, and the aperture through which the ovule has escaped.

When the ovary, therefore, is examined shortly after the evolution of the ovule, it is observed externally to be much increased in size, and in one or other extremity an enlargement is generally to be seen, most commonly of the size of a hazel-nut, but sometimes larger.

At this early period the protuberance is always of a bluish red or dark purple colour, with numerous vessels, ramifying over its surface. These vessels are generally filled with florid blood, which contrasts beautifully with the dark colour of the subjacent parts.

On examining the surface of this dark portion, a minute cicatrix or depression is always to be observed, and even an aperture

may be recognized.* All such appearances, however, although they are present in cases of impregnation, are found occasionally to exist when no such circumstance has happened. It is only, therefore, by the internal examination of this dark-coloured body, and by certain marks which are to be discovered upon a section being made of it, that we are enabled to pronounce it to be a true *corpus luteum*.

Internal Appearance of Corpus Luteum during the first three months.

Figs. 1 and 2 represent the external and internal appearance of a *corpus luteum*, a very short time after the rupture of the Graafian vesicle and escape of the ovule. It was removed from the body of a female, who died suddenly in consequence of injuries inflicted by her husband.† I am indebted to Dr J. Y. Simpson for this specimen. Upon making a section of this *corpus luteum*, blood exuded abundantly from the whole cut surface of the ovary. This blood having been gently removed, it presented very nearly the appearance seen in Fig 2. The cellular tissue of the immediately surrounding portion of the ovary was very much filled with blood, and the external margin of the *corpus luteum* was of an intensely dark colour, thicker, however, on one side than on the other. The internal membrane, which was of a bluish colour, and partially filled with blood, was irregular in its shape, and between it and the dark external margin formerly mentioned, the substance was of a brighter red colour, having dark striæ or folds running through it. After immersion in spirits, these striæ assumed a yellow colour, and the internal membrane could (with delicacy) be lifted up from the substance of the *corpus luteum*.‡

The uterus of this case was a little enlarged, and contained an extremely thin and soft decidual membrane.

An interesting specimen of a *corpus luteum*, a very little older than the above described one, occurred to Dr John Reid, lately in the Royal Infirmary. The patient, a young female about 18 or 19 years of age, came into the house labouring under peritonitis, of which she died on the third day after her admission. The left ovary presented a *corpus luteum* with its edge about two or three lines thick, beautifully plicated, and of an intensely yellow colour; the centre was filled with a coagulum of blood. I had not an opportunity of examining this specimen till after its immersion in spirits; the plicated margin was then quite distinct, but the central coagulum was gone. The uterus of this girl was also slightly enlarged, and contained a soft decidual membrane.

* Sir Everard Home's case, related in Philosophical Transactions for 1817.

† A more particular account of this case will be given afterwards. See page 60.

‡ This preparation is still preserved in Dr Simpson's Museum, and the above-mentioned points are distinctly visible.

The next case which falls to be noticed is one of very great interest, as it exhibits the structure of the early *corpus luteum* in a state of great perfection. The poor woman from whose body it was taken, walked into the waiting-room of the Royal Infirmary, apparently in good health, for the purpose of receiving advice. She had not been long seated when she suddenly groaned, and dropped her head upon her knee. Upon being looked to she was found to be quite insensible, and she died in the course of a very short time. It appeared from the account which was procured from her friends, that she had separated from her husband about two years before, and that since then she had lived a very intemperate and irregular life.

Upon examination of the body, extensive ramollissement of the brain was discovered. The internal surface of the uterus exhibited a coating of soft but thick decidual membrane, which reached to within an inch of the *os uteri*, and the aperture of the Fallopian tube was quite pervious. No ovum could be detected in the uterus upon minute microscopic examination. The ovary externally was much increased in size, and presented the usual appearance of tortuous vessels and a small cicatrix. Its section, which is exhibited in Fig. 3, presented to us a reddish gray-coloured central coagulum, with a yellow plicated margin. The quantity of diffused melanotic matter in the substance of the ovary immediately external to the yellow margin considerably heightens its effect. We think it most probable, from the consideration of the case, and on comparison with others, that impregnation had occurred from a fortnight to three weeks before death.

Fig. 4 represents a section of the ovary of a female who died with symptoms of chorea in the Edinburgh Infirmary, and for which and the immediately preceding specimen, I am indebted to Dr John Reid. Dr Allen Thomson, in describing the ovum which was found in this case, says, "that it was procured from the uterus of a woman aged twenty, who died after an illness of a fortnight's duration. This person was married six weeks before her death to a man with whom she had cohabited for a year before their marriage, and by whom she had had one child. The last menstruation ceased on the 24th of May 1838. Her husband, a labourer, visited her at the end of every week, and her death took place on the 1st of July, that is five weeks and one day after the first visit of her husband, succeeding to her last menstruation." The uterus was nearly one-half larger than in the unimpregnated condition. "The left ovary presented the most perfect specimen of a *corpus luteum* in process of formation which I have ever seen in the human female." Dr Thomson, from whose paper the above quotation is taken, goes on to state that a cavity existed in its interior. This, however, is erroneous, as its centre was filled up with a reddish

gray-coloured fibrinous mass, very similar in appearance to the immediately preceding one. The yellow plicated structure which surrounded this fibrinous mass was extremely regular in its foldings, and of a bright yellow colour. (For a further account of the appearances in the uterus, and the minute anatomy of the ovum and envelopes, I refer the reader to Dr Thomson's paper in the Edin. Med. and Surg. Journal, No. 140, for 1839.) It appears most probable that this was a pregnancy of about five weeks' duration.

The next specimen which has been represented, (Fig. 5,) exhibits the appearance of the *corpus luteum* at the second month of pregnancy. The patient died of *delirium tremens* in Dr Craigie's ward of the Royal Infirmary. On Sunday she miscarried, and died on the Thursday following, making an interval of three days and a half from the time of her miscarriage to that of her death. No account could be procured from this woman of her state; but the fœtus had the size and appearance of a two months' old embryo. The *corpus luteum* was contained in the left ovary; it was of smaller size than those formerly mentioned, and had not the plicated structure distinctly marked. This was still, however, to be noticed on narrowly inspecting it. Lining a cavity in the interior of this yellow body was a strong grayish-coloured membrane, the internal surface of which had a soft, minutely lobulated and lymphy appearance, and a small quantity of clear fluid was contained in it. External to the yellow body was also a firm membrane, and the substance of the ovary was very much injected around it. (See Fig. 5.)

Dr Montgomery* of Dublin has figured and described some beautiful instances in which the most usual appearance of the *corpus luteum* at the third month are exhibited; but about this time or a little later, certain changes are more actively commenced for the purpose of diminishing the size of the ovary, by contracting the *corpus luteum*. It will be observed from the cases which have just been related, that Dr Montgomery has fallen into an error, in imagining that the central cavity always exists till about the third month of pregnancy; his words are, "We shall, I believe, always find the cavity still existing within the first three or four months after conception." That this is no test whatever of an early state of the *corpus luteum*, and consequently of pregnancy, will at once be apparent from simple inspection of Figures 3 and 4, where a cavity evidently has never existed, and where the cavity of the Graafian vesicle has been from the moment of its rupture filled with coagulated blood, which has subsequently become lymphy and organized.

* Montgomery on the Signs of Pregnancy, p. 226.

Distinguishing Marks of the early Corpus Luteum.

What, then, are the marks by which we recognize a *corpus luteum* before the third month? These we shall find to consist of the peculiar plicated structure of its proper substance, and the presence of a central cavity or fibrinous coagulum.

I shall here shortly review the anatomy of the Graafian vesicle, and the changes which it undergoes in consequence of fruitful intercourse, so that we may the more readily understand the manner in which this peculiar plicated structure is produced. The ovary, as has already been stated, contains imbedded in its proper substance from twelve to twenty various sized vesicles, which are well known to have been denominated after the celebrated De Graaf, who first described them accurately. Each Graafian vesicle is composed of two coats or layers, an external one, dense and strong, and an internal one, delicate and soft. In the interior is placed the proper fluid of the Graafian vesicle, and floating in it the ovule of Baer, with its abundant proligerous disk. Upon the occurrence of conception, a larger quantity of blood than usual is sent to the ovary; the vessels, more especially surrounding the vesicle, which has been the seat of conception, carry a greater quantity of blood, and transmit it to the coats of the vesicle. A degree of active hyperemia is consequently now induced, by which the quantity of fluid in the Graafian vesicle is considerably increased, at the same time that an effusion, partly of blood globules, and partly of lymph, takes place between the membranes of the vesicle. The result of this combined process is, that the whole of the vesicle is very much increased in size, from substances effused into its interior, and which, consequently, puts its membranes greatly upon the stretch.

Immediately upon the rupture of the vesicle, and the escape of the ovule, along with a quantity of the fluid, a sudden diminution in the size of the Graafian vesicle takes place, and the formerly stretched walls of the vesicle regain, by their elasticity alone, somewhat of their former size. But the effusion which has taken place between these membranes in their distended condition necessarily becomes puckered up when the rupture takes place, and assumes the folded appearance which is well seen in Figs. 3 and 4. The internal membrane of the Graafian vesicle is sometimes also puckered up, and folds of it become insinuated into the plicæ of the substance of the *corpus luteum*. Upon the rupture of the Graafian vesicle taking place, a certain effusion of blood always occurs from the ruptured portion. This in some cases is greater than in others, and the quantity of it, which enters the cavity of Graafian vesicle, depends upon the greater or less emptiness of that cavity. If a large quantity of fluid escape, more of the blood enters the cavity, and, becoming shortly organized, constitutes the

fibrinous-looking mass which is to be seen in Figs. 3 and 4. But if a very small quantity of the fluid escapes, very little blood, of course, can enter, and it is in such cases that we have a central cavity existing from the first. It will be evident to those acquainted with this subject, that we consider the substance of the *corpus luteum* to be effused between the two coats of a Graafian vesicle. A similar opinion is held by Dr Montgomery.

Opinions of Baer and Lee regarding the situation of the Corpus Luteum.

It is proper here to mention, that two different views are held by celebrated members of the profession regarding the situation of this body.

