On the alleged growth of the placenta in extra-uterine gestation after the death of the fetus / by D. Berry Hart.

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PLACENTA IN EXTRA-UTERINE GESTATION

AFTER THE

DEATH OF THE FETUS.

BY

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Within recent years the statement has been confidently made by several eminent gynecologists that the placenta in extra-uterine gestation may grow after the fetus has died. Up till recently I was of the same opinion, but fresh consideration of this belief in the light of new material has seriously shaken me in it, and I therefore wish to reopen this question.

Mr. Lawson Tait[1] says: "As I am responsible for having made a statement that I had seen the placenta growing after the fetus had clearly been dead for some time, let me here draw the attention of Dr. Buckmaster and others to the evidence upon which the statement is based. In Case No. VI.

[1] The small figures refer to Bibliography at the end of the article.

the rupture had occurred apparently in the tenth or eleventh week of a gestation, and the placenta was lying in the midst of a quantity of clots as a round mass the size of a cricket ball, for the most part in the wall of the tube, for when the tumor was removed the placenta was still adherent to part of its inner surface and the pelvic mass was intact. On slitting it open the ovum cavity was found to contain about a dessert-spoonful of liquor amnii, but there was no trace of fetus at all.

"As we have very frequent experience of this kind of incident—the growth of a huge placenta, embracing a small ovum cavity without any, or with only a slight, trace of a fetus in the so-called uterine 'moles'—we have no reason to do other than expect that it will occasionally occur in tubal pregnancy. As a matter of fact such was the state of matters in this case.

"In Case XIX., when the fetus was found it was only about two and one-half inches long, and had evidently been dead for some considerable time, for it was partly digested, whereas the placenta had grown to be quite as large as that of an intra-uterine fetation of four months, and it had been forming adhesions to intestine and omentum, giving rise to recurrent hemorrhages, for which the operation had ultimately to be performed.

"Similar appearances occurred also in Cases XXIV., XXX., XXXII., and XXXVII. . . .

"In looking over the records of cases which have gone beyond the full period of gestation, I find numerous illustrations which cannot be other than the growth of the placenta after the death of the child. No emphasis in any case is laid upon this fact, but the descriptions completely establish it. In a case mentioned by the first Mr. Samuel Hey, of Leeds, the patient went over the nine months with a false labor, and the child died. Three months after the mother succumbed from the sufferings involved in the carriage of the ectopic gestation. The child was found to be fully developed and showed no marks of decomposition. As the child had attained a size so unusual as to weigh nearly two pounds and a half, the cyst was supposed to be the right Fallopian tube, but the description makes it perfectly clear that it was the right broad ligament together with the tube. The placenta

in this case must have grown greatly after the death of the child."

The following opinions were given at a discussion in the London Obstetrical Society in 1887:

"Another point in which Mr. Tait was greatly interested was that indicated by Mr. Knowsley Thornton when he gave evidence to the effect that the placenta grew after the death of the fetus. When evidence on this point was first brought forward, it was one of the observations to which he (Mr. Tait) had listened with great hesitation, and he had several times written to this effect, for he could not believe it. But there could be no question now that it was so, that after the fetus died the placenta went on growing in at least a fairly large number of these cases."

In the same debate Dr. G. E. Herman[2] said: "There were two kinds of placenta met with in extra-uterine gestation: one kind was thin and spread out, having very extensive attachments, and this kind would evidently be very difficult of complete removal, and much more difficult at term than at the fourth month, as in the case related by Mr. Tait. There were other cases in which the placenta formed a thick, solid lump, thicker than a normal placenta, and closer in texture, looking not unlike a piece of hepatized lung. In this kind the vascular connection between the placenta and the maternal structures was much less extensive and the placenta could be removed without great difficulty.

"He had exhibited to the Society at its meeting on June 2d, 1886, an extra-uterine fetus and placenta which he had successfully removed. In that case the placenta was of this kind and its removal was easy. The placenta now shown of Dr. Champneys' case presented the same characters, and he gathered from the paper that it was so loose that it might have been easily removed.

"Mr. Knowsley Thornton[3] had exhibited to the Society a fetus and placenta which he had removed with success, and the condition of this placenta was similar.

