Chapter 9
PELVIC INFLAMMATION

Since the discovery of the various antibiotics and their use in the prevention and treatment of infections, the incidence and severity of pelvic infections have been materially reduced so that the critically ill patients we formerly saw in the presulfonamide and preantibiotic era are seldom seen today. Likewise, the extensive chronic pelvic inflammations which formerly required surgery, often radical, for cure have been seen less frequently in the past five years. In spite of the improved results with new methods of prevention and treatment, there are still cases which do not respond; hence it is important that one should be conversant with all methods of managing these difficult cases. Another reason for retaining much of the material on former methods of treatment is that in many of the countries in which this text is used the antibiotics are not generally available.

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 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. 6. 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 due to the ordinary bacteria such as staphylococcus and streptococcus or to gonococcus. Stevenson et al. found the *Aerobacter aerogenes* a frequent pathogen in pelvic inflammatory disease.

Pneumococcus peritonitis occurs chiefly in children but, as shown by the reports of King and Nuckols and Hertig, may occur in the adult. Ladd et al. and Schauffler have emphasized the importance of early operation in children, for appendicitis is far more common than pneumococcus peritonitis in this group. Postoperative treatment with antibiotics is important.

In a recent article Randall et al. reported finding a pleuropneumonia-like organism in 26 per cent of cultures from the vagina and cervix in 300 gynecologic cases. One pelvic abscess had a pure culture of this organism, and these workers felt that the role of the organism as a pathogen in women needs further investigation.

Practically every case of primary acute pelvic inflammation in the adult can be traced to infection from **labor,** from **abortion,** from **instrumentation,** or from **gonorrhea.** 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 gonorrheal cases, the infection extends by way of the uterine mucosa to the fallopian tubes, as indicated in Fig. 746, and through the tubes to the peritoneum and other pelvic structures. In puerperal metritis (streptococcic or staphylococcic) 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. 747. Another avenue of entrance is through the thrombosed sinuses of the puerperal uterus. Infection of these sinuses leads to infective thrombosis of the broad ligament veins (Fig. 748), 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

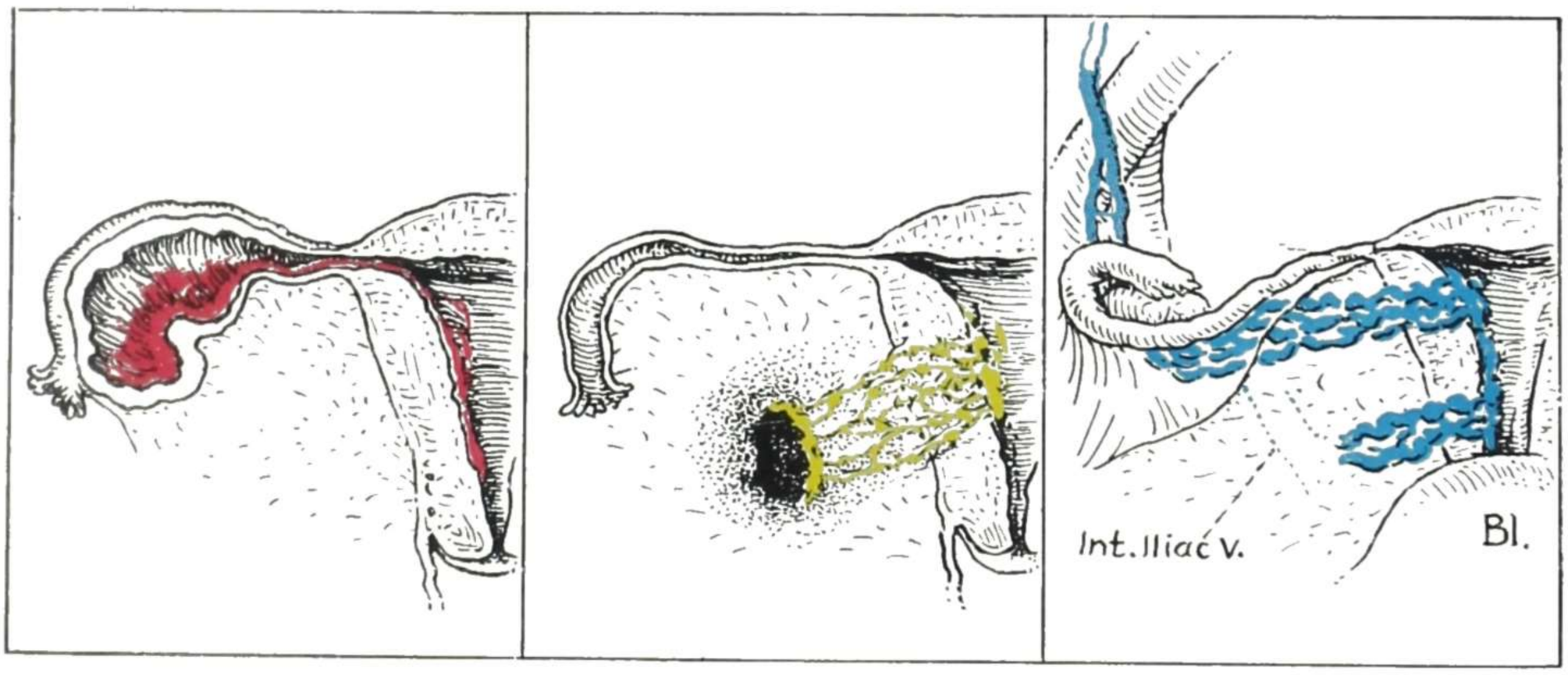


Fig. 746. Fig. 747. Fig. 748.

Figs. 746 to 748.—Comparing and contrasting the gonococcic and streptococcic types of pelvic inflammation. The clinical significance of this distinction is very great.

A gonococcic 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 streptococcic or staphylococcic mass the bacteria are likely to continue virulent a much longer time, even for years. Hence intraperitoneal operation is contraindicated for any mass of streptococcic or staphylococcic 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. 746.—Gonococcic inflammation extending along the mucous membrane, from within the uterus out into the tube.

Fig. 747.—Streptococcic or staphylococcic inflammation extending outward in the lymphatics of the uterine wall to the connective tissue of the broad ligament.

Fig. 748.—Streptococcic or staphylococcic inflammation extending outward in the veins of the uterine wall to the veins of the broad ligament.

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.**

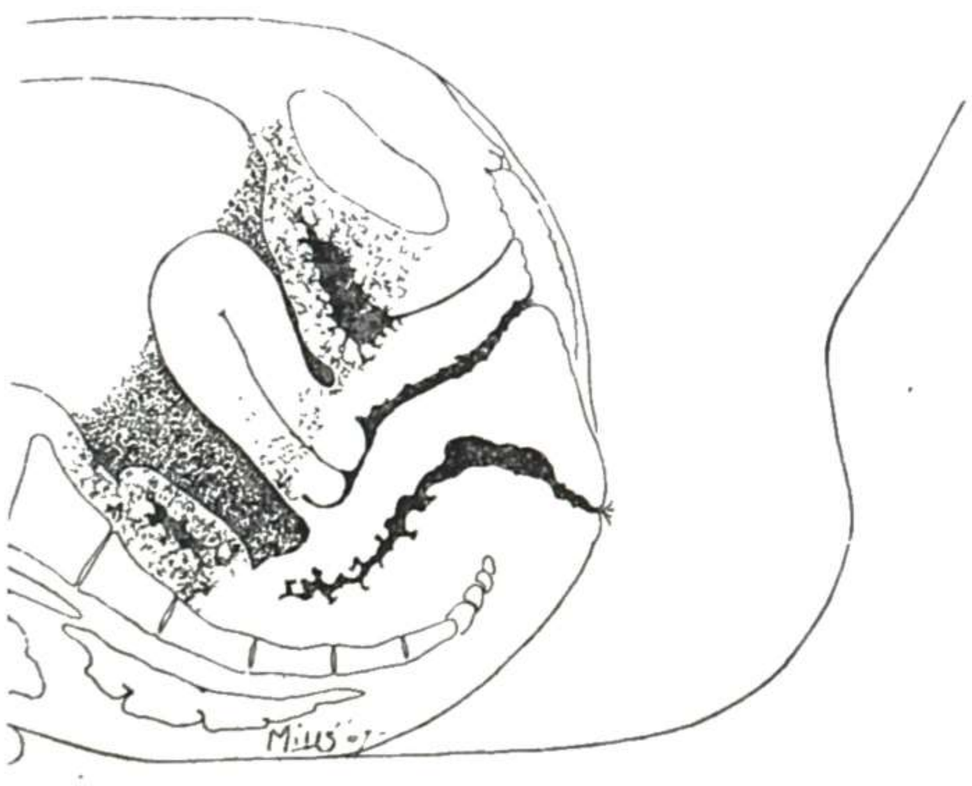


Fig. 749.

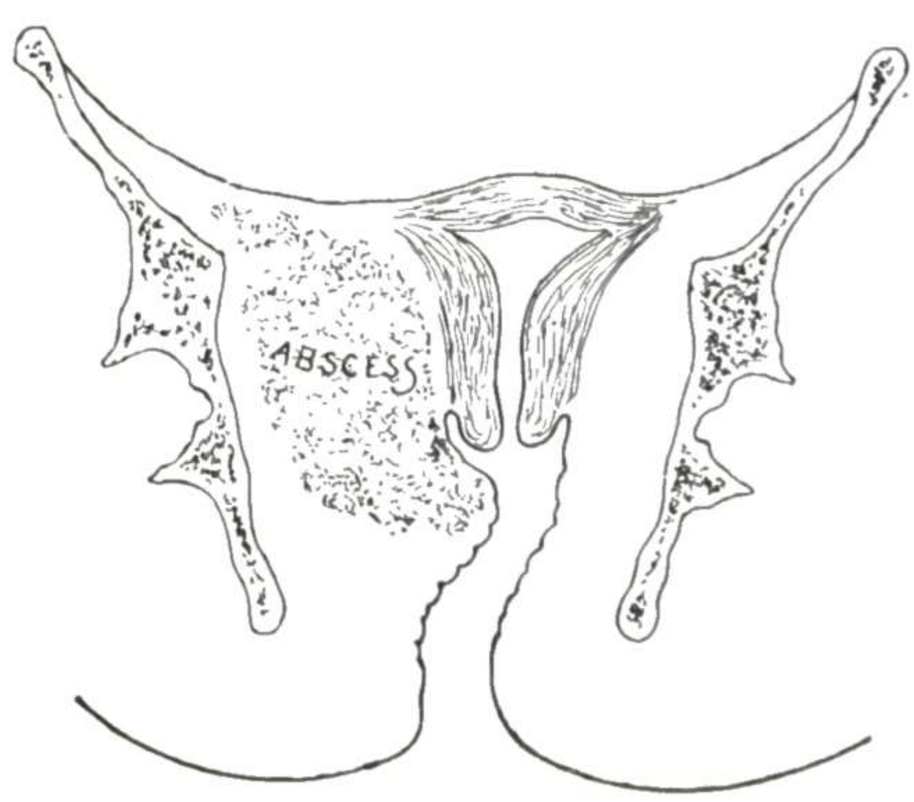


Fig. 750.

Fig. 749.—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.

Fig. 750.—Mass beside uterus, formed by abscess in broad ligament.
(From Montgomery: Practical Gynecology, The Blakiston Company.)

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. 749), 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.—Cellulitis (Fig. 750) 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.

7. Septic Thrombosis.—This 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. 748). If it enters through the lower portions of the uterus, the resulting septic thrombosis affects the uterine veins lower in the broad ligament (Fig. 748).

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. 748) 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° to 103° F.) or there may be high fever (105° F.), 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 gonorrhea, or in rare instances a history of chronic endometritis due to one of these causes. Witherspoon found that pelvic inflammatory

disease was the second most frequent cause of **uterine hemorrhage** in women in the childbearing age. More recent work on this subject is given under chronic pelvic inflammation.

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 behind 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. 749). 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. 748) 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.
Ovulation with abnormal pain.
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 Extrauterine Pregnancy in Chapter 10).

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 critical. On consultation examination the pelvis was clear and it was evident that the peritonitis which she had was due to an acute appendicitis. This patient died before operation could be performed.

Another confusing condition is **bleeding** and **pain** with **ovulation** especially when this occurs on the right side. Morton reported 93 cases in which laparotomy for acute abdomen revealed this condition, and many cases have been reported in the literature since that time. The time of onset in relation to the cycle is an important point in the differential diagnosis; there is usually a slight elevation in the temperature and slight leukocytosis. Observation with frequent blood counts will help to rule out infection, and the red count and hemoglobin determination will reveal whether or not progressive hemorrhage is present. These together with the severity of the symptoms should be the guide to operation. Taniguchi and Kilkenny reported 19 cases of hemoperitoneum caused by rupture of a corpus luteum.

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 mor-

phine 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 sulfate in ½ to 1 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 gonorrhea.

Special Measures

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

1. Internal Medication.—After the introduction of sulfanilamide the treatment of acute gonorrhea was revolutionized, and its success caused overenthusiastic advocates to prophesy the elimination of this social scourge. It soon became evident that there were certain drawbacks, one being sensitivity to the drug and another the fact that an increasing number of gonococcal infections were found to be sulfonamide-fast. The newer antibiotics have largely supplanted the sulfonamide because of a higher incidence of cures and a lower incidence of the complications mentioned. The treatment of acute gonorrhea of the lower genital tract has been given in Chapter 3; penicillin has been the preferred antibiotic, though in cases of sensitivity the other antibiotics are also very effective.

In the treatment of pelvic inflammatory disease of the upper genital tract the results, though good for the most part, have not been as striking as had been hoped. Stevenson et al. found that some cases did not respond in spite of intensive therapy with sulfadiazine, penicillin, and streptomycin, either alone or in combination, plus all general supportive measures.

In a group of 32 cases of pelvic inflammatory disease these workers found that the majority of the stubborn cases were caused by infection due to members of the *Escherichia coli* group, *Aerobacter aerogenes* and nonhemolytic streptococci. Since chloramphenicol (Chloromycetin) was known to be effective in treatment of infections caused by these bacteria, it was used in this group of cases. The course of therapy consisted of chloramphenicol 0.5 Gm.

by mouth every six hours for ten days; some patients required only one course, others required two or three. All patients were hospitalized so that they could be followed carefully.

The following quotation gives a few of the points in their Summary and Conclusions:

> 1. "Chloramphenicol was administered following treatment with penicillin, sulfadiazine, and/or streptomycin in 21 of the 34 cases in this series. Of the 21 patients receiving this preliminary antibiotic therapy, there was no response to these agents in 16 cases, a poor and inadequate response in 3, and a good response in 2, whereas only 3 patients in the series failed to respond adequately to chloramphenicol therapy, as explained above. This failure of response was due to the fact that the pathogenic bacteria in 2 cases were outside the antibiotic spectrum and chloramphenicol and to inability to administer this agent effectively in the third patient.
>
> 2. "Two patients with pelvic peritonitis of indeterminate origin at the time of admission were treated with chloramphenicol successfully, and at subsequent laparotomy were determined to have definite evidence of healed appendiceal abscesses and no evidence of recent salpingitis.
>
> 3. "The clinical response to chloramphenicol consisted of marked symptomatic improvement, usually within 48 hours, rapid disappearance of the peritonitis, and subsequent anatomic regression of the tubo-ovarian inflammatory masses, the patients being ready for exploratory laparotomy within about 3 to 4 weeks in the average case.
>
> 4. "Women who had large pelvic abscesses were treated so effectively with chloramphenicol that posterior colpotomy, with drainage of the abscess, was not necessary in effecting a rapid cure in any of our patients who were treated with this antibiotic agent from the start.
>
> 5. "From an economic aspect, since the use of chloramphenicol permitted us to have most of the patients with nonpuerperal pelvic inflammatory disease in sufficiently good condition to permit definitive surgical treatment within 3 to 4 weeks following institution of such therapy, and since this antibiotic agent can be given to some patients while in an outpatient status, the savings in cost of hospitalization offsets by several times the cost of the drug."

The high incidence of successful therapy either alone or combined with surgery is very encouraging, especially in view of the disappointing results of a decade ago.

Claudon and Holbrook refer to several deaths from aplastic anemia following the use of chloramphenicol and report two cases of their own. Since this report, the drug company manufacturing this antibiotic has sent out a letter warning against this complication.

An extensive clinical investigation concerning the intramuscular use of "deep vat" bacitracin in 270 cases was made by Meleney et al. Its success in some apparently hopeless cases after failure with other methods including sulfonamide, penicillin, streptomycin, and aureomycin certainly warrants more extensive use of this antibiotic in difficult cases. The dose was 400 units per kilogram of body weight intramuscularly every six hours.

2. Heat Treatment.—It is in acute and subacute inflammation that the special methods of applying heat find their most useful field. External heat over the pelvis usually gives some relief, though some prefer cold. The heat may be given with a heating pad, or with a pelvic "baker." Fever therapy may be needed in selected cases, and, if used, the patients should be hospitalized and the treatment should be given under the supervision of an expert.

Local heat can be given by prolonged hot douches, diathermy, circulating hot water (Elliott), or circulating hot air (Newman). Falls et al. obtained 70 per cent complete cures in 200 cases of pelvic inflammation, using the Newman

apparatus. Vaginal iontophoresis with mecholyl chloride solutions was found to be successful by a number of workers; Jacoby and Der Brucke reported on a series of 74 cases.

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.

T. K. Brown was able to reduce the mortality from this condition to 1.4 per cent by promptly empting the uterus of its infected material with a sponge forceps and following this with an intrauterine douche of 1:1,000 potassium permanganate, acidulated with 50 c.c. of N/1 sulfuric acid. The length of hospitalization was cut to an average of 6.5 days. This procedure, combined with antibiotics and sulfonamides, if necessary, is still the preferred treatment in our cases.

Another treatment found to be effective in postabortal sepsis and peritonitis is the Knott technique of ultraviolet blood irradiation. Olney obtained gratifying results in a series of 631 cases of pelvic cellulitis, and in 1951 Rebbeck reported a second series of postabortal sepsis cases in which he felt that he obtained better results with this technique than he had with antibiotics.

