

an unbiased and uncontradicted expert opinion could be obtained without infringing upon personal rights, would be gladly welcomed by both professions. The plan most constantly urged is the appointment of a board of experts commissioned by the court to make a physical or mental examination, or both, as the case may be, and then to report the result of its findings to the court and jury. This seems simple, and no doubt it would prove to be a most satisfactory method if the question could be ended then and there. But it would not end there. A party to an action has a right to call any witness whose testimony will tend to prove his allegations. Should the report of the commission of experts be adverse to his interests he may call his own experts, who may not agree with the commission and then there is the same old story of expert against expert.

A most simple and effective method and one which, while it preserves the rights and liberties of all the parties concerned, would result in more harmonious expert evidence, is the following: Each party to the controversy shall select such expert or experts as they may desire. When this has been accomplished to the satisfaction of both parties, it shall be obligatory that every examination of the plaintiff or defendant, as the case may be, shall be made in the presence of all the experts together and shall be participated in by all the experts. And that at each examination counsel for both parties shall be present, and an official stenographer who shall report verbatim what was said and also what was done by each examiner in the line of his examination, and that a copy of the report of each examination shall be furnished to each counsel and to the court to be used by counsel on the direct and cross examination of each expert; and that all information relating to the question supplied to or acquired by any expert shall be furnished to every other expert. By this means all the experts will have an equal knowledge of the case and each will have every opportunity for forming a correct opinion. The stenographer's report, showing each expert's complete examination, in the hands of counsel will do more to secure a unanimity of opinion than anything else could do.

When everything has been said, however, and the question has been considered from all its standpoints, it must be admitted that expert medical testimony, which should be a valued, scientific, and honored method of assisting justice to know the truth, has been prostituted by those attorneys who are willing to use any means to save a client or secure a verdict, and by physicians who are willing to lend themselves for such a purpose. The medical expert should be regarded as a scientist, and expert evidence should be received by court and jury with respectful consideration. It is the medical expert himself who is to blame. When he recognizes this fact the remedy will quickly follow. The medical profession is respected everywhere but in the courts. Let it be seen that it is respected there also.

Graeme M. Hammond.

**EXTRA-UTERINE PREGNANCY.**—By extra-uterine pregnancy we mean those instances in which the fertilized ovum is arrested somewhere in its course from the ovary to the uterus and there undergoes development. The term ectopic gestation has a somewhat broader meaning than extra-uterine pregnancy, and has reference not only to such cases as mentioned above, but also to those instances in which the pregnancy occurs in some abnormal diverticulum of the uterus.

Until as recently as 1883 the condition was of interest chiefly from its pathological standpoint; and few or even no cases were recognized clinically. But from that date, at which time Tait operated on his first case of ruptured tubal pregnancy, the clinical interest in the affection has been markedly increasing, as is shown by the decided increase in the literature on the subject and the apparent increase in the frequency of the condition.

**FREQUENCY.**—Before extra-uterine pregnancy came to be recognized clinically and at autopsy, observers were much misled as to its frequency; and consequently such

statements as that made by Hennig, in 1876, to the effect that the affection is so rare that the directors of large obstetrical clinics might never see a case of it, were not to be wondered at. On the other hand, the data now available might readily lead one to suppose that the frequency has markedly increased since that time. Thus, for example, Parry, in 1876, was able to collect only five hundred cases that had been reported up to that time, while in 1892 Schrenck collected six hundred and ten cases which had been reported in the five previous years.

This apparent increase in frequency has also been noted in the experience of individual operators and in single clinics. The increase, as a matter of course, is more apparent than real; it is due unquestionably to our improved methods of diagnosis and greater knowledge of the subject.

**ETIOLOGY.**—So many theories have been advanced to explain the occurrence of extra-uterine pregnancy that it is impossible to make any very definite statements as to its etiology. J. Whitridge Williams, after a most exhaustive review of the literature, gives the following classification, which, although somewhat complicated, is probably the best which, in the present state of our knowledge, can be offered. He divides the etiological theories into four groups:

I. *Conditions which Interfere Mechanically with the Downward Passage of the Ovum.*—(a) Peritoneal adhesions. This is one of the earliest explanations for the occurrence of extra-uterine pregnancy and is still held by many to be the principal one. The adhesions act either by directly compressing the lumen of the tube, or by interfering with its muscular action; both of which conditions are sometimes verified at operation or at autopsy.