"So was the one exhibited this evening by Mr. Doran, and there was another in the museum of the Royal College of Surgeons which was like those already mentioned. Judging from the cases at present known to him, he thought this

transformation of the placenta into a fleshy mass easy of removal took place after the death of the fetus. It would help greatly in treatment if we knew upon what these differences in the placenta depended, and could diagnose the condition of the placenta before operation."

Mr. Knowsley Thornton,[3] in a case which he believed to be tubal (the tumor reached nearly to the umbilicus), stated that "the fetus would appear to have died about the beginning of the fourth month, while the placenta continued to grow, and hence at the time of operation presented that peculiar solid mass which simulated a solid ovarian or uterine tumor."

Freeland Barbour,[4] in describing a frozen section of an extra-uterine gestation which had advanced to the middle of the fifth month, speaks of death having been caused by hemorrhage from "the continued growth of the placenta after the fetus had died."

In his recent most valuable work on the "Surgical Diseases of the Ovaries and Fallopian Tubes," Mr. Bland Sutton[5] expresses himself guardedly, saying: "In the majority of cases the fetus dies. When this event occurs at the fourth or fifth month there is reason to believe that the placenta may in some instances continue to grow, instead of undergoing atrophy."

It is evident from these quotations that, among several observers well qualified to judge, it is held that the placenta undeniably large as compared with that of normal pregnancy, found in cases of extra-uterine gestation where the fetus has died, is due to a growth of the placenta continuing after the death.

Yet for this statement there seems to me no adequate proof.

Before one could make such a deduction it must be shown:

1. That the placenta in cases where the fetus is alive is distinctly smaller than in those where for some time previous to examination the fetus has died.

2. The part that so grows should be demonstrated microscopically by an examination of such cases as are indicated under 1.

This proof, however, has not been given, and it may simplify this part of the paper if I say that, so far as I have read, no proof has ever been brought forward.

It is an undoubted fact that the extra-uterine placenta is, to the naked eye, markedly different from the normal one. If we take the placenta as displayed in the more recent literature, we find that on section it is a dense, liver-like substance, resembling closely a blood clot hardened in spirit. So unlike normal placenta is it that one's first thought on looking at it is that it is some solid tumor.

I have personally examined, post mortem, four cases of extra-uterine gestation in regard to the question of this alleged growth of the placenta after the death of the fetus. One of these was a broad-ligament gestation, the others were advanced abdominal gestations. All were examined by means of frozen sections, and microscopical examination of the placenta was also made. These cases are now to be considered so far as they bear on our present inquiry.

I. Broad-ligament Gestation.—This was a pregnancy which had developed between the layers of the broad ligament, and was about the fourth and a half month. The fetus lay below in the sac, while the placenta was at the roof of the sac. This specimen is figured in the original paper[6] by Dr. Carter and myself, and copied in Tait's "Ectopic Gestation" and Bland Sutton's "Surgical Diseases of the Ovaries and Fallopian Tubes." The fetus was quite fresh and not macerated, and seemed less advanced than one would have expected.

The placenta formed a firm mass attached to the extraperitoneal surface of the top of the broad ligament, and measured two and three-quarter inches (vert.) by two inches (breadth) by three inches (antero-posteriorly).

On microscopical examination it is found to be made up of villi which in structure and arrangement differ considerably from the normal (Fig. 5). They are disposed very irregularly and are not nearly so numerous as in an ordinary placenta. The individual villi are compressed, so that the connective tissue of which they are formed is much denser than usual and the nuclei crowded very closely together. Only here and there are vessels to be found in the villi. A covering of a single layer of flattened epithelium can usually be traced round them, but sometimes this seems to have disappeared. These villi are embedded, not in blood spaces as in the normal

placenta, but in connective tissue of the ordinary areolar variety, in which are a certain number of fat cells, and which is here and there traversed by bands of unstriped muscular fibres. This connective tissue is sometimes compressed in the neighborhood of the villi, and in the same situation its meshes are often full of leucocytes. The blood vessels of this connective tissue are fairly numerous, but stand in no very traceable relation to the villi. But the most striking feature in the sections is the enormous number of hematoidin crystals scattered through them. These are evidently the result of old blood extravasations, and these have apparently occurred at differ-

