IV. *On Corpora Lutea.* *By Sir* Everard Home, *Bart. V. P. R. S.*

Read January 14, 1819.

In May, 1817, I laid before the Society an account of the human ovum, and not only showed the cavity of the corpus luteum from which it had escaped, but another corpus luteum in the same ovarium, which had made a considerable advance in its growth.

Ever since that time I have been actively employed, with the assistance of Mr. Bauer, in tracing the rise and progress of the corpus luteum to its full growth, its use, and afterwards its decay. The result of our labours is contained in the present communication, and in the drawings which accompany it.

Corpora lutea are never met with before puberty; the natural structure of the ovarium is therefore more readily ascertained before that period. It is nearly the same in different animals; is of a loose open texture, in which, more particularly near the circumference, a number of small cells of a globular form are met with. This structure is shown in the annexed drawings, in the human ovarium, [Plate III. fig. 2.] in that of the cow, [Plate VI. fig. 2.] and in that of the sow, [Plate VIII. fig. 2.]

The corpus luteum, from its first appearance, seems to be an entirely new substance, distinct from that of the ovarium itself; it is never formed within the cells, but in the substance of the ovarium; [See Plate IV. fig. 2 and 4: Plate VI. fig. 4: and Plate VIII. fig. 4:] and compresses the surrounding

parts so much, that when full grown, and even when there are several in the same ovarium, that body is not much encreased beyond its natural size.

The structure of the corpus luteum is of a very particular kind, and is not distinctly seen in small animals, or in those that have numerous litters; but in the cow, which has commonly only one calf at a birth, the corpus luteum is so large, that when it is magnified, the structure can be made out; it is a mass of thin convolutions, bearing a greater resemblance to those of the brain than of any other organ. Its form is an irregular oval with a central cavity, and in some animals its substance is of a bright orange colour when first exposed; all these appearances are most accurately displayed in the annexed drawings of it in the cow. [Plate VII. fig. 2, 3.] Corpora lutea are found to make their appearance in the ovaria at the age of puberty, and continue to succeed each other as the young are produced, till the period arrives when breeding no longer goes on. [Plate III. fig. 7; Plate IV. fig. 6; Plate IX. fig. 6.]

As the object of the present paper is to draw conclusions from the appearances that are represented in the annexed drawings, in proof of corpora lutea being the structures in which the ova are formed; of their being produced previous to, and independent of sexual intercourse; and when they have fulfilled their office of forming ova, being afterwards removed by absorption, whether the ova are impregnated or not; I shall not take up the time of the Society longer than in detailing a number of facts, which indeed will be doing little more than giving a catalogue raisonnèe of Mr. BAUER's drawings, which put these facts upon record. That corpora

lutea are formed in a state of virginity, is proved both in the human species and the hog tribe, as will be seen in the annexed drawings. In a young woman of twenty years of age with a perfect hymen, one of the ovaria was found by Mr. BAUER to contain a corpus luteum, in the cavity of which there was an ovum which had nearly arrived at its full size; the second covering or chorion had already formed, by means of which the ovum had a slight adhesion to the inner surface of the corpus luteum. [Plate III. fig. 4.] When this ovum was examined after it had been removed from its situation, [Plate III. fig. 5,] its figure was the same as that found in the uterus and described in my former paper; it only differed in being smaller in the proportion of $\frac{15}{200}$ to $\frac{18}{200}$, in the whole being transparent, and in the chorion not having extended itself completely over the anterior surface of the ovum. The Fallopian tube on that side was fuller than the opposite. The fimbriæ were spread out, and unusually vascular; so that every preparation was made for the reception of the ovum into the tube. No sexual intercourse had taken place. [Plate III. fig. 3.]

I have met with corpora lutea in virgins at 14; and know of two instances of girls having children still earlier, one at 13, the other at 12.

Sir JOHN SEBRIGHT, whose knowledge respecting pigeons is well known, informs me, that when mated, they lay eggs earlier than when kept from the male; they do not lay a greater number of eggs, but they lay them at all seasons, while the others lay only in the spring.

In the cow, the age of puberty is considered to be two

years old, and the corpus luteum represented in the engraving is that of a first calf. [Plate VI. fig. 4; and Plate VII. fig. 2, and 3.] In the hog tribe, the age of puberty is six months; and in the series of drawings of their ovaria, one is given from a sow pig at four months, in which no corpora lutea had begun to appear. [Plate VIII. fig. 2.] In another, between five and six months, several have made a considerable advance, [Plate VIII. fig. 4.] and in one nearly six months they were completely formed, and their cavities filled with blood, similar to the human corpus luteum containing the ovum, but no ova were detected. [Plate VIII. fig. 6.]

