

## CHAPTER X

# PELVIC INFLAMMATION

Pelvic inflammation is the term applied to inflammation in the pelvis outside the uterus. The inflammatory process may be located in the fallopian tubes, in which case it is called "salpingitis," or it may be in the ovary, in which case it is called "oophoritis," or in the peritoneum, where it is known as "pelvic peritonitis," or it may be in the connective tissue, where it constitutes "pelvic cellulitis." The cause of these various forms of inflammation is the same—viz., infection—the symptoms are much the same, the treatment is in many respects the same, and two or three of the lesions are usually associated—in some cases so intimately associated that it is difficult to determine which is predominant. Consequently, it is convenient to group these lesions due to pus bacteria under the general term, pelvic inflammation, which at once identifies the type of process affecting the patient.

The continuous opening by which infection travels from outside the body into the peritoneal cavity is shown in Fig. 862. This continuous cavity is a large factor in the greater frequency of pelvic peritonitis in women than in men. There are narrowings which tend to check the upward progress of infection, for example, the external os and internal os and the uterine openings of the tubes. The mucus-filled cervical canal acts in the adult as an effective barrier to the upward extension of pathogenic bacteria, except the gonococcus, and even the gonococcus may be delayed and sometimes stopped by the protective qualities of the undisturbed canal contents. However, instrumentation in the canal interferes with this protective function and favors upward progress of any infection present. Hence, instrumentation within the uterus should be carried out only when indicated by conditions warranting the risk, and then under strict aseptic precautions.

The clinical differences between the acute and chronic forms of pelvic inflammation are greater than between the separate lesions, which fact indicates the two main divisions of the subject.

### ACUTE PELVIC INFLAMMATION

The cause of acute pelvic inflammation is bacterial infection. The infection may be with the ordinary pus germs (staphylococcus and streptococcus) or with the gonococcus. Practically every case of primary acute pelvic inflammation in the adult can be traced to infection from **labor**, from **abortion**, from **instrumentation**, or from **gonorrhoea**. Secondary inflammation of the genital organs may be caused by extension from an inflammatory focus in some adjacent organ—e.g., the appendix or the bladder or from some general disease, particularly mumps or scarlet fever.

In a large proportion of the cases of pelvic inflammation, particularly the gonorrhoeal cases, the infection extends by way of the uterine mucosa to the fallopian tubes, as indicated in Fig. 863, and through the tubes to the peritoneum and other pelvic structures. In puerperal metritis (streptococccic or staphylococccic) the infection more often extends by way of the lymphatics directly through the wall of the uterus, from the endometrium to the connective tissue as shown in Fig. 864. Another avenue of entrance is through the

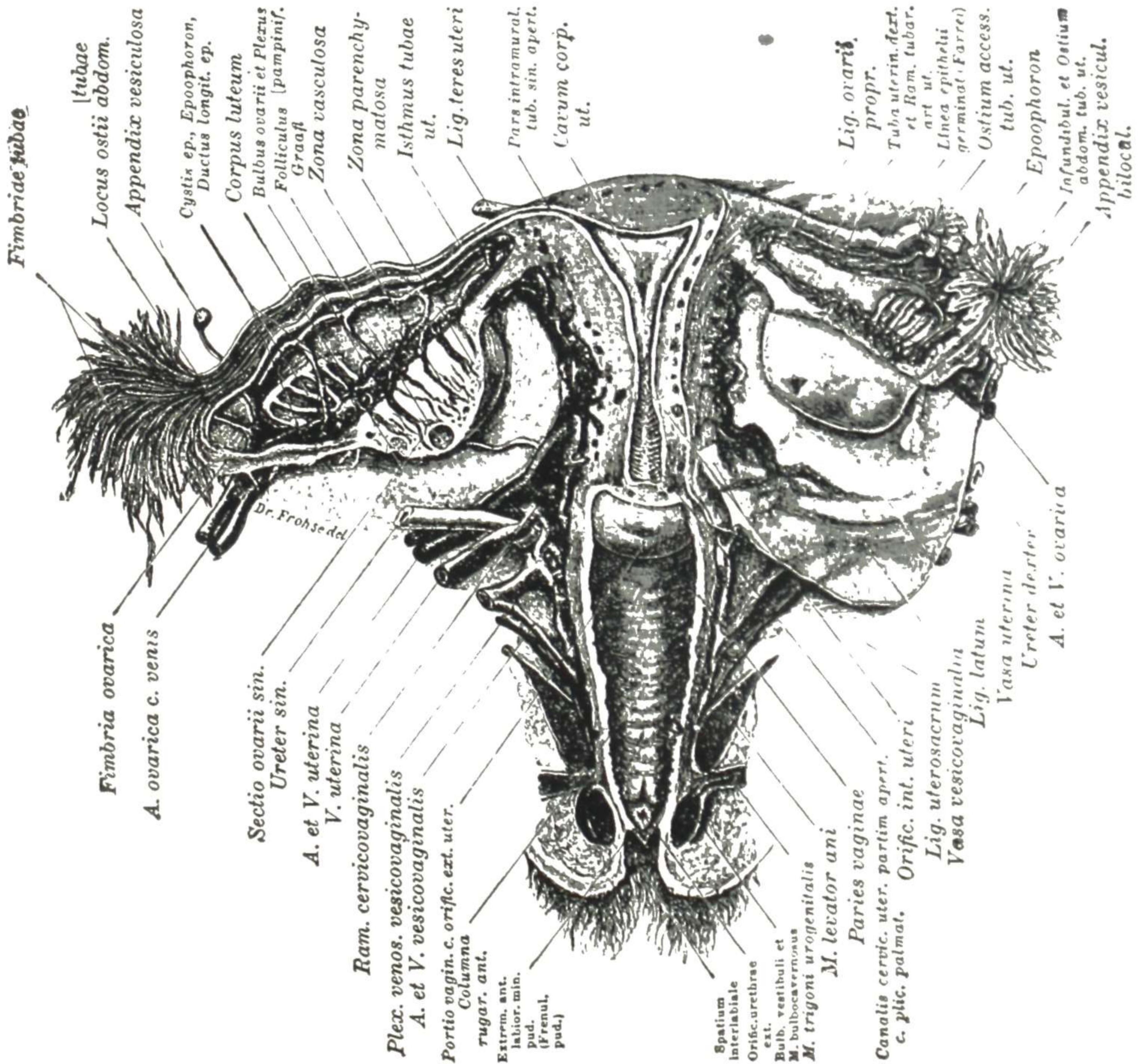


Fig. 862.—A diagrammatic section of the genital canal. Notice the continuous opening from the vulva through the vagina, uterus, and fallopian tubes to the peritoneal cavity. This is the reason genital infection extends to the peritoneal cavity so much more frequently in women than in men. (Waldeyer—*Das Becken.*)

thrombosed sinuses of the puerperal uterus. Infection of these sinuses leads to infective thrombosis of the broad ligament veins (Fig. 865), resulting in broad ligament abscess or general pyemia or both.

The fact that nearly every case of pelvic inflammation is due to an infected endometritis emphasizes the importance of checking endometritis at once when present, and of preventing it whenever possible.

### Types of Lesions

The pathologic changes are varied. There are hardly two cases exactly alike and the same case presents a very different picture at different periods. However, the cases may be divided somewhat into classes, as follows:

1. **Mild Salpingitis.**—The inflammation is very slight. There is some round-celled infiltration of the wall of the tube, with slight thickening and hardening, and a few fimbriae bound together. Both ends of the tube are open. This is the mildest form of pelvic inflammation, and, as a rule, gives rise to very few symptoms. A more severe type of the same class is that in which both ends of the tube are occluded, the fimbriae matted together, and the tube distorted and often adherent to the ovary or to some other structure. The wall of the tube is thickened, but the cavity contains no appreciable amount of fluid.

2. **Salpingitis with Exudate.**—In the cases of this class there is a large amount of exudate, binding together the tubes, ovaries, intestines, and uterus, but there is no distinct collection of pus.

3. **Pyosalpinx (Tubal Abscess).**—The tube is distended with pus and there are the usual evidences of inflammation within and without the tube, but no pus outside the tube. There may or may not be a large mass of exudate. In exceptional cases the infection may localize in the ovary instead of in the tube, causing an **ovarian abscess**. In still other cases the abscess cavity involves both the tube and the ovary, forming the **tuboovarian abscess**.

4. **Diffuse Suppuration in Pelvis.**—In this fourth class the pus itself has extended outside the tube, the fibrinous exudate always extending before it and shutting it off from the general peritoneal cavity. This may result simply in an abscess low in the pelvis, which can be easily reached and evacuated from below, or the inflammation may extend until all the pelvic organs are bound together in an irregular mass (Fig. 866), with pus lying in the spaces between them and burrowing into the connective tissue. In such a case there are present all the lesions of pelvic inflammation—salpingitis, oophoritis, peritonitis, and cellulitis.

5. **Acute Diffuse Peritonitis.**—In cases of this class the infection is so virulent and spreads so rapidly that but little limiting exudate is formed. The infection quickly involves the general peritoneal cavity and causes a fatal peritonitis. This is an unusual form of pelvic inflammation and is found principally in cases of severe sepsis following labor or abortion.

6. **Cellulitis** (Fig. 867) is largely a lymphangitis of the connective tissue about the uterus. It is due usually to the streptococcus, the staphylococcus or the colon bacillus—rarely, if ever, to the gonococcus alone. Cellulitis is favored by deep laceration of the cervix, which opens up the connective area beside the uterus. Pelvic cellulitis, like inflammation of connective tissue elsewhere, may end in resolution or abscess formation or general sepsis. If resolution takes place or if an abscess forms and is opened, the inflammation subsides, leaving only infiltration and scar tissue, which causes but few symptoms aside from distortion of the parts. The inflammation may, however, extend to the peritoneum, in which cases there are added the evidences of pelvic peritonitis.

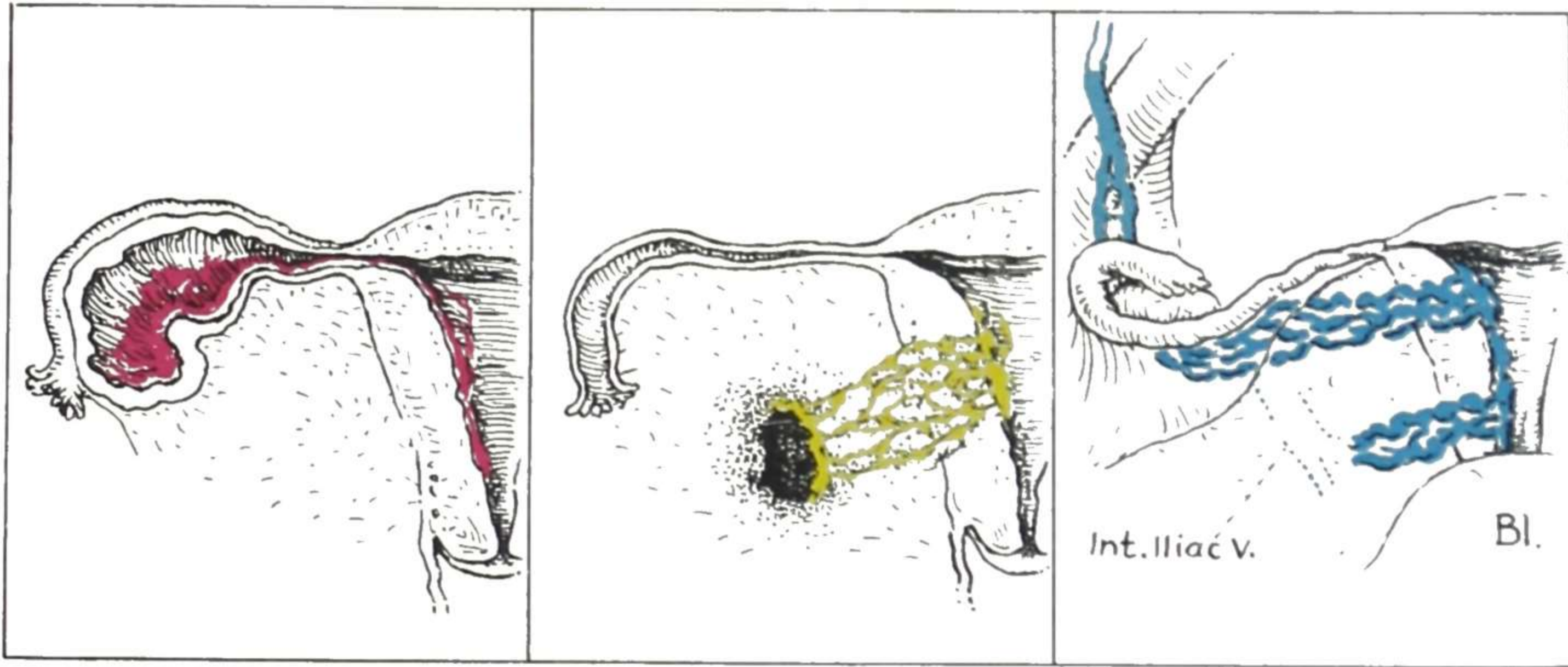


Fig. 863.

Fig. 864.

Fig. 865.

Figs. 863 to 865.—Comparing and Contrasting the Gonococcal and Streptococcal Types of Pelvic Inflammation. The clinical significance of this distinction is very great.

A gonococcal pus collection (in a closed cavity) usually undergoes automatic sterilization in three or four months, and hence may be removed by intraperitoneal operation with fair safety after that time. In a streptococcal or staphylococcal mass the bacteria are likely to continue virulent a much longer time, even for years. Hence intraperitoneal operation is contraindicated for any mass of streptococcal or staphylococcal origin. Such an abscess should be drained extraperitoneally if possible. Intraperitoneal operation is indicated only when all other methods of treatment fail and the chance of fatal peritonitis is outweighed by the danger of failing strength.

These two types of pelvic inflammatory mass may usually be readily identified by attention to the two distinguishing features, namely, the apparent *cause* of the trouble and the *location* of the mass, as explained in the text.

Fig. 863.—Gonococcal inflammation extending along the mucous membrane, from within the uterus out into the tube.

Fig. 864.—Streptococcal or staphylococcal inflammation extending outward in the lymphatics of the uterine wall to the connective tissue of the broad ligament.

Fig. 865.—Streptococcal or staphylococcal inflammation extending outward in the veins of the uterine wall to the veins of the broad ligament.

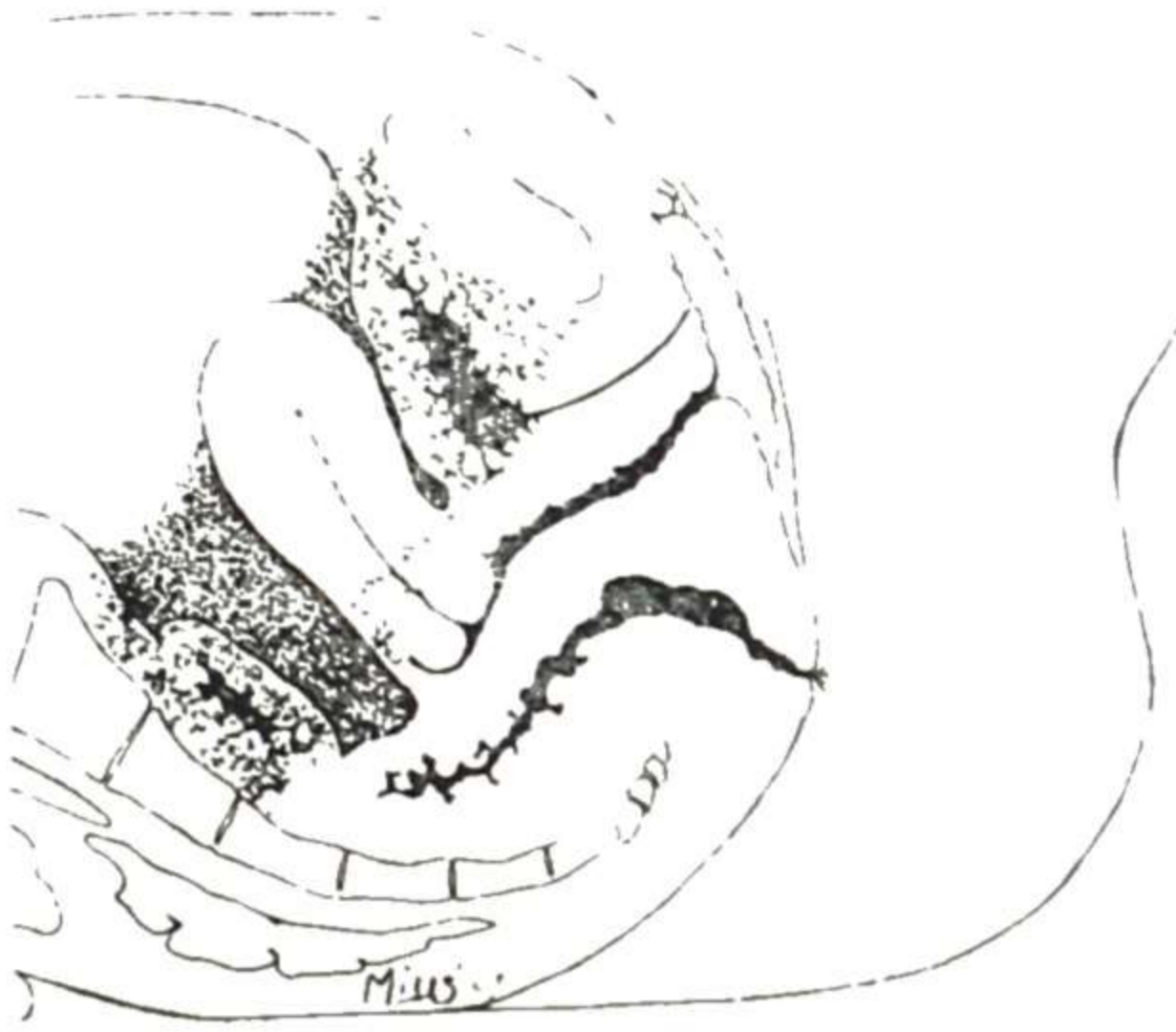


Fig. 866.

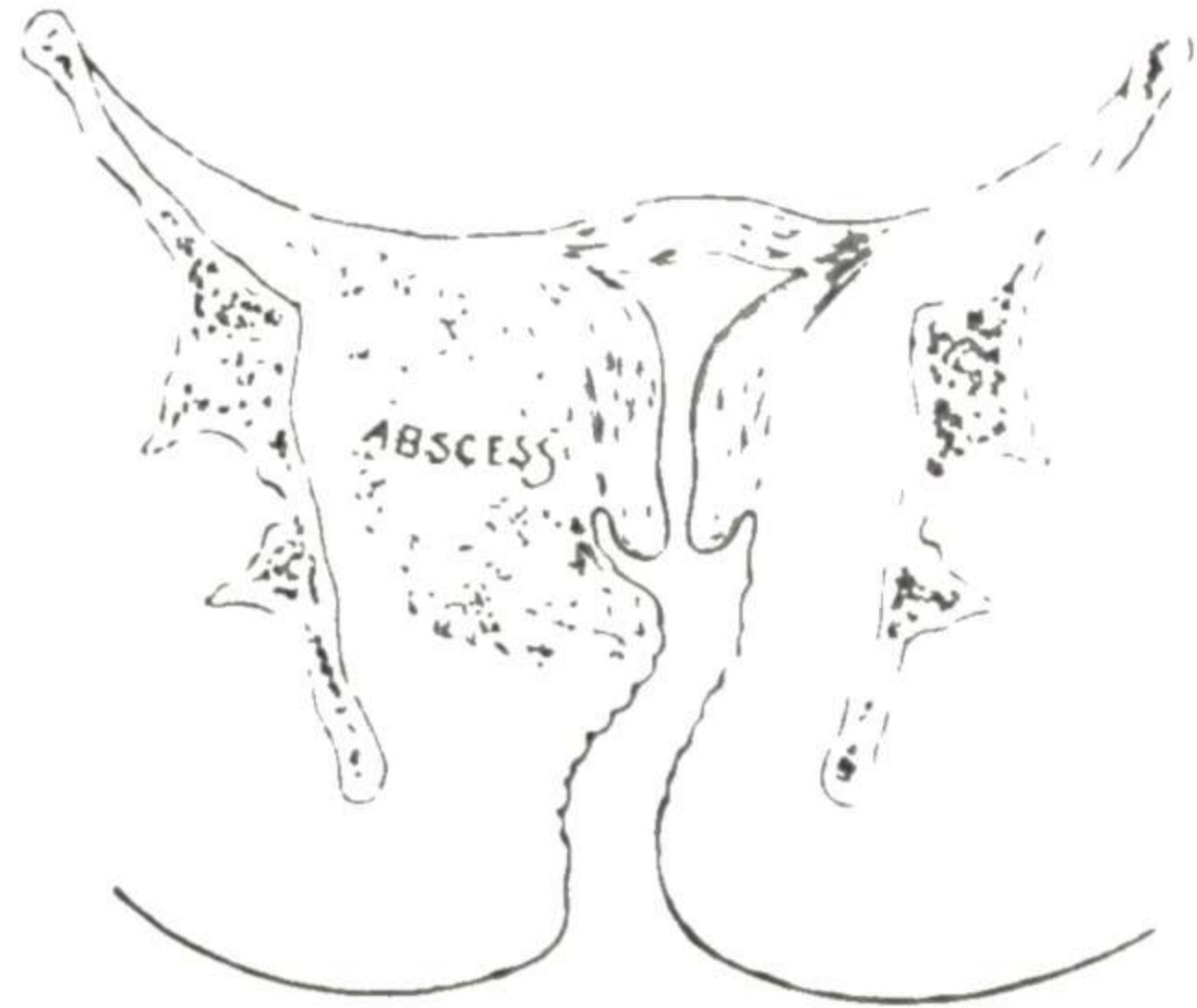


Fig. 867.

Fig. 866.—Inflammatory exudate filling the pelvis and forming a firm roof above the examining fingers. The resisting "roof" of an extensive inflammatory mass usually follows about the line here indicated. (Montgomery—*Practical Gynecology*.)

Fig. 867.—Mass beside uterus, formed by abscess in broad ligament. (Montgomery—*Practical Gynecology*, The Blakiston Company.)

7. **Septic Thrombosis** comes from infection of the normal thrombi filling the uterine sinuses after labor. It constitutes a severe and often fatal form of puerperal sepsis. In the effort to limit the infective and destructive process in the sinus or vein, another thrombus is formed proximal to the infected one. If the infection extends into the new thrombus, a portion of the vein proximal to that in turn becomes thrombosed. This process may keep on until the veins of the broad ligament become extensively thrombosed. If the infection enters through the upper part of the uterus (the usual placental site), it affects the ovarian veins in the upper part of the broad ligament (Fig. 865). If it enters through the lower portions of the uterus, the resulting septic thrombosis affects the uterine veins lower in the broad ligament (Fig. 865).

If the process is limited to this region, pockets of pus may form in the thrombosed veins and break into the connective tissue, forming a pelvic abscess, which can be recognized and opened. If the process is not limited, it extends centrally—along the ovarian veins (Fig. 865) toward the vena cava, or along the lower veins to the internal iliac, the common iliac, and finally to the vena cava. When the common iliac is involved, the process extends downward also along the external iliac vein, producing the usual signs of external iliac thrombosis (so-called "milk leg"). It must be kept in mind, however, that external iliac thrombosis may or may not be a septic thrombosis, many cases occurring without any evidence of sepsis. At any stage of the septic process in the veins, infected particles may become detached and pass into the general circulation, giving rise to metastatic foci in various parts of the body, and constituting general pyemia.

### Symptoms

A patient with acute pelvic inflammation complains of **pain** in the lower abdomen, increased by movements, such as walking or turning over or sitting up. She is usually confined to bed. There may be moderate **fever** ( $101^{\circ}$  to  $103^{\circ}$ ) or there may be high fever ( $105^{\circ}$ ), the high temperature being found most frequently in pelvic inflammation following labor or miscarriage.

There is usually a **vaginal discharge**, due to the coincident inflammation of the endometrium, and there is a **history** of a recent labor or abortion, or instrumentation or gonorrhoea, or a history of a chronic endometritis due to one of these causes.

On abdominal examination the lower abdomen is found to be tender on pressure. This **tenderness** may be confined to one or both tubal regions or it may extend over all the lower abdomen. On account of this tenderness the abdominal muscles are held more or less tense, thus preventing deep palpation.

In the vaginal examination the character of the discharge is determined, indicating to some extent the etiology of the trouble, and there is noticed also the presence or absence of evidences of recent labor or miscarriage. Manipulations in the upper part of the vagina cause pain. This **tenderness** on vaginal palpation and bimanual palpation is found both in the body of the uterus and about the tube of one or both sides. If a **mass of exudate** is present, it may be felt to one side of the uterus or behind it. If the exudate is low in the pelvis—for example, in the posterior cul-de-sac or about a prolapsed ovary or tube—it may be easily felt back of the uterus just above the posterior vaginal fornix. If the exudate is situated high in the pelvis, it may require very deep bimanual palpation to detect it, and the deep bimanual palpation may be impossible at first on account of the tension of the abdominal muscles. The mass of exudate is distinguished by its being more resistant (firmer) than the surrounding tissues and more tender on pressure. The exudate may extend all around the uterus, fixing that organ as though plaster of Paris had been poured into the pelvis and had hardened there. In these cases of extensive distribution of the exudate, the sensation imparted to the examining fingers is that of a firm roof across the pelvis just above the vagina (Fig. 866). The uterus projects through this roof of exudate and is held firmly by it.

If there is a **collection of pus** of considerable size, fluctuation may be detected, the soft area being surrounded by a firm area of exudate which has not yet broken down. If there is only a small collection of pus, not large enough to give fluctuation, its presence is indicated by persistent fever and its location is shown by a point of marked tenderness. When there is an inflammatory exudate in the posterior cul-de-sac, fluctuation may in some cases be detected earlier by rectal than by vaginal examination, the rectal finger being able to palpate the posterior surface of the mass.

In **septic thrombosis** without other involvement and in puerperal pyemia there may be no evidence of pelvic peritonitis or of pelvic cellulitis—simply repeated chills and high fever without any palpable local lesion of sufficient extent to account for them. There is tenderness in the region of the veins affected, and in some cases distinct induration may be made out, particularly where there is more or less perivenous inflammation. If the infection has come through the upper part of the uterus (which is the usual location of the placental site and hence of the area of penetration), the ovarian veins are the ones most likely to be affected. In many cases they alone have been found involved. When the infection penetrates the lower part of the uterus, the uterine veins and broad ligament veins generally become affected (Fig. 865) and later the internal and common iliac veins.

### Diagnosis

The diseases that may be confused with acute pelvic inflammation and that must therefore be taken into consideration in the **differential diagnosis** are as follows:

Acute endometritis.

Tubal pregnancy.

Appendicitis.

A tumor which has become gangrenous from twisted pedicle.

A suppurating tumor (usually a dermoid cyst or a necrotic fibroid).

In acute **endometritis** the bimanual examination shows that the tenderness is limited to the uterus. There is no marked tenderness in the periuterine structures, neither is any mass found there.

**Tubal Pregnancy** has been mistaken so many times for ordinary pelvic inflammation that the differential diagnostic points should be considered in detail (see Tubal Pregnancy).

In **appendicitis** the pain is more likely to start as a general abdominal pain, the point of greatest tenderness and the inflammatory mass, if there is one, being in the appendix region instead of in the tubal region. In appendicitis also there is frequently a history of stomach or bowel disturbance preceding or associated with the attack of pain, while in salpingitis there is usually a history of uterine disturbance—dysmenorrhea, prolonged menstruation, vaginal discharge, and other indications of a previous or coincident uterine disease. In girls and in unmarried women an attack of inflammation low in the right side is much more likely to be appendicitis than salpingitis. In some patients both structures are involved.

In all right-sided inflammations keep in mind appendicitis. One having his mind too intent on pelvic disease may overlook this. This fact is very well illustrated by a case seen in consultation. A few days before, the physician had operated for laceration of the cervix. Following the operation the patient developed pain in the lower abdomen, rapid pulse, nausea, and fever. The symptoms were persistent and progressive, and in three days the patient's condition became alarming. Fearing acute pelvic inflammation from infection at the site of operation, he asked for a consultation. Examination showed the cervical wound to be in good condition and nothing could be found in the immediate vicinity of the uterus to account for the serious symptoms. But on searching further it was evident the patient had appendicitis, with peritonitis. The vomiting and intraabdominal disturbance following anesthesia had evidently stirred to renewed activity an old focus of inflammation about the appendix. The patient had general peritonitis and she died before the consent of her people to an operation could be secured.

In the case of a **tumor** which is **gangrenous** from twisted pedicle, the tumor has existed a long time, and one can usually get a history of pelvic disturbance caused by it, and in some cases a clear history of a tumor can be obtained. When the turning of the tumor with torsion of its pedicle takes place, that causes a sudden onset of serious symptoms—severe pain, extending more or less throughout the abdomen, and symptoms of shock. Later, as the

tumor begins to degenerate on account of the cessation of its blood supply, local peritonitis comes on, causing fever. The local peritonitis may spread and become general peritonitis, and at this stage the origin of the trouble is much obscured. Absence of evidence of infected endometritis is another important point in the differential diagnosis of this condition from ordinary pelvic inflammation, as is also the absence of fever at the onset of the trouble and for several hours afterward.

A **suppurating tumor** is usually a **dermoid cyst**, connected with the ovary, and hence gives rise to a mass in the same region in which an inflammatory mass from salpingitis would be found. When suppuration takes place in an ovarian dermoid, there is resulting local peritonitis, with fixation of the mass by adhesions. The fever and pelvic pain and marked tenderness on examination all tend to further confusion with ordinary pelvic inflammation, making the differential diagnosis often very difficult and sometimes impossible. If the patient is a girl, or a woman who has never been pregnant or had any uterine infection, the probability is in favor of dermoid tumor and against salpingitis. Two other points in favor of the mass being a dermoid tumor are (1) a history of pelvic disturbance, pointing to the existence of a tumor before the acute symptoms developed, and (2) the absence of vaginal discharge and other evidences of uterine infection.

Necrosis or suppuration within a uterine fibroid presents the evidences of inflammation added to evidences (past and present) of a fibroid tumor.

### Treatment

In the treatment of acute pelvic inflammation (acute salpingitis, acute oophoritis, acute pelvic peritonitis, acute pelvic cellulitis, and all combinations of these lesions), there are employed certain measures that may be called **general measures**, because they are applicable to all cases. There are employed also other measures that may be called **special measures**, because they are applicable to special conditions only.

#### GENERAL MEASURES

The general measures indicated in the treatment of practically all cases of acute pelvic inflammation, are as follows:

1. **Rest.**—Keep the patient in bed. If the inflammation is severe, she should use the bedpan and should not be permitted to get up to a vessel beside the bed.
2. **Applications to the Lower Abdomen.**—The hot applications are usually most effective in relieving pain and the hot-air chamber is a good method of applying dry heat. In exceptional cases the cold applications give more relief.
3. **Sedatives.**—If the pain is persistent in spite of the measures already mentioned, mild sedatives should be used, such as the bromides. Avoid morphine unless the pain is so severe as to make its use imperative, for it disturbs the stomach, checks the secretions and, in addition, masks the pain to such an extent as to interfere with our knowledge of the progress of the disease. The coal-tar antipyretics are also usually best avoided for the reason that they mask the fever. The pain and the fever are two important guides as to the progress of the inflammation, and hence should not be masked more than



necessary. If there is much fever, cool sponging will give comfort, reduce the temperature, and stimulate the patient, and its effect can be more accurately gauged than that of internal antipyretics. If there is much pain, of course sedatives must be given in sufficient quantity to give rest. Codeine phosphate or sulphate in one-half to one grain doses disturbs the stomach less than morphia and usually gives relief. If not sufficient, then morphia will be necessary. Whenever sedatives or antipyretics are given, their effect must be allowed for in reckoning the extent or progress of the inflammation.

4. **Hot Vaginal Douches.**—These may be given from one to three times daily as needed to clear away any irritating discharge. The douches are regulated also as to the comfort they give the patient. If they cause discomfort and there is no discharge of importance, they may be omitted.

5. **Laxatives** are to be omitted in pelvic peritonitis until the inflammation is well localized, enemas being used instead, unless there is an acute gonorrhoea.

#### SPECIAL MEASURES

The special measures, indicated in certain cases of acute pelvic inflammation, are presented under the following headings.

1. **Internal Medication.** Chemotherapy, particularly the administration of some member of the sulfanilamide group, is to be considered. These potent drugs have advantages and disadvantages, details of which are being gradually worked out. The following two quotations present in brief reliable general information pertaining to their use in serious pelvic inflammations. Further details in regard to the use of individual preparations, with particular indications and contraindications, will be found in these articles (see Reference List).

In his study of chemotherapy in obstetrics and gynecology, Douglas reported its use in 180 patients, and reached the following conclusions:

*General.*—1. Bacteriologic examinations of urine, blood, lochia, cervical and urethral secretions, etc., are of the greatest importance in the diagnosis, control and evaluation of chemotherapy in infections in obstetrics and gynecology.

*Urinary Tract Infections.*—2. Organisms of the colon aerogenes group are the chief cause of urinary tract infections, complicating obstetric and gynecologic conditions. The urine under such circumstances can usually be rendered sterile with varying amounts of sulfanilamide. Subsequent follow-up is necessary because re-infection may recur if the same conditions subsequently exist as were present prior to the initial infection.

3. The urinary tract should be free from organisms before the patient is finally discharged. It is usually more difficult to render the urine sterile where the infection has been severe or has existed over a long period of time.

4. In ante-partum bacilluria and definite pyelitis, the urine was rendered bacilli-free and kept so in 10 of 13 cases. This fact is of great importance in the prevention of pyelitis. The earlier the diagnosis and treatment, the better the results will be.

5. The primary infecting organism was eliminated from the urinary tract in 69 per cent of a group of 115 obstetric and gynecologic patients with bacilluria or pyelitis, who were treated with sulfanilamide.

*Gonorrhoea.*—6. Employing relatively high dosage of sulfanilamide in hospitalized patients, for a relatively short period of time, gonorrhoea in the female can probably be cured by the criteria of repeated cultures and smears in a large percentage of cases. The cure rate was at least 94 per cent in the 34 patients here reported.

7. For the successful and safe employment of sulfanilamide in the present state of our knowledge we are not justified in treating the disease by this means in ambulatory patients.

8. Cultures are essential for accurate diagnosis and are a much more reliable index of cure than smears alone. However, the best results are obtained when both cultures and smears are employed.

*Puerperal and Postabortal Infections.*—9. Prophylactic cultures should be taken where later infection appears probable.

10. Sulfanilamide is usually indicated in infections caused by hemolytic streptococci or *B. welchii*.

11. The drug is not known to exert any definite therapeutic effect in other types of infection.

Gordon and Rosenthal reported results in 125 cases and conclude as follows:

In minor febrile disturbances chemotherapy should not be used. In severe intrapartum and puerperal infections of the genital tract, sulfanilamide should be given provided the patient is in a hospital where its administration may be properly controlled. Bacteriologic diagnosis need not precede therapy, yet early recognition of the infective agent is important. Since it is probable that sulfanilamide is effective only when the *Streptococcus hemolyticus* Group A is present, administration should not be continued for longer than a week, if another organism has been isolated.

In mastitis not responding to ordinary treatment, chemotherapy should be tried. In pyelitis it is at least as effective as other methods of drug treatment. A large series of cases followed over a considerable period of time will be necessary before positive statements can be made.

Sulfanilamide should be used in gynecologic infections (1) if they are primary gonococcal, (2) if smear or culture is positive with exacerbation or reinfection of old gonococcal infection, and (3) when the *Streptococcus hemolyticus* can be demonstrated as the infective agent.

Sulfanilamide should not be given in cases of cellulitis, pelvic or abdominopelvic abscess or to patients with acute exacerbations of chronic pelvic infections with tubo-ovarian masses when the gonococcus cannot be demonstrated. Evidence accumulates that sulfanilamide should not be given to ambulatory patients.

Long, Haviland, Edwards and Bliss, in studying the dangers of the sulfanilamide group, analyzed the records of 1,588 hospitalized adults, 1,000 of whom were treated with sulfanilamide, 297 with sulfapyridine and 291 with sulfathiazole. They close their report with the following comments:

We believe that, whenever possible, it is wise to utilize every available means of laboratory control in following patients who are receiving sulfanilamide or one of its derivatives. White blood cell counts, hemoglobin and urine examinations should always be done when circumstances permit this type of control. However, we are convinced that with the exception of acute leukopenia, all the toxic manifestations of sulfanilamide or its derivatives which may occur in the first two weeks of therapy can be recognized by careful clinical observation, and we feel that no physician should hesitate to administer these drugs in therapeutically adequate amounts, provided he can see his patient at least once a day.

At the time the physician visits the patient who is receiving one of these drugs he should inquire as to his symptoms, especially in respect to headache, body aching or malaise, because these symptoms are often the precursors of many of the toxic reactions of sulfanilamide or its derivatives. In addition to an inquiry about symptoms, the scleras should be examined for the presence of jaundice, the mucous membranes for pallor and the skin for evidences of rash. The temperature should always be taken in order to detect whether drug fever is present, and if the patient says that he has been having chills and at the time that it is taken the temperature is normal, arrangements should be made to have the temperature taken frequently during the next twenty-four hours in order to determine whether or not fever is present.

No special precautions have to be observed in respect to the urine of patients who are receiving sulfanilamide, but it is highly important that the urine of patients who are receiving sulfapyridine or sulfathiazole be measured daily. This does not mean that the attendants or family of the patient have to record the urine volume in cubic centimeters or ounces, but any standard measure, whether it is only cups, will suffice. As a matter of fact, in the case of infants it would probably be satisfactory to record the number of voidings daily. In this way it is possible to detect an oliguria which may herald an approaching anuria. The daily examination of the urine under these circumstances should consist of a careful examination of a fresh specimen for gross blood, and at the same time instructions should be given to the patient's attendants to stop the drug and administer fluids in large quantities if the urine looks bloody.

Finally, one should always remember that if a patient has once had drug fever, rash, hepatitis, leukopenia, acute hemolytic anemia, injection of the scleras and conjunctivas, diarrhea or purpura haemorrhagica in the course of therapy with sulfanilamide or its derivatives he is very likely to have a second, earlier and more severe toxic reaction if the drug is administered a second time. Therefore it is highly important to determine whether or not a patient has previously had a toxic reaction in the course of therapy with one or the other of these drugs. If he gives a history of a toxic reaction in the group which we have just enumerated, it is best to give a small test dose of the drug (0.3 Gm.) and observe the patient carefully over a period of twelve hours before cautiously beginning the course of therapy. Patients who have had a toxic reaction caused by one of these drugs may have a similar reaction when another member of the sulfonamide group is prescribed.

Bacteria and immunogens also are to be considered in the treatment of pelvic inflammations which do not yield to the other measures.

**2. Heat Treatment.**—It is in acute and subacute inflammation that the special methods of applying heat find their most useful field. The hot-air chamber, the circulation of hot water in a vaginal bag, and diathermy are to be considered in this connection.

The use of the hot-air "baker" usually lessens the patient's local discomfort decidedly, and it may be employed from the first, once or twice daily, for periods of increasing duration.

In the cases that are not making satisfactory progress under ordinary measures, the radical application of heat by the Elliott method or by diathermy or by fever therapy is to be considered. These methods must be employed discriminately—with careful study of the local conditions present in the individual and a fair idea of just what tissue changes you are trying to bring about in that case. Details are given under Treatment Methods (Chapter III).

3. If the infection has followed **labor** or **abortion**, it is desirable to have the interior of the uterus clean. Exploration of the interior of the uterus with the finger or curette may become necessary.

4. If the infection has taken place through an **operation wound** of the cervix, remove the sutures so as to give free drainage to the inflamed area.

5. If a collection of **pus** can be felt **low** in the pelvis, open and drain it by vaginal incision. These low pelvic abscesses are usually streptococcic or staphylococcic, and start in the connective tissue of the broad ligament, though the abscess may push into the back of the pelvis or even involve the peritoneal cul-de-sac. In opening the abscess it is important to keep within the connective tissue area or, if the cul-de-sac is involved, under the protecting roof of **exudate**.

It requires care to open a pelvic abscess widely and safely, particularly if the pocket of pus is small. The rectum, uterus, uterine vessels, ureter, or bladder may be injured, or the abscess may not be opened and drained thoroughly enough to effect a cure.

*Opening Abscess.*—The steps in opening a pelvic abscess back of the uterus are shown in Figs. 868 to 871. The preliminary incision of the vaginal wall back of the cervix is usually best made by sight, with the vaginal retractor in place and the cervix raised with a tenaculum, as shown in Fig. 868. The dissection through the connective tissue is most safely and conveniently accomplished by the sense of touch alone. The speculum, or perineal retractor, is removed and two fingers are introduced into the vagina, one of the fingers being carried into the wound back of the cervix. With this finger, blunt dissection is made through the connective tissue, keeping close to the wall of the cervix, which is distinguished by its greater hardness. This dissection is facilitated by introducing the closed blunt scissors some distance ahead of the finger as shown in Fig. 869, and then opening the scissors widely. The finger is introduced into the opening thus made in the connective tissue, and the scissors are again introduced beyond the finger and opened widely. In this way a wide tract may be made rapidly through the connective tissue, and it may be made safely, provided the operator keeps close to the cervix as indicated in Fig. 869. Each arrow in this illustration may be taken to represent a forward thrust of the blunt scissors beyond the end of the finger. Notice that the direction of the dissection carries it between the uterus and the abscess instead of between the rectum and the abscess, and thus the danger of tearing into the rectum is avoided. On the other hand, the dissection must not be carried into the cervix uteri. Involvement of the tough tissue of the cervical wall is indicated by the blunt dissection becoming very difficult while still some distance from the abscess.

*Puncturing the Abscess Wall.*—When the wall of the abscess is reached, further advance by blunt dissection becomes difficult or impossible. This wall of dense infiltration blocking further advance is especially marked in a long-standing abscess, but it is present in acute abscesses also to a considerable extent. The blunt scissors are now exchanged for the sharp-pointed scissors (Fig. 870), and with these the puncture is made into the center of the inflammatory mass. Care must be taken to make sure that the puncture will not extend into the rectum. A hard fecal mass in the rectum may be mistaken for a portion of the inflammatory mass, or a gas-distended part of the rectum may simulate the soft, elastic feel of a fluctuating mass, or a collapsed pocket of the rectum may project between the vaginal vault and the abscess. In Fig. 869 this dangerous proximity of the rectal wall to the operative tract is well shown. If the line of blunt dissection is kept close to the uterus, the abscess wall is reached close to the uterus, with a considerable part of the abscess lying between the point of puncture and the rectum, as shown in Fig. 870. Should there be any doubt about this, leave the scissors in the tract and, with gloved fingers, make an examination per rectum. This examination gives a clear idea of the amount of tissue between the point of intended puncture (indicated by the end of the scissors) and the nearest portion of the rectal wall.

After the curved, sharp-pointed scissors have been pushed into the center of the mass, they are opened widely and then withdrawn while still wide open. This makes a large tract into the abscess. A finger is then introduced into the cavity and its wall explored for secondary pus pockets. If a fluctuating area is found, it may be opened by the finger, dressing forceps, or scissors, care being taken to avoid wounding the rectum or mistaking an adherent knuckle of intestine for a fluctuating pus pocket. While an adherent loop of intestine may feel soft and elastic, it does not present the tense fluctuation and resistance of a pus pocket, unless obstructed. In this palpation of the interior of the abscess cavity, all manipulation should be made gently, so as not to break through the protecting roof of exudate.