Professor Baer of Konigsberg believes, that the *corpus luteum* is nothing more than the internal membrane of the Graafian vesicle in a state of hypertrophy. This opinion, from the celebrity of its author, has been extensively adopted by the profession. The other view which has been lately advanced by Dr Lee of London, is, that the substance of the *corpus luteum* is deposited external to both layers of the Graafian vesicle, and, consequently, between it and the proper substance of the ovary. This opinion, Dr Lee has been led to advance, from having noticed in one or two early cases, that he could divide the thick internal lining of the *corpus luteum* into two layers, while the external covering of it appeared to be simply the condensed cellular tissue of the ovary. Before the appearance of Dr Lee's paper,* I had many opportunities of observing that the proper substance of the *corpus luteum* was covered by two membranes; *first*, by its cellular envelope, a continuation of the proper cellular tissue of the ovary, and, *secondly*, by an immediately investing thick, and distinct membrane. Since then, however, I have paid additional attention to this subject, and have had much pleasure in demonstrating both these layers to Dr Simpson, and a number of professional friends, as well as to the members of the Anatomical Society of this town. Any one may satisfy himself of this by a very simple experiment. Let him procure the ovary of a cow containing the *corpus luteum*. In this animal the parts are so large as to be easily distinguished. An incision is to be carefully made through the peritoneum and proper tunic of the ovary, and then turning their edges aside, no difficulty will be experienced in turning out the *corpus luteum* from the ovary. On examining it we find, that it is still covered with its cellular envelope. Upon cutting gently through this, and reflecting it, we find that the orange-coloured *corpus luteum* is still covered by a proper tunic, and when this is cut through and elevated with the forceps, the naked *corpus luteum*

* Medico-Chirurgical Transactions for 1839.

comes immediately into view. Now what else can this second tunic be but the external membrane of the Graafian vesicle. This arrangement may be demonstrated not in the cow alone; for it is easily to be seen in the sheep and pig as well as the human subject. We cannot understand how Dr Lee has fallen into this error, unless it be from the circumstance of not having examined the state of parts in the lower animals, where, as in the cow, they are exceedingly manifest.

Again, for the next point, which is not one of such easy demonstration, I am proud to adduce the testimony of my friend, Dr A. Thomson, who was a believer in the doctrine of Baer regarding the internal membrane of the Graafian vesicle, until he saw it otherwise demonstrated. In a series of experiments which he was following out on bitches, he was kind enough to permit me to assist. In this animal we had many excellent opportunities of watching the formation of the *corpus luteum* on almost every day from the thirty-sixth hour till the twenty-first day after impregnation. It was truly interesting to notice the gradually increasing development of the substance of the *corpus luteum* between the membranes of the Graafian vesicle during this interval. The internal membrane continues distinct during all this time; but as it reaches the sixth or eighth day it becomes much thicker and whiter in appearance. Upon examining minutely into the cause of this, it is found to arise from the presence of an effusion of soft lymph upon its internal surface. The use of the lymph is evidently for the purpose of effecting the closure of the central cavity. If the *corpus luteum* is examined at such an advanced stage as when the lymph has become pretty firm around the membrane, and where evidently a cavity would have continued to exist, this lymph can be separated with care into several layers. Dr Lee found that it separated most easily into two layers; while Professor Baer imagined that it was all lymph together. Dr Lee's internal membrane then is evidently nothing else than a layer of coagulable lymph. Professor Baer, on the contrary, had failed to distinguish the proper internal membrane from the effusion of lymph on its surface.

In the experiments on the bitches before-mentioned, we had opportunities of witnessing the progressive effusion of this lymph, but could, in general, distinctly tell the internal membrane from it.

Upon viewing this internal membrane with the microscope, it is found to have lost the granular structure which it has previous to impregnation.

Appearance of the Corpus Luteum from the third month up to the full term of Pregnancy.

It may be remarked as a general rule regarding the *corpus*

luteum, that it is larger in the early months, and proportionally diminishes in size as we approach the full term of pregnancy. Its colour is now most generally of a dingy-yellow ; occasionally the yellow is very bright, (see Fig. 7), and not unfrequently it has a reddish hue. Dr Montgomery believed that this reddish hue of the *corpus luteum* is always communicated to it in consequence of inflammation existing in the uterus and ovaries at the time of death. This change of the usual colour cannot always be traced to such a cause. We have frequently observed it when no inflammation of these parts existed at the time of death, and a similar variation of colour, is occasionally seen in the lower animals. Thus we have seen the *corpus luteum* of the cow, of a pinkish yellow colour, and that of the ewe of a yellow colour throughout, their ordinary respective colours being orange and pink. We believe it is as liable to change of colour as lymph effused on any other membrane has. Figs. 6 and 10 may be consulted for the sake of comparison. Fig. 6 is the natural appearance of the *corpus luteum.* The patient died from the effects of ruptured uterus, two hours after delivery. No evidence of inflammatory action having existed in these parts was obtained upon dissection. For this case, I am indebted to Dr Craigie of Leith, who was called in by the midwife who had charge of the case. Fig. 10, on the contrary, was taken from the body of a female who died of inflammation of uterus from retained placenta one month after mature delivery. For this preparation I am also indebted to Dr Craigie.

The central cavity, too, if one existed in the early months, begins to contract, and is then generally to be found (more especially towards the later months) in the form of a central irregular white and puckered line. This, however, is not always the case. We have already remarked that, from the very first, occasionally, no central cavity exists, but when it does exist, and its internal coating of lymph is thick, it not unfrequently retains its cavity entire throughout the whole course of pregnancy. This is well seen in Figs. 6 and 8, taken from individuals who died after mature delivery.

We conceive that one of the most distinguishing marks of this body during the period that we are at present considering, is to be found in its regular shape. This is never to be seen in the bodies which have been denominated false *corpora lutea*, which will be considered immediately. We have seen the *corpus luteum* once or twice with an appendage in the shape of an additional lobule ; but that also, as well as the *corpus luteum* itself, was rounded and not in the least irregular in its outline. In its centre it may either have a fibrinous mass, a central cavity, or a white puckered line. " Of this latter appearance," says Dr Montgomery, " it ought to be observed, that it is visible as long as any distinct

trace of the *corpus luteum* remains, and forms one of the most essential characters, distinguishing this body from every other that might be confounded with it."

It is of importance to remember that the *corpus luteum* is extremely soft in those dying from puerperal fever and similar diseases, so much so, indeed, as occasionally, when making a section of them, the edge of the knife removes the central cicatrix. This is exhibited as it happened in Fig. 7. The patient died of puerperal fever, and the knife with which the section was made happening to be rather blunt, the central cicatrix was torn from its attachment to the substance of the *corpus luteum*.

Mode and period of disappearance of the Corpus Luteum.

The use to which the *corpus luteum* is put during pregnancy is wholly unknown. It appears most probable that the object of its formation is to assist in the evolution of the ovule, and to close up the aperture from which it has escaped. After this it acts merely the part of an extraneous body in the ovary, and its absorption would be accomplished much more speedily were it not for its organization.

The large quantity of blood sent to these parts during pregnancy prevents absorption going readily on, and it is to this that we attribute its long residence in the ovary. We think this is distinctly shown by the fact of its speedy disappearance after delivery when the absorbents are active; but if any cause, such as inflammation, keeps up a larger supply of blood in the parts for a length of time after delivery, the removal of this body is completely stopped, and it remains of larger size. Fig. 10 illustrates this very well. It was taken from the body of a female who died one month after delivery at the full term.

Inflammation in the uterus of this case had been constantly going on in consequence of a partially retained placenta, and we see the large size of the *corpus luteum* at such a length of time after delivery. In the usual course of things, then, after a natural labour at the full term, or even after an abortion, the activity of the absorbents is so great, that little confidence can be placed upon the appearance of this body in many cases, in the course of six weeks after that event, as an indication that the individual has been pregnant. "The exact period of the total disappearance of the *corpus luteum*," says Dr Montgomery, "I am unable to state, but I have found it distinctly visible at the end of five months after delivery at the full term, but not beyond this time." We have not been so fortunate as Dr Montgomery in discovering the remains of the *corpus luteum* at this period after delivery, although we have examined many ovaries about five months, and are therefore inclined to look upon it as a rare occurrence. We have also examined

many ovaries at three and four months after mature delivery, without finding any thing like positive evidence of a true *corpus luteum* having existed in them. Passing, then, from the time of its disappearance, of which we evidently know very little, it being modified by so many different circumstances, we proceed to consider the manner in which it disappears from the ovary.

We have already stated, that the formation of the *corpus luteum* consists in the deposition of a lymphy deposit between the layers of the Graafian vesicle. It is natural, therefore, to expect, that in the reabsorption of this deposit, will consist the method in which this body disappears. The manner of its obliteration then will greatly depend upon the presence of a central cavity or a cicatrix. So long as the cicatrix remains in a distinct form in the ovary, so long may every confidence be placed upon it as evidence that a true *corpus luteum* has existed there. But in many cases where abortion occurs at an early period, and in others where delivery takes place at the full time, a central cavity exists. When the substance of the *corpus luteum* is absorbed, the two membranes of the Graafian vesicle are brought into contact again, and then appear under the form of a small puckered cyst.

There are other appearances in the ovary totally unconnected with pregnancy, which so resemble the *corpus luteum* disappearing, in which a central cavity has existed, that no confidence can be placed upon it in this stage. Cysts in contracting become puckered up, and assume quite the same appearance. This will be evident on referring to the Plate. Fig. 11 is the representation of the ovary of a patient who died in the Glasgow Fever Hospital, twenty-eight days after delivery of a seven months child; and Fig. 12 exhibits a case of a similar kind, but where abortion had taken place earlier. Now, let us compare these with Fig. 5, at the lower part of which ovary we see a cyst; and indeed the appearance of such puckered up cysts is familiar to many.

We may remark, then, in summing up this part of the subject, that little or no confidence is to be placed in the appearance of the cyst alone, unless between its layers we have a yellow substance, still visible. The central cicatrix, however, more especially when surrounded by more or less yellow matter, is an undeniable proof that the individual had been pregnant.

Part II.—False Corpora Lutea.

I now enter upon the consideration of false, virgin, or pseudo-*corpora lutea*, as they have been variously termed. This is a subject which has caused great discussion amongst medical authors, and it is here where the practical bearing of our subject shows itself. In some cases it is of the greatest importance to tell a true from a false *corpus luteum*. This distinction became of great im-

portance, in a trial which took place at Liverpool thirty years ago. Charles Angus, Esq. of Liverpool, was, in September 1808, tried at Lancaster for the murder of Miss Burns, a female residing in his house. The symptoms previous to her death, and the appearances observed on dissection, were such as to warrant a suspicion that she was poisoned. The medical examiners also found the uterine organs in such a state as to lead them to declare, that in their opinion the deceased had been delivered a short time before her death of a fœtus which had nearly arrived at maturity. It is the appearances in the uterus and appendages alone that we have to consider. The uterus was found so large as to be capable of containing nearly a quart of fluid. Great difference of opinion prevailed, as to whether or not the appearances in the uterus were the result of a delivery having recently taken place, or arose from the dilatation and recent expulsion of a collection of hydatids. It was not until after the trial that the ovaria were examined. They were then divided in the presence of a number of physicians, and a *corpus luteum* distinctly perceived in one of them; and certificates were received from Drs Denman and Haighton, Messrs Henry Cline, Charles M. Clarke, Astley Cooper, and Abernethy, all stating that it exhibited appearances, which could be alone explained on the idea of an advanced state of pregnancy.