(b) Tubal polypi, projecting into the cavity of the tube and therefore impeding the downward passage of the ovum, have been found by certain operators. Williams in his analysis is of the opinion that only a few of the cases in which this condition was stated to have been the cause are at all convincing, and he agrees with Ahlfeld in thinking that in many cases the "tubal polypi" are merely decidua ingrowths, the result rather than the cause of the extra-uterine pregnancy.

(c) Tumors of the tube wall and in some instances tumors of adjacent organs have been said to play a similar part by compressing the lumen of the tube.

(d) Salpingitis. The suggestion was made by Schroeder and Tait that inflammation of the lining of the tube so damaged the cilia of the mucous membrane that a downward current was no longer produced and consequently no obstacle was offered to the entrance of the spermatozoon into the tube. This view presupposed that fertilization normally took place in the uterus and that the ciliary currents favored a meeting of the male and female cells at the fundus. We know now, however, that the currents throughout the utero-tubal tract run in the same direction, viz., from above downward, that the spermatozoon has to work against the stream from the time it enters the internal os, and that as fertilization normally takes place in the tube all pregnancies are primarily tubal. Microscopic examination, furthermore, has not confirmed the view put forward by Schroeder and Tait, for in these cases of tubal pregnancy ciliated epithelium is usually found covering the mucosa.

(e) Obstruction by twin ova. The comparative frequency of the coexistence of extra- and intra-uterine pregnancy has led certain observers to suggest the possibility of the mutual interference of twin ova as a cause for tubal pregnancy.

(f) Fetal twisting of the tube. While the Fallopian tube in adult life is a comparatively straight canal, that of the fetus is a convoluted one. These convolutions may persist in adults, and may then stand in causative relation to certain forms of tubal disease, notably extra-uterine pregnancy.

(g) Diverticula of the lumen of the tube. The occasional presence of these diverticula was demonstrated by Williams in 1891, and he at that time suggested that they might be shown to act as a causative factor in certain cases

of tubal pregnancy. While he is still of the opinion that such a state of affairs may exist, he admits that he has been misled by some of his specimens in which he found the fertilized ovum lying outside of an apparently intact tubal lumen. Since Peters has demonstrated in the uterus that the ovum burrows down beneath the epithelium, which finally closes to form an intact surface over it, there is reason to believe that the same thing occurs in the tube; thus explaining the fact that in early cases of tubal pregnancy the ovum may be entirely outside of the lumen of the tube.

(h) Puerperal atrophy of the tube. Dührssen has reported cases of extra-uterine pregnancy which have occurred in an incredibly short time after labor, in some instances even while the mothers were nursing their children. In these instances he considers the cause to be a puerperal atrophy of the tube which interferes with its peristalsis. In one case operated upon by the author this factor may have been present. The pregnancy probably began six weeks after the birth of a dead child, and tubal rupture took place six weeks later.

(i) External migration of the ovum, which is quite a common occurrence in extra-uterine pregnancy, has been given as a causative factor by some investigators, they holding that the fertilized ovum in its transit through the peritoneal cavity attains such a size that its transmission through the opposite tube is an impossibility.

II. *Abnormal Conditions Resulting from Inflammatory Diseases of the Tubes, Ovaries, and Pelvic Peritoneum.*—Mention has already been made of the part that the absence of cilia is supposed to play in the causation of extra-uterine pregnancy and little need be added to this statement. Most cases of tubal pregnancy will reveal a history of pre-existing inflammatory trouble, and it is the rule to find some other abnormality besides the pregnant tube at operation or autopsy. This has given rise to the statement that an inflammatory condition of the pelvic organs is the principal cause of extra-uterine pregnancy, but, unfortunately for the correctness of this statement, actual examinations, at operation or at autopsy, show that such an inflammatory condition is not present in all cases. On the other hand, the fact that tubal pregnancy occurs repeatedly in women suffering from gonorrhoea certainly favors the above statement.

III. *Physical and Developmental Conditions which Favor Decidual Formation in the Tubes.*—This theory was originated by J. C. Webster, who was not satisfied with the numerous etiological views that had been advanced. He recalls the fact that as the uterus and tubes are both developed from the same embryonic structure, the Müllerian ducts, there is no reason why the ovum should not be implanted upon the upper as well as upon the lower portion of the tract. Normally, the lower portion of this duct becomes differentiated from the upper, so that in the latter the conditions are not such as to favor the formation of a decidua. Abnormally, on account of some developmental anomaly or reversion to an earlier type, the condition of the tubal mucosa is such that a decidua can form, and in such instances we can get an extra-uterine implantation of the ovum. This view has been adopted by a number of observers, but, as is readily seen, it is based upon a theoretical rather than upon a practical basis.