*Drainage.*—After all pus pockets are opened, introduce a good-sized drainage tube into the abscess cavity (Fig. 871). Swab out the vagina and pack it lightly with antiseptic gauze. The upper end of the gauze should be packed rather firmly into the connective tissue about

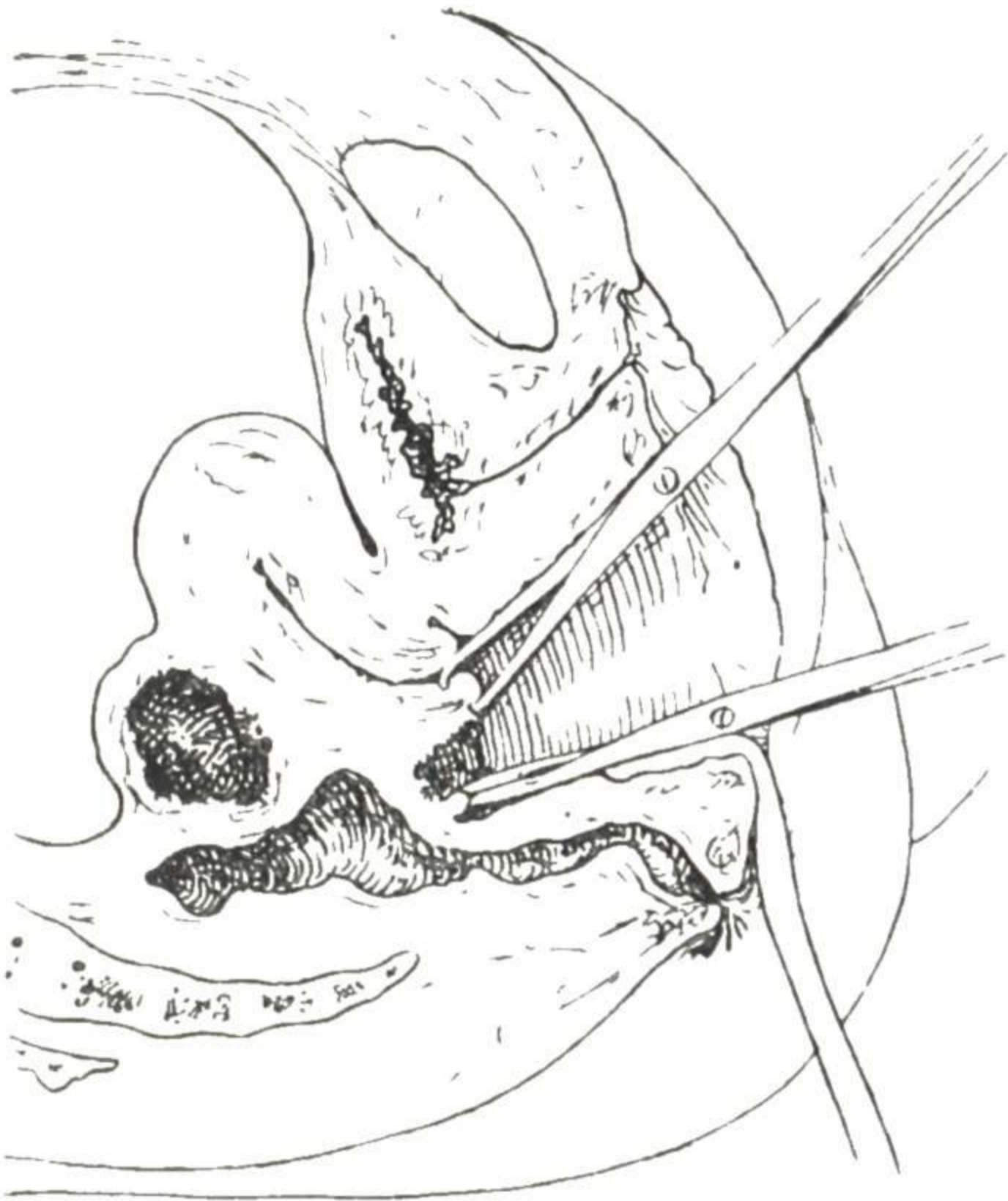


Fig. 868.

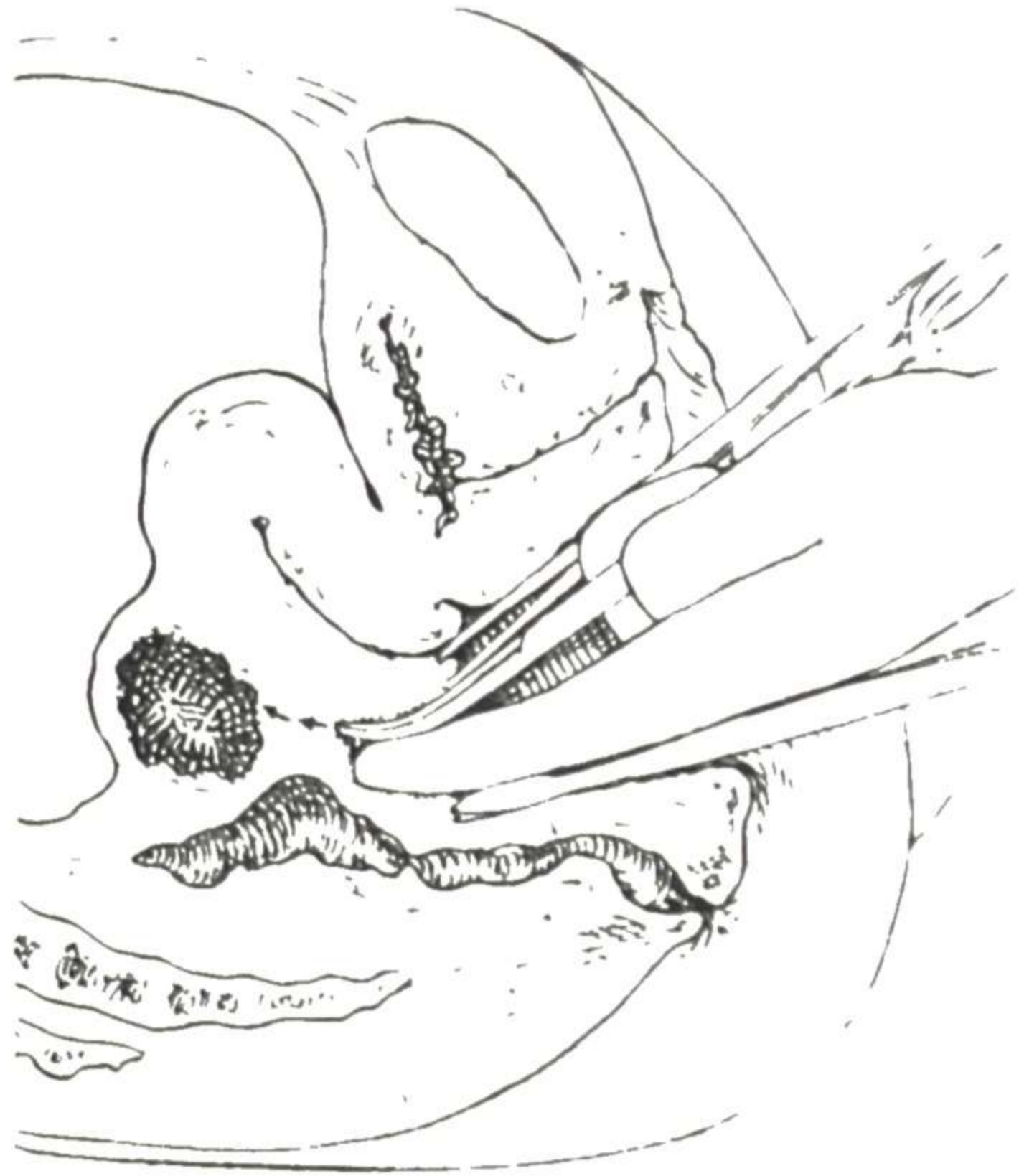


Fig. 869.

Figs. 868 and 869.—Opening a pelvic abscess. Fig. 868, Incision through vaginal wall. The retractor has been introduced, the cervix caught with a tenaculum forceps, and the vaginal wall clipped through just back of the cervix. Fig. 869, Blunt dissection through connective tissue. The retractor has been removed to permit the fingers to be introduced into the vaginal incision, and dissection is now being made through the connective tissue with fingers and blunt scissors, as described in the text. The arrows show the direction of the dissection (between abscess and uterus and not between abscess and rectum), and each arrow may be taken to represent a forward thrust of the blunt scissors beyond the end of the finger

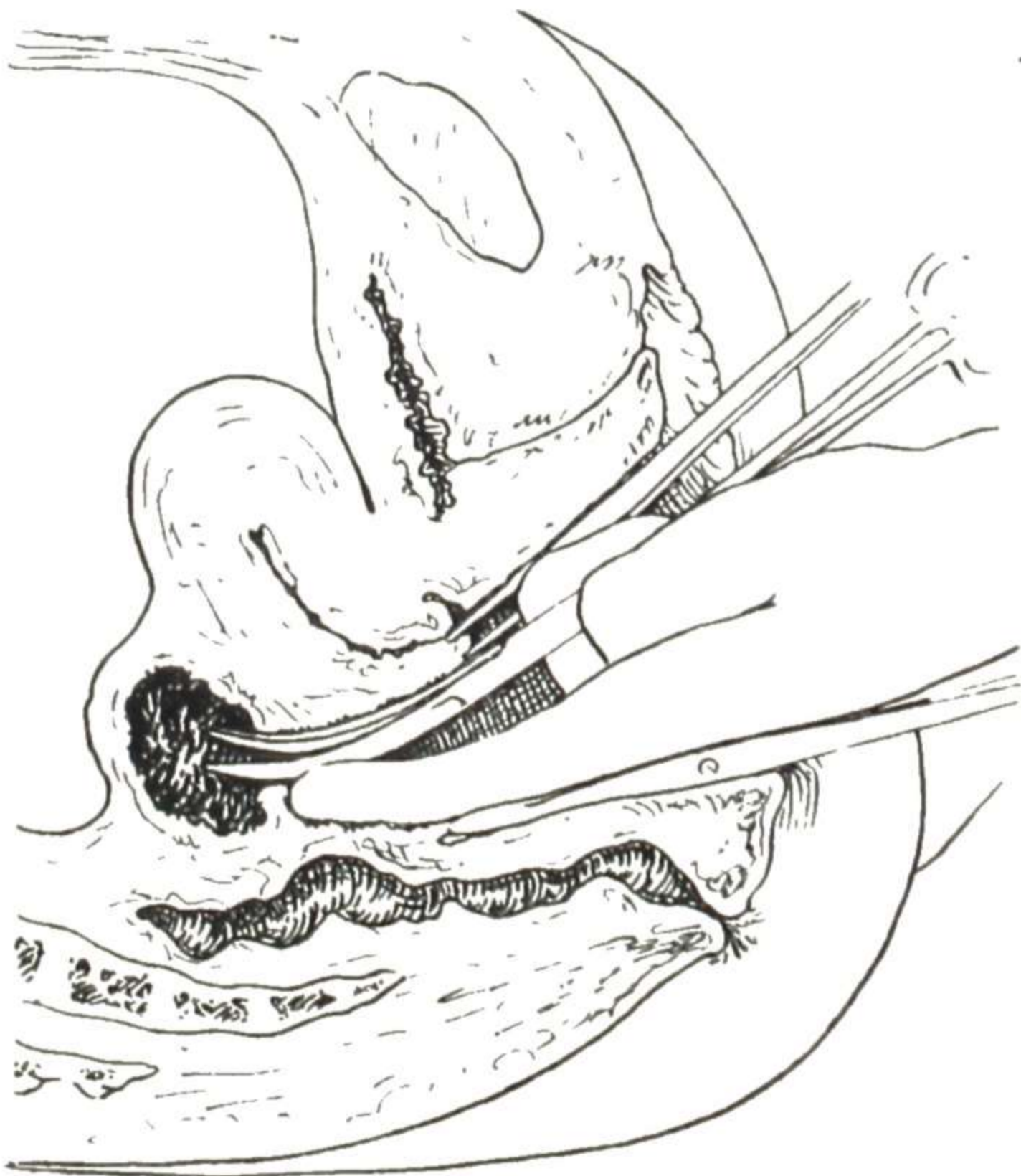


Fig. 870.

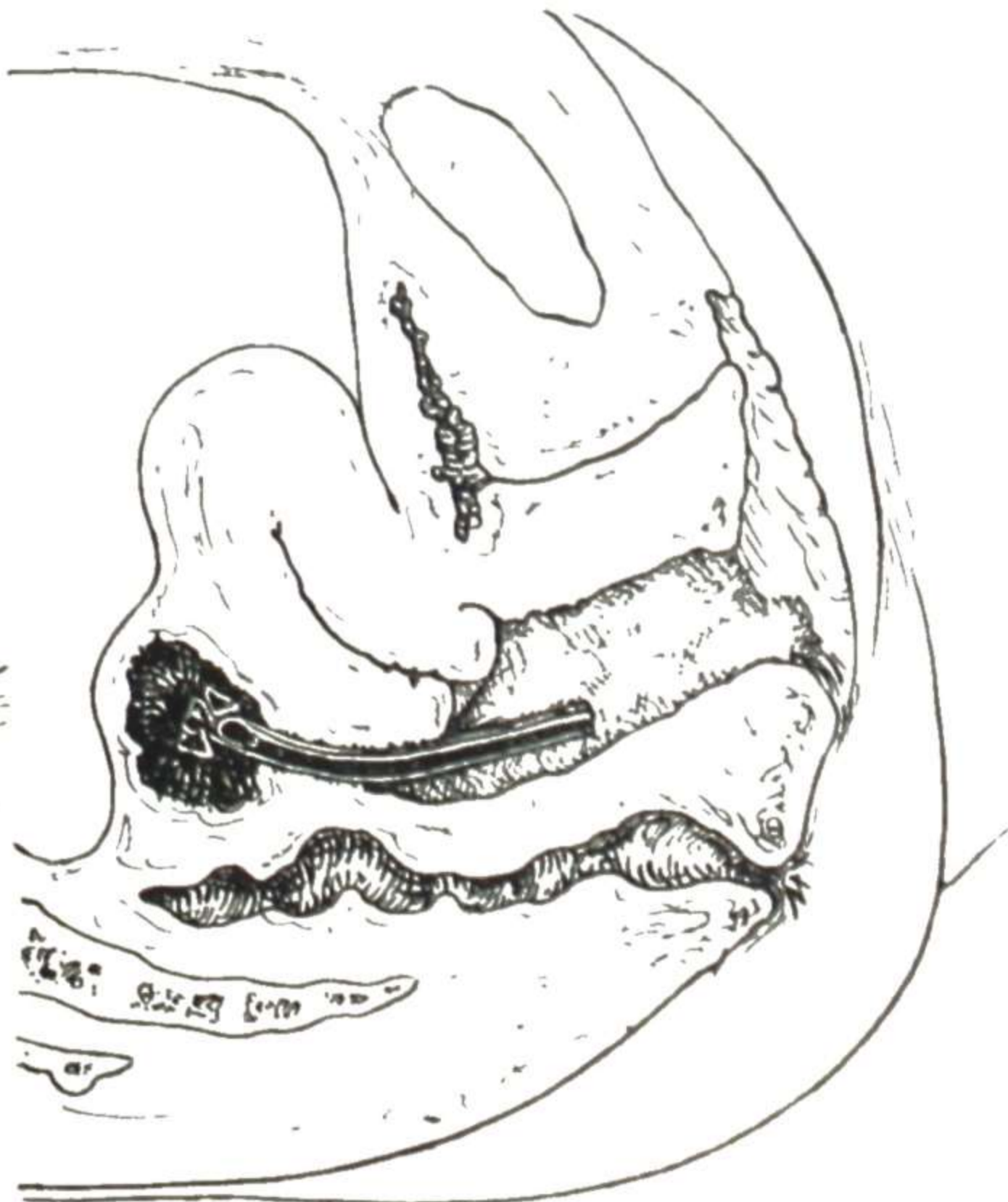


Fig. 871.

Figs. 870 and 871.—Opening a pelvic abscess. Fig. 870, Puncturing the abscess wall. The sharp-pointed scissors have been introduced into the mass under the guidance of the finger, and then opened widely. Fig. 871, Drainage tube in place. The cross-piece is to prevent the tube slipping out. The tube is cut off about midway of the vagina. The gauze packing extends into the connective tissue area about the tube, but not into the abscess cavity.

the tube, so as to stop any bleeding there. The gauze is to be packed only a short distance into the wound, so that it will not pull out the tube when it is removed, for the rubber tube is to be left in place until the cavity is nearly obliterated by granulation, which requires from two to six weeks.

The drainage tube will not stay in place without some special device. A method of forming a cross-piece on the tube is shown in Fig. 872 and another method in Fig. 873. After the tube is in place, its lower end is cut off about the middle of the vagina and the vaginal gauze packing is distributed around it. If the tube is allowed to extend out-

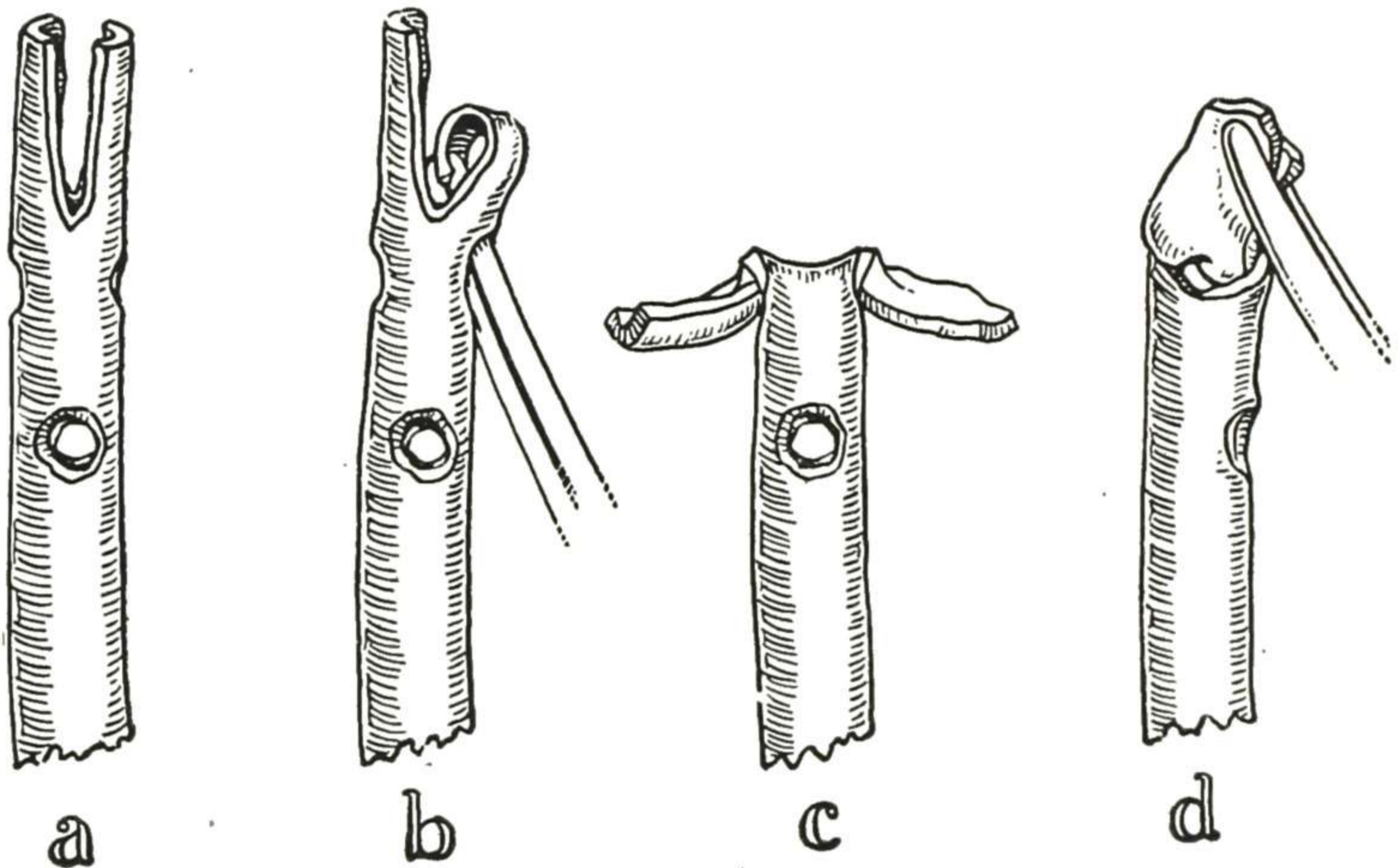


Fig. 872.—Another method of arranging the drainage tube to keep it from slipping out of the abscess cavity. *a*, The end of the drainage tube, showing the split in the end and the small opening at the base of each flap. *b*, Drawing one of the flaps through the opening at its base. *c*, Both flaps drawn through. *d*, The flaps bent up and grasped with forceps preparatory to introduction of the tube into the abscess cavity. (Crossen and Crossen—*Operative Gynecology*, The C. V. Mosby Company.)

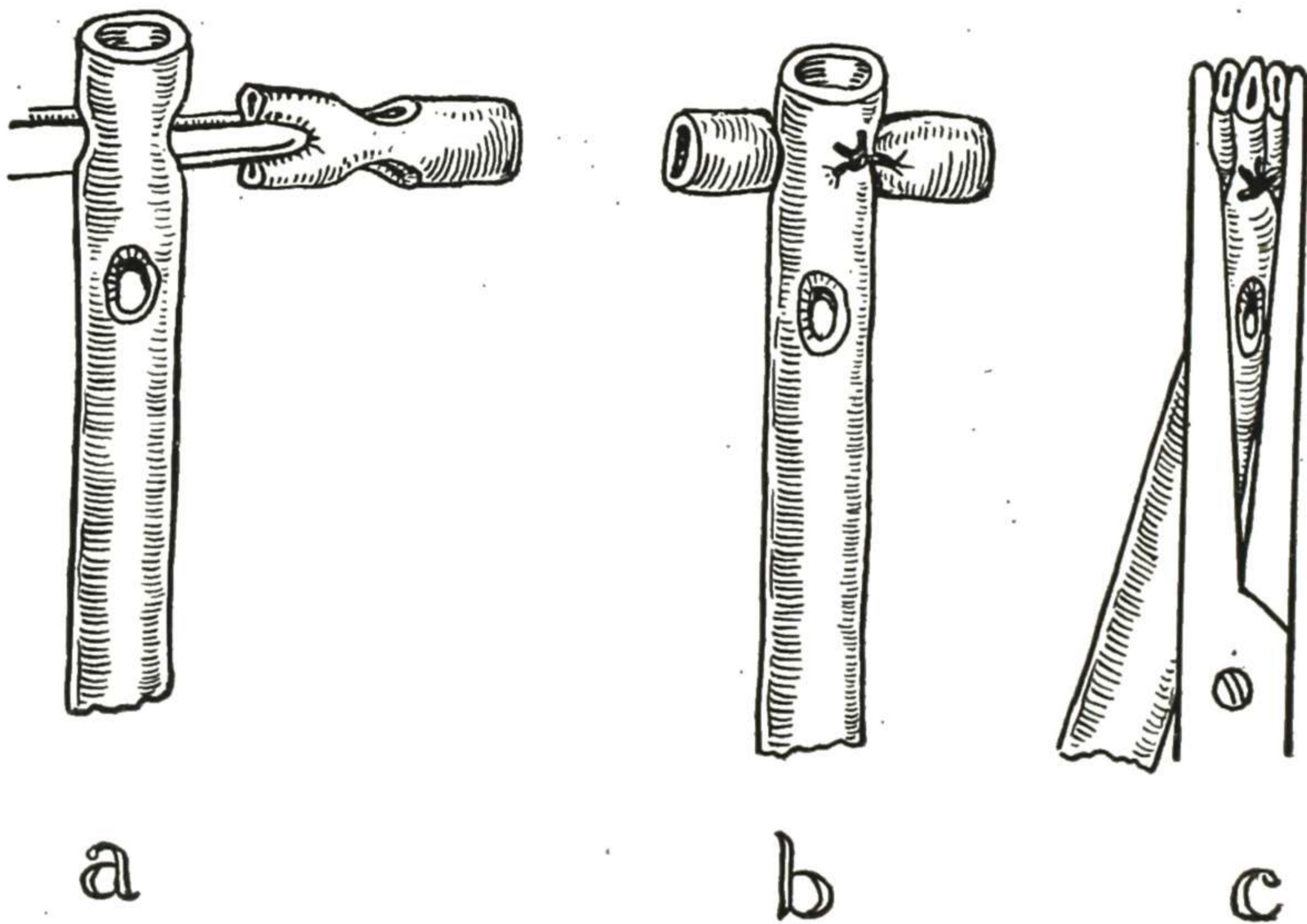


Fig. 873.—Another method of making projections on a drainage tube to keep it from slipping out of a cavity. *a*, A forceps thrust through small holes in the drainage tube and grasping a prepared cross piece, to draw it through the drainage tube. *b*, The cross piece in position, and sutured securely in place, so that it cannot be left behind when the tube is removed. *c*, The ends of the cross piece bent up and caught with a forceps, preparatory to the introduction of the tube into the cavity. (Crossen and Crossen—*Operative Gynecology*.)

side the vaginal entrance, it causes more or less irritation of the external surfaces, and if it is cut too short it may slip up into the abscess cavity and be lost.

*Errors to Avoid.*—It is best to *avoid irrigation* of the cavity. The free opening of the abscess relieves the tension, and this, with the subsequent drainage, is all that is required. Furthermore, if a stream of fluid is run into the cavity, it may break through some weak place in the protecting wall and cause infection of the general peritoneal cavity. Irrigation, therefore, is not only unnecessary, but also dangerous, and may cause fatal peritonitis in a patient who would have recovered promptly under simple drainage.

Another error to avoid is *dependence on gauze drainage*. A considerable proportion of failures and secondary operations are due to this. When there is a distinct abscess cavity, there will necessarily be a discharge for some time, and this discharge should find a ready exit through tube drainage. Gauze packing is very good for checking bleeding or for holding the tract open for a few days, but it is not satisfactory when prolonged drainage is necessary, and prolonged drainage is necessary in practically all cases where a distinctly

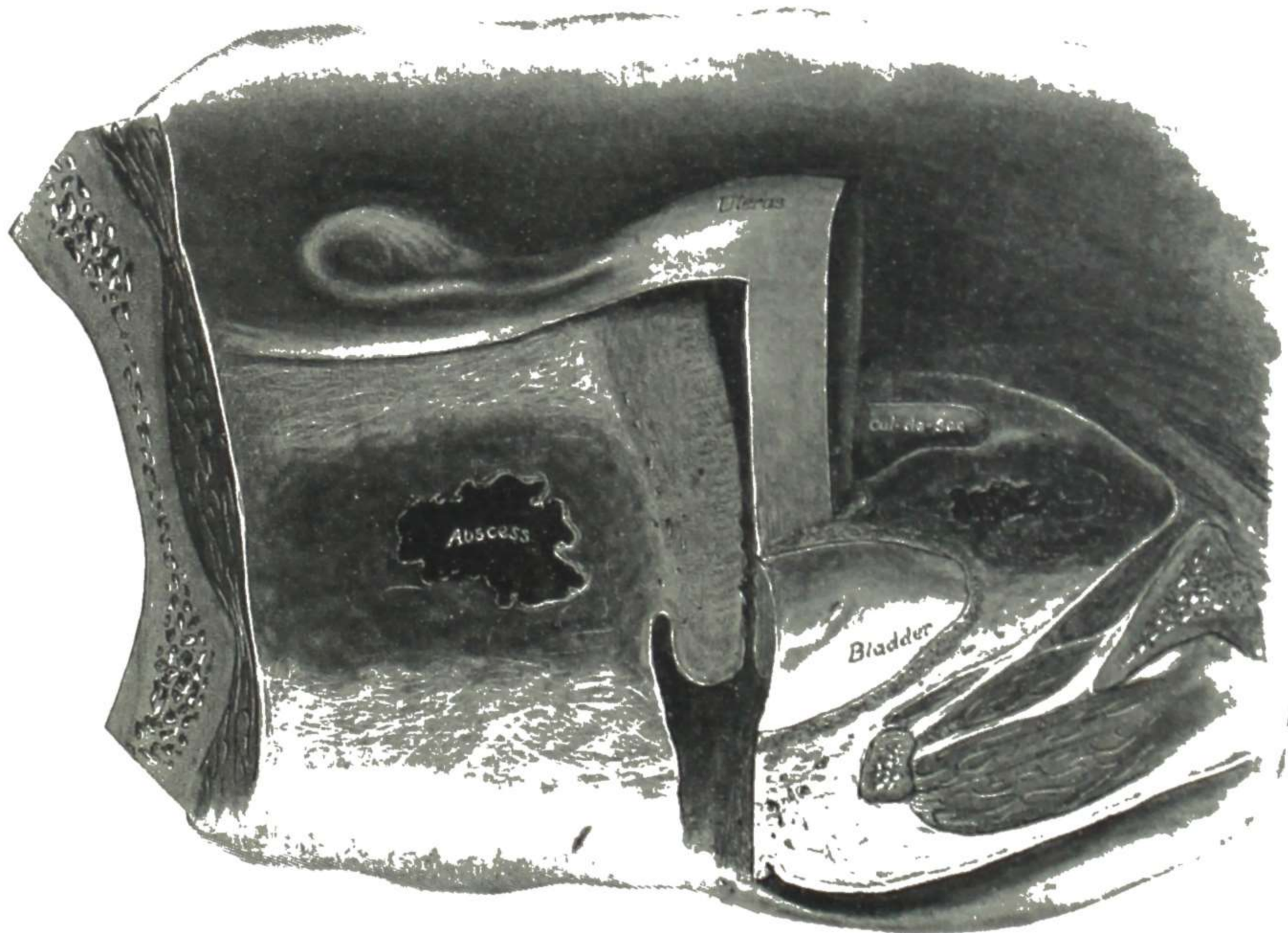


Fig. 874.—Pelvic cellulitis (parametritis). The broad ligament inflammatory mass is represented as sectioned longitudinally on the right side and transversely on the left side. The former (right side of pelvis) indicates how the infiltration extends down along the cervix and vaginal wall, and the latter (left side of pelvis) indicates how it extends forward to the bladder and also backward.

walled abscess has formed. In the crowded and contracting tissues of the pelvis, tube drainage is the only kind that will keep the drainage tract open satisfactorily and conveniently for the length of time required for a large cavity to become obliterated by granulation. And the best time to place this tube drain satisfactorily is when the patient is under the anesthetic and the abscess just opened.

*Lateral Abscess.*—In draining a lateral broad ligament abscess, avoid opening the peritoneal cul-de-sac, for it may be uninfected and still connected with the general peritoneal cavity. In opening a lateral mass, after the vaginal wall is incised the dissection is carried laterally between the layers of the broad ligament. In this way a collection of pus situated even in the upper part of the broad ligament may be drained without opening the peritoneal cavity. The anatomic points to be kept in mind, and also certain details of the operative procedure, are shown in Figs. 874 to 877.

*After-treatment.*—In the after-treatment of an opened pelvic abscess the two important points are (1) continued free drainage until the cavity has been practically obliterated by granulation, and (2) avoidance of unnecessary irritation, such as repeated packing or probing of the tract, or frequent syringing of the abscess cavity.

Neglect of the first point is the cause of the failure in a large proportion of the cases where the abscess re-forms and requires secondary operation—that is, when the case has been well chosen and is really suitable for vaginal drainage. The neglect of the second point causes much unnecessary pain and irritation by repeated probing and packing of the suppurating tract, and also contributes to failure by early removal of the well-placed rubber drainage tube, which is the only efficient method of continued drainage in this situation.

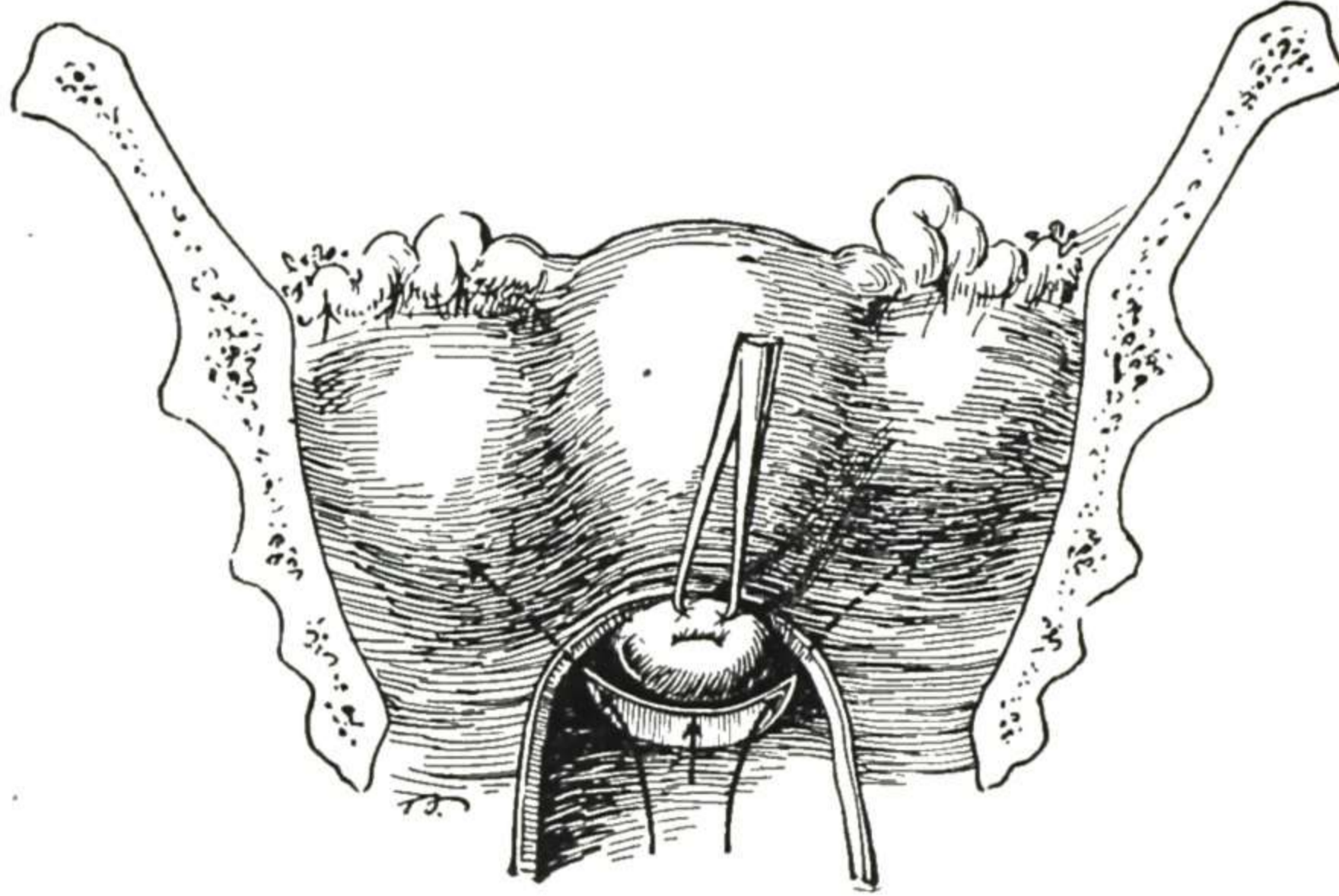


Fig. 875.—Opening a lateral abscess. After the vaginal wall is cut through, the blunt dissection is carried laterally into the broad ligament of the affected side, as indicated by the arrow. In this way opening of the peritoneal cavity may be avoided.



Fig. 876.

Fig. 877.

Fig. 876.—The gloved finger thrust into the opening back of the cervix and directed toward the abscess in the left broad ligament. (Crossen and Crossen—*Operative Gynecology.*)

Fig. 877.—The finger tip appearing in the small abscess cavity high in the broad ligament. Notice the close proximity of the ureter and of the uterine artery. (Crossen and Crossen—*Operative Gynecology.*)

The gauze in the vagina is removed in one or two days and after that an antiseptic vaginal douche is given from one to three times daily, the frequency depending on the amount of discharge. The patient is kept in bed for a week; and after that, if there is no pain or fever, she is allowed to be up and about.

The tube should be left in place as long as there is a cavity to discharge—varying in different cases from two to six weeks. If, after the large tube has been in for a week, the patient complains of pain on bowel movement, or other pain in pelvis, remove the tube and introduce a smaller one.



6. If a **mass of exudate** that may or may not contain pus is found **high** in the pelvis, do not disturb it during the acute attack unless the patient's life is threatened by the severity of the process. Avoid abdominal operation in the primary acute attack, if possible. There are two reasons for this—first, the patient may recover completely under the minor measures and, second, if extirpation of the mass is finally necessary, it can be carried out later with much less danger to the patient. There is less danger later because collections of pus in the pelvis become less virulent after a time. In many old pelvic abscesses the bacteria are dead and the pus is sterile, and extensive contamination of the field of operation fails to cause peritonitis. If, on the other hand, the operation is done early while the bacteria are still virulent, contamination of the field is very likely to result in fatal peritonitis.

In mentioning the fact that the majority of inflammatory masses in the pelvis become sterile after a time, attention must be called to an exceptional class—namely, the streptococcal cases. In the streptococcal masses automatic sterilization or attenuation is uncertain. Though sometimes present, its occurrence can never be counted on. In streptococcal masses the bacteria have been found active and virulent after long periods—even years. Consequently, in these cases intraperitoneal operation is never safe. This point is further considered under Chronic Inflammation.

In these cases of acute or subacute inflammatory mass or infiltration without a distinct pus collection readily accessible from below; the general and special conservative measures are to be persisted in until chance of cure by such means has been eliminated.

7. **High Cellulitis Abscess.**—Occasionally a streptococcal or staphylococcal abscess in the pelvic connective tissue will approach the surface in the lower abdomen, instead of at the vaginal vault. In such a case, if the pus cannot be reached per vaginam, it may be practicable to drain the abscess extra-peritoneally by operation above Poupart's ligament. This is entirely practical when the abscess is situated in the broad ligament (as most streptococcal abscesses are) and it has proved a life-saving measure in several instances. The route followed is the same as for ligation of the external iliac artery. In all but exceptional cases, however, an abscess actually in any part of the broad ligament can be reached and drained satisfactorily per vaginam by one experienced in vaginal work.

8. If the inflammation takes the form of a **rapidly spreading peritonitis**, with little or no limiting exudate, or in spite of limiting exudate, it may be necessary to open and drain the peritoneal cavity, by either vaginal section or abdominal section, or both. Such cases are seen principally in pelvic inflammation following labor or miscarriage, and constitute a severe type of puerperal sepsis. The inflammation may have extended directly through the wall of the uterus to the peritoneum, or first to the fallopian tubes and from there to the peritoneum. In either case there is a rapidly spreading peritonitis of virulent type, and the patient is in a desperate condition. There are two methods of dealing with these cases:

*Vaginal Section.*—Open into the pelvic cavity by posterior vaginal section and let the infected peritoneal fluid run out. Palpate the uterus and appendages, and, if a collection of pus is found, evacuate it. Put in a large size rubber drainage tube and pack the pelvis lightly with gauze, letting the ends extend out into the vagina. The gauze may be removed in a day or two, but the drainage tube should be left in place.

*Abdominal Section.*—Open the abdomen by incision in the median line and make free drainage with red rubber tubing to the depth of the pelvis, with or without removal of the affected tube or tubes, as seems best in the particular case.

Of the two methods of pelvic drainage, the first (vaginal section) is the preferable one in the majority of cases of acute virulent pelvic peritonitis if the inflammation is still confined to the pelvis. When the general peritoneal cavity is not involved, vaginal section accomplishes all the important results that can be accomplished by abdominal section—the emptying of pus pockets and free drainage of the infected area—and with much less danger to the patient. Of course, if the infection has already extended to the higher portions of the peritoneal cavity, there may be pockets of septic fluid in the central abdomen which cannot be evacuated from below. Under such circumstances abdominal operation is usually required, either alone or in combination with vaginal drainage. In addition to drainage of the infected peritoneal cavity by vaginal section or abdominal section, or both, there are certain other measures of much importance in acute peritonitis—namely, stomach lavage and withholding nourishment by mouth (to prevent injurious intestinal peristalsis), Fowler posture (for drainage), and the introduction of large quantities of normal saline solution into the system (to strengthen the vital organs and aid elimination).

**9. X-ray Treatment.**—X-ray treatment is being employed with good results in an increasing number of types of acute inflammation, and it is worthy of trial in pelvic inflammation.

### CHRONIC PELVIC INFLAMMATION

Not all cases of acute pelvic inflammation result in chronic salpingitis, many undergoing curative resolution with only nonsymptomatic sequelae remaining, such as a few adhesions and some old cellular infiltration. This curative resolution without subsequent disturbance may occur in any kind of acute pelvic inflammation but is most frequent in the streptococcal and staphylococcal types which, though more immediately dangerous to life, are more likely to clear entirely if the patient survives. As the infections of this type extend primarily to the pelvic connective tissue instead of the tubes, the persisting lesions, if any, are usually of the broad-ligament rather than the tubal type. Gonococcal inflammation is the type most likely to progress along the mucosa into the tube and to remain there as a chronic salpingitis.

The inflammatory process may be situated principally in the fallopian tubes and pelvic peritoneum, or it may be in the pelvic connective tissue. In chronic pelvic inflammation the different forms of the disease are more distinct than in the acute variety. That is, the cases may be divided into distinct groups, representing different localizations of the inflammatory process and differing considerably in etiology and pathology and symptomatology. It is convenient to divide them into two groups—(a) chronic salpingitis (including complicating oophoritis, pelvic peritonitis, exudate, and adhesions) and (b) chronic pelvic cellulitis (parametritis).

**CHRONIC SALPINGITIS**

Chronic salpingitis is due to acute salpingitis. In practically every case of genital origin there has been endometritis due to infection following labor, miscarriage, gonorrhoea, or instrumentation. From the endometrium the inflammation extends to the tube, causing first acute salpingitis and later chronic salpingitis.

In chronic salpingitis, the serous exudate (whether in the cavity or in the tissues of the tube) has been largely absorbed and the infected areas are surrounded by protective plastic exudate. Any collection of pus is well walled in, and in some cases is sterile from long standing. The adhesions, which at first were simply fibrinous exudate are now organized and contain fibrous tissue and



Fig. 878.



Fig. 879.

Fig. 878.—Chronic salpingitis. Cross-section of tube near outer end. Gyn. Lab.

Fig. 879.—Chronic salpingitis. Cross-section of tube near uterine end. Notice the agglutination of the folds and total disorganization of the tubal interior in this and the preceding specimen. Gyn. Lab.

small vessels. The interior of the tube normally presents the beautiful complex system of mucosal folds with waving cilia on the surface and the functioning cells underneath, as shown in Figs. 99 to 103. In chronic salpingitis the folds become swollen and agglutinated and the interior of the tube becomes disorganized, as shown in Figs. 878 to 880.

