ECTOPIC GESTATION.

DEFINITION.—By the term "ectopic gestation" is meant a pregnancy situated outside the cavity of the uterus, and the title *ectopic* is preferred to that of *extra-uterine*, as including, also, pregnancy in the interstitial portion of the tube, which, while ectopic, is not outside of the uterus.

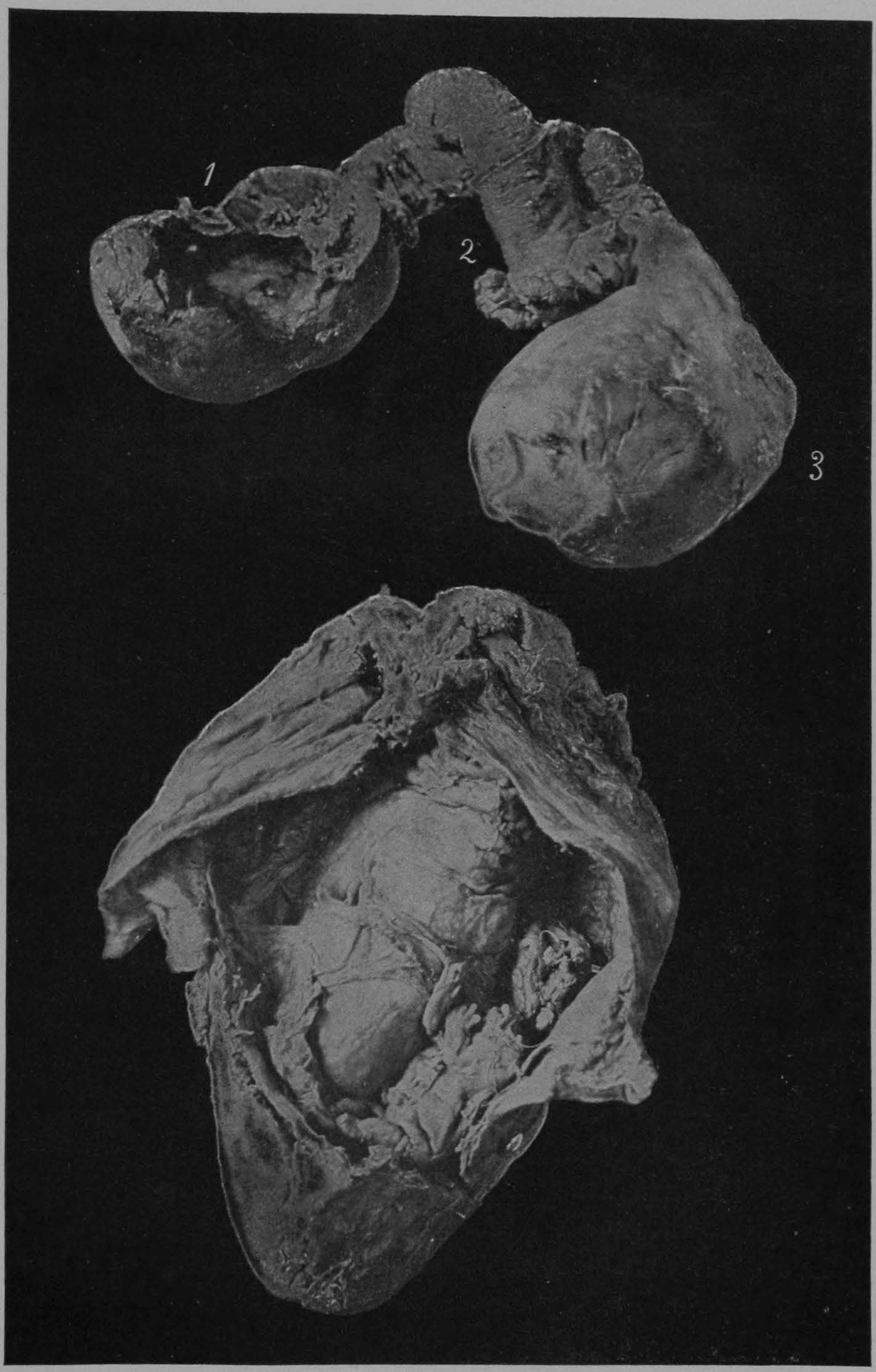
Cornual pregnancy will not be included in this article.

HISTORY.—We shall not enter into the history of the subject, save to say that Albucasis, in the middle of the eleventh century, described the first known case of ectopic gestation. For centuries it was considered one of the rarest of Nature's freaks, but since March 3, 1883, when Lawson Tait of Birmingham, Eng., performed his first successful operation on a case of ruptured ectopic gestation, examples of this condition have been observed so frequently that the literature of reported cases is voluminous, and to Tait and his views of the etiology and treatment of pelvic hematocele are largely due our knowledge of the subject now before us. Instead of regarding the condition a rare one, we know now that it is comparatively frequent, and that every gynecologist in active operative practice must meet with several cases each year. Formad of Philadelphia, in a series of 3500 general autopsies, found 35 ectopic gestations.

The relative frequency of this condition at the present time, as compared with the past, simply means that we are now better able to recognize such cases; and many of the deaths formerly assigned to idiopathic peritonitis and to hematocele were undoubtedly due to ectopic gestation.

VARIETIES.—For all practical purposes we may regard the tube as the primary seat of the ectopic gestation. When the fimbriated extremity of the tube is adherent to the surface of the ovary and embraces one or more Graafian follicles, we admit the possibility, after rupture of the follicle, of impregnation of the ovum before it leaves the follicle, and its development within the ovary, constituting, in one sense, an ovarian pregnancy. Such an event, however, if it ever occurs, would be so extremely rare that it may be left out of consideration in a practical work like this and *ectopic gestation* be regarded as *originally tubal.*

PLATE XXXII.



Combined Ectopic and Intra-uterine Gestation; operation five months after marriage: A, tube and ovary removed at operation; 1, gestation-sac containing amnion and giving chorionic villi under the microscope; 2, fimbriated extremity; 3, ovary; B, fetus contained within its membranes, passed from the uterus on the day following the operation.

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The idea that an "abdominal pregnancy" ever occurs primarily, as such, has been abandoned. It seems neither rational nor possible, when we consider the absorptive power of the peritoneum, that an ovum should drop into the peritoneal cavity, meet with a spermatozoön, and develop there. Knowing as we do how easily much larger and firmer masses are rapidly absorbed by the peritoneum, we do not believe that a young fertilized ovum would long escape destruction. We shall show later on how the condition called "abdominal pregnancy" originally started in the tube.

Three varieties of tubal gestation are recognized, according to the situation:

1. Tubal proper (free tubal);
2. Tubo-ovarian;
3. Tubo-uterine or Interstitial.

The first variety, that situated in the free portion of the tube, between the cornu of the uterus and the fimbriated extremity, includes by far the largest number of cases, and consequently is of the greatest importance.

The tubo-ovarian variety we consider as still *sub judice*. As usually described, it includes the condition where the fimbriated extremity of the tube is adherent to the surface of the ovary, and the gestation takes place in the outer extremity of the tube, between it and the ovary. This variety is rare, and, as the treatment would be similar to that of the first variety, and the diagnosis would in all probability only be made at the operation or the autopsy, they will be considered together. We shall see later on that the direction of rupture may differ in the two cases.

Careful observation of specimens of ectopic gestation removed by operation has largely modified the views held concerning the tubo-ovarian variety. In all probability cases have been reported as tubo-ovarian in which the ovary, just as coils of intestine or the uterus, simply formed a part of the sac created by adhesive peritonitis binding together adjacent organs about the blood-effusion, resulting from rupture of any portion of the pregnant tube.

In the tubo-uterine or interstitial variety the gestation occurs in that portion of the tube which is embraced by the uterine wall. This constitutes a distinct class, and will be considered separately.

Etiology.—Concerning the etiology of ectopic gestation very little is known. The theory which has gained the widest acceptance is, that it is due to some lesion in the interior of the tube

No change observable — cilia injured — desquamation — Stenosis.

obstructing the ovum in its passage to the uterus. This lesion is in some cases a desquamation of the epithelium, in a very few a stenosis of the lumen by the traction of peritonitic adhesions causing an angulated condition of the tube, and in others a change in the epithelium short of desquamation (a destruction of the cilia), but sufficient to cause a departure from its normal function. The theory of lesion in the interior of the tube seems to cover a large number of cases, and is strengthened by the fact that frequently a history of previous trouble on that side of the pelvis can be elicited, and the event is often, though not always, preceded by a period of sterility.

In some cases of ectopic gestation, on the other hand, the microscope has disclosed in the epithelium no deviation from the normal.

Recent investigations have shown that in certain cases of pregnancy decidual cells occur in the tubes as well as in the uterus. The view is therefore advanced that ectopic gestation is only possible in tubes containing decidual cells, and in such tubes anything delaying the progress of the ovum would favor the lodgement and ectopic development of that body.

This disaster may occur at any age: it may happen in a woman who has borne several children, or it may occur in the first pregnancy a few months after marriage.

As stated above, the event is often preceded by a long period of sterility, and yet it may follow a confinement by only a few months; in fact, it may accompany an intra-uterine pregancy. In this case the presence of the intra-uterine gestation may perhaps be the cause of the extra-uterine.