Another case which shows the importance of distinguishing accurately between a true and a false *corpus luteum* occurred several years ago in Edinburgh. A prosecution was raised against four medical students for disinterring the body of a lady in Glasgow. The body happened to be so disfigured that it could not be identified by the relations. The ovaries, however, were examined, and it was reported that a true *corpus luteum* was found in one of them, which decided that they had not belonged to the lady in question, who was a virgin and advanced in life. On the trial, great contradiction took place between the opinions of the medical witnesses, one-half of whom asserted that the *corpus luteum* in question, was a true *corpus luteum*, while the other half maintained that it was not. The body of this individual was afterwards identified by a dentist who produced a cast of the gums. While the above cases show the uncertainty which pervades the profession on this point, it not the less forcibly points out to us the necessity for its farther elucidation, as circumstances might arise as in the last mentioned case, which might again call our professional opinions before the public, when it is desirable we should be better informed than on the occasion just mentioned.

A case occurred lately in Edinburgh which illustrates this subject, and, with very little alteration, might have brought forward the opinions of the profession on it. A lamplighter residing in the Canongate was indicted for the murder of his wife. It ap-

peared that the parties had been married eight years, and had had no family. The man was a sober and decent person, while the woman was addicted to the use of spirits. Latterly she had become acquainted with a young man, whose frequent visits to her in the absence of her husband excited suspicions against them. This man, in a fit of passion and jealousy, inflicted on her head wounds which proved fatal. The uterine organs were removed at the inspection and examined afterwards. The right ovary presented externally an enlargement of the size of an ordinary marble, of a dark purple colour, having several minute vessels ramifying on its surface, a distinct depression in its centre, and the appearance of a minute cicatrix. On cutting into it the structure and appearance of a very early *corpus luteum* was observed which was formerly described. The uterus contained an extremely soft decidual membrane; but no ovum could be detected, although minutely and carefully examined. Indeed, although this person had conceived, there can be little doubt, from the puckered and contracted appearance of the fimbriated extremities of the Fallopian tube, which would hardly admit of a small probe to enter, that no ovum could have passed into them.

In this case, it is possible that the woman had conceived by her husband; but it is much more probable that she had not, and that the husband had great cause of provocation. But let us suppose that the husband had been absent for a month or so, and had inflicted similar blows on his return; it would have become a question of the greatest importance, to have determined, not only if that was a true *corpus luteum*, but whether or not it was possible to have been produced,—the result of a conception before his departure. Although this case is in so far imaginary, yet the circumstances supposed are very likely to have happened, and the appearances observed in the ovary, if carelessly examined, would either have been set down on the one hand as a coagulum of blood, or as bearing at least none of the marks of the *corpus luteum* as described by authors.

The origin of False Corpora Lutea as connected with the changes which puberty induces.

For the purpose of enabling us to comprehend the manner in which many of these substances are produced in the ovary, it will be necessary for us to glance very shortly at the changes which puberty effects on these parts. On the occurrence of this change in the internal as well as the external economy of the animal the Ovaries, which are the prime movers, the essential cause of them, undergo various and remarkable differences. They are increased in size, and have one or more of the vesicles protruded from their surface.

Simultaneous changes are at the same time effected in the uterus and Fallopian tubes, by which, in the whole class of the Mammalia, a discharge from the uterus and tubes takes place, indicating that this change has occurred. In the lower animals this discharge is colourless and exceedingly sparing in quantity, while in the human female it is of a dark-brown colour, and is usually in large quantity. I am aware that great variety of opinion exists regarding the question, whether the state of heat in the lower animals, and that of menstruation in the human female, are to be considered the same. There is such a degree of similarity in the two actions, that I am of opinion they cannot be considered different. That the ovaries are the cause of this change both in the lower animals and human female, may be regarded as proved by Mr Yarrell in fowls; and the cessation of the discharge proper to the period of heat is well known to follow the removal of the ovaries in bitches, rabbits, and more especially in swine, in the latter of which it is daily practised.

In the human female, Mr Charles Pears* has recorded a very interesting case of congenital absence of the ovaries where the patient had a masculine appearance, and no monthly changes had ever occurred. Mr Pott† has related a very interesting case also, where the ovaries were excised, and where the patient ceased to menstruate. (The changes which take place in the ovaries, as the enlargement and rupture of prominent vesicles, I shall consider more fully afterwards.) The appearances of congestion of the membrane lining the uterus and tubes in the lower animals and human being is of a similar nature.‡

The menstrual discharge disappears like heat in the lower animals during gestation, and it ceases simultaneously in both as the period of procreating life closes. The only difference which is found to exist between the two states, consists in impregnation taking place in the lower animals during the season of heat, and not in the human being during menstruation. It is a generally allowed fact, however, that impregnation most generally occurs in the human body shortly after the cessation of the monthly discharge. This difference I am inclined to attribute, not to any dissimilarity of function in the two classes of animals, but to the presence of a copious discharge coming from the whole course of the Fallopian tubes and uterus, which must of a necessity prevent the access of any seminal fluid along these parts, while in the

* Philosophical Transactions for 1805, p. 225; and for a number of very interesting cases of this description, the reader is referred to Dr Simpson's article on Hermaphroditism in the Cyclopedia of Anatomy and Physiology, p. 715.

† Pott's Surgical Works, Vol. ii. p. 210.

‡ "The Internal parts of Generation, (in the rabbit,) were exactly in the same state as external, that is as black as ink, from congested blood." (Cruikshanks in Philosophical Transactions for 1797.)

lower animals, where the discharge is extremely trifling in quantity, (and in some animals it is hardly more than an increased moisture of the parts), no barrier exists to the passage of the seminal fluid. On the contrary, every thing assists (from the extreme activity of all the vital actions of the parts), to facilitate its transmission to the ovaries.* The changes which take place in the last named organs, too, are of a very similar nature. When the ovaries of an animal killed while in this state are examined, they are found to be much increased in size, partly from their increased vascularity, and partly from a number of protuberances on their surface. These are the enlarged Graafian vesicles. In some of the lower animals, as the pig and ewe, whether the animal has connection with the male or not, towards the termination of the season of heat these burst of their own accord, sometimes without any effusion of blood whatever. At other times the vesicle is quite filled with this substance, and not unfrequently a small quantity is effused into the vesicles, which soon becomes deposited in the form of a thin layer all around the interior of the vesicle. It is not difficult to foretell what becomes of the two former instances; in the first the vesicle contracts into the form of a small cyst, and is soon absorbed from the ovary; in the second, the colouring globules of the blood are in a short time taken up, leaving a yellowish irregularly-shaped mass, generally of small size. In the third instance, however, more difficulty will be experienced. As the vesicle which has become the seat of the layer of blood in its interior contracts, it is evident that the blood having become firm, will be puckered up in a similar way to the true *corpus luteum*. This form of false *corpus luteum* we have only seen in the lower animals, and can at once be distinguished, by its opening into the cavity of the peritoneum, remaining long in a patulous condition, and the absence of any lining membrane to its cavity. Dr Montgomery refers to this change in the human female as a frequent one. We cannot say that we have been satisfied with it there, although, from its occurring in the lower animals, and the statement of Dr Montgomery, renders it a subject of the greatest importance to be attended to.

In the human female the period of menstruation is also marked by prominence of one or more of the vesicles, and by their occasional rupture. This circumstance was, so long ago as the year 1672, pointed out by Kerkringius.† His words are, "aliquando fœminæ dejiciunt hæc ova, imprimis, tempore menstruorum." Dr Lee of London has of late directed more particularly the at-

* This theory of impregnation seems now to be the one which is most generally received at the present day.

† Philosophical Transactions for 1672.

tention of the profession to this circumstance in the article Ovaria, in the Cyclopedia of Practical Medicine, to which I have had occasion previously to refer. In this paper, he makes no mention of the remark of Kerkringius, but relates several cases which he had an opportunity of examining, in which death had taken place during the menstrual period, and in which he found a Graafian vesicle, enlarged, protuberant, and vascular, and in others, an aperture in the peritoneal coat, communicating with a cavity of greater or less extent in the interior of the ovary, and filled with coagulated blood. One of his cases I subjoin for the purpose of illustration. "In a patient who died from cholera while menstruating, the ovarium was much larger than natural, and at one point, there was a small irregular aperture in its peritoneal coat, through which a portion of a slender coagulum of blood was suspended. On cutting into the substance of the ovarium, it was found to be occupied by three small cavities or cysts, one of which was filled with a clear ropy fluid, another with semifluid blood, and the third, which communicated with the opening in the peritoneal coat of the ovarium, with a firm coagulum.

Very similar to the case above-mentioned is one, for which I am indebted to the liberality and kindness of Dr J. Reid, and a view of the peculiarities of which is represented in Fig. 18. The patient, aged 22, had been bedridden in the Royal Infirmary for three weeks, in consequence of a severe burn over the chest and abdomen, and of which she died. The uterine organs were removed entire, and examined afterwards. The uterus and Fallopian tubes were found filled with menstrual blood. On examining the right ovary, a dark protuberance was observed to exist, and the appearance of a cicatrix on the surface of it. On cutting into this it was found to consist of a large coagulum of blood, which did not seem to be bounded or defined by any distinct membrane, but was rather effused into the substance of the ovary. I fear, however, that this appearance of effused blood has been too seldom observed to be deemed a universal occurrence, and more especially to the extent which Dr Lee has mentioned, and which is represented in our drawing of the natural size. It appears to me more probable that the most usual appearance must be simple enlargement of a vesicle, without rupture, the increased quantity of fluid in which becomes reabsorbed afterwards. Nothing is more common than to observe in the ovaries of women during the child-bearing period of life a number of cysts puckered up to an astonishingly small bulk, and feeling quite firm. Fig. 10, at A. represents several of these bodies of different sizes. If an effusion of blood into a Graafian vesicle or into the tissue of an ovary always occurred at each menstrual period, it is most probable that we should always find one or more of these coagula in different stages of absorption in the ovaries of every woman who dies during menstrual life. Now this we know

is not always the case, for I think we are safe in alleging that six out of every ten ovaries of patients dying during that period of life, and unconnected with pregnancy existing or recently terminated, present no appearance whatever of red, pinkish, or yellow-coloured substances, which I shall afterwards show are the colours that blood assumes in the progress of absorption from the ovary. While the circumstance of effusion of blood occasionally taking place in such cases points out the similarity between the season of heat in the lower animals, and menstruation in woman, it not less clearly shows us, one of the many ways in which these false *corpora lutea* are formed.

Different Varieties of False Corpora Lutea.

False *corpora lutea*, then, in the human female, or yellow bodies which are liable to be mistaken for the true structure, may be of two different kinds, arising from as many causes.