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 THE ABSCESS.—The steps in opening a pelvic abscess back of the uterus are shown in Figs. 751 to 754. 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. 751. 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. 752, 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. 752. 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

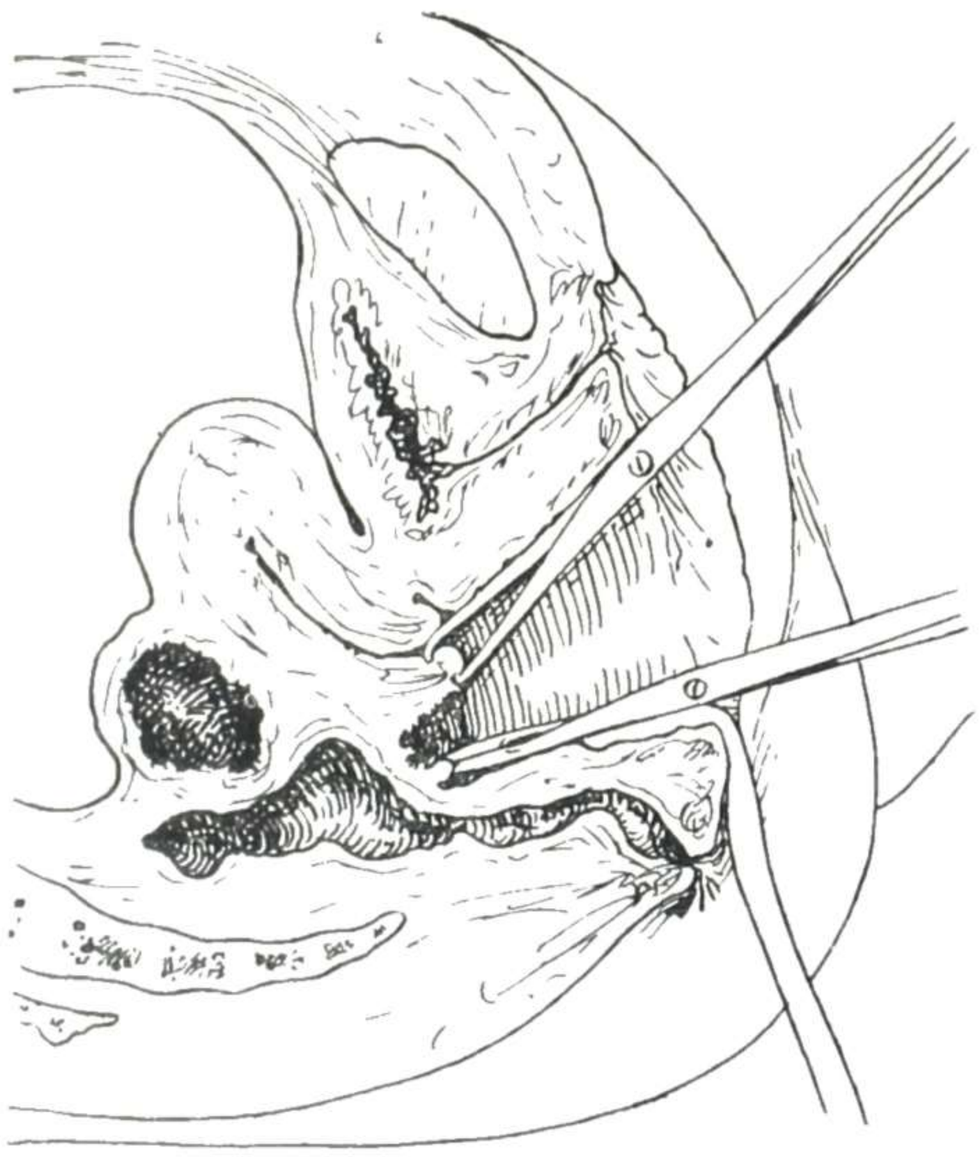


Fig. 751.

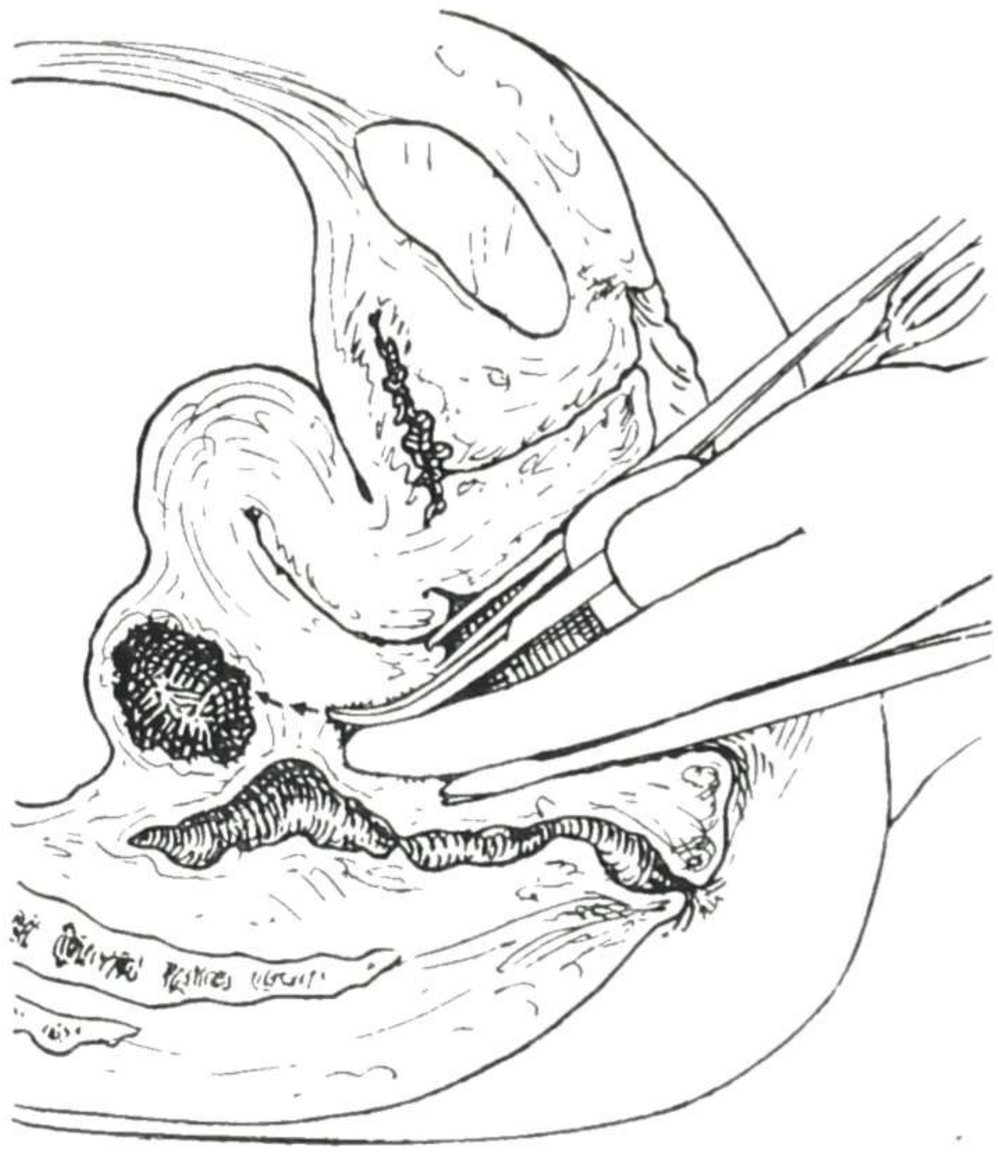


Fig. 752.

Figs. 751 and 752.—Opening a pelvic abscess. Fig. 751, Incision through the 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. 752, 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.

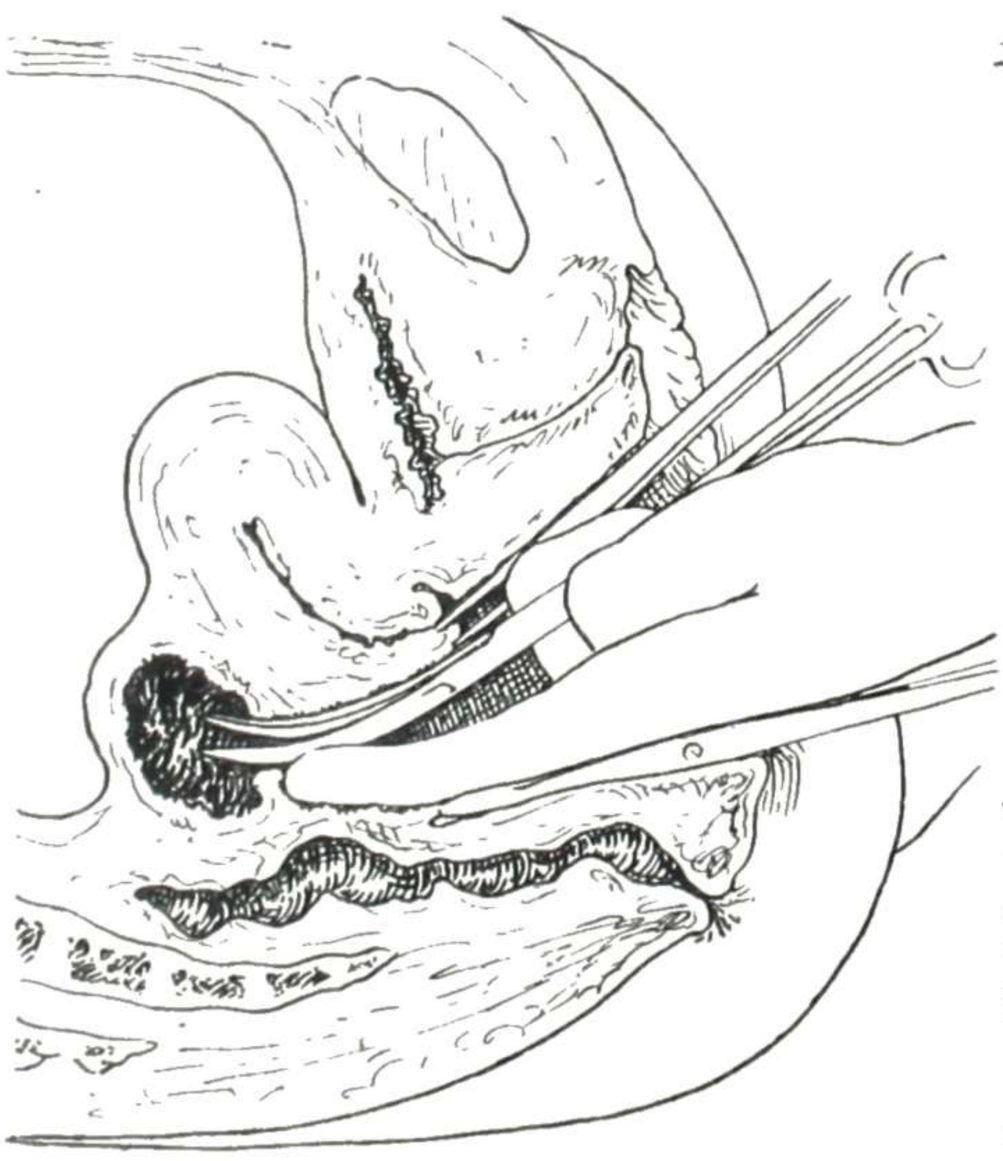


Fig. 753.

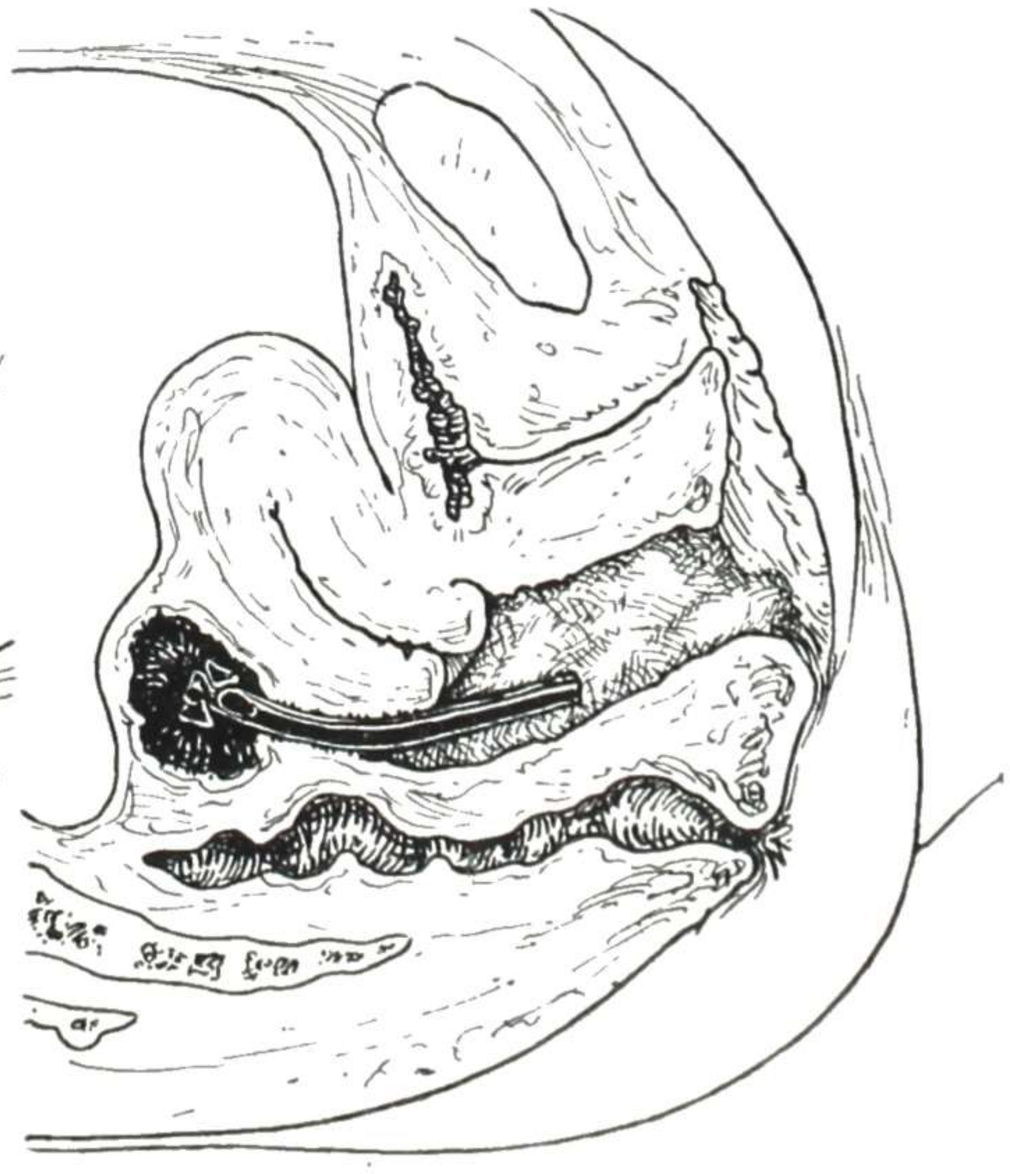


Fig. 754.

Figs. 753 and 754.—Opening a pelvic abscess. Fig. 753, 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. 754, Drainage tube in place. The crosspiece 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.

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. 753), 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. 752 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. 753. 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. 754). 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 the tube, so as to stop any bleeding there. The gauze is to be packed only a short distance into the wound, so that is 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. Some method of forming a cross-piece on the tube should be used. 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 outside 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 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. 755 to 758.

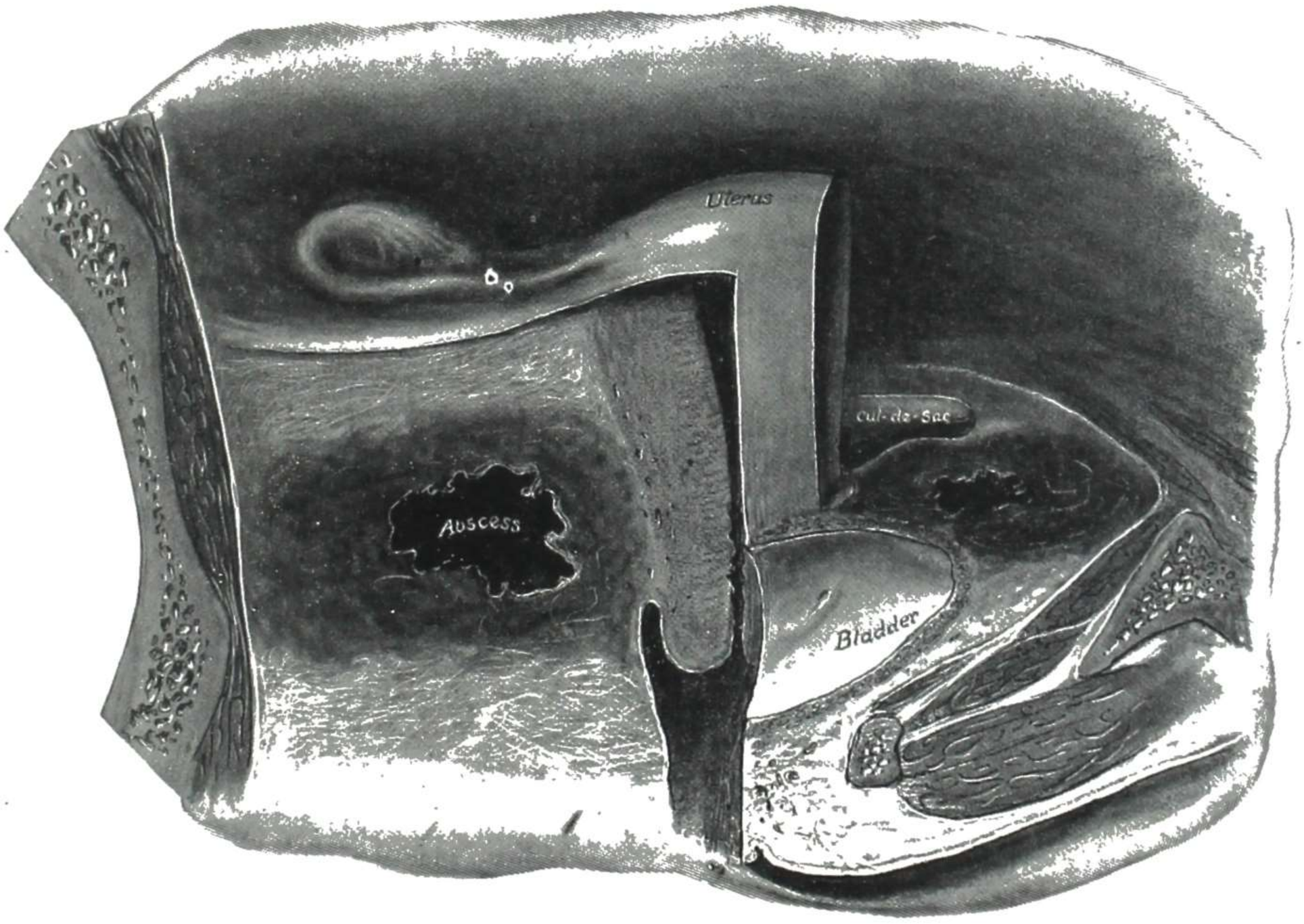


Fig. 755.—Pelvic cellulitis (parametritis). The broad ligament inflammatory mass is represented as sectioned longitudinally on the right side and transversely on the left side. The former (right side of pelvis) indicates how the infiltration extends down along the cervix and vaginal wall, and the latter (left side of pelvis) indicates how it extends forward to the bladder and also backward.