Other observers, among whom may be mentioned Moericke and Fehling, have elaborated Webster's idea in that they claim that the occurrence of extra-uterine pregnancy is a reversion to an earlier type, brought about by poor hygienic conditions. The former authority, basing his conclusions upon a large number of gynecological patients who were under his care in Chili, states that extra-uterine pregnancy is a very rare occurrence among them, whereas at the Clinic in Stuttgart it was observed quite frequently. He attributes this marked difference to the fact that the Chilean women lead an outdoor life, while those of Stuttgart are subjected to very poor hygienic surroundings.

External migration of the ovum, the frequency of which in extra-uterine pregnancy has already been referred to, has led Sippel to put forth a view that is more

or less closely allied to that of Webster. Sippel claims that it is necessary for a certain length of time to elapse between fertilization and decidual formation. Thus, when external migration occurs, the ovum is delayed in reaching the genital tract, and then finds in the tube conditions favorable for the formation of a decidua. This view is an interesting one, but is purely theoretical.

IV. *Conditions of the Ovum which may Favor its Arrest in the Tube.*—A few years ago, when the general opinion was that the uterine and tubal epithelium was converted into syncytium, Strassman was of the opinion that as the ovum entered the tube covered by the cells of the membrana granulosa, it could not become attached to the syncytium of the tube until this layer of granulosa cells had disappeared; but if the layer of granulosa was diminished in amount, or if for any reason it was absent, the naked ovum came into direct contact with the syncytially changed tubal mucosa and there became attached, while normally the layer of granulosa prevented this occurrence until the ovum had reached the uterus. This view is no longer tenable, for opinion is now unanimous that the tubal and uterine epithelium does not undergo this change,—i. e., into syncytium,—but that the latter is derived from the fetal ectoderm.

It is therefore very evident that there is no lack of theories as to the causation of extra-uterine pregnancy. The mechanical theories must be given a certain amount of consideration, but they are open to the objection that while mechanical obstacles are frequently present, the existence of extra-uterine pregnancy is of comparative rarity. On the other hand, recent experimental work on animals—ligation of the tubes and uterine cornua—has failed to cause extra-uterine development of the ovum, after the animal under consideration has been put to the male. Thus these experimenters believe that the supposed extra-uterine pregnancy in the lower animals is really uterine, the mistake being due to confounding the tubes and uterine horns with one another. Tubal diverticula may play an important part, and in some cases undoubtedly exist; but this again cannot hold good for all cases. The same may be said of inflammatory conditions.

We had best close this portion of the subject by quoting from Williams, who summarizes as follows: "The etiology of extra-uterine pregnancy is not a simple matter, and there is no universal cause for all cases. Careful study of the specimen and of the patient's history will give us a satisfactory explanation for its occurrence in the majority of cases, but in a small number we cannot account for the production of the affection, and its cause will remain to us as great a problem as to our predecessors."

**CLASSIFICATION.**—The fertilized ovum may be arrested at any point between the ovary and uterus. We may thus distinguish between ovarian and tubal pregnancy according as the development occurs in either of these organs. To these two forms some add a third, viz., abdominal pregnancy; but there is considerable doubt as to whether a primary implantation can take place on the peritoneum and thus give rise to this form of pregnancy.

**Ovarian Pregnancy.**—Ovarian pregnancy was first described early in the seventeenth century, and in the eighteenth was pretty generally recognized. In 1835 Velpeau made the statement that many of the cases described as ovarian pregnancy were open to objections, and he took the rather radical view that none of the cases reported gave to him conclusive evidence as to their ovarian origin. Observers in general agreed with him, and at present there are few who believe in the existence of ovarian pregnancy.

There is evidence, however, that the condition undoubtedly does exist, although very rarely; and, since Spiegelberg reported a case of this nature in 1878, we are in possession of certain criteria by which an ovarian pregnancy can be recognized. Spiegelberg demands that the following conditions be noted before we can make a diagnosis of a given extra-uterine pregnancy being ovarian: (1) The tube on the affected side must be intact. (2) The fetal sac must occupy the position of the ovary. (3) It must

be connected with the uterus by the utero-ovarian ligament. (4) Definite ovarian tissue must be demonstrated in its walls. When judged by these criteria it is clearly seen that many of the cases reported as ovarian pregnancy will be found wanting. Williams, in discussing these points brought out by Spiegelberg, calls attention to the fact that in certain cases of tubal and broad-ligament pregnancy, the ovary may be so flattened out as apparently to occupy a portion of the sac wall, and for this reason he suggests that the fourth condition be so modified as to read: "Definite ovarian tissue must be demonstrated, not at a single point in the sac wall, but at several points a considerable distance from each other."