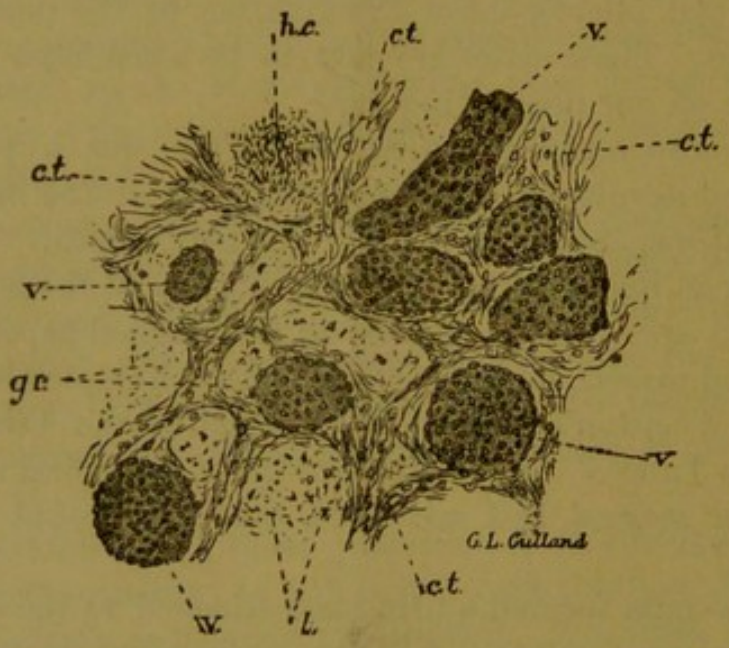

FIG. 1.—Placenta of extra-uterine gestation at 4½ months. × 200. *v*, villus; *c t*, connective tissue; *h c*, hematoidin crystals; *l*, leucocytes; *g r*, granular débris.

ent dates, to judge from their disposition. There are brown masses, as large as peas, here and there in the preparations, entirely made up of crystals, large and small, whilst all through the connective tissue, but especially close to the villi, are smaller foci in which the crystals are usually small. All trace of red blood corpuscles has disappeared from these masses, but many leucocytes are to be found in the smaller ones and at the margins of the larger masses, where also there is a certain amount of newly formed connective tissue. These extravasations have often displaced the connective tissue considerably from around the villi, and compressed villi are here and

there to be seen in the midst of the larger masses of crystals.* (Fig. 1.)

II. Case of Advanced Extraperitoneal Gestation.[6]—Here the woman was supposed to have gone beyond the time of normal pregnancy. The fetus had begun to decompose, but was fairly well nourished and not macerated. It weighed two pounds four ounces.

The placenta was attached to the anterior abdominal wall and inner surface of the peritoneum as follows: It measured five and two-fifth inches vertically, three and one-fourth