Pathology.—We must consider—

1. Changes which occur in the tube;
2. Changes which occur in the ovum.

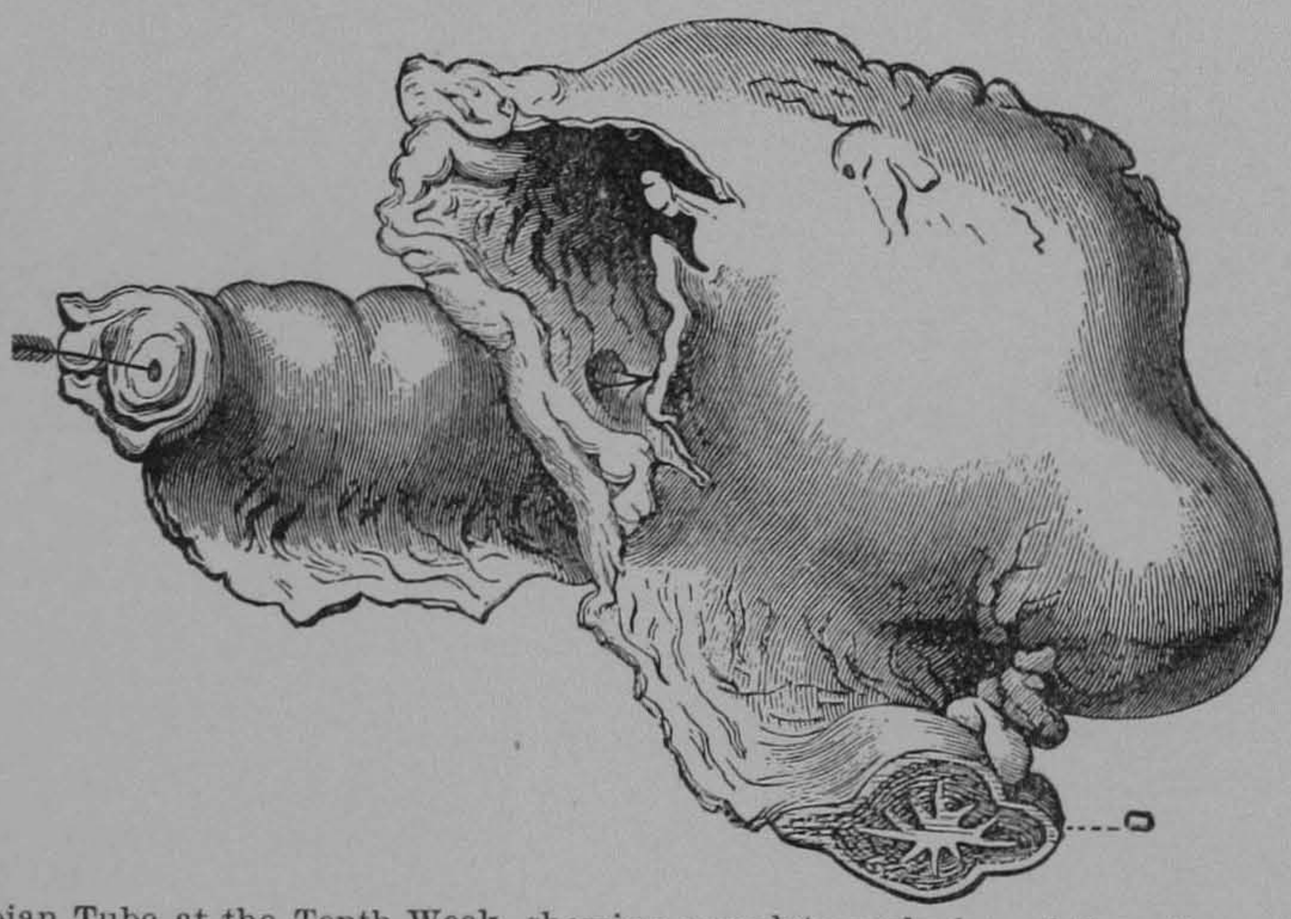
Following the lodgment of the ovum in the tube, the wall of the latter at first thickens; this is chiefly due to its increase in vascularity, especially at the site of attachment. As the ovum grows, the tubal wall becomes thinned and weakened by the ingrowths of the chorionic villi. Simultaneously with the growth of the ovum, the fimbriated extremity of the tube becomes progressively narrowed, until at about the eighth week it is completely occluded. The method of this occlusion has been accurately described by Bland Sutton. As the structures of the tube become swollen from the congestion, the peritoneal and muscular coats of the fimbriated extremity form a prominent ring about the fimbriæ; this ring grad-

ually projects beyond the fimbriæ, then contracts and closes the ostium, leaving the fimbriæ within the tube, concealed from view. Now, until this occlusion occurs, either one of two events is possible:

1. Rupture of the tubal wall;
2. Tubal abortion.

After the occlusion of the fimbriated extremity, the ovum can escape from the tube only by rupture of its wall. As the chorion

FIG. 288.



Gravid Fallopian Tube at the Tenth Week, showing complete occlusion of the ostium: *o*, ovary with corpus luteum.

develops, the tubal wall, thinned by distension and weakened by the inroads of the villi, finally yields, the exciting cause coming either from without or from within the tube.

(*a*) From without: As a misstep, lifting, straining, or, not infrequently, from sexual intercourse, as was proven to be the case in the patient from whom the accompanying specimem (Plate XXX.) was taken, where the rupture immediately followed that event.

(*b*) From within: As a hemorrhage into the sac from separation of the tubo-chorionic vessels in the process of organic growth.

This rupture, when the gestation is situated in the tube proper, may take place in either of two directions:

1. Through a portion of the tube covered by peritoneum—viz. into the peritoneal cavity. (See Fig. 289.)

2. Through a portion of the tube not covered by peritoneum—viz. between the folds of the broad ligament—*i. e.* outside the peritoneal cavity. (See Fig. 290.)

In the tubo-ovarian variety the direction of rupture would be into the peritoneal cavity only.

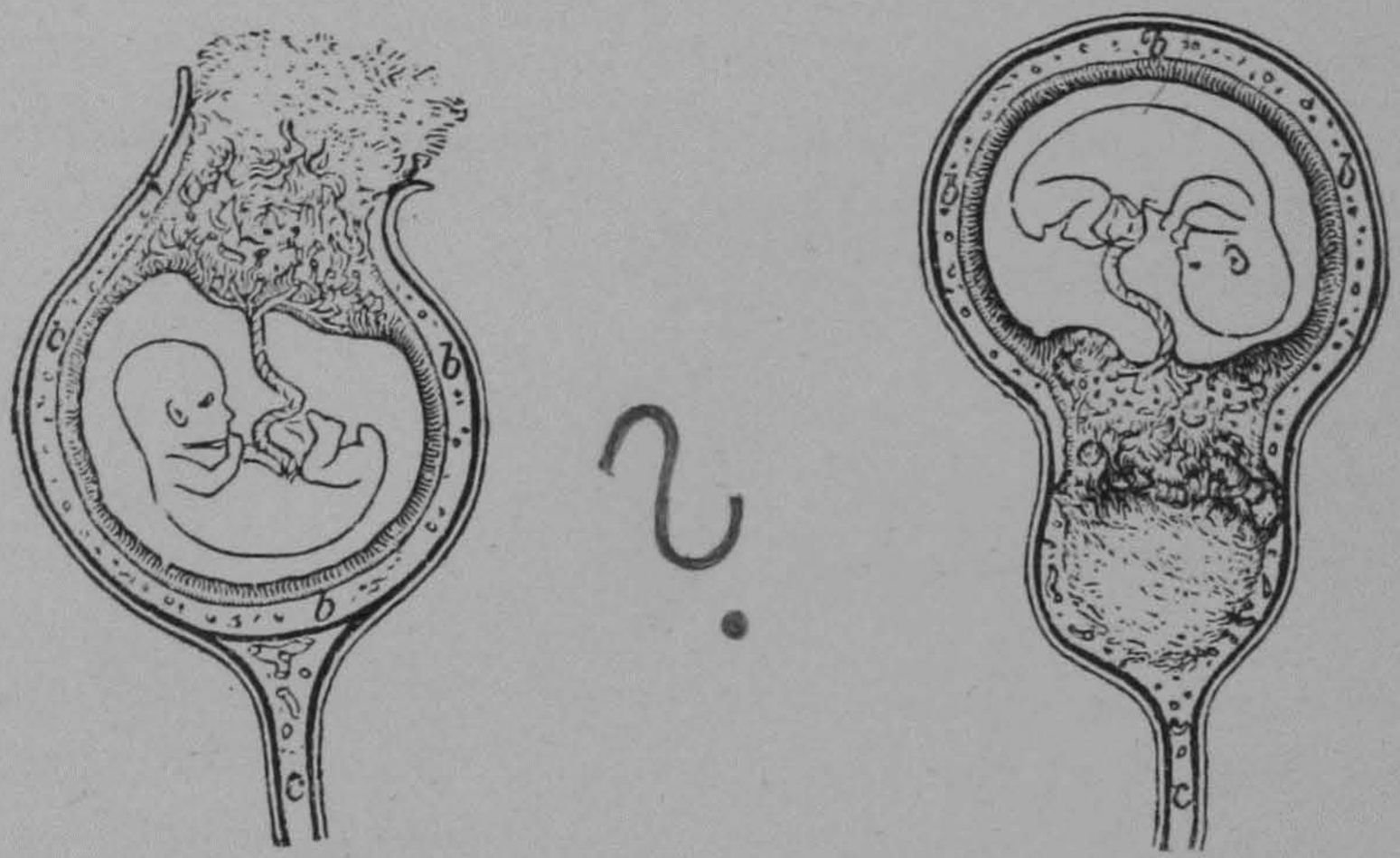
When a rupture takes place into the peritoneal cavity, either one of two events may occur:

(*a*) The hemorrhage may be sufficient to prove speedily fatal;

(*b*) The hemorrhage may be insufficient to prove speedily fatal.

In the latter case the tubal laceration is small: the chorion in its

FIG. 289. FIG. 290.