Williams has carefully reviewed the literature of ovarian pregnancy in the past hundred years and has applied the above criteria to the reported cases. The results of his analysis show that only four cases can be classified as *positive cases*, eleven cases as *highly probable*, and twenty as *fairly probable*; thus clearly demonstrating that, although ovarian pregnancy undoubtedly does exist as a primary condition, it is of the greatest rarity. He also shows that one-half of the positive or probable cases reached full term, indicating that the ovarian tissue can more readily accommodate itself to the increase in size of the growing ovum than can the tube.

In ovarian pregnancy rupture with formation of a secondary abdominal pregnancy can occur, or the case may go to term and the formation of a lithopædion be the result.

**Tubal Pregnancy.**—When the ovum is arrested in the Fallopian tube and develops there, we have what is known as a tubal pregnancy; this is by far the most frequent variety of extra-uterine pregnancy. According as the arrest of the ovum occurs in the various portions of the tube we can distinguish between ampullar, isthmic, and interstitial pregnancy, the relative frequency being in the order named.

Tait's idea was that the invariable fate of a tubal pregnancy was rupture into the peritoneal cavity, and that this rupture always occurred not later than the twelfth week. Further investigation, however, has proven this view to be an erroneous one, and that many cases terminate at a much earlier period, in what is known as tubal abortion, or that in rare instances the tube may so accommodate itself to the growing ovum that the case may go on to term.

Tubal abortion was thought to be, until quite recently, a pathological curiosity, but in 1887 Werth called attention to the fact that it was not infrequent for the ovum to be extruded through the fimbriated end of the tube into the peritoneal cavity. Attention having been directed to the fact, it is now generally believed that this is the most frequent termination of tubal pregnancy, and in the last three years statistics collected by Martin, Orth, Mandl, Schmidt, and others show that seventy-eight per cent. of the cases end in tubal abortion as against twenty-two per cent. rupturing into the peritoneal cavity. Martin indeed considers that abortion is the general rule and says that rupture occurs only in those cases in which abortion is prevented by closure of the fimbriated end of the tube.

The abortion which occurs in the tube is in a measure analogous to that which takes place in the uterus. The liability to hemorrhage is increased owing to the imperfect development of the decidua. The maternal vessels are opened up by the downgrowth of fetal ectoderm or trophoblast, and the hemorrhage loosens the embryo from its attachment to the tube wall. If the separation is complete, the ovum is forced through the fimbriated extremity and the abortion can be designated as "complete." On the other hand, if the separation of the ovum is only partial, the hemorrhage continues and the ovum remains in the tube; here the abortion is "incomplete."

It is probable that two factors act in the expulsion of the ovum—viz., the actual contraction of the muscular walls of the tube, and the force from behind furnished by the blood clot. If the abortion is complete, hemorrhage will be profuse; but if the ovum remains in the tube,

it may be converted into a "fleshy mole," similar to those observed in uterine abortions.

What has been just gone over has served in the last few years markedly to change the views that were held as to the causation of pelvic hæmatocoele and hæmatosalpinx. Opinion is now pretty general that both of these conditions are secondary results of tubal pregnancy. In the first instance the blood flowing through the fimbriated end forms a clot in the neighborhood of the ovary, and in the second the hemorrhage occurs into the tubal lumen and the blood remains there.

**Rupture into the Peritoneal Cavity.**—As has already been stated, rupture in this manner is not so common as was thought by Tait. When it does occur the pregnancy is usually situated at some distance from the fimbriated end of the tube—either at the isthmus or in the interstitial portion. If it is situated at the isthmus, rupture usually takes place within the first twelve weeks of the pregnancy, and not infrequently during its first month; but if it is situated in the interstitial portion rupture occurs later, for this portion of the tube, being surrounded by uterine muscularis, more readily responds to the influence of pregnancy and allows the ovum to attain a larger size.

Rupture may occur spontaneously or may be brought about by violence; the most frequent form of violence being a rough vaginal examination. The writer recalls a case in charge of a friend in which death from hemorrhage took place twelve hours after a vaginal examination; the diagnosis of extra-uterine pregnancy had not been made. When rupture occurs spontaneously it usually follows some exertion on the part of the patient.