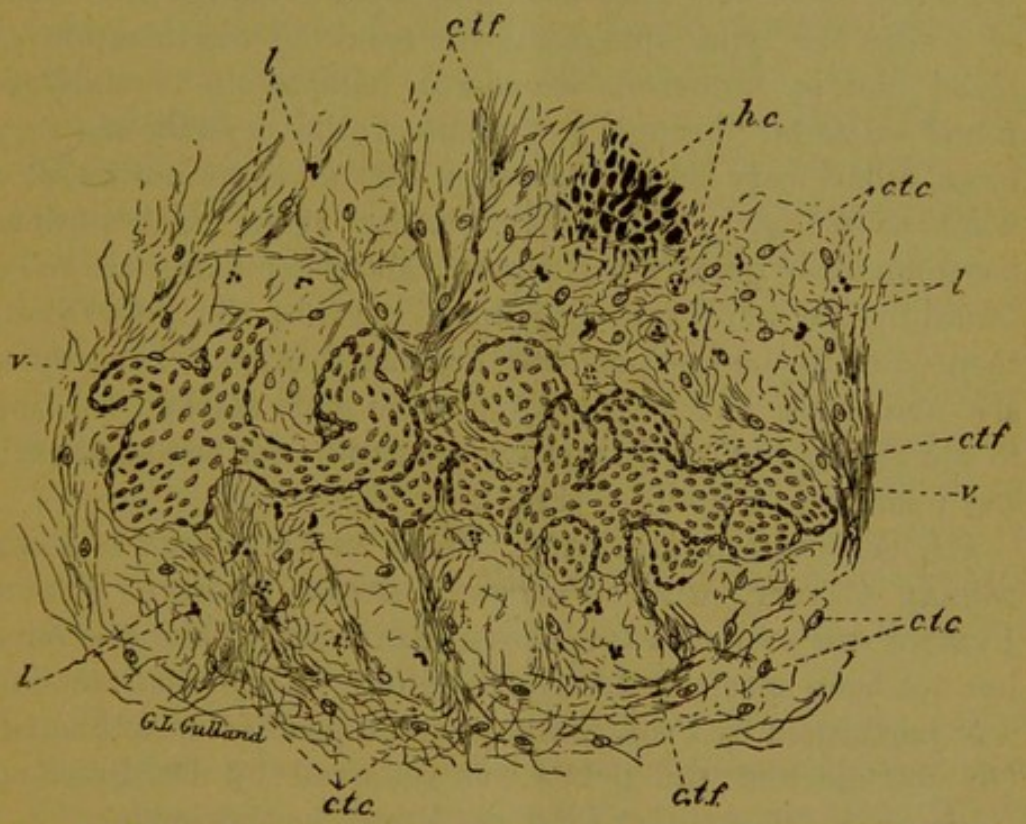

Fig. 2.—Placenta of extra-uterine gestation at full term. × 250. *v*, villus; *h c*, hematoidin crystals; *c t c*, connective-tissue corpuscles; *c t f*, connective-tissue fibres; *l*, leucocytes.

inches from side to side, and three and one-fourth inches antero-posteriorly (thirteen and one-half by eight by eight centimetres), *i.e.*, was somewhat cocoanut-shaped. To the naked eye and touch it had a firm, spirit-hardened, liver-like aspect. On microscopical examination it was found practically to be connective tissue, with large areas of extravasated blood crystals and tortuous, distorted villi, with more

* The description of the microscopical conditions is that of my assistant, Dr. Lovell Gulland, who is an expert in this matter.

or less degenerated epithelium. More particularly it may be described as follows: In this case the placenta is formed almost entirely of the fetal villi and blood clot more or less organized; the maternal connective tissue takes little or no part in its structure. The villi are greatly altered, and are much more compressed than those in Case I., the alteration in them consisting rather in an extreme tortuosity and distortion of the villus as a whole than in any very marked pathological change in its individual elements. The villus stems are generally isolated, and often widely separated from one another. They are embedded in connective tissue of a very low type, apparently the result of organization of blood clot, as numerous masses of hematoidin crystals are found scattered through it. Some of the crystals are very large, others very small; but they are not so numerous as a whole as in Case I., and the organization of the extravasations has gone on to greater perfection. Many capillaries are to be found in the more fully organized parts of the intervillous tissue, few in the less perfectly organized areas. Leucocytes are numerous, but they have not the same marked relation to the villi as in Case I., nor are the capillaries arranged with any relation to the villi. (Fig. 2.)

III. Abdominal Gestation: Fetus at Full Time in Peritoneal Cavity, with Placenta lying beneath Pelvic Peritoneum and in part above Bladder.—This specimen has not been specially described before. Abdominal section was performed by Prof. Simpson and a dead fetus extracted. On post-mortem the pelvis was removed by Dr. Freeland Barbour, to whose great kindness I owe the specimen.

The points of interest in the clinical history are as follows: Last menstruation, beginning of July, 1886; severe vomiting in September, with bloody discharge and apparent abortion (evidently a decidua); then a great deal of pain, persisting for weeks, beginning usually at 10 P.M. and lasting till 4 or 5 A.M.; in beginning of April fetal movements ceased, pain passed off, and abdomen diminished in size.

On physical examination a tumor is felt reaching from pelvis and right iliac fossa up to below left ribs; vertical measurement, eight inches. Head of fetus can be felt between examining hands immediately below ribs on left side. The

fetal limbs lie to front and right, and are felt distinctly. No bruit or fetal heart. On vaginal examination os uteri admits tip of finger; rest of examination unsatisfactory, but a round, elastic swelling is felt through roof of vagina (placenta).*

This patient unfortunately vacillated between her medical attendants and was seen at various periods by at least three specialists. Symptoms of peritonitis and obstruction of the bowels came on after dilatation of the cervix with tents, and on May 22d Prof. Simpson performed laparatomy and extracted the child, now dead, from the amniotic cavity lying intraperitoneally. The cord was found separated about two inches from the navel. The placenta, which lay below, was not touched. Patient died at 10 A.M. on May 24th, 1887. The child weighed five pounds, measured twenty inches; skin peeling and bones of head soft. It was fully developed, and had no external malformation except right talipes varus.