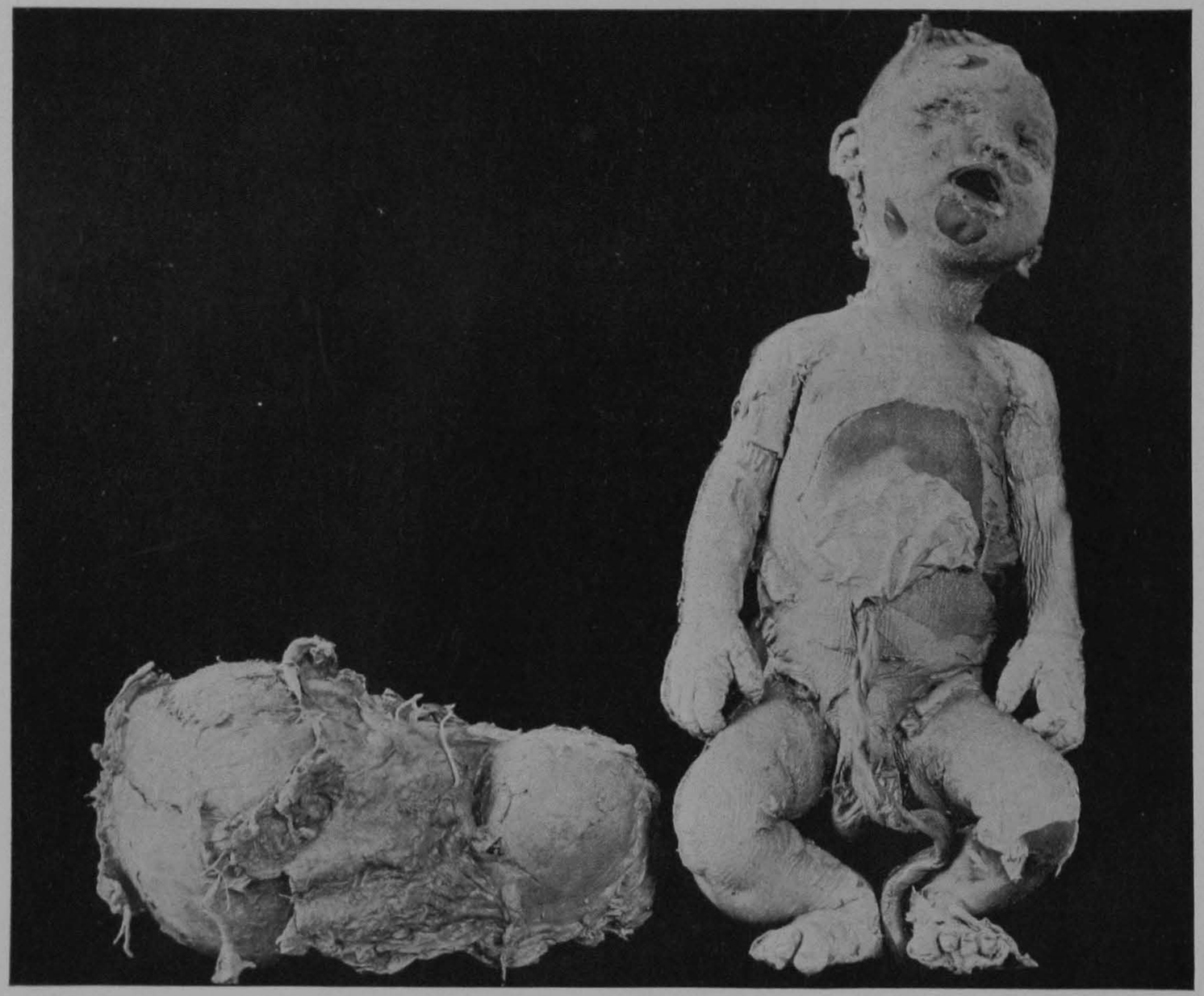
A *B*

Diagrammatic Section of Fallopian Tube, representing the two directions of rupture in tubal pregnancy: *A*, into the peritoneal cavity; *B*, between the folds of the broad ligament; *b*, wall of Fallopian tube; *c*, cavity of broad ligament.

attempted escape plugs the opening and checks further hemorrhage; the effused blood then gravitates to the pouch of Douglas, finally coagulates, and is roofed in by peritonitic adhesions. In this way a new false sac is formed. As the chorion grows this new sac is ruptured, with a second hemorrhage, which in turn may be fatal, or may again be arrested and the fatal event postponed. This process may be repeated several times, or, indeed, if the effused blood is small in amount and the rupture occurs early, the effused blood, fetus, and membranes may be absorbed and the patient recover.

The death of the fetus usually occurs with the first hemorrhage, but Webster reports and minutely describes a case in which the fetus escaped into the peritoneal cavity and went to term, the so-called placenta remaining in the tube. This may have occurred either by a marked distension and thinning of the tube, allowing the gradual escape of the fetus through the tubal wall, with little or

Berry Hart. Frozen Section.



Full-term Fetus developed between the Folds of the Right Broad Ligament: sac torn in removal; partially sutured afterward; A, right tube opening out into broad ligament.

Berry Hart. Frozen section.

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no hemorrhage, or the fetus may have gradually escaped through the fimbriated extremity—*i. e.* by tubal abortion.

When the rupture occurs through the floor of the tube, between the folds of the broad ligament, the death of the fetus also usually occurs at once.

Occasionally, however, the chorion only gradually changes its site of implantation, and the fetal circulation is maintained; fetal life continues, and may go to full term with complete development of the child.

Thanks to the frozen-section studies of Dr. Berry Hart, we now understand pretty clearly the changes which occur as the fetus develops. These changes were well exemplified in the case, the specimen of which is illustrated by the accompanying plate taken from a photograph. The folds of the broad ligament are opened out; the peritoneum is gradually lifted from the floor of the pelvis, from the lower portion of the rectum, and from the side, posterior surface, and fundus of the uterus. The uterus itself is enlarged, and usually pushed to the side opposite the gestation-sac.

The distance the peritoneum may be lifted from the pelvis and its contents without its rupture, by the gradual development of the fetus or by repeated hemorrhages beneath it, seems almost incredible to one who has not actually seen it either at operation or autopsy. This elevation not infrequently reaches to the level of the umbilicus or above, and explains how an incision may be made into the gestation-sac, to one side of the median line, without going into the peritoneal cavity. We say, "to one side of the median line," for although the peritoneum may be stripped from the side, posterior surface, and fundus of the uterus, it seems to remain attached to the anterior surface, especially at its lower portion, and an incision in the median line would usually go through the peritoneum.

The distension of the broad ligament and the elevation of the peritoneum is well shown in Fig. 291.

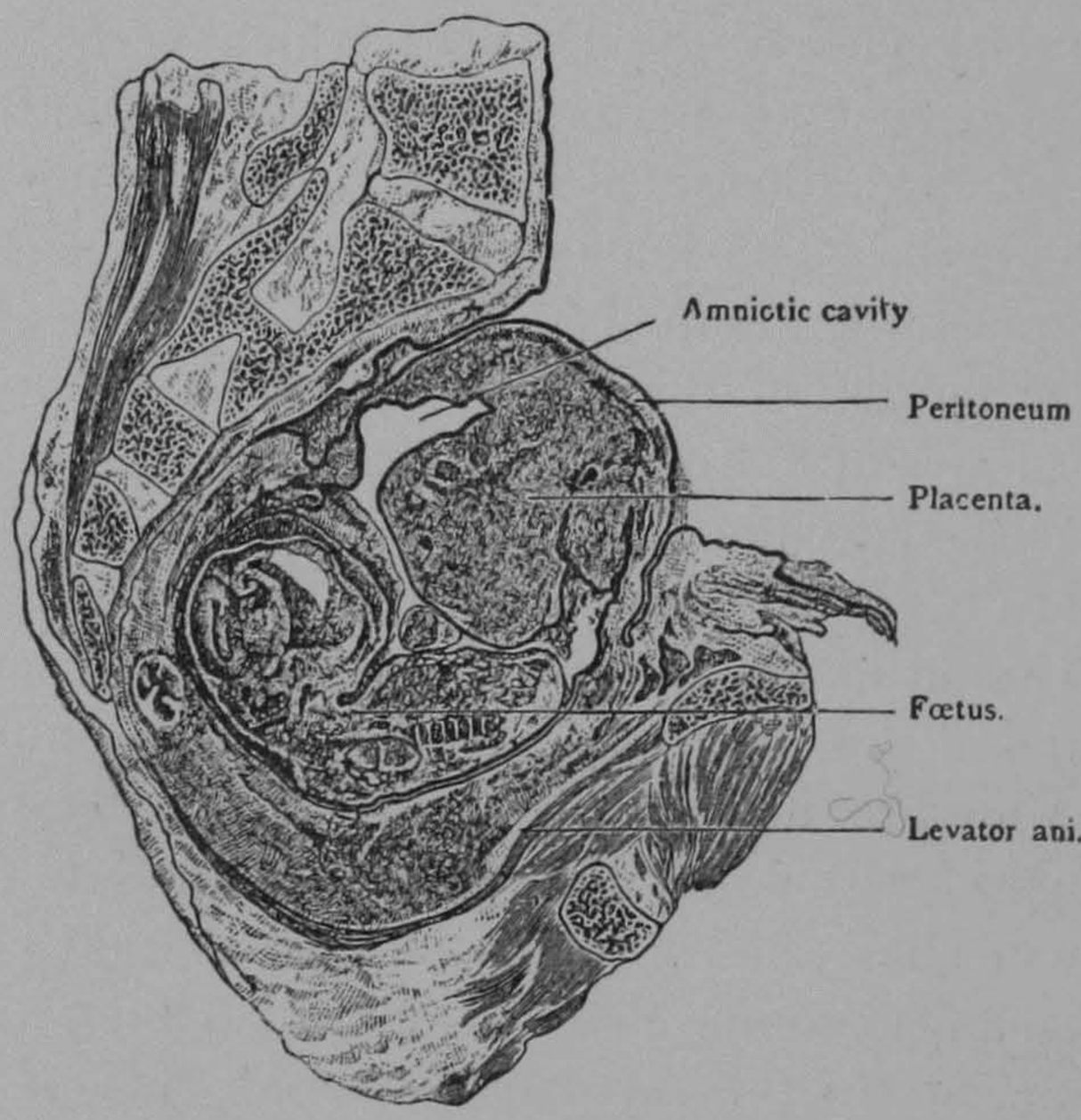
The amount of distension which the peritoneum forming the folds of the broad ligament will tolerate is sometimes exceeded, and a secondary rupture occurs into the peritoneal cavity, the primary rupture having taken place extraperitoneally—viz. from the tube down between the folds of the broad ligament; the secondary rupture from the broad ligament into the peritoneal cavity. Either one of two results may follow this event:

1. Profuse hemorrhage into the peritoneal cavity, with or without the escape of fetus or fetus and placenta;

2. The gradual escape of the fetus into the peritoneal cavity, with little or no hemorrhage, the placenta retaining its attachment within the broad ligament and the fetus perhaps continuing its existence.

The first result, profuse hemorrhage, is more likely to occur when the distension of the broad ligament is due to recurring hem-

FIG. 291.



Transverse Section of the Pelvis of a Woman, with an Embryo and Placenta of the Fourth Month of Gestation occupying the Right Broad Ligament.

orrhages, and will be referred to again as one of the possible indications for operation in the treatment of an extraperitoneal rupture.