The *first* order of *corpora lutea* arise, as I have before-mentioned, from effusion of blood into a Graafian vesicle. These have been well represented by Dr Montgomery. They have more or less of a regular form, but their internal structure is homogeneous, and without any appearance of radiation, central puckering, or cavity.

The *second* set also originate in effusion of blood, but they are preceded by a diseased state of the ovary, viz. apoplexy. In this species the blood is effused into the tissue of the ovary, and of course assumes a very irregular appearance. These are to be found of various sizes, from that of a millet-seed to a pea, and once or twice we have seen them of the size of a good large marble. No one can mistake this appearance in its recent state; it is only as absorption goes on, and the colouring matter of the blood begins to be removed, that it assumes a yellow colour. M. Andral, in taking notice of this appearance in the ovary, says, sometimes the effused blood has a red, and sometimes a brown colour. "We not unfrequently observe beside or around such an effusion a fine yellow colour, similar to that which is found on the parietes of certain collections of extravasated blood in the brain."* When these coagula have remained still longer in the ovary their interior generally becomes filled with black matter, or assumes the appearance of a cavity, and we have them then presenting to us, the aspect of an irregular-shaped soft membrane, either lined or not with a layer of black substance. In Figs. 13, 14, and 15, we have delineated these appearances, and where the gradual changes are very well marked. Fig. 13 is the coagulum of blood alone, of an irregular shape; Fig. 14 has been a similar coagulum, but its edges have

* Pathological Anatomy, Vol. i. p. 676. A similar change takes place in coagula of blood found in the cavities of veins from inflammation of their coats, or mechanical obstruction.

assumed the yellow colour, its centre still retaining some of its early appearance; and Fig. 15, which was procured from the body of a female who died in the Glasgow Fever Hospital. Numerous yellow bodies are seen, some with, and some without, a cavity, some filled with, and others without, melanotic matter, but all presenting such appearances, as no doubt might be mistaken for *corpora lutea*. It will be observed that the substance marked at A, Fig. 15, has all the characters of the true *corpus luteum*, the regular shape, the radii and the central cicatrix. This specimen excited at first a good deal of interest and discussion; many individuals being inclined to consider it nothing more, than one of numerous cysts seen in the ovary. Upon making inquiry, however, it was ascertained that the patient had miscarried five or six weeks before her death.

Two other forms of this pseudo-structure have been pointed out by Dr Montgomery. "I have often found," says this author, "a vesicle enlarged to three or four times its natural size, full of fluid, and its internal surface of a bright yellow colour." When the vesicle bursts or collapses from absorption of the contained fluid "this deposit closes upon itself, and forms an irregular line of junction, which is generally darker than the rest of the structure." This appearance we have often seen unconnected with a vesicle, as has been before-mentioned.

I think that the deposit of blood on the internal surface of the vesicle, before it bursts, or the contained fluid is absorbed, as Dr Montgomery has described it, is very likely to be mistaken by individuals unacquainted with the structure of the true body. It will be easily distinguished, however, by the want of the foldings and internal lining membrane, which we have mentioned in a former part of the paper, to be so characteristic of a true *corpus luteum* in its early stage.

The second form of false *corpus luteum*, to which we before referred as pointed out to us by Dr Montgomery, is tubercular deposits in the ovarian structure. These, no doubt, have been mistaken for the true body, as Dr Montgomery has shown.* They possess, however, little or no resemblance to true *corpora lutea*, at any stage of their progress, or even in the act of disappearing. They never have any striated appearance or central cavity, and they are generally numerous in both ovaries; besides these, they are always found in subjects who die of tuberculous disease. There is only one other appearance which is liable to be mistaken for the true body. We allude to small cysts filled with yellow-coloured fatty matter.

In conclusion, then, we would remark that false *corpora lutea* in the human female may arise;—

* Opera citata, p. 24.

First, From the bursting and subsequent filling of a vesicle with blood, as in menstruation.

Second, From partial effusion of blood into a vesicle either with or without rupture of it.

Third, By reabsorption of the fluid of a morbidly enlarged Graafian vesicle, giving rise to a puckered cyst.

Fourth, From effusion of blood into the tissue of the ovary, the apoplexy of that organ.

Fifth, Tubercular deposits.

Sixth, Cysts filled with yellow fatty matter.

These are to be distinguished from the true *corpus luteum* by the following marks,—

They in general have an irregular form.

They want the central cavity lined with a distinct membrane, or the central puckered cicatrix.

They have no concentric radii.

They are frequently numerous in both ovaries.

In a future communication it is my intention to consider the much debated question, whether or not the true *corpus luteum*, as it has been described, ever occurs in the human subject or any of the lower animals, without impregnation having taken place.

Explanation of the Plate.

Figs. 1 and 2 represent the external appearance of the ovary, and Fig. 2 the section of the *corpus luteum* of a female who died a few days after impregnation.

Fig. 3. *Corpus luteum* about the second or third week after conception; it exhibits the plicated structure and central fibrinous mass.

Fig 4. *Corpus luteum* about the sixth week after impregnation.

Fig. 5. *Corpus luteum* at second month.

Fig. 6. *Corpus luteum* two hours after mature delivery.

Fig. 7. *Corpus luteum* thirteen days after delivery at full term.

Fig. 8. *Corpus luteum* three days after delivery at full time.

Fig. 9 exhibits two *corpora lutea* in the same ovary, the one about half the size of the other. The patient died on the fourth day after delivery at the full time. She had miscarried in a previous pregnancy at the sixth month, and was impregnated three months after.

Fig. 10. *Corpus luteum* one month after mature delivery. The patient died from inflamed uterus.

Fig. 11. *Corpus luteum* six weeks after abortion, at the seventh month.

Fig. 12. *Corpus luteum* about six weeks after abortion, at sixth month.

Fig. 13. Coagulum of blood in the ovary of a young female, who died during menstruation.

Fig. 14 represents a coagulum of blood, from the edges of which the colouring matter has been absorbed, constituting one form of false *corpus luteum*.

Fig. 15. Numerous false *corpora lutea* with melanotic centres. The patient miscarried some weeks previous to her death. The true *corpus luteum* is represented at *a*.

All the *corpora lutea* are of their natural size.

PRINTED BY JOHN STARK, EDINBURGH.

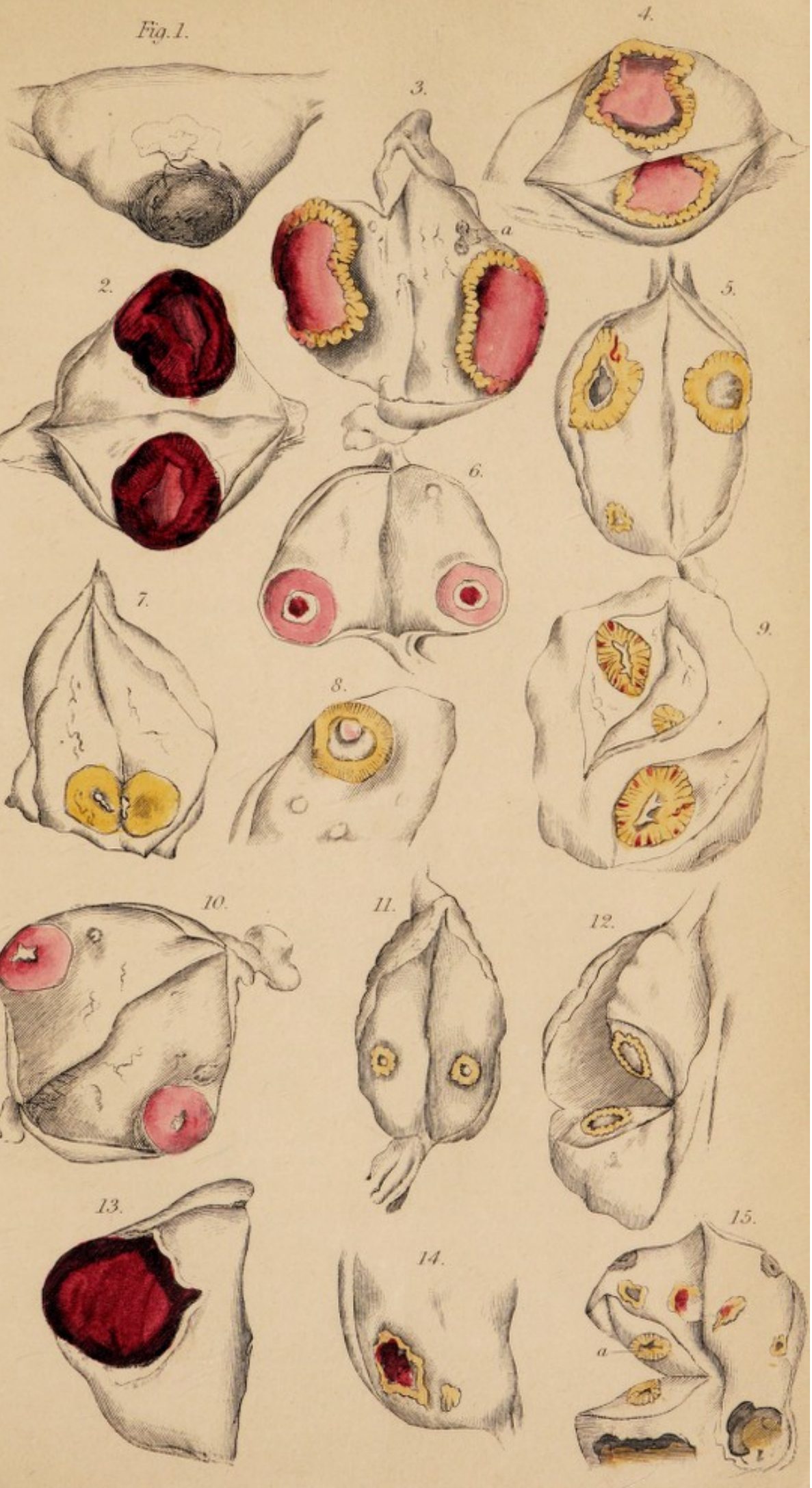


Fig. 1.
2.
3.
a
4.
5.
6.
7.
8.
9.
10.
11.
12.
13.
14.
15.
a

Dr. Hunter
with the Authors

OBSERVATIONS

ON

CORPORA LUTEA.

Part II.

CONTAINING A DESCRIPTION OF THE APPEARANCE OF THIS BODY IN THE MORE COMMON OF OUR DOMESTIC ANIMALS.

By ROBERT PATERSON, M.D., &c.

Physician to the Leith Dispensary.

(From the Edin. Med. and Surg. Journal, No. 145.)