When the pelvis was removed it was frozen and sawn (Fig. 3) in sagittal mesial section.

The uterus (which measures three and one-half inches in length) lies retroposed, and the placenta is extraperitoneal, placed beneath the pelvic peritoneum and in the middle line, above the bladder. It is a rounded mass, measuring four inches in all its diameters. It has the ordinary liver-like aspect and is firm to the touch. Large veins are seen lying at its anterior and posterior edges. (Fig. 3.)

The placenta here, on microscopical examination, presents a much more nearly normal appearance than in either of the foregoing cases. In some places the villi are as closely packed together as in the normal placenta, and they are in most situations identical in appearance with normal villi, but here and there they are widely separated from one another. In this placenta also blood extravasation has occurred; the villi are embedded, not in connective tissue, but in blood clot. In this the outlines of the red blood corpuscles are still recognizable in places, though there are many fibrin threads running through it, and in some places, especially round some of the villi, dense layers have been deposited. There are many

* Report by Dr. J. Hutchison, Dr. Keiller's resident physician, Royal Maternity Hospital.

hematoidin crystals also, all of large size, and found almost exclusively near the villi. There is little or no maternal connective tissue, except near the margin of the placenta, and in

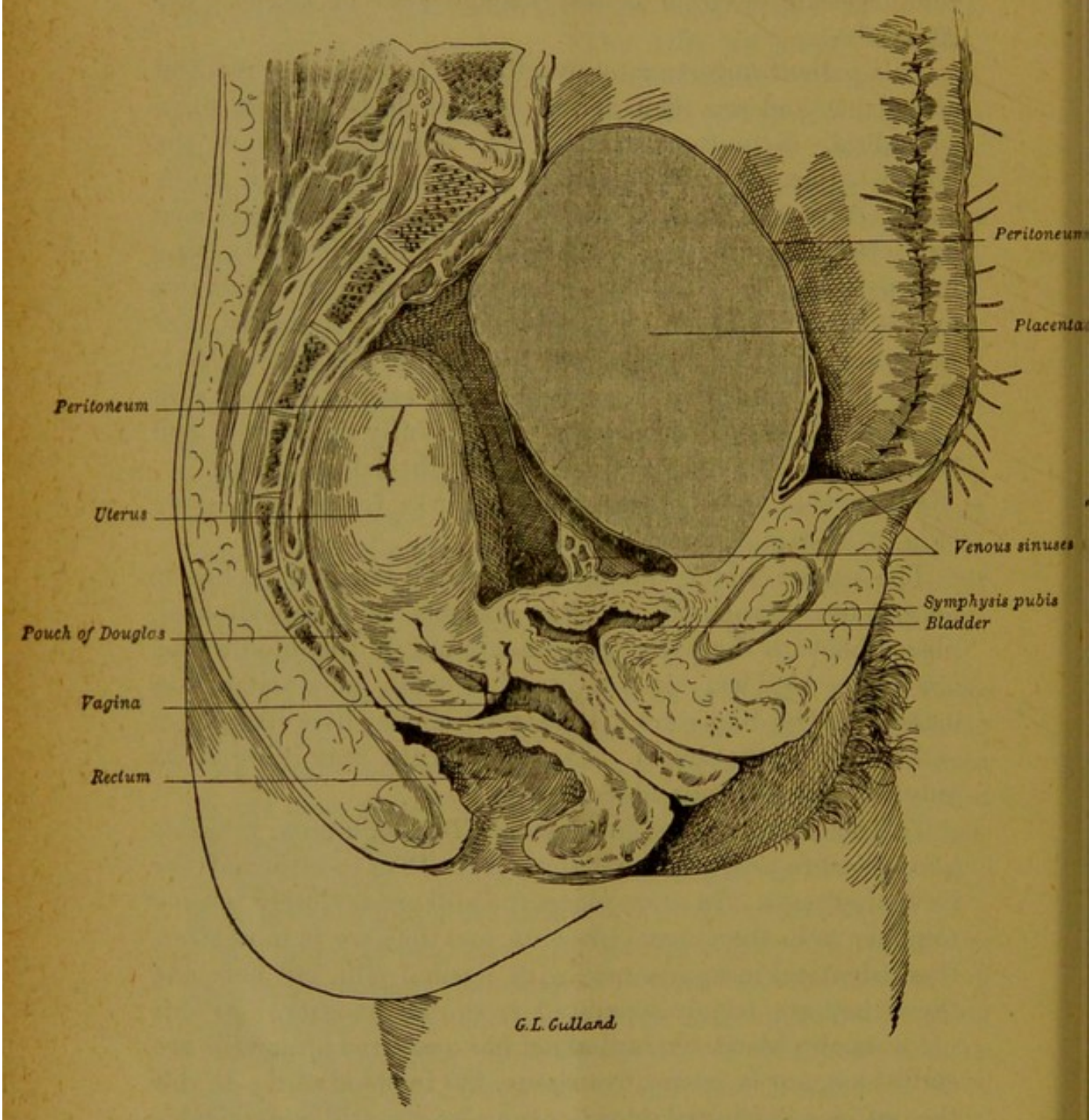

Fig. 3.—Sagittal mesial section of pelvis, showing extraperitoneal placenta (½).

the specimens examined the blood clot had nowhere as yet become organized. (Fig. 4.)

IV. Case of Full-time Intraperitoneal Extra-uterine Pregnancy; Placenta in Tube, Fetus and Amniotic Sac in

PERITONEAL CAVITY; LAPARATOMY BY DR. HALLIDAY CROOM AND DEAD CHILD EXTRACTED; MOTHER DIED.—This case will shortly be published *in extenso* by Dr. J. C. Webster, who has in the meantime kindly given me the following abstract of his work:

"Chief facts regarding nature of placental sac, placenta, and membranes in full-time 'tubo-peritoneal ectopic gestation':