AFTERTREATMENT.—In the aftertreatment 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.

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.

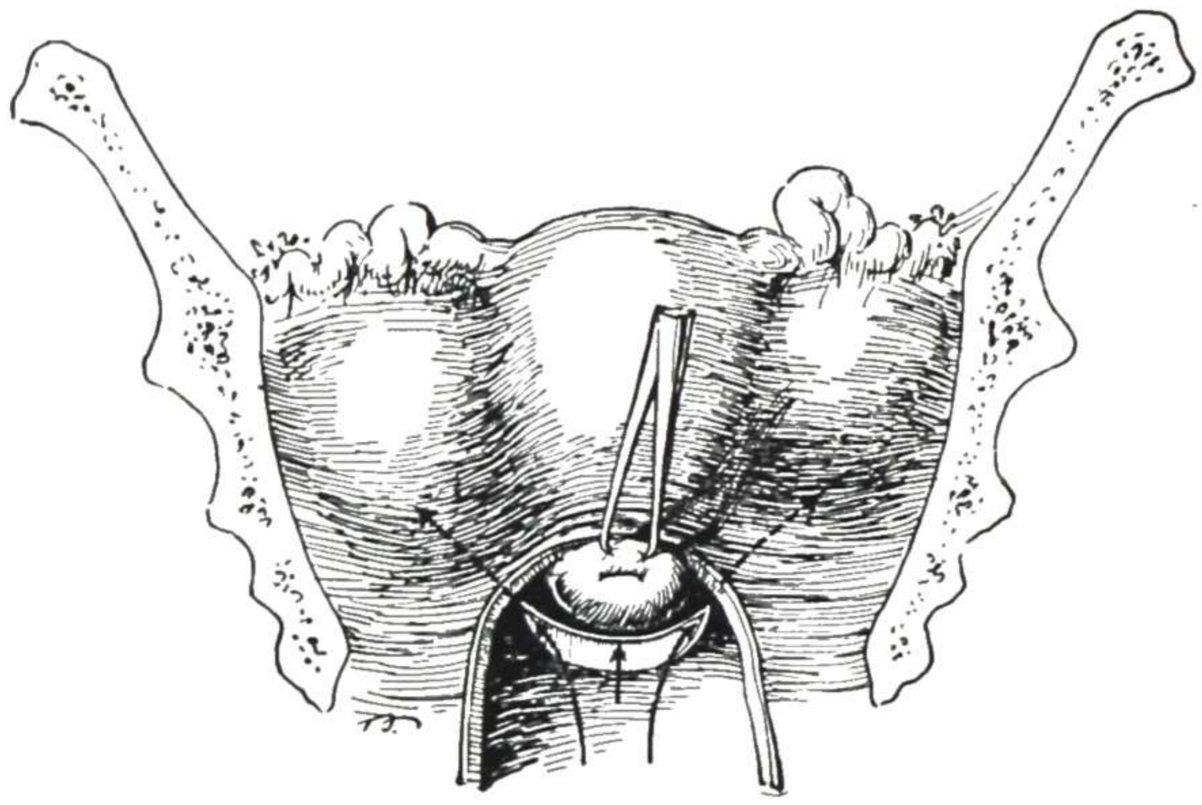


Fig. 756.—Opening a lateral abscess. After the vaginal wall is cut through, the blunt dissection is carried laterally into the broad ligament of the affected side, as indicated by the arrow. In this way opening of the peritoneal cavity may be avoided.

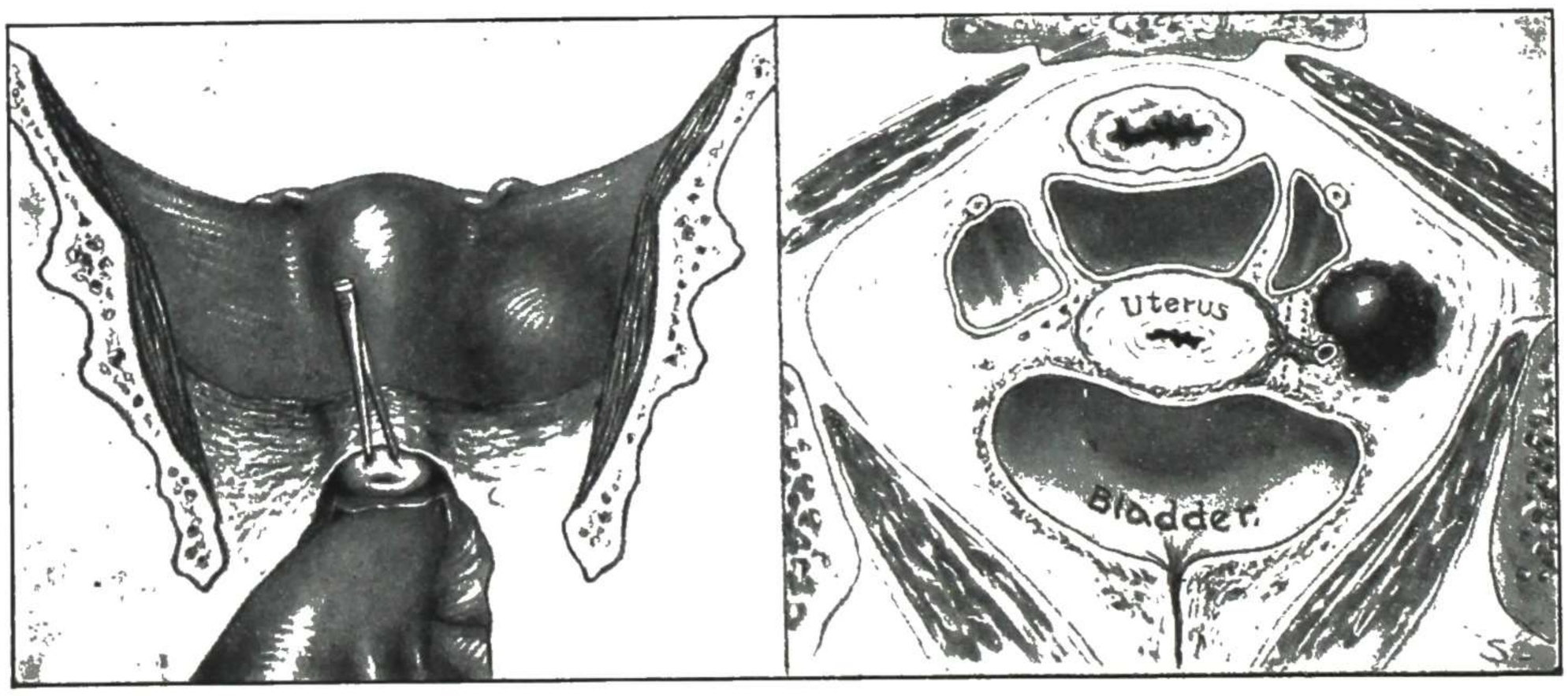


Fig. 757. Fig. 758.

Fig. 757.—The gloved finger thrust into the opening back of the cervix and directed toward the abscess in the left broad ligament.

Fig. 758.—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.

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 conservative measures and, second, if extirpation of the mass is found 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 completely safe. With the use of antibiotics, however, most of these patient can, if necessary, be operated upon after four to six weeks. 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 extraperitoneally 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 lifesaving 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, in spite of antibiotics, it may be necessary to open and drain the peritoneal cavity, by either vaginal section or abdominal section, or both. Such unusual 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 surgical 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-sized 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).

CHRONIC PELVIC INFLAMMATION

Since the introduction of the antibiotics, the incidence of the sequelae from acute gonococcal and other bacterial infections has been materially lowered. Even before we had these modern methods of treatment, not all cases of acute pelvic inflammation resulted 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, gonorrhea, 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 small vessels. The interior of the tube normally presents the com-

plex system of mucosal folds with waving cilia on the surface and the functioning cells underneath, as shown in Figs. 93 to 97. In chronic salpingitis the folds become swollen and agglutinated and the interior of the tube becomes disorganized, as shown in Figs. 759 to 761.

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. 761, *A*. Plasma cells are distinguished by their eccentric nucleus, as shown in Fig. 761, *B*. They may be further identified by the Una-Pappenheim stain, which leaves them a bright red.

Fig. 759.

Fig. 760.

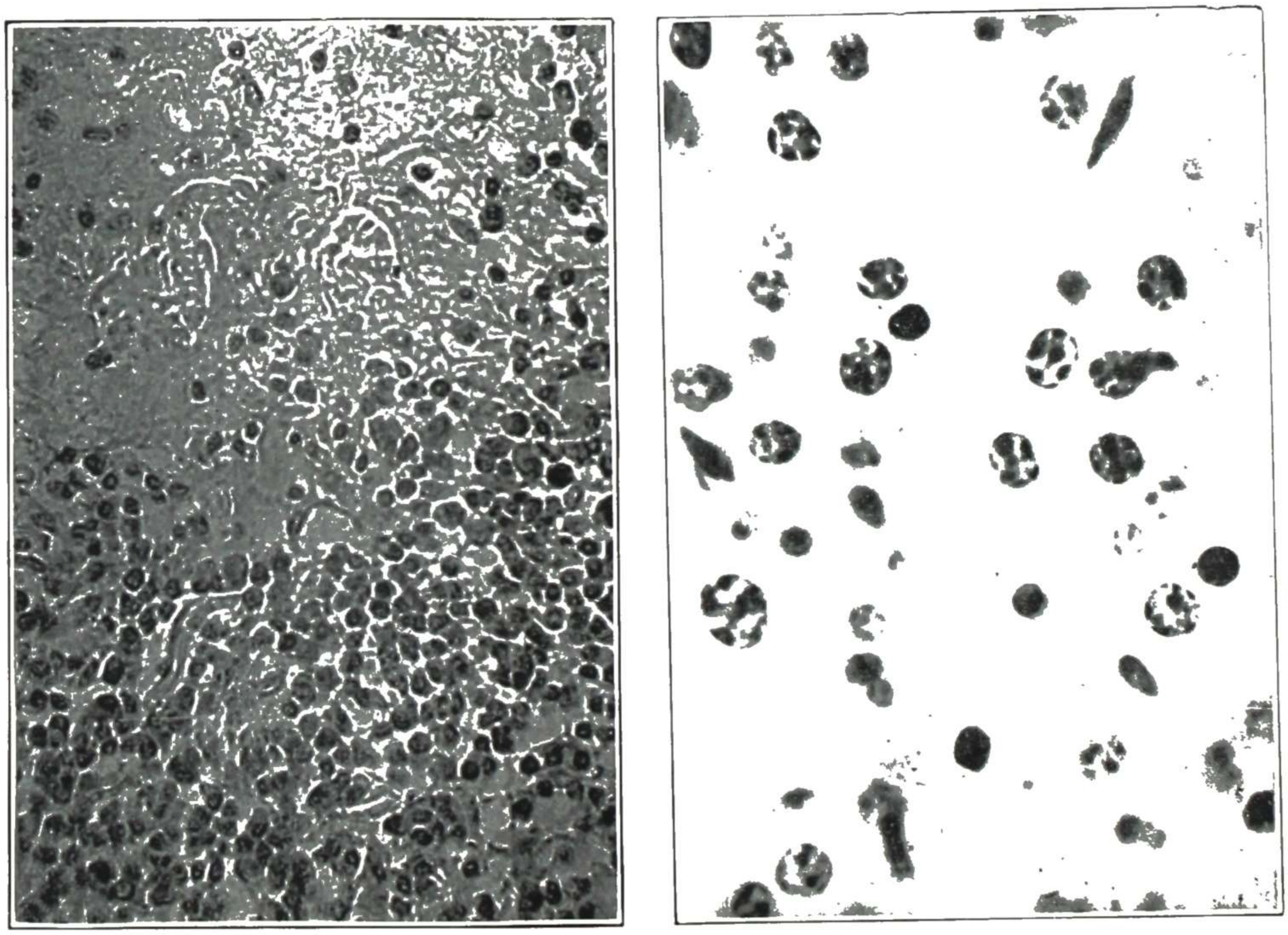
Fig. 759.—Chronic salpingitis. Cross section of tube near outer end. Gyn. Lab.

Fig. 760.—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.

The question of the etiologic factors involved in cases of recurrence of infection after long periods of quiescence has been the subject of numerous investigations. Curtis in an exhaustive study concluded that the gonococcus was killed off in the fallopian tube in about two weeks and that the lighting up of the tubal infection was due to a reinfection from below. A somewhat different result was obtained by Studdiford et al.; they found that though the pus in the cavity of the tube was sterile, positive cultures were obtained in 66 per cent of the cases when pieces of tissue and exudate were used for culture. Hundley et al. reported a carefully controlled study of 80 nontreated cases of chronic pelvic infection, preceded by a gonococcal infection, in which there was some indication for abdominal operation. Smears and cultures were taken from the urethra, cervix, and tubal lumen; sections of the tubal

wall were macerated, and cultures made in all cases. The tubes were found to be sterile in 76 per cent, whereas the urethra and cervix were positive for gonococci in 41 per cent of the cases. In the five cases showing positive gonococcal cultures in the tubes, either the urethra or the cervix or both were also positive. Positive cultures of other bacteria were present in the tubes in 18 of the cases. The conclusions reached by these workers were as follows:

"In summarizing our work on gonococcal infections we feel that every effort should be concentrated upon eradicating the infection in the urethra, cervix, and Bartholin's glands to prevent ascending disease. One immediately observes the great disparity between the incidence of infection in the lower generative tract and that existing in the tube. The infection in the cervix and urethra may exist for years without tubal involvement."



A. *B.*

Fig. 761.—*A*, Chronic salpingitis, high power, 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.

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 Pelvic Inflammation. However, the serous exudate has been largely absorbed. The adhesions, which at 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. 762).—In the cases of this class the ends of the affected tube are occluded and the fimbriae, matted together and distorted, are

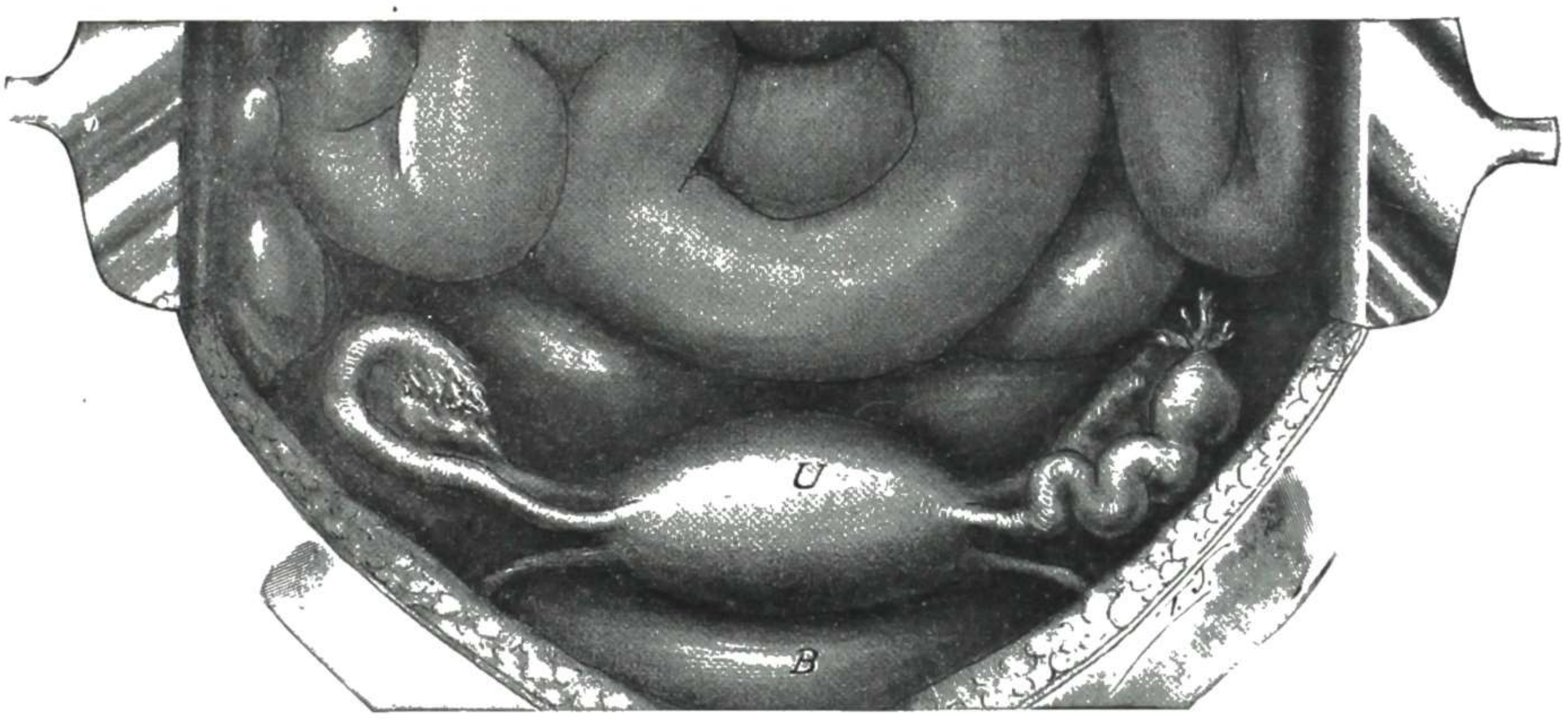


Fig. 762.—Mild salpingitis on the left side. Contrast this with the normal right tube. Notice the enlargement and tortuosity of the affected tube, and also the distortion of the fimbriae.