In a former communication on this subject I shortly described the appearances of the true *corpus luteum* in the human female. I considered it, as regards its early and mature stages, its anatomical position, and the manner in which it disappears from the ovary. To these were added some observations on the false or spurious bodies which have so frequently been confounded with the true *corpus luteum*.

It was my intention now, to have examined the question of the possibility of a true *corpus luteum* ever occurring without impregnation. But it will be obvious to every one, that it is necessary to resort to experiments on the lower animals for assistance in the solution of this question, as no single individual, however extended his experience or opportunities, can be expected to accumulate sufficient evidence from the human female alone.

In the course of our experiments and observations on this subject, extended as they have been over the space of several years,

many curious and interesting facts have come under our notice; and, as it appears that the distinguishing marks of the true *corpus luteum* in the lower animals are not very generally understood, and the confounding the true with the false *corpus luteum*, as was so long and often done with that of the human female, is not unlikely to have taken place; and further, as it may assist others in pursuing a similar inquiry; it has been deemed advisable to devote a part of the present series of observations to the examination of the *corpus luteum* in the more common of our domestic quadrupeds.

Before entering, however, upon the description of the *corpus luteum* in the different domestic animals separately, I shall premise a short description of the process for the evolution of the ovule and the formation of the *corpus luteum* in the different classes of animals.

When the ovaries are hollow, as is observed in fishes, the ova are gradually pressed from the ovary into the oviduct, their passage along which is assisted by the contractility of this passage; no changes taking place in the ovary further than the loss of a certain number of ova, and the retraction of that part of the sac.

In the urodiles, the mature egg distends the membrane into a pediculated calyx, which then makes its issue from the cavity. The calyx or covering of the ovum then bursts, and is speedily absorbed along with its pedicle. In the chelonian reptiles, the membrane of the ovary which has become torn in allowing the exit of the ovum, remains for some little time in the form of an empty pouch, which by degrees contracts and disappears. In birds, the ovarium consists of a number of separate bags, which are attached by peduncles to a common stalk. These are called the yelk bags.

In consequence of the ova of birds being placed in different sacs, a very different process takes place for their evolution. The egg, as it enlarges, gradually distends the compartment or sac of the ovary in which it is placed, and, by bursting the enclosing membrane, escapes into the oviduct. Upon the escape of the ovum into the oviduct, the previously distended and torn membrane remains under the form of an empty sac, which is completely obliterated in the space of ten days, without the formation of any body whatever within it. This is probably owing to no blood being effused after the rupture of the distended sac; for in birds there is a white spot formed at the point at which the rupture takes place. This white point is destitute of vessels, and, therefore, no blood is effused. In the Mammalia, and more especially in the lower orders of the class, a white spot is to be seen before the rupture of the vesicle; but this spot is always much smaller than in birds. Blumenbach compares this process to the opening of an abscess, which results in part from the pressure of the accumulated fluid, and in part by the absorption of the walls of the ab-

cess, especially at the point where the rupture is about to take place.

In the Mammalia, however, a very different process is followed. The ovary is composed of parenchymatous cellular tissue, in which the Graafian vesicles are placed. Each of these Graafian vesicles contains one or more ovula floating in the contained liquid. The process which takes place when ova are to escape from the ovarium may be shortly described as follows. A turgescence of blood is observed in the parenchymatous part of the ovary, and more especially around the vesicle from which the ovula is to escape. The quantity of fluid in the vesicle is next increased, by which means the vesicle is pressed near the surface of the ovary, and escapes along with the contained fluid, by means of a very small opening. In this class of animals, it is observed, that, unlike fishes, birds, or amphibia, the rupture of the sac containing the ovum arises from the increase of the quantity of fluid around the ovum, and not by the increase in the size of the ovum itself. Upon the escape of the ovum in all the mammiferous animals, whether this arises from impregnation or from any other cause, certain changes take place for the purposes of obliterating the cavity which formerly contained the ovum; and the results of these changes are, that a certain body is formed, which has received the name of *corpus luteum*. I have already had occasion to show in part first, that the term *corpus luteum* has been applied to bodies of very different kinds, which are found in the ovary, the result of which has been, that authors have been led to point out certain marks by means of which, to distinguish true from false *corpora lutea*.

Such, then, being the process which is followed in the different classes of animals for the obliteration of the cavity which contained the ovum, before describing the appearance of *corpora lutea* in the more common of our domestic quadrupeds, I shall make a few general observations upon certain peculiarities which are noticed in them from that of the human female.

General Remarks on the Corpora Lutea of the Lower Animals.

Size compared with that of the Ovary.—First, then, it may be remarked generally, that the size of the *corpora lutea* of the lower animals is greater in comparison to the size of the ovary, than that of the human female. Thus in the cow, the *corpus luteum* is of such great bulk as to occupy fully about a half of the ovary. In the ewe a similar thing is noticed; but in this latter animal, where occasionally there are two *corpora lutea* found in the ovary, and in all those animals where there are several, as the pig, bitch, &c. the bulk of the *corpora lutea* occupies two-thirds of the ovary, even although the ovary is much increased in size. This, of course, does not depend upon any diminution

in the quantity of ovarian parenchymatous tissue, but upon the compression and diminished bulk which it undergoes.

External appearance. Nipple-like prominence, &c.—Secondly, In our domestic quadrupeds, the recent *corpus luteum* very generally presents a prominent nipple-like body, with frequently a depression in its centre. See Plate IV. Fig. 3, representing this appearance in the pregnant ewe. This is a phenomenon of extreme rarity in the human female. The explanation of the prominence just mentioned will be readily understood from what has been already said regarding the process which takes place for the evolution of the ovule, and the remarks that have just been made regarding the greater size of the *corpus luteum* in the lower animals. The large size to which the Graafian vesicle is distended before rupture takes place, produces a great thinning both of the external membrane of the Graafian vesicle, and that part of the enveloping membrane of the ovary which covers the vesicle; consequently, when rupture takes place, and rapid formation of the substance of the *corpus luteum*, the vesicle is soon redistended to its former bulk by the *corpus luteum*, and it projects beyond the surface of the ovary in the form of a nipple-like body, in consequence of the compression which is exerted on it by the parenchymatous substance of the ovary.

External appearance. Nipple-like prominence, depression in centre.—The depression in the centre of this body points out the spot at which the ovule escaped. In the sow there is frequently a patulous opening, leading into a small cavity in the interior of the *corpus luteum*. This cavity is lined by the internal membrane of the Graafian vesicle, and its opening is formed by the junction of the internal membrane of the vesicle with the enveloping membrane of the ovary. When no opening exists, but there is a simple depression in its place, this depression is caused by the retraction of that part of the enveloping membrane of the ovary, to which the internal membrane of the Graafian vesicle has formed an attachment; and in consequence of the obliteration of which, the retraction has taken place. On cutting into the *corpus luteum* directly through this depression in the centre of the nipple-like protuberance, a white line is distinctly seen running from it into the irregular-shaped whitish coloured centre of the *corpus luteum*, and which is the remains of the internal membrane of the Graafian vesicle.

General Remarks on False Corpora Lutea in the Lower Animals.

When considering previously the subject of false, spurious, or *pseudo-corpora lutea* in the human female, we were led to the belief that many of these bodies were formed in the human female during the period of menstruation. We then also took an op-

portunity of pointing out * the great similarity between the period of menstruation in the human female, and that of heat or desire in the female of the lower animals. Since the period that the observations referred to were written, we have had three opportunities of examining the uterus and appendages of females dying during the menstrual period. They all three died in the Royal Infirmary of Edinburgh of acute disease; and, for the examination of the uterus and appendages, I am indebted to the kindness of Dr John Reid. In one of the three, dark-coloured blood was found in the vagina, and the interior of the uterus and Fallopian tubes were also lined with it. In the other two, there was a considerable quantity of blood in the upper part of the uterus, and the mouth of it was filled with bloody, thick mucus. The Fallopian tubes were also filled with blood. In all the three there was a recent clot of blood in one or other of the ovaries, and in one case an aperture which communicated with the peritoneum. The clot of blood was close to the surface of the ovary in them all, but of very different sizes; in one case being about the size of a barley-pickle, and in another the size of a walnut. In two of them more than one clot was found, and these additional ones were of old standing, being of a yellow colour, with blood in the centre, or melanotic matter. In addition to these, however, five cases may be also adduced, which have been detailed in M. Gendrin's late work on Practical Medicine,† in all of which there is a rupture in the ovary leading to a cavity of irregular size, lined or filled with blood. This is presumed to be the remains of a ruptured Graafian vesicle.

I have also had several opportunities of examining the ovaries of the sow and ewe, killed during the period of heat, and in both these animals I found vesicles protruding from the surface, and in one specimen taken from the cow, which was supposed to be killed during the period of heat, the uterus, tubes, and ovaries were extremely vascular. In the one ovary there was an opening communicating with a cavity within it. This cavity was found filled with blood, and the ovarian tissue around this cavity was extremely vascular.‡

* See Edinburgh Medical and Surgical Journal, No. 142.

† Traite Philosophique de Medecine Pratique. Par A. N. Gendrin. Paris, 1838–9. Tom. ii. pp. 18–21.

‡ Dr Barry has mentioned some curious facts regarding the Graafian vesicles in the rabbit. He says, "that after the impregnated ova have been discharged from the ovary, some of the larger Graafian vesicles remaining unbroken, are frequently found to contain a considerable quantity of dark blood, which gives them the appearance of blackish spots. Such spots have been noticed by several authors, who supposed them to indicate the Graafian vesicles from which ova were destined to be expelled. It is not unusual, however, to find Graafian vesicles thus filled with blood, in cases when the escaped ova, in number, size, and local situation in the uterus forbid the supposition that more would have been discharged from the ovary." Thus, in a rabbit killed 108½ hours *post coitum*, ten ova were found distributed throughout the two uteri, the number of incipient *corpora lutea* corresponded to that of the ova, and yet each ovary presented several large and unbroken Graafian vesicles filled with blood.—Barry's Researches in Embryology, Part ii.

During the period of menstruation in the human female, and heat in the lower animals, it would appear that similar changes take place in the ovaries; that there are prominent vesicles; that these are ruptured; that their cavities become filled with blood; and that, after a time, this blood changes its colour, and gives rise to the appearance of false *corpora lutea*. While this is one of the most common origins of the false *corpus luteum* in the lower animals, another very frequent one is the effusion of blood into the tissue of the ovary, forming the ovarian apoplexy. We have found small coagula of blood at almost every part of the ovary, and under all circumstances, unconnected with heat or conception; and even when the animal has been several months pregnant, these clots of blood soon change their hue, and become either yellow and firm, or melanotic throughout, or yellow and black in the centre. In the cow they not unfrequently assume a brick-red colour, with small dark or black points through them. I have also not unfrequently found cysts filled with a yellow caseous matter. These are occasionally found as large as true *corpora lutea*, but are easily distinguished by their consistence and structure, as well as by their general appearance. In all instances, too, they can be turned out of their cyst with the greatest ease, which cannot be done with a true *corpus luteum*.