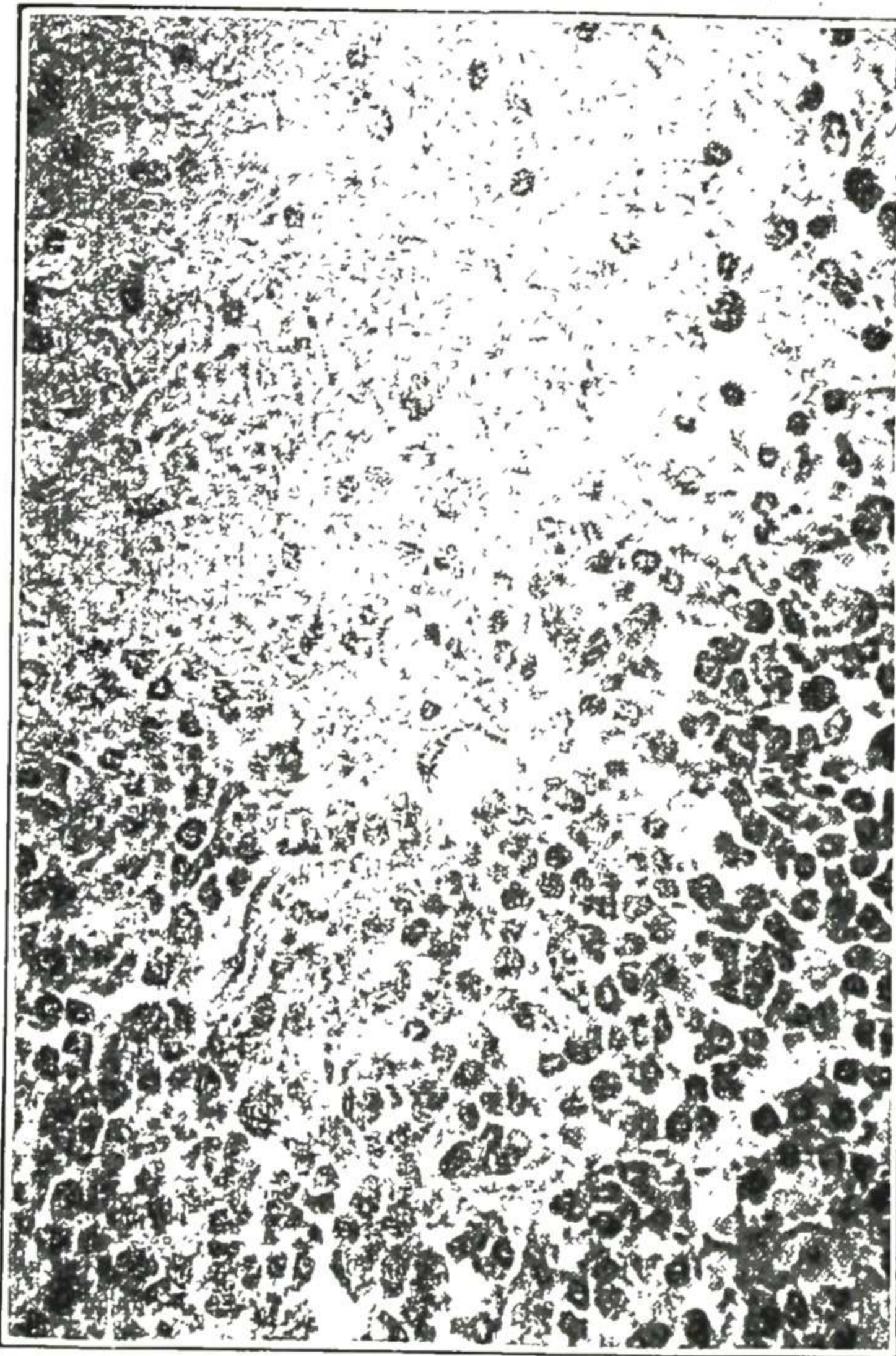
The inflammatory round cell infiltration extends throughout the tube wall, and in this chronic stage is characterized by the large number of plasma cells, as shown in Fig. 881, *A*. Plasma cells are distinguished by their eccentric nucleus, as shown in Fig. 881, *B*. They may be further identified by the Unna-Pappenheim stain, which leaves them a bright red.

## Types of Lesions

In chronic inflammation of the tube there is found much the same variety of pathologic changes as has been mentioned under Acute Inflammation. However, the serous exudate has been largely absorbed. The adhesions, which at



Fig. 880.—Chronic salpingitis. Low power from the specimen in Fig. 879, showing pus in the tube lumen (at left), marked inflammatory infiltration and destruction of folds. Gyn. Lab.



A.



B.

Fig. 881.—A, Chronic salpingitis, high power from Fig. 880, showing the cells of the inflammatory infiltration. Most of these are plasma cells. B, Chronic salpingitis, very high power from A, showing details of the plasma cells, especially the characteristic fragmented nucleus eccentrically placed. Gyn. Lab.

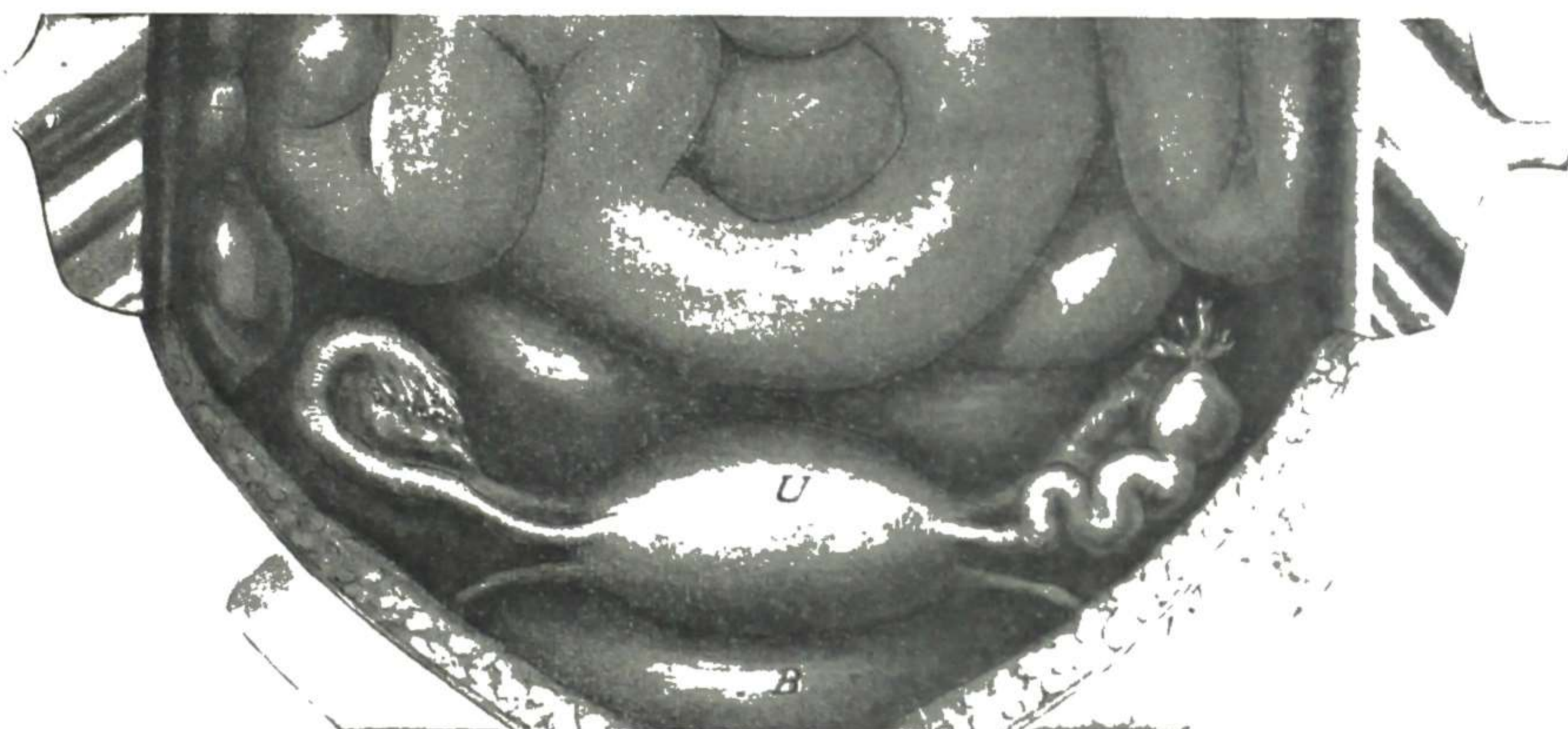


Fig. 882.—Mild salpingitis on the left side. Contrast this with the normal right tube. Notice the enlargement and tortuosity of the affected tube, and also the distortion of the fimbriae.

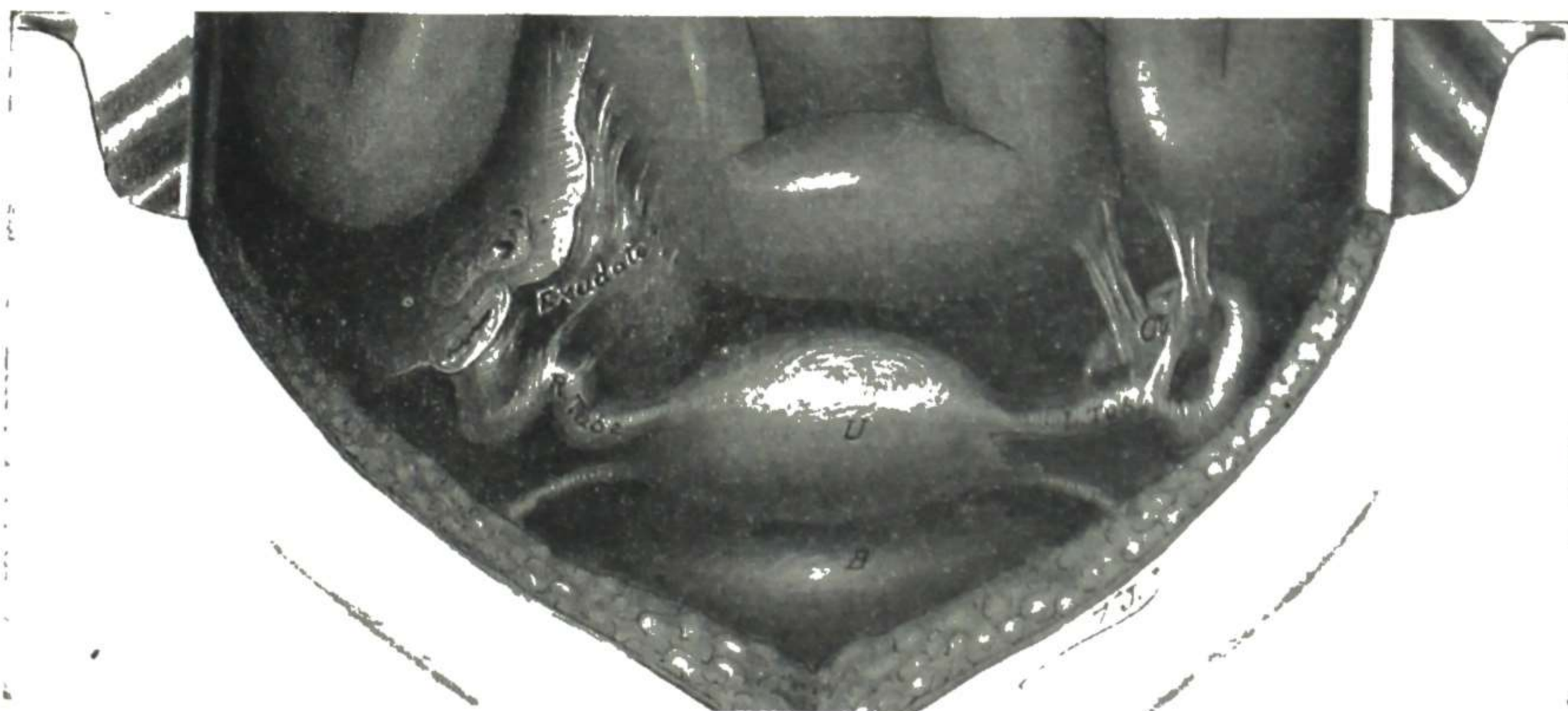


Fig. 883.—Salpingitis with exudate. On left side is indicated salpingitis with a few adhesions. On right side is indicated salpingitis with extensive exudate and adhesions. The section indicates the relation of the thickened tube, the ovary, and the surrounding exudate.



Fig. 884.—Pyosalpinx. Left tube distended with pus, but with few adhesions. Right tube distended with pus and surrounded by extensive adhesions. The section on the right side indicates the relation of the distended tube to the surrounding structures. The sectioned ovary is indicated dimly below and to the outer side of the enlarged tube, which has fallen behind and to the inner side of it.

first were simply fibrinous exudate, are now organized and some may become stretched into long bands or attenuated cords, owing to the constant movement of the organs. The cases may be divided in classes as follows:

1. **Mild Salpingitis** (Fig. 882).—In the cases of this class the ends of the affected tube are occluded and the fimbriae, matted together and distorted, are frequently adherent to the ovary or some other adjacent organ. The wall of the tube is thickened and the cavity is empty.



Fig. 885.—Pyosalpinx with no adhesions. (Kelly—*Operative Gynecology*.)

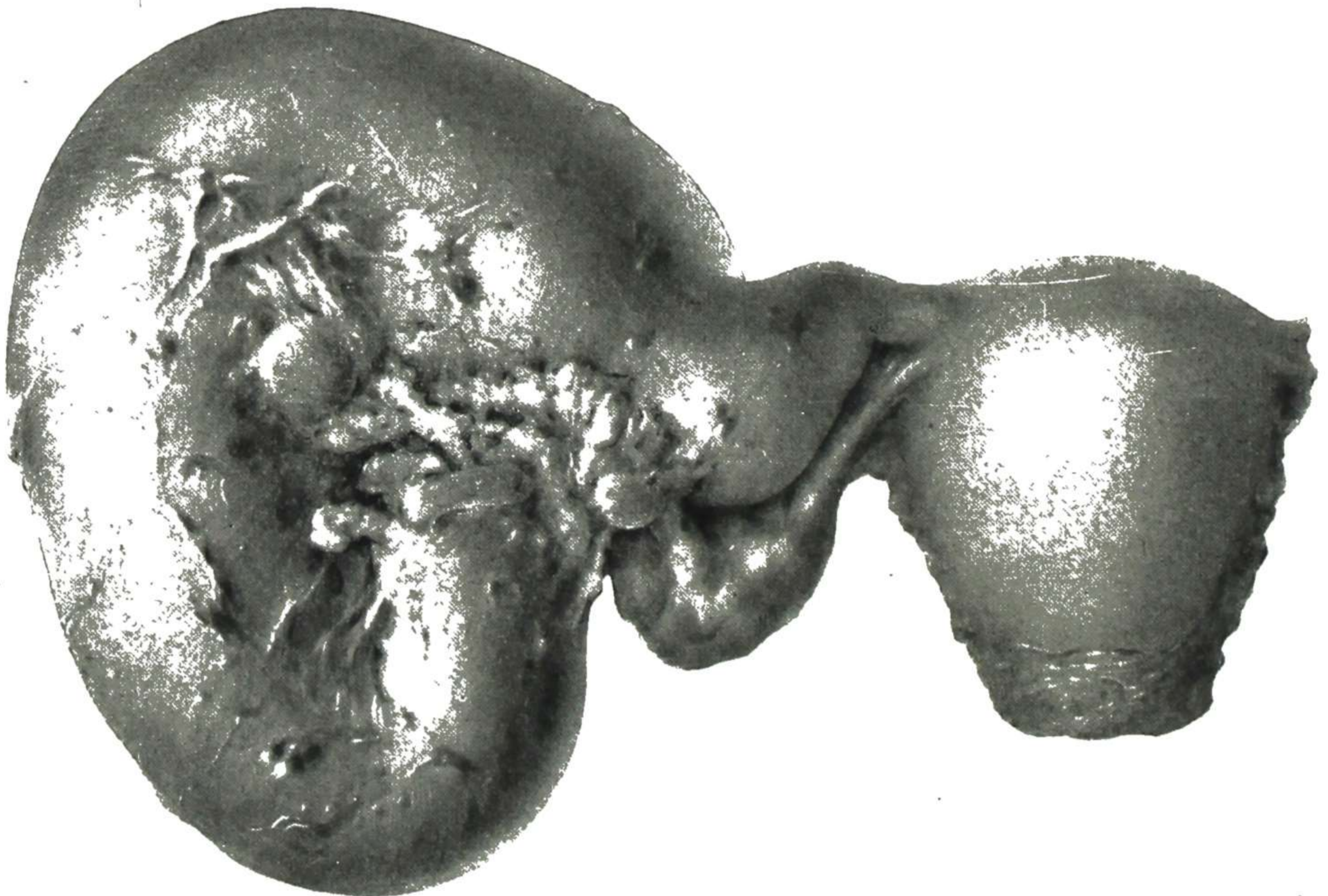


Fig. 886.—A very large pyosalpinx, removed intact together with the uterus. The specimen was photographed from the back and shows the ovary and the tortuous appearance of the greatly distended left tube. Gyn. Lab.

2. **Salpingitis With Exudate** (Fig. 883).—In the cases of this class there is a mass of exudate about the tube, binding together the adjacent organs, with more or less damage to the various organs involved.

3. **Pyosalpinx** (Figs. 884 to 888).—The occluded tube contains a collection of pus. There may or may not be extensive exudate and adhesions. There is no pus outside the tube.

These tubes may gradually enlarge until of great size (Figs. 886, 887), or the inflammation may break through and cause extensive peritubal adhesions, as shown in Figs. 884 and 888. The affected tubes are usually thick-walled and contain pus (Fig. 887), which may be still infective or may be sterile. Ordinarily in these closed cavities gonococci are automatically killed

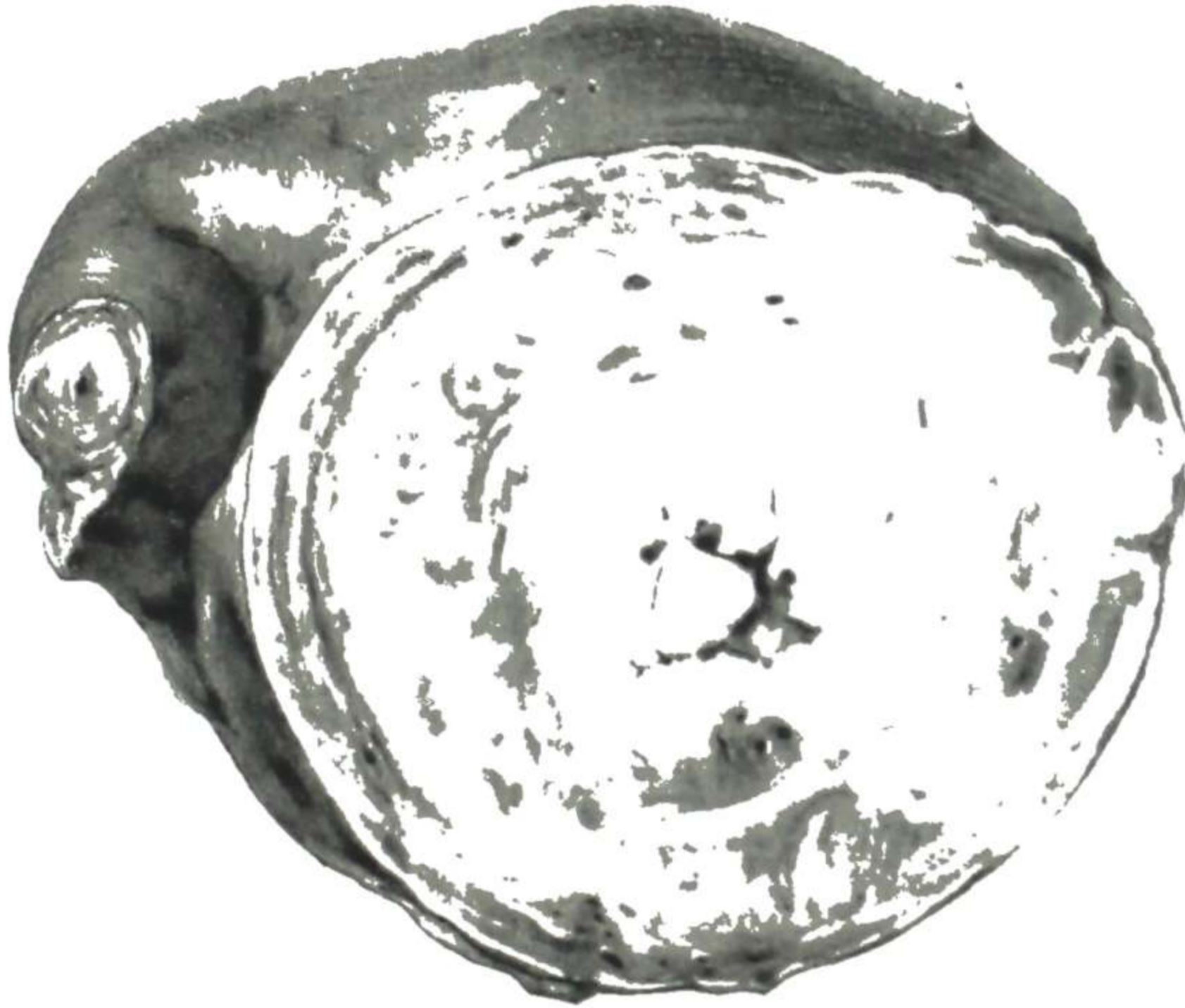


Fig. 887.—Section through a pyosalpinx, contrasting the fairly normal uterine end of the tube (to the left) with the distended portion. The pus in the tube has been hardened by preservation of the specimen in formalin. Gyn. Lab.

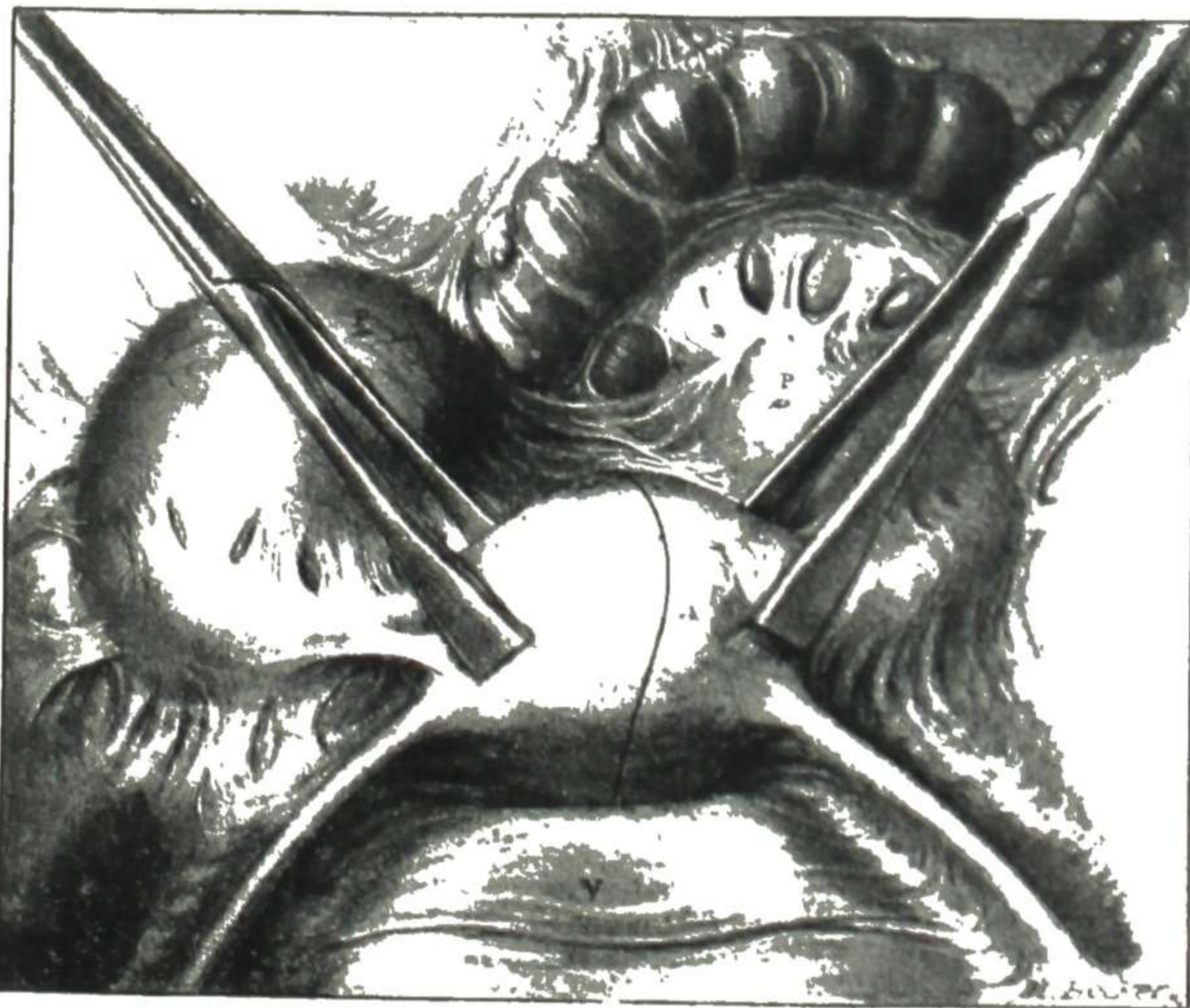


Fig. 888.—Pyosalpinx with very extensive adhesions. (Kelly—*Operative Gynecology*.)

by their own products in three or four months. The large sterile tubal abscess remains as a foreign body, causing persistent or recurring disability. Not infrequently there is secondary infection by colon bacilli or other bacteria, coming in from adjacent organs or by the blood stream.

**4. Ovarian Abscess.**—The inflammation may extend to the ovary, forming an ovarian abscess in connection with a tubal abscess, as indicated in Fig. 889.

right side of pelvis. More rarely there is a distinct ovarian abscess without evident pus formation in the tube, as indicated on left side of pelvis.

5. **Diffuse Pelvic Suppuration** (Fig. 890).—In the cases of this class the pus has extended outside the tube. As the pus extends in various directions,



Fig. 889.—Ovarian abscess. A window, cut in the wall of the abscess on the right side, shows that it is composed of a tubal portion and an ovarian portion (tuboovarian abscess), with a communication between the two cavities. On the left side is indicated an abscess involving the ovary only, which is a much rarer condition.

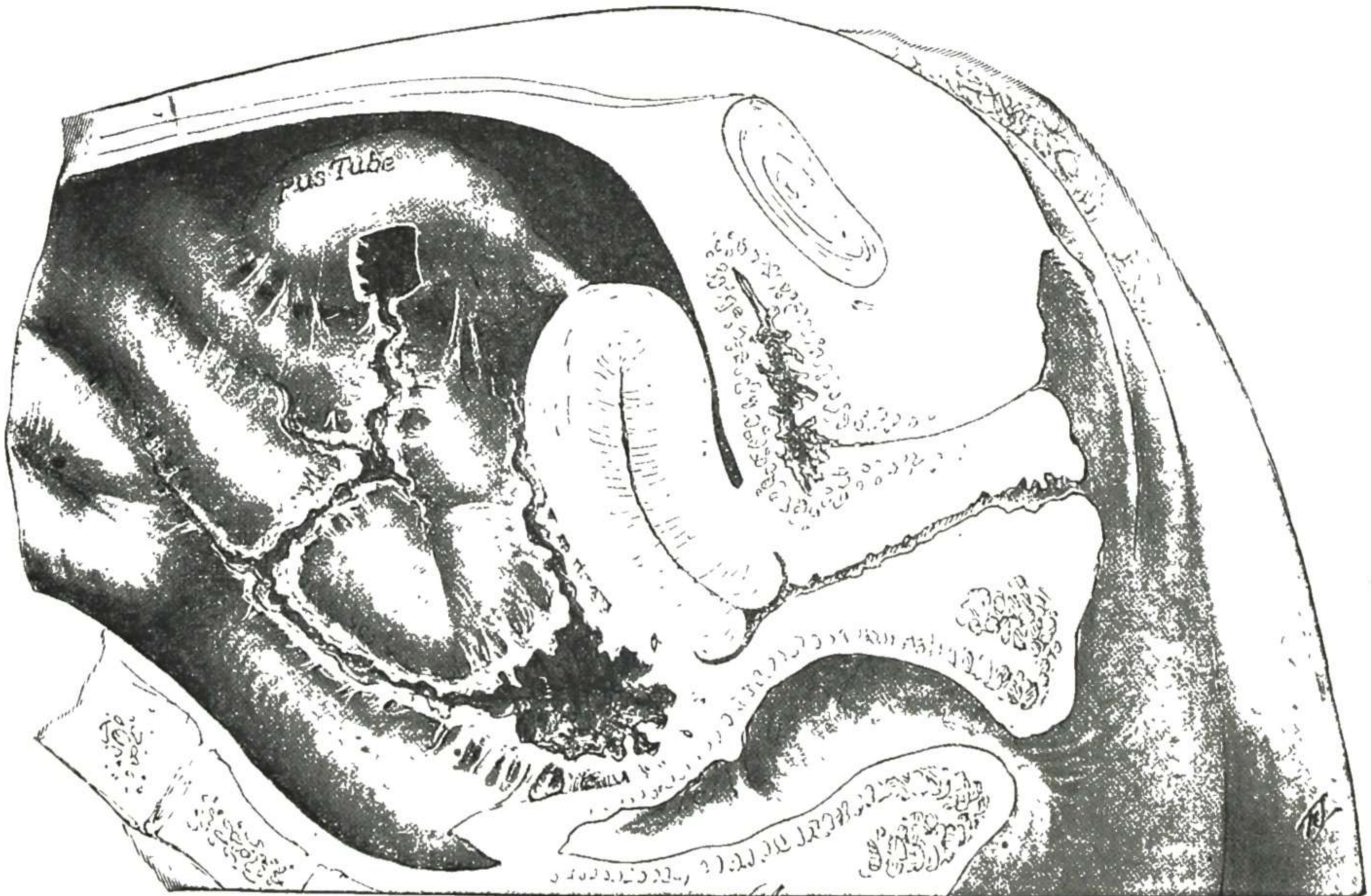


Fig. 890.—Diffuse pelvic suppuration from pyosalpinx. The pus has broken through the tube wall, spread among the intestinal coils and gravitated to the cul-de-sac. A window, cut in the distended tube, shows the connection of the suppurating tract with the tubal cavity.

the exudate extends in front of it, shutting it off from the general peritoneal cavity. As in acute inflammation, this process may extend until all the pelvic organs are bound together in an irregular mass, with pus lying in the spaces between them.



6. **Hydrosalpinx** (Fig. 891).—The tube may be much distended and contain serous fluid, but no pus. As the result of the pressure of the fluid within the closed tube the largest part of the mucous lining is destroyed. Only here

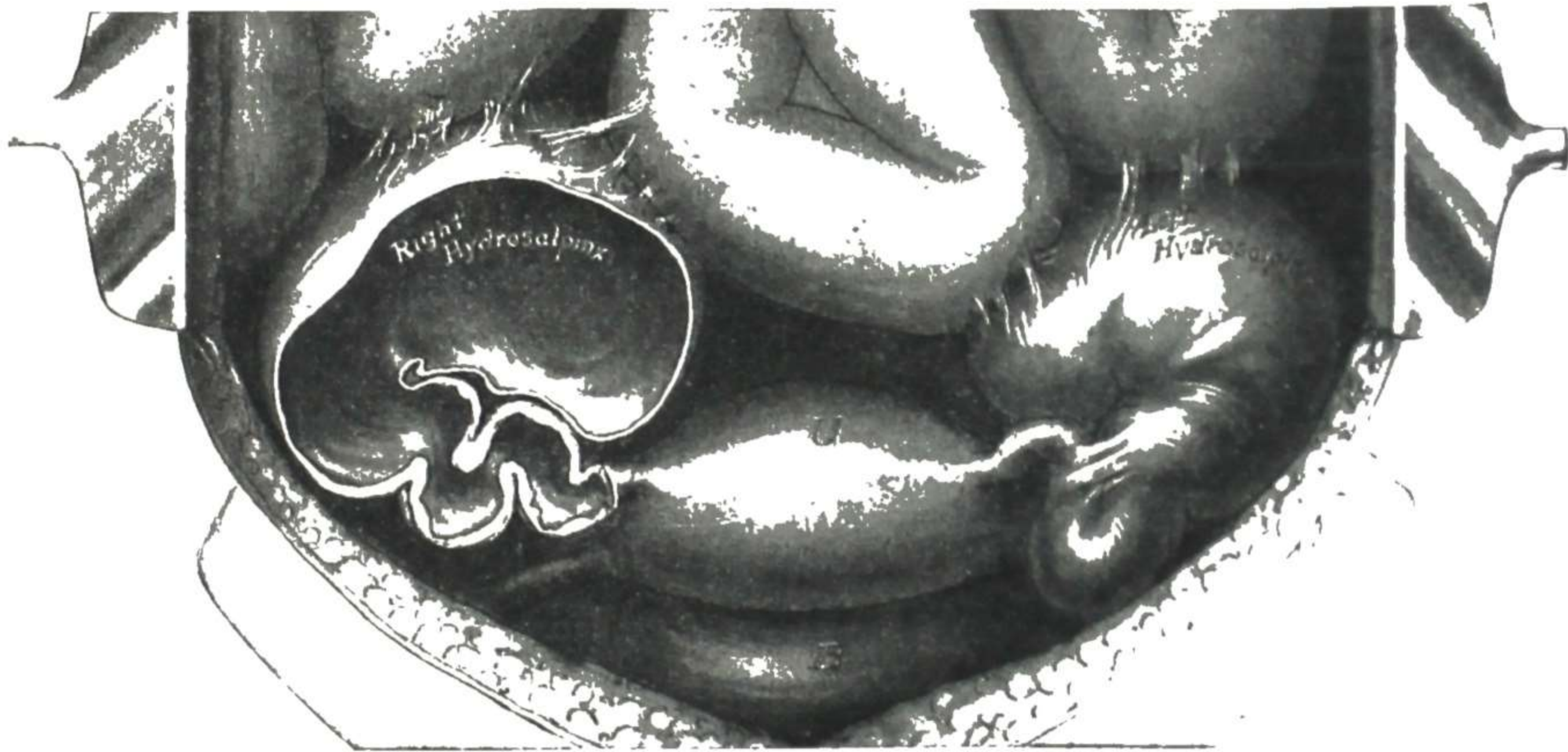


Fig. 891.—Double hydrosalpinx. The sectioned right tube indicates clearly the marked thinning of the wall found in these cases.



Fig. 892.

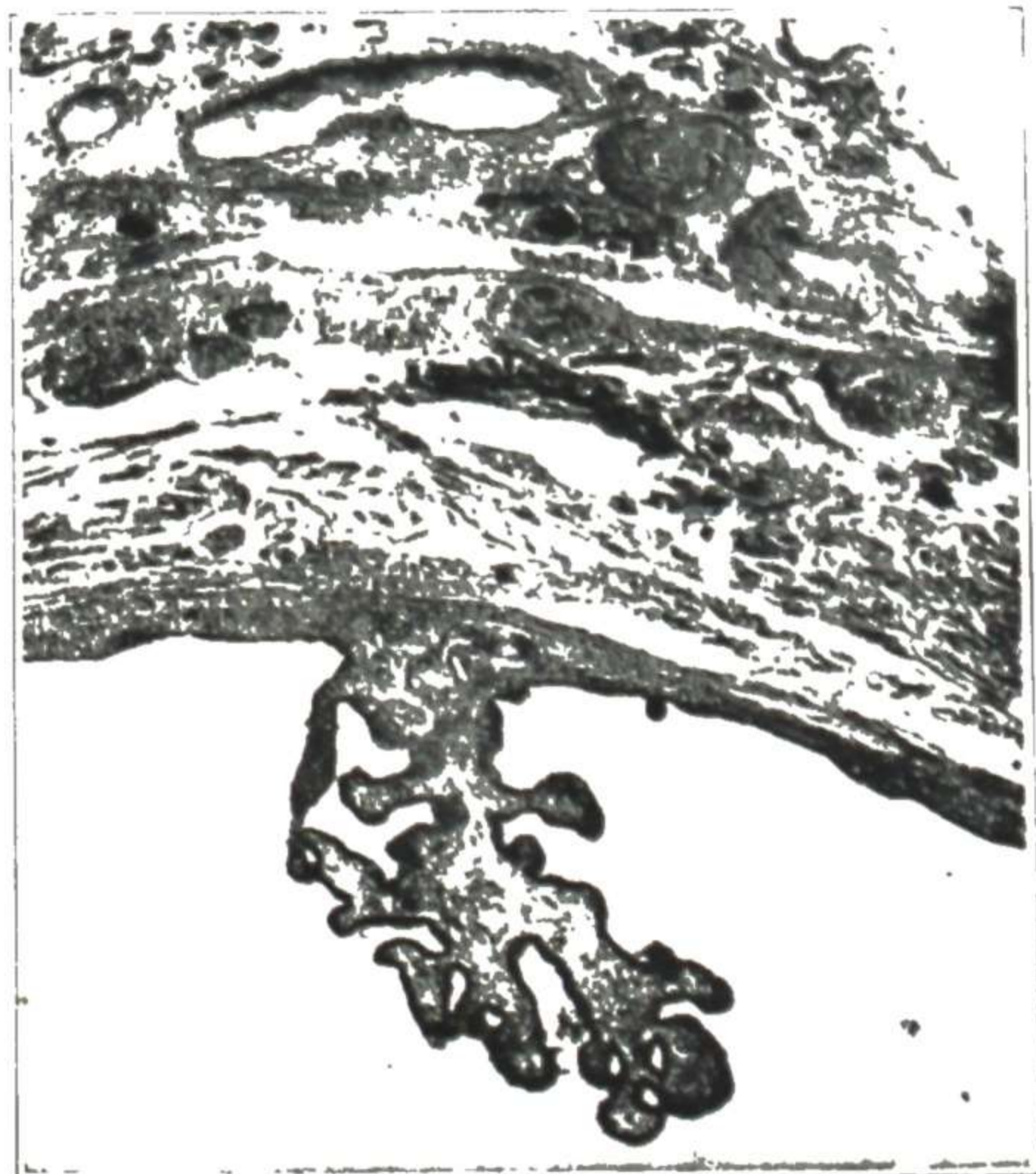


Fig. 893.

Fig. 892.—Hydrosalpinx. Notice how the pressure of the fluid destroys the mucosal folds, leaving only a few remnants.

Fig. 893.—This shows, under higher power, the small fold-remnant at the top in Fig. 892. Gyn. Lab.

and there a preserved typical fold can be seen. There may or may not be many adhesions. This condition is designated hydrosalpinx, and is usually the result of a very low-grade infection. The fimbriae in the chronic pus tubes

and in hydrosalpinx are usually found adherent, retracted toward the lumen. This is due to the fact that the fimbriae are merely continuations of the mucous lining of the tube, and with the chronic inflammation and resulting fibrous contraction, are drawn in mechanically. These tubes are often bound in the cul-de-sac by adhesions.

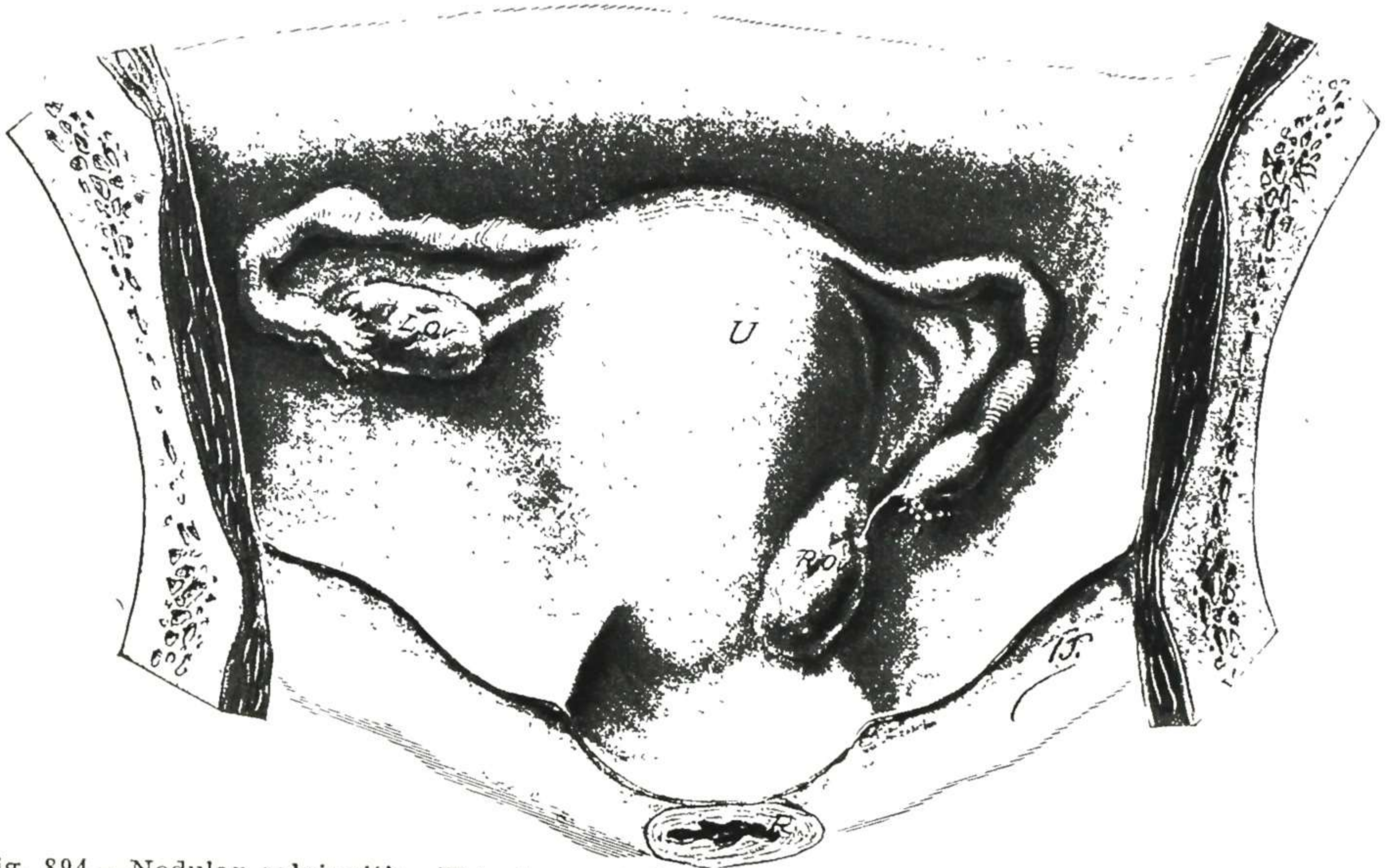
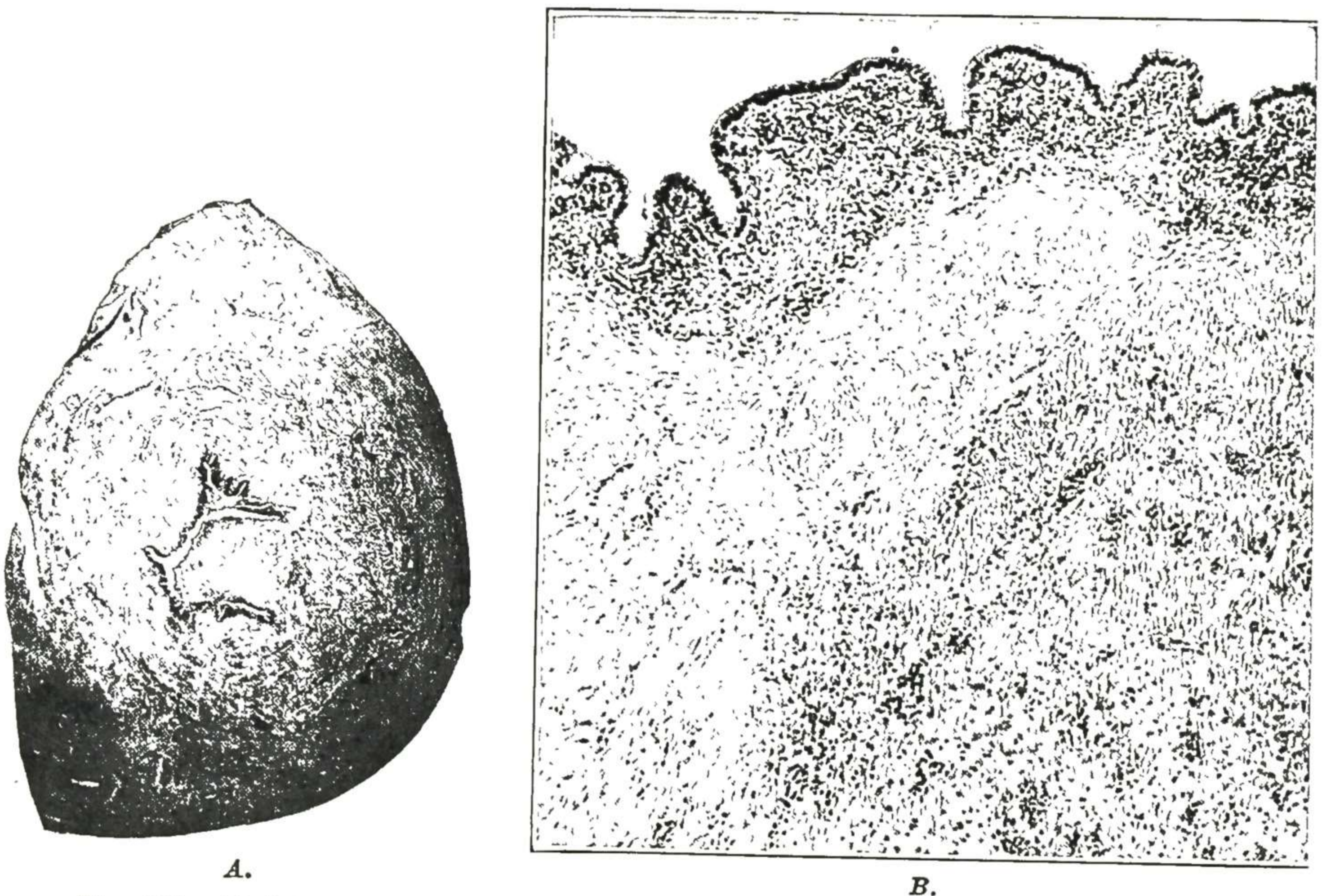


Fig. 894.—Nodular salpingitis. This form of chronic salpingitis is usually bilateral, and is often accompanied by prolapse of the tube or ovary on one or both sides.