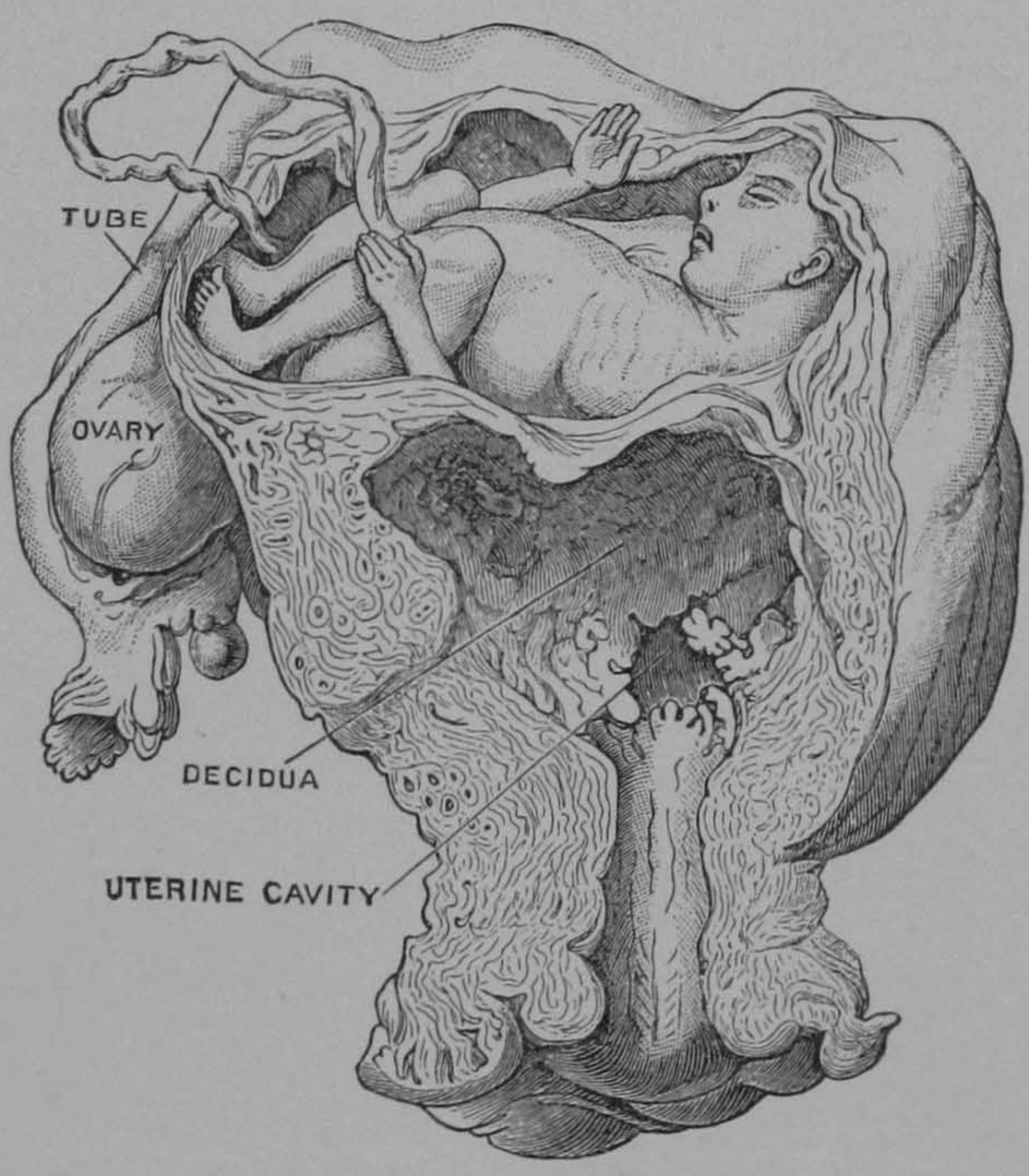
The second result, escape of the fetus with continuance of its life, is of great interest anatomically, as it explains the majority of the cases in which a fetus has been found free among the intestines, and has given rise to the erroneous impression of primary abdominal pregnancy.

We believe that by far the most usual place for the growth of an ectopic fetus escaped from the tube is between the folds of the broad ligament. Webster (*Tubo-peritoneal Ectopic Gestation*) has demonstrated the possibility of such a growth where the fetus gradually escaped from the tube directly into the peritoneal cavity and there

developed. This, however, must be only a very rare exception to the rule that *full-term ectopic fetuses are extra-peritoneal.*

Tubal Abortion.—By this term is meant an expulsion of the ovum from the fimbriated extremity of the tube at any time before its occlusion. As this occlusion usually takes place before eight weeks, tubal abortion is considered possible only during the first two months. This event is likely to occur only when the ovum is implanted in the outer third of the tube. Our knowledge of tubal abortion enables us to understand many cases of effusion of blood into the peritoneal cavity in which we find at operation or autopsy a tube empty, but with a collapsed appearance, as though it had been previously distended; and the true nature of the case is often placed beyond doubt by finding among the blood-clots either a

FIG. 292.



Tubo-uterine Pregnancy.

fetus, fetal membranes, or a firmly-clotted mass, in the interior of which microscopical examination discloses chorionic villi.

Tubo-uterine or Interstitial Pregnancy.—This variety of ectopic gestation includes those cases in which the impregnated ovum is lodged and develops in that portion of the tube which is embraced by the uterine wall.

In its life-history this condition differs from the other varieties of ectopic gestation in the following particulars:

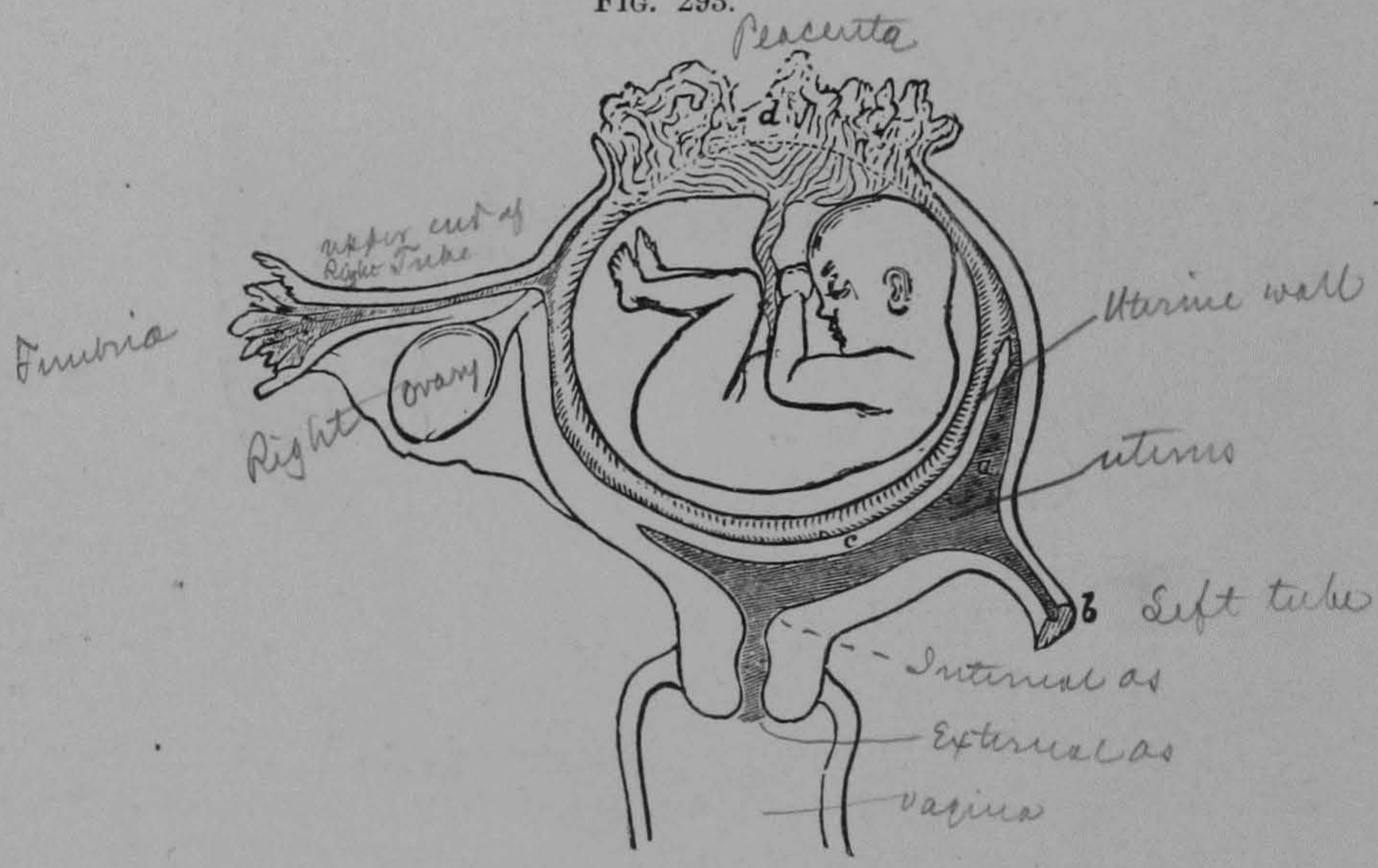
(*a*). Period of growth before rupture;

(*b*). Direction of rupture.

Situated as it is within the substance of the uterine wall, rupture of the sac would not be expected to occur at as early a period as in the varieties called tubal proper and tubo-ovarian, and this is borne out in the histories of reported cases. The wall of the gestation-sac, instead of rapidly thinning, as occurs when the ovum is lodged elsewhere in the tube, markedly thickens, resembling the uterine wall in normal pregnancy, and rupture frequently does not occur until the end of the fourth month.

Direction of Rupture.—An interstitial pregnancy may rupture in either one of two directions: 1. Into the abdominal cavity. (See Fig. 293.) In this case the hemorrhage, without operative interference, is profuse and rapidly fatal on account of the thickness and vascularity of the wall.

FIG. 293.



Diagrammatic Representation of Interstitial Tubal Pregnancy at the Time of Rupture.

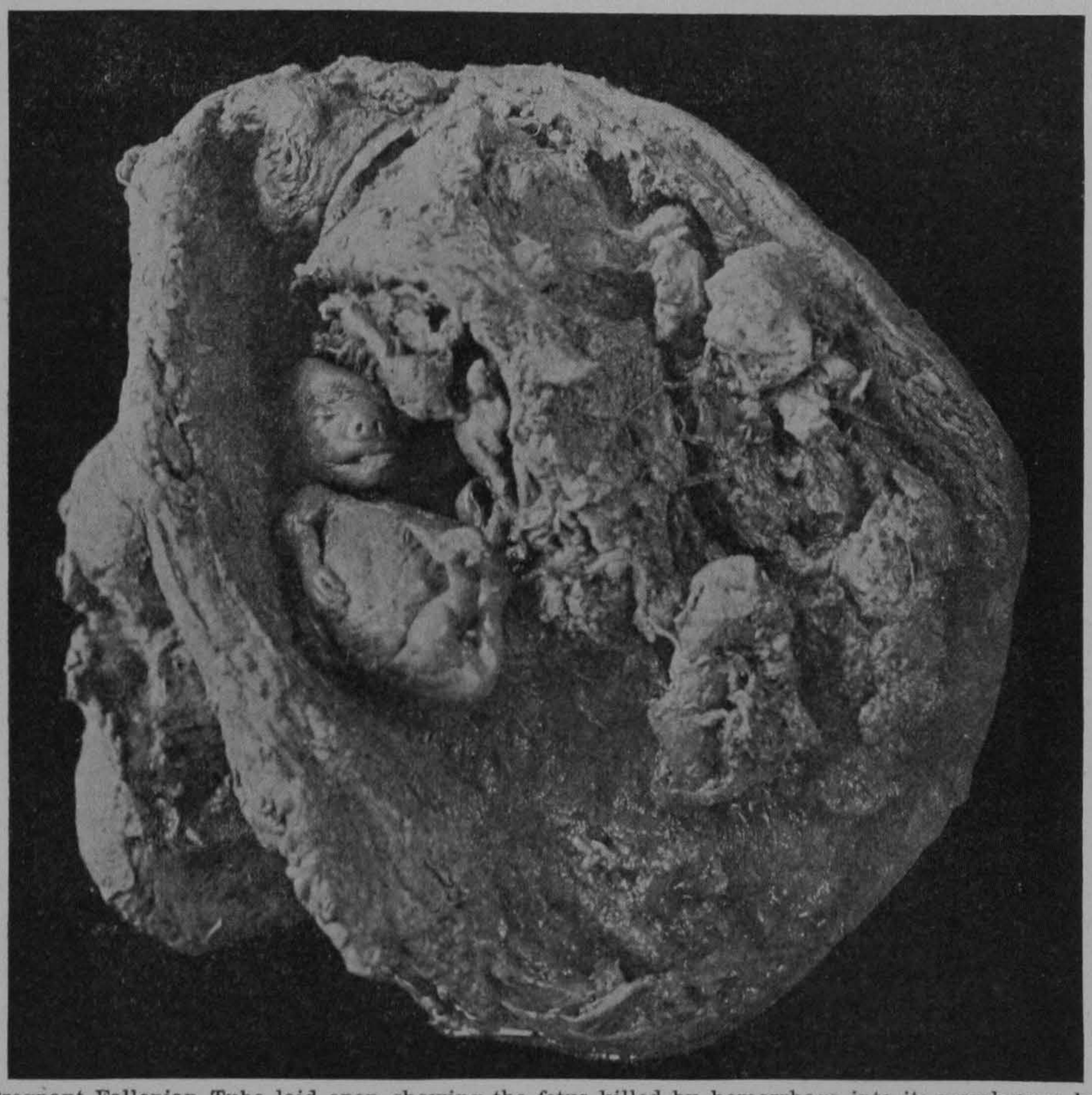
2. Into the cavity of the uterus. Such an event is considered possible, but, as it would be almost impossible to positively diagnose the condition from normal intra-uterine pregnancy, this direction of rupture we must regard as still *sub judice.*