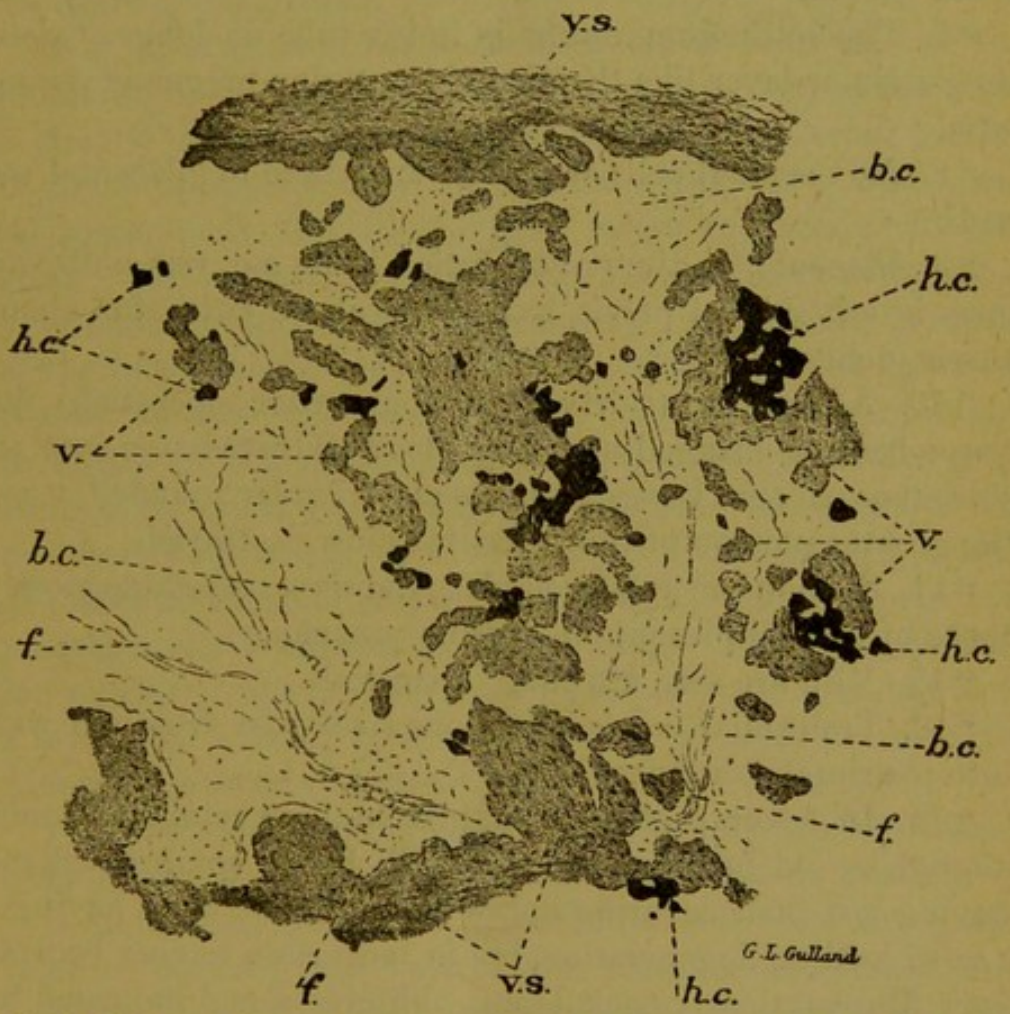

FIG. 4.—Placenta of extra-uterine gestation at full term. × 50. *v s*, villus stem; *v*, villus; *b c*, blood clot; *h c*, hematoidin crystals; *f*, fibrin strands.

"1. Increase in size of Fallopian tube accompanying the growth of placenta, due to increase in connective tissue and muscle, chiefly in former.

"2. The proportion of these two elements to each other is the reverse of what is found in the normal tube, the connective tissue now being greatly in excess.

"3. The connective tissue is more compact for most part and the fibres in many places larger than in normal tube.

"4. The normal arrangement of the muscle in two layers is completely altered, the fibres being found in groups, which run in various directions.

"5. There is enormous enlargement of vessels opposite placental site, and the large sinuses are found chiefly in deep layers of the wall.

"6. Trabeculæ containing vessels extend into placenta from the wall.

"7. The epithelium normally lining tube no longer exists, no glandular layer like that found in uterine pregnancy being seen.

"8. No decidual cells are found anywhere in placental sac wall.

"9. Placenta, at time of operation in its sac, was a discoid mass in left side of pelvis, extending above brim for about three inches.

"10. After death (thirty-eight hours after operation) the shape became changed owing to blood extravasation into its substance, so that it was found as an irregular rounded mass, the greater portion of the placenta being destroyed.

"11. Sections of unaltered placental tissue resemble closely those of normal placenta in uterine pregnancy.

"12. Villi are seen attached to sac wall.

"13. Trabecular bands of various sizes pass from sac wall into placental substance.

"14. In several places the placental structure is much altered by old hemorrhages, the villi being compressed and having lost their covering epithelium, in some cases having a sort of hyaline degeneration, but in most cases having become very fibrous, their vessels being obliterated and indicated by lines of blood crystals. Blood clots are seen in various stages of degeneration.