The underlying causes of rupture are twofold, viz., (a) overdistention of the tube by the growing ovum and (b) perforation of the tube wall by the chorionic villi, which grow down rapidly between the muscle fibres and not infrequently penetrate to the peritoneal coat. The fetal ectoderm or trophoblast proliferates and causes a certain amount of degeneration of the muscle fibres and connective tissue of the tube wall. If then, as frequently happens, a maternal blood-vessel be opened, the rapid discharge of blood into the tube will cause its overdistention and rupture.

Rupture usually takes place in the neighborhood of the placental site, and hemorrhage and discharge of the ovum will occur either into the peritoneal cavity or between the folds of the broad ligament, depending on the original site of implantation of the placenta.

When rupture occurs into the peritoneal cavity, as a rule the entire ovum is extruded; but if the wound be a small one, there may be profuse hemorrhage without the ovum being discharged. In either case, however, the hemorrhage is profuse and the patient will show marked signs of collapse—or will die before relief can be obtained. In the event of an operation or if a fatal issue should not take place, the result will depend upon the amount of damage which has been done to the ovum.

If the entire ovum escapes into the peritoneal cavity its death is inevitable, and, unless the fetus is beyond the third month, absorption of the entire product of conception is the rule. The old view that in such a case the placenta may become attached to some neighboring organ and thus form vascular connections is now scarcely tenable; but if the fetus alone escape from the tube and the placenta remains *in situ*, the effect of the rupture on the pregnancy will vary according to the amount of damage done to the placenta. In those cases in which the greater portion of the placenta remains attached, the fetus will go on to term as a secondary abdominal pregnancy, and if the original tubal wound has been a small one the placenta will develop in a sac formed by the remains of the tube; but if the rent were large and close to the margins of the placenta, this organ will overgrow its tubal attachments and become adherent to some neighboring organ, viz., uterus, pelvic floor, or intestines. Most observers agree that further growth of the fetus after escape from the tube is impossible unless it is surrounded

by the amnion. There are, however, exceptions to this rule.

Rupture between the folds of the broad ligament takes place in a few cases through that portion of the tube wall which is not covered by peritoneum, and here the tubal contents will pass downward into that space which is situated between the broad ligament and its peritoneal covering. This is considered the most favorable termination of an extra-uterine pregnancy and usually results in the death of the ovum and the formation of a broad-ligament hæmatoma. More rarely the pregnancy may go on to term in this situation; and in such a case it is evident that the placenta, being attached to the unruptured portion of the tube wall, will lie at the superior part of the gestation sac, which condition has given rise to the erroneous idea that the placenta may be attached to some remote organ such as the liver or the diaphragm. In such a case the pregnancy is entirely outside of the peritoneal cavity, and the condition has been spoken of as a broad-ligament or extraperitoneal pregnancy. The gestation sac here has been known to rupture, and a secondary abdominal pregnancy is then the result.

The intimate relation that exists between these pregnancies and the rectum renders them more prone to invasion by intestinal bacteria, and if suppuration should occur the proximity to the bladder explains the discharge of fetal bones, etc., by way of the urethra—an occurrence which has been noted in such instances.

Williams and others are of the opinion that the frequency of this form of pregnancy has been overestimated, as Williams has observed it only once in about forty cases.

**Abdominal Pregnancy.**—There is at present little doubt in the minds of most operators that those cases which were thought to be primary abdominal pregnancies have turned out to be only secondary abdominal pregnancies, *i. e.*, secondary to a pre-existing tubal pregnancy, and there is uncertainty as to the possibility of the existence of a pregnancy primarily abdominal. Recent work by Zweifel, Martin, and others, has shown that the fertilized ovum can become implanted upon that thin strip of tubal tissue which extends from the fimbriated extremity of the tube to the ovary, the fimbria ovarica. It is readily seen, however, that such cases are not abdominal but in reality tubal in origin, which, when we bear in mind the fact that small structures covered by ciliated epithelium have been found in the wall of the gestation sac of many cases described as primary abdominal pregnancy, materially weakens the theory as to the possibility of such a form of extra-uterine pregnancy existing. If, for example, an ovum became implanted upon this portion of the tube, the placenta would very rapidly overgrow the very narrow limits of the fimbria ovarica and give one the impression that the pregnancy were primarily abdominal. Williams, in his discussion of this part of the subject, says that, of the cases thus far described, not a single one appears to him to furnish sufficient evidence to justify its being considered primarily abdominal. Nevertheless, in view of the fact that decidual formation has been noted in the sub-peritoneal connective tissue, the possibility of such a thing cannot be denied.