Cases of interstitial pregnancy are, as a rule, only diagnosed during life at operation necessitated by an intra-peritoneal hemor-

rhage, the pregnancy up to the time of rupture being considered normal.

Period of Tubal Rupture.—When the ectopic gestation is either of the tubal proper or tubo-ovarian variety, the rupture usually occurs some time between the third and the twelfth week, more often near the eighth. In the interstitial variety rupture may occur at any time between the third and the twentieth week, more often in the

FIG. 294.



Pregnant Fallopian Tube laid open, showing the fetus killed by hemorrhage into its membranes, but without the escape of the fetus from the tube.

fourth month. In tubal abortion, as previously stated, the ovum may escape from the tube at any time prior to the occlusion of the fimbriated extremity which occurs at the eighth week.

The isthmus of the tube, that straight narrow portion just outside the uterus, seems little adapted to distension with the growth of the ovum, and in our experience rupture of the gestation-sac has

occurred at an earlier period here than when situated in the ampulla of the tube. In a general way, then, we might say that an early escape from the tube is more likely to mean rupture of a sac situated in the isthmus, or a tubal abortion, than a rupture of the ampulla.

Changes in the Ovum.—Notwithstanding the implantation of the ovum upon foreign soil, the fetal portions of the placenta are developed much as they would be in the cavity of the uterus; it is only the maternal portion which is lacking, but this causes insecure attachment of the chorion, and, as the fetus develops, a rupture of some of the tubo-chorionic vessels easily occurs. This usually causes the death of the fetus, with or without its escape from the tube.

So long as fetal life continues, the growth and development of the ovum seem fairly normal. When death of the fetus occurs early, however, with hemorrhage into its membranes, a condition is formed so resembling a uterine mole that it has been called "tubal mole" or "apoplectic ovum."

FIG. 295.

Apoplectic Ovum, or Tubal Mole (natural size).

The hemorrhage separates the ovum from the tubal wall, coagulates in the meshes of the chorion, causes contraction of the fetal sac by compression, and forms a mass, resembling a dark-red blood-clot. This may be found in the tube, or, if the hemorrhage causes the death of the ovum at the same time it causes tubal rupture or abortion, the tubal mole may be found among a mass of blood-clots, either in the peritoneal cavity or between the folds of the broad ligament. This tubal mole may at first be mistaken for a simple blood-clot, but on section one can often find an amniotic cavity, as in Fig. 295, with or without a fetus; or, if neither amnion nor fetus is discernible, a microscopic section will usually disclose chorionic villi.

As previously stated, the death of the fetus usually occurs at the time of its expulsion from the tube. Rarely, however, fetal life continues, and may even reach full term. After its expulsion from the tube the following changes may take place in the ovum or fetus:

1. When the death of the ovum occurs early, forming a tubal mole, this may be absorbed by the tissues in which it is lodged, be it peritoneum or connective tissue. Rarely suppuration in it may occur, perhaps from the proximity of the rectum.

2. When death of the fetus occurs after it has reached a considerable degree of development and its bony framework is well formed, it may for a long time remain quiescent, the liquor amnii being gradually absorbed. Subsequently it may mummify from absorption of the fluids of the fetal tissues; it may calcify, forming a lithopedion, may be changed into adipocere, or the soft parts may suppurate and the fetal débris be discharged into the rectum, vagina, bladder, or through the abdominal wall.

SYMPTOMS.—The symptoms of a patient, afflicted with ectopic gestation, are of great importance, for by these symptoms, coupled with a careful study of the history of the patient, the diagnosis is usually made.

In almost every case there has been some departure from the normal menstruation. Usually the patient has gone over her monthly period for a longer or shorter time, it may be only a few days or may be several weeks. Occasionally, however, no period has been skipped, but there has been some change in the character of the last menstruation; usually a lessening in amount. Not infrequently, instead of the menstruation coming on in the usual way, there is at first only a splash, just enough to stain the clothes, then an irregular dribbling, followed by a more or less irregular, continuous brownish discharge containing débris. The early symptoms of pregnancy are often present, such as morning nausea, sensitive breasts, etc. The patient often believes herself pregnant, and this is of assistance in diagnosis.

The next symptom which may surprise the patient is a sudden attack of very severe, sharp pain on one side of the abdomen: this pain is usually excruciating, causing the patient to feel faint, grow pale, and perhaps lose consciousness; she is often covered with cold perspiration; she not infrequently vomits; the pulse becomes rapid and the temperature subnormal. Usually about this time metror-

rhagia appears, and may continue several weeks, being due to the separation of the uterine decidua. As shreds are usually passed from the uterus, the patient often believes she has had a miscarriage and that her troubles will soon be at an end. Following this attack of pain, symptoms of pelvic peritonitis often present themselves. They may subside and the patient be up and around, when she is suddenly seized with another attack of sharp pain, syncope, etc., perhaps even worse than the preceding.

Careful inquiry into the history of these cases often elicits the fact that the patients have been sterile for a longer or shorter period; to this, however, there are many exceptions. To recapitulate, we would call attention to the following symptoms:

(*a*) Amenorrhea;
(*b*) Symptoms of pregnancy;
(*c*) Sudden sharp pain with syncope;
(*d*) Metrorrhagia;
(*e*) Often a history of previous sterility.

PHYSICAL SIGNS.—If examined prior to rupture, one simply feels a distended tube, perhaps a little more boggy and vascular than a hydro- or pyosalpinx of a corresponding size. There is the same elongated, sausage-shaped mass, extending from the cornu of the uterus laterally or downward and backward, which one feels in a salpingitis. The uterus is enlarged; the cervix is soft and patulous.

If seen at the time of, or soon after, a primary intra-peritoneal rupture, the physical signs are often very meagre. There is usually no distinct tumor, and one can only get the sensation of fluid blood or an indistinct doughy feel in the pelvis and the constitutional symptoms of internal hemorrhage.

When the rupture has occurred between the folds of the broad ligament, one gets all the physical signs of a pelvic hematoma.

Let us now digress a little and consider the conditions *pelvic hematocele* and *pelvic hematoma*. By pelvic hematocele we mean an effusion of blood into the peritoneal cavity. This would naturally gravitate into the pouch of Douglas should this not be obliterated, or, if profuse, the blood may rarely flow over into the utero-vesical pouch as well. Coagulation, although longer delayed than in blood effused into connective tissue, finally occurs, and the blood-mass is roofed in by peritonitic exudate binding together adjacent structures—coils of intestine, omentum, and uterus.

ETIOLOGY.—Concerning the etiology of pelvic hematocele our ideas have changed greatly within the past few years. While formerly the text-books contained long lists of causes of this condition, operative experience has taught us that in nearly all cases we can assign but one cause—viz. ectopic gestation; and, as the source of the blood, the tube, either from rupture or from tubal abortion. To this general rule we admit exceptions. We know that after the enucleation of diseased tubes and ovaries, or tumors of the same, an oozing surface is left which often gives rise to quite a large effusion of blood; here, however, the cause is plain, and would not produce confusion. We also admit the possibility, from a slight traumatism, of rupture of peritonitic adhesions, some of which are markedly vascular, and would cause a considerable blood-effusion. Other possible causes are rupture of an ovarian hematoma or excessive hemorrhage from the rupture of a Graafian follicle. These events, however, would only rarely occur, and may be considered as exceptions to the general rule stated above. Most of the cases of regurgitation of blood from the tube we believe to be instances of tubal abortion.

Physical Signs.—Previous to the encapsulation of the blood-effusion the physical signs are very few. There is a fulness in the pouch of Douglas which gives to the finger the impression of thick fluid, and from the floating up of the intestines there is usually more or less distension of the abdomen. When the effusion becomes encapsulated by peritonitic adhesions, the mass becomes firmer to the touch, the posterior fornix bulges, and the uterus is pushed forward. As the blood coagulates, the increase in the density of the effusion becomes apparent to the examining finger. The course and prognosis of pelvic hematocele are usually similar to ectopic gestation with intra-peritoneal rupture, and will be discussed later.

By *pelvic hematoma* we mean an effusion of blood into the connective tissue beneath the peritoneum—viz. between the folds of the broad ligament. Here, again, although other causes are probably more common than in a pelvic hematocele, a very common cause is the rupture of an ectopic gestation-sac. The reason for considering other causes more frequent than in hematocele lies in the fact that varix of the broad ligament, due to various causes of venous congestion, is common, and where such is present, but a slight traumatism is required to produce a blood-effusion.

Physical Signs.—These differ from those of a pelvic hematocele.

While in the latter there is at first no limiting membrane, in the former the effusion is clearly limited by the folds of peritoneum forming the broad ligament, and a distinct tumor is developed. This tumor bulges down on one side of, and behind, the cervix, pushes the uterus forward and to the opposite side, and can be felt above Poupart's ligament when it has lifted the peritoneum from the pelvis. It seems to occupy all the space between the uterus and the sides of the pelvis, and if the finger is inserted into the rectum, the effusion, especially if situated on the left side, is found to have surrounded it, thus producing a stricture. This is due to the ring formed by the attachment of the peritoneum to the second portion of the rectum.