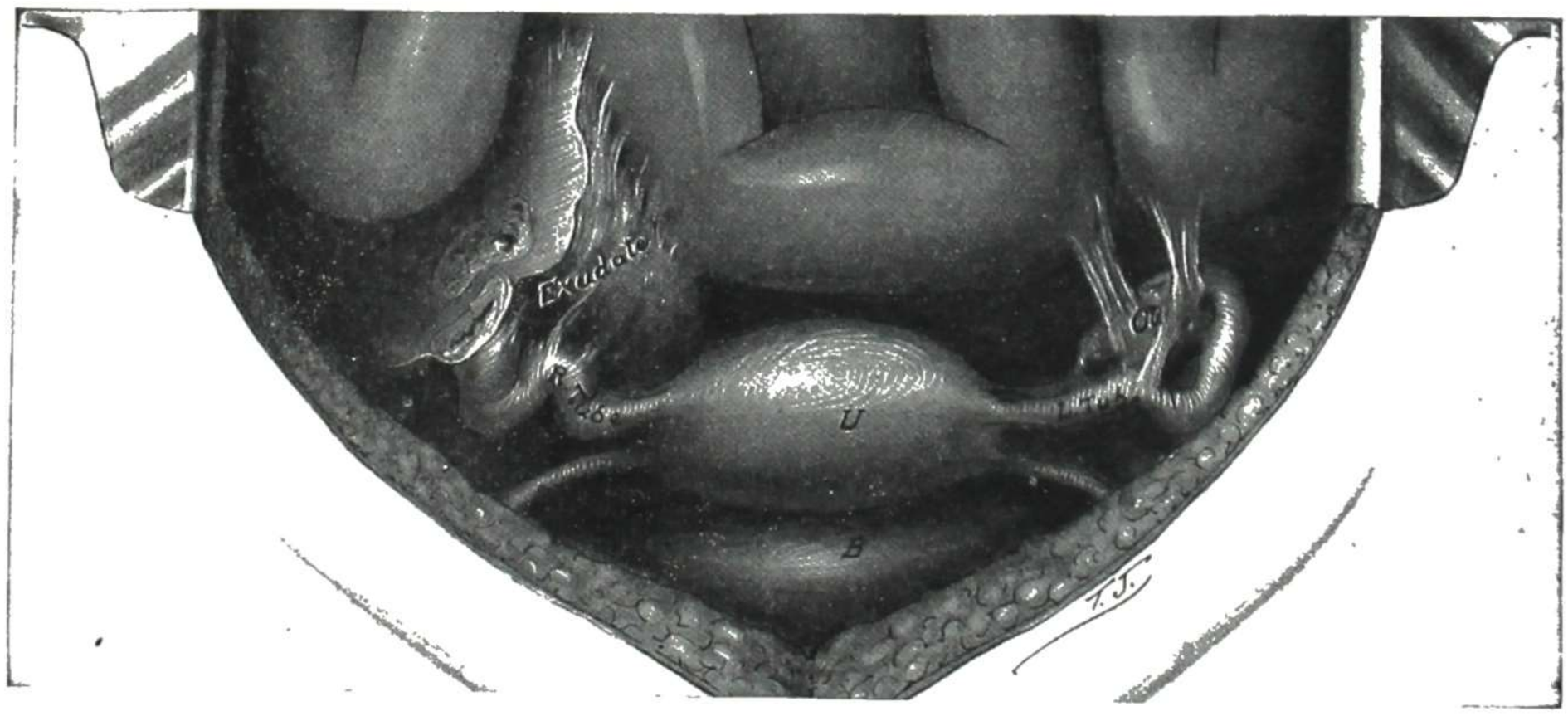


Fig. 763.—Salpingitis with exudate. On left side is indicated salpingitis with a few adhesions. On right side is indicated salpingitis with extensive exudate and adhesions. The section indicates the relation of the thickened tube, the ovary, and the surrounding exudate.

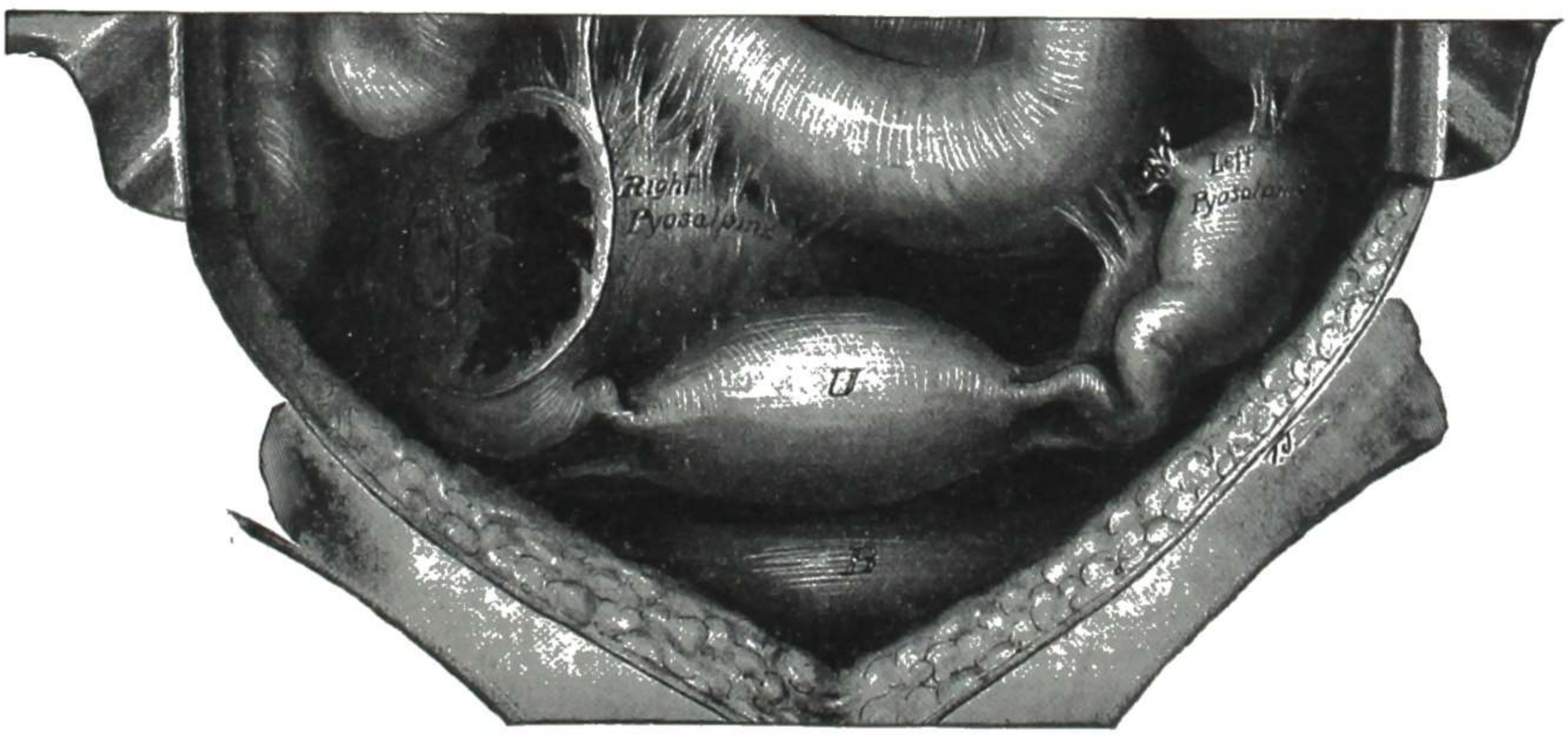


Fig. 764.—Pyosalpinx. Left tube distended with pus, but with few adhesions. Right tube distended with pus and surrounded by extensive adhesions. The section on the right side indicates the relation of the distended tube to the surrounding structures. The sectioned ovary is indicated dimly below and to the outer side of the enlarged tube, which has fallen behind and to the inner side of it.

frequently adherent to the ovary or some other adjacent organ. The wall of the tube is thickened and the cavity is empty.

2. Salpingitis With Exudate (Fig. 763).—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. 764 to 768).—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.

Fig. 765.—Pyosalpinx with no adhesions. (From Kelly: Operative Gynecology.)

Fig. 766.—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.

These tubes may gradually enlarge until of great size (Figs. 766 and 767), or the inflammation may break through and cause extensive peritubal adhesions, as shown in Figs. 764 and 768. The affected tubes are usually thick-walled and contain pus (Fig 767), which may be still infective or may be sterile. Ordinarily in these closed cavities gonococci are automatically killed 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. 769, 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.

Fig. 767.—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.

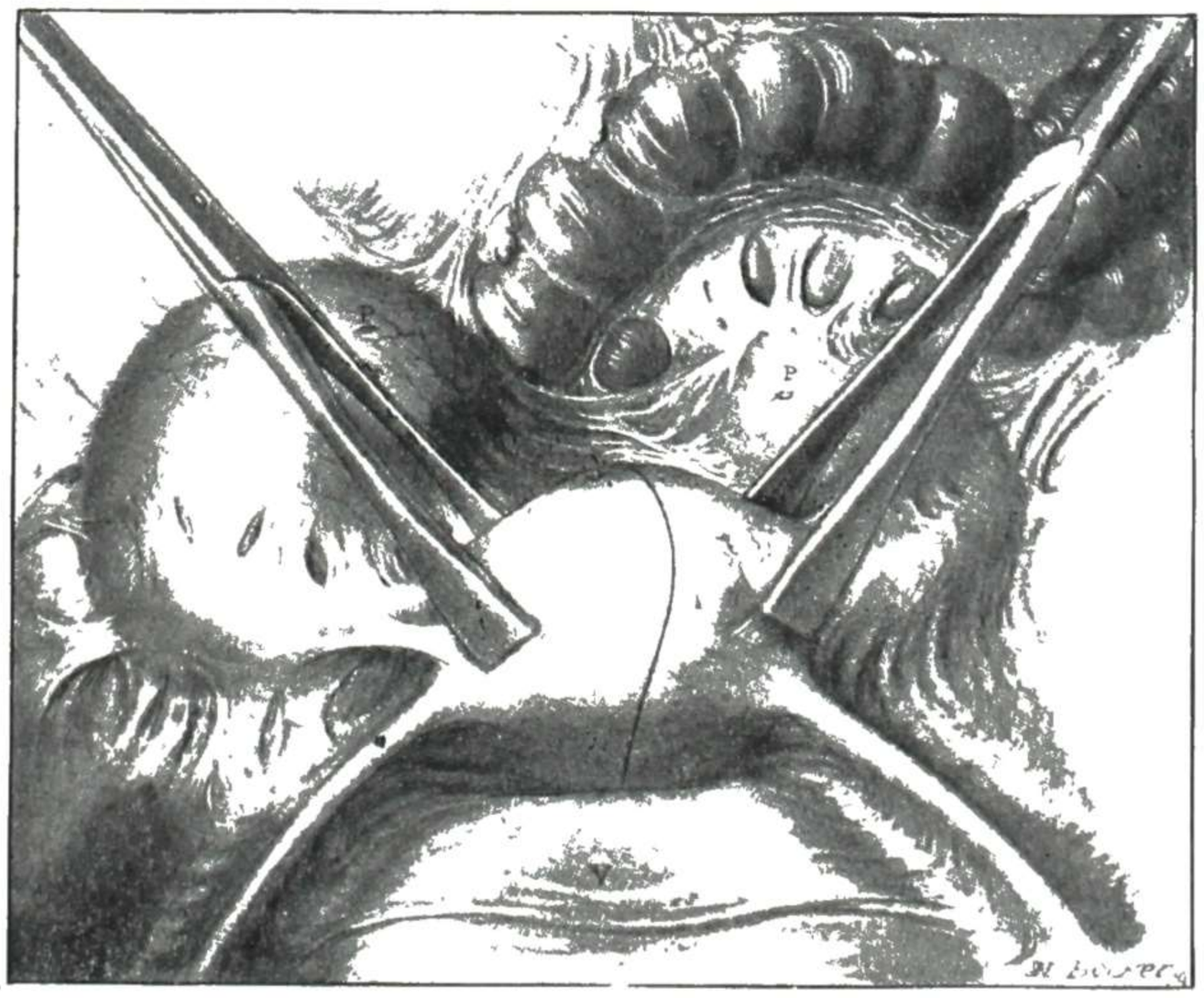


Fig. 768.—Pyosalpinx with very extensive adhesions. (From Kelly: Operative Gynecology.)

5. Diffuse Pelvic Suppuration (Fig. 770).—In the cases of this class the pus has extended outside the tube. As the pus extends in various directions, 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. 771).—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 and there a preserved typical fold can be seen. There may or may not be

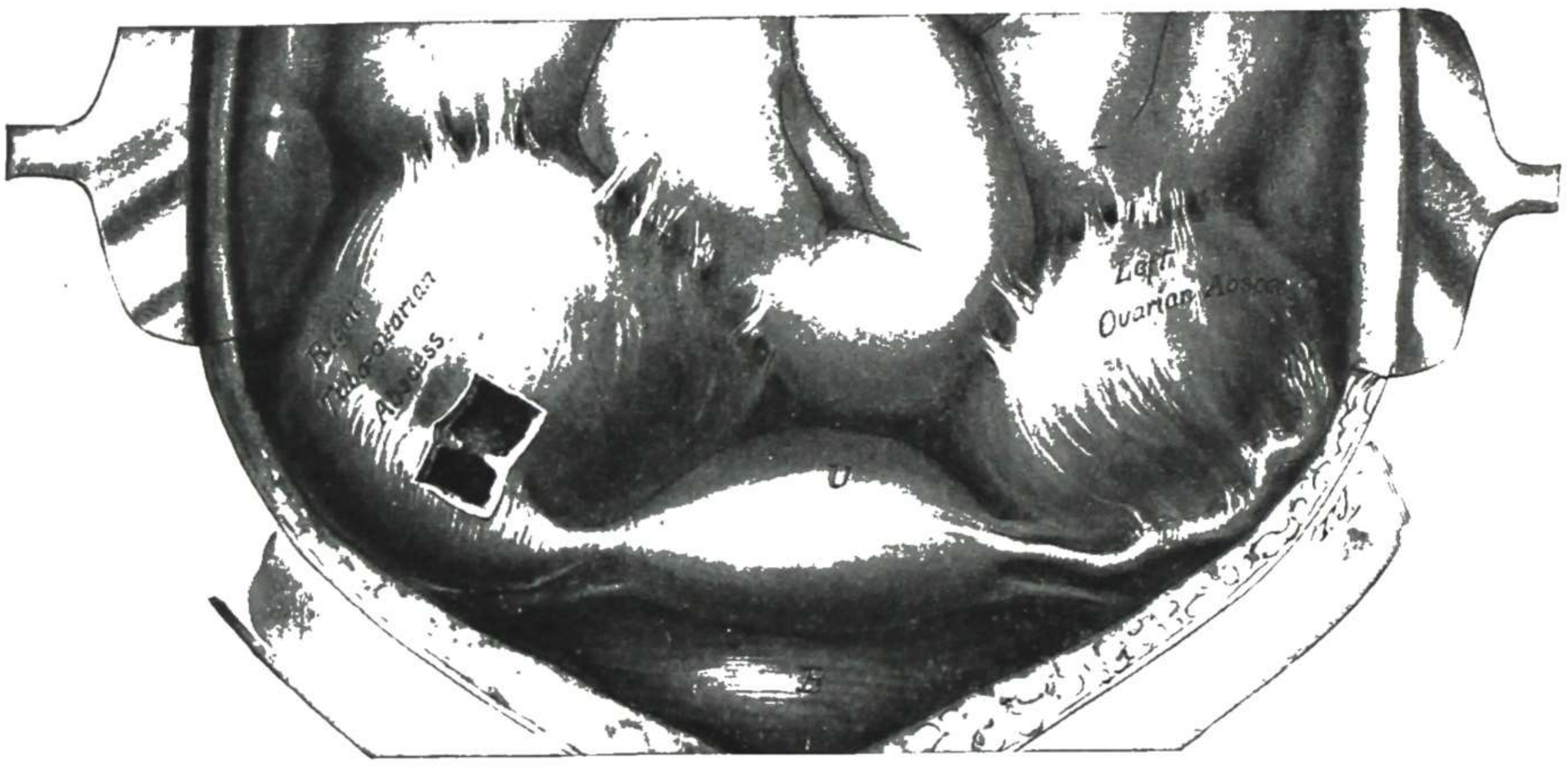


Fig. 769.—Ovarian abscess. A window, cut in the wall of the abscess on the right side, shows that it is composed of a tubal portion and an ovarian portion (tuboovarian abscess), with a communication between the two cavities. On the left side is indicated an abscess involving the ovary only, which is a much rarer condition.

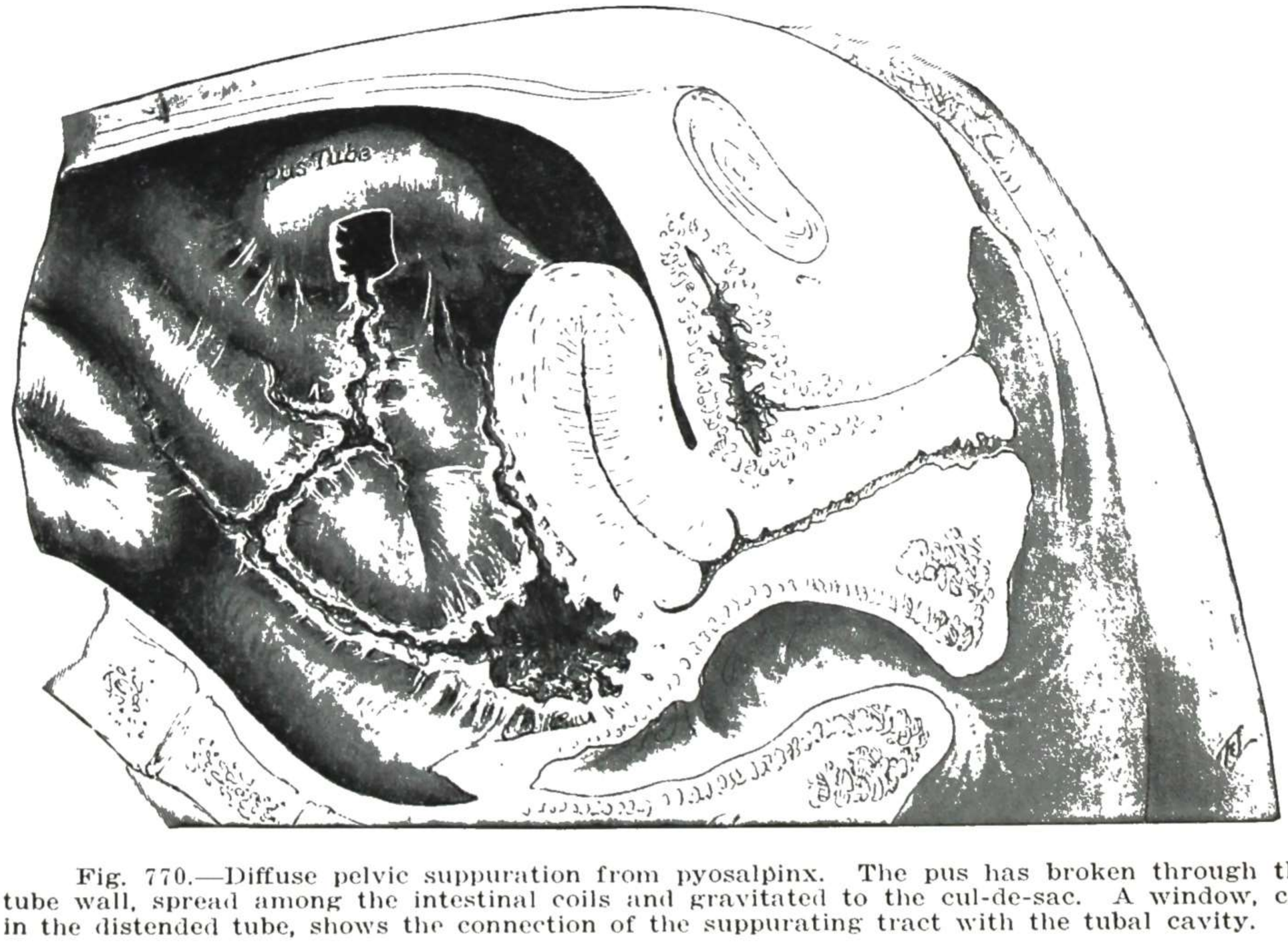


Fig. 770.—Diffuse pelvic suppuration from pyosalpinx. The pus has broken through the tube wall, spread among the intestinal coils and gravitated to the cul-de-sac. A window, cut in the distended tube, shows the connection of the suppurating tract with the tubal cavity.