A.

B.

Fig. 895.—Nodular salpingitis, cross-section. *A*, Shows a markedly thickened tube. The thickness is due entirely to chronic inflammation and fibrous tissue formation in the wall. The lining epithelium is intact—see *B*. *B*, High power of *A*. Notice inflammatory infiltration of the wall and the intact epithelial lining of the cavity. Gyn. Lab.

The distention of the tube tends to flatten out the folds till only remnants remain, as shown in the photomicrographs in Figs. 892 and 893.

**7. Nodular Salpingitis.**—The wall of the tube becomes greatly thickened, the thickening being so irregular as to give the tube a distinctly nodular appearance, as indicated in Fig. 894. Usually both tubes are affected, and frequently there is also chronic oophoritis of one or both sides. The microscopic picture is shown in Fig. 895.

**8. Adhesions.**—There is a class of cases of chronic salpingitis in which the tubal trouble is slight or has largely disappeared, but the resulting peritoneal adhesions are extensive and troublesome, dislocating the tubes and ovaries and holding them firmly in abnormal positions. In such cases all active infection may have disappeared, leaving only the sequelae, consisting of exudate, adhesions, and distortions, as indicated in Fig. 896.

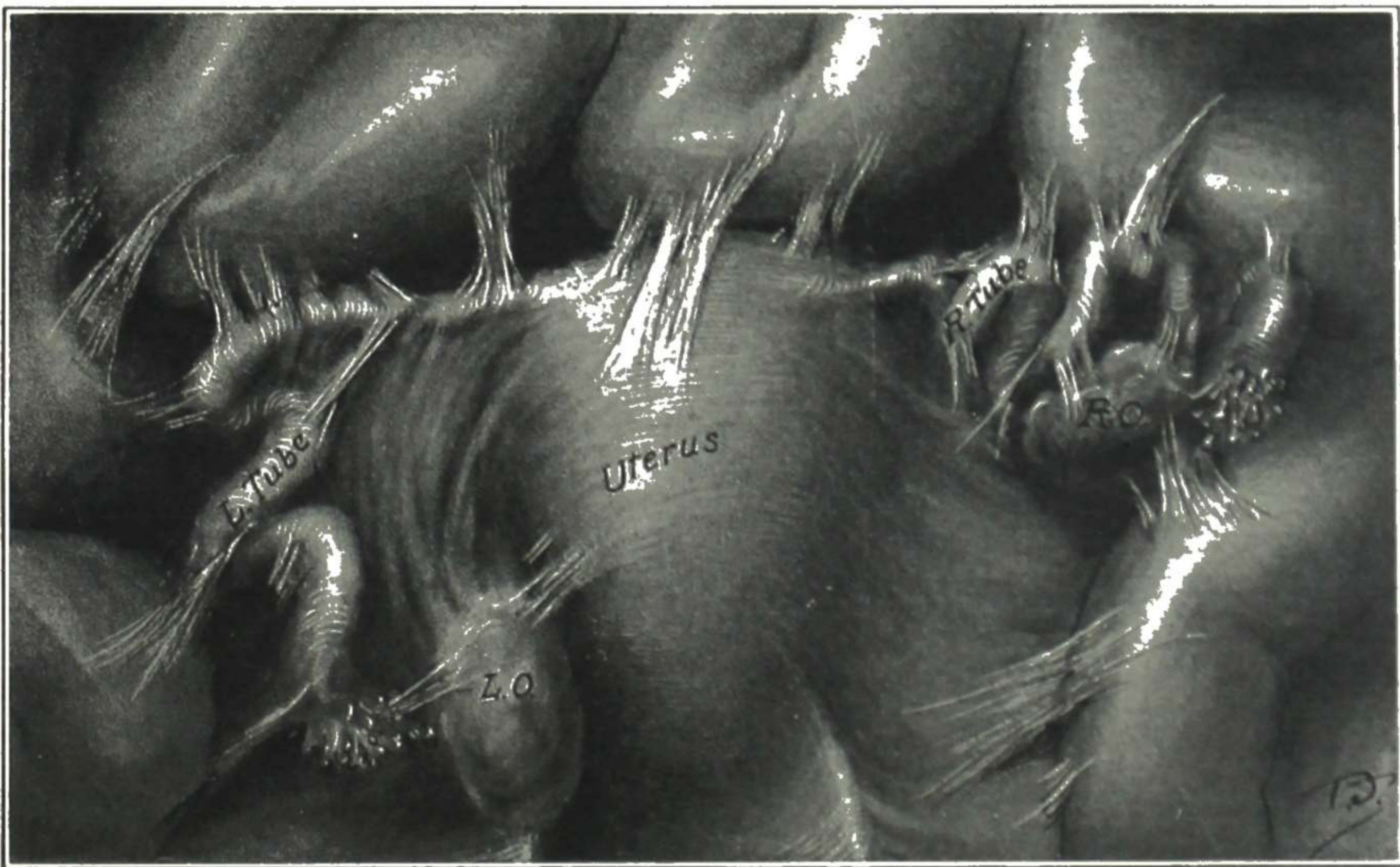


Fig. 896.—Multiple adhesions from chronic pelvic inflammation. This illustration represents a posterior view of the pelvic organs, with the intestinal coils pushed upward and to the sides to show the numerous adhesions.

### Symptoms

The symptoms of which the patient complains in chronic salpingitis are **backache** and **pain in the pelvis**, increased by walking or working. There is **tenderness** in the lower abdomen, usually over one or both tubes. There are decided **menstrual disturbances**, consisting of painful menstruation, prolonged menstruation, and an increase of all the troublesome symptoms at the menstrual periods. The patient complains of **weakness** and loss of weight, and an inability to stand walking or working as she formerly did. **Vaginal discharge** is usually present, due to the accompanying endometritis. There occur also **exacerbations**, in which the patient has sharp pain and some fever, and is sick in bed from a few days to several weeks.

On examination there is found **tenderness** in the tubal region of one or both sides and in most cases a **mass** in the same region. If the inflammation

is slight, there may be no mass of exudate, but simply a thickening of the affected tube. If the inflammation is more marked, there is a distinct mass beside the uterus in the tubal region, fixing the uterus to the pelvic wall. If the inflammation is still more marked, the posterior cul-de-sac contains a mass of exudate, or the whole pelvis may be filled with a mass, which forms a wall above the plane of the vagina (Fig. 866), and the uterus is fixed immovably in this roof of exudate. The exudate is tender when pressed upon and, if there is a large **collection of pus**, fluctuation may be felt in the cul-de-sac of Douglas or in the tubal region of one side. The uterus is fixed, and attempts to move it cause pain. The amount of **fixation** or limitation of movement depends, of course, on the extent of the exudate and adhesions.

The cases of chronic salpingitis frequently present also complications—laceration of pelvic floor, laceration of cervix, retroversion of uterus, and chronic endometritis. These conditions should be searched for and noted, for they must be taken into consideration in the treatment.

### Diagnosis

The diseases which may be confounded with chronic salpingitis, and which therefore must be taken into consideration in the differential diagnosis, are as follows:

- Chronic endometritis.
- Myoma of the uterus.
- Pelvic endometriosis.
- Tubal pregnancy, with chronic symptoms.
- Tuberculosis of the tubes and peritoneum.
- Ovarian and broad ligament tumors.
- Chronic appendicitis.
- Mucous colitis.
- Bladder and rectal affections.
- Pelvic neuralgia.

In **chronic endometritis**, without pelvic inflammation, the trouble is confined to the uterus, and consequently there is no marked tenderness nor any inflammatory mass outside the uterus.

In **myoma** of the uterus usually the symptoms are of gradual onset, and consist principally of menstrual disturbances, particularly increased flow. There is absence of fever and absence of attacks of pelvic peritonitis. The mass is firm, has a definite and rounded outline, is intimately connected with the uterus and there is not the marked tenderness that is found in pelvic inflammation. There is no fixation unless the tumor is large enough to impinge on the pelvic wall. The uterus and tumor are movable together, but not separately.

**Pelvic endometriosis** is a condition often so difficult to differentiate from chronic inflammation that it is well to consult the detailed consideration of symptoms given under that disease.

**Tubal pregnancy**, with chronic symptoms, is a serious condition which has often escaped recognition, because the atypical accompaniments of the supposed chronic inflammation were not analyzed. These are given detailed consideration under Tubal Pregnancy.

**Tuberculosis** of tubes and peritoneum should be suspected when there are decided symptoms of pelvic inflammation in a young woman who has had no opportunity to contract pelvic inflammation—that is, in a woman who has never had endometritis. There is gradual onset, usually, and persistent progress without the marked improvement usually

following the treatment of ordinary pelvic inflammation. There may be encysted ascites—a collection of fluid shut off from the general peritoneal cavity by adhesions—without the marked pain and fever that would come with a collection of pus. Other points are evidence of tuberculosis elsewhere, and emaciation, gradual but marked and persistent, and more than accounted for by the small amount of pain and fever.

**Ovarian and Broad Ligament Tumors** present a gradual onset of symptoms. There is absence of fever and of marked menstrual disturbance and of severe attacks of pelvic peritonitis. There is usually a definite tumor mass without particular tenderness and without fixation. In the case of an ovarian tumor the mass can usually be moved about in the lower abdomen. There may be distinct fluctuation without marked tenderness, indicating that the fluid is not pus.

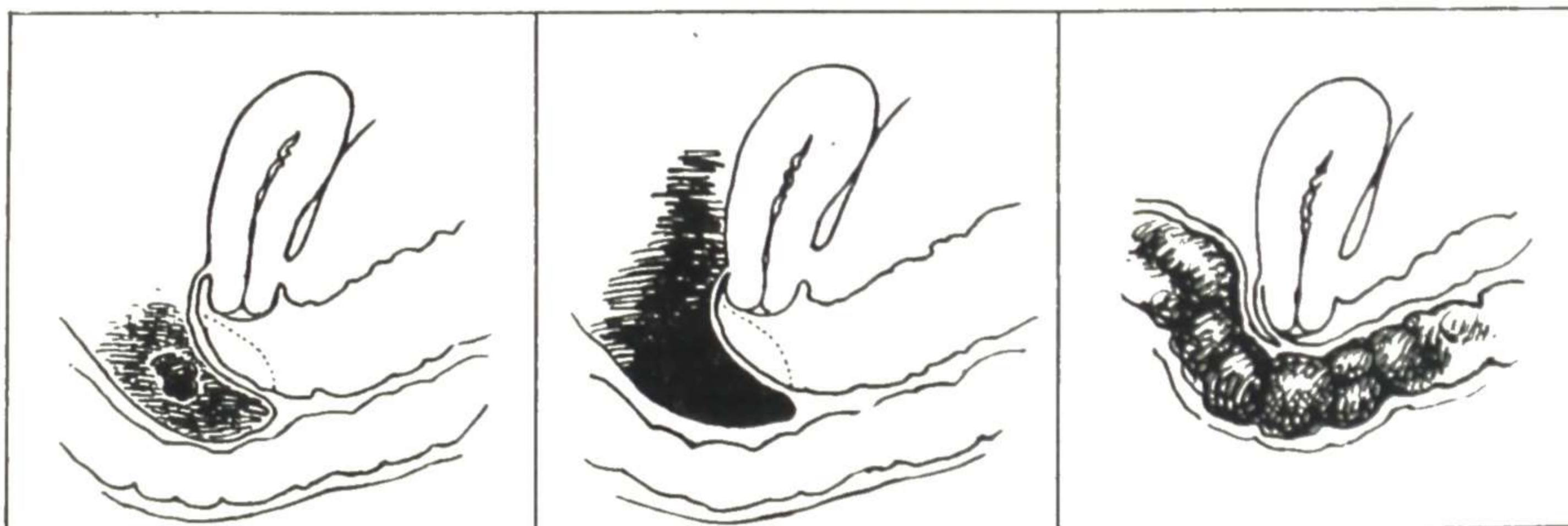


Fig. 897.

Fig. 898.

Fig. 899.

Figs. 897 to 899.—Differential diagnosis of pelvic inflammation. A mass low behind cervix. Fig. 897, Inflammatory mass filling cul-de-sac. Fig. 898, Blood filling cul-de-sac. Fig. 899, Fecal mass distending rectum back of cervix.

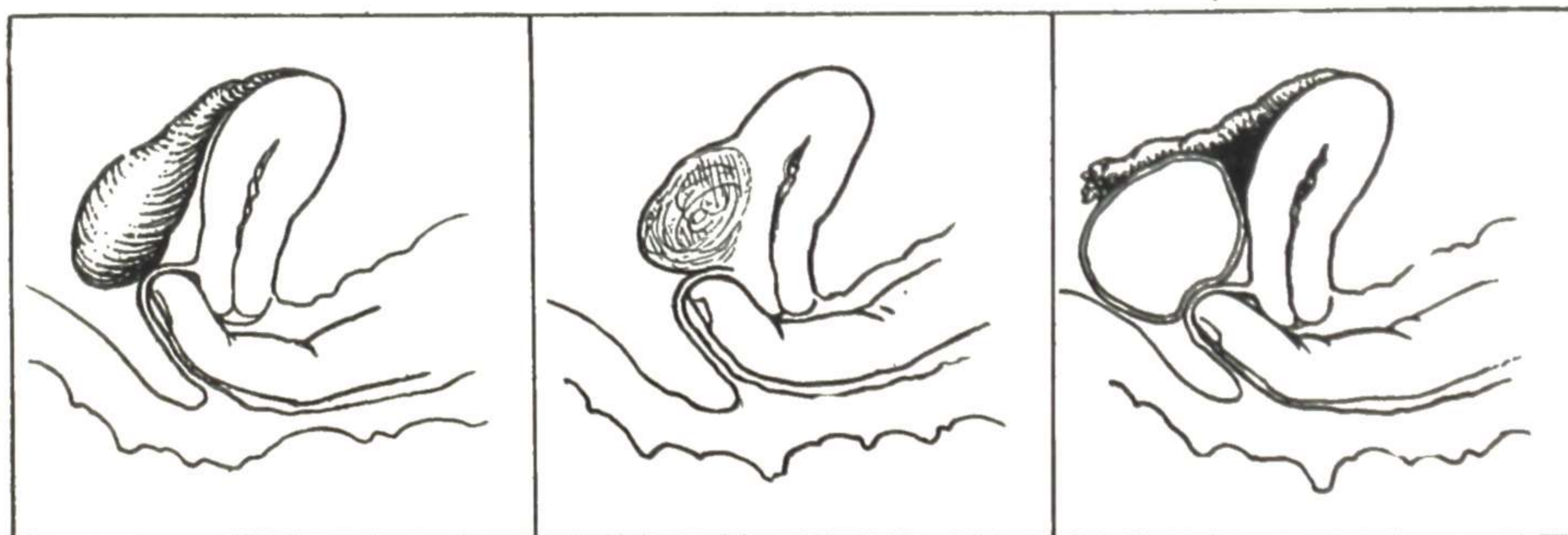


Fig. 900.

Fig. 901.

Fig. 902.

Figs. 900 to 902.—Differential diagnosis of pelvic inflammation. A rounded mass rather high in cul-de-sac. Fig. 900, Tubal mass. Fig. 901, Small myoma on posterior wall of uterus. Fig. 902, Small ovarian cyst.

**Chronic Appendicitis** may be difficult to differentiate from chronic salpingitis of the right side. The facts pointing to appendicitis are as follows:

a. High location of the painful area, at McBurney's point, without a painful area at the site of the fallopian tube.

b. Stomach and intestinal disturbance, preceding and accompanying an attack. Also pain in the region of the umbilicus, rather than in the back.

c. High location of the mass of exudate—not felt so well from vagina as would be a mass about the fallopian tube.

d. Absence of endometritis and absence of a history of previous uterine sepsis or gonorrhoea.

e. No marked increase of the trouble at the menstrual periods. Even appendicitis may show some increase then, but it is not so marked as in salpingitis.

In a case of inflammation in the right lower abdomen in a girl, or in a woman who has never been pregnant nor had any uterine infection, the trouble is more likely to be appendicitis. On the other hand, in a case of inflammation in that locality in a woman who has once had infection of the uterus, the probability is in favor of salpingitis. In some cases it is impossible to make a positive differential diagnosis until the abdomen is opened. In fact, it not infrequently happens that both structures are involved in the inflammatory process, the inflammation beginning in the tube and extending to the appendix or beginning in the appendix and extending to the tube.

Other **intestinal diseases** also must be excluded. Mucous colitis is the one which has most frequently been mistaken for chronic tubal or ovarian inflammation. The points that distinguish mucous colitis from chronic pelvic inflammation are (a) the character of the pain (resembling intestinal cramps and extending throughout the lower abdomen), (b) the passage of characteristic masses of mucus during some of the attacks, and (c) the absence of any palpable pelvic lesion.

There are also diseases of the **urinary organs** that may be confounded with chronic pelvic inflammation. All these affections must be excluded by a knowledge of the symptoms and signs that accompany them.

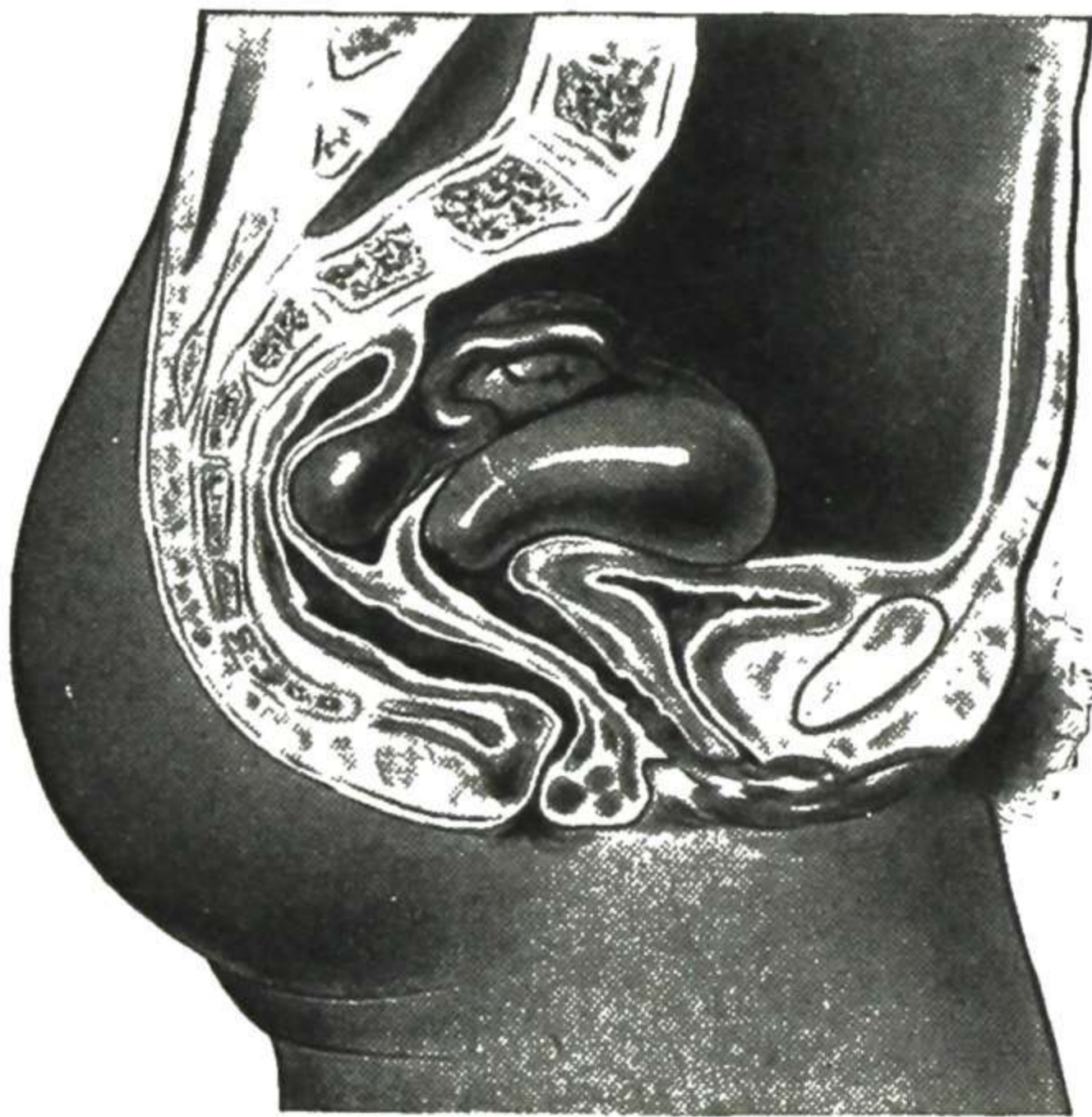


Fig. 903.

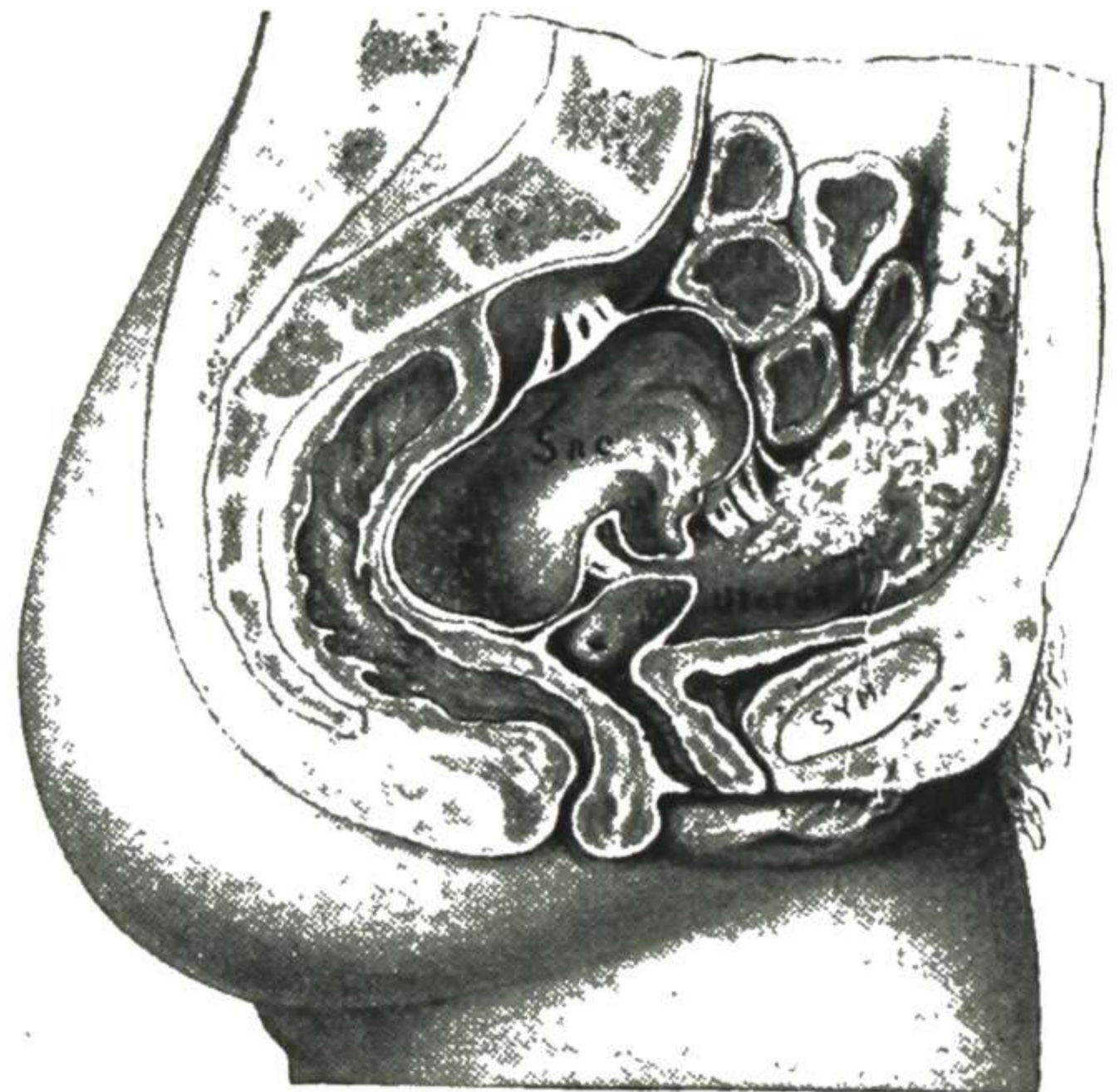


Fig. 904.

Fig. 903.—Thickened tube and ovary prolapsed into the cul-de-sac behind the uterus. (Montgomery—*Practical Gynecology*, The Blakiston Company.)

Fig. 904.—An abscess behind the uterus. (Montgomery—*Practical Gynecology*.)

In **pelvic neuralgia** and in neurasthenia, and in hysteria, without complicating pelvic inflammation, there is no abnormal mass within the pelvis. In pelvic neuralgia the tenderness may be localized along the pelvic nerve trunks (see Fig. 244). Certain conditions in the posterior cul-de-sac area that must be differentiated in examination are indicated in Figs. 897 to 904. Masses occurring in the broad ligament area are indicated in Figs. 905 to 908.

### Treatment

In the treatment of chronic salpingo-oophoritis, there are certain general measures, which are applicable to practically all cases, and there are also special measures which are applicable to special conditions only.

#### GENERAL MEASURES

1. Attention to the general health is important. This includes diminution of work and family care to the point where it is not exhausting, regular sleep, periods of rest (especially at the menstrual time), proper nourishment, elimination, blood making, and special medication needed for any special conditions.

2. Vaginal douches, as needed to take care of any irritating vaginal discharge. These may be the ordinary vaginal douche or the long hot douche, as preferred.

3. Office treatments, for anything which may be improved thereby, and also for observation as to progress under the measures being employed.

#### SPECIAL MEASURES

1. Correction of **local complications** is important. Such associated condition may be a factor in prolonging the trouble, such for example as chronic cervicitis or chronic endometritis persisting from the inflammation which extended to the tubes. In such a case, troublesome chronic salpingitis may sometimes be decidedly benefited by removal of the cervix infection by conization and improvement of intrauterine condition by curettage

2. **Heat treatment** in the form of the electric baker may be employed with benefit in case of exacerbation with acute or subacute symptoms. Also, in some cases a course of chemotherapy in the form of sulfanilamide medication may be beneficial.

3. If there is a collection of pus low in the pelvis, it should be **opened and drained** by vaginal operation, according to the technique given in detail under Acute Pelvic Inflammation (Figs. 868 to 871). In the after-treatment, the drainage tube will have to remain in longer than for an acute abscess of the same size, for the chronic abscesses have thicker walls and hence collapse more slowly.

4. If there is an inflammatory **mass high**, which probably contains pus or which continues to give serious trouble after a thorough trial of the general measures, abdominal operation for the removal of the mass may be necessary.

In this connection it is important to differentiate between tubal masses and inflammatory masses in the connective tissue (cellulitis, parametritis). In the latter, abdominal operation is definitely contraindicated for two reasons. Such masses, being in the connective tissue, cannot be extirpated as can a salpingo-ovarian mass. Again, they are usually due to streptococci, which may be still virulent, and hence if the mass is disturbed at all it should be by vaginal drainage, to avoid peritoneal contamination.

5. **Avoid Radical Operation** in those cases in which the examination shows only a somewhat thickened and tender tube (catarrhal salpingitis), or a slightly enlarged and sensitive and perhaps prolapsed ovary (cystic ovary), or adhesions with some induration and fixation, but with no distinct mass. Give a thorough trial of the nonoperative measures previously mentioned, with such additions and modifications as the peculiarities of the case may suggest. Some such cases may be benefited by the special application of deep heat, such as diathermy with its localization of maximum heat to the deep area affected, or the Elliott treatment with its general diffusion of heat throughout the pelvis.

Careful study should be made of the patient generally—of all the organs. In some such cases it will be found that the principal trouble is some general disease or some local disease in another portion of the body, the pelvic disorder being of secondary importance. If nothing is found outside the pelvis

to account for the patient's symptoms and all other measures fail to relieve the pelvic distress, operation is to be considered.

6. In the operative cases, when the patient is under thirty-five years of age and the pathologic condition will permit, it is advisable to **preserve enough ovarian** tissue to continue menstruation and enough fallopian tube to make pregnancy possible, if the organs do not seem seriously involved in the inflammatory process.

Preservation of an organ which is the seat of active chronic inflammation may necessitate another serious operation at a later date, but in those cases in which all active inflammation has disappeared, leaving only adhesions and exudate, it is often possible to preserve in place part of an ovary and part of a tube, which by proper treatment may continue their functions. Even if pregnancy does not take place, the simple fact that it may take place—that it is possible—leaves the patient in a much better frame of mind.

If the uterus must be removed, one ovary at least should be preserved, if it is not diseased, because the preservation of one ovary, or even part of an ovary, tends to prevent those troublesome nervous symptoms which frequently accompany the artificial menopause and which sometimes become serious.

### **CHRONIC PELVIC CELLULITIS (PARAMETRITIS)**

Parametritis is chronic inflammation of the connective tissue surrounding the uterus, being synonymous with cellulitis. There is usually more or less secondary infiltration of the connective tissue in all extensive pelvic inflammations, and sometimes pus of tubal origin will make its way into the connective tissue. Most of the cases of well-marked cellulitis, however, are due to extension of infection directly from the uterus into this region.

#### **Etiology**

Chronic cellulitis is due to a preceding acute cellulitis and consequently has the same causative factors. It is usually due to infection following labor or miscarriage, the bacteria passing directly through the wall of the uterus into the connective tissue or through tears of the cervix. In other cases it can be traced to operation on the cervix, to operation within the uterus, to instrumental examination of the interior of the uterus, or to attempts at abortion. Cellulitis alone (without tubal involvement) is usually due to the streptococcus, staphylococcus, or colon bacillus—practically never to the gonococcus. This point is further discussed under differential diagnosis and selective treatment.

#### **Pathology**

Pelvic cellulitis, like inflammation of connective tissue elsewhere, is essentially an acute or subacute lymphangitis, running its course and ending in resolution or abscess formation, or a mass of unabsorbed exudate and infiltration, which may or may not conceal a focus of pus in its interior. Occasionally the infection will progress through the wall of the uterus as a thrombophlebitis and later break through the broad ligament veins into the connective tissue. The condition in any particular case may vary from a small



area of induration on one side of the cervix to extensive induration, involving the connective tissue all around the uterus and extending out to the pelvic wall on each side. The process may extend forward into the connective tissue beside the bladder, or backward along the sacro-uterine ligaments.

### Symptoms and Diagnosis

The **symptoms** are much the same as those due to salpingitis—namely, backache, pain in the lower abdomen, tenderness in pelvis, and menstrual disturbances. The severe exacerbations, so characteristic of salpingitis, are not

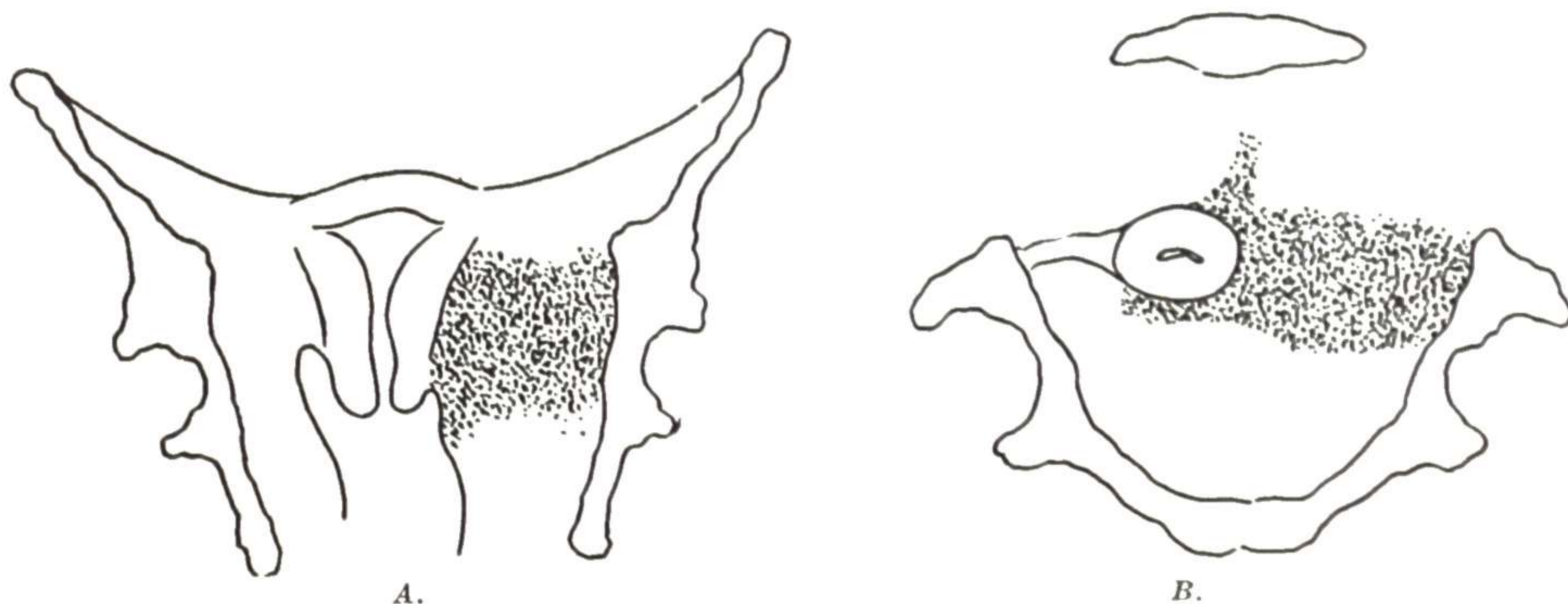


Fig. 905.—Diagnosis of chronic parametritis (pelvic cellulitis). There is firm infiltration in the broad ligament of one or both sides. Notice how the outline of the firm infiltration follows the outline of the connective tissue area. *A*, Vertical side-to-side section. *B*, Transverse section.

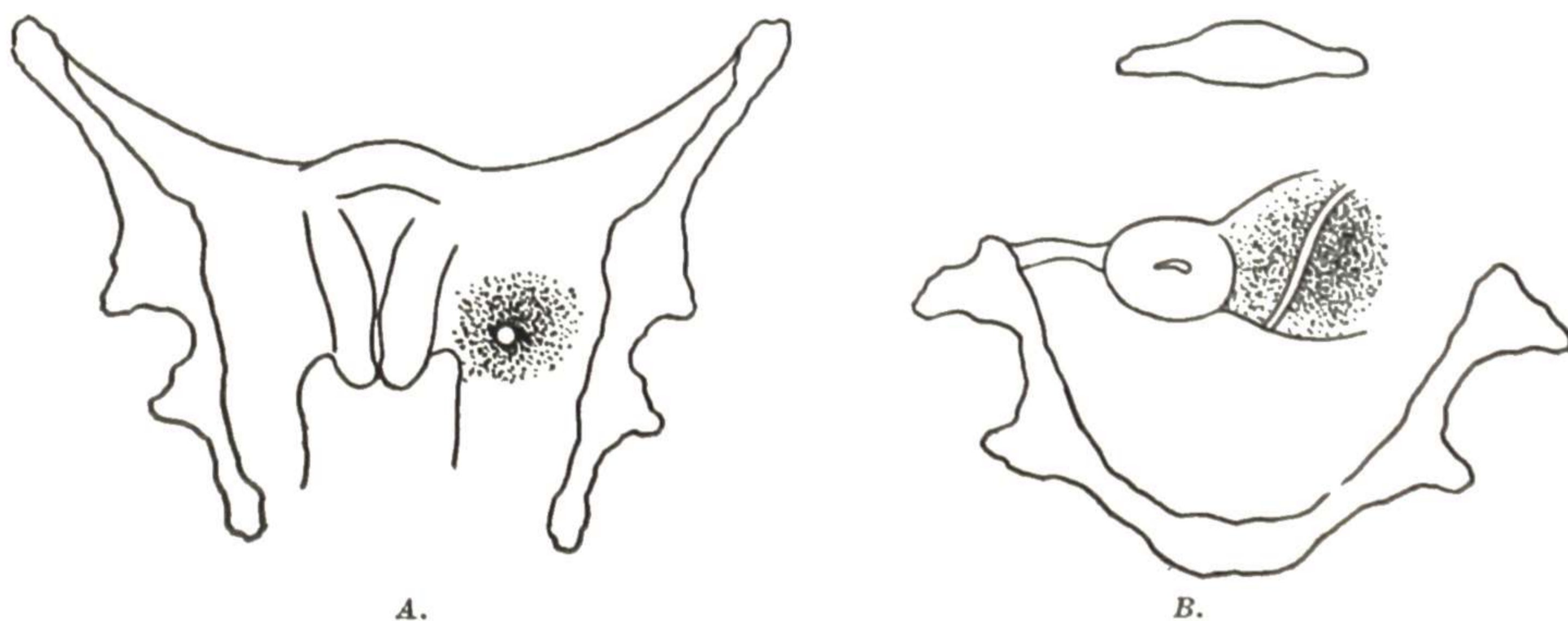


Fig. 906.—Diagnosis of periureteritis. The limited infiltration is in the region of the ureter. Also, there are usually accompanying symptoms indicating cystitis or ureteritis.

present usually in cellulitis, unless there is complicating salpingitis. Often the principal complaint is dyspareunia, the pain in coitus being due to the fact that movement of the cervix causes pain from the adjacent connective-tissue inflammation.

On examination, **induration of extreme hardness** is felt very low in the pelvis and closely attached to the sides of the cervix—the portion of the uterus in contact with the connective tissue (Fig. 905). The marked induration may extend out to the pelvic wall, and may be so intimately attached to the bone and so hard as to appear to be a bony or cartilaginous outgrowth

from the wall of the pelvis. Parametritis (of uterine origin) is to be distinguished from another inflammatory mass in this locality, namely, ureteritis and periureteritis (Fig. 906). As the location and tenderness are the same, the distinction is made by the accompanying history and symptoms.

An intraligamentary myoma (Fig. 907) is distinguished by the rounded outline, its broad uterine connection and free outer margin, the absence of tenderness, and the accompanying history and symptoms. A parovarian cyst has the additional distinguishing point of being soft, and there may be distinct fluctuation.