Means of distinguishing true from false Corpora Lutea in the lower animals.—The means of distinguishing true from false *corpora lutea* in the lower animals may be shortly stated to be that false *corpora lutea* have

First, An irregular form.

Second, No distinct central cavity lined with a membrane or a central puckering.

Third, No concentric radii, or lobular divisions.

Fourth, They can frequently be turned out of a distinct cyst, when the body will be found to be of a caseous consistence and appearance.

Fifth, They have not the same colour as the true body in the different animals.

§. I.—Observations on the Corpus Luteum of the Cow.

The only figures of the *corpus luteum* of this animal to which we can refer our readers are contained in Sir Everard Home's Comparative Anatomy. He has delineated in plate cxiii. figs. 2 and 3, a very beautiful specimen of this body in the cow, a short time after impregnation. As usual, however, the drawings are magnified representations of the objects, and are not coloured. In the accompanying plate, Fig. 1, is represented the *corpus luteum* of this animal about a month after impregnation. The figure is of the natural size, and was drawn a very short time after the ovary

was removed. The period of impregnation was well known, and the size of the *fœtus in utero* corroborated the testimony; the same ovary at *a*, contained the *corpus luteum* of the former pregnancy, but disappearing. The *corpus luteum*, then, of the cow, from a very short time after impregnation,* up to an advanced period of utero-gestation, is much larger than the unimpregnated ovary itself.

Size.—We examined one specimen, the bisection of which measured $1\frac{1}{4}$ inch in its greatest diameter, and 1 inch in its smallest; generally they are a little smaller, and sometimes so small as 8 lines in the greatest, and 6 or 7 lines in the smallest diameter. The average size of about a hundred of the *corpora lutea* of cows, the section of which I have measured, gives $11\frac{1}{2}$ lines for the greatest diameter by about 10 lines for the smallest. The above measurements have reference to the early states of pregnancy alone, up to the fifth or sixth month,—instances rarely occurring when we have an opportunity of examining the ovaries in animals killed, until after delivery. But we frequently have an opportunity of examining them at this time, when they are found considerably diminished in size, but still retaining the same appearance and colour as before. The late Mr Scott of Greenock, for some time previous to his death, was engaged in the investigation of this subject. He was at great pains to measure the size of the fœtus, and to compare it with the size and appearance of the *corpus luteum* in this animal. He was unfortunately cut off in the midst of his labours. The conclusions, however, at which he had arrived, I have been able to procure, having had an opportunity of consulting his notes.

Thus the *corpus luteum* of the cow was about the same size, when the fœtus weighed

Weight of Fœtus.	Length of Fœtus. From Cervix to Ischium.	From Cervix to Umbilicus.	From Umbilicus to Ischium.
1 oz. 4 dwt. 25 gr.	$2\frac{5}{8}$ in.	$1\frac{9}{16}$ in.	$1\frac{1}{16}$ in.
5 6 45	$3\frac{3}{8}$	2	$1\frac{3}{4}$
3 1 0	$3\frac{1}{8}$	$1\frac{3}{4}$	$1\frac{3}{8}$
4 7 0	$3\frac{3}{8}$	$2\frac{1}{8}$	$1\frac{5}{8}$
1 0 10	$2\frac{3}{8}$	$1\frac{1}{2}$	$0\frac{7}{8}$
4 7 11	$3\frac{5}{8}$	$2\frac{3}{8}$	$1\frac{3}{8}$
0 4 56	$1\frac{7}{8}$	$1\frac{1}{8}$	$0\frac{7}{8}$
2 1 40	3	$1\frac{3}{8}$	$1\frac{1}{4}$

Central Cavity.—It would appear from the statement made by M. Burdach, that the central cavity exists in every case at twelve days, and is about the size of a pea at that time. We have seen it much larger at a more advanced period of pregnancy, and have delineated one, Fig. 2. It is probable that in some cases

* We say a very short time, as we have not been able to see it and trace it in its very early stages in this animal. Burdach says, that in cows, the cavity in the *corpus luteum* is still the size of a pea at twelve days, and its walls have a yellowish red and flocculent appearance.

this cavity is very early obliterated, and in others persists unusually long.

Colour.—It was stated in part first of these observations, that the colour of the *corpus luteum* in the human subject varies according as it is examined at different periods, and also varies in different individuals. Thus, when the human *corpus luteum* is forming or newly formed, it has a red colour, and occasionally throughout pregnancy and even after delivery, a pinkish hue. Yellow, however, is the colour most commonly seen, and hence its name. The same observation applies to the *corpus glandulosum* or luteum of the cow. In this animal, the most common colour is a bright orange yellow, which colour even shines through the coverings of the ovary, and when a section is made of the ovary which contains it, the contrast with the ovary itself is great and striking. The colour of this body, however, although most frequently, as described above, certainly has not the orange hue, when the *corpus luteum* is forming or just formed, and I have occasionally seen it of a pinkish yellow hue during the course of pregnancy, and even at an early period of utero-gestation. On what this difference depends, it is impossible to say; but it certainly makes a difference upon the colour which the *corpus luteum* assumes when disappearing from the ovary.

MANNER IN WHICH THE CORPUS LUTEUM DISAPPEARS, AND COLOUR WHICH IT ASSUMES IN THE PROCESS OF ABSORPTION.—The manner in which this body disappears from the animal under consideration, is to be explained in the same way as has been already done, when speaking of the manner in which the human *corpus luteum* disappears from the ovary. I then endeavoured to show, that the *corpus luteum* consists of a lymphy effusion between the two coats of the Graafian vesicle which separates the internal from the external membrane, by the thickness of the *corpus luteum*; the internal membrane either remaining entire in the shape of a cavity, or becoming puckered up, and forming the central cicatrix, while the external remains exterior to the proper *corpus luteum*. I at the same time explained that the manner in which this body disappears, is, by the absorption of this lymphy deposit, and consequently the re-approximation of the two coats of the Graafian vesicle, leaving as the last vestige of a *corpus luteum* in the ovary, a small cyst or puckered cicatrix. The same remarks apply precisely to the animal under consideration. When a central cavity has existed from the first, and has remained during pregnancy, an instance of which is delineated, (Fig. 2,) the proper substance of the *corpus luteum* is absorbed, and a cyst left as above described. Most frequently, however, in this animal no central cavity has existed, the internal membrane being thrown into innumerable curious foldings over the lobules of the *corpus luteum*, as is seen in (Fig. 1.)

In such cases, as the substance of the *corpus luteum* becomes absorbed, these irregular striæ become more visible, and, in consequence of the diminished quantity of the glandulose substance, gradually assume the appearance of a central, puckered, and extremely irregular cicatrix. In disappearing, the colour of the *corpus luteum* in this animal varies; assuming sometimes a pinkish hue, but most frequently a brick-red or reddish yellow.

We can say nothing of the period at which this body disappears from the ovary of the cow, in consequence of the animals being killed for the market, and little being known of their history; and it is always necessary to sift to the bottom whatever information we obtain, before any reliance can be placed upon it.

§. II.—Observations on the Corpus Luteum of the Ewe.

The ewe is one of the most readily accessible of all our domestic quadrupeds, for the purposes of experimental inquiry on the formation of the *corpus luteum* and development of the embryo. It goes four months with young, producing one, two, or more, rarely three and four, at a birth.

We find that, in consequence of the ease with which this animal can be procured for experiments of the kind, many of the ancient authors founded their doctrines on the examination of no other animal but itself; and we have many elaborate series of experiments, as concerns not only the *corpus luteum*, but also the evolutions of the embryo, by Haller, Kuhleman, &c.; and in our own day by M. Coste and others. We have also directed our attention, in an especial manner, to the appearances of the *corpus luteum* in this animal; and we have had abundant opportunities of studying those appearances throughout almost every stage of pregnancy, from one or two days after impregnation, up to the full period of pregnancy, having twice examined the uterus and appendages of ewes killed for the market, in whom the lamb was taken out of the uterus alive, and lived afterwards.

Appearance of the Corpus Luteum at different periods of Pregnancy.—It would appear from the observations of different experimenters, that the Graafian vesicle of the ewe is not regular as to the period after conception, at which rupture takes place. Haller* found the vesicle ruptured in one instance so soon as ninety minutes after conception, and always after two hours. Kuhleman may also be mentioned as testifying the same thing. It is rather remarkable, however, that the vesicle in the sheep should burst so soon, seeing that in other animals, as the bitch, rabbit, &c. the interval between conception and rupture of the vesicle is much greater.

In the ewe, the formation of the *corpus luteum* does not ap-

* Haller's Opera Minora, Vol. ii p. 427.

pear to begin till about five hours after conception, and the commencement of it at that time is thus mentioned by Kuhleman. * "Vesiculam incipisse crassescere. Per id ostium caveam vesiculæ inflavi. In ea flocculi laceri cellulosi, et in ostio glutinosi quid et cruenti, tum in superficie ovarii, et circa tubæ fimbrias." The opening from the vesicle into the peritoneal cavity now closes, and the formation of the *corpus luteum* goes on rapidly. At twenty hours after conception in the ewe, we find Haller describes the appearance of it to be, "Rubrum inflammatum, de membrana ovarii eminens fissum. Membrana vesiculæ in ovarium mutatæ nunc crassior, et flocculi in cavea majores, in acinos increverant. In cavea mucus et striæ sanguineæ."

The changes which now take place may be shortly described to be as follow. The acini or fleshy projections, from the interior of the vesicle, gradually enlarge, until they entirely fill up the cavity. Haller found the cavity almost entirely filled up at seventy-two hours after conception. We have already explained that the substance of the *corpus luteum* is effused between the external and internal membrane of the Graafian vesicle; therefore, in consequence of the extreme delicacy of this internal membrane, it was not noticed by Haller to cover the acini or fleshy projections which he describes. That it does, however, is easily demonstrated, and has been already done in the first part of these observations. It is this delicate internal membrane which gives rise to the light-coloured striæ or divisions which are noticed to divide the lobuli of the *corpus luteum* in those cases where no central cavity exists. But it is still more distinctly seen when this does exist. In such cases, there always appears to have been a greater quantity of fluid effused into the cavity of the vesicle than takes place where no cavity remains, and also a quantity of lymphy effusion on the internal surface of the internal membrane, which considerably thickens and strengthens it. When this cavity does exist, it remains throughout the greater part of pregnancy; and we have frequently seen it filled up by numerous lymphy subdivisions or flocculi.

Colour.—The colour of the *corpus luteum* in this animal, when it is completely formed, is generally of a dull fleshy red, and occasionally of a pinkish or yellowish red. See Plate IV. Figs. 4 and 5.