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 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.

The distention of the tube tends to flatten out the folds till only remnants remain, as shown in the photomicrographs in Figs. 772 and 773.

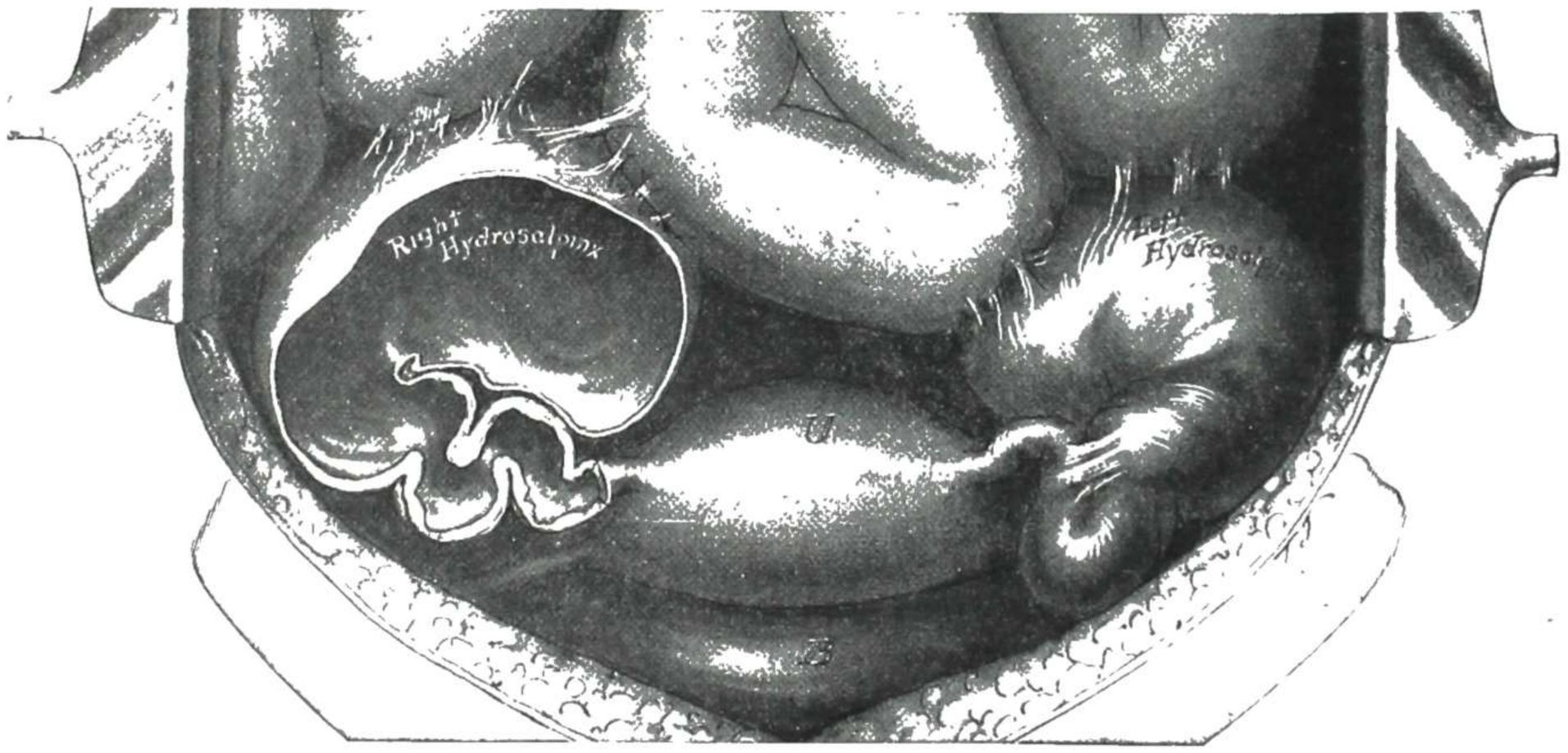


Fig. 771.—Double hydrosalpinx. The sectioned right tube indicates clearly the marked thinning of the wall found in these cases.

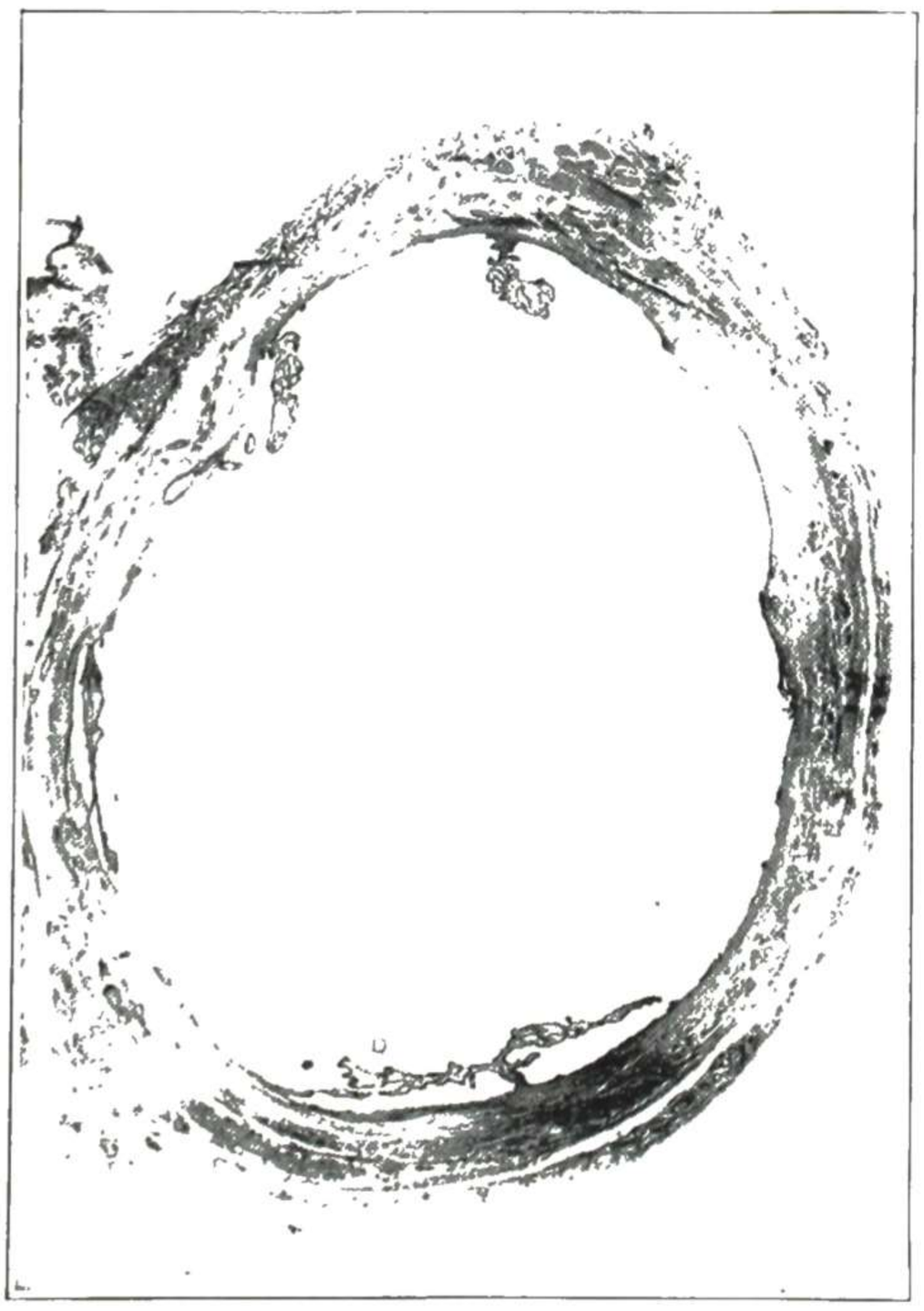


Fig. 772.

Fig. 773.

Fig. 772.—Hydrosalpinx. Notice how the pressure of the fluid destroys the mucosal folds, leaving only a few remnants.

Fig. 773.—This shows, under higher power, the small fold-remnant at the top in Fig. 772, Gyn. Lab.

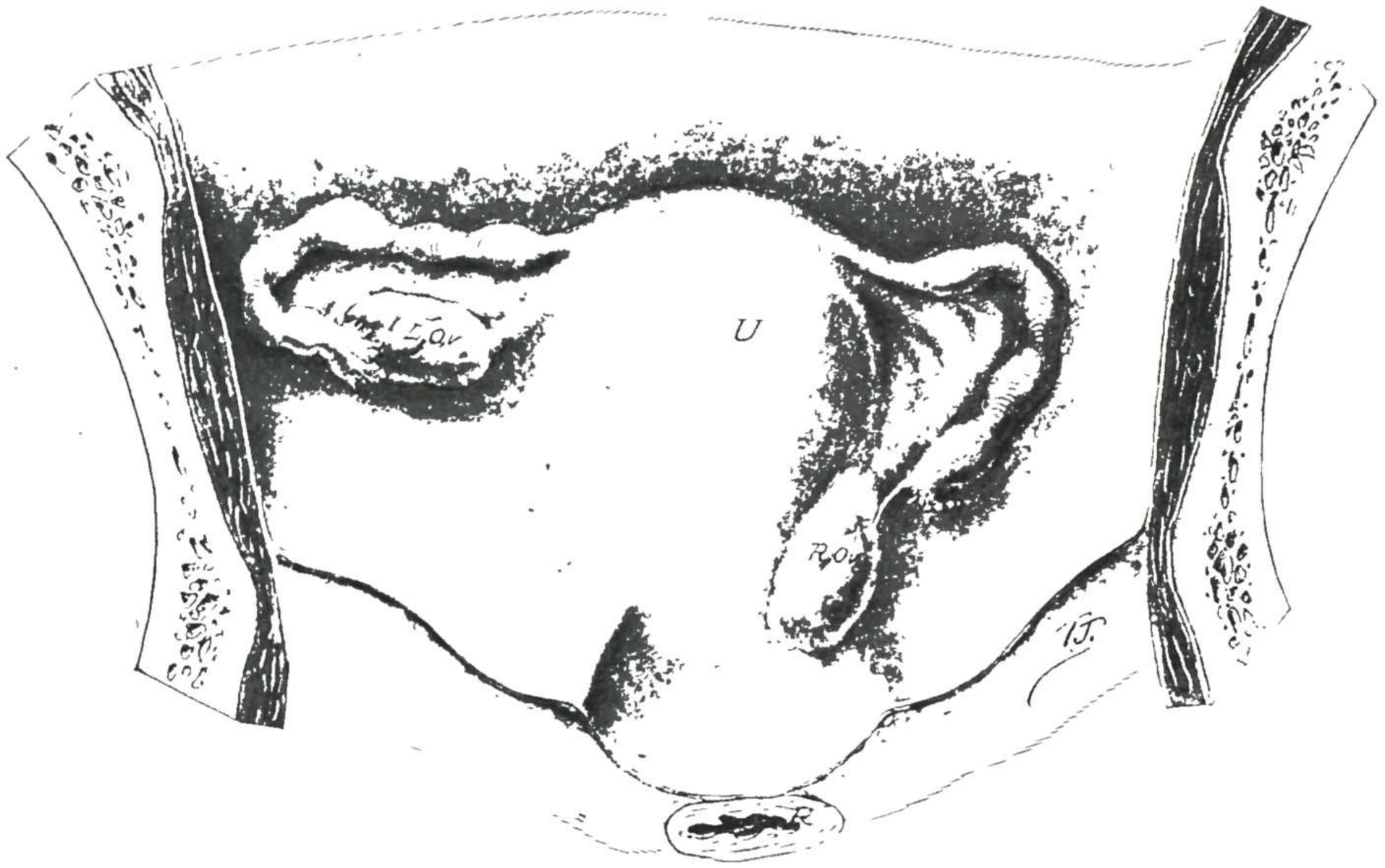
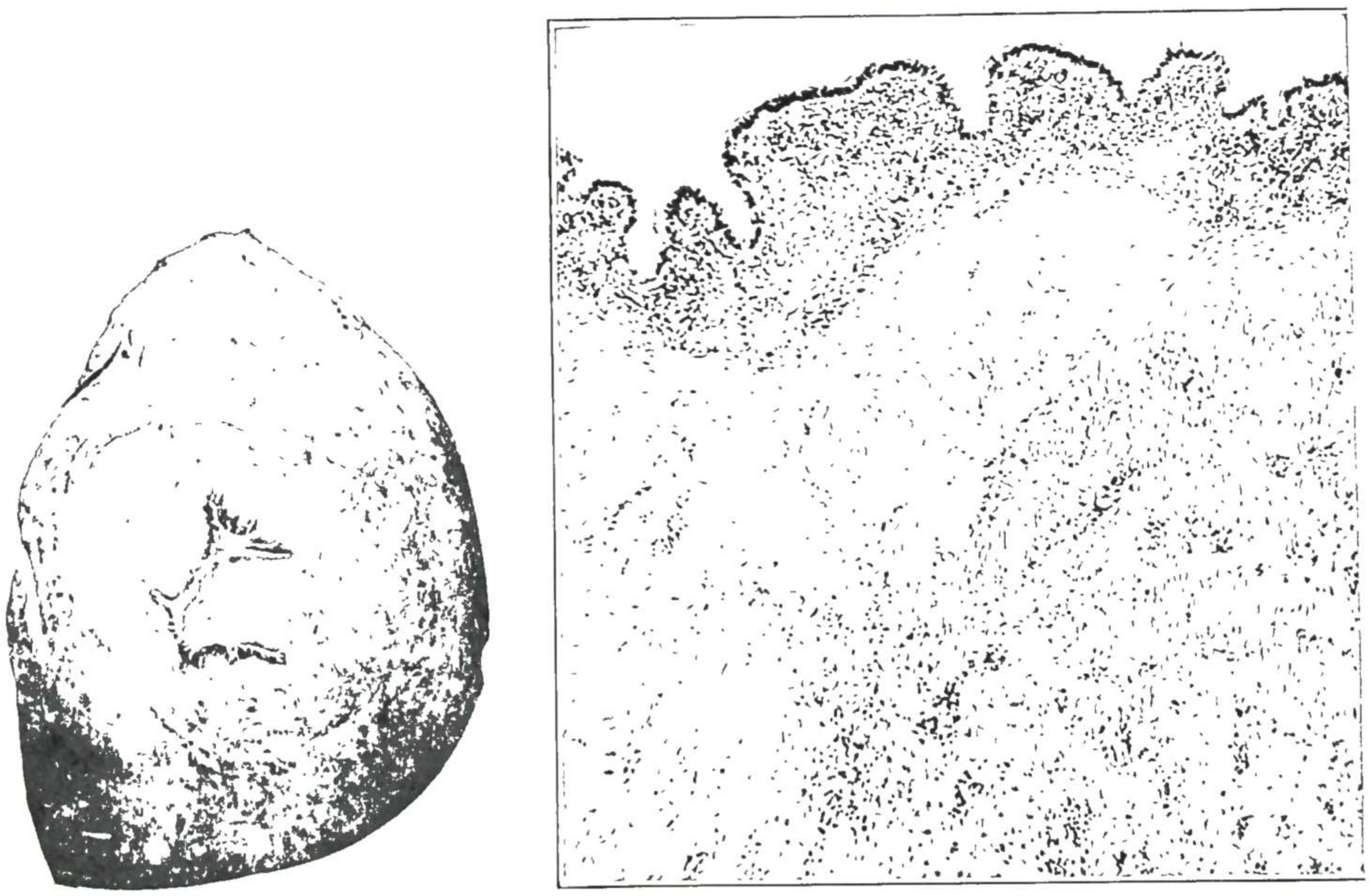


Fig. 774.—Nodular salpingitis. This form of chronic salpingitis is usually bilateral, and is often accompanied by prolapse of the tube or ovary on one or both sides.



A. *B.*

Fig. 775.—Nodular salpingitis, cross section. *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.

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. 774. Usually both tubes are affected, and frequently there is also chronic oophoritis of one or both sides. The microscopic picture is shown in Fig. 775.

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. 776.