Concerning the changes in a pelvic hematoma, two are possible:

1. Absorption. This is possible even when the tumor is of quite a considerable size;

2. Suppuration. This seems frequently due to the proximity of the rectum, or if the hematoma is due to a ruptured tube, infection may come from the uterus through the stump of the lacerated tube. The suppurating hematoma may rupture into the rectum, vagina, bladder, or rarely above the pelvic brim.

Diagnosis of Ectopic Gestation.—For a clearer discussion, this may be divided into two periods:

1. Prior to tubal rupture or abortion;
2. Subsequent to tubal rupture or abortion.

Few opportunities are presented for diagnosing ectopic gestation during the ante-rupture period. Unfortunately for the diagnosis, the patients during this period are apt to suffer but little. A large proportion of the cases have absolutely no symptoms leading them to suspect an abnormal condition. Occasionally, however, perhaps from surprise at the symptoms of pregnancy after a long period of sterility, or in their first pregnancy, in order to determine if that condition really exists, or from pain in one inguinal region, they present themselves to the physician, and under these circumstances the diagnosis has been made a number of times and its correctness verified by subsequent operation.

To enable one to make a diagnosis of ectopic gestation prior to rupture we would emphasize two rules, which we consider of great importance:

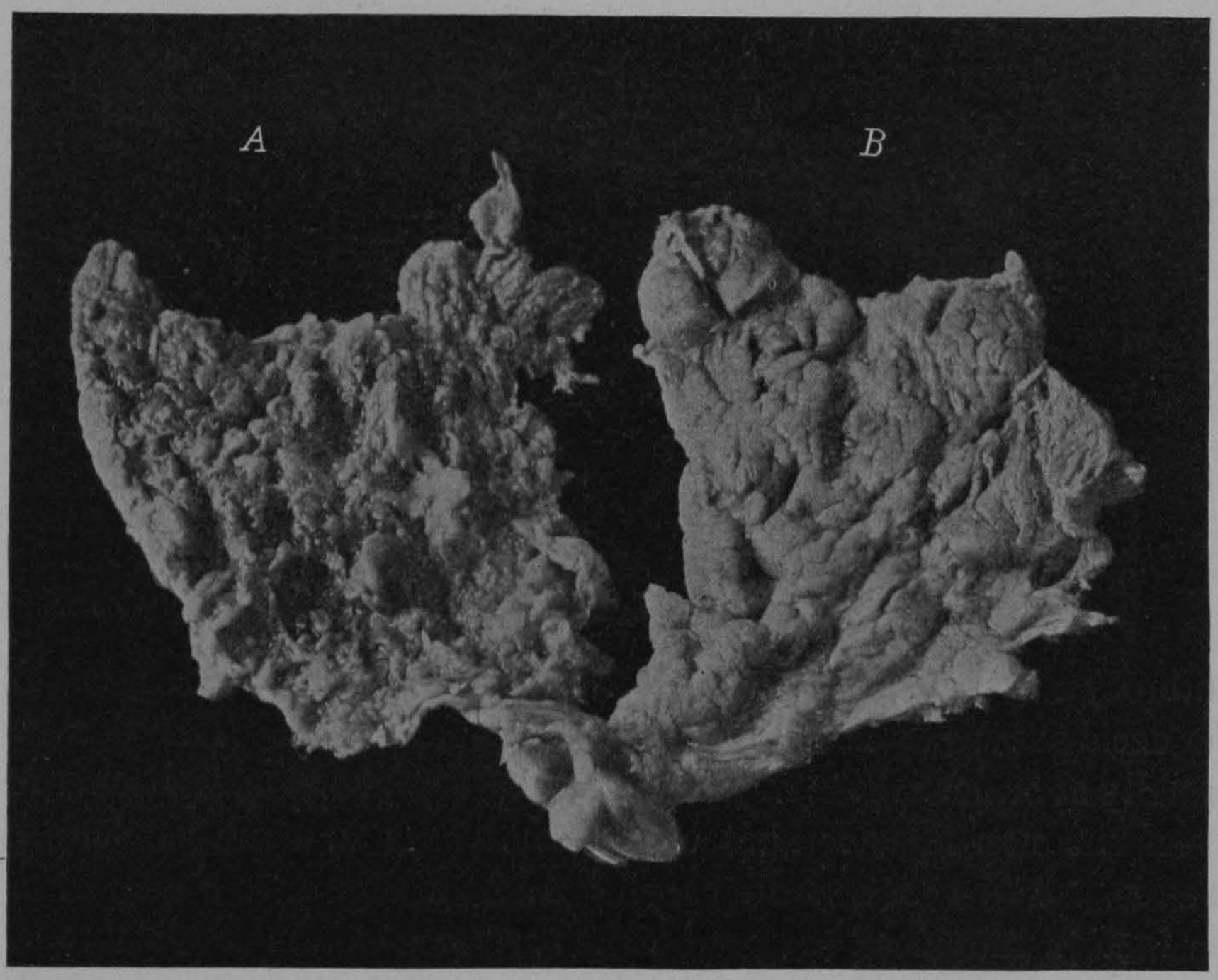
1. Whenever a pregnant woman presents herself with a mass at

the side of or behind the uterus, always think of the possibility of ectopic gestation.

2. Whenever any irregular symptoms of pregnancy occur, the menstrual history should always carefully be inquired into, noting any change in its character, the exact duration in days, and its relative amount during each of the months which are open to suspicion.

The reason that so many more diagnoses of ectopic gestation are now made than formerly, and made correctly, lies in the fact that we are now on the watch for that condition. We need frequently to ask ourselves: Can this be ectopic gestation? This is especially

FIG. 296.

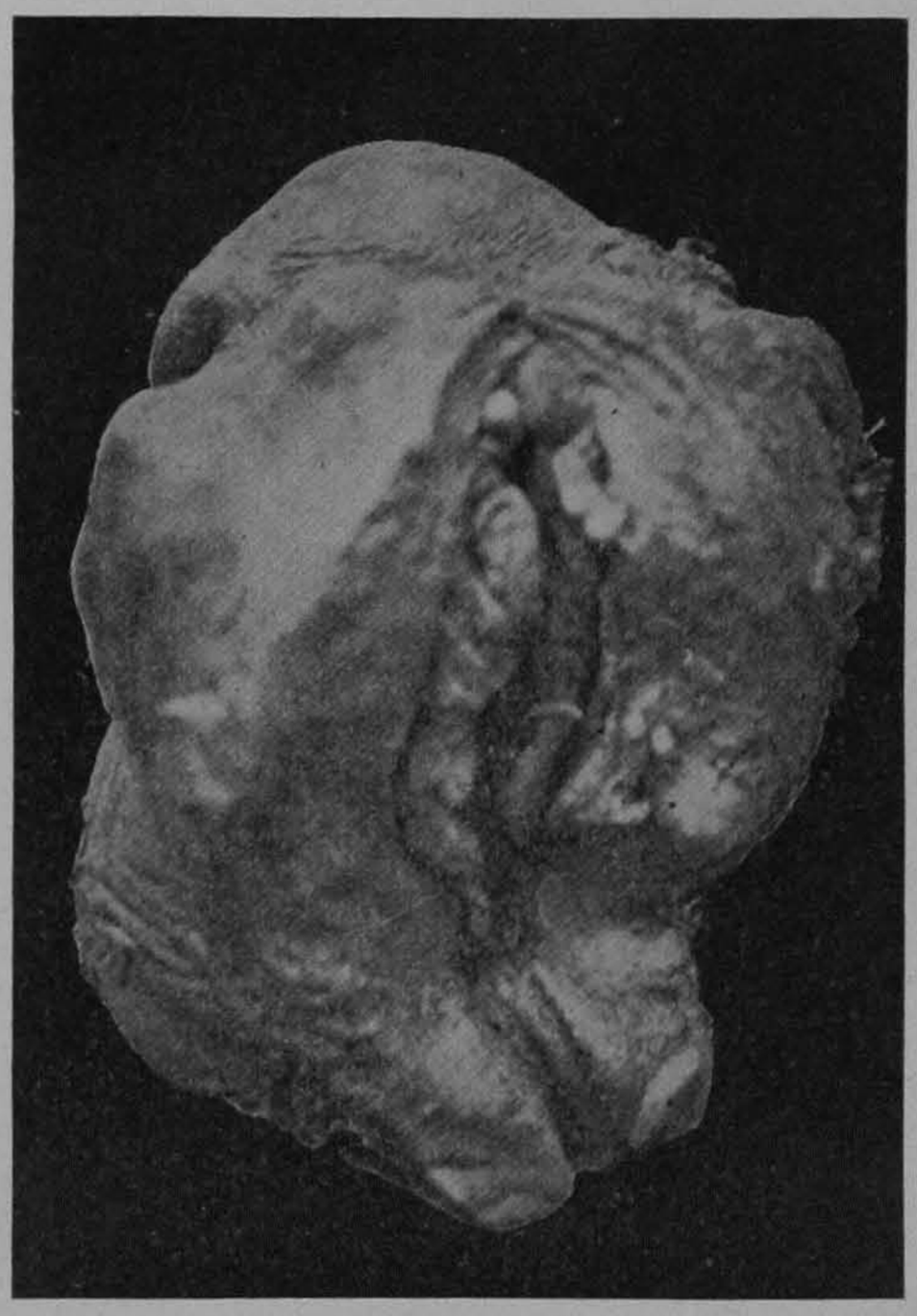


Decidua expelled from the Uterus in a case of Ectopic Gestation: *A*, rotated, so as to show the shaggy uterine side; *B* shows the free surface.

imperative when we meet with the early symptoms of pregnancy—nausea, sensitive breasts, softened cervix, etc., with a distended tube at the side of the uterus. This may be a hydro- or pyosalpinx simply coexisting with pregnancy. On the other hand, however, its boggy feel, a rather marked vascularity, and a careful observance of the second rule stated above concerning menstrual history may lead us to make a probable, if not a positive, diagnosis of ectopic gestation.

Another factor in the diagnosis of this condition is the expulsion of the uterine decidua. While the ovum is developing in the tube there is forming in the uterus a decidua, resembling that of a normal pregnancy, but differing from it in having a smooth, inner surface,

FIG. 297.



Decidua in Situ: fibroid uterus removed at time of operation for ruptured ectopic gestation.