The size is various, being largest immediately after the complete formation of the body, and decreasing gradually till the termination of pregnancy. It is astonishing, however, how little difference takes place upon it during the course of pregnancy, much less, we would say, than on that of any other animal with which we are conversant.

We instituted a series of experiments to determine the rate of decrease which took place on the *corpus luteum* during pregnancy, thinking at the time that the same would hold good with re-

* Op. cit. p. 428.

gard to other animals. We preserved a series of specimens which showed this body at about every week from impregnation to mature pregnancy. From these data, we were enabled precisely to ascertain the size of the *corpus luteum*, at different stages of pregnancy, and also to estimate any decrease of size which might take place. Thus, we have found the average size of the *corpus luteum* in the ewe, about fourteen days, three weeks, or a month after conception, to be about six lines in diameter, while at an advanced period of utero-gestation, it is about four lines in diameter. The largest size which we have found it in the ewe was nine lines in diameter. It may be said, generally speaking, to be about the size of a horse-bean or large pea. The size of the *corpus luteum*, in comparison to the size of the ovary, is very great, occupying nearly the whole of it; and where two exist in the same ovary, the size of the organ is considerably increased, while its proper substance is much compressed.

The same series of specimens, which we have mentioned above, enables us to speak regarding the frequency of a central cavity. We have only found it about 8 times in 100 cases; and so little is it to be relied on, as at all indicative of the relative age of the embryo, that it is frequently completely obliterated before the embryo has reached the uterus; and we have seen it (probably oftenest) when the fœtus was the size of a bean. We have also seen it existing in one *corpus luteum*, and not in the other, when there were two *corpora lutea* in one ovary, and when of course the embryos were of the same age.

The *corpus luteum* rapidly decreases in size, after the delivery of the animal, and not unfrequently becomes more lengthened in its shape, in consequence of enlarged Graafian vesicles, or new *corpora lutea* pressing against it. We shall have occasion to mention and explain this circumstance more particularly when we speak of the ovary of the pig.

It appears to me, however, that, even although they have assumed a more lengthened form, they may always be detected upon minute examination. When examined by means of a strong lens, they will be observed to possess some delicate central radii or lobular subdivisions, similar to what is seen in the recent body. The colour after delivery becomes of a much duller and darker hue, more of a brick red.

False Corpora Lutea.—It would appear that Haller was in the habit of distinguishing between the remains of true *corpora lutea*, and the false bodies found in these animals. He says of his experiment XIV. "In eodem ovario, corpus luteum vetustum, et vesiculae septem: sic in altero ovario duo vetusta corpora lutea, et octo vesiculae;" and of Experiment XVI. "In altero ovario etiam corpus luteum vetustum, et duo puncta fusca cum sex vesiculis;" and again in XIX. "In ovario hydatis grandiuscula et

tria puncta fusca."* From these it would distinctly appear that Haller not only considered it possible, but was in the habit of pointing out the difference between the remains of true *corpora lutea*, and those yellow bodies or *puncta fusca*, which, in general, take their origin from apoplectic effusions into the substance of the ovary.

The only forms of false *corpora lutea* which we have noticed in this animal, would seem to have originated, either in small apoplectic effusions into the tissue of the ovary, or from rupture of a vesicle, and effusion of blood at the season of heat. The former may generally be distinguished at an early period, by its dark, bloody, red colour, and afterwards by its rapidly assuming a yellow tint, (puncta fusca of Haller); the latter, or the effusion of blood from the rupture of a vesicle, can always be recognized by its semicircular or irregular shape. It possesses, however, more of the colour of the true *corpus luteum*. In addition to these marks, however, no trace of central radiation or lobular arrangement is ever found in the false bodies, and they have always a much more irregular shape. We shall also generally find the remains of true *corpora lutea* placed near the periphery of the organ, while those false bodies occur most frequently towards the centre, or in the substance of the ovary.

§. III.—Observations on the Corpora Lutea of the Sow.

This animal also has frequently been made the subject of experimental inquiry both by ancient authors and those of the present day. Haller has related several experiments which he performed on this animal, and Sir Everard Home, in his work on Comparative Anatomy, has not only described the *corpus luteum*, but given delineations of it in the pig.

Appearance of the Ovary during heat, and of the Corpus Luteum in its recent state.—The ovary of the sow when young, and before it has reached the age for breeding, is about an inch or so in length, and having numerous small vesicles projecting from the surface. As the breeding period arrives, however, and more especially when the animal is in heat or season, the whole size of the ovary is much enlarged, and the small vesicles which previously projected from the surface become extremely prominent and much enlarged. We had lately an opportunity of examining the uterus and appendages of a sow killed during the period of heat. It had had one litter of pigs, had not been near the boar, or even in sight of one from the time of its previous litter. The uterus and appendages of this animal were of large size, and of darker colour than in their ordinary state. Upon cutting into the uterus, its internal membrane was found of a dark-red or purplish colour,

* Haller's Opera Minora, Vol. ii. p. 428–9.

this redness being caused by numerous small and tortuous vessels filled with blood. The same redness extended throughout every part of the uterus and its cornua, and also into the Fallopian tubes of both sides.* Both ovaries were very large, and had numerous vesicles protruding from the surface, some of which were about the size of a large pea, others of a good sized marble. Three of the largest in the one ovary had been ruptured, the fluid having escaped by an extremely minute orifice, so that the vesicle had collapsed. In this way a cup-like cavity was formed in three points of the ovary, into which the point of the little finger could be easily introduced. The whole surface of the ovary was extremely vascular, and on making a section of it through some of the enlarged vesicles, and through two of those that had already burst, no appearance of the formation of *corpora lutea* could be discovered. The internal membrane of all the enlarged vesicles was extremely soft and gelatinous, but no bloody effusion was noticed either around them or between the membranes of the vesicle, and no lymphy projections were to be observed within the vesicle. The remains of the former *corpora lutea* were still visible, and the central puckering could be easily discerned in them all; they were five in number.

The period after impregnation at which the vesicle of the sow bursts to allow the escape of the ovule is not precisely known. Hausmann says that he never found the ova of the sow in the uterus before the period of four weeks had elapsed after conception. Dr Allen Thomson, however, has cautioned us against the error of considering that in the sheep, sow, and other animals, because the ova have not been seen in the uterus, they do not actually exist there previous to a certain date; for the ovum on its descent into the uterus is so minute that it is not easily discovered, and is very likely to have been passed over by experimenters of the time of Hausmann. The formation of the *corpus luteum* in this animal is beautifully seen about twelve to fourteen days after impregnation. In such instances the ovarium is found externally like a bunch of currants. It is extremely vascular, and frequently openings are found leading into the centre of the *corpora lutea*. Upon a section being made of the ovary, these bodies are generally found (about fourteen days,) with a hollow centre; this central cavity being most frequently filled with dark-coloured blood, and lined with a distinct membrane. This membrane, which is the internal membrane of the Graafian vesicle, is extremely delicate, and is frequently continuous with the external membrane of the ovary. The substance of the *corpus luteum* at this

* It ought to be mentioned that this animal was bled to death, and that, even although the vascularity of the uterus and appendages was great after death, it would have been much greater, had the animal been killed in any other way in which the blood would have been preserved within the body.

time is of a lightish red colour, with numerous minute vessels ramifying through it and carrying red blood. It has numerous lobuli pressing in towards the centre in an irregular manner. The substance of the *corpus luteum* is extremely soft at this time. The *corpus luteum*, however, of this animal, when completely formed, is of a roundish shape, generally about the size of a horse bean.

Colour.—It has a light red or reddish colour "subrubra," as Haller calls it, or orange red "e flavo rubens," very similar, indeed, to the human, with numerous lighter coloured irregular striæ running through it. These are the remains of the internal membrane of the Graafian vesicle, and lymphy effusion along with it.

The number of *corpora lutea* in each ovary amounts to from three to fourteen;* and in general† are found to correspond with the number of fœtuses in the uterus. Not unfrequently in this animal the *corpora lutea* are so pressed together that two of them assume the appearance of one, as will be seen in Fig. 8; and this affords a very good illustration, of the appearance of a pretty thick membrane, (and in this case two folds of it,) when pressed on all sides by the *corpus luteum*, almost loosing entirely the appearance of a membrane. This we have frequently noticed, and have had difficulty in distinguishing in this animal whether it was one *corpus luteum* or two conjoined. In one instance it was so impossible to tell this, that we had recourse to the number of fœtuses *in utero*, and found it then to be a double *corpus luteum*. If we occasionally mistake two folds of a thick membrane, like that of the external one of the Graafian vesicle, how much more liable shall we be to overlook its internal membrane, when puckered up over the innumerable acini or projections of the interior of a *corpus luteum*?

Changes which the Corpus Luteum undergoes throughout Pregnancy.—As pregnancy advances, the *corpus luteum* of the pig becomes gradually firmer in its texture, and a certain diminution takes place in its size. This, however, is trifling; but upon the completion of pregnancy, they are rapidly absorbed, and soon leave no remains whatever in the ovary, by which the former *corpus luteum* can be detected. We have seen, however, their remains distinctly visible, at between two and three months after delivery, and bearing the marks which we have formerly described as distinguishing true from false *corpora lutea*.

* Haller's op. cit. p. 447.

† It has been shown by Haller, Baer, Coste, Montgomery, Dr Allen Thomson, and others, that the number of *corpora lutea* may not precisely correspond, although they in general do so; as when two ovula exist in one Graafian vesicle, of course only one *corpus luteum* is formed upon the impregnation of that vesicle; or when one or more of the ovula are blighted either before or after their entrance into the uterus, but when they are still so small as not to be easily discovered, unless with the greatest care.

§. IV.—Observations on the Corpus Luteum of the Bitch.

This animal has very frequently been made the subject of experiment from Haller's time down to the present day; and it is now generally looked upon as the animal best calculated for making observations on the processes connected with generation, not only from the facility with which it is procured, but also from the precise way in which the period of impregnation can be determined. The ovaries of this animal are about the size of large beans.* They contain numerous vesicles of small size, each enclosing a clear fluid. There is a considerable increase in the size of one or more of the vesicles of this animal during the season of heat; but upon the occurrence of impregnation, they enlarge much, and are generally found ruptured about the seventh or eighth day after impregnation.†

Like what has been observed in other animals upon examining the interior of a vesicle which has just been ruptured, and allowed its ovule to escape, the interior of it is generally more or less filled with bloody-looking serum, and a certain number of extremely soft villosities on its surface. These villosities rapidly increase and project into the interior of the cavity, and soon fill it up. This is the manner in which the *corpus luteum* is formed. At the end of eight days after impregnation, the *corpora lutea* of this animal, are generally found well, if not entirely formed. Occasionally, however, they still retain a central cavity, and in such instances, and about this period after impregnation, we have excellent opportunities of examining the position of the *corpus luteum*, as regards the external and internal membrane of the Graafian vesicle. The internal membrane will generally be found lining the cavity if this does exist, and having lymph effused on its internal surface, which can be separated, (with a pair of delicate forceps) into numerous thin shreds.