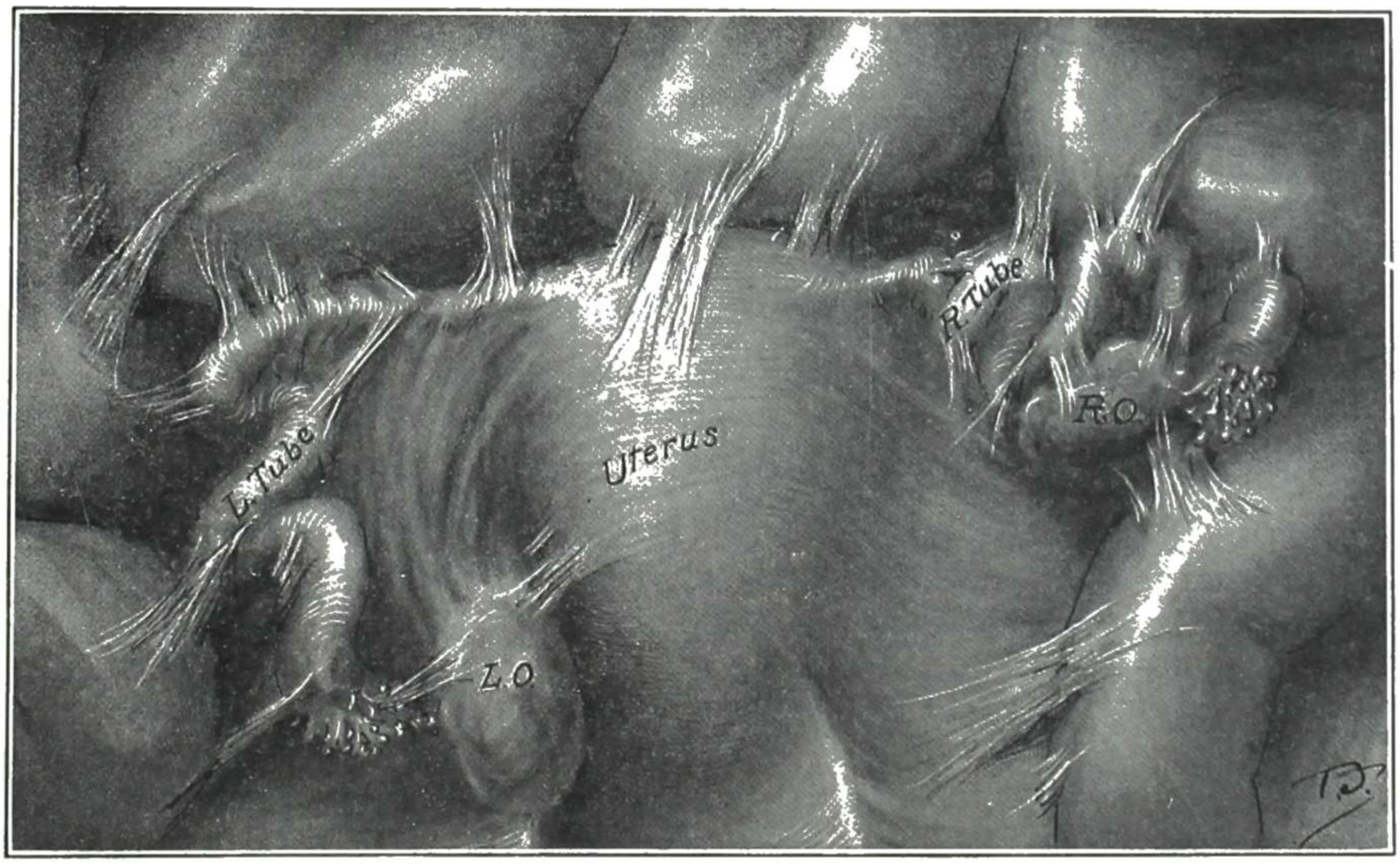


Fig. 776.—Multiple adhesions from chronic pelvic inflammation. This illustration represents a posterior view of the pelvic organs, with the intestinal coils pushed upward and to the sides to show the numerous adhesions.

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.

Smiley and Bozeman found that 21 per cent of patients with a diagnosis of pelvic inflammation had **irregular uterine bleeding.** In an attempt to determine the cause of the bleeding they selected 40 patients, from the Gynecologic Clinic of the Homer Phillips Hospital, who had pelvic inflammation and abnormal bleeding with no other evident lesion which would cause bleeding. Endometrial premenstrual biopsies in 76 per cent of these cases showed a proliferative endometrium indicative of anovulatory bleeding. They con-

clude that abnormal bleeding associated with pelvic inflammatory disease is probably due to ovarian dysfunction usually associated with suppression of ovulation.

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. 749), 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.
Intestinal Diseases.
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 Extrauterine 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. See also under Tubal Tuberculosis, Chapter 10.

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.

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 gonorrhea.

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. Colitis and enteritis are two conditions which have most frequently been mistaken for chronic tubal or ovarian inflammation. The points that distinguish them 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.

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 tender-

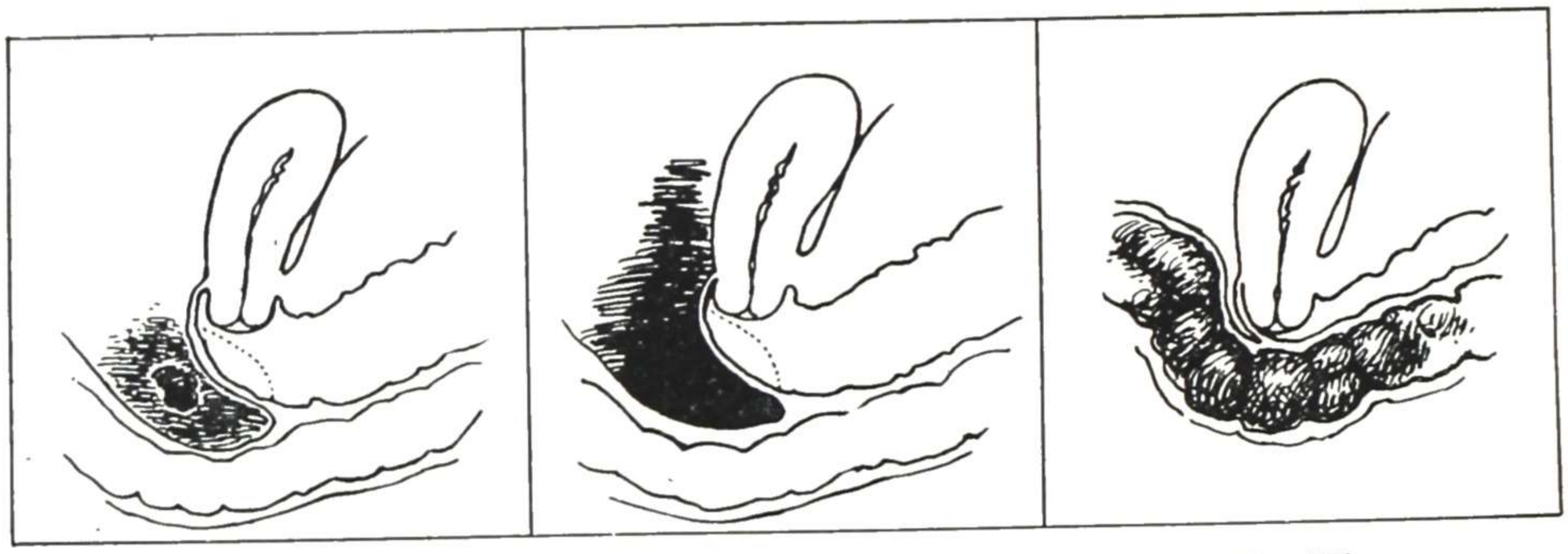


Fig. 777. Fig. 778. Fig. 779.

Figs. 777. to 779.—Differential diagnosis of pelvic inflammation. A mass low behind cervix. Fig. 777, Inflammatory mass filling cul-de-sac. Fig. 778, Blood filling cul-de-sac. Fig. 779, Fecal mass distending rectum back of cervix.

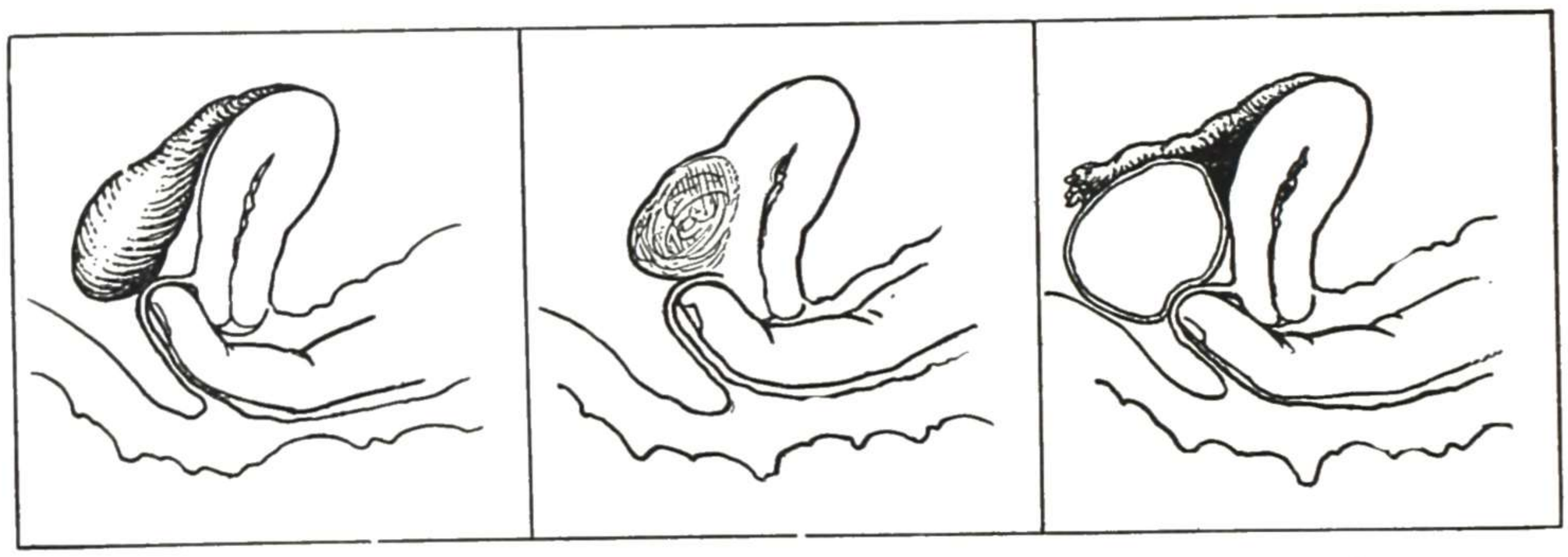


Fig. 780. Fig. 781. Fig. 782.

Figs. 780 to 782.—Differential diagnosis of pelvic inflammation. A rounded mass rather high in cul-de-sac. Fig. 780, Tubal mass. Fig. 781, Small myoma on posterior wall of uterus. Fig. 782, Small ovarian cyst.

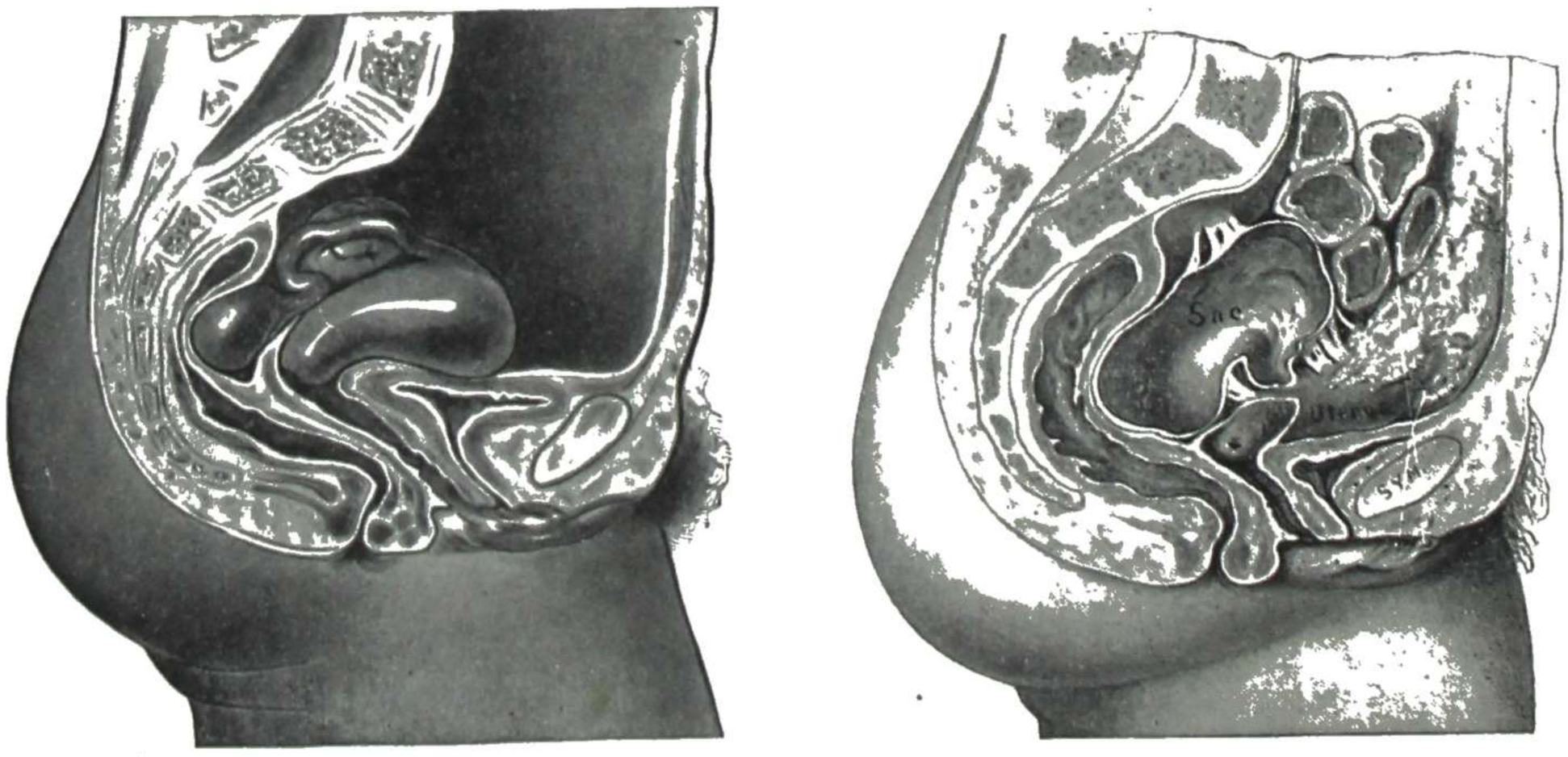


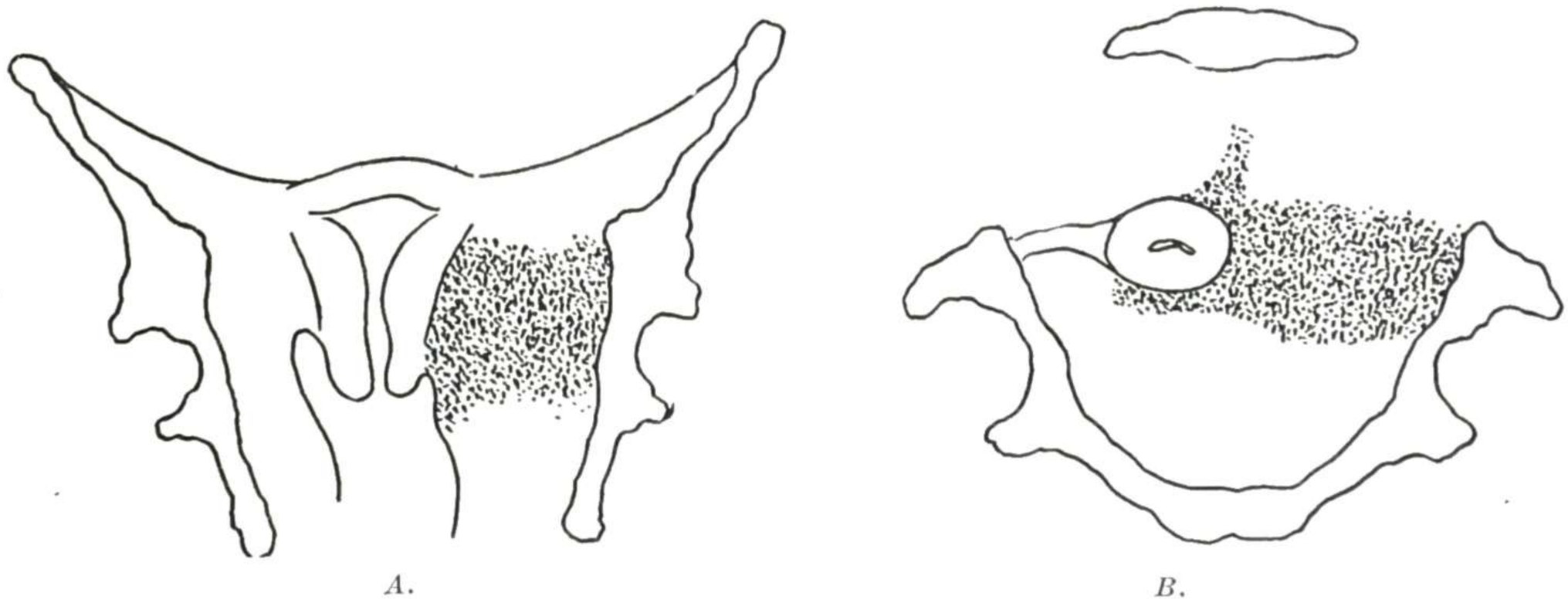
Fig. 783. Fig. 784.

Fig. 783.—Thickened tube and ovary prolapsed into the cul-de-sac behind the uterus.
Fig. 784.—An abscess behind the uterus.
(From Montgomery: Practical Gynecology, The Blakiston Company.)

ness may be localized along the pelvic nerve trunks (see Fig. 187). Certain conditions in the posterior cul-de-sac area that must be differentiated in examination are indicated in Figs. 777 to 784. Masses occurring in the broad ligament area are indicated in Figs. 785 to 788.