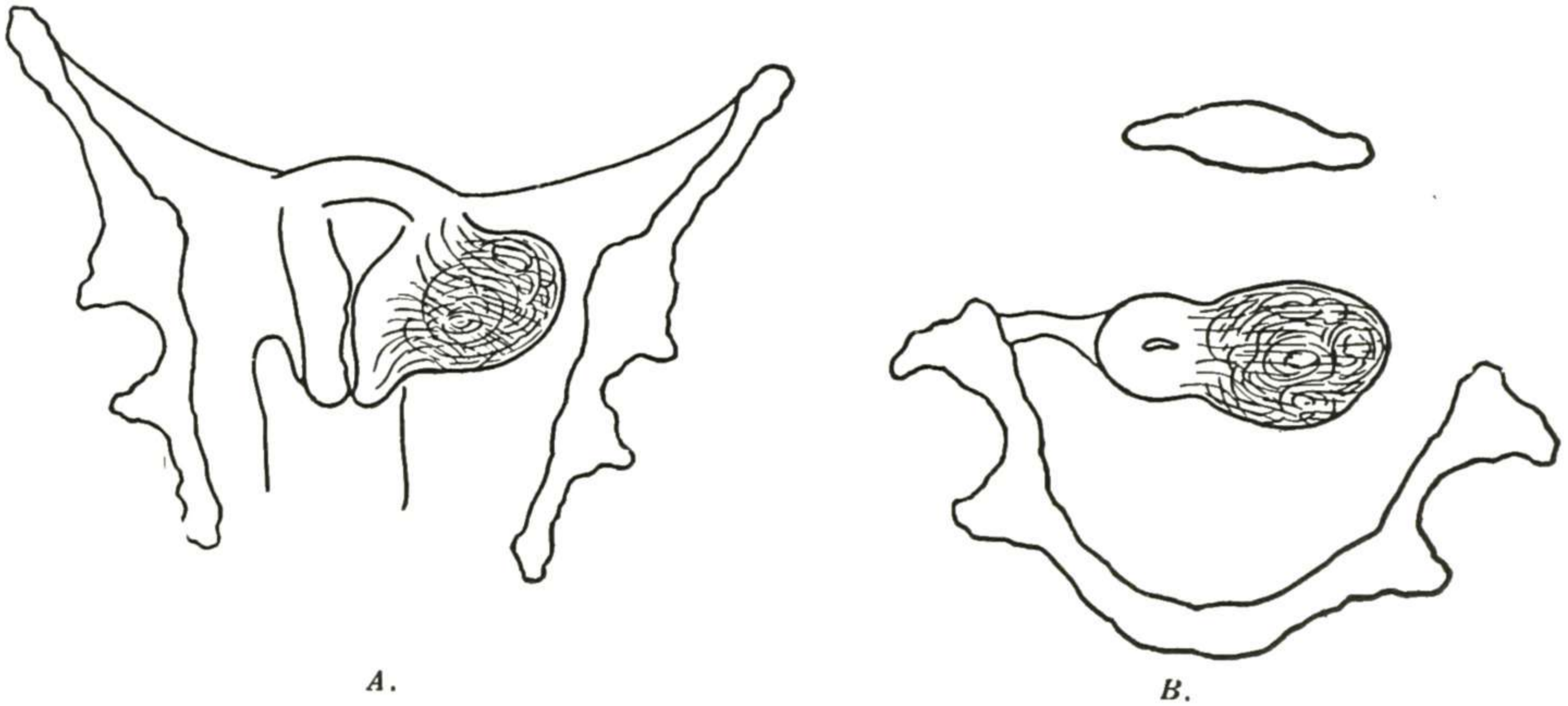


Fig. 907.—Diagnosis of uterine myoma projecting into the broad ligament. Notice the distinct clear-cut outline some distance from the pelvic wall, which outline can be traced directly into the outline of the uterus. In a parametritis mass of that size the inflammatory infiltration would extend to the pelvic wall, giving fixation of the mass to the wall, and the margins of the infiltration would shade off gradually.

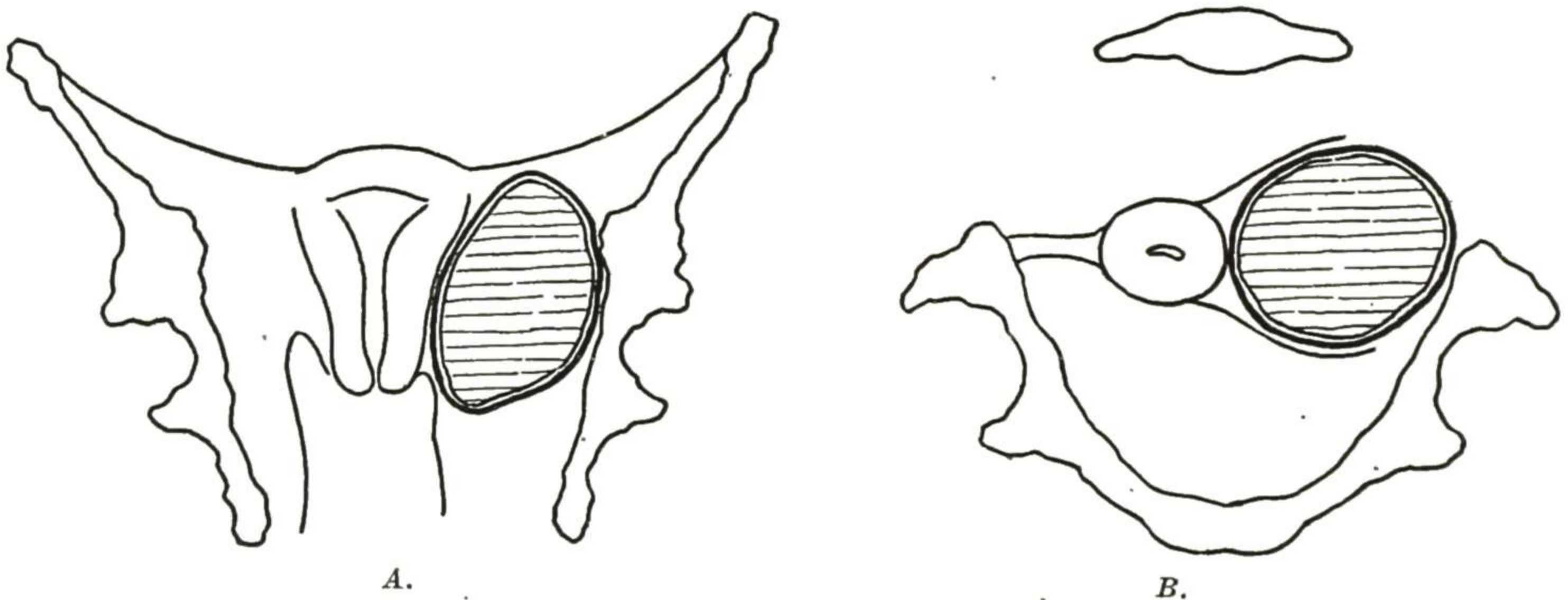


Fig. 908.—Diagnosis of a broad ligament cyst. This presents the clear-cut margins of a tumor, to distinguish it from inflammatory infiltration, and presents cystic fluctuation or softening to distinguish it from a myoma.

In some cases the chronic inflammatory mass involves both the tubal area and the connective tissue area. When such is the case and it is difficult to determine whether the primary lesion was parametritis or salpingitis, the history of the trouble (cause and subsequent course) may help. The differentiation between parametritis and salpingitis is very important in all cases, for the type of treatment to be employed hinges upon it. A broad ligament mass is likely

to be streptococcic, and may still contain viable streptococci that could cause fatal peritonitis if the mass were attacked and opened into by intraperitoneal operation.

### Differential Diagnosis and Selective Treatment of Chronic Pelvic Inflammatory Masses

The importance of postponing operation in gonococcal masses until automatic sterilization has taken place, the persistence of virulence in streptococcal masses and how to recognize them before operation and what to do for them when operation is necessary, and other points of interest were considered in detail in a published study of this subject by the senior author (*What Is the Preferable Time for Operation for a Chronic Inflammatory Mass in the Pelvis?*), and the following summary is largely from that study.

1. Bacteriologic studies in the several reported series of cases (comprising about 3,600 cases) of chronic pelvic inflammation (excluding tuberculosis) showed that the tubal contents were sterile in more than half. This indicates that sterilization of the infected focus takes place automatically within a reasonable time in the majority of cases.

2. Abdominal removal of the mass while the bacteria are active and virulent results in fatal peritonitis or localized infection in many of the cases. Abdominal removal of the mass after the bacteria are dead or greatly attenuated is almost never followed by infection, even though there is extensive escape of pus into the pelvis. Hence abdominal operation for a chronic inflammatory mass in the pelvis should not be undertaken before the period of probable sterilization, except in those rare cases in which, in spite of palliative measures, the patient's life is threatened by the severity of the inflammation and the infected focus cannot be satisfactorily drained extraperitoneally.

3. The time required for the death of the bacteria or for their effective attenuation varies greatly in different cases. The persistence of virulence depends largely upon the character of the infection. The two infections concerning which definite information has accumulated as to persistence of virulence are the gonococcal and the streptococcal.

In the gonococcal cases the bacteria are dead or attenuated to practical sterility within three or four months from the beginning of the trouble. In such cases abdominal section may be safely undertaken after this period. In the streptococcal cases, on the other hand, the bacteria live and retain their virulence indefinitely. In some cases there seems to be a diminution in the virulence, but this is erratic and not to be depended upon. Abdominal section for a mass of streptococcic origin is never safe. Such an operation at any time, even years after the infection, is liable to be followed by fatal peritonitis.

4. These two classes may be distinguished before operation in most cases, the distinguishing characteristics of each being found in the **apparent cause** of the trouble and the **location of the lesion**.

**Classification.** For the purpose, then, of considering the persistence of virulence in a practical way, i.e., as a guide to treatment, the cases of chronic pelvic suppuration (tuberculosis excluded) may be divided into two classes—the gonococcic and the streptococcic. To be useful, this classification must be made before operation, that is, it must be a clinical rather than a strictly bacteriological classification. Of course, from a bac-

teriologic standpoint there are other cases, due to other bacteria, but in the present state of knowledge these other cases cannot, as a rule, be distinguished before operation, and, even if they were distinguished, not enough information has accumulated to show the average persistence of virulence in such cases. Consequently, when confronted with a case of nontuberculous chronic pelvic inflammation, the endeavor should be to decide whether it belongs to the gonococcic or streptococcic class, ignoring for the time the fact that it may possibly be due to other bacteria, which in point of virulence lie between these two extremes.

How may the gonococcic and the streptococcic cases be distinguished before operation? What diagnostic facts are available at that time? Bacteriologic examination of the urethral or uterine or other discharge is of assistance in only a small proportion of these chronic cases, for, as a rule, the bacteria have disappeared from the discharge. Hence we must depend on other information obtainable before operation. Fortunately the gonorrhoeal cases and the streptococcal cases differ usually in two particulars, namely, (a) in the apparent cause of the trouble, and (b) in the location of the lesion. As a rule, these distinguishing points may be settled and the case definitely classified by an accurate inquiry into the onset of the trouble and a careful bimanual examination.

Uncertain cases are to be classed with one or the other, as the preponderance of evidence warrants, and are to be given treatment accordingly. After operation, bacteriologic examination may show other bacteria, either alone or associated, and, if accurate records are kept of the histories and bacteriologic findings in large series of cases, it may be possible later to form a third clinical class, comprising one or more of the miscellaneous or mixed infections. For the present, however, the two classes, gonococcic and streptococcic, are all that can, as a rule, be satisfactorily distinguished before operation.

#### GONOCOCCIC CLASS (CLINICAL)

In the gonococcic class (clinical) the distinguishing points are (a) that the pelvic inflammation is preceded by evidence of gonorrhoea or comes on without apparent cause and (b) that the lesion is located in the tube, as indicated in Fig. 863, extending thence to the ovary or adjacent peritoneal surfaces but not involving the connective tissue (parametrium) to any decided extent. As so much diagnostic importance is attached to these two points, it is necessary to consider them somewhat in detail.

a. **Apparent cause** or mode of onset. As a general proposition it may be said that the gonococcus is the only germ that will spontaneously invade the normal nonpuerperal uterus and tubes. There are exceptions. Reidel reported that of 56 girls under ten years of age operated on for appendicitis, five had peritonitis due, not to appendicitis, but to acute salpingitis. He states positively that the infections reached the tubes by way of the vagina and uterus, and that gonorrhoea was excluded in every case. Cultures showed the ordinary pus germs. The inflammation was virulent and every patient died in spite of operative treatment. He observed the same clinical picture in two girls past ten years of age, both of whom died. In contradistinction to these cases in children, he states that he has never seen such penetration of normal genitalia by streptococci or staphylococci in the adult.

General experience is in accord with this statement in regard to adults. Purulent inflammation beginning in a normal adult nonpuerperal vagina or uterus, and later extending out into the pelvic cavity, may be set down as almost certainly gonorrhoeal. The patient must of course be questioned closely enough to eliminate an early miscarriage and also any intrauterine instrumentation (curettement, intrauterine treatment, sounding in examination, etc.). The probability of gonorrhoea is increased if the purulent discharge ("free leucorrhoea") began within a few weeks after marriage. Again, in a large proportion of the cases of gonococcal leucorrhoea there is urethritis, causing burning on urination and increased frequency of urination. This discharge and disturbance of micturition may last a few days or much longer. It may precede the pelvic inflammation by a few days or a few weeks or a few months. A history of abscess of one of the vulvovaginal glands has about the same significance as a history of urethritis. These structures are frequently involved in gonococcal leucorrhoea, but very seldom in leucorrhoea from other causes.

In those cases in which the vaginal and uterine gonorrhoea did not cause sufficient disturbance to be noticed, the pelvic inflammation began without apparent cause. A con-

siderable proportion of the gonorrhœal cases give such a history. Here, again, one must be careful not to overlook an early miscarriage or some intrauterine instrumentation. Also, it is important to trace the inflammation back to its very beginning, for some cases of puerperal infection are very mild in outward manifestations and do not cause much trouble until there is an exacerbation after several weeks or months. In these cases, however, there is usually a history of some disturbance during the puerperium, from which the patient recovered to a large extent, but not entirely. On the other hand, an inflammatory trouble, at first apparently due to a miscarriage or full-term delivery, may on careful questioning be found to antedate the pregnancy and to be due to a preceding gonorrhœal infection.

In the examination a search should be made about the external genitals for evidences of an old gonorrhœa—signs of previous inflammation of the urethra or of the vulvovaginal glands, such as red spots (*maculæ gonorrhœa*) in these situations, or secretion that can be pressed from the structures. Bacteriologic examination of discharge from the urethra, vulvovaginal glands, vagina, or cervix may show gonococci. Negative findings, however, do not exclude gonorrhœa, for in many of the chronic cases the causative bacteria have disappeared from the discharge.

**b. Location** of the lesion. The extension of gonorrhœal inflammation is almost invariably along the uterine mucosa into the tube, and any further extension is toward the ovary and the peritoneal cavity. Gonococci very seldom extend through the uterine wall into the parametrium. Even when they do extend into the connective tissue, they are not likely to form an inflammatory mass there. Steinschneider and Schaefer injected pure cultures of gonococci into connective tissue, but no decided inflammatory action resulted. Though parametrial abscess may occasionally result from gonococci, as demonstrated by Wertheim and others, it is so rare as to be a curiosity.

#### STREPTOCOCCIC CLASS (CLINICAL)

The distinguishing characteristics are (a) the apparent cause of the trouble and (b) the location of the lesion. The inflammatory lesion is located in the parametrium, either in the connective tissue as in Fig. 864 or in the veins as in Fig. 865.

**a. Apparent cause.** Nearly all the streptococcic inflammatory masses in the pelvis can be traced to sepsis following labor or miscarriage. In the adult, streptococci do not spontaneously penetrate the nonpuerperal uterus. Aside from labor or miscarriage, streptococcus infection may be due to curettement or other uterine operation, to intrauterine application or sounding, to a stem pessary, or to conditions caused by carcinoma or fibroid or chronic inflammation. If a pelvic inflammatory trouble cannot be traced to one of the causes above mentioned, it is almost certainly not streptococcic. In taking the history, care must be exercised not to miss an early miscarriage or an intrauterine treatment. Care must be taken also to trace the trouble back to its very beginning, otherwise an exacerbation remote from the causal miscarriage or labor may be mistaken for the beginning of the trouble.

On the other hand, not all puerperal cases are streptococcic. About twenty-five per cent of puerperal infections are gonococcal. They are usually of a mild type and subside quickly, but it must be kept in mind also that other puerperal infections (staphylococcic and even streptococcic) may run a mild course. Consequently the mildness of the preceding septic attack must not be given too much weight. Outside of external evidences of gonorrhœa (about the vulva or in the discharge), most dependence is to be placed on the location of the lesion. Streptococcus lesions are usually parametrial, while gonococcus lesions are usually tubo-ovarian.

Another complicating factor in these puerperal cases is that there may be a mixed infection, causing both kinds of lesions to be present. Stone and McDonald reported such a case. This case furnished also a beautiful and striking illustration of the fact that the gonococcus spreads by way of the mucous membrane and the streptococcus by way of the connective tissue. The gonococci occupied the right tube and extended thence into the peritoneal cavity, while the streptococci occupied the right broad ligament and extended thence into the peritoneal cavity.

**b. Location** of the lesion. A chronic lesion in the pelvis of streptococcic origin is nearly always in the connective tissue (parametrium). Unlike the gonococcus, the strepto-

coccus does not progress along the mucosa into the tube, but penetrates the wall of the uterus and extends into the connective tissue. It not infrequently extends from the connective tissue to the peritoneum, causing peritonitis. Of course, in exceptional cases streptococci may pass from the uterus into the tube, but in such cases they are likely to pass on through the tube and cause fatal peritonitis. Consequently, in the streptococcal cases that survive the acute attack and come later for treatment for an inflammatory mass, the lesion nearly always involves the connective tissue (parametrium). As before mentioned, Menge found the streptococcus in four cases of pyosalpinx, while Whiteside and Walton found it in three, but parametritis was not excluded. The last mentioned authors endeavored to produce streptococcus salpingitis experimentally by injecting into the uterus in rabbits pure cultures of streptococci and also mixed cultures of streptococci and staphylococci. In no instance did salpingitis result. One rabbit died of acute streptococcus septicemia, while the others simply developed a purulent vaginitis for a few days and then recovered, and when replaced in the rabbit pen became pregnant and bore litters of six rabbits each. Miller, in the bacteriological examination of 127 cases of pelvic inflammation, found the streptococcus 7 times, but in no case was the lesion a pyosalpinx alone. There are very few exceptions to the rule that streptococcal masses in the pelvis are parametrial in whole or in part.

Are all parametrial inflammatory masses streptococcal? Nearly all. That parametrial suppuration is usually due to the streptococcus is substantiated by Rosthorn, Bumm, Doleris and Bourges, West, Cullingworth, and others. Hartman and Morax found it in 21 cases of parametrial abscess. In every such case operated on by Fritsch the streptococcus was found to be the cause. It is only occasionally that staphylococci and other bacteria are found either alone or associated with the streptococcus. As parametrial inflammation is nearly always due to the streptococcus, every case presenting a parametrial mass should be placed in the streptococcal class until it is definitely proved to be due to some other cause.

The distinguishing characteristics of a parametrial mass (chronic) are: (a) its situation in the connective area, usually in the broad ligament; (b) its low situation in relation to the uterus, often coming far down beside the cervix; (c) its intimate blending with the uterine wall, as though it were a part of the wall; (d) its intimate blending with the pelvic wall, as though it were an outgrowth from that structure; and (e) its hardness, often being so hard as to simulate a cartilaginous or bony tumor growing from the pelvic wall. A tubo-ovarian mass, on the other hand, is distinguished by its being situated high, in the tubo-ovarian region, or prolapsed into the cul-de-sac; by its not blending so intimately with the uterine wall, a distinct groove usually marking the point where the two come in contact; by its not blending so closely with the pelvic wall; by its presenting to the examining finger a portion of the rounded outline of the tube or ovary; and by absence of the cartilaginous hardness often seen in chronic parametrial masses.

*Persistence of Virulence.*—The virulence of the streptococcus persists indefinitely. Miller reports one case in which the bacteria persisted for six years and another in which they persisted for twelve years. Martin states that streptococci have been found fully virulent in a pelvic inflammatory mass after nineteen years. In one instance (case 19) streptococci apparently disappeared in six months, but the pus also disappeared. The case was one of severe sepsis following labor. On the eighth day vaginal incision into a pelvic abscess evacuated pus containing streptococci. Six months later, a mass persisting, a vaginal incision was made into the cul-de-sac and the mass. No pus was found, but there was serous fluid showing staphylococci alone.

Automatic sterilization of a streptococcus abscess is perhaps possible, but it is so rare that it is not to be counted on. A streptococcal mass in the pelvis is always dangerous, and abdominal section for that cause at any time is likely to be followed by a fatal peritonitis. The cases tabulated give striking proof of the seriousness of intraperitoneal operation in these cases.

5. What is the **preferable time** for abdominal operation for a chronic inflammatory mass in the pelvis? This varies in different cases, as follows:

a. In a case that is *clearly gonococcal* (agreement on the two points—the apparent cause of the trouble and the location of the lesion) abdominal operation may be considered safe after *three or four months* from the onset of the

trouble. If after this time the mass is a source of serious irritation in spite of palliative treatment, it should as a rule be removed. On the other hand, if there is marked improvement, it is better to wait, as there may be a spontaneous cure.

**b.** In a case that is *clearly streptococcal* (agreement on the two points) abdominal section is *never safe*. Even where the temperature and pulse are normal and everything quiescent, intraperitoneal operation for the mass may cause the patient's death from streptococcal peritonitis.

**c.** In a case that is doubtful (disagreement on the two points) a most careful study should be made of all the features of the case and every helpful diagnostic method should be brought into use to aid in reaching a definite conclusion. No intraperitoneal operation should be undertaken until the streptococcus is excluded with reasonable certainty. In a doubtful case in which the abdomen is opened on the supposition that the mass is tubo-ovarian and it is found before adhesions are much disturbed that the mass is principally in the connective tissue (parametritic), the route of attack should be changed to extraperitoneal (per vaginam or above Poupart's ligament) and the abdominal wound closed. Such a lesion probably contains streptococci and the adhesions of omentum and bowel, which cause the deceptive mass high in the tubal region, constitute the protective barrier between the virulent bacteria and the peritoneal cavity. When this barrier is broken down, the way is opened for a fatal peritonitis.

**6.** Other treatment measures. In the treatment of old inflammatory infiltration in the connective tissue of the pelvis, the various conservative measures may be tried, selecting those which seem best adapted to the particular conditions present in the case. Deep heat, with diathermy or the Elliott apparatus, may give sufficient relief. If there is evidence of pus in the induration, vaginal drainage is indicated. Any active inflammation may call for the internal administration of some one of the sulfonamides.

Complicating conditions are to be searched for and relieved. An associated chronic cervicitis should be eliminated, as bacteria from it may be keeping up the parametritis. Also, the excision of an enlarged cervix may aid in relieving dyspareunia if present. If the trouble is persistent and disabling in spite of other measures operation on the mass must be considered. The safest way to operate for streptococcal pus collections is by the extraperitoneal method. If possible, the pus collection should be reached and evacuated per vaginam. If this cannot be accomplished, it may be practicable to drain the abscess by extraperitoneal operation above Poupart's ligament, as was done in some of the cases reported. Intraperitoneal operation in these cases should be undertaken only when the patient's life is threatened by the severity of the inflammation and it is impossible to reach the mass in a less dangerous way.

## CHAPTER XI

# OTHER DISEASES

### of Fallopian Tubes, Pelvic Peritoneum and Pelvic Connective Tissue

The following conditions will be considered in the order given: Extrauterine pregnancy, other pelvic hemorrhages (from graafian follicle or tumor), tubal tuberculosis, tumors of fallopian tubes, torsion of adnexa, varicose veins of broad ligaments, and miscellaneous rare conditions.

### EXTRAUTERINE PREGNANCY

Extrauterine pregnancy is pregnancy outside the uterine cavity. With few exceptions the developing embryo is, in the beginning, located in the fallopian tube (Figs. 909, 910), consequently the term "tubal pregnancy" is applicable in most cases. The lodgment and development may occur at any part of the tube, as indicated in Fig. 911. A pregnant tube may rupture and discharge the embryo and blood mass into the peritoneal cavity, in which case there may be complete severance of the vascular connection or the cord may remain attached in the tube wall and continue to nourish the embryo, or the embryo may remain within the tube and grow there. Occasionally the fertilized ovum lodges and develops in the ovary (ruptured follicle or other crevice) or in some other part of the peritoneal cavity.

The condition is designated also "ectopic gestation" and "abdominal pregnancy." Certain forms are given special names, for example, "ampullar" pregnancy (in outer dilated part of tube), "isthmial" pregnancy (in narrow part of tube near uterus), and "interstitial" pregnancy (in interstitial part of tube, which is in the uterine wall). This last type of "extrauterine" pregnancy is within the uterine wall, but not in the cavity, unless it breaks in during development.

Extrauterine pregnancy occurs on the average about once in every two hundred cases of pregnancy, and in about 2 per cent of gynecologic cases. Though furnishing some of the most striking and severe and easily recognized cases of internal hemorrhage, the majority of cases present at first simply recurring mild attacks of pelvic disturbance. Consequently, the condition is often mistaken for threatened miscarriage or pelvic inflammation, until a severe attack shows some additional factor and starts investigation which leads to the diagnosis of tubal pregnancy.

### Etiology

The cause of extrauterine pregnancy is some interference with the downward progress of the fertilized ovum. The ovum and spermatozoa meet normally in the tube, and after fertilization the ovum passes along the remainder of the tube and into the uterus, where, having reached the trophoblast stage,





Fig. 909.



Fig. 910.

Fig. 909.—Specimen of Tubal Pregnancy, showing the small embryo in its sac and old blood clots in the tubal lumen and hemorrhagic areas in the tubal wall.

Fig. 910.—The other side of the specimen, showing the rupture in the tubal wall, through which blood clots may be seen. Gyn. Lab.

it becomes attached and develops, constituting a normal pregnancy. Now, if the progress of the fertilized ovum is interfered with so that it remains in the tube and develops up to its trophoblast stage there, extrauterine pregnancy is the result. The tubal obstruction must, of course, not be so marked as to prevent the upward progress of the spermatozoa; consequently extrauterine pregnancy is impossible when both tubes are completely occluded by inflammation or other process.

The conditions which interfere more or less with the downward progress of the ovum are as follows:

1. Mild salpingitis. Slight inflammation may lead to destruction of the cilia. The action of the cilia is supposed to be necessary to the normal progress of the ovum from the abdominal to the uterine end of the tube, the peristaltic action of the tube being of secondary importance and not sufficient in itself to carry the ovum along.

Again, such inflammation leads to swelling of the tubal mucosa and mechanical obstruction in the various portions of the tube. This obstruction, while not marked enough to prevent the upward progress of the active spermatozoa, may prevent the downward progress of the passive ovum.

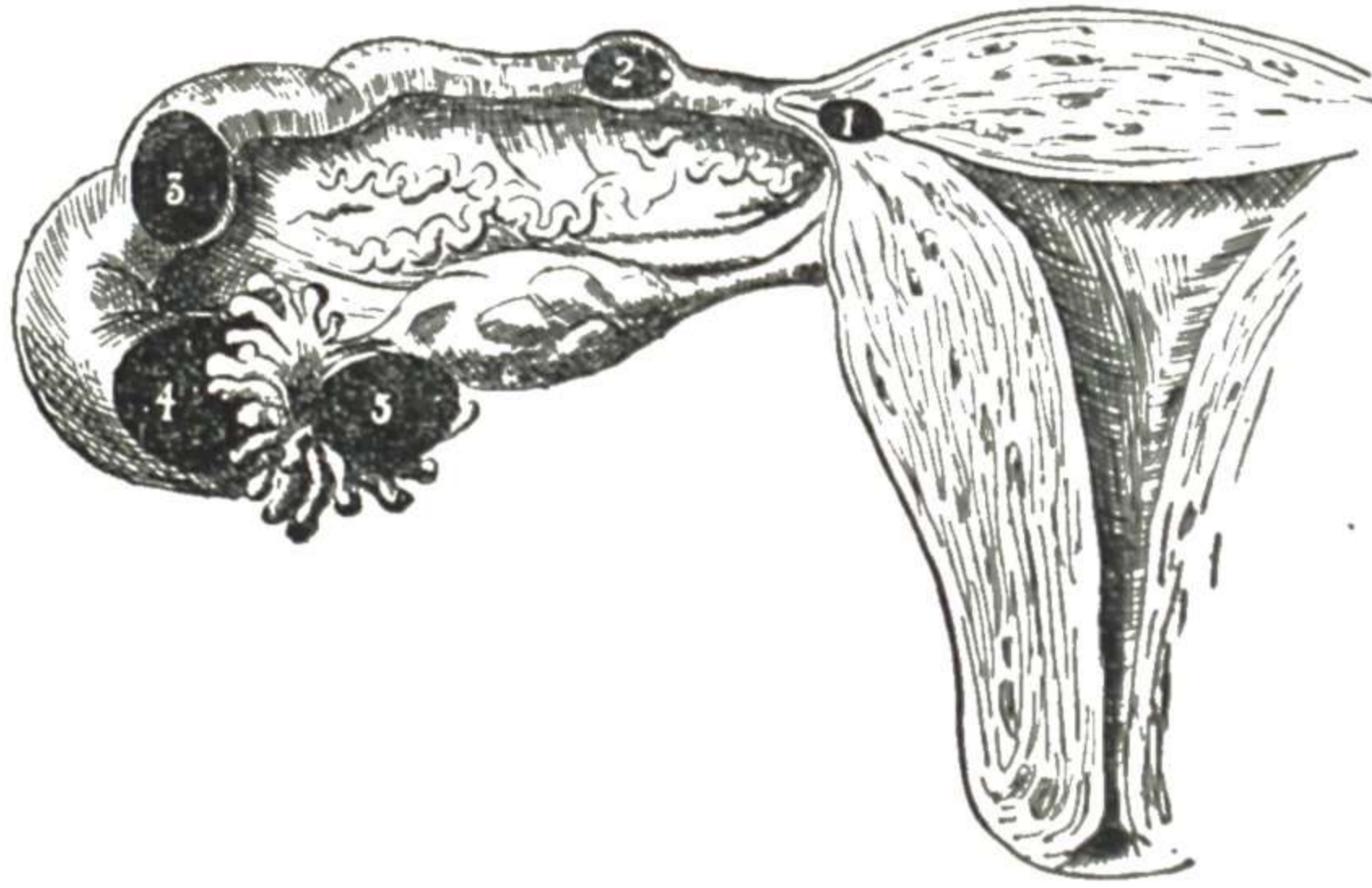


Fig. 911.—Diagram representing the sites for the various forms of tubal pregnancy. 1, Interstitial pregnancy. 2, Isthmial pregnancy. 3, Ampullar pregnancy. 4, Infundibular pregnancy. 5, Tuboovarian pregnancy. (Gilliam—*Practical Gynecology*, F. A. Davis Company.)

2. Adhesions, from inflammation originating in the tube or elsewhere, may so distort the tube by bending or pressure as partially to obstruct its lumen.

3. Tumors within the tube wall or arising from other structures may by pressure narrow the lumen of the tube.

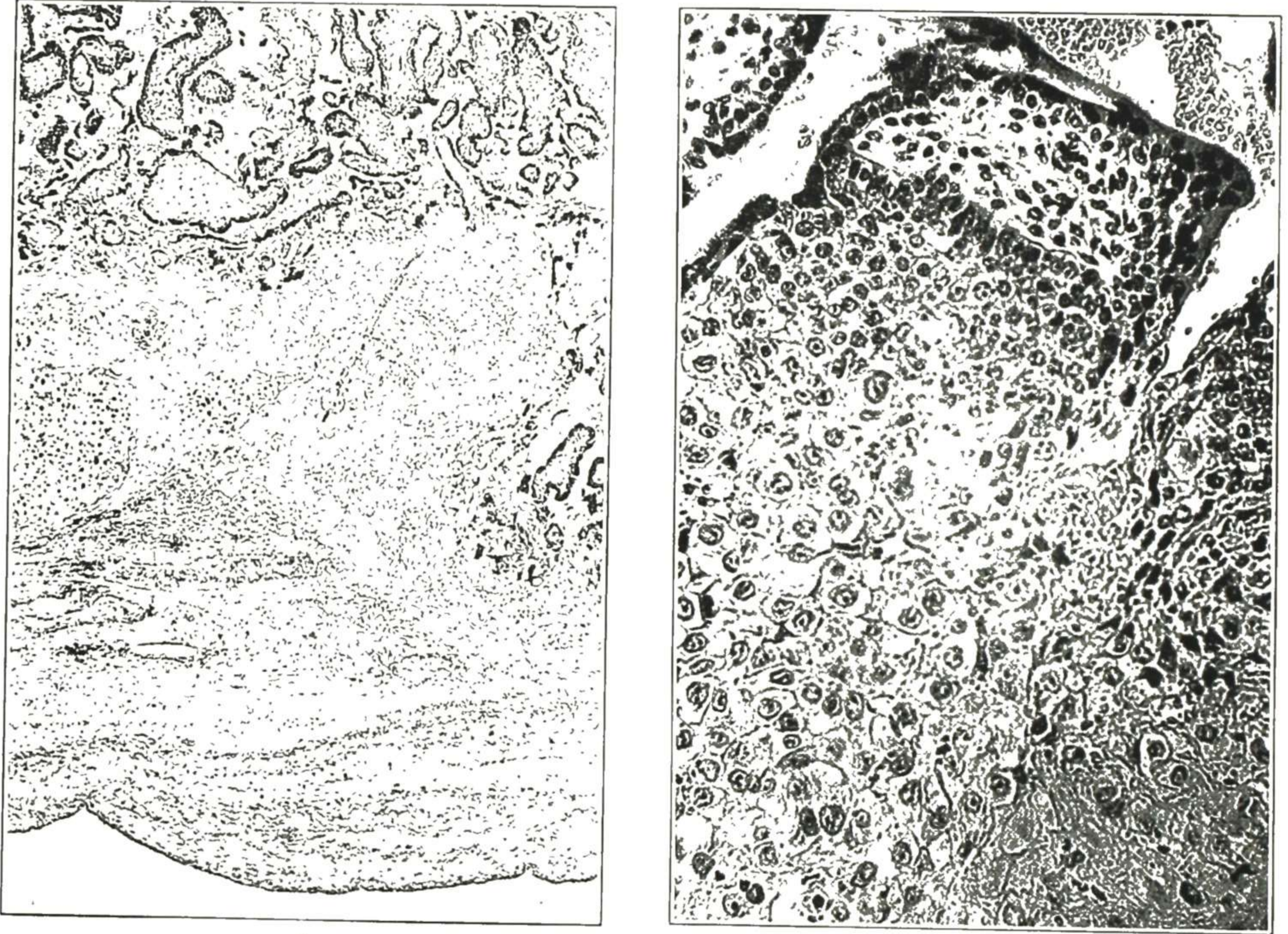
4. Malformations. Abel agrees with Freund that some of the spiral twists which are normally present in the tube in the embryo may persist to adult life and cause sufficient obstruction to lead to extrauterine pregnancy. Diverticula may lead off from the lumen of the fallopian tube. If a fertilized ovum lodges in one of these blind canals, tubal pregnancy will result. There may be also accessory tubes.

A rudimentary tube which is not open all the way to the uterus may be entered by an ovum which has been fertilized by a spermatozoon passed through the normal tube of the opposite side. The large fertilized ovum is stopped at the impervious portion of the deformed tube, and a tubal pregnancy is the result. Kelly illustrates an interesting case in which this same series of events occurred in a rudimentary uterine horn, the horn being so separated from the remainder of the uterus that it resembled part of the tube (Fig. 1059).

### Pathology

When the ovum becomes attached to the tube wall, certain changes begin. First, there is marked hyperemia, which leads to some swelling of the structures

and to increased growth of all the tissue elements of the tube wall. In the mucosa in tubal pregnancy the stroma cells enlarge and become decidua cells, though they do not become so large or so closely packed together as in the uterine mucosa. There is some hypertrophy of the muscular tissue near the attachment of the ovum. Very soon there appear certain interesting changes



A.

B.

Fig. 912.—Tubal pregnancy. A, Section of wall and chorionic area, low power. Notice at the right how the tube wall is being penetrated. B, High power of A, showing decidua cells and the attachment of chorionic villi. Gyn. Lab.

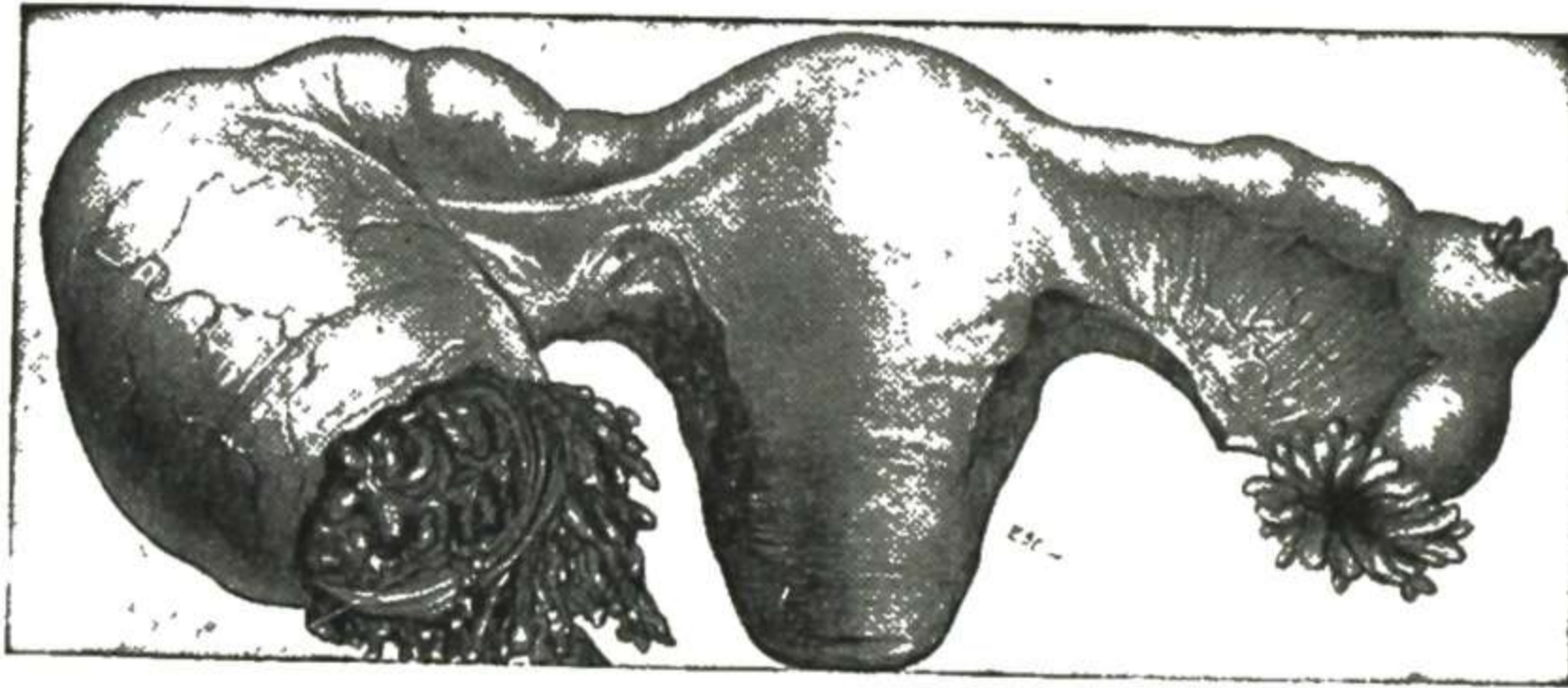


Fig. 913.—Bilateral tubal pregnancy. Drawing showing the conditions found at operation. Pregnancy near the middle of one tube and at the outer end of other, both ruptured. Tubal abortion on left side. (Findley—*Surg., Gynec. and Obst.*)

that have a bearing on the early rupture of the pregnant tube. As the fetal elements reach into the tubal tissues, seeking nourishment, the wall of the tube becomes penetrated by cells of the trophoblast layer, and the resulting blood vessel disturbance causes hemorrhage into the wall tissues and into the lumen of the tube, as shown in Fig. 909. The trophoblast cells work into the muscular layer and weaken it, and gradually penetrate all the way through

the wall, causing an early small rupture. Later, the weakened area is extended and the opening in the tube wall becomes larger, as shown in Fig. 910.

On opening the tube, the amniotic sac and frequently the ovum may be seen and there is usually a partially organized blood clot filling the rest of the lumen, as in Fig. 909. But in some cases the blood clot is all that is seen.



Fig. 914.—Early tubal pregnancy with twin embryos. (Jewett—*Am. J. Obst. & Gynec.*)



Fig. 915.



Fig. 916.

Fig. 915.—Advanced tubal pregnancy mass, the contents of which are shown in Fig. 916.

Fig. 916.—Twin fetuses from a tubal pregnancy which had advanced to term. (Ferguson and Otis—*Am. J. Obst. & Gynec.*)

Microscopically, trophoblast cells and decidual cells are seen, much as they are in a uterine implantation. Fig. 912 shows the characteristic changes in the tube wall. A hemorrhagic mass in the tube at operation does not necessarily mean tubal pregnancy, for hemorrhage in the tube may be due to some other cause.

If the blood supply is shut off from the growing ovum, it dies and becomes absorbed or calcified. If sufficient circulation is maintained to support life, the ovum continues to grow. A number of cases of full-term extrauterine pregnancy have been reported.

Accompanying the tubal pregnancy there is a decidual reaction in the uterus and this decidua is frequently passed as a cast of the uterine canal. When this does occur it aids in diagnosis. Not infrequently there is an accompanying decidual reaction in the peritoneum and in the ovary.

Several cases of bilateral tubal pregnancy (Fig. 913) have been reported, so it is well at operation to examine the other tube carefully also. Occasionally the tubal pregnancy is a twin pregnancy, as shown in Figs. 914 to 916.

### Types of Cases

Clinically, the cases may be divided into the following classes:

1. **Before Rupture.**—The developing embryo with its membranes is still completely surrounded by the unbroken tube.



Fig. 917.

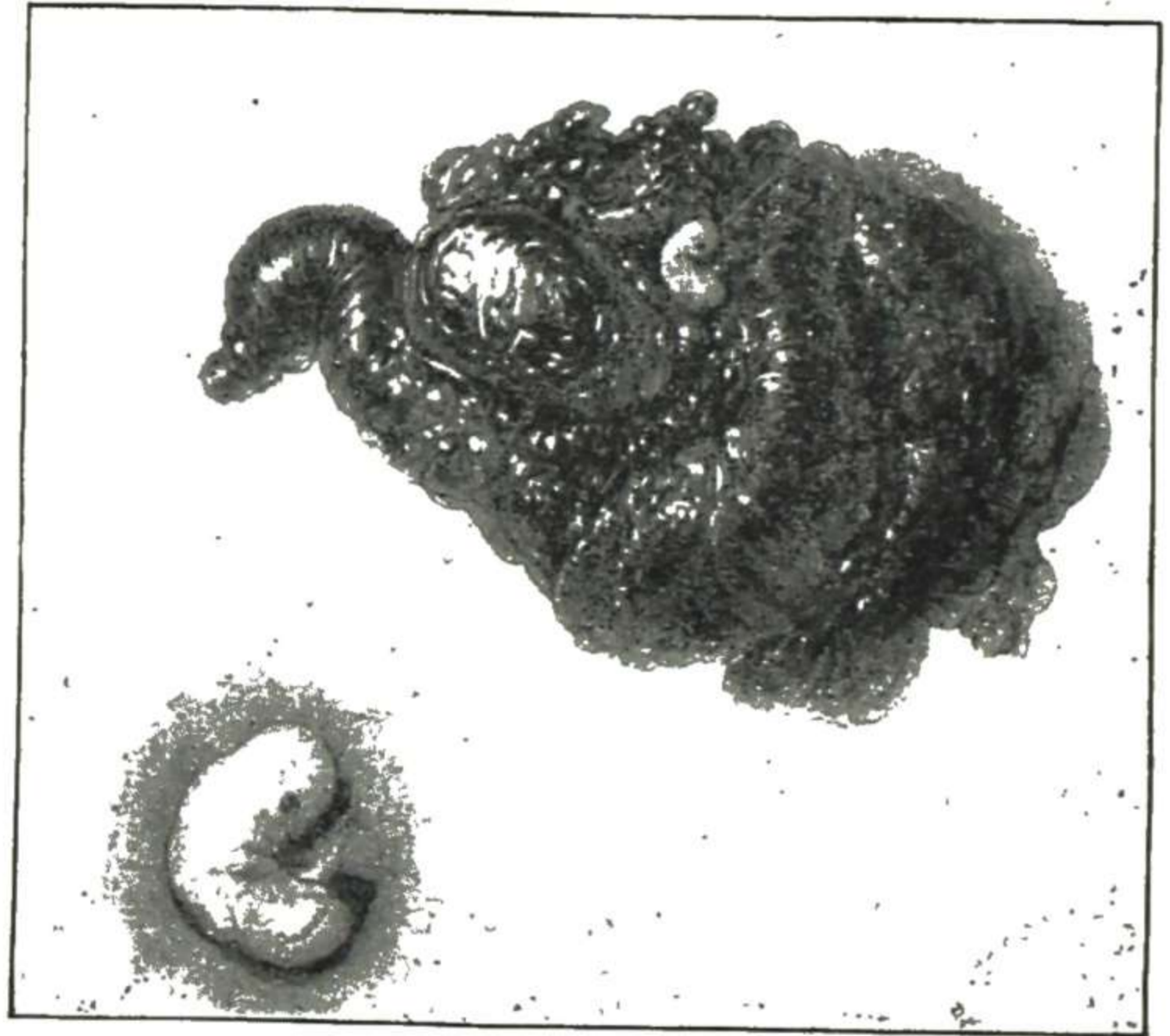


Fig. 918.