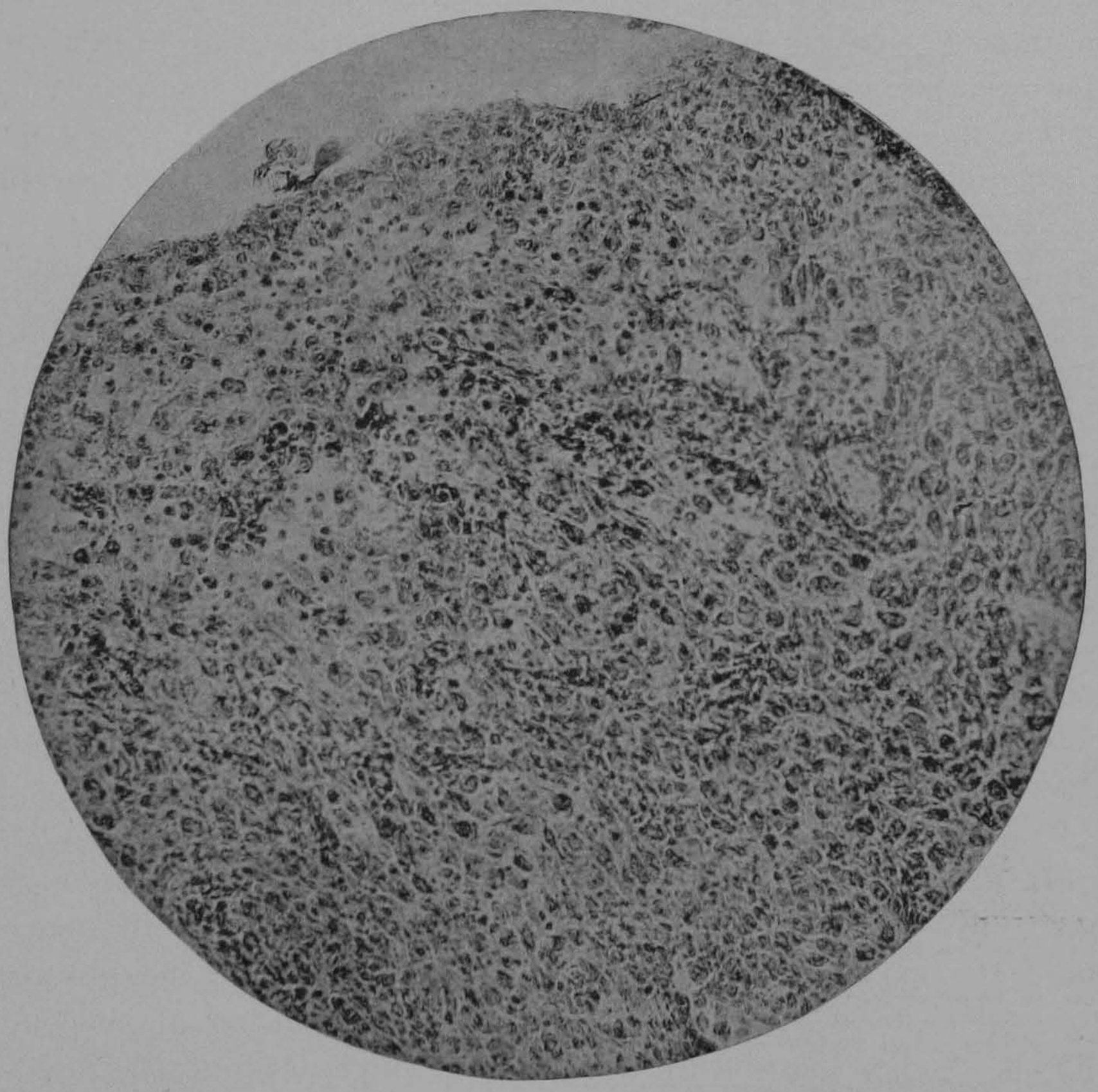
unbroken by the attachment of the ovum; in other words, having no decidua reflexa or serotina; it is all decidua vera. This decidua, usually at or near the time of tubal rupture or abortion, is discharged from the uterus, sometimes entire, sometimes in small particles or shreds. It is a membrane varying from an eighth to a quarter of an inch in thickness, shaggy on the surface which is attached to the uterine wall, smooth, but presenting numerous fine wrinkles, on the inner free surface. On microscopical section it presents the appearance shown in the accompanying cut (Fig. 298). When passed entire it forms a triangular sac containing three openings, one corresponding to each Fallopian tube and one to the internal os. With the separation and discharge of this decidua there occurs a metrorrhagia which may continue for several weeks. The passage of these shreds with the subsequent metrorrhagia is often a source of error both to the patient and her physician, and a miscarriage is frequently the source of an erroneous diagnosis.

There are two conditions from which the decidua from a case of ectopic gestation must be differentiated:

1. The decidua of an intra-uterine pregnancy;
2. The membrane of a membranous dysmenorrhea.

The decidua in an early miscarriage may resemble in places that

FIG. 298.



Photomicrograph of a Section of Decidua in a Case of Ectopic Gestation, showing the large decidual cells.

of an ectopic gestation, but in the former there is found evidence of implantation of the chorion, villi, etc. which is wanting in the latter.

The condition called membranous dysmenorrhea is surrounded with much confusion. It is perfectly possible, in the light of recent experience, that some of the cases described as membranous dysmenorrhea were in reality cases of ectopic gestation. The points on which we would lay the greatest stress in differentiating the dys-

menorrhea from the ectopic gestation would be the frequent recurrent character of the former at the time of a menstrual period and the absence of the symptoms of pregnancy. According to Wyder and Ayers, the dysmenorrheal membrane does not contain the large cells seen in Fig. 298.

The diagnosis of ectopic gestation has occasionally been made by curetting a uterus for supposed retained secundines, under the impression that the patient had had a miscarriage, and finding the uterus empty save for the decidua, which showed no chorionic villi.

Diagnosis at the Time of, and Subsequent to, Tubal Rupture or Abortion.—This is usually not difficult if a careful history is obtained, and this is considered in conjunction with the present condition of the patient. If seen at the time of tubal rupture or abortion, we find, coupled with the history of the patient during the ante-rupture period, the symptoms of sudden shock and internal hemorrhage. The patient is suddenly seized with a sharp, excruciating pain, usually on one side of the abdomen. She feels faint, grows pale, perhaps loses consciousness; the surface of the body is often covered with cold perspiration; the pulse is rapid and feeble; the temperature is often subnormal. These symptoms, especially if there has been a period of amenorrhea, should always suggest a ruptured ectopic gestation-sac. If the patient survives this primary rupture—and she frequently does—the symptoms abate, perhaps to be repeated at almost any instant, with or without a fatal result.

If seen subsequent to the time of tubal rupture or abortion, we have, in addition to the history of early pregnancy, with one or more attacks of sharp pain and threatened collapse, the physical signs of either a pelvic hematocele or a pelvic hematoma, depending on whether the rupture was intra- or extra-peritoneal.

Differential Diagnosis.—The condition most likely to be confused with an ectopic gestation is probably a tube distended with either serum or pus, especially the latter. The physical signs of the two conditions prior to rupture often closely resemble each other, and, just as the rupture of an ectopic gestation-sac is followed by symptoms of shock and then peritonitis, so may the rupture or leakage of a pus-tube be followed by similar symptoms. The chief point in their differentiation is the difference in their clinical history. Here comes in the necessity for eliciting, if present, the symptoms of a possible early pregnancy. During the ante-

rupture period, as already stated, the greater vascularity and boggy feel of a pregnant tube may enable one to differentiate it from a pyosalpinx.

Subsequent to the rupture the symptoms of the two conditions differ more widely:

Ruptured Ectopic Gestation	*vs.*	*Ruptured Pyosalpinx.*
Frequency of pulse greater.		Frequency of pulse less.
Temperature at first subnormal; later rises slightly.		Temperature rises steadily and markedly.
Pain of shorter duration.		Pain of longer duration.
Patient shows loss of blood.		Patient does not show loss of blood.
Septic symptoms not usually present.		Patient soon shows signs of sepsis.

A fibro-myoma is sometimes confused with an ectopic gestation, and instances occur where the differential diagnosis is difficult. The means on which we rely are chiefly the difference in the history of the two cases: In the case of ectopic gestation the short history, first of amenorrhea, then attacks of sudden sharp pain, faintness, and metrorrhagia; in the case of the fibro-myoma a long history of gradually increased menstruation, and perhaps gradually increased pressure-symptoms, without the symptoms of early pregnancy.

In physical signs the fibro-myoma is usually much more intimately connected with the uterus and harder than the ectopic gestation. Both conditions may coexist, as in the case from which the specimen (Fig. 297) was taken.

Into the differentiation between pelvic hematocele and pelvic hematoma due to ectopic gestation and those due to other causes, we shall not enter, believing our present knowledge insufficient for the task, and that most cases of pelvic hematocele and hematoma, especially the former, are due to the rupture of an ectopic gestation-sac. We believe, however, that in the present state of our knowledge we should not declare to be due to an ectopic gestation an effusion of blood in the pelvis, found at operation or autopsy, unless we find either a fetus or chorionic villi, or unless we have obtained from the uterus a decidua, devoid of chorionic villi.

The appearance of the chorionic villi, as seen in section under the high powers of a microscope, is well shown in Fig. 299. The central portion of the villus is seen to be composed of irregular-shaped cells, while the outer wall consists of a single or double row of cubical epithelium. Sometimes several villi may be seen in a single field, but not infrequently a large number of sections have to be cut and examined before a single villus can be found.

The differences in the physical signs of pelvic hematocele and pelvic hematoma have already been given, and we will here only refer to them.

Tumors of the ovary are sometimes confused with ectopic gestation, but a careful study of the menstrual history and a search for

FIG. 299.

Photomicrograph of Chorionic Villi, found in the tube of a case of ectopic gestation.

the physical signs of pregnancy will usually enable one to arrive at a correct diagnosis. Mistakes, however, in diagnosing ectopic gestation are bound to occur, even with the most careful, from the fact that the condition is sometimes found at operation, when not a period has been missed, and not a symptom of pregnancy has been presented.

TREATMENT.—In considering this division of our subject we would recognize two periods, requiring separate discussion:

1. Prior to tubal rupture or abortion;
2. Subsequent to rupture:
   (*a*) Intraperitoneal.
   (*b*) Extraperitoneal.

When the diagnosis of an ectopic gestation is made prior to the rupture of the tube, the question which must present itself to every conscientious gynecologist is: How can we best subserve the interests of our patient? The advocates of electricity claim that by the current, either galvanic or faradic, the fetus is killed and the products of conception are absorbed. Admitting this as a possibility, we still believe that we are not consulting the best interests of our patient by so doing.

In spite of the unfortunate case of Matthews Duncan, referred to in nearly every work on this subject, in which high currents, both galvanic and faradic, were used without killing the fetus, we believe that in many cases, when seen early, electricity will kill the fetus, but that the danger to the patient disappears with the life of the fetus we cannot believe. Even after the death of the fetus, hemorrhage into the tube sufficient to cause its rupture or tubal abortion, although it may not occur in every case, is still far from improbable.