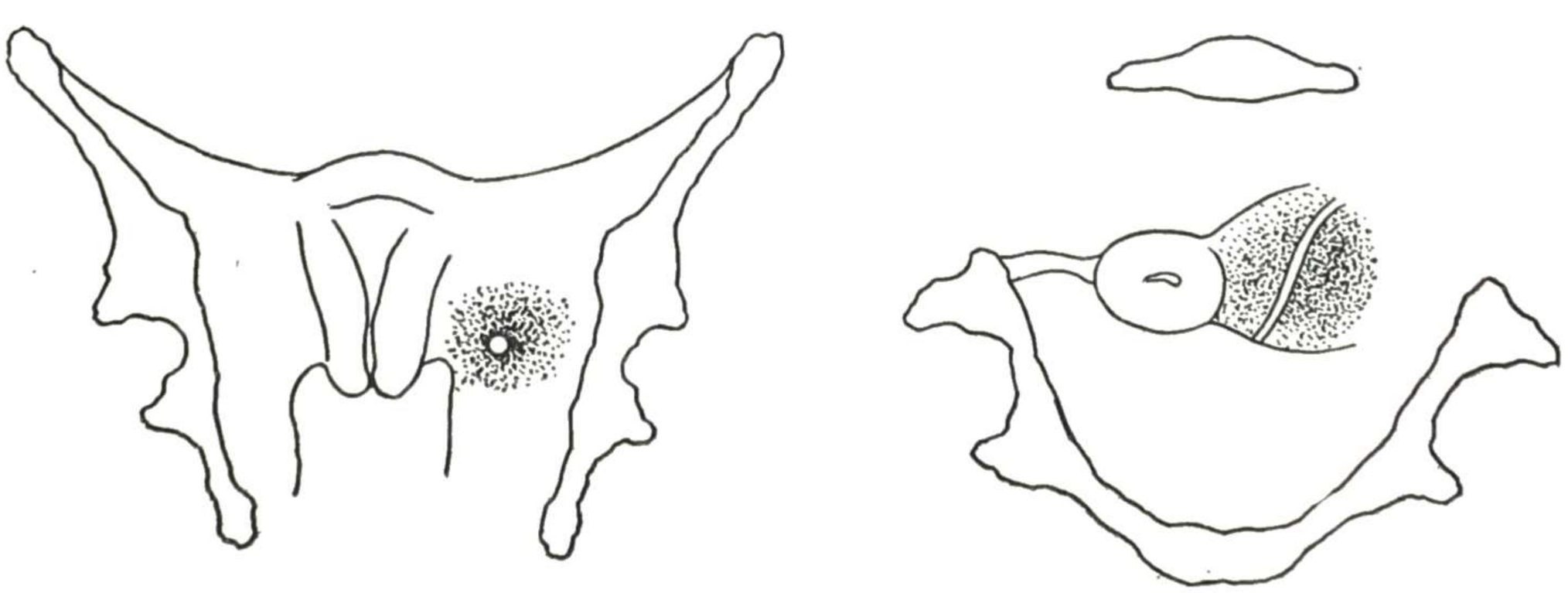
Treatment

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.



A. *B.*

Fig. 785.—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.



A. *B.*

Fig. 786.—Diagnosis of periureteritis. The limited infiltration is in the region of the ureter. Also, there are usually accompanying symptoms indicating cystitis or ureteritis.

General Measures

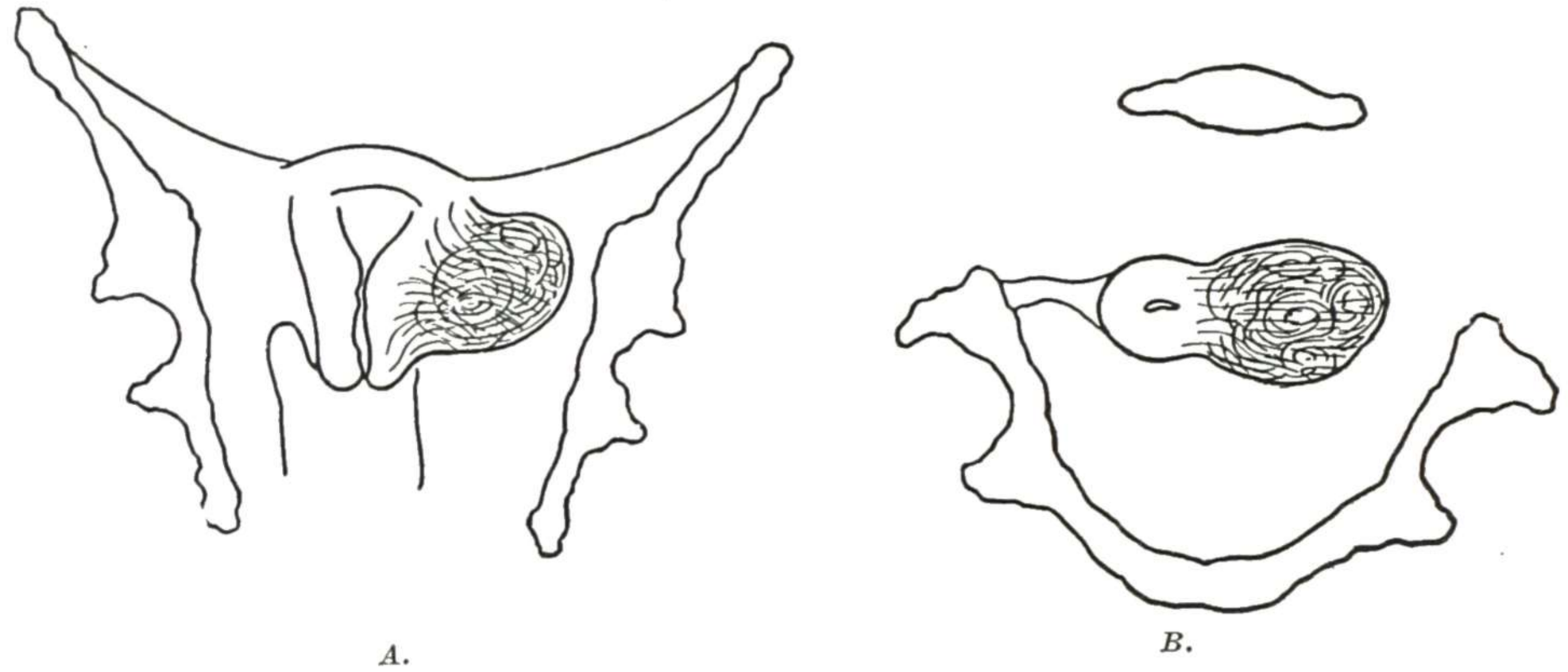
1. Attention to the general health is important. This includes diminution of work and family care to the point where it is not exhausting, regular sleep, periods of rest (especially at the menstrual time), proper nourishment and elimination.

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.

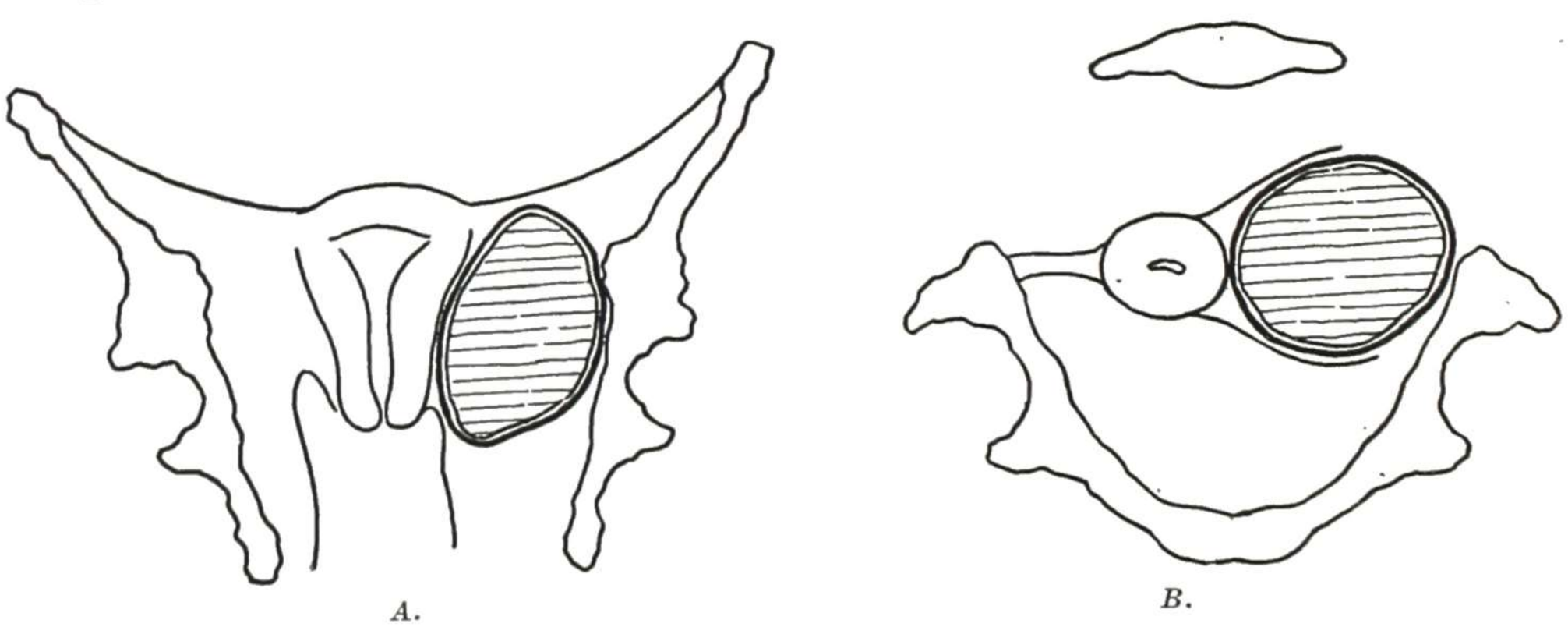
Special Measures

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 and treatment of any persistent focus in the urinary tract.



A. *B.*

Fig. 787.—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.



A. *B.*

Fig. 788.—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.

2. As mentioned under Acute Inflammation, Stevenson and his co-workers obtained excellent results even in chronic cases with chloramphenicol (Chloromycetin); many other antibiotics are also effective.

3. Heat in any of the forms mentioned under Acute Inflammation may be beneficial. We have seen large pelvic inflammatory masses disappear under controlled fever therapy.

4. 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. 751 to 754). In the aftertreatment, 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.

5. 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.

6. **Avoid radical operation** in those cases in which the examination shows only a somewhat thickened and tender tube, 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.

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.

7. 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.

When there is no need to preserve the possibility of pregnancy, a simple procedure suggested by Falk is indicated, namely, cornual resection. After confirming the work of Curtis and others who demonstrated that "flare-ups" of chronic salpingitis were due to reinfection from foci in the cervix, urethra, or Bartholin gland, Falk decided to test these conclusions by excising the cornual portion of the tubes in cases of chronic salpingitis, instead of removing the tubes. This was carried out in over 1,000 such cases and the follow-up extended for eight years. In some cases tubes measuring as much as 4 cm. in diameter were left in and on postoperative follow-up were found to have disappeared completely. In no case was there a recurrence of the salpingitis

sufficient to cause the patient to return to the clinic for treatment. Since a small percentage of the salpingitis cases were due to staphylococcus, streptococcus and other organisms, Falk's work would indicate that these organisms may also ascend to the tubes from foci in the lower genital tract. In 1950 Freed and Kimbrough in a clinical evaluation of the Falk procedure obtained clinical relief in 95 per cent of 62 cases so treated.

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. Johnson, Collins, and Webster, in a review of 93 cases of tubo-ovarian or ovarian abscesses, emphasize the importance of surgery if the treatment is to be adequate. The antibiotics are of value in the pre- and postoperative care in these cases.

In cases where it is deemed unwise to leave the ovaries in the pelvis Buxton and Wong suggest homeotransplant of ovarian tissue to the rectus muscle. In nineteen cases in which this procedure was followed, menopausal symptoms were alleviated, and in cases in which the uterus was preserved the menstruation continued and there were many other evidences of physiological function.

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 sacrouterine 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, especially bleeding. The severe exacerbations, so characteristic of salpingitis, are not 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. 785). 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. 786). As the location and tenderness are the same, the distinction is made by the accompanying history and symptoms.

An intraligamentary myoma (Fig. 787) 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.

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 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 Dr. H. S. Crossen (''What Is the Preferable Time for Operation for a Chronic Inflammatory Mass in the Pelvis?''). Some points in the following summary are 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 may result 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. Before the advent of the sulfonamides and antibiotics it was found that the time required for the death of bacteria or for their effective attenuation varied greatly in different cases. The persistence of virulence depended largely upon the character of the infection. The two infections concerning which definite information had accumulated as to persistence of virulence were the gonococcal and the streptococcal. In the gonococcal cases the bacteria were dead or attenuated to the point of practical sterility within three to four months from the onset of the infection. In such cases abdominal section could be safely undertaken after this period. In the streptococcal cases, on the other hand, the organisms were found to live and retain their virulence indefinitely, although there were a few exceptions. Abdominal section for a mass of streptococcic origin was never considered safe, and such an operation, even years after the infection was apt to be followed by fatal peritonitis.

Since the antibiotics have become available, most of these cases of streptococcal infections respond to treatment, and operation is not necessary. The work of Stevenson with Chloromycetin has been mentioned. If operation is needed, it can usually be safely undertaken in four to six weeks if preceded and followed with antibiotic therapy.

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.**

Gonococcic Class (Clinical)

In the gonococcic class (clinical) the distinguishing points are (a) that the pelvic inflammation is preceded by evidence of gonorrhea or comes on without apparent cause and (b) that the lesion is located in the tube, as indicated in Fig. 746, 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, pneumococcus being one. 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 gonorrheal. 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 gonorrhea is increased if the purulent discharge (''free leukorrhea'') began within several days of sexual intercourse or within a few weeks after

marriage. Again, in a large proportion of the cases of gonococcal leukorrhea 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 leukorrhea, but very seldom in leukorrhea from other causes.

In those cases in which the vaginal and uterine gonorrhea did not cause sufficient disturbance to be noticed, the pelvic inflammation began without apparent cause. A considerable proportion of the gonorrheal 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 gonorrheal infection.

In the examination a search should be made about the external genitals for evidences of an old gonorrhea—signs of previous inflammation of the urethra or of the vulvovaginal glands, such as red spots (maculae gonorrhoea) 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 gonorrhea, for in many of the chronic cases the causative bacteria have disappeared from the discharge.

b. **Location** of the lesion. The extension of gonorrheal 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.

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. 747 or in the veins as in Fig. 748.

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 25 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 gonorrhea (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 streptococcus 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 streptococcic cases that survive the acute attack and come later for treatment for an inflammatory mass, the lesion nearly always involves the connective tissue (parametrium). Whiteside and Walton 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. As parametrial inflammation is nearly always due to the streptococcus, every case presenting a parametrial mass should be placed in the streptococcic 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.

Prior to the use of antibiotics, the virulence of the streptococcus persisted indefinitely. Miller reported one case in which the bacteria persisted for six years and another in which they persisted for twelve years. Martin stated that streptococci have been found fully virulent in a pelvic inflammatory mass after nineteen years.

5. What is the **preferable time** for abdominal operation for a chronic inflammatory mass in the pelvis? In the treatment of old inflammatory masses various conservative measures should be tried, selecting those which seem best adapted to the particular conditions present in the case. In addition to a thorough trial of the antibiotics, deep heat with diathermy or the Elliott apparatus, fever therapy, and, in certain cases, x-ray should be tried.

Williams and Velkoff report gratifying results in premenopausal patients with extensive chronic pelvic inflammation who had had repeated exacerbations, by the use of a sterilizing dose of x-ray therapy. In some of these cases the radiation carried the patient through the critical stage, and operation was performed later, while in others the symptoms were relieved and the patient was able to resume her work without operation.

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.

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 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.

If extraperitoneal drainage is not possible or masses persist, abdominal operation should be delayed as long as the patient is showing improvement, as in some cases the mass may eventually become resolved or be reduced to such an extent that it causes no disturbance. Another advantage of delaying the intraperitoneal operation is that the virulence of the infection is reduced or eliminated.

6. **Operative Results**: Blake and Diddle report that their results in the treatment of 88 cases of pelvic cellulitis with a combination of sulfonamides and antibiotics. There were seven deaths, all due to nonhemolytic streptococci, staphylococci, or E. coli infections. One out of every six given either sulfonamides or antibiotics (penicillin or streptomycin) showed a favorable response.

The recent report of Stevenson et al., mentioned under Acute Pelvic Inflammation, on the use of chloramphenicol is much more encouraging. In a group of 32 patients including pelvic abscesses, postpartum and postabortal sepsis, and 2 cases of ruptured appendix, all were successfully treated but one. The one patient who died was a postabortal case; she had three perforations of the uterus with generalized peritonitis and a subdiaphragmatic abscess. Terramycin has given excellent results in a few cases, but the number treated does not permit definite conclusions. In patients who are sensitive to the antibiotics, a combination of the sulfonamides, such as Gantrisin, should be given by mouth or, if necessary, Gantrisin Diethanolamine may be given intravenously every eight to ten hours.

In septic patients frequent transfusions are utilized to counteract the rapid destruction of red cell and hemoglobin. If peritonitis is present with ileus, nasal tube should be inserted and suction started. Intravenous amino acids and electrolytes and vitamins can be given with or without glucose. In lung or cardiac complications intranasal oxygen is given.

When evidence of thrombosis is present and it is progressing, ligation of the ovarian veins and, in some cases, hysterectomy may be advisable.

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Chapter 10

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 ligament, 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. 789 and 790); 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. 791. 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. There are a few reported cases where implantation has occurred in the cervical mucosa. Roblee reported an ectopic pregnancy in a woman who had had a previous supravaginal hysterectomy in which three-fourths of the corpus had been removed.

Extrauterine pregnancy occurs on an average of once in every 200 cases of pregnancy, though Beacham et al. found the incidence in the Charity Hospital to be one to every 106 deliveries. The average occurrence among gynecologic cases is about 2 per cent.

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, 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.

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. Adhesions may interfere with the normal movements of the tube which help ensure the entrance of the egg into the tube.

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. Carpenter and Jameson illustrated 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. 792).

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

Fig. 789.

Fig. 790.

Fig. 789.—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. Gyn. Lab.

Fig. 790.—The other side of the specimen, showing the rupture in the tubal wall, through which blood clots may be seen. Gyn. Lab.

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 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. 789. 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. 790.