Fig. 917.—Tubal pregnancy, with abortion through the abdominal end of the tube into the peritoneal cavity. The end of the tube is dilated, but the structures have not yet been extruded. (Kelly—*Operative Gynecology*.)

Fig. 918.—The clots, membranes, and embryo extruded into the peritoneal cavity. (Kelly—*Operative Gynecology*.)

2. **Tubal Abortion.**—If the place of lodgment of the fertilized ovum happens to be near the outer end of the tube, the enlargement of the lumen by the developing embryo opens the end of the tube, and the embryo and its membranes may be extruded through this opening into the peritoneal cavity, as shown in Figs. 917 and 918. This is called "tubal abortion." Tubal abortion is accompanied with more or less intraperitoneal bleeding.

The blood gravitates into the cul-de-sac of Douglas. Adhesions bind together the structures above, thus forming a roof which shuts off the blood-filled cul-de-sac from the remaining part of the peritoneal cavity as indicated in Fig. 919. This condition is known as "pelvic hemothorax." The blood may be gradually absorbed without further disturbance or the hemothorax may require drainage, as described under Treatment. The very early embryo with mem-

branes, having been completely cast off from its point of nourishment, perishes, and is usually absorbed without causing further trouble.

3. **Intraperitoneal Rupture With Single Moderate Hemorrhage.** The process is practically the same as described for tubal abortion, except that the small embryo and membranes and blood clot are extruded through a rent in the tube wall instead of through the dilated fimbriated end. The symptoms are usually somewhat more severe.

4. **Intraperitoneal Rupture With Repeated Moderate Hemorrhage.**—The membranes usually remain partially attached within the broken tube, and hence the extruded embryo continues to grow, causing trouble later. The first hemorrhage leads to peritoneal exudate, with resulting adhesions, which bind together adjacent structures. Thus the blood mass and broken tube and

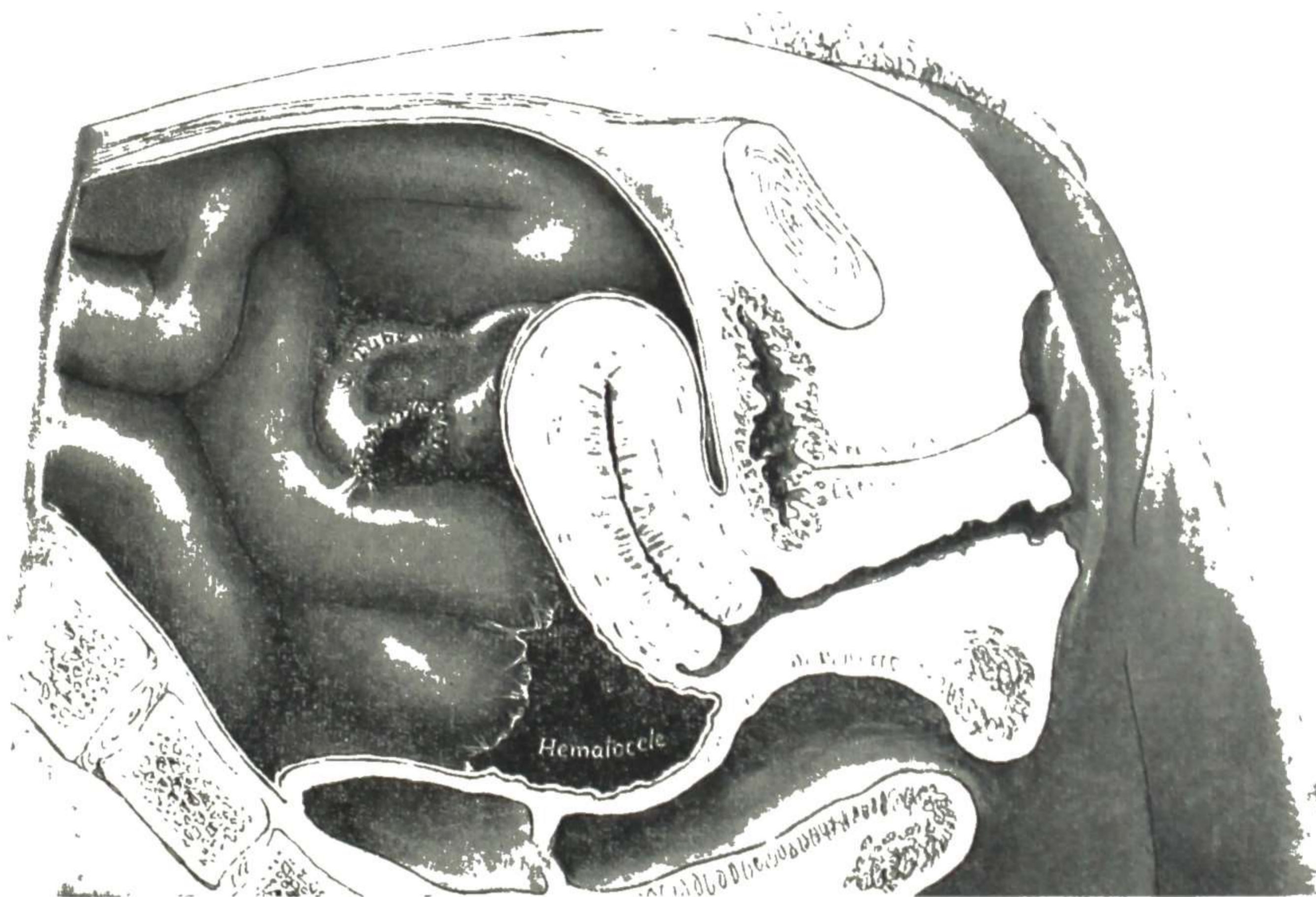


Fig. 919.—Pelvic hematocoele. Indicating the condition where there has been a tubal abortion and the blood from it has gravitated to the cul-de-sac and become surrounded by exudate.

growing embryo are surrounded by a wall of exudate and adherent intestine. This wall lessens the danger temporarily. But after a few days or a few weeks the continued growth causes further rupture of the tube or of the other limiting tissues, with accompanying fresh intraperitoneal hemorrhage of small or large amount. More exudate is then thrown out about the new blood mass, lessening the danger for a time. This process may be repeated many times within the course of a few months, provided the patient does not in the meantime succumb to hemorrhage or peritonitis. Thus there is found in this class of cases (Figs. 920 and 921), a gradually increasing mass, accompanied by frequent attacks of pelvic pain and marked soreness. This class includes the majority of cases of extrauterine pregnancy that come to operation. Whether or not the patient's color and pulse are much affected depends upon the

severity of the hemorrhages. In many cases the recurring pain and soreness are the most evident features, and at the bedside such cases are often mistaken for ordinary pelvic inflammation.

5. **Intraperitoneal Rupture With Profuse Hemorrhage.**—There is a free rupture of the tube, and blood pours out into the peritoneal cavity rapidly and

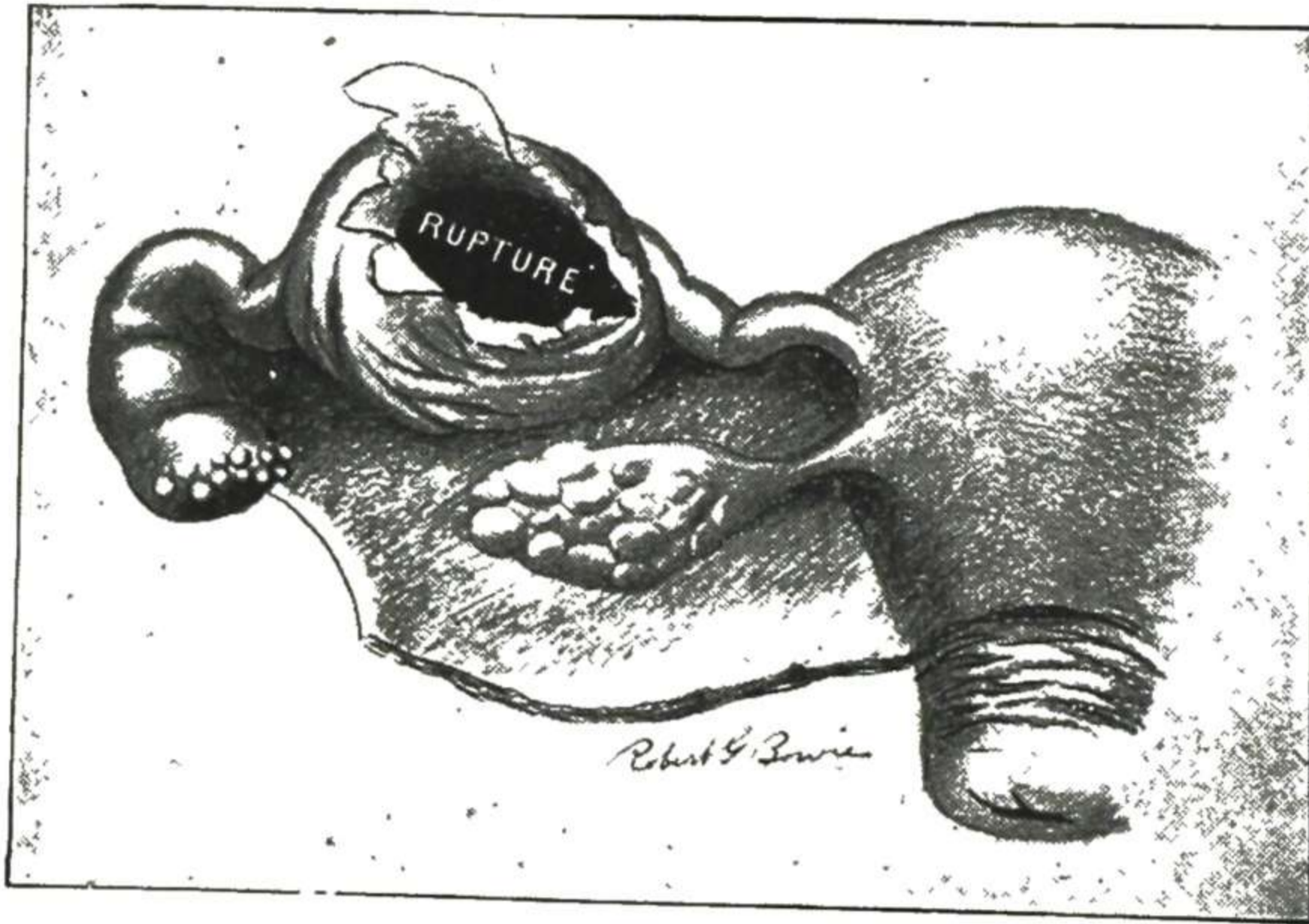


Fig. 920.—Tubal pregnancy, with rupture into the peritoneal cavity. (Gilliam—*Practical Gynecology*.)

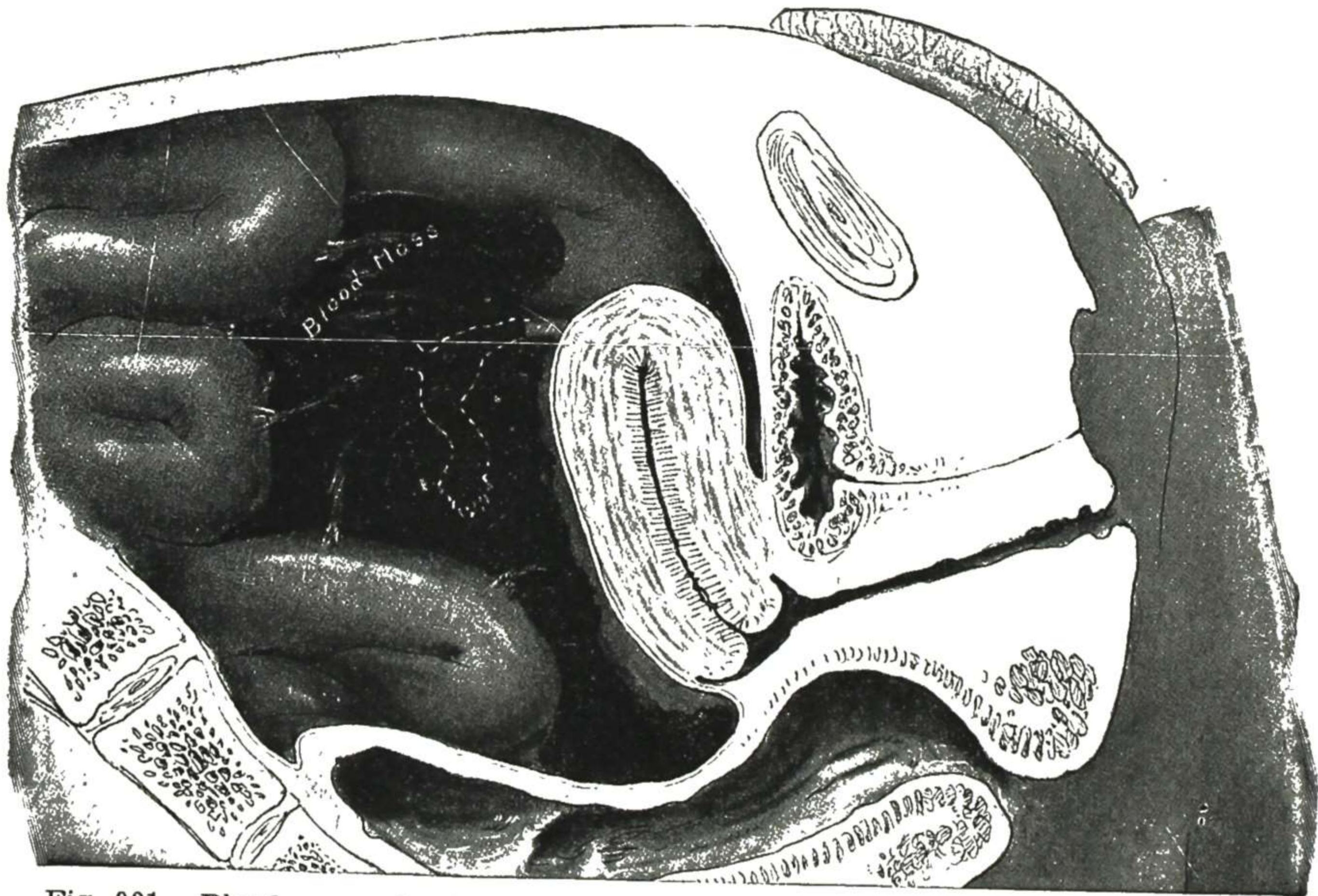


Fig. 921.—Blood mass about tube. Indicating the condition where there has been rupture of the tube, with repeated slight hemorrhages, resulting in a large mass of blood and exudate, which surrounds the tube.

in great quantity. It extends among the intestines and in some cases practically fills the abdominal cavity, as indicated in Fig. 922. The patient at once passes into a condition of severe shock. She is blanched, almost pulseless and, with the air-hunger and extreme pain, presents a most distressing picture. The cases of this class have been fittingly designated as the "tragic" cases. This severe and persistent hemorrhage is most likely to occur when the develop-

ing ovum is situated near the uterus, in that portion of the tube known as the "isthmus," as in Fig. 923. In the vast majority of cases the bleeding ceases when the patient passes into complete shock, which is nature's provision for checking the hemorrhage. In exceptional cases, however, the patient does actually bleed to death, either from the first free flow or from a renewal of the bleeding due to vomiting, bowel movement, sitting up, or other disturbance of the newly formed clot.

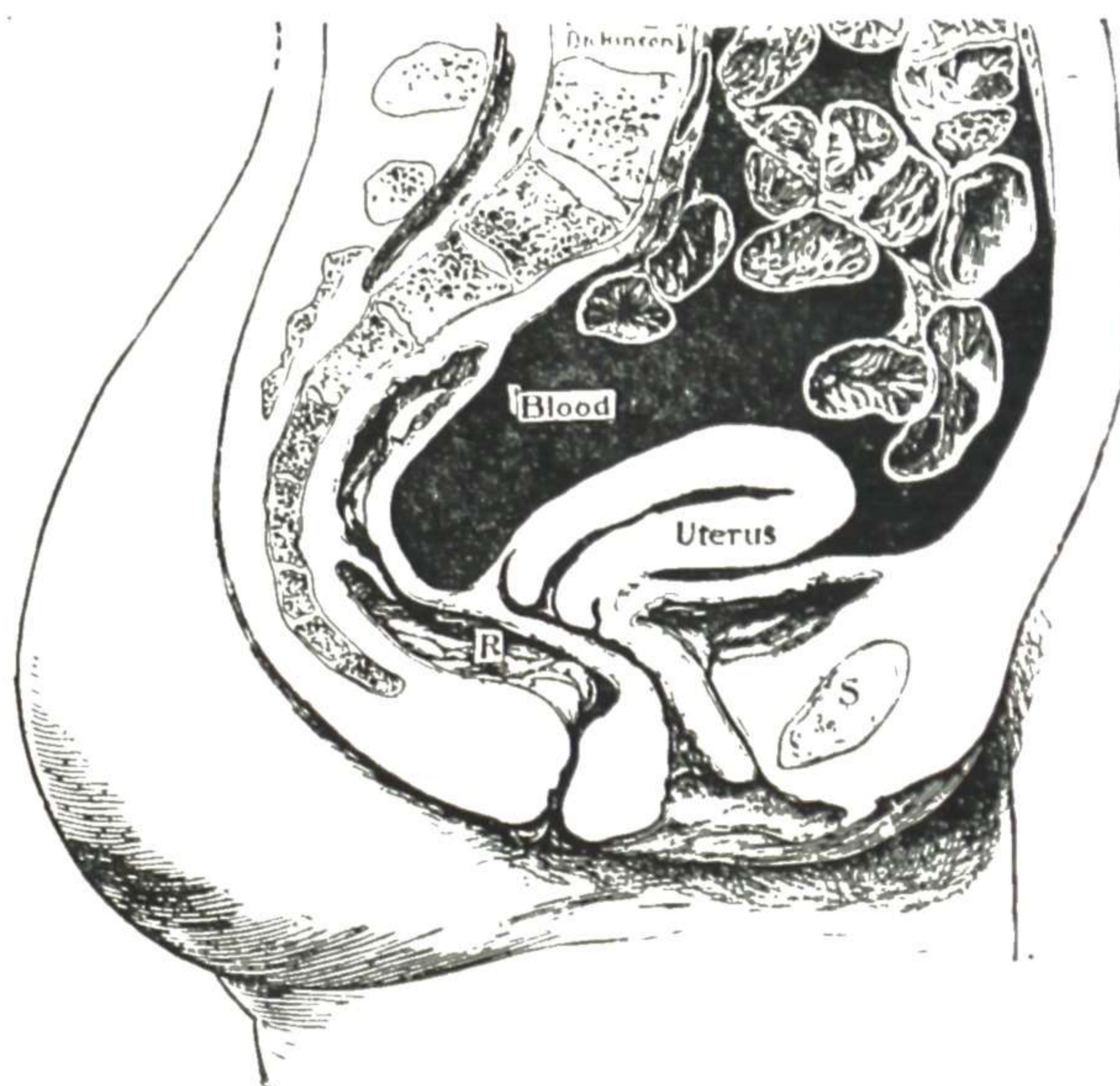


Fig. 922.—Tubal pregnancy with free intraperitoneal hemorrhage, showing a large amount of blood in the peritoneal cavity among the intestinal coils. This constitutes the "tragic" type, in which there is a sudden large hemorrhage and the patient goes into collapse. (Dickinson—*American Textbook of Obstetrics.*)



Fig. 923.—Tubal pregnancy in the narrow portion of the tube (isthmus) close to the uterus. This is the type in which the primary hemorrhage is likely to be very severe. Gyn. Lab.

**6. Rupture Into Broad Ligament.**—When the break in the tube wall takes place between the layers of the broad ligament, the hemorrhage is into the connective tissues of the pelvis—forming a "hematoma," as shown in Fig. 924. The hemorrhage may be moderate, forming a hematoma in one broad ligament, or it may be severe, forming a hematoma which gradually extends until it fills most of the connective tissue space in one or both sides of the



pelvis. If the extruded embryo continues to grow in the broad ligament, then arises the condition designated as "broad ligament pregnancy."

7. **Interstitial Pregnancy.**—When the ovum lodges and develops in the interstitial portion of the tube, the resulting condition is known as "interstitial

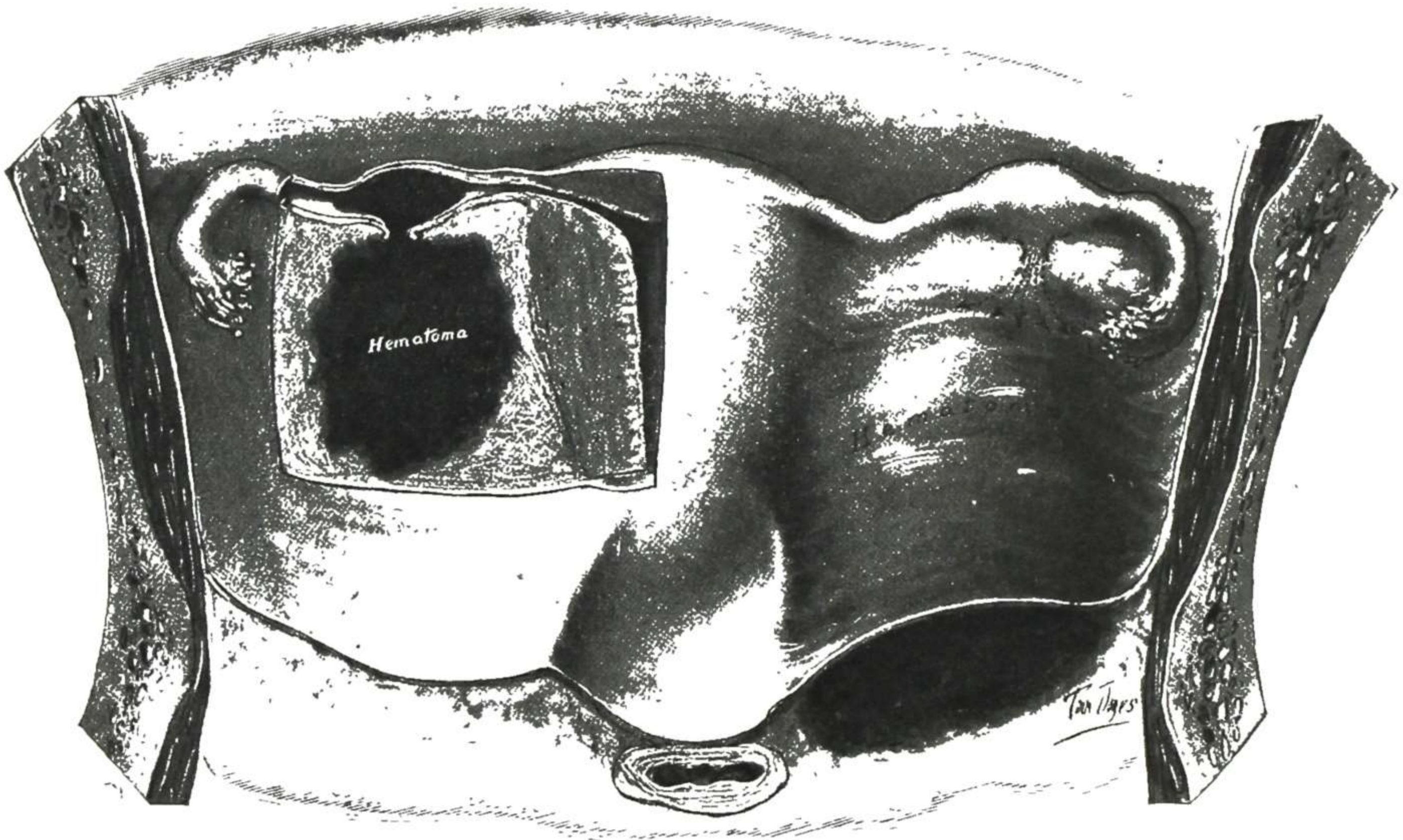


Fig. 924.—Hematoma. In the left broad ligament is indicated a small hematoma from rupture of the tube. In the right broad ligament is indicated a much larger hematoma.

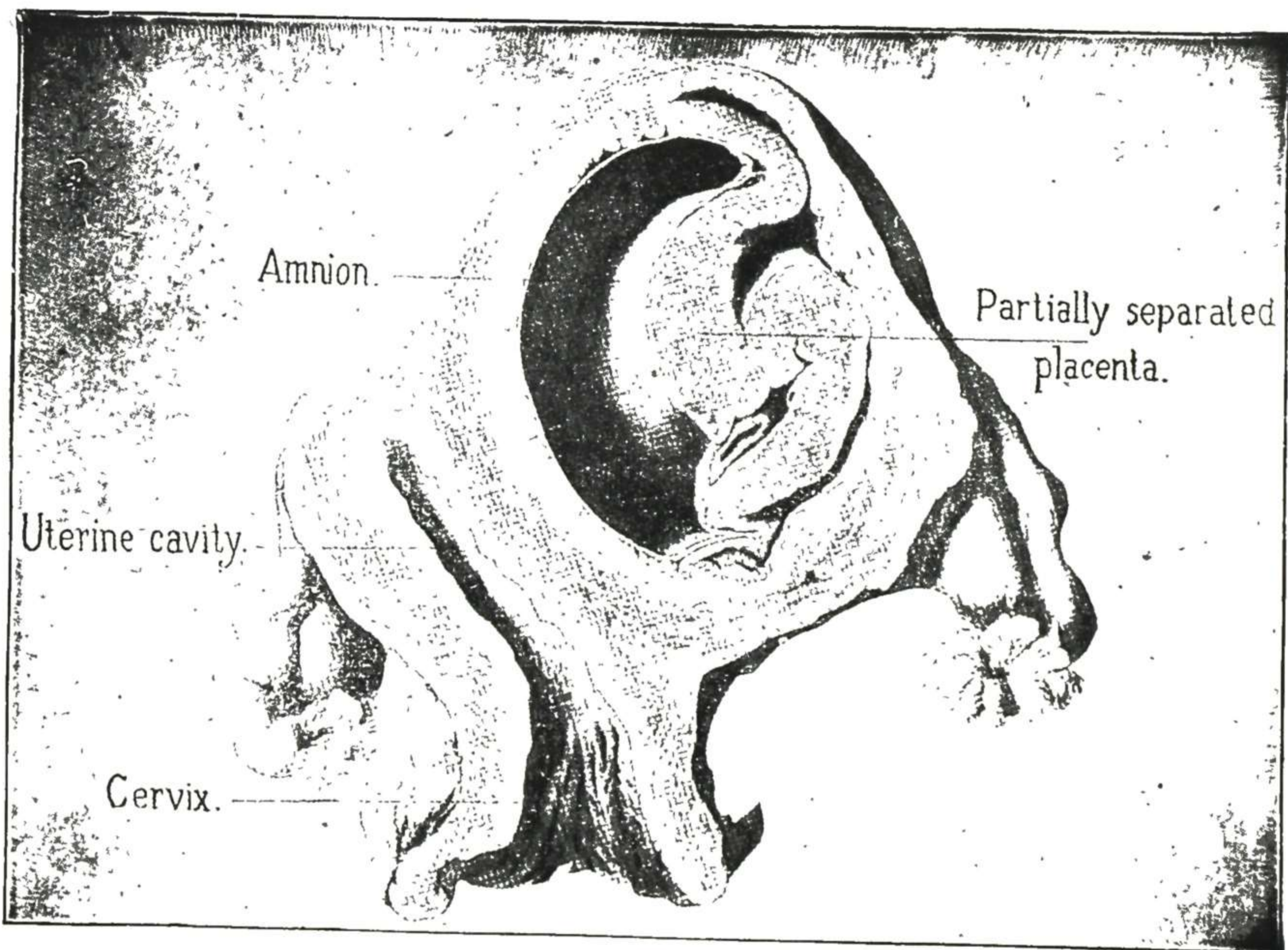


Fig. 925.—Interstitial pregnancy. (Williams, after Bumm—*Obstetrics*.)

pregnancy." This is peculiar in that the development takes place within the wall of the uterus, though outside the uterine cavity (see Fig. 925). In this form of tubal pregnancy, rupture of the gestation sac usually does not take

place until much later than with the ordinary form. Also, the rupture may in some cases be into the uterine cavity. Consequently there is a possibility of this form of tubal pregnancy terminating as a normal (intrauterine) pregnancy. Interstitial pregnancy in the early stages approaches in symptoms and signs very close to normal pregnancy, and hence presents more difficulties in diagnosis than a pregnancy farther out in the tube. It is difficult and sometimes impossible before operation to distinguish between interstitial pregnancy and pregnancy in a rudimentary horn of the uterus (cornual pregnancy). The latter is an intrauterine pregnancy in an abnormally shaped uterus and does not belong to the affection now under consideration (extrauterine pregnancy), though it may require the same operative treatment.

8. **Ovarian Pregnancy.**—If the developing ovum is found within the ovary, it constitutes “ovarian pregnancy,” of which a few well-substantiated cases have been reported.

9. **Wandering Pregnancy.**—If the pregnancy is found in the peritoneal cavity without any apparent connection with the tubes, or uterus, or ovary, it is called a “wandering pregnancy,” after the manner of designating fibroids which have lost their connection with the uterus. Such a pregnant mass



Fig. 926.—Bones removed from the rectum in a case of ectopic pregnancy. The ectopic pregnancy terminated by skeletization of the fetus and extrusion into the rectum. (Gustafson—*J. A. M. A.*)

(fetus and surrounding membranes) may be attached to and receive blood supply from various structures. In an interesting case reported by Tuholske the placenta was attached to the liver, creating a most serious condition. “Abdominal pregnancy” is a general term which has been used to designate cases of pregnancy developing in the peritoneal cavity, with or without connection with the tube or ovary.

10. **Extrauterine Pregnancy Carried to Near Term.**—The fetus may develop to term. The embryo and membranes remain attached to the tube and derive nourishment there, and the fetus develops in the peritoneal cavity almost the same as in the uterus. In this class of cases, if the patient survives long enough and the fetus continues to grow to term, false labor pains come on and the child dies, and it then constitutes a foreign body in the abdomen. Again, the embryo and membranes may be extruded entirely from the tube and find attachment to some adjacent structure, from which nourishment is derived, or to some distant structure—for example, the liver, as in the case mentioned above. In a rare case the tube itself may gradually enlarge and accommodate the growing fetus, as in the case reported by Schumann.

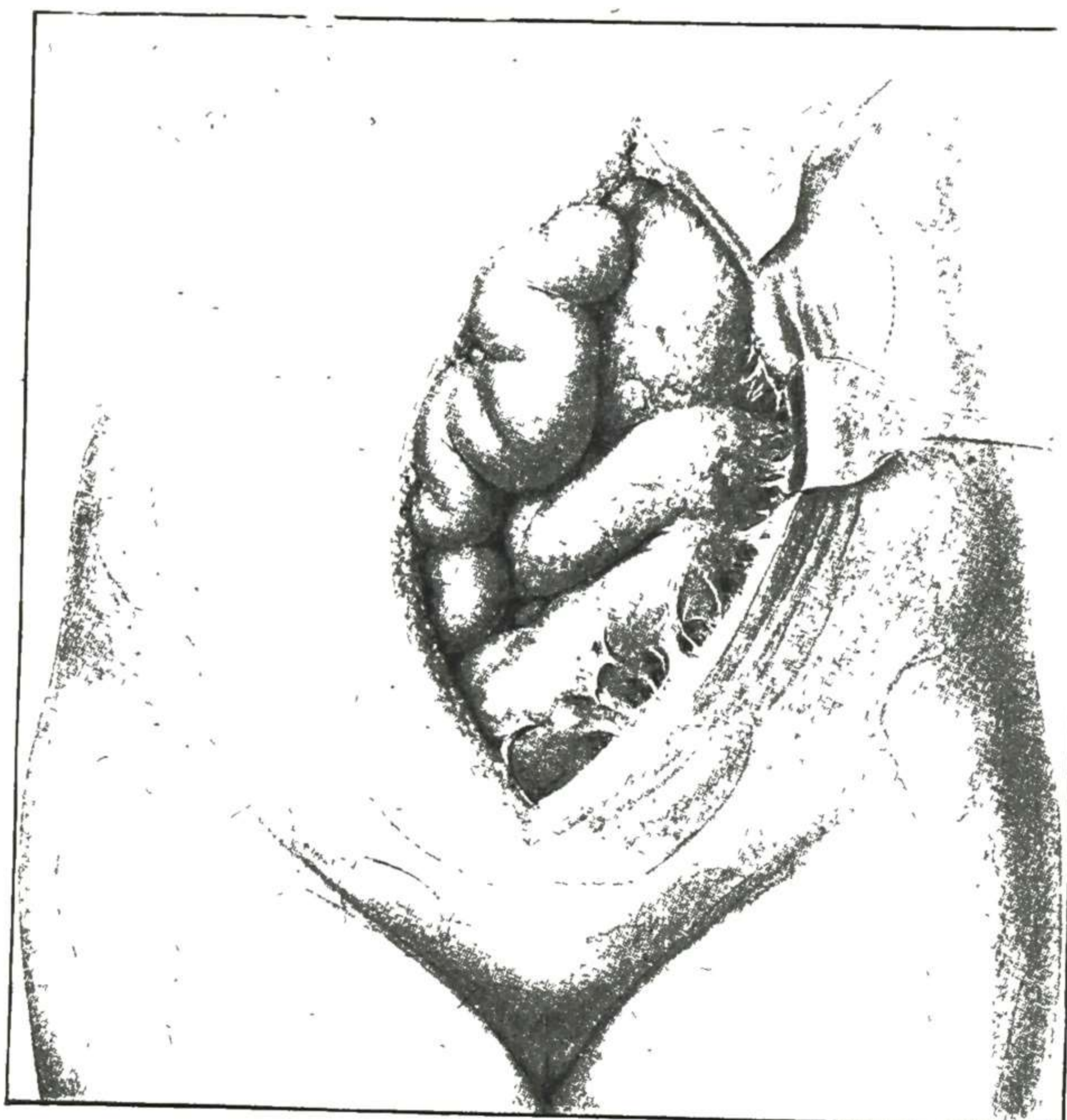


Fig. 927.

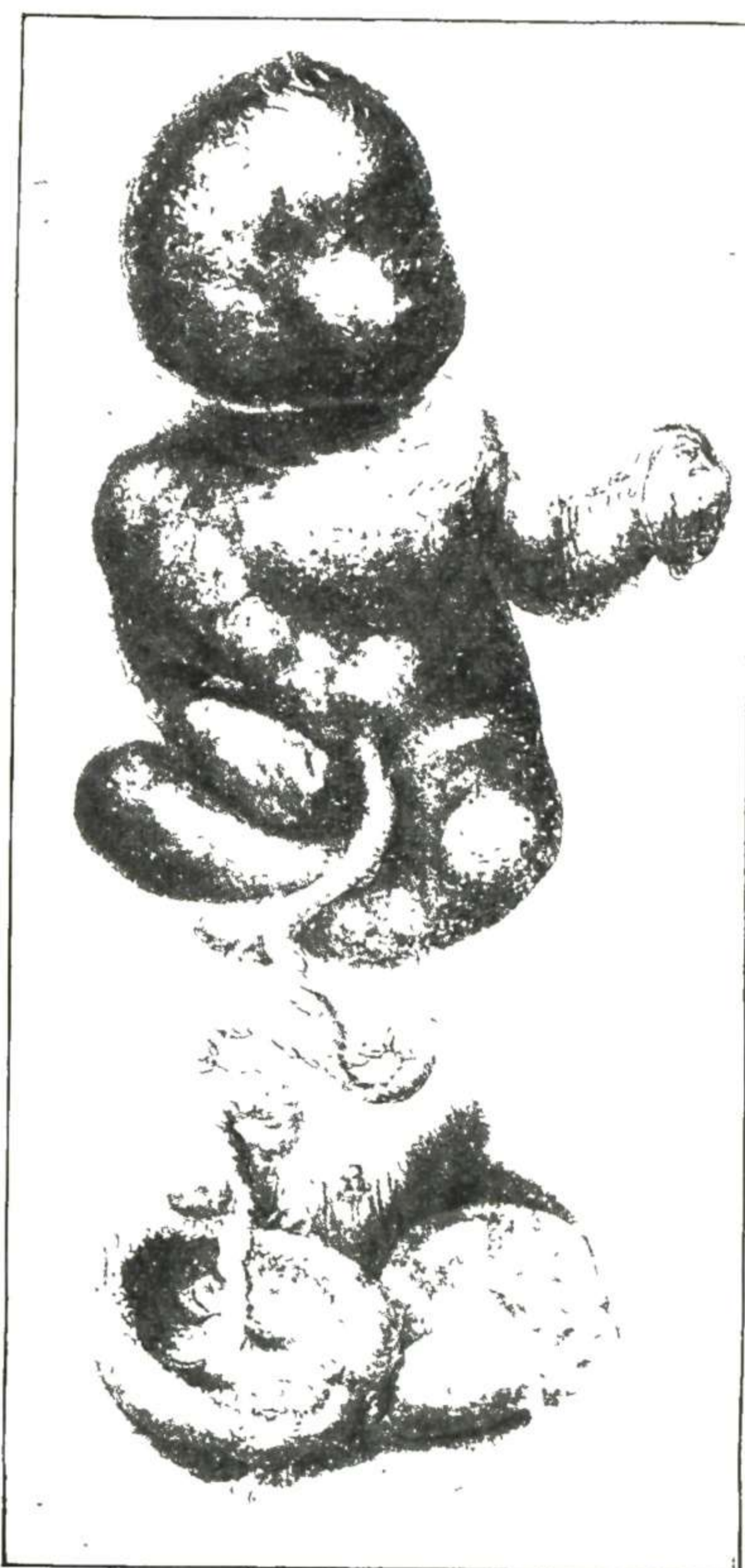


Fig. 928.

Fig. 927.—Extrauterine pregnancy with lithopedion. Showing the lithopedion in situ.  
 Fig. 928.—Showing the lithopedion removed, and also the site of the tubal pregnancy.  
 (Kelly—*Operative Gynecology*.)



Fig. 929.—X-ray of a calcified tumor mass containing fetal bones. This was an eight months' extrauterine pregnancy, calcified and retained for forty years. (Titus and Eisaman—*Am. J. Obst. & Gynec.*)

In a few reported cases of extrauterine pregnancy carried to near term, the condition has been recognized in time and the child saved alive by operation.

**11. Secondary Changes.**—Suppuration may take place, and operation for the pelvic inflammatory mass reveals remnants of the tubal pregnancy. If the embryo had advanced to bone formation, the bones are found in the abscess. Occasionally such an abscess will rupture into the bladder or rectum, discharging pus and pieces of bone, to the astonishment of the attending physician. Fig. 926 shows the bones discharged from the rectum in such a case.

In other cases the tissues of the encapsulated dead fetus undergo a kind of fatty degeneration which converts them into "adipocere." Occasionally some calcification of the soft tissues of the fetus takes place, forming a "lithopedion," shown inside the abdomen in Fig. 927 and outside with attachment to tube in Fig. 928. Such calcification and fetal bones, if any, may produce some surprising items in x-ray films of the abdomen. Extrauterine pregnancy must be considered whenever bizarre shadows are incidentally encountered in abdominal films. An eight-months' extrauterine pregnancy which became calcified and was retained for forty years is shown in Fig. 929.

### Symptoms and Diagnosis

This subject is of interest to everyone called to make a diagnosis in acute abdominal affections, for tubal pregnancy must be considered along with the other conditions which produce sudden abdominal pain and severe shock. There are, however, certain symptoms that usually precede the sudden internal hemorrhage and which help to differentiate tubal pregnancy from the other causes, and these differentiating items must be inquired about before making the diagnosis of ruptured tubal pregnancy. Not infrequently, in cases diagnosed and operated on as such, the operation has revealed that the trouble was not tubal pregnancy but some entirely different condition. On the other hand, many cases of tubal pregnancy with less severe symptoms are treated as pelvic inflammation or as threatened miscarriage, until the persistence of the trouble or a severe attack arouses suspicion of something more serious.

The symptoms of early tubal pregnancy are (1) a missed menstruation, (2) sudden onset of pain (with or without shock), (3) bloody vaginal discharge, (4) a tender mass beside the uterus, (5) only slight fever, (6) evidence of internal hemorrhage, (7) exacerbations of pain and enlargement of the mass without corresponding elevation of temperature, (8) symptoms of early pregnancy, (9) positive Aschheim-Zondek reaction, and (10) exclusion of intrauterine pregnancy.

Suppose that you are called to see a patient with pain in the pelvis and lower abdomen, and a tender mass beside the uterus or behind it. Is the trouble ordinary pelvic inflammation or is it tubal pregnancy? As ordinary pelvic inflammation, in the form of salpingitis, is the more common affection, it is to be assumed that the trouble is ordinary pelvic inflammation and not tubal pregnancy, unless there are special symptoms pointing to the latter.

The special symptoms pointing to tubal pregnancy (but not pathognomonic of it) are as follows:

**1. Missed Menstruation.**—The patient, previously regular in her menstruation, fails to menstruate at the proper time. She goes overtime a few days or a week, or several weeks.

2. **Sudden Onset of Pain.**—After going overtime for a few days or a few weeks, the patient is suddenly seized with pain in the pelvis, usually severe enough to confine her to bed, and in exceptional cases she is completely prostrated and in collapse.

3. **Bloody Vaginal Discharge.**—Usually within a few days of the onset of the pain a blood-stained vaginal discharge appears. The patient regards this as the return of the menstrual flow. But generally it is not so free as the regular menstrual flow, and does not stop in a few days as the menstrual flow should, but persists as an irregular bloody discharge for a week or two—some days present and other days absent. In some cases there are shreds of membrane and blood clots in the discharge, leading to the supposition that a miscarriage has taken place.

4. **Tender Mass.**—This may be well out in the adnexal area or in against the uterus laterally or posteriorly.

5. **Only Slight Fever.**—The temperature may go up to 102° or even higher at the onset of the trouble, but after that it usually ranges about 100° and may go to normal. The absence of marked fever is one of the strong points in distinguishing tubal pregnancy from early abortion with persistent bloody discharge and infection and salpingitis.