Further than this, while waiting for a cure by electricity or in the manipulation incident to its application, tubal rupture or abortion, with fatal hemorrhage, may occur before the surgeon has time to open the abdomen and remove the sac. A forcible illustration of this was the case illustrated by Fig. 300. The patient was moved from the bed to the table for the application of electricity. In so doing the tube ruptured, and before the surgeon could be obtained and the abdomen opened the patient was moribund from internal hemorrhage.

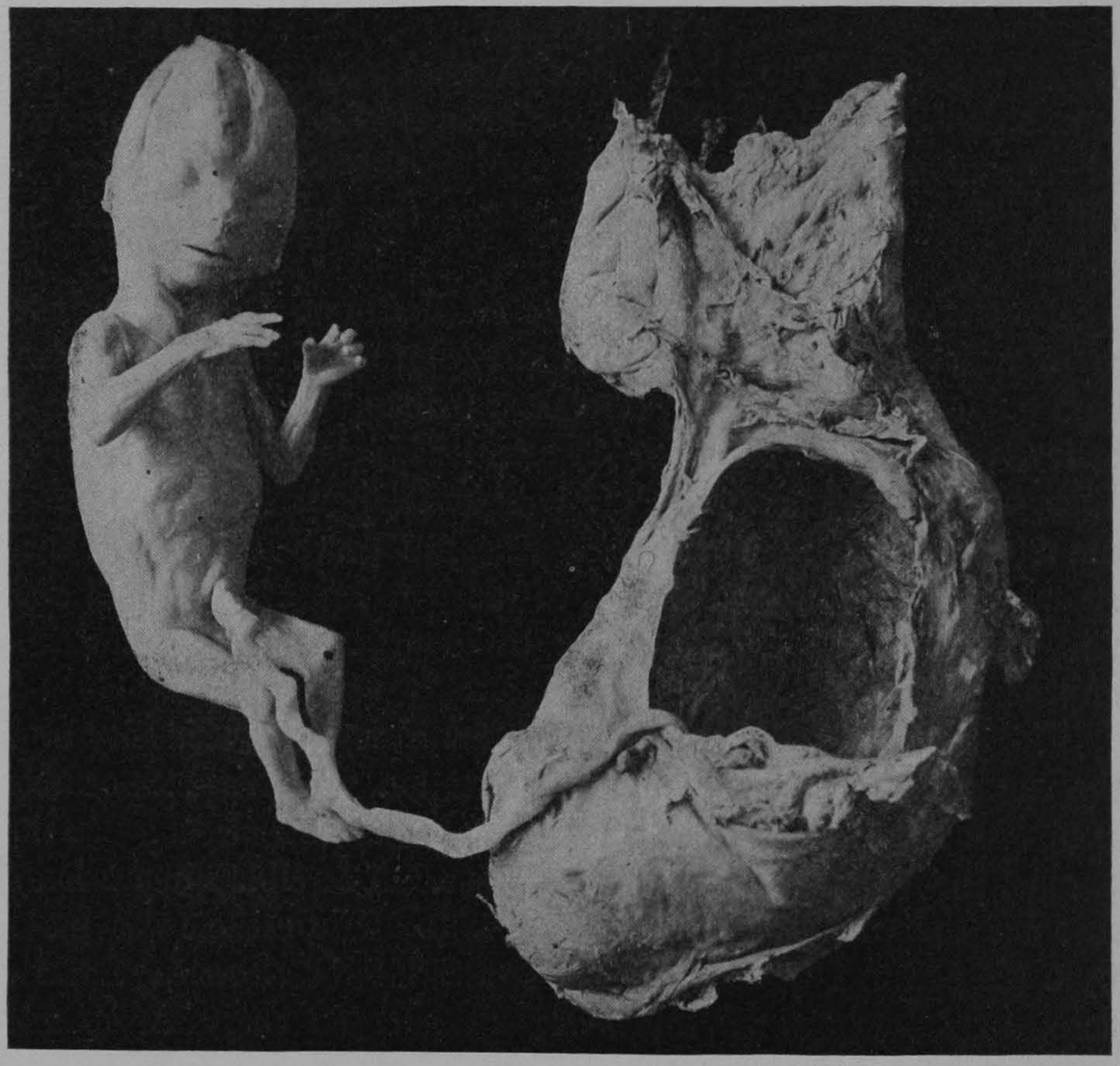
Even if the fetus and membranes are absorbed under the use of electricity, a damaged tube is left, which is very likely to prove a source of future trouble.

For these reasons we claim that electricity is not a satisfactory method of treating this condition. Galvano-puncture of the sac is dangerous, and ought never to be used. We believe that the method which gives the best promise of deliverance, not only from present danger, but from future trouble, is removal of the pregnant tube.

We admit the possibility of a tubal rupture or abortion with only

a slight hemorrhage, the absorption of the effusion, and the recovery of the patient. This is a possibility, but no one can tell when this is to be the result, or when a rupture is to occur with hemorrhage so profuse as to be fatal within a few hours without operative interfer-

FIG. 300.



Tubal Rupture in Case of Ectopic Gestation.

ence. From the time an impregnation occurs in a Fallopian tube until the tube is removed, that patient is never free from danger.

Moreover, during the period prior to the rupture of the tube the operation for the removal of the gestation-sac is one of the simplest in abdominal surgery, and in the hands of a skilled operator should have a mortality nearly *nil.*

Let us next consider the treatment at the time of, and subsequent to, tubal rupture or abortion. Here, again, we must consider two classes of cases depending on whether the rupture is *intraperitoneal* or *extraperitoneal.* If *intraperitoneal* rupture has occurred, most

electro-therapeutists agree that the time for their method of treatment has passed, and it is the consensus of opinion that there is now but one proper treatment—viz. cœliotomy and removal of the lacerated tubal sac. We do not mean to say that every case is fatal at its first hemorrhage. Many cases prove the contrary, and in the hands of careful observers it may be good practice, *if the patient is improving in pulse*, to wait till she has rallied from the shock of the initial hemorrhage before operating. The safest rule, however, is to *prepare at once* for operation.

Just a word as to the method of procedure. Strict asepsis is a matter of great importance. The gestation-products and the effused blood at the time of or soon after rupture may be considered aseptic; at the same time they form a medium very easy to infect.

On making the incision in the median line down to the peritoneum the latter is often found tense and dark, and at the first nick of the peritoneum fluid blood may well up in great abundance. No attention must now be paid to the blood already in the peritoneal cavity, but the source of the hemorrhage, the lacerated tubal sac, is to be seized at once, ligated, and removed. Not infrequently it may be advisable to remove the opposite appendage and the uterus at the same time. The manipulations necessary for the removal are the same as those described in the article on Pelvic Inflammation. The same structures are dealt with, and, as a rule, the tubal pregnancy is complicated by adhesions, just as is the case in pus-tubes. We now have time to remove the blood-clots and products of conception, which are probably free in the abdominal cavity. Large clots and masses are removed by the hand; the remainder may either be floated out with the irrigating fluid, boiled water (preferably containing a half-teaspoonful of common salt to the pint), or, what is often sufficient, the blood may simply be removed by sponging. Too much time must not be spent in attempting to remove every blood-clot. Let the pelvis be sponged and the abdomen closed. Unless infection has occurred or oozing from vascular adhesions is pronounced, drainage is unnecessary.

If the patient has lost a large amount of blood and the pulse is very feeble, some of the irrigating saline fluid may with advantage be left in the abdomen; also a saline enema containing stimulants may be administered. The question of infusion may have to be decided.

Extra-peritoneal Rupture.—If this event has occurred, as deter-

mined by the physical signs given under Pelvic Hematoma—viz. the circumscribed tumor, the lateral fixed position, stricture of the rectum, etc.—the treatment is usually *non-operative*. The patient should be kept quiet in bed and cold in the form of ice-bags applied to the abdomen, while the progress of the case is carefully watched.

In the majority of cases the pelvic hematoma thus formed will gradually be absorbed. There are, however, three possible indications for a future operation:

1. If the hematoma suppurates;
2. If repeated hemorrhages occur into the sac;
3. If fetal life continues.

Occasionally, through infection from the rectum or from the uterus through the stump of the lacerated tube, suppuration of the hematoma occurs: it is then to be incised through the vagina, washed out, and thoroughly drained. If repeated hemorrhages are added to this hematoma, two courses are open, according to the size of the tumor. If comparatively small and situated low in the pelvis, it may be incised through the vagina, the clots and débris removed, and the cavity drained. If large and extending high in the pelvis, cœliotomy is probably the better operation. The broad ligament is incised and the blood-clots and products of conception are removed. If the contents of the sac appear aseptic, the sac may be sponged out and then closed.

If for any reason the contents of the sac seem open to the suspicion of sepsis, the sac had better be stitched to the lower portion of the abdominal wound and drained. A vaginal opening into the sac, where practicable, will favor drainage and shorten convalescence.

Fetal Life Continuing.—In the rare condition where fetal life survives the tubal rupture new problems present themselves. We have seen above that in almost all cases this only happens when the rupture is extra-peritoneal, between the folds of the broad ligament. From the time of tubal rupture until the ectopic fetus has reached the period of viability it is to be regarded as a foreign body endangering the life of the mother, and the indication for its removal is emphatic. After the fetus has reached a viable age its life has some claims upon the surgeon, but from the fact that ectopic fetuses, even if allowed to reach full term, are usually frail and few reach adult life, as well as for other obvious reasons, it must be borne in mind that the claims of the fetus are always secondary to those of the mother. After the seventh month, if the circumstances are such

that the mother can be carefully watched by one competent and prepared to operate promptly in case untoward symptoms present themselves, it may be justifiable to wait a few weeks and allow the fetus this additional time for growth and development. Each case, however, must be judged by itself. To wait until pseudo-labor has passed and the child is dead is neither scientific nor surgical.

Having prepared for operation, an incision is made well to one side of the median line, so as carefully to avoid opening the peritoneal cavity; the fetal sac is incised and the fetus is extracted. The chief point at issue in the whole treatment of a living ectopic fetus now presents itself: How shall we deal with the placenta? Whenever it is possible to ligate in advance the vessels supplying the fetal sac and the patient is in good condition, the best procedure is the complete removal of the sac and placenta even if the uterus has to be removed at the same time. When, however, the placenta lies in intimate vascular connection with all the important structures at the bottom of the pelvis, most operators are agreed that the safer method is to stitch the fetal sac into the abdominal incision, pack the sac with gauze, and wait until the placenta separates. The sac is then kept open and as clean as possible until it closes from the bottom. When the operation discloses the fact that the fetus has been dead for some time, the placenta is, as a rule, only loosely attached, and can be separated with very little danger of hemorrhage. In such cases the placenta is removed and oozing is controlled by gauze packing.

There is one other condition the treatment of which requires consideration—viz. interstitial pregnancy with intraperitoneal rupture. Although rare, this condition needs prompt surgical interference if the patient is to be saved. The treatment is abdominal hysterectomy.