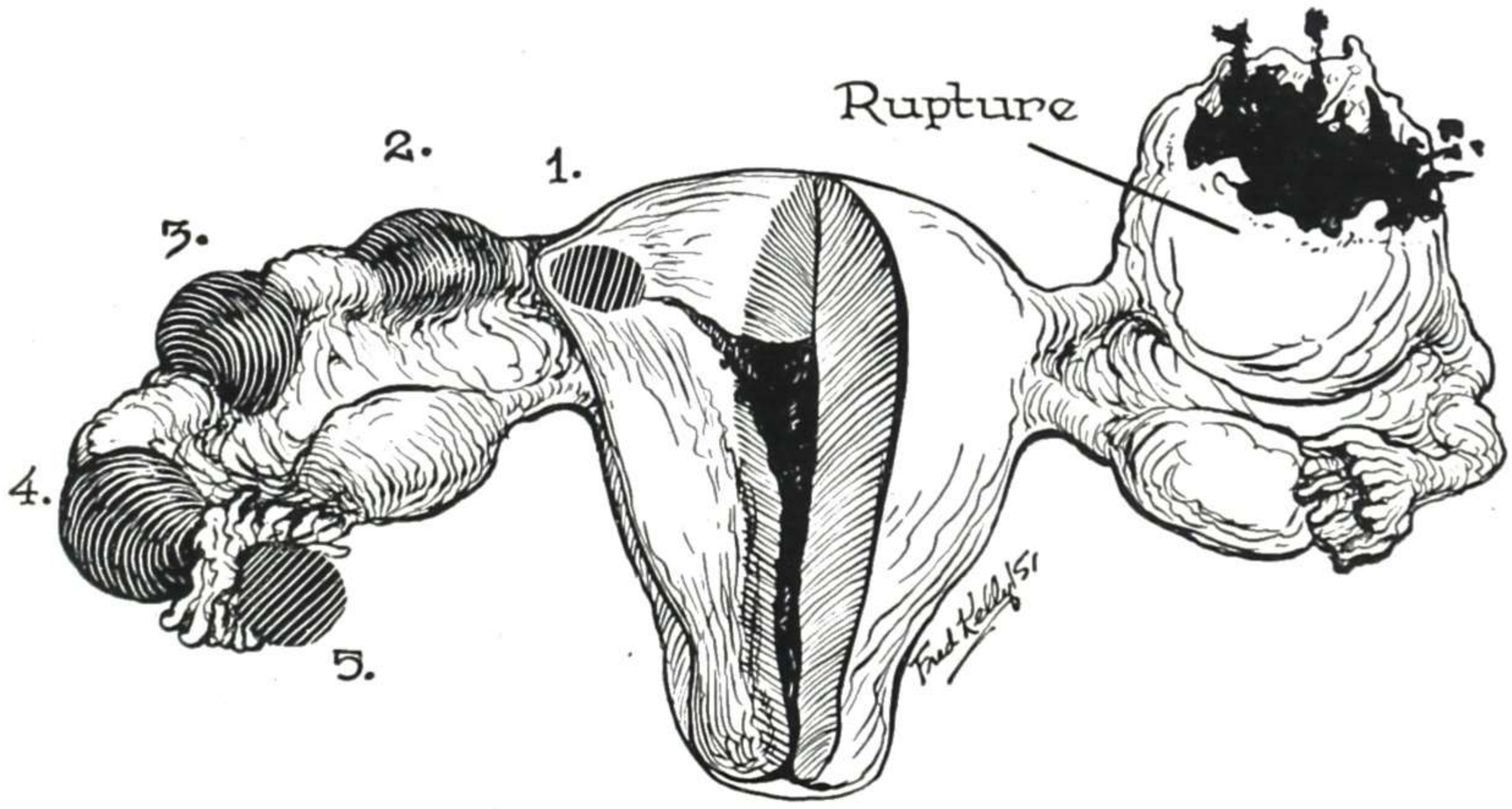


Fig. 791.—On the left the various sites of tubal pregnancy are shown. *1*, Interstitial; *2*, isthmial; *3*, ampullar; *4*, infundibular; *5*, in the end of the tube. This type would probably end as an abdominal or a tuboovarian pregnancy.

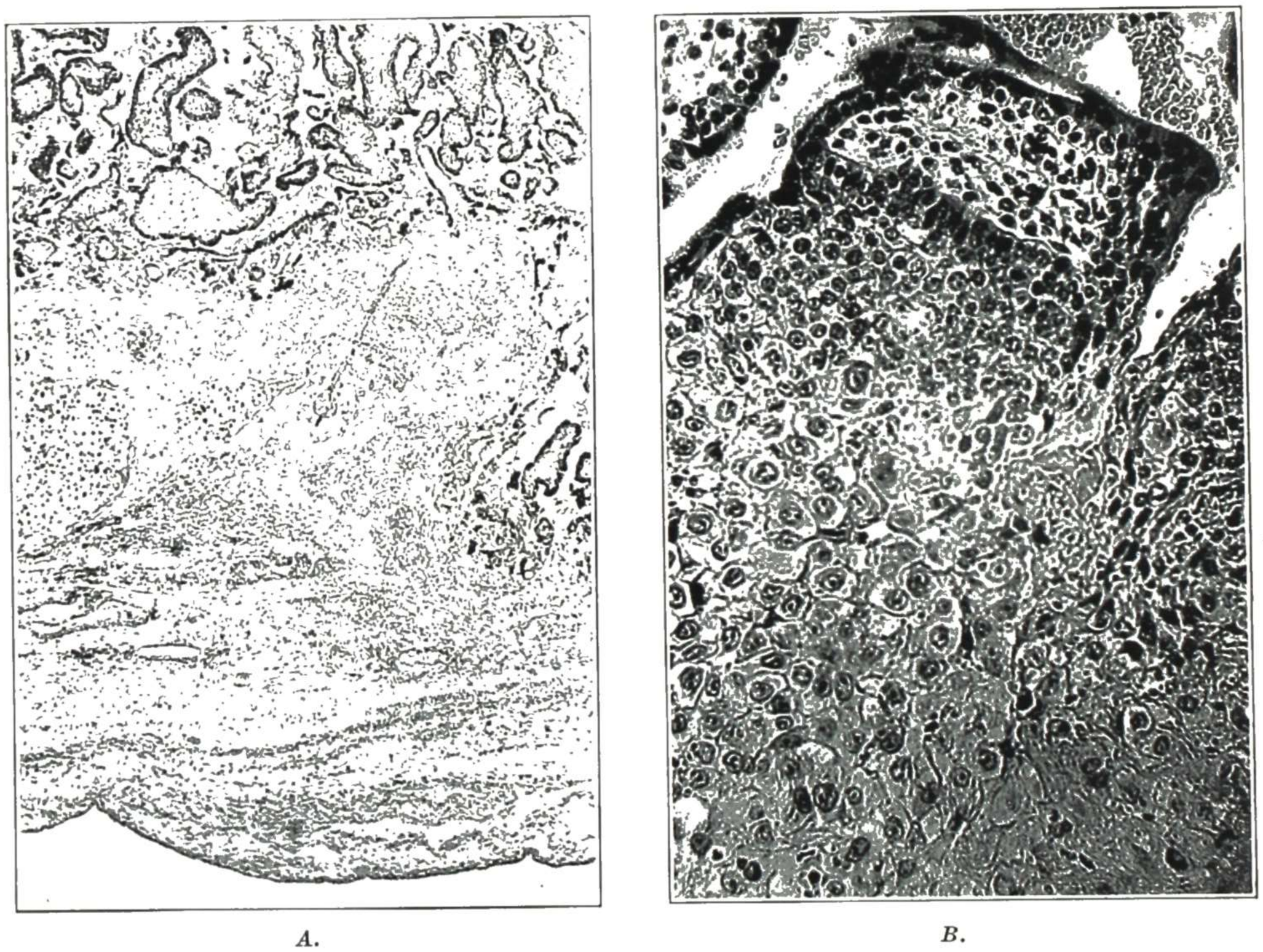
Fig. 792.—Uterus bicornis unicollis with rudimentary horn. The cystic ovary and rudimentary horn are on the left. The lower pole of this structure was probed and sectioned and showed no opening. It had no connection with the vagina. The cervix on the right was removed from the vagina. (From Carpenter and Jameson: Am. J. Obst. & Gynec., January, 1952.)

In many cases there is no evidence of decidua. Rock stated that his studies of the normally implanted conceptus and the research by others of the transplanting of mouse eggs fertilized in vivo into distant organs have led him to the conclusion that the trophoblast seeks, not primarily decidua, but maternal blood.

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. 789. But in some cases the blood clot is all that is seen.

Microscopically, trophoblast cells and usually decidual cells are seen, much as they are in a uterine implantation. Fig. 793 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.



A. *B.*

Fig. 793.—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.

Accompanying the tubal pregnancy there is sometimes a decidual reaction in the uterus and this decidua is 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. Romney et al. recently made a study of endometria associated with ectopic pregnancy and they found decidua without villi in only 19 per cent of the 115 cases where the endometrium was available for study. A proliferative endometrium was found in 30 per cent and a secretory endometrium in 39 per cent, showing the unreliability of curettage as a diagnostic measure.

Bilateral tubal pregnancy (Fig. 794) has been reported in about 80 cases, according to Hall, who reviewed the literature in 1949. Approximately 350 cases of combined extrauterine and intrauterine pregnancies have been reported, according to Michaels; one reported by Thorek et al. is shown in Fig. 795. Occasionally a tubal pregnancy is a twin pregnancy, as shown in Figs. 796 and 797.

A. *B.*

Fig. 794.—Bilateral tubal pregnancy; *A*, left tube; *B*, right tube. Courtesy D. P. Hall, University of Louisville; from Am. J. Surg., December, 1949.)

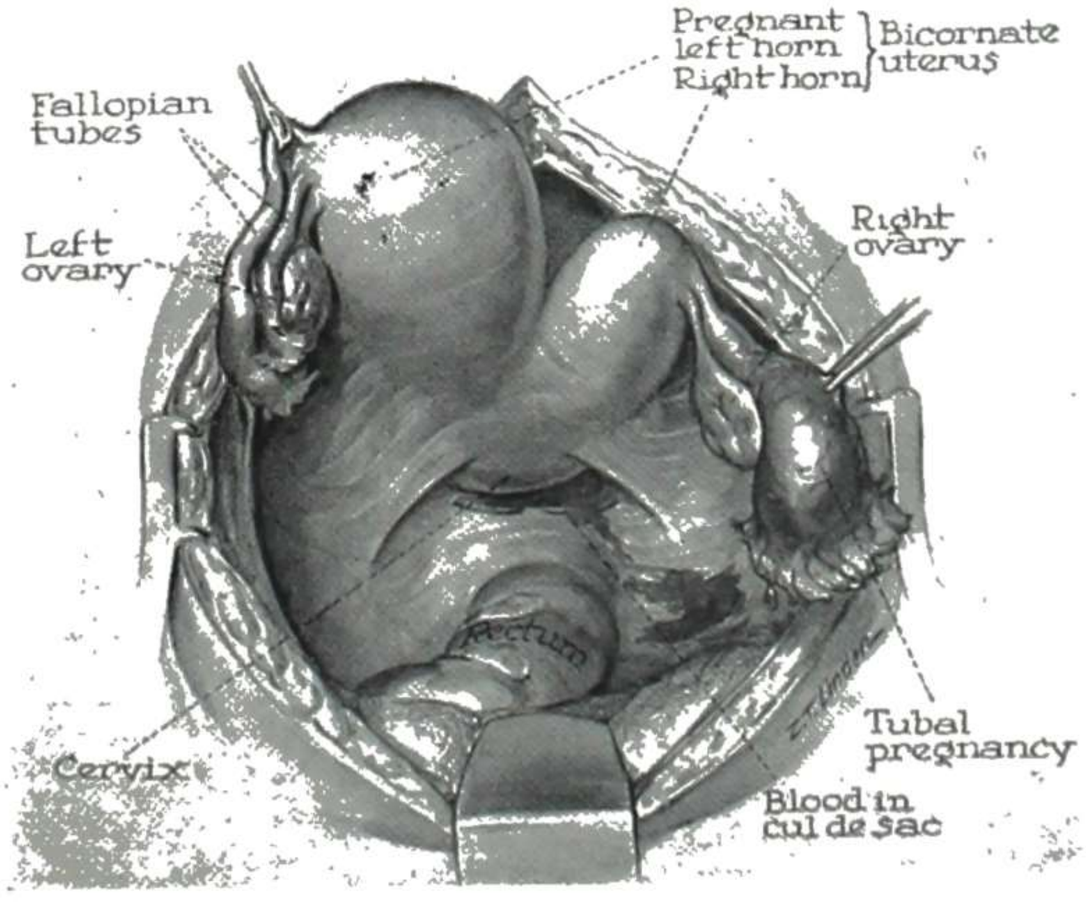


Fig. 795.—The findings as seen at surgery; it is to be noted that the uterus is distinctly bicornate, with a pregnancy in the left horn. A tubal pregnancy is seen on the right and two "normal" fallopian tubes are present on the left. As a result of an incomplete tubal abortion free blood is present in the cul-de-sac of Douglas. (From Thorek et al.: Am. J. Surg., April, 1950.)

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. Beacham et al. in 750 cases of tubal pregnancy found the tube intact in 12.1 per cent.

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. 798 and 799. This is called "tubal abortion." Tubal abortion is accompanied with more or less intraperitoneal bleeding. Tubal abortion comprised 16.4 per cent of Beacham's cases.

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. 800. This condition is known as "pelvic hematocele." The blood may be gradually absorbed without further disturbance or the hematocele may require drainage, as described under Treatment. The very early embryo with membranes, having been completely cast off from its point of nourishment, perishes, and is usually absorbed without causing further trouble.

Fig. 796.

Fig. 797.

Fig. 796.—Advanced tubal pregnancy mass, the contents of which are shown in Fig. 797.
Fig. 797.—Twin fetuses from a tubal pregnancy which had advanced to term. (From Ferguson and Otis: Am. J. Obst. & Gynec.)

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. Rupture of some extent occurred in 70.9 per cent of Beacham's series.

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 growing embryo are surrounded by a wall of exudate and adherent intestine.

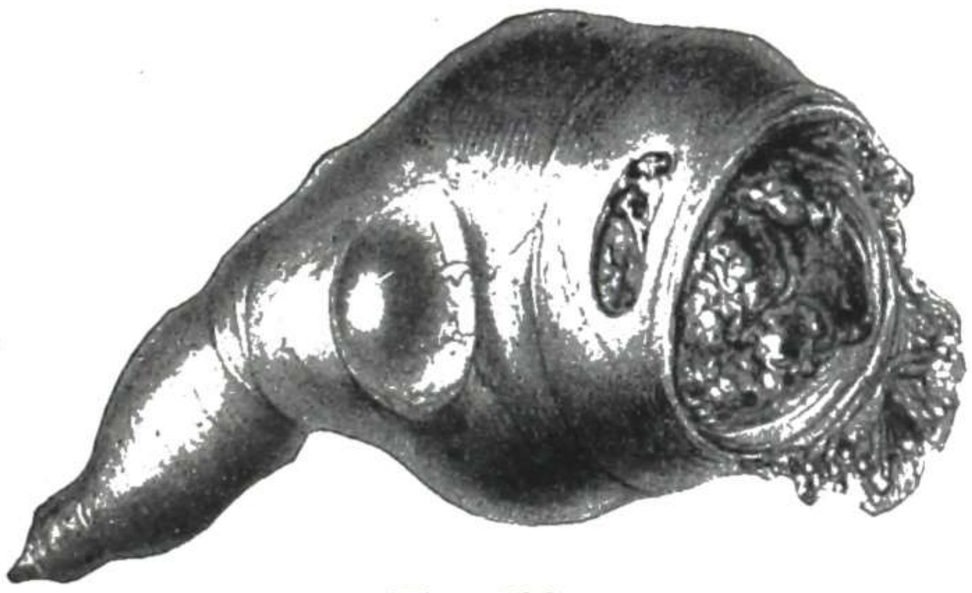


Fig. 798.

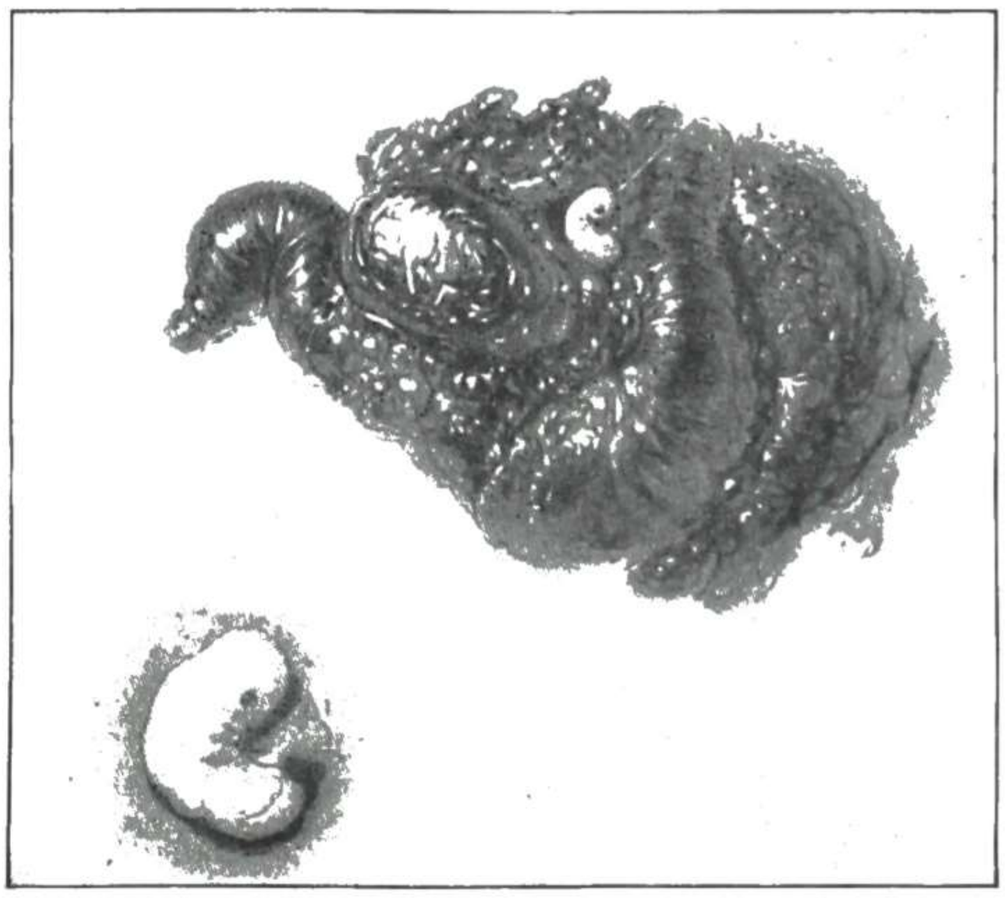


Fig. 799.

Fig. 798.—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.

Fig. 799.—The clots, membranes, and embryo extruded into the peritoneal cavity. (From Kelly: Operative Gynecology.)