6. **Evidence of Internal Hemorrhage** will, of course, vary with the amount of blood lost internally. If the internal hemorrhage is free, the patient may be in collapse within a few minutes after the onset of the pain. In other cases the internal bleeding is so slight as to produce no effect on the patient's pulse or color—but it causes pain.

7. **Exacerbations of Pain Without Apparent Cause and Without Decided Elevation of Temperature** is characteristic of those cases of tubal pregnancy in which there are repeated slight internal hemorrhages.

In salpingitis, with the patient quiet in bed, such exacerbations of pain could be caused only by an increase in the inflammatory process, and this would be accompanied by a decided rise in temperature.

8. **Signs of Pregnancy.**—Some of the early signs of pregnancy may be present—for example, stomach disturbance, or pain in the breasts, or softening of the cervix uteri.

9. **Positive Aschheim-Zondek Pregnancy Test.**—This is decisive in differential diagnosis between tubal pregnancy and other extrauterine masses in cases in which intrauterine pregnancy can be positively eliminated. There are, however, certain complications or sequelae of intrauterine pregnancy which may continue the positive Aschheim-Zondek long after the termination of the pregnancy, as in remnants of hydatidiform mole or in chorioepithelioma.

10. **Absence of Intrauterine Pregnancy.**—It may be very difficult to determine, in a given case, whether the trouble is tubal pregnancy with slight hemorrhage, or an incomplete abortion with persistent bleeding and mild sepsis and salpingitis. In such a doubtful case the uterus may be cleared out with the curette and the scrapings examined. If there has been recent pregnancy within the uterus, the microscopic examination of the tissues removed will show chorionic villi. If the trouble is tubal pregnancy, there will be no fetal structures in the scrapings.

This procedure is somewhat dangerous, for, if tubal pregnancy be present, a fresh hemorrhage and a serious one may be started by the manipulations. Consequently, curettage should be employed in these doubtful cases only when serious symptoms make a positive diagnosis necessary at once. In such a case the operator should have arrangements made so that immediate abdominal section may be carried out should threatening symptoms indicating internal hemorrhage arise during the process of curettage.

11. **X-Ray Examination Findings.**—X-ray examination may help materially in the differential diagnosis, by positive findings or by negative findings or by both—the significance of the findings depending on the type of tubal-pregnancy lesion under consideration and the conditions from which it must be differentiated.

**Special Conditions.**—There are two special conditions or stages of extrauterine pregnancy in which the symptoms may so closely simulate normal pregnancy that the true condition is overlooked, namely, before rupture and near term.

*Before Rupture.*—Previous to primary rupture the symptoms are practically those of an early pregnancy. The patient goes over her menstrual time without the menstrual flow appearing. There is some nausea, usually most marked in the morning, and perhaps some tenderness of the breasts. Pain is not necessarily present. There may be some soreness in the pelvis, either general or localized to one side, but this is rarely troublesome enough to arouse suspicion of anything abnormal, for some soreness through the pelvis is very common in normal pregnancy owing to the marked congestion and the enlarging uterus and the new corpus luteum.

Pelvic examination at this stage shows some tenderness about the adnexa of one side, and perhaps a small mass, due to the enlargement in the tube. Normal ovaries, however, are usually tender in early pregnancy, and the tenderness is frequently more marked on one side. The small mass in the tubal region is really the only positive evidence of any abnormal condition within the pelvis, and as far as known this mass may have been there for a long time, due to some previous trouble. Unless a previous examination has shown the pelvis to be clear, making it certain that the little mass is of recent development, the diagnosis of tubal pregnancy is hardly justified, for there is not sufficient evidence to establish it.

A diagnosis based upon such insufficient evidence will prove erroneous in the great majority of cases, as has been amply demonstrated by the operative results from such hasty diagnoses. In exceptional cases the soreness will be so well localized to one side and so marked, particularly on exertion, and the tenderness of the little mass so very pronounced on palpation, in a patient previously perfectly well, that with a positive Aschheim-Zondek reaction a diagnosis of tubal pregnancy with operation for it before rupture may be safely made. But such cases are very rare, the conditions so closely simulating normal pregnancy that no suspicion of abnormality is aroused, or, if aroused, the differential examination signs are not positive.

It seems probable that a large proportion of the cases set forth as diagnosed and operated on "before rupture" are really not seen until after the primary rupture. There may not be much disturbance from this first rupture, only a very slight hemorrhage taking place. But this is sufficient to give the few sharp pains, and the persistent soreness, and the markedly tender mass without apparent cause—the three symptoms that occupy such an important place in the diagnosis of tubal pregnancy after rupture.

Be careful (1) to make a pelvic examination in every case of early pregnancy in which there is sufficient pain or soreness in the pelvis to arouse suspicion of some abnormality, (2) to make no positive diagnosis of tubal pregnancy unless the physical signs justify it, and (3) to pronounce no case "before rupture" which shows blood in the pelvis, or recent plastic exudate and adhesions about the tube, or damage to the peritoneal coat of the tube at the time of operation.

*Near Term.*—It is well to be suspicious of extrauterine pregnancy when your obstetric patient has "false pains" a great deal or fails to go into labor on time or when some of the examination-signs are not clear. One expects a history of a stormy course in an extrauterine pregnancy, but occasionally the early trouble is of short duration and after that the fetus develops with sur-

prisingly little disturbance. Also, the patient's plausible assumptions that the various abdominal discomforts were due to common ailments, may throw one off guard. In all cases it is important to determine definitely that the fetus is really in the uterus.

In the case of a large mass in which the diagnosis lies between extrauterine pregnancy near term and a large tumor or intrauterine pregnancy or a combination of tumor and pregnancy, x-ray examination may aid by showing fetal bones within the uterus or outside it or possibly by showing mass outlines which aid interpretation.

Even with x-ray examination, however, the diagnosis may be difficult. Aschman and Helwig report an instructive case in which examination findings, including a check-up x-ray film, so closely simulated those of intrauterine pregnancy that that diagnosis was made. Six months later, the patient returned with the mass no larger and with evidences of extrauterine pregnancy, which diagnosis was confirmed by operation.

Another instructive case is that reported by Friedman. This patient came to the prenatal clinic in March, and examination revealed a pregnancy in the fourth month. After that she was examined regularly in the clinic until August, when they became suspicious of extrauterine pregnancy. An x-ray film was made. This and the physical signs indicated that the fetus was outside the uterus, and an opaque injection into the uterus confirmed that diagnosis. Incidentally, this patient had had a tubal gestation six years before, for which she had operation with right salpingo-oophorectomy. In another reported case the patient had a combination of lithopedion in one side of the abdomen and a living fetus in the other side.

### Treatment

In pointing out the treatment for extrauterine pregnancy, several clinical classes must be considered—namely (1) before rupture, (2) hematocele, (3) repeated moderate intraperitoneal hemorrhage, (4) profuse intraperitoneal hemorrhage, (5) hematoma, and (6) advanced cases.

**1. Before Rupture.**—The only safe line of treatment in this stage is abdominal section and removal of the pregnant tube as soon as the diagnosis is fairly certain. The patient is in constant danger of a sudden serious hemorrhage, hence the sooner she is operated on the better.

**2. Pelvic Hematocele (Fig. 919).**—In these cases the hemorrhage has long since ceased and the collection of blood in the pelvic cavity is well shut off from the general peritoneal cavity by plastic exudate and adhesions. The embryo and membranes have probably escaped from the tube, either through a rupture in the wall or more frequently through the end of the tube by "tubal abortion," and perhaps have been largely absorbed.

Practically all that remains is the blood in the pelvis, with the exudate and adhesions around it. This forms a tender mass low in the cul-de-sac back of the uterus, without much disturbance higher.

In such a case it is well to watch the patient for a while, in the meantime keeping her quiet in bed. In the course of a week or ten days there will probably be decided improvement, showing that nature is taking care of the blood

and exudate, and that the patient will probably recover without operation, or renewed evidences of irritation will appear, showing that embryo and chorion are still growing or that the blood and exudate are acting as a persistent source of irritation. When there is persistent irritation after this period of rest, operation is indicated.

The choice of operation depends on the circumstances of the case. If the evidences of irritation (pain and tenderness) are all low in the cul-de-sac, the probability is that evacuation of the blood from the cul-de-sac by vaginal section will be all that is necessary. If the pain and tenderness extend into the upper part of the pelvis, abdominal section is the safer operation. When the conditions are doubtful, the abdominal route should be chosen.

In a case in which a hemocele is to be evacuated by vaginal section, the patient should be prepared for an abdominal section also, for there is a possibility of the vaginal manipulations starting an internal hemorrhage which could not be satisfactorily controlled from below.

3. **Repeated Moderate Intrapertoneal Hemorrhage** (Fig. 921).—This class comprises the majority of the cases of tubal pregnancy. The treatment is abdominal section as soon as the diagnosis is positive and the patient can be placed in a hospital and given the regular careful preparation for that operation.

4. **Profuse Intrapertoneal Hemorrhage** (Fig. 922).—In these cases immediate abdominal section is advisable as a rule if the patient is within reach of an experienced abdominal surgeon and can be placed in suitable surroundings. In the absence of an experienced operator and suitable facilities, operation had best be deferred.

In operations for the various classes of cases of extrauterine pregnancy, as well as other conditions in which abdominal section is required, the patient's chance of recovery is greater if the operation can be conducted in a well-ordered hospital. Consequently, the patient should be taken to a hospital if possible. Even a trip on the train, with the patient on a stretcher and in a strictly recumbent posture all the time, is less hazardous than operation in poor surroundings. The marked emphasis which teachers and writers generally have placed upon promptness of operation in extrauterine pregnancy has unfortunately led to considerable indiscriminate operating in these cases—operations on patients in which it would have been safer to wait a while, operations without adequate aseptic preparation, operations by persons without sufficient surgical experience to handle the serious intra-abdominal conditions in a safe and effective way.

Even in the restricted class of cases in which there is free intraperitoneal hemorrhage, the so-called "tragic" cases, it is probable that not many patients really die at once from the loss of blood. There are some that do, but they are comparatively few, as indicated by mortality records and by the number of patients that come to operation later with a history of having passed through a severe attack. It is the repeated hemorrhages, with the resulting peritoneal irritation and inflammation, coming on within a few days or a few weeks, that constitute the greatest menace and that cause the death, rather than the mere withdrawal of a certain amount of blood from the circulation at the primary rupture. This being the case, the patient has a better chance of surviving the



primary loss of blood if simply kept quiet without operation, than if operated on at an inopportune time or without reliable aseptic preparation or by a person without adequate experience in abdominal surgery.

In most of these cases, the hemorrhage has ceased by the time the physician reaches the patient. Whether this is the case can be determined with a fair degree of certainty, as a rule, by watching the patient for a short time. If the hemorrhage has ceased, it will be seen that the pain is diminishing and the pulse, though weak, remains about the same in rate and volume. The immediate requirements are (a) to make hospital arrangement and summon an ambulance to take the patient there, (b) to relieve pain and quiet the patient, and (c) to lessen the severe thirst caused by the blood loss and at the same time begin the gradual restoration of body fluids.

If there is much pain or restlessness, a hypodermic of  $\frac{1}{2}$  gr. codeine will help, and is less likely to cause vomiting than morphine. This moderate dose, which may be repeated later as needed, is preferable to a large dose. These patients on the borderline between life and death sometimes react unduly to the larger drug-dosages which are ordinarily perfectly safe. If the patient complains of thirst, it may be lessened by giving water by mouth, in small quantities to avoid vomiting, repeated frequently as desired, so that there is a continuous supply of fluid being absorbed from the stomach.

While waiting for the ambulance, the family is instructed as to the danger of renewed internal hemorrhage if the patient is allowed to sit up or is propped up for any reason or any attempt is made to change clothing. She must be kept horizontal with head level—even a pillow may increase cerebral anemia and start vomiting, the straining of which may cause renewed bleeding. This same precautionary information is given to the ambulance attendants, who must slide the patient from bed to stretcher in a strictly horizontal position, and must exercise the same care at the hospital end of the trip.

If the patient is in some locality where ambulance and hospital services are not available, arrangements are made at home to supply the necessary fluid and nourishment during the critical period of the next few days. Fluid may be supplied by normal saline solution subcutaneously and nourishment by 5 per cent glucose solution subcutaneously, avoiding intravenous administration of fluid in quantity because of the danger of renewed hemorrhage from raised intravascular pressure. Fortunately, materials for saline solution and for glucose solution may be purchased in convenient packages ready sterilized for use, and these, with suitable apparatus for administration, will of course be kept on hand by the physician practicing in a locality where these hospital facilities must be supplied in the home.

Glucose solution for subcutaneous use must be weak (5 per cent) and, like subcutaneous saline, is to be given slowly to permit distribution without undue local tension. As to the fluid requirements of the patient, 2,000 c.c. daily, given in two subcutaneous injections, should tide the vital forces over the acute period of three or four days. A portion of this (third to half) may be of the 5 per cent glucose, to supply nourishment. This may be given along with the saline (thus further diluting the glucose) or separately at another site. Also, the administration of amino acids is to be considered in connection with meeting the nutritional and vitamin requirements. The role of the amino acids is considered in detail in Chapter III under Plasma Balance. In addition to supplying fluid and nourishment, it is important to avoid vomiting, purgatives, enemas and pelvic examination, any one of which may disturb the pelvic structures enough to start more bleeding. As the patient will be taking no solid food, no bowel movement is necessary in the next few days or if necessary it will come spontaneously. Straining is to be avoided, and of course a bedpan is to be at hand for urination and any bowel movement.

As the patient becomes able to take more water by mouth and, later, nourishment, the subcutaneous administration may be diminished. Iron and associated tonics, for restoration of blood cells and hemoglobin, are to be started early, perhaps by hypodermic administration and continued later by mouth. When the patient has recovered sufficiently to travel safely, she should be taken to a hospital for the deferred operation. This should not be postponed till there is additional growth of the embryo and membranes and another severe hemorrhage.

Ordinarily, we rely so much on blood transfusions and intravenous solutions in combating shock in emergencies, that they come at once to mind when confronted with this emergency. But with a serious internal hemorrhage just checked by a fresh blood clot, rendered possible by the low blood pressure of shock, which is nature's protective measure, it can be readily appreciated that safety lies in continuing the low intravascular pressure until the clot is firmly organized or until the abdomen is opened and the bleeding area under control. This applies to blood transfusion the same as to the intravenous administration of any other fluid in quantity. Hence the importance of omitting blood transfusion and intravenous glucose, until the patient is in the hospital where operation can be carried out immediately should there be evidence of renewed bleeding. When the patient is in such desperate condition from exsanguination that it is thought necessary to put some blood in the vessels, the fractional method may be employed—that is, a small quantity is given slowly with careful watching as to blood pressure, and repeated according to indications. Of course, if the patient is on the operating table, a regular transfusion may be started slowly as the operative field is being prepared, the flow to be increased as soon as the vessels are clamped. In some cases sufficient fluid blood is found in the peritoneal cavity for some to be citrated and used for transfusion, if other blood is not at hand. It is preferable, however, to use other blood for the transfusion, and leave the fluid peritoneal blood to be absorbed from there.

As to operation, the desperate cases where the vital forces are at a low ebb, require much judgment and discrimination as to when to operate in a particular case and as to just what to do at the operation—on the one hand, to stop the bleeding and thus prevent the patient from passing into an absolutely hopeless condition, and, on the other hand, to avoid snuffing out the little spark of life remaining by the added strain of intraperitoneal manipulations and anesthesia. The anesthesia and operative work must be reduced to a minimum, both in duration and in extent. Some cases can be satisfactorily operated on under local anesthesia, and occasionally there is a case in which the patient's sensibilities are so obtunded that practically no anesthesia is necessary for the work required.

5. **Pelvic Hematoma** (Fig. 924).—If there are any evidences of active or recurring hemorrhage, the preferable treatment is abdominal section with removal of the damaged tube and the blood mass. If there is simply a quiescent blood collection in the connective tissue, keep the patient quiet and watch. If the blood mass is gradually absorbed, keep the patient quiet until the mass has largely disappeared, and then she may be allowed up and be counted practically well. If the mass remains stationary and symptoms of pronounced irritation persist or arise later, the patient should be subjected to operation—abdominal or vaginal, as indicated by the location of the mass and the accompanying symptoms.

6. **Advanced Cases**.—These cases vary so much that it is impossible to give any general rule of handling. In some of them immediate operation is indicated, while in others it is advisable to wait for a time, either because the child has only recently died and the placenta and adhesions are still dangerously vascular, or, in rare cases, because there is good reason to hope for saving the child without unjustifiable risk to the mother. The problem of bleeding control at operation, whether to remove the placenta immediately or leave it in situ for a while, and various other important surgical items are discussed in *Operative Gynecology*.

### OTHER HEMORRHAGES

When there is hemorrhage into the pelvis from any cause, if the blood passes into the peritoneal cavity, it is known as "intraperitoneal hemorrhage." If the amount of blood is small and becomes shut in the pelvic cul-de-sac by a roof of exudate and adhesions above, it is referred to as a "pelvic hemothorax." If the blood, instead of passing into the peritoneal cavity, passes into the connective tissue, the resulting condition is called "pelvic hematoma."

The usual cause of blood in the pelvis is extrauterine pregnancy, the characteristics of which have just been presented. However, hemorrhage into the pelvis occurs occasionally from other causes. A collection of blood in the pelvis may be caused by any one of the following conditions:

1. Hemorrhage from a corpus luteum or from a follicle at time of ovulation.
2. Hemorrhage from a papillary tumor of the fallopian tube.
3. Rupture of vessel of any tumor or of a varicose vein of broad ligament.
4. Leakage from an endometrial ovarian cyst.
5. Tissue traumatism in examination, such as rupture of a thin-walled cyst or when determining a deep attachment under anesthesia or attempting reposition of a fixed uterus.
6. Traumatism in crushing accidents or falls.

The **diagnosis** is made by the same symptoms that indicate hemorrhage in extrauterine pregnancy, but without the evidences of pregnancy.

As in the vast majority of cases of spontaneous pelvic hemorrhage the cause is extrauterine pregnancy, this affection must be excluded in any particular case before any other diagnosis is permissible. Sometimes this may be excluded by the circumstances of the case—for example, the patient may be a virgin, or may be past the menopause, or may have had no recent opportunity of becoming pregnant. In some cases the differential diagnosis cannot be made until the operation, when one of the causes above mentioned may be apparent, with absence of indications of tubal pregnancy. In a doubtful case the diagnosis should be reserved until the suspicious mass, removed at operation, has been submitted to microscopic examination. In a tubal pregnancy, ruptured early and not operated on for several weeks, all naked-eye evidence of the pregnancy may disappear. But by microscopic examination of the affected tube, evidence of the pregnancy may be found.

Meigs and Hoyt reported from the Massachusetts General Hospital a series of 22 patients in whom it was found that the pelvic hemorrhage occasioning operation came from a recently ruptured follicle or a fresh corpus luteum or the edge of a ruptured cyst. Harris and Groper reported a series of 45 cases of ruptured ovarian retention cyst and collected 367 cases from the literature. From their study they reached the following conclusions:

1. For clinical purposes the term, ovarian retention cyst, is advocated in the discussions of rupture of graafian follicle and corpus luteum cysts.
2. Intraperitoneal hemorrhage from rupture of an ovarian retention cyst has not received sufficient recognition in the differential diagnosis of acute surgical abdominal conditions.

3. A classification into 3 groups of *mild*, *moderate*, and *massive* hemorrhage resulting from rupture of ovarian retention cyst is described. The clinical aspects of this entity are determined by the amount of intraperitoneal bleeding.

4. The mechanism of rupture may be due to increased intracystic pressure from spontaneous bleeding into the cyst, or increased extracystic pressure from trauma of various types.

5. The diagnosis of the condition is dependent upon time relation to the previous menstruation, characteristic variation in abdominal pain and tenderness, the presence of active peristalsis, and frequently positive pelvic findings. A "high index of suspicion" aids materially in the diagnosis.

6. Rupture of an ovarian retention cyst must be differentiated from: (1) acute appendicitis; (2) ectopic pregnancy; (3) pelvic inflammatory disease; and (4) torsion of an ovarian cyst.

7. The majority of these cases can be treated by conservative observation after the proper diagnosis is made. The tendency to recurrent attacks is rare but does occur, and the possibility of treatment by endocrine therapy is suggested in such cases.

8. Rupture of ovarian retention cysts seems to have a high incidence among nurses.

9. When surgical intervention is necessary, the entire ovary should not be sacrificed. Plastic resection of the cyst and preservation of normal ovarian tissue is advocated.

The **treatment** of pelvic hemorrhage not due to tubal pregnancy depends on the circumstances of the case. If the hemorrhage is into the connective tissue (hematoma) and well circumscribed, palliative treatment only is indicated. This consists of perfect quiet in the recumbent position, elevation of the foot of the bed and an ice bag over the abdomen, and sedatives sufficient to give rest. In intraperitoneal hemorrhage of slight extent, where tubal pregnancy can be excluded, the same treatment is indicated. In either case the effused blood may be largely absorbed. If after a time it still remains and gives trouble or suppurates, the hematoma or hematocele, as the case may be, has to be opened from the vagina, the same as a pelvic abscess.

If there is serious intraperitoneal hemorrhage, it requires abdominal section if the patient is in fit condition, the additional steps in the intra-abdominal treatment depending upon the conditions found within the abdomen.

## TUBAL TUBERCULOSIS

Tuberculosis of the interior of the fallopian tubes is the characteristic pelvic type of tuberculosis. There may be secondary involvement of the tubal peritoneum and adjacent structures. It is usually bilateral. Occasionally the ovaries are involved primarily, but usually by extension from the tubes. Associated uterine tuberculosis was found in about fifty per cent of investigated cases, but there is a difference of opinion as to whether this means extension down from tubes to uterus or vice versa or by the blood stream to both. Uterine tuberculosis is considered under uterine diseases.

Extension of general peritoneal tuberculosis to the pelvic peritoneum constitutes simply a part of general abdominal tuberculosis or tuberculous peritonitis. There is involvement of the peritoneum over the tubes (Fig. 930) as well as elsewhere, but it would be misleading to include this condition in the distinctive term tubal tuberculosis or tuberculous salpingitis. This distinction is important from the treatment standpoint also, for there is ordinarily no occasion for pelvic organ removal in operations for this condition.

### Etiology

The same factors are operative here as in tuberculous lesions elsewhere, namely, tubercle bacilli and lowered tissue resistance. As to how the tubercle bacilli reach these deep-seated structures, and why they locate here, is an interesting story and one not yet completed.

The following factors have a bearing on the etiology of the affection:

1. Tuberculous lesions in distant organs—for instance, in the lungs. From these distant lesions the bacilli get into the blood stream and are carried to various parts of the body, frequently to the fallopian tubes. In some cases the fallopian tube lesions constitute the only secondary lesion found.

2. Tuberculous lesions in adjacent organs, as the bladder, rectum, intestines, or abdominal peritoneum. Occasionally these penetrate deeply into the tubal wall and become so extensive that the tubal lesion is an important item in the situation, in which case the term tubal tuberculosis may be reasonably applied to designate the pelvic part of the picture. Two foci to be kept in mind in this connection are tuberculous ulcers of the intestine and tuberculous appendicitis.



Fig. 930.—Peritoneal tuberculosis. (Kelly—*Operative Gynecology*.)

3. In some cases the tuberculous infection may come by way of the genital tract from lesions lower—for example, from tuberculosis of the uterus, though presumably extension is usually from above downward.

### Pathology

Three forms of intratubal tuberculosis are recognized—(a) miliary tuberculosis of the mucosa, (b) chronic fibroid tuberculosis, and (c) chronic diffuse tuberculosis.

a. Miliary tuberculosis of a fallopian tube presents the same characteristics as miliary tuberculosis of other mucous membranes—that is, there are fine tubercles scattered beneath the epithelium and not yet broken down. Owing to the structure of the tube, the miliary tubercles readily escape observation unless the removed tube is examined microscopically. This form of tuberculosis may give rise to but few symptoms, and may cause so little disturbance that there is no suspicion of serious disease.

b. If these tubercles fail to pass on to the stage of caseation, but instead become surrounded by a large amount of connective tissue and pass into a quiescent state, we have the condition known as “fibroid tuberculosis of the tube.” The tube is somewhat thickened, hardened, and enlarged by the infiltration, but there is little or no breaking down of the lesions.

c. If, on the other hand, the tubercles progress to the stage of caseation and break down, there results the condition known as “chronic diffuse tuberculosis of the tubes.” The tube is disorganized and contains collections of caseous tuberculous material, as shown in Figs. 931 and 932.

The appearance of the tube varies, of course, with the severity of the disease. In advanced cases the tube is greatly enlarged and on cutting it open the yellow broken-down material is seen—the so-called “caseous pus.” This varies much in consistency, being in some cases rather thin and in others semisolid. When this is removed, the mucosa of the tube is seen to be studded with tubercles in all stages of breaking down, and there are also irregular, ragged ulcers, with small yellowish tubercles in their walls. Microscopic sections reveal giant cells lying in typical tubercles, as shown in Fig. 933.



Fig. 931.—Tubal tuberculosis. (Kelly—*Operative Gynecology*.)



Fig. 932.—Tuberculosis of the tube. The tubal lumen is shown in the left half. Notice in the solid area near the center of the tube, some small grayish patches. These are tubercles. Gyn. Lab.

Macroscopically, in typical cases, small gray tubercles may be seen on the peritoneal surface and in the cut walls and mucosal folds. But in the early cases it is easy to mistake the condition for ordinary salpingitis. In carefully examined series of tubes at operations for salpingitis, tuberculosis was found in 10 to

15 per cent, but in only about one-fourth of these was it so marked as to be readily recognized. In the remaining cases it was found only by microscopic examination, and it may be missed even in the microscopic examination unless routine sections are made from different parts of the tubes.

On the other hand, there is occasionally seen a condition known as **pseudotuberculosis** of the peritoneum in which the tubal surface may be studded with small opaque thickened spots presenting the appearance of peritoneal tuberculosis. Microscopic examination of the involved tissue, however, shows no tuberculosis, but simply chronic inflammatory infiltration.



Fig. 933.—Tuberculosis of the tube. High power of the specimen shown in Fig. 932. Notice the typical tubercles containing giant cells. Gyn. Lab.

Denton and Dalldorf called attention to very confusing pseudotuberculosis lesions deep in the tube wall and presented an extended discussion of the pathology. They conclude that it is a "foreign-body salpingitis," and state that in the investigation of their pathological material they found several diagnosed as tubal tuberculosis. They suggest careful investigation for it in all cases of supposed tubal tuberculosis which present atypical microscopic pictures, and checking by bacteriologic staining and cultures.

### Symptoms and Diagnosis

The symptoms of pelvic tuberculosis are much the same as those of chronic pelvic inflammation. In fact, it is a pelvic inflammation of a special kind. In a large percentage of the cases the diagnosis of tuberculosis is made only after the abdomen has been opened, the operation having been undertaken for what was supposed to be ordinary pelvic inflammation.

In not a few cases, however, a positive diagnosis of tuberculosis is possible before operation, and in some cases it is easy.

The conditions that point to pelvic tuberculosis are as follows:

1. Symptoms of chronic pelvic inflammation in a girl or young woman who has had no evidence of uterine infection.

2. Gradual onset without previous uterine disease, and persistent progress without the periods of marked improvement usually present in ordinary pelvic inflammation.

3. Emaciation, gradual and persistent, without a corresponding severity of the inflammatory trouble.

4. Evidences of tuberculosis elsewhere. Most cases of pelvic tuberculosis occur in patients having pulmonary or intestinal tuberculosis.

5. Tuberculin reaction. In a doubtful case this may aid materially in the diagnosis.

King reviews the subject of pelvic tuberculosis and states the following in regard to tests:

There are three tests that have been extensively used and certain facts concerning them should be known even by those not especially interested in pulmonary tuberculosis. When Koch developed his "old tuberculin" it was used as a diagnostic agent and also as a "cure" for tuberculosis. Its use as a cure was quickly abandoned, and it was finally used only in diagnosis by means of the Pirquet scratch test. This proved to be somewhat crude. It was sufficiently definite, but was not a quantitative test. The Mantoux test is at present the one most frequently employed. It is used intradermally and its advantage lies in the possibility of accurately determining the amount of tuberculin to which the individual will react. It may be used in varying dosage. A 0.001 mg. dose will usually elicit a reaction to an active tuberculosis. Should it not, a 0.01 mg. dose may be tried, reaction to which will always indicate the presence of tuberculosis.

A still more recent test is the use of purified protein derivative, the so called "P. P. D." test. It is supplied in one-fourth grain tablets of two strengths, 0.0002 mg. and 0.05 mg. These tablets are soluble in the salt solution supplied with them, and varying strengths can thus be prepared. Incidentally, it is of interest to note that during the two-year period from June, 1934 to June 1936, 56,688 individuals were tested with purified protein derivative, and positive reactions were found in 47 per cent. This is a marked decrease from the 70 to 80 per cent of a few years ago. Purified protein derivative will doubtless be the choice for future tests for tuberculosis. It is intradermal and possesses all the advantages and none of the disadvantages, such as sensitization, of the other tests.

About the time Löwenstein reported his blood cultures, he proposed a skin test. It consists of the soluble substance of the tubercle bacillus, extracted with glycerine, and the whole dead bacillus. The skin is cleansed and a drop of this testing agent is rubbed in. A positive reaction consists of a nodule at the site of the inunction. In a reactor, the nodule will appear in from twenty-four to seventy-two hours. This test is not as delicate as the Mantoux and Pirquet tests. Fine, who did a comparative study of the three tests, concluded that, while the Löwenstein test is not as delicate as the other two tests, a reactor to it is certain to have an active tuberculosis and in his opinion it qualifies that individual for sanitarium treatment. Is it possible that such a test, being less sensitive, would be of greater value in surgical tuberculosis than the more sensitive ones?

### Treatment

If there are no contraindicating lesions elsewhere, the affected tubes should be extirpated, preferably by abdominal section. The operation should be preceded and followed by antituberculous remedies and regimen. X-ray treatment is worthy of trial.



If there are marked lesions elsewhere, or if the local trouble has advanced too far for radical operation, palliative measures are indicated—anti-tuberculosis remedies and the employment of the various other measures found useful in tuberculosis elsewhere.

In some cases of extensive peritoneal tuberculosis, cure has followed simple abdominal section. However, in operating for tubal tuberculosis, removal of the tubes is advisable whenever practicable, and in some cases the uterus and ovaries also should be removed. Supravaginal hysterectomy is the preferable type in such a case, as the cervix is rarely involved and also this reduces the chance of tuberculous sinus into the vagina. The uterus is involved in about 50 per cent of the cases of tubal tuberculosis, and the ovaries are likely to be involved from close proximity. Also, continued ovarian activity might favor extension of any remaining foci.

In a young woman, however, the matter of continuing ovarian activity is to be carefully considered pro and con along with the other circumstances of the case. The many complete recoveries from extensive peritoneal tuberculosis after simply opening the abdomen gives reasonable hope of recovery from remaining foci after removal of the tubes when they harbor the main lesion. It is to be remembered also that if the continued ovarian activity and recurring menstruation should later seem undesirable in that case, they may be easily stopped by x-ray treatment. On the other hand, in or near the menopause age radical operation by removal of the uterus and ovaries along with the tuberculous tubes is indicated when the abdomen is opened.

Jameson in his monograph on *Pelvic Tuberculosis* includes the following items in his summary:

The end-results of surgery followed by roentgen radiation, as advocated by Edling, Wetterdal, and others, appear to be an improvement over those of either method alone.

Accurate diagnosis is essential before roentgen-rays are to be used and exploratory laparotomy with or without excision of tissue for microscopic examination is usually necessary.

Collections of purulent material are not influenced by the roentgen-rays and must be drained surgically.

According to Baer the following types of cases should be radiated: (a) Cases with co-existent active tuberculosis of other organs, particularly of the lungs; (b) all cases of adnexal tuberculosis in which the diagnosis is certain; (c) cachectic cases which cannot be operated for diagnosis or which refuse operation. (The use of roentgen-rays in cases with uncertain diagnosis should be deprecated and is contraindicated without exploratory laparotomy—E. M. J.) (d) All radically or incompletely operated cases (prophylactic after-irradiation); (e) all cases in which a relapse has occurred; (f) all cases of adnexal tuberculosis associated with an adhesive peritoneal tuberculosis.

King employs tube drainage when pus is encountered in operating for pelvic tuberculosis. He states that sinuses will heal under conservative measures, and that operation is rarely required for them. He emphasizes the value of sanatorium treatment and heliotherapy, and is firmly convinced that they should be employed in every case of pelvic tuberculosis, regardless of how successful the surgery may have been.

## TUMORS OF FALLOPIAN TUBES

New growths of the tube are rare. They include the ordinary types of benign and malignant tumor formation.

### Benign Tumors

There are several types of cysts occasionally seen in the tube—endometrial or endosalpingeal. The hydatid of Morgagni is usually seen as a small cyst

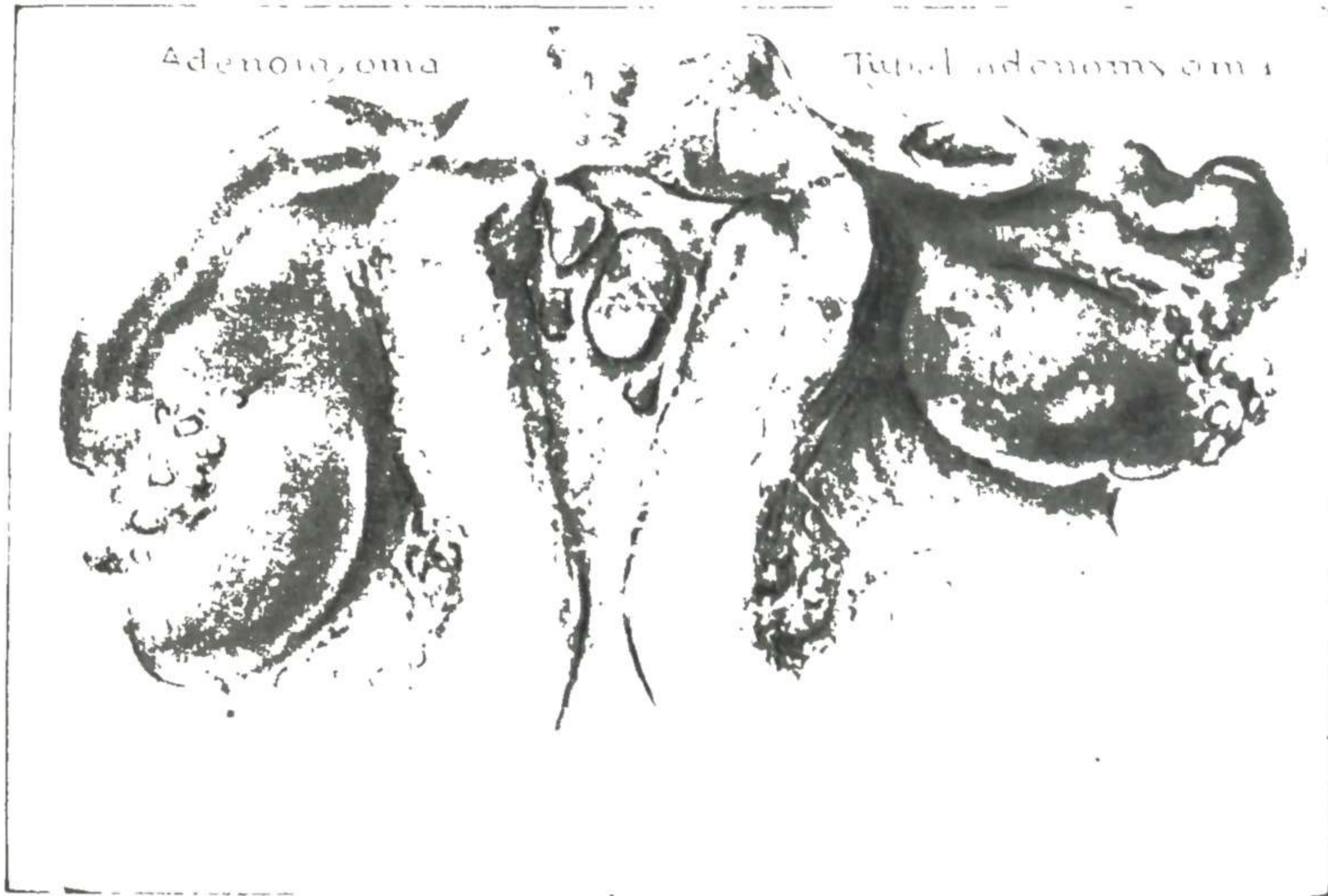


Fig. 934.—Adenomyomas of the fallopian tubes. (Hahle—*Surg., Gynec. and Obst.*)

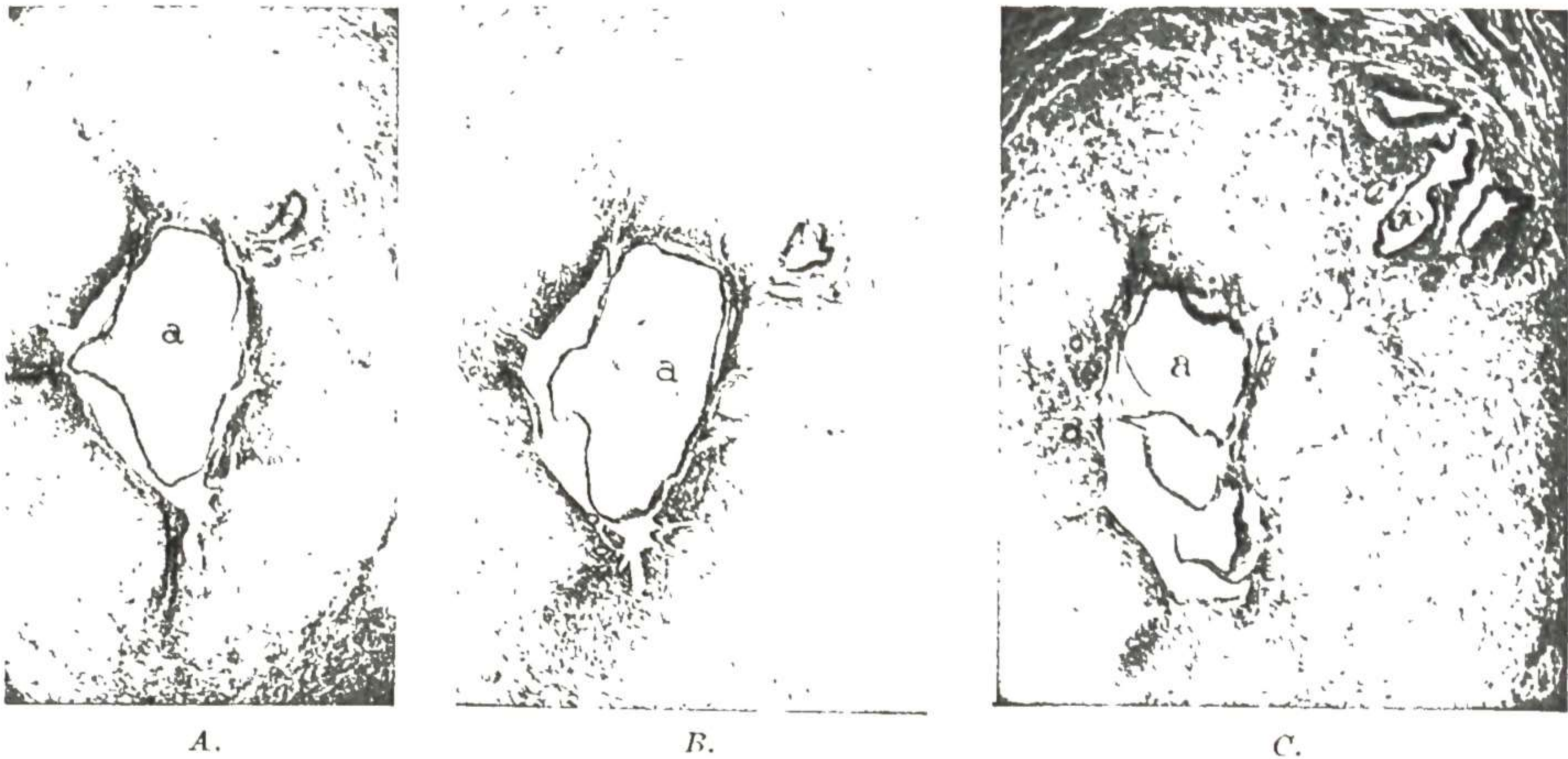
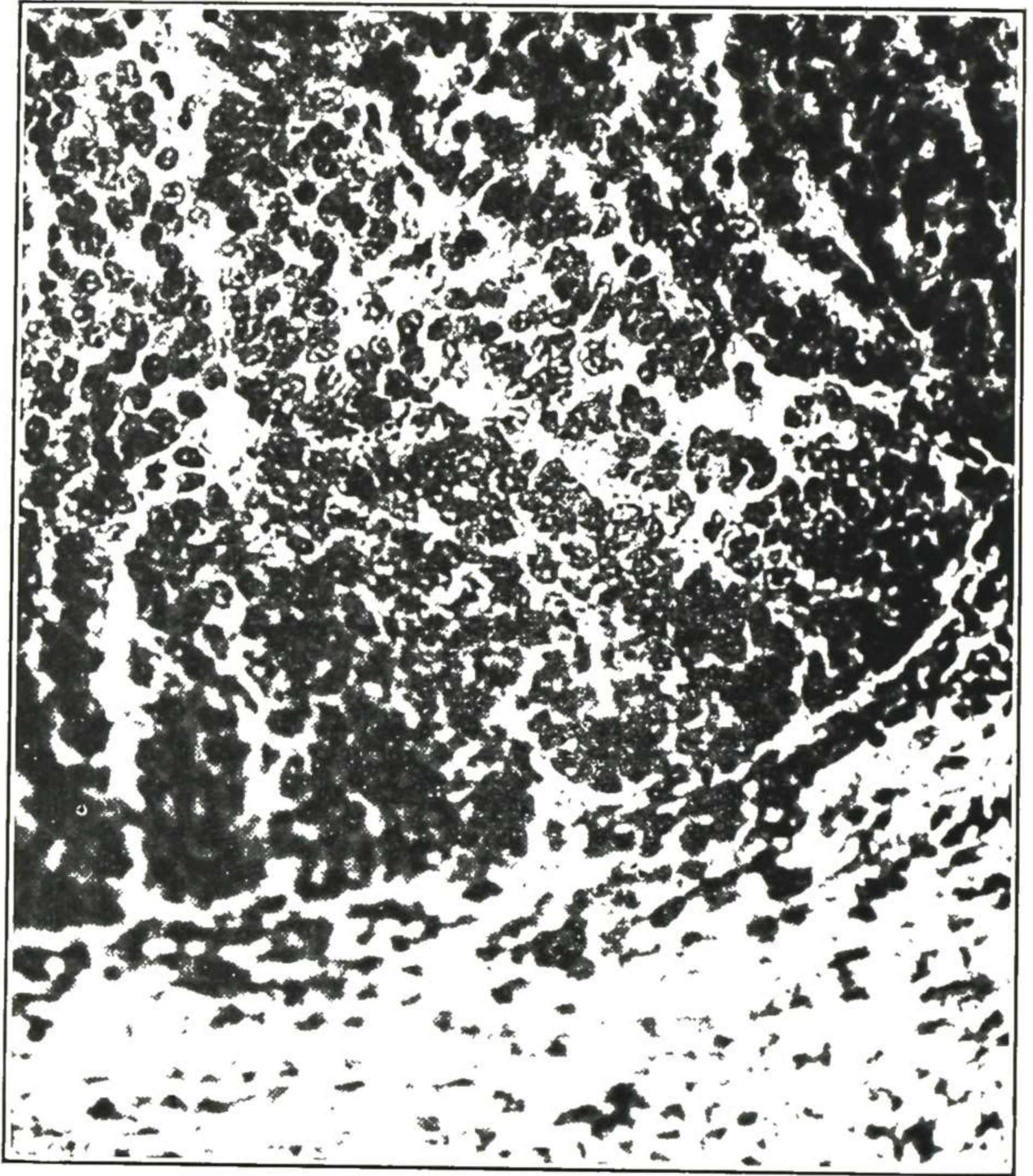


Fig. 935.—Demonstrating origin of a tubal adenomyoma from the tubal mucosa, by serial sections. A, B, C, Rather widely separated sections, showing the mucosal glands at different stages of outward growth. (Mable—*Surg., Gynec. and Obst.*)

at the fimbriated end of the tube, and rarely an accessory tube is found attached to the normal tube as a cystic mass. These cysts are nearly always small. The hydatid of Morgagni is lined with low cuboidal epithelium. The

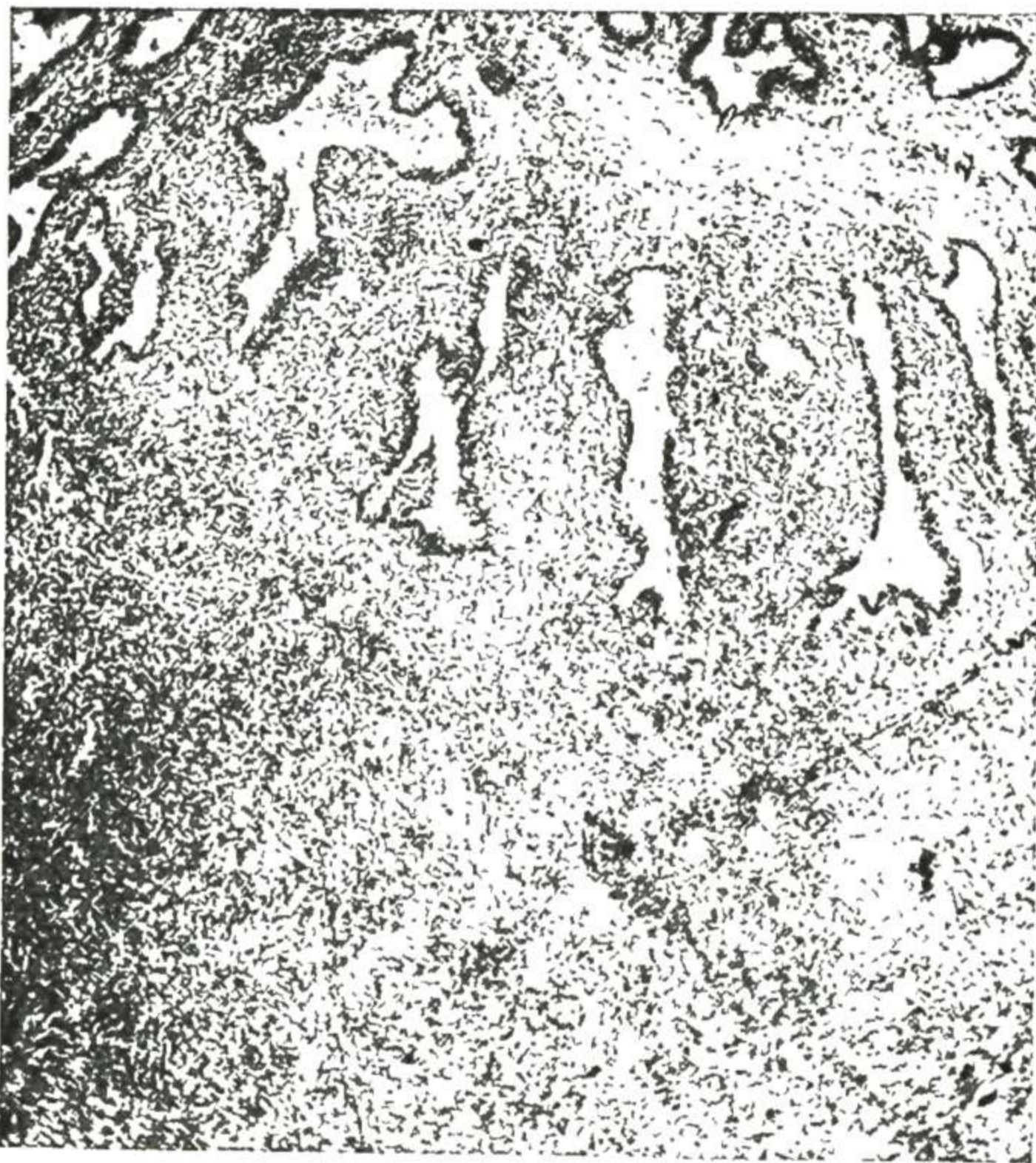


A.