**FATE OF THE FETUS IN EXTRA-UTERINE PREGNANCY.**—Attention has already been called to the fact that when small embryos are extruded into the peritoneal cavity absorption is the rule. This fact is made manifest by the circumstance that one rarely succeeds in finding any trace of the fetal body in the blood clots which fill the peritoneal cavity after tubal rupture. Absorption frequently takes place within the gestation sac inside of the tube, and when we cut into such a tube it is by no means unusual to find a shapeless mass hanging to the umbilical cord, or even no trace of embryonic body at all, while the cord simply hangs free in the amniotic cavity.

Such a termination, however, is impossible when the fetus has reached a certain size; it then undergoes one of the following changes: mummification, suppuration, conversion into a lithopædion or into adipocere. In the first of these conditions the fluid portions of the embryo

are absorbed and the fetus becomes converted into a dry, mummified mass, nothing remaining but the bones, covered by a shrivelled skin. When suppuration takes place, as is quite common in cases of broad-ligament pregnancy, the sac first suppurates and the process then extends to the fetus. The patient, under these circumstances, shows marked signs of sepsis, and, unless the pus is evacuated by operation or by rupture, she will die. Rupture into the bladder or rectum is not an uncommon termination in such instances.

In a small number of cases neither of the above changes takes place, but the fetus and membranes, by a deposition of lime salts within them, become converted into a calcareous mass or lithopædion. A structure of this character has, in certain instances, been carried by the mother for years, giving no trouble except when it blocks the pelvis and forms an obstacle to normal labor. Küchenmeister has carefully reviewed the literature of this portion of the subject and divides lithopædia into three classes: (1) Calcification limited to the fetal membranes (lithokelyphos); (2) both fetus and fetal membranes partially calcified (lithokelyphopædion); and (3) calcification limited entirely to the fetus (lithopædion).

The last possible termination—conversion into adipocere—occurs only rarely. Here the fetus is transformed into a greasy yellow mass; the material is thought to be an ammoniacal soap.

**ANATOMICAL CONSIDERATIONS.**—It has been the privilege of the writer to examine most of the sections of the specimens of Williams, also to read the manuscript of his as yet unpublished article on extra-uterine pregnancy. In the present section, therefore, I shall quote somewhat fully from his report.

**Structure of the Sac Wall in Tubal Pregnancy.**—If one is lucky enough to get a specimen of early unruptured tubal pregnancy, one finds that the tube is the seat of a fusiform swelling about 1 or 2 cm. from its uterine end. Sections through a pregnancy at this age show that the sac wall is made up of the muscularis of the tube. The individual muscle cells, however, do not seem to be increased in number but spread apart by œdema. There is marked dilatation of the arteries and veins in this situation, particularly in the neighborhood of the placental site, and there may be some hemorrhage into the lumen of the tube. Later, one will notice marked degenerative changes in the tube wall in the neighborhood of the chorionic villi, so that at this period the sac wall consists of a tissue closely resembling fibrin. The thickness of the tube wall diminishes as the pregnancy advances, and the muscular elements appear to have diminished in number. If the case reach term the sac wall will be found to be composed almost entirely of connective tissue with here and there a muscle fibre, indicating that the muscularis of the tube has not the same tendency to proliferate under the influence of pregnancy as has that of the uterus.

It is not possible to make definite statements as to the part played by the ovary in the formation of the sac wall of an ovarian pregnancy. Maybe if an early specimen could be obtained the entire sac wall would be found to consist of ovarian tissue. The diagnostic value of the presence of ovarian tissue in the sac wall of pregnancies thought to be ovarian has already been referred to, and it is evident that positive statements cannot be made as to the ovarian origin of the pregnancy unless ovarian tissue can be demonstrated in several parts of the sac wall more or less remote from one another.

The condition of the fimbriated end of the tube varies: if tubal abortion has taken place, it is of course patent; while if abortion has not occurred it may or may not be opened. The relation of the lumen of the tube to the pregnancy is also a subject of variation. In certain instances it can be traced into both ends of the fetal sac, while in others it is apparently completely shut off.

**Decidua.**—It has long been known that the uterine mucosa under the influence of extra-uterine pregnancy becomes converted into decidua just as it does in uterine pregnancy, and the statement is usually made that its structure is the same under both conditions. However,