"15. The amniotic covering resembles that seen in an ordinary placenta.

"16. The chorionic layer under the amnion is of dense fibrous tissue, from which villous stems project.

"17. Secondary (peritoneal) sac which contained the fetus is lined throughout with amnion which in many places is considerably wrinkled.

"It consists of a layer of cubical epithelial cells resting on

a thin layer of connective tissue, which is attached to fibrous layer—altered and thickened peritoneal covering of the various structures to which it was attached."

I have now to consider what explanation is to be given of the undeniably altered conditions of the placenta, especially in the first three cases, to which the present remarks apply.

The ordinary belief is that the placenta has grown after the death of the fetus.

Now, no statement has been made as to what part of the placenta grows. It cannot be the fetal portion, as the fetus is alleged to be dead, and there is no special maternal portion in advanced cases except the ordinary connective tissue, and no reason why this should grow when the active villi are dead. The increase in bulk of the placenta is brought about by organized blood clot, and we see no reason why the death of the fetus should cause this blood effusion. The apparent reason for this belief seems to be that the alleged primary extra-uterine gestation, where the villi were supposed to graft themselves on the peritoneum and where the placenta was necessarily stationary, seemed to call for this alleged growth of placental tissue after the death of the fetus as the only explanation of the unusual placental bulk. The primary grafting of villi on the free surface of the peritoneum is, however, a myth, and so with its discredit the dependent myth of the placental growth after fetal death must disappear.