B.

Fig. 936.—Carcinoma of the tube. *A*, Low power. *B*, High power to show the character of the cells. Gyn. Lab.



A.



B.

Fig. 937.—Sarcoma of the fallopian tube secondary to a sarcoma originating in a uterine myoma. *A*, Low power showing the sarcomatous infiltration of the tubal mucosa. *B*, High power showing the form and distribution of the sarcoma cells. Gyn. Lab.

accessory tubes are lined with tubal epithelium, and the endometrial cysts have been described under similar cysts in the ovary.

The other benign tumors of the tube are solid tumors. The most common is the adenomyoma. Fig. 934 shows adenomyosis of the tubes, and Fig. 935 indicates one method of origin. Other types of tumor in this situation are so rare as to require mere mention—fibroma, lipoma, osteoma, dermoid, lymphangioma.

### Malignant Tumors

**Carcinoma.**—Primary carcinoma of the fallopian tube is very infrequent. Vest, in 19,000 gynecologic cases, found four carcinomas of the tube. It occurs in only about 1 per cent of operations for tubal affections. It is bilateral in approximately one-third of the cases.

The most frequent age incidence is between forty and fifty years. Preceding chronic tubal infection is the most important single etiologic factor.

The carcinoma occurs most frequently in the middle and outer thirds of the tube. The tube appears as a sausage-shaped tumor. In the early cases the surface is smooth with few adhesions, but in the more advanced cases the surface is nodular and covered by adhesions. On sectioning the tube, the lumen is found to be filled with soft, friable, papillary projections. In the more rapidly growing carcinomas the tissue has a solid brainlike appearance. Rupture is frequent and this causes dense adhesions due to the attempt at walling off.

The papillary carcinoma (Fig. 936) shows a multilayered polymorphous epithelium on a fibrous network. In the more malignant types, the papillae are so closely packed that the growth appears to be solid. Occasionally they have a glandular appearance, resembling adenocarcinoma of the uterus.

**Sarcoma.**—Only about 10 cases of proved tubal sarcoma have been reported. They present the ordinary characteristics of sarcoma, and may be spindle cell, round cell or polymorphous, with giant cells present. Sarcoma of the tube is shown in Fig. 937.

Secondary carcinoma or sarcoma may occur, and is usually due to direct extension from some nearby organ.

If arising from the interstitial portion of the tube, they produce the symptoms of similar tumors of the uterus. If arising from the outer portion of the tube, they correspond in position to tumors of the ovary.

It is interesting to note that chorioepithelioma has been found in a tube following tubal pregnancy.

The diagnosis of tumors of the tube is usually made after the abdomen is opened. They present no definite distinguishing characteristics, and when felt in examination are usually taken for growths arising from those structures in which tumors more frequently occur; namely, the uterus, the ovary, or the broad ligament.

The treatment for tumors of the tube is removal when circumstances permit.

### TORSION OF ADNEXA

Torsion of the approximately normal tube and ovary occurs occasionally giving rise to attack of pain in that region. Smith reviewed the subject,

detailing and analyzing the reported cases. Anything which increases the size and weight of the adnexa favors the development of a twist in the narrow portion joining the uterus. In some cases the torsion comes and goes, the relations of the structures evidently changing with the positions of the patient and probably with the swelling of the parts. A patient with this condition will have intermittent pains difficult to account for. Fig. 938 shows the condition found in a patient operated on by the senior author for a small adnexal mass with attacks of pain which would come and go without apparent cause. Fig. 939 shows the specimen with the torsion untwisted.

### VARICOSE VEINS OF BROAD LIGAMENT

Occasionally the veins of the broad ligament are found markedly varicose, as shown in Fig. 940, and in the dilated veins are sometimes found thrombi and even small stones (phleboliths).

The principal etiologic factors of these varicosities are subinvolution of the broad ligaments following pregnancy, relaxation of the tissues from poor general health, and obstruction of the venous circulation of the broad ligament by tumors or heart disease or loaded bowel or uterine displacement.

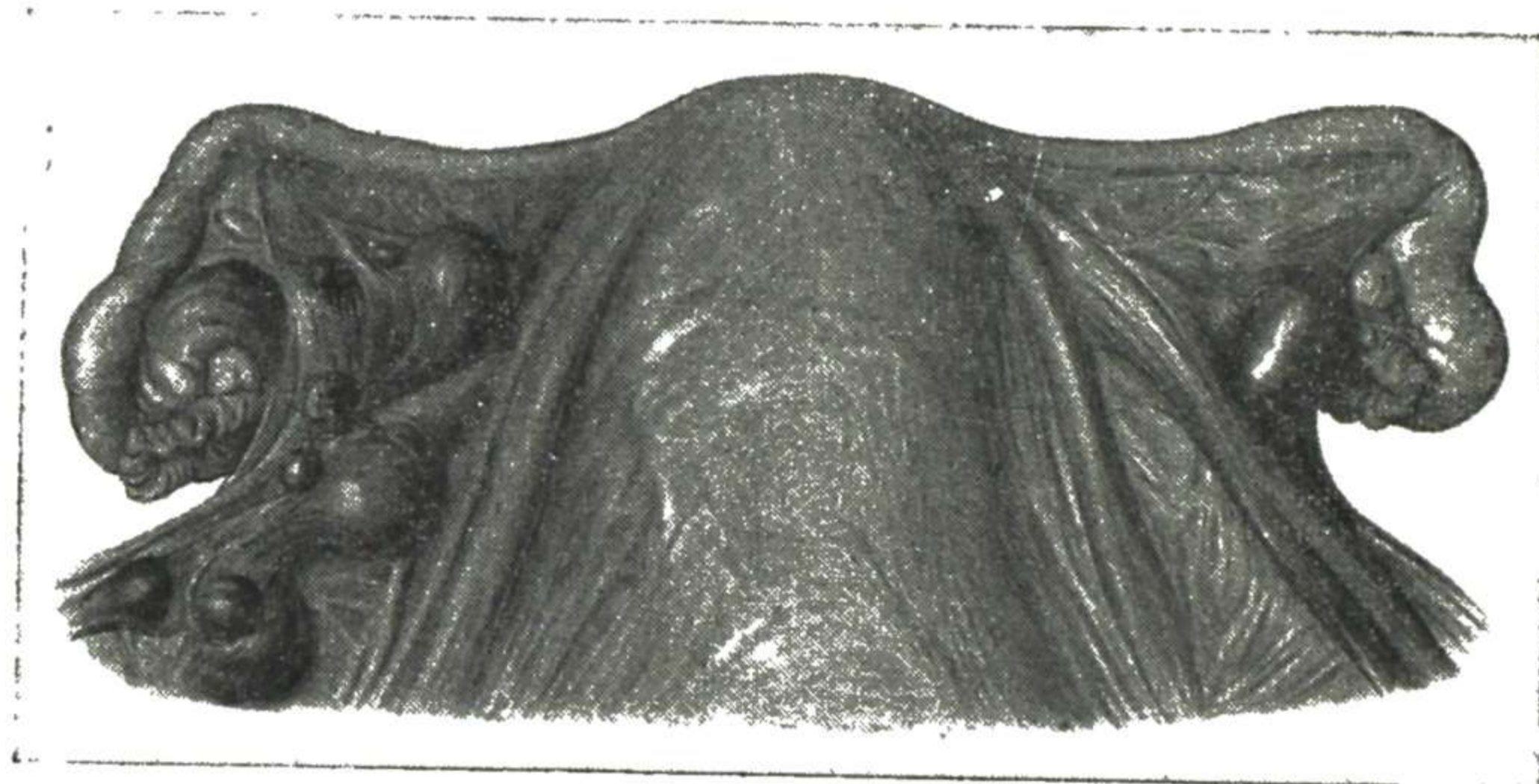


Fig. 940.—Thrombosed veins of the broad ligament. (Schaeffer—*Hand-Atlas of Gynecology*.)

The symptoms (weight and pressure when upright, relieved by the recumbent posture) are not distinctive—in fact, the condition is usually overshadowed by more evident lesions. In most cases so far reported this condition was thought of only after the abdomen was opened and the enlarged veins were apparent.

In cases of persistent pelvic pain without palpable lesion this condition should be considered, and if the symptoms are severe in spite of palliative measures it may be advisable to make an exploratory abdominal section, with the idea of correcting this condition if found.

When phleboliths or thrombi are present, they may produce enough induration to be appreciated on bimanual palpation. If phleboliths show in an x-ray plate, they may be mistaken for ureteral or bladder calculi or for myoma calcification. The treatment of varicose broad-ligament veins found at operation should be adjusted to the particular conditions present in that case. Very often the ovary or tube on that side needs removal for some condition, and its removal and the resulting ligation take care also of the varicose veins.

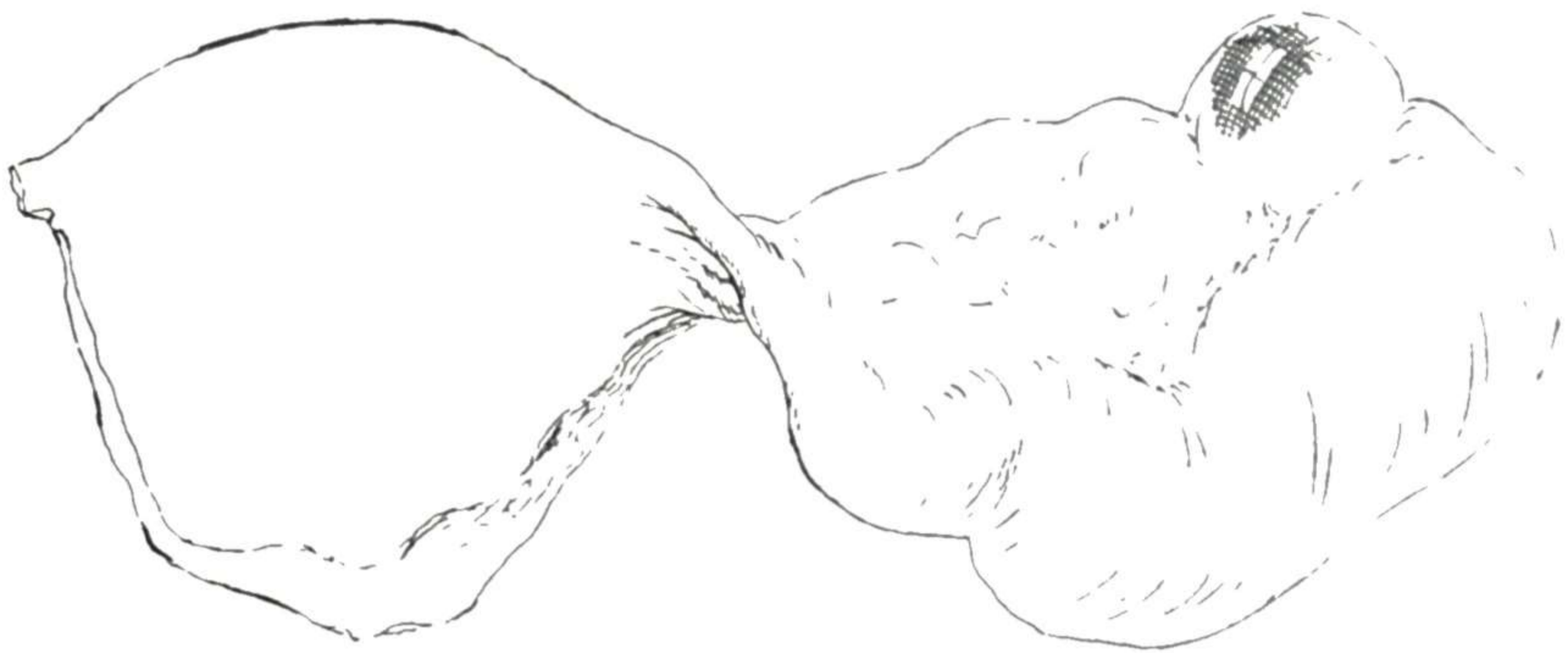


Fig. 938.



Fig. 939.

Figs. 938 and 939.—Hydrosalpinx with Torsion of Pedicle. Patient had intermittent attacks of pain, with complete subsidence between attacks. The recurring pains were evidently due to recurring moderate torsion, with resulting circulatory disturbance and temporary acute swelling. The intermittent torsion was not severe enough to block the circulation and cause thrombosis (as in the specimens shown in Figs. 1019 and 1020). Fig. 938 shows the twist in the pedicle. In Fig. 939 the twist has been untwisted, showing the constriction of tissue at the site of the torsion and the swelling of the structures distal to it. Colored drawing from fresh specimen. (Crossen and Crossen—*Operative Gynecology*, The C. V. Mosby Company.)

### MISCELLANEOUS RARE CONDITIONS

The miscellaneous conditions, found in the pelvis less frequently, will be considered in the following order: brucellosis, actinomycosis and blastomycosis, trichomoniasis, lymphogranuloma, echinococcus disease, metastatic cancer nodules in the cul-de-sac, retroperitoneal masses, and foreign bodies.

**Brucellosis.**—This disease, due to bacteria of the brucella group and known in somewhat different forms as undulant fever, tularemia, rabbit disease, Malta fever, etc., is likely to be overlooked as a cause of pelvic lesions, because pelvic localization is infrequent. The authors recall one such case that was very puzzling, with the attacks of disability and fever and pelvic exudate coming and going without apparent cause. Finally, suspicion of brucellosis was aroused, and tests showed that disease.

The pelvic lesions consisted of masses of exudate, as in subacute inflammation, but without traceable evidence of pelvic infection from labor, miscarriage, instrumentation, gonorrhea, or tuberculosis. Effective treatment proved a difficult problem. Fever therapy was an important factor in the final control of the recurrent attacks.

**Actinomycosis and Blastomycosis.**—*Actinomycosis* is occasionally encountered in the pelvis. Auster gives the following summary regarding this disease, including its pelvic forms:

1. Human actinomycosis is a relatively infrequent but wide-spread disease which is prevalent more particularly in grain-producing areas of the United States.

2. The causative organism is an anaerobe of specific morphological, cultural and serological character.

3. The pathologic picture is characterized by long-standing productive inflammation associated with liquefaction necrosis and draining sinuses, although diagnosis is frequently obscured by intercurrent infection.

4. The clinical course is that of a wasting infectious process, similar to tuberculosis, with bizarre symptomatology depending upon the organs involved or the anatomical location of the disease. No tissue is immune.

5. The abdominal form is usually ileocecal in origin, and in its early state presents a clinical picture similar to acute appendicitis, ileocecal tuberculosis, or nonspecific intestinal granulomatosis. It may be associated with bacillary dysentery.

6. The genito-pelvic type is more common in females and may occur by direct infection of the pelvic generative organs without prior intestinal involvement.

7. Dissemination of the disease, while showing metastatic (probably hematogenous) involvement of the liver, occurs by direct extension to neighboring organs with the production of mural intestinal lesions rather than by lymphatic drainage pathways. Lymph node involvement is usually the result of secondary infection by bacterial invaders from the intestine or skin wounds. Peritonitis is a frequent complication.

8. Four illustrative cases are presented showing varying forms of the disease with particular reference to the abdominal and genito-pelvic forms, of which one case each is reported in detail with postmortem findings. No apparent source of infection was determined.

9. Mortality, in types other than the cervico-facial form, has been unusually high on account of lack of effective therapeutic measures.

10. Best results in the treatment of actinomycosis, at this time, probably may be obtained by combined therapy including the use of surgery, high-voltage x-ray treatment, and both local and systemic administration of thymol.

Bobson, Holman and Cutting report on the use of sulfanilamide in the therapy of actinomycosis.

Joseph and Summerill report invasion of the tubes by yeast fungus, and show the *blastomyces* cultured from a suppurating tube. They feel that pelvic mycosis in different forms occurs more frequently than generally appreciated.

**Trichomoniasis.**—The *Trichomonas vaginalis* has been found in the uterus and tubes and peritoneal cavity, as mentioned under Trichomonas Vaginitis in Chapter IV.

**Lymphogranuloma.**—Lymphogranuloma inguinale may appear in the fallopian tubes. D'Aunoy and Schenken report a case in which the ordinary symptoms of chronic pelvic inflammation and tender adnexa were the only clinical findings. Inspection of the tubes after removal gave the impression of nodular salpingitis. The microscopic check-up revealed a suspicious histologic structure. Frei tests were then made with two different antigens, and the reaction was strongly positive with each.

**Echinococcus Disease.**—Echinococcus invasion of the pelvis comes from the intestinal tract. After digestion of their covering, the embryos are released and penetrate the bowel wall into the surrounding tissues. They may enter the blood stream and be carried to liver and lungs or remain and grow locally, forming small cysts. When the disease affects the pelvic organs, it is supposed to come by penetration of the rectal walls. When a cyst breaks into the pelvic peritoneal cavity, that liberates the scoleces, which attach themselves to the peritoneum. They may penetrate into the subperitoneal tissues, forming echinococcus cysts there and then penetrate on into the organs including the uterus (see Echinococcus Disease of Uterus).

**Metastatic Cancer Nodules in Cul-de-sac.**—Ordinarily when a small hard mass is felt in the posterior peritoneal cul-de-sac it is assumed to be old inflammatory exudate or endometrial implantation. In older women, however, gravitational cancer implantation, from gastrointestinal or other growths higher in the abdomen, must be kept in mind. The Krukenberg tumor is not the only type of growth representing metastasis from higher abdominal areas to the pelvis. Bacon has called attention to such extrarectal masses felt in the peritoneal cul-de-sac area in the male, as an indication of cancer higher, and illustrates the examination findings instructively, as shown in Fig. 941.

**Retroperitoneal Masses.**—The difficulties of pelvic diagnosis are greatly increased by retroperitoneal masses, which may simulate more common lesions to some extent. Such a mass may be a new growth from connective tissue or from some structure along the pelvic wall or it may be an ectopic organ, congenitally displaced to the pelvis. These conditions are comparatively rare and hence are likely to be overlooked when considering the probabilities and possibilities in a case. Though the commoner lesions must of course come first in diagnosis, an atypical clinical picture calls for careful consideration of these rarer lesions, particularly before tackling the mass for operative removal. Such preoperative consideration, with its looking-up of anatomical points and possible distortions, may prove of material assistance when, with the abdomen open, one is trying to determine relations and connections and the safest plan of attack.



J. R. Miller presents an instructive article calling attention to growths and other masses arising from the various organs and structures, and gives details of illustrative cases. There are many reports of retroperitoneal growths and deceptive masses, but the conditions are so varied that the result of an attempt at systematic classification is not satisfactory. However, the arrangement of the following list and the accompanying illustrations may aid in recalling diagnostic pitfalls to be avoided.

*Connective Tissue.*—In the connective tissue and contained structures there may arise various tumors, including lipoma, fibroma, myoma, adenomyoma, lymphangioma, hemangioma, and sarcoma. Also, inflammatory masses here may be bizarre in symptoms and in examination findings, particularly psoas abscess from tuberculosis of the spine.

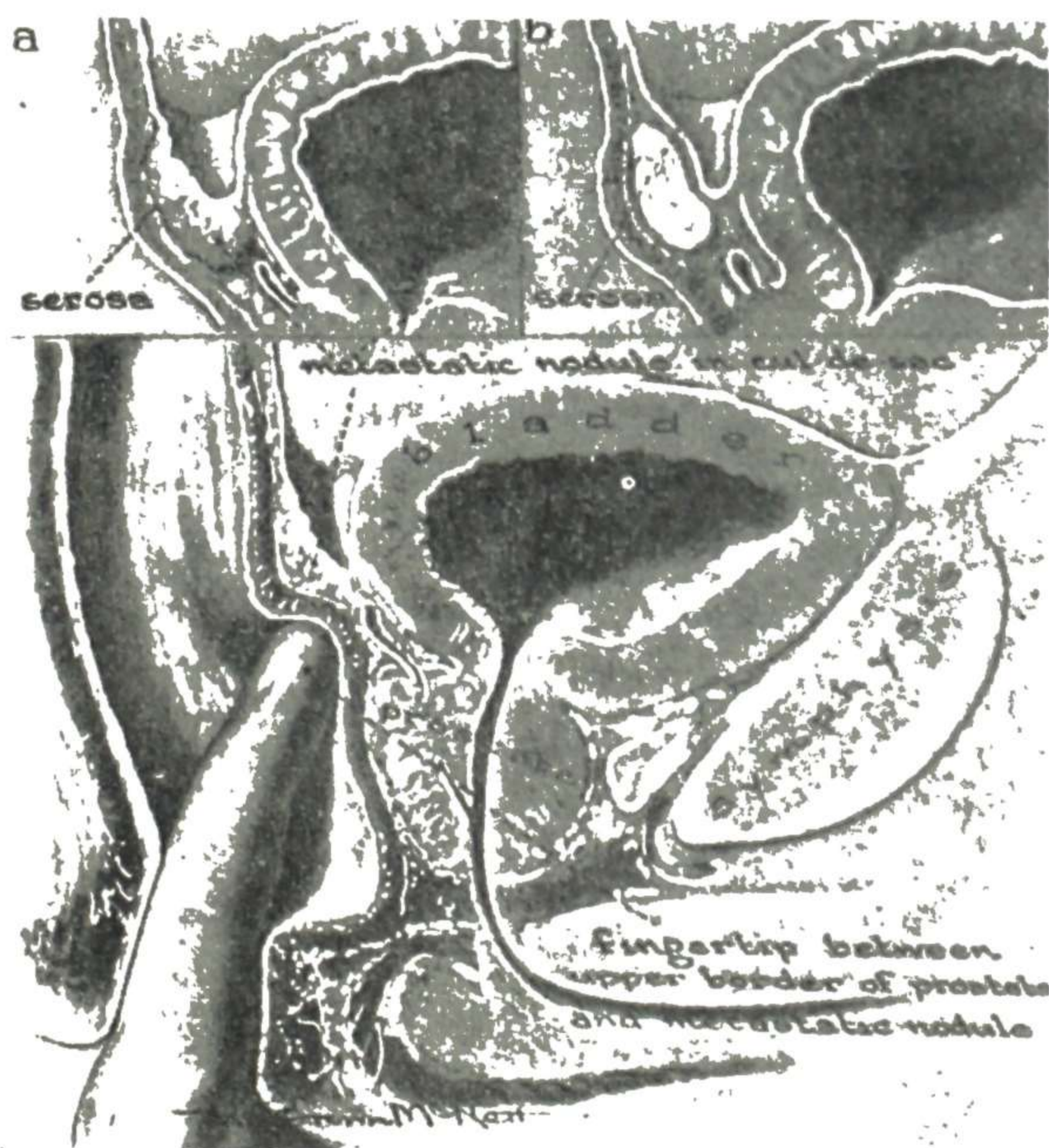


Fig. 941.—Sagittal section, showing the tip of the finger between the prostate and a growth in the cul-de-sac; a, supraserosal mass and, b, subserosal mass. (Bacon—J. A. M. A.)

*Pelvic Walls.*—Varied types of tumors arising from bones, muscles, fasciae or nerves of the pelvic walls may grow into the cavity, with resulting confusion in diagnosis. The plain x-ray film, advisable in all atypical pelvic masses, will show bony growths and other opaque outlines, but for the greater difficulties encountered in other conditions differential diagnosis may require other special measures, including gastrointestinal x-ray series to determine possible connection with that tract or displacement of intestinal coils in a way to show the deep relations of the mass. Many bony growths have been reported.

*Displaced Organs.*—The several terms “ectopic kidney,” “fused kidney,” “horse-shoe kidney,” and “pelvic kidney,” indicate the attention and tragic interest forced by masses in the pelvis which proved to be of that character. It is hardly necessary to remark that such a condition should be absolutely excluded

before an uncertain mass is removed. Even prolapse of an otherwise normal kidney may carry it to the pelvis where it may at first be mistaken for an adnexal mass.

The kidney is not the only abdominal organ that occasionally appears in the pelvis. A spleen has been dug out of adhesions beside the uterus and removed under the impression that it was a degenerating fibroid.

**Foreign Bodies.**—A foreign body in the pelvis excites inflammatory reaction or encapsulating exudate, forming a mass which is replete with possibilities for diagnostic error. Being a very unusual condition it is rarely thought of, until some incidental finding excites suspicion or operative removal reveals its character.

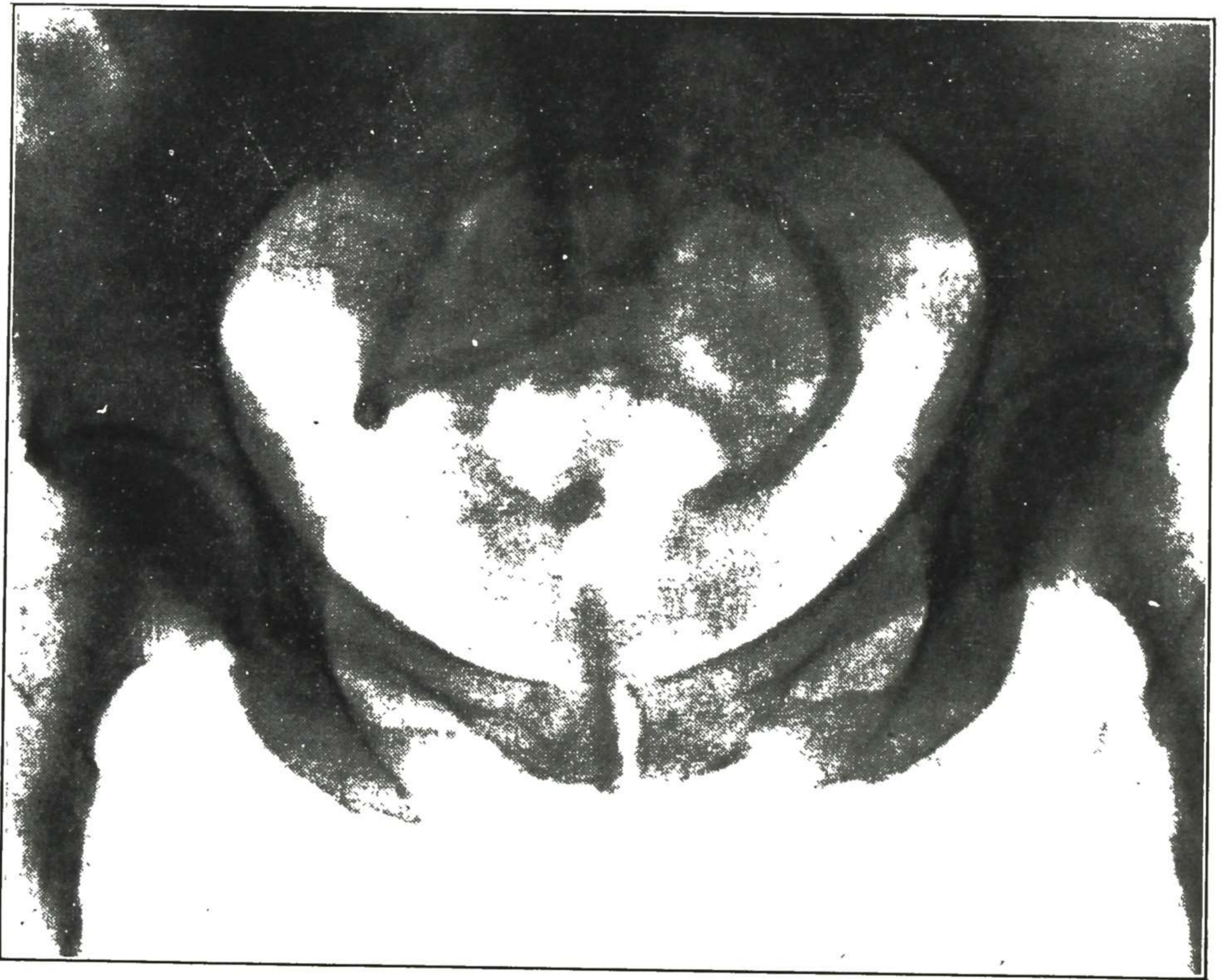


Fig. 942.—X-ray film showing a catheter in the peritoneal cavity. It had been there since an abortion twenty-six years before. (Hill—*J. Missouri M. A.*)

Attempts at abortion are responsible for a large proportion of the foreign bodies in the pelvis. Fig. 942 shows an interesting case of this kind. The many reported cases of a foreign body left at operation and found unexpectedly in a removed mass, months or years afterward, should cause consideration of this possibility in all obscure abdominal conditions and lead to appropriate diagnostic investigation. Figs. 943 and 944 show types of such cases.

A swallowed body (often swallowed without the patient knowing it) may lodge in the intestine and gradually work out into the surrounding tissues and cause a pelvic inflammatory mass. This mass may simulate ordinary pelvic

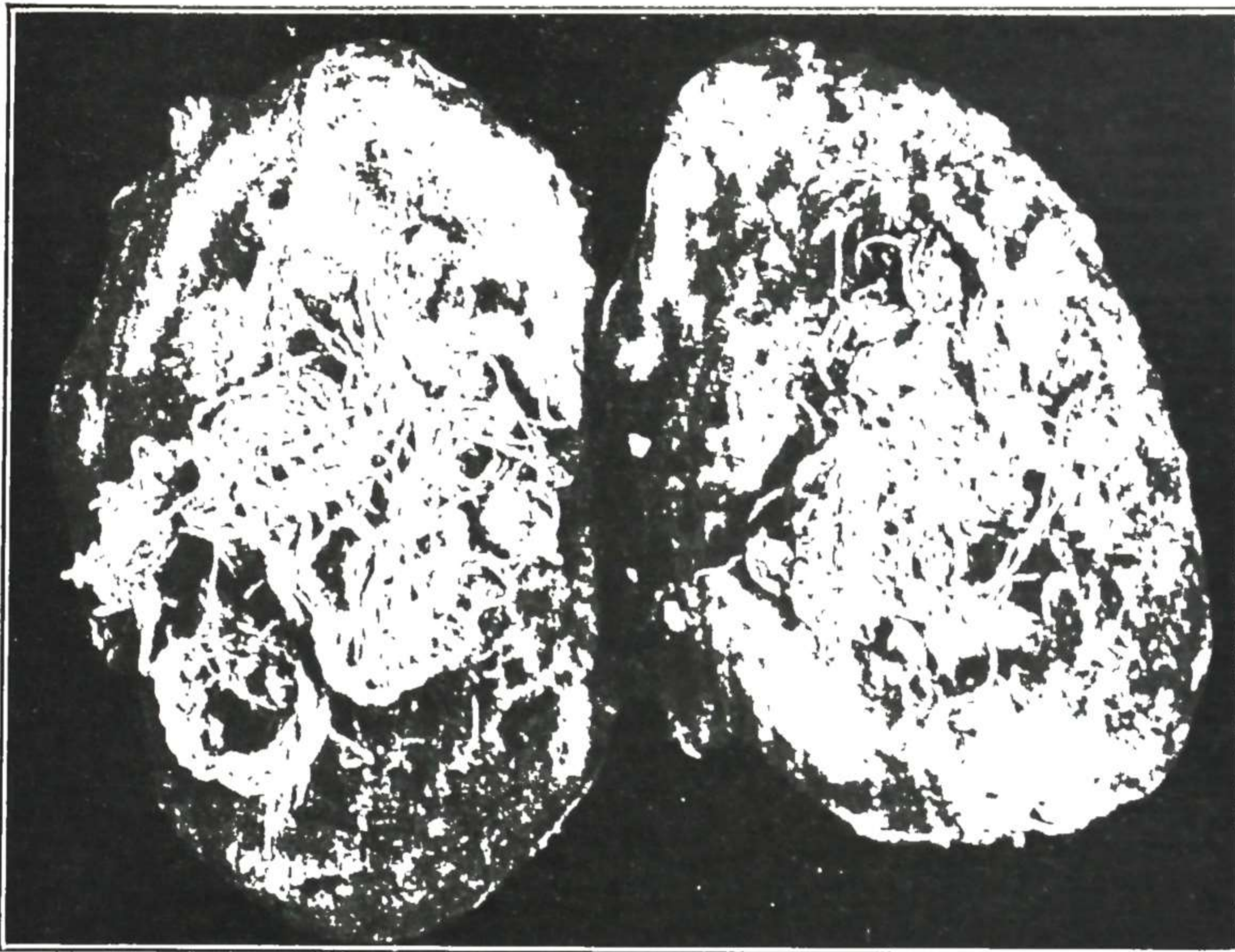


Fig. 943.—Encapsulated sponge removed after fourteen years. The capsule has been opened, and the mesh of the gauze is clearly seen. (Watson and Desnoes—*J. A. M. A.*)

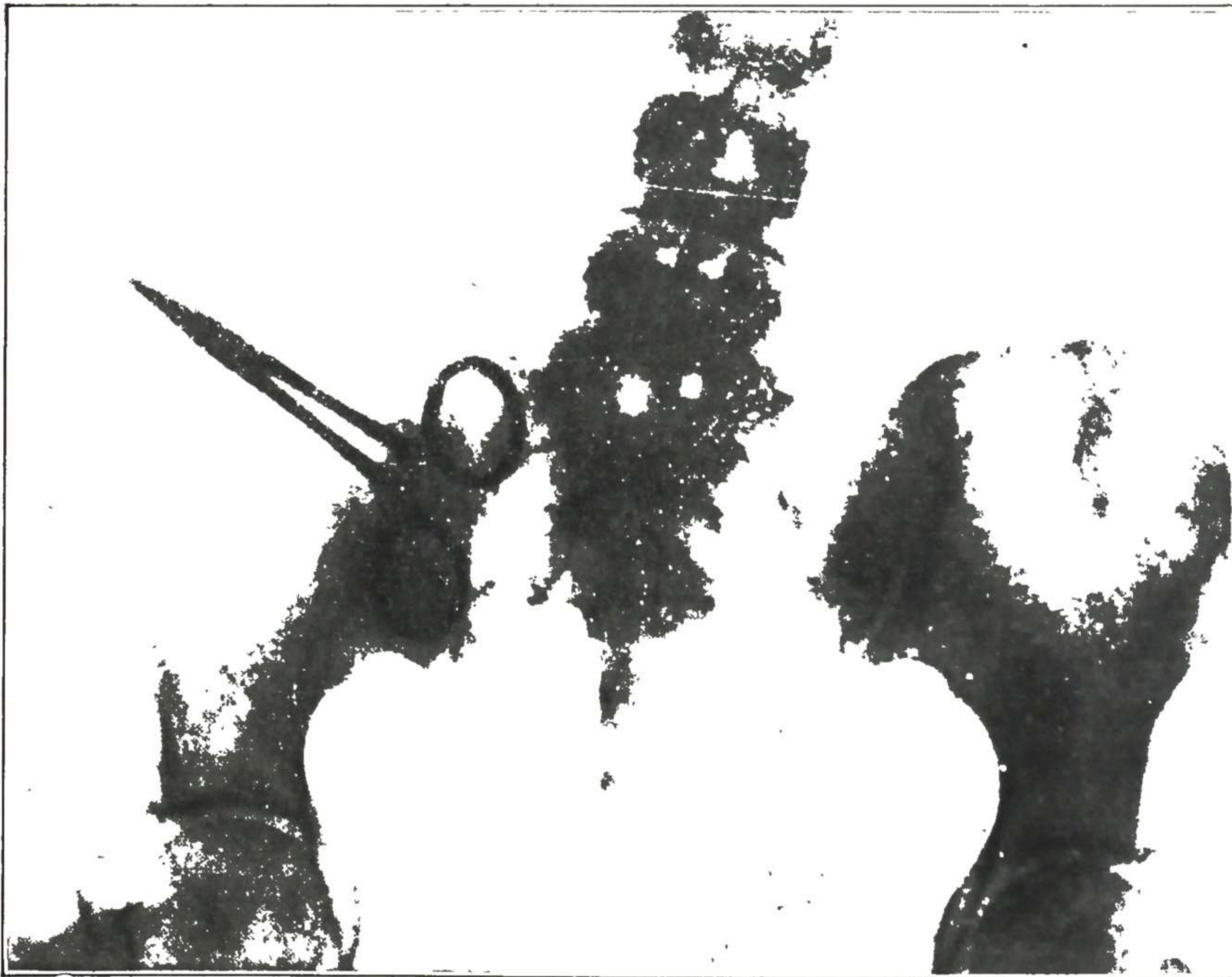


Fig. 944.—X-ray film showing a forceps (hemostat) in the abdomen four years after an abdominal operation. The patient was supposed to have a tumor, till x-ray examination revealed the forceps. (Crossen—*Foreign Bodies Left in Abdomen.*)

inflammation, and be operated on as such. The intestinal connection adds a dangerous complication, which should be known before operation so that it could be taken into consideration in making the decision as to operation and in arranging for the technical details of the work. Hence the advisability of x-ray examination in all atypical abdominal conditions, to obtain all information possible before deciding on type of treatment.

An instructive case of this type was a patient sent to the senior author in 1933 for a pelvic inflammatory mass. The mass involved the right tubal region but also extended higher, giving the impression of possible appendiceal complication, so she was sent for x-ray examination. This revealed an open safety pin which had perforated the cecum and formed an inflammatory mass lower. The patient was fifty-five years of age, had had no abdominal operation and had never swallowed a pin as far as she knew. It was probably swallowed unnoticed when her children were small and required the daily handling of safety pins. Her youngest child was nineteen, and the patient had noticed trouble in that side off and on for at least that many years—not severe, but uncomfortable and annoying. She was partially disabled at times and had to rest a few days, but otherwise worked right along.

Operation was advised, but not urged. The foreign body was apparently well encapsulated and could be carried with little danger of sudden serious development. The patient decided she did not wish operation, unless the symptoms should become more marked. Lateral films were made, along with anteroposterior ones, for accurate localization, in case operation should become necessary any time. The patient was instructed to report periodically for check-up, and to come immediately if there should be any marked disturbance. A check-up film made in 1939, six years after the first one, showed the safety pin in the same location. There have been no marked symptoms.

In another of our cases, an x-ray film (made on account of persistent pelvic neuralgia without apparent cause) revealed an ordinary pin, which had evidently worked out of the intestine and become fixed in the center of the left side of the pelvic cavity.

The subject of foreign bodies left in the abdomen at operation and otherwise, with symptoms and methods of examination and treatment and prevention, has been considered in detail by the senior author in a recent monograph (*Foreign Bodies Left in the Abdomen*), and Figs. 942 to 944 are from that work.