In another virgin pig, nearly six months old, Mr. BAUER was so fortunate as to meet with corpora lutea in the very act of bursting to part with their ova: the appearance is shown in Plate IX. fig. 1 and 2. From this most fortunate occurrence we learn that animals part with their eggs whether there is sexual intercourse or not, and this is done with such force, that the cavity of the corpus luteum is absolutely inverted, so that the ovum is exposed completely to the emission of the male. The extravasation of blood in rupturing the ovarium, and inverting the corpus luteum, is in many instances so great, that some of it passes out through the vagina, which when met with, is considered a sign of impregnation having taken place. As soon as the ovum is expelled, the corpus luteum recovers itself, and returns to its natural state. When the ovum accidentally adheres by a portion of the chorion to the inner surface of the corpus luteum, as is shown to be the case in Plate III. fig. 4, it may retain its hold; and however compleat its expulsion, may be carried back, and form what is

called an ovarium case, the fœtus growing in the ovarium; several cases of this kind are met with, particularly one now in the collection of the Emperor of RUSSIA, purchased from the late Mr. CRUIKSHANK, teacher of Anatomy in London.

An instance of corpora lutea forming in succession, and probably to the same number, whether the female is ever impregnated or not, is shown in a drawing of the ovarium of a woman who died a virgin at 47 years old; the fragments of seven corpora lutea are distinctly seen in it, and in the opposite there were five, putting on the same appearance. [Plate III. fig. 7.]

After the escape of the ova, the corpora lutea have their cavities distended with blood, which coagulates, loses its colour, and forms a white solid mass surrounded by broken portions of the corpus luteum. [Plate IV. fig. 4 and 5.] These become smaller and smaller, till they disappear. A series of them is shown in the human ovarium, six weeks and nine months after impregnation; also after a woman had borne 12 children, and had for many years left off breeding. [Plate V. fig. 6.]

The remains of the corpus luteum, at nine months after impregnation of the ovum, are so indistinct as hardly to be recognized; but in the opposite ovarium there is commonly a corpus luteum far advanced, forming another ovum; and it will be found that all the preparations of corpora lutea taken from the ovaria of women who die in child-bed, actually belong to this new ovum not yet completely formed. [Plate V. fig. 2, and fig. 4.]

In some cases, the coagulum filling the cavity of the corpus luteum is absorbed, leaving a circular cup, whose margin is

fringed with small portions of the substance of the corpus luteum; this has been usually taken for a perfect corpus luteum, and preserved as such.

The cells met with in the ovaria before puberty are globular; but as the ovaria increase in size, the sides of these cells become squeezed, which gives them an oval form. [Plate VI. fig. 4. and Plate VII. fig. 2 and 3.]

EXPLANATION OF THE PLATES.

PLATE III.

In this Plate are represented six figures of the human ovarium in a virgin state, and one of the human ovum before it is impregnated. The external appearances of the ovaria are of the natural size. The internal appearances are magnified two diameters, the ovum itself is magnified twenty-two diameters.

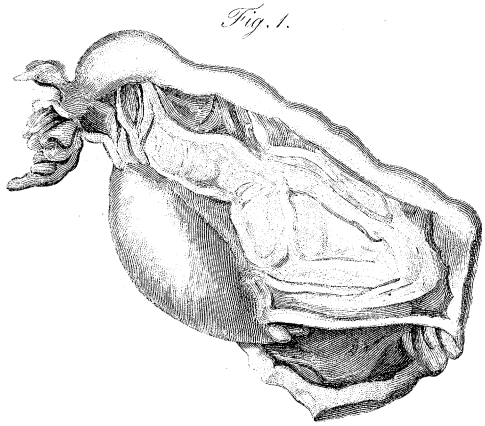
Fig. 1. the human ovarium at twelve years of age, showing its external form.

Fig. 2. An internal view of the same: the blood vessels are injected, its structure is more compact than natural, the parts having been preserved in spirit. The cavities contained coagulated lymph and a serous fluid.

Fig. 3. The external view of the ovarium at 20 years of age, after having been some days in spirit.

Fig. 4. An internal view of the same, showing that although the woman was a virgin, there was a corpus luteum arrived at its full growth containing an ovum, which has two membranous coverings, the amnion and chorion; the cavity surrounding the ovum was filled with blood; and the

Fig. 1.



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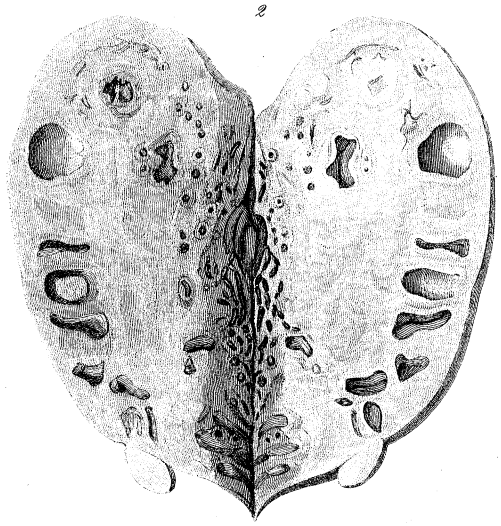

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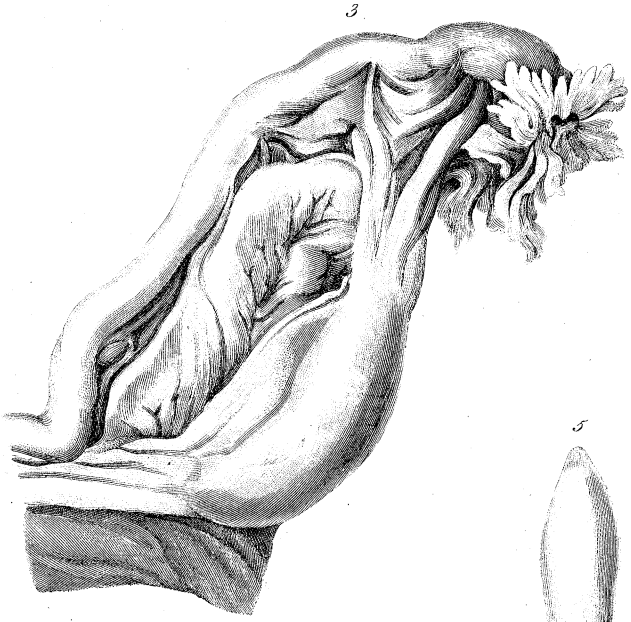

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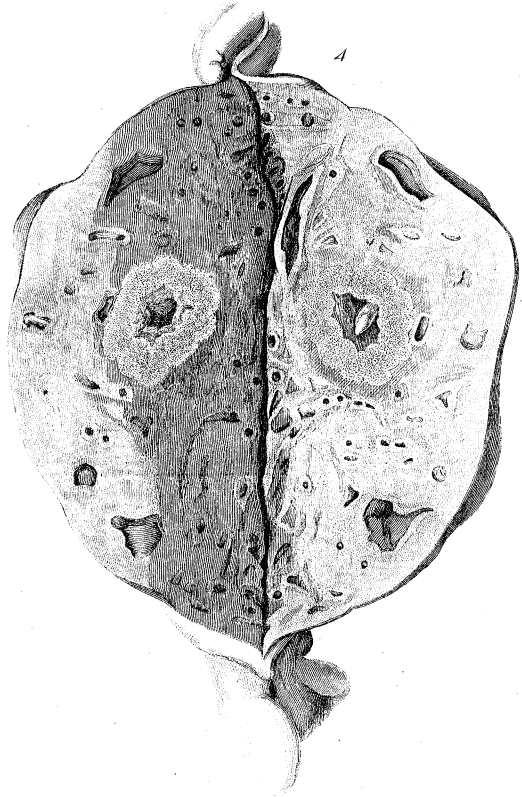

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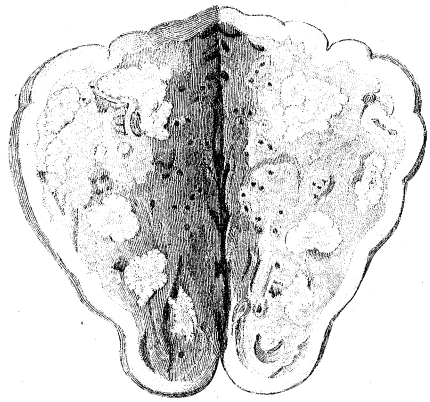

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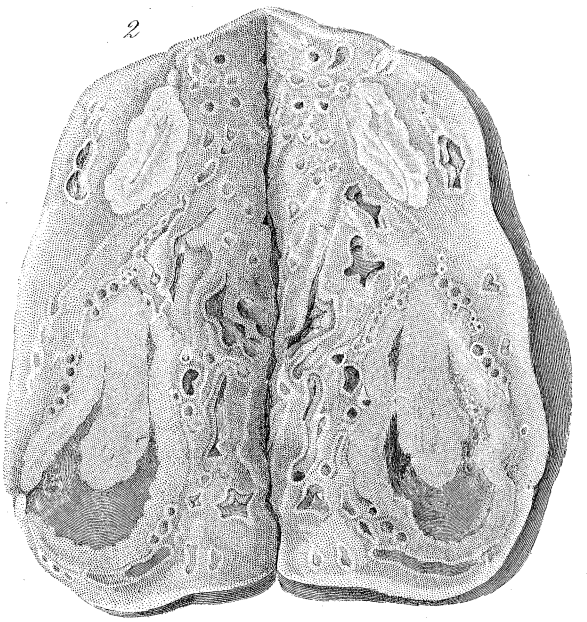

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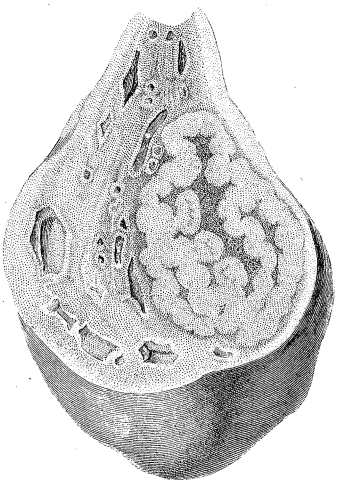

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ovum, by means of the chorion, has a slight attachment to the inner surface of the corpus luteum.

Fig. 5, represents the ovum in a detached state; it is smaller than that represented in my former paper, which had arrived at the cavity of the uterus, in the proportion of $\frac{15}{200}$ to $\frac{18}{200}$, and differs from it in being pellucid, the two opaque spots met with in the other not yet being formed.

Fig. 6. The external form of the ovarium at 47 years of age.

Fig 7. An internal view of the same, showing the remains of seven corpora lutea. The central cavities are distended with coagulated blood, as in all the corpora lutea met with after the ova that escaped from them had been impregnated. The corresponding ovarium contained five corpora lutea, similar in appearance to those here represented.

PLATE IV.

Contains five figures of the human ovarium after impregnation, the external appearances are of the natural size, the internal ones are magnified two diameters.

Fig. 1. The external appearance of the ovarium represented in a former paper on the human ovum, and shown again here to complete the series.

Fig. 2. An internal view of the same, to show the appearance of the corpus luteum five days after the impregnation of the ovum.

Fig. 3. The external appearance of the ovarium, six weeks after the impregnation of the ovum, which was arrested in the Fallopian tube.

Fig. 4. An internal view of the same, showing the corpus luteum partly absorbed, and the remaining parts unconnected with each other.

Fig. 5. A transverse section of the same ovarium, and its corpus luteum.

PLATE V.

Contains six figures of the human ovarium at different periods after impregnation, all of them of the natural size, except Fig. 6, which is magnified two diameters.

Fig. 1. An external view of the ovarium, that did not contain the ovum from which the child was produced, taken immediately after the child was born.

Fig. 2. An internal view of the same, in which there is a corpus luteum nearly arrived at its full size.

Fig. 3. The external view of the ovarium, in which the impregnated ovum had been formed.

Fig. 4. An internal view of the same, showing how much the corpus luteum had been broken down, and the want of distinctness in the remaining parts. There is also a new corpus luteum forming.

When Fig. 2 and Fig. 4 are compared, it will be seen, that all corpora lutea which have been preserved after the mother dies in child-birth, do not belong to the ovum of the child born, but to that which is to succeed it.

Fig. 5. The external appearance of the ovarium of a woman who had twelve children, and died at seventy years of age.

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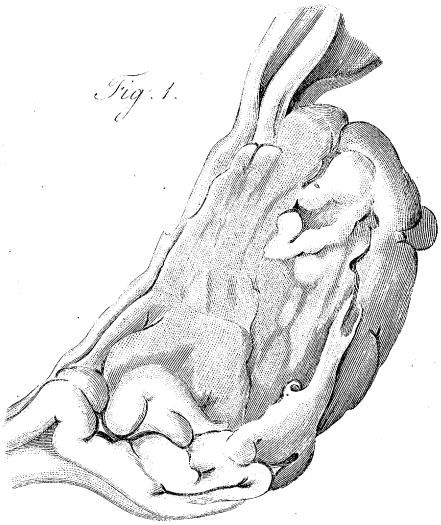

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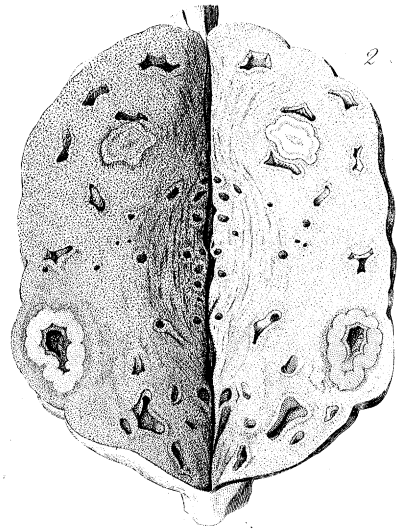

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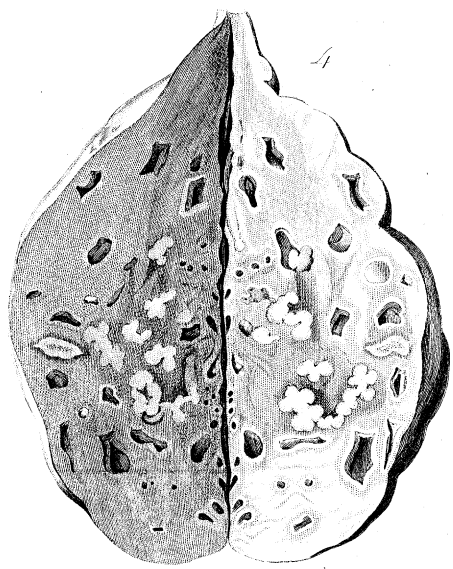

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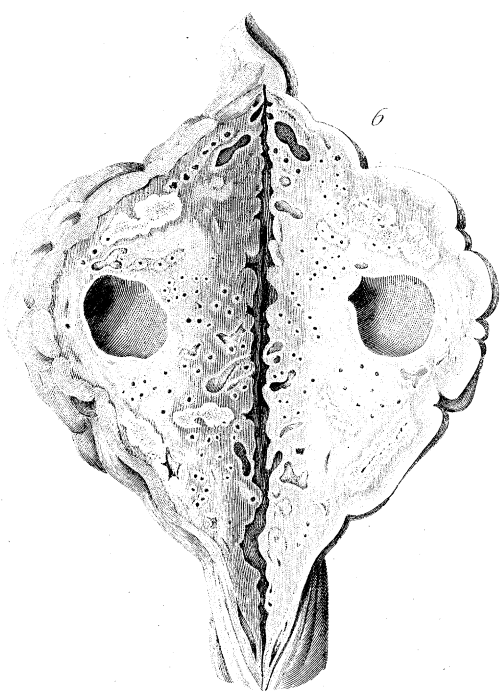

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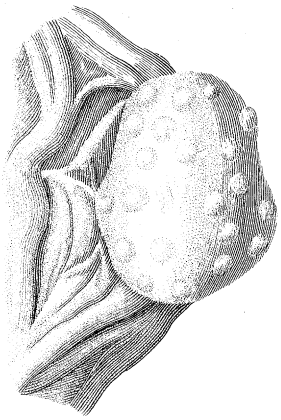

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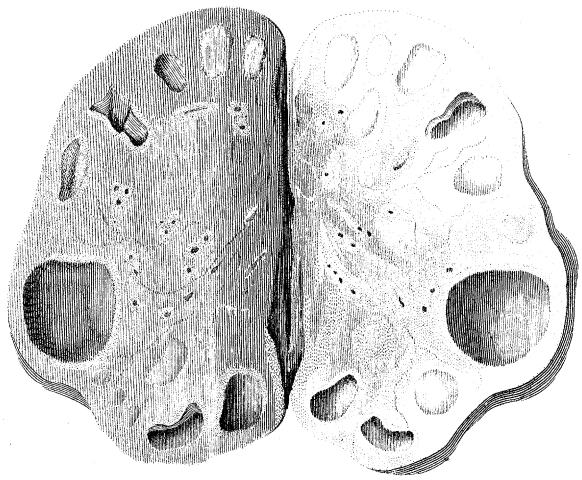

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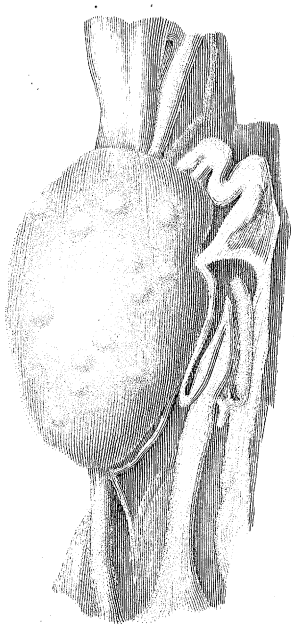

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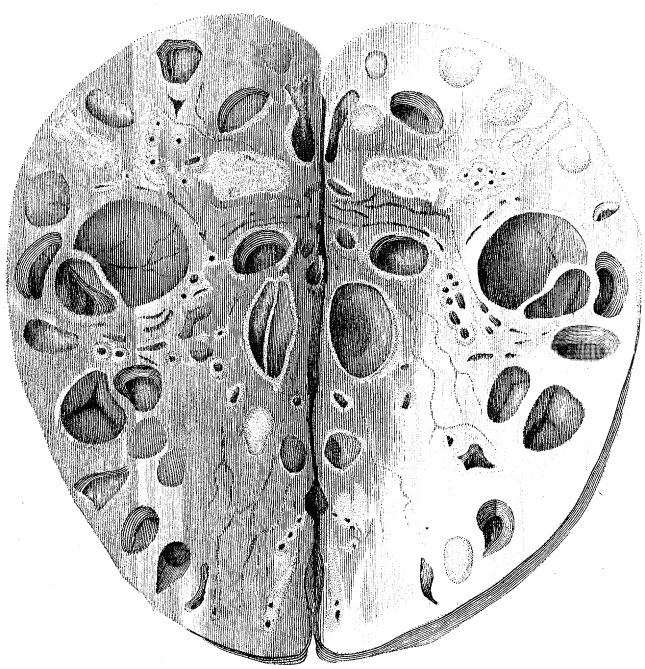

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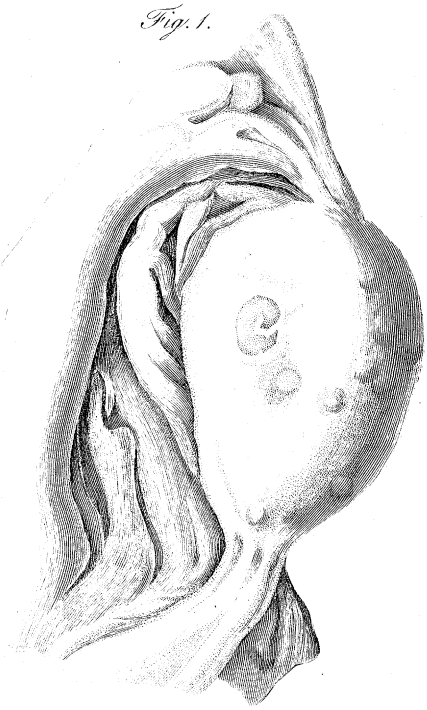

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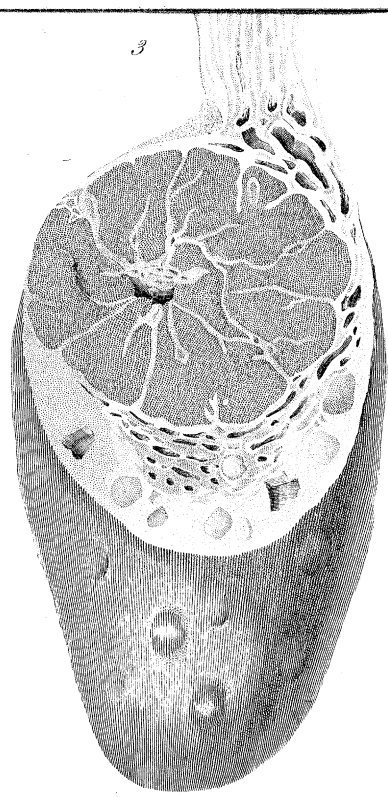

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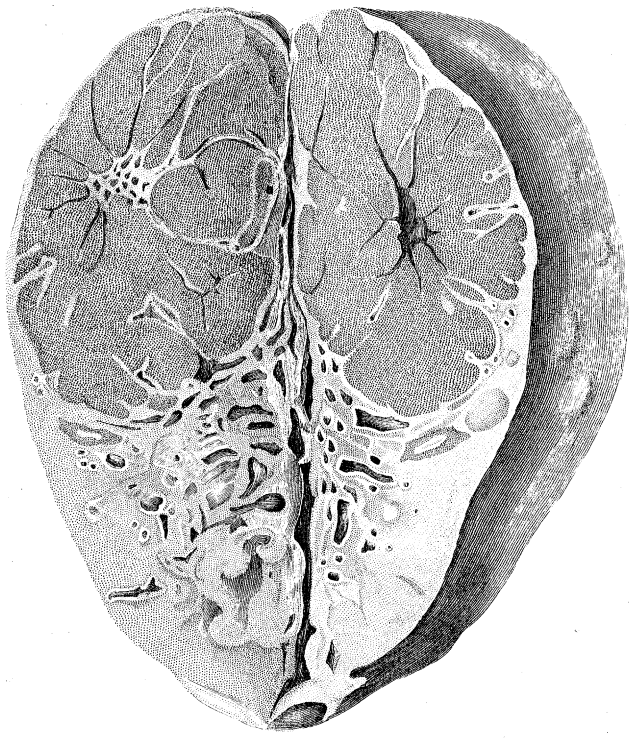

Fig. 6. Internal view of the same, to show how small the remains of the corpora lutea had become at that age. The large cyst contained coagulated lymph and serum.

PLATE VI.

Contains four figures of the ovaria of the cow. The external appearances of the natural size, the internal magnified two diameters.

Fig. 1. The ovarium of a calf, two months old.

Fig. 2. An internal view of the same.

Fig. 3. External view of the unimpregnated ovarium of a cow, 14 days after her being with calf.

Fig. 4. Internal view of the same, representing the commencement of a corpus luteum, and showing that the cells in the ovarium which before puberty are met with in a globular form, become gradually of an oval and irregular shape as the ovarium increases in size.

PLATE VII.

Contains three figures of the ovarium of a cow with calf. The external appearance is of the natural size; and the internal is magnified two diameters.

Fig. 1. External view of the corresponding ovarium.

Fig. 2. Internal view of the same, showing the structure of the corpus luteum, which in this animal is very large, and is evidently made up of convolutions more nearly resembling those of the brain, than of any other organ.

Fig. 3. A transverse section of the corpus luteum.

PLATE VIII.

Contains six figures of the ovaria of the pig, in a virgin state. The external appearances of the natural size, the internal magnified two diameters.

Fig. 1. The external view of the ovarium at four months.

Fig. 2. Internal view of the same.

Fig. 3. External view of the ovarium at nearly six months.

Fig. 4. Internal view of the same, showing three incipient corpora lutea.

Fig 5. External view at six months.

Fig. 6. Internal view, showing six corporea lutea, nearly if not quite at the full size: the cavities filled with blood, as in Plate III. fig. 4, but no ova were detected.

PLATE IX.

Contains six figures of ovaria of the pig; two in a virgin state, nearly six months old, in which the corpora lutea are in the act of bursting, and four of the sow after impregnation.

Fig. 1. The external view of the ovarium, showing five inverted corpora lutea, spreading over the surface of the ovarium, considerably beyond the orifices through which they protruded; their inner surface is turned inside out, by which means the ova must have been completely discharged. No ova were detected.

Fig. 2. Internal view of the same, showing four corpora lutea, and a great number of blood-vessels, which at that instant become very visible. Both figures are magnified two diameters.

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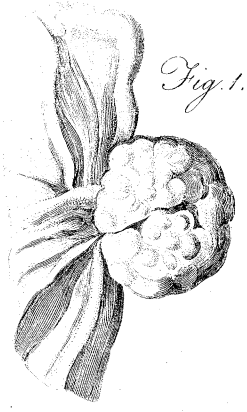

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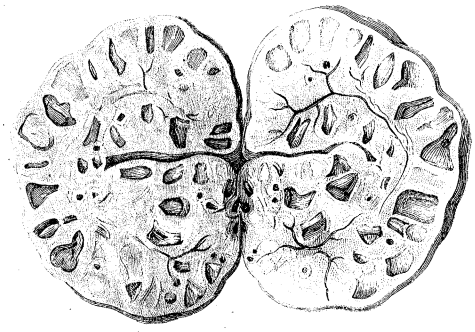

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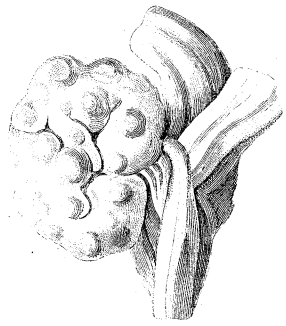

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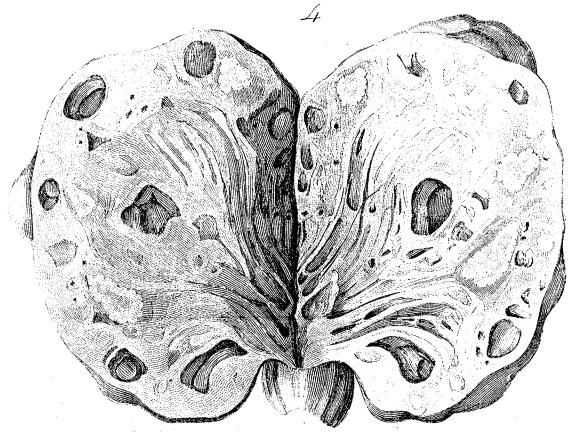

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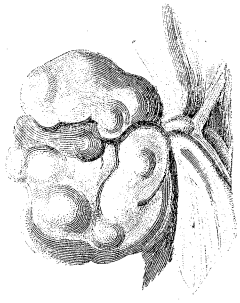

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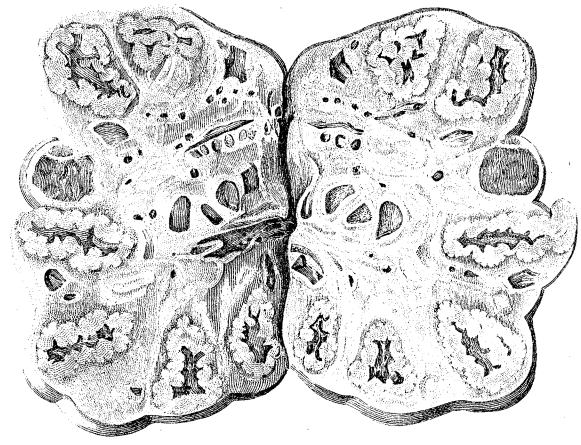

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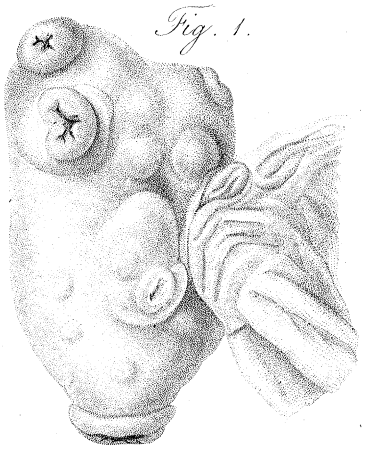

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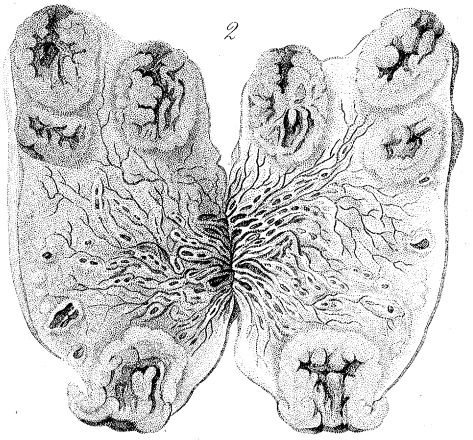

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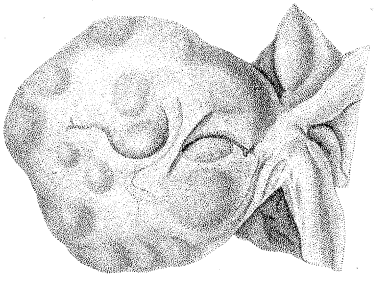

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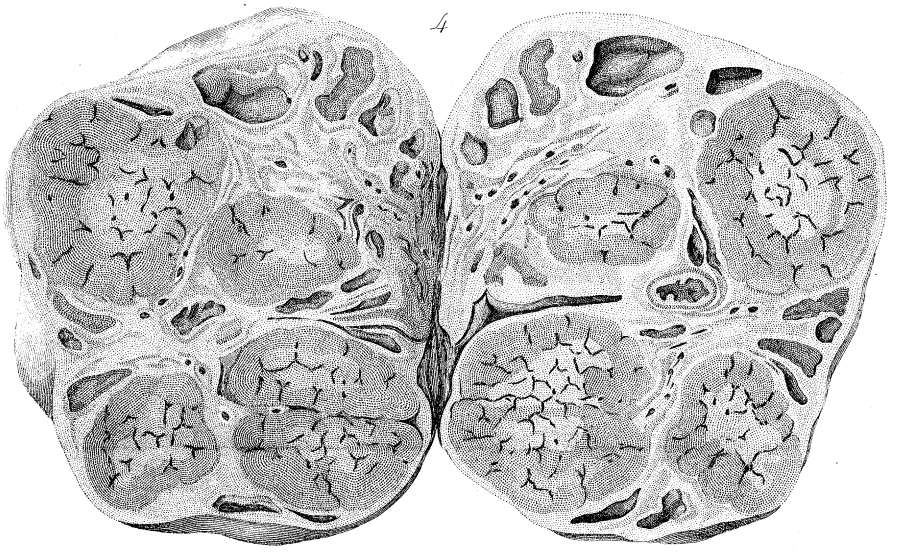

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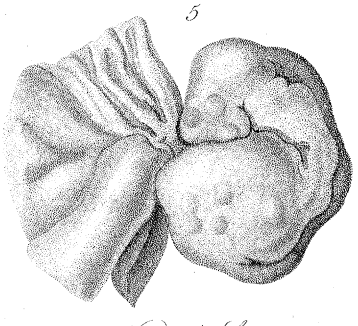

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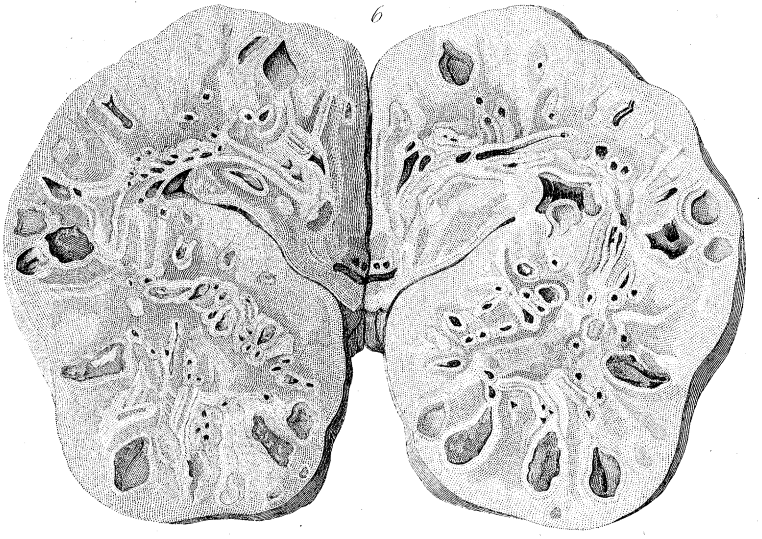

Fig. 3. An external view of the ovarium of a sow, 14 days after impregnation.

Fig. 4. The internal view, in which there are five corpora lutea, their appearance becoming very indistinct.

Fig. 5. The ovarium of a sow five years old, that had in all six litters of pigs, and had left off breeding for a year.

Fig. 6. An internal view of the same, to show that all vestiges of corpora lutea were nearly removed.

Since the first part of this Paper was printed, a fœtus of the size usually met with at the end of the fourth month, has been found compleatly inclosed in the ovarium. It is evident that the ovum, after impregnation, was retained in the cavity of the corpus luteum in the manner explained above, since vestiges of the corpus luteum are still visible between the chorion and the substance of the ovarium. The mother died in consequence of hæmorrhage, produced by the bursting of a branch of the spermatic artery. An account of the case, with drawings of the parts made by Mr. BAUER, will be laid before the Society, after the long vacation, by Dr. GRANVILLE.