Colour.—The *corpus luteum* of the bitch is of a pinkish yellow colour, and as pregnancy advances, it becomes gradually yellower; and firmer; and smaller; and we have seen it about a month after delivery, in the shape of a small firm yellow body.

Size.—The size of the *corpus luteum* in this animal may be compared to that of an ordinary sized pea; but, like other animals, it varies a little in its size, being sometimes larger and sometimes smaller.

§. V.—Observations on the Corpus Luteum of the Cat.

The *corpus luteum* of the cat has a dingy yellow hue, with

* Prevost and Dumas, Tom. iii. p. 114.

† Haller found the vesicles burst before the sixth day; but Prevost and Dumas, as well as many other experimenters, never have found this before the seventh or eighth.

occasionally red vessels running through it. They are about the size of a grain of wheat, or ordinary vetch seed.

It is not advisable to choose this animal for experimental inquiries of the present nature, as it is extremely difficult to ascertain the precise period of impregnation, in consequence of the aversion of the animal to copulate in the presence of any one, or when shut up for that purpose.

§. VI.—Observations on the Corpus Luteum of the Rabbit.

This animal has been made the subject of experiment on the formation of the *corpus luteum* by individuals, both ancient and modern,—by Haller, Cruickshank, and Haighton, Blundell, Prevost and Dumas, and many authors both in this country and the Continent; and we have, consequently, observations on the appearance of the Graafian vesicle throughout all its stages, down to the complete formation of the *corpus luteum*. It would be needless here to repeat the observations of different experimenters on this subject, as I have already gone over the same ground, when describing the appearance of this body in the ewe and other animals. Suffice it to say, that the ovary, uterus, and appendages, become gorged with blood during the period of heat; that certain vesicles become prominent, and at a certain period after impregnation burst and discharge their contents. Cruickshank found in some of his experiments vesicles burst two hours after coition. Haighton, however, and M. Coste do not agree with him. The former says, forty-eight hours is the general time, and the latter says, between the second and third day. The formation of the *corpus luteum*, however, commences thus. A vesicle is first found filled with blood or bloody serum, then, projections arise from the uterine surface of it; the opening through which the vesicle escaped now closes, and the formation of the *corpus luteum* goes on rapidly. A central cavity not unfrequently exists within the substance of the *corpus luteum* for a few days, and is then filled up.

Colour.—The colour of the *corpus luteum* in the rabbit, is of a dingy yellow, very like that of the cat. They are of very small size, a good idea of which may be formed from the inspection of the plate.

Concluding Remarks.—I have thus considered the appearance and size of the *corpora lutea* in the more common of our domestic animals, to which has been added some facts connected with the formation of this body in the different animals, and the distinguishing marks between it and the numerous false bodies which are so frequently to be seen in the ovarian structure. I have been obliged to leave out the consideration of the appearance in many animals which may occasionally fall under the observation of the reader, as the mare, the deer, guinea pig, &c. The diffi-

culty of procuring the two former, for the purposes of an experimental inquiry of the nature of the present, and the little difference which is to be found between the appearance in a guinea pig and the rabbit, have induced me to leave this out of consideration. In the course of the inquiry, therefore, I have endeavoured to point out, 1*stly*, The general appearance which the *corpora lutea* of different animals present at the different stages of maturity; 2*dly*, The distinguishing marks which characterize them; and 3*dly*, The appearance which false or pseudo *corpora lutea* present, and the manner in which they are to be distinguished from the true bodies, and from the remains of them.

Explanation of the Plate.

Fig. 1. Ordinary appearance of the *corpus luteum* of the cow a short time after its complete formation.

Fig. 2. *Corpus luteum* of the cow at a more advanced period of pregnancy, still retaining its central cavity.

Fig. 1. *a.* Fig. 2. *b.* The ordinary appearance of false *corpora lutea* in this animal.

Fig. 3. External appearance of the ovary of the ewe, showing the nipple-like prominence, the central depression, and inflammatory blush around it.

Fig. 4. Section of the ovary of the ewe, in which two *corpora lutea* were found.

Fig. 5. Ordinary appearance of the *corpus luteum* of this animal.

Fig. 4. *a.* Fig. 5. *b.* Show the ordinary appearance of false *corpora lutea* in this animal.

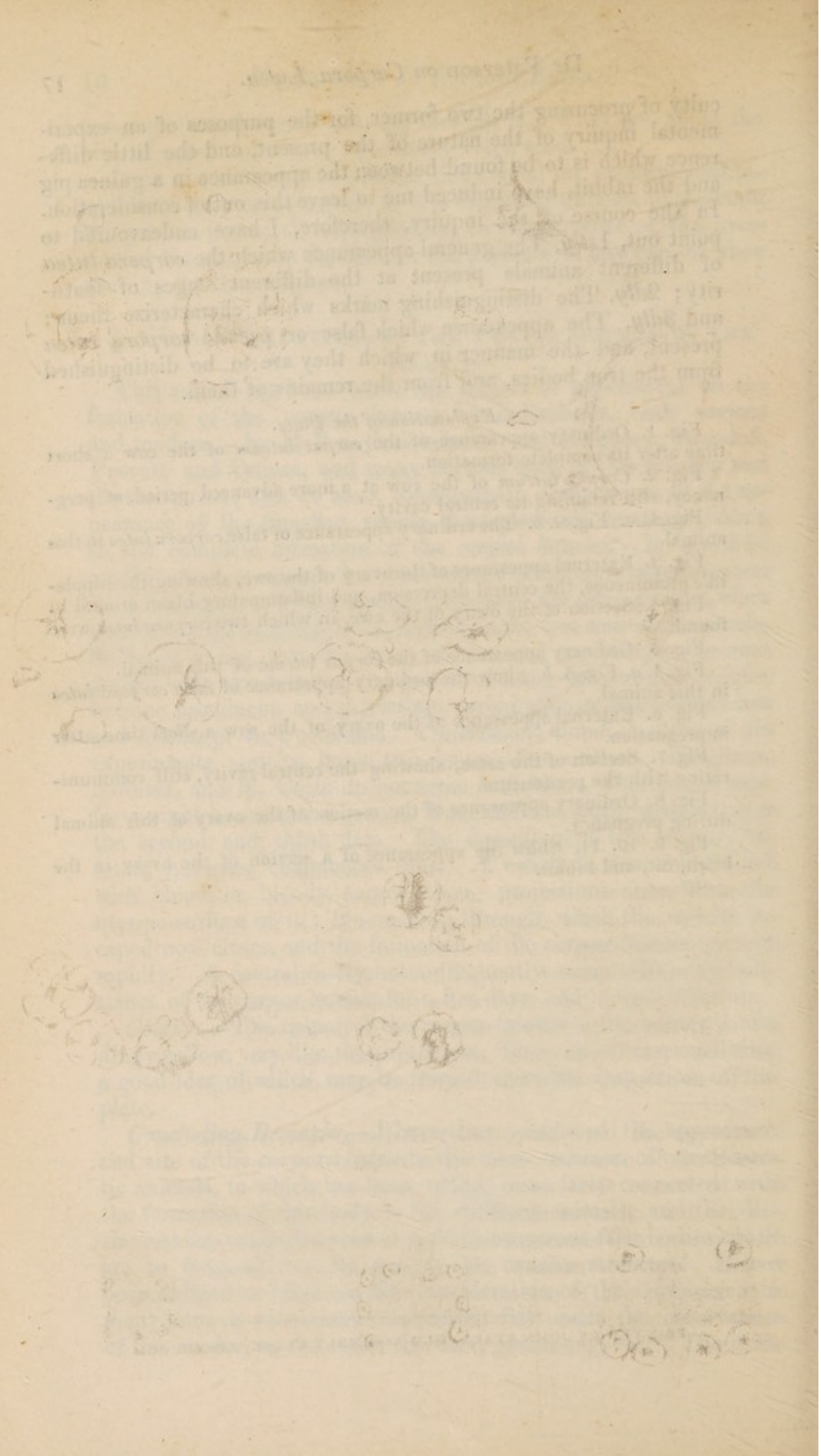
Fig. 6. External appearance of the ovary of the sow a short time after impregnation.

Fig. 7. Section of the same, showing the central cavity, still communicating with the peritoneum.

Fig. 8. Ordinary appearance of the section of the ovary of this animal during pregnancy.

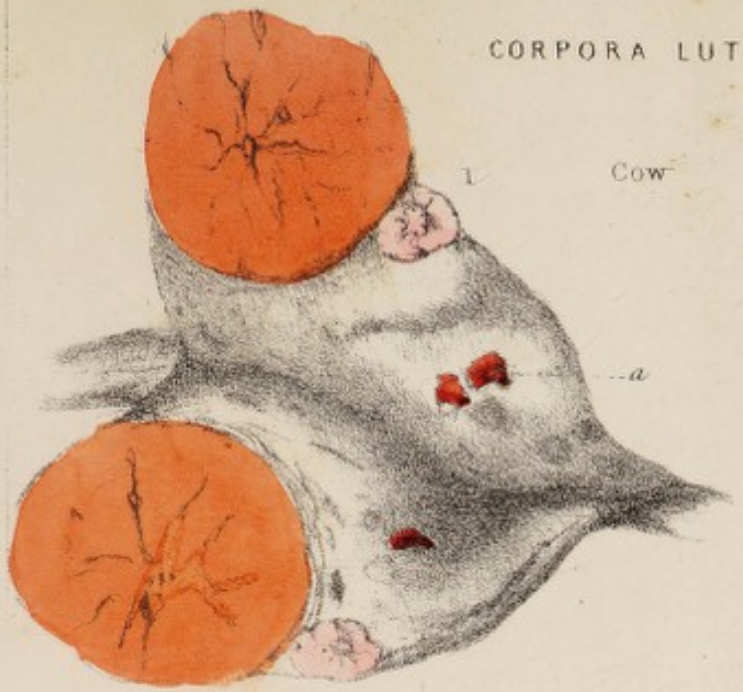
Fig. 9. 10. 11. Show the appearance of a section of the ovary in the bitch, cat, and rabbit.

PRINTED BY JOHN STARK, OLD ASSEMBLY CLOSE, EDINBURGH.



CORPORA LUTEA.

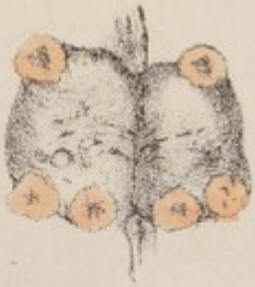
Cow.



Ewe.

Sow.

Bitch.



Cat.

Rabbit.