I believe that the increased bulk of the placenta is produced only during the life of the fetus and not after its death.

In none of the four cases I record can one trace any special relation between the bulk of the placenta and fetal death. In Cases II. and III. the fetuses were well developed and near full time, and in Case I. the fetus was evidently not long dead. The real explanation of the increased size and altered structure is much more probably as follows: We now know that there is no primary peritoneal pregnancy—*i.e.*, no case known where the placenta has had the free peritoneal surface as its maternal portion. Advanced abdominal gestation has arisen primarily from a Fallopian-tube pregnancy where the placenta remains in the extraperitoneal tissue or, more rarely, in the tube. The fetus may be also extraperitoneal, or by

secondary rupture may lie, with or without its amnion, in the peritoneal cavity.

In this extraperitoneal development of the placenta we have two things happening which do not occur in normal pregnancy. The extraperitoneal placenta (1) develops below a serous membrane which it separates from the subjacent tissues; (2) it is displaced usually either down and not extensively if the growing fetus lies above it, or up and extensively if the fetus lies below. *It is this extraperitoneal burrowing and displacement that causes the blood effusion and*

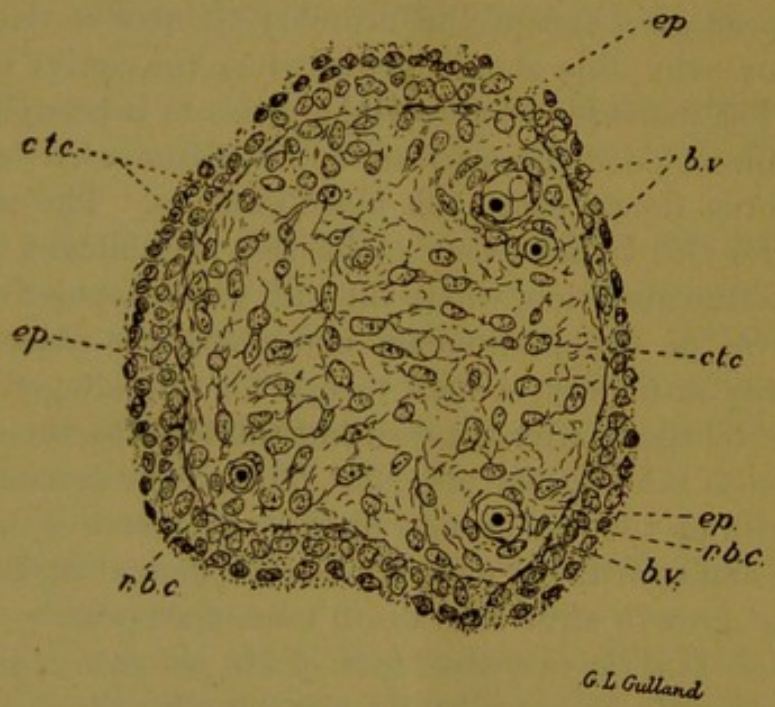

FIG. 5.—Transverse section of villus from placenta of a normal six weeks' pregnancy. × 400. *e p*, double epithelial layer; *c t c*, connective-tissue corpuscles; *b v*, blood vessels; *r b c*, red blood corpuscle.

connective-tissue formation leading to the larger bulk of placenta, and it can only happen during active fetal life. The alterations in the structure of the placenta, when extensive, cause the death of the fetus, and in proportion as these are less profound are the children healthy.[7] (Fig. 5.)

In the last case (Webster's, No. IV.) the placenta developed in the tube, was not subject to displacement as in the first three, and thus had no great alteration in the structure of its fetal portion. Unfortunately its size could not be accurately estimated, owing to blood extravasation the result of operation.

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[4] HART AND BARBOUR: Manual of Gynecology, first edition, page 271. Barbour does not speak of this growth in his original paper, Edinburgh Medical and Edinburgh Obstetrical Transactions, 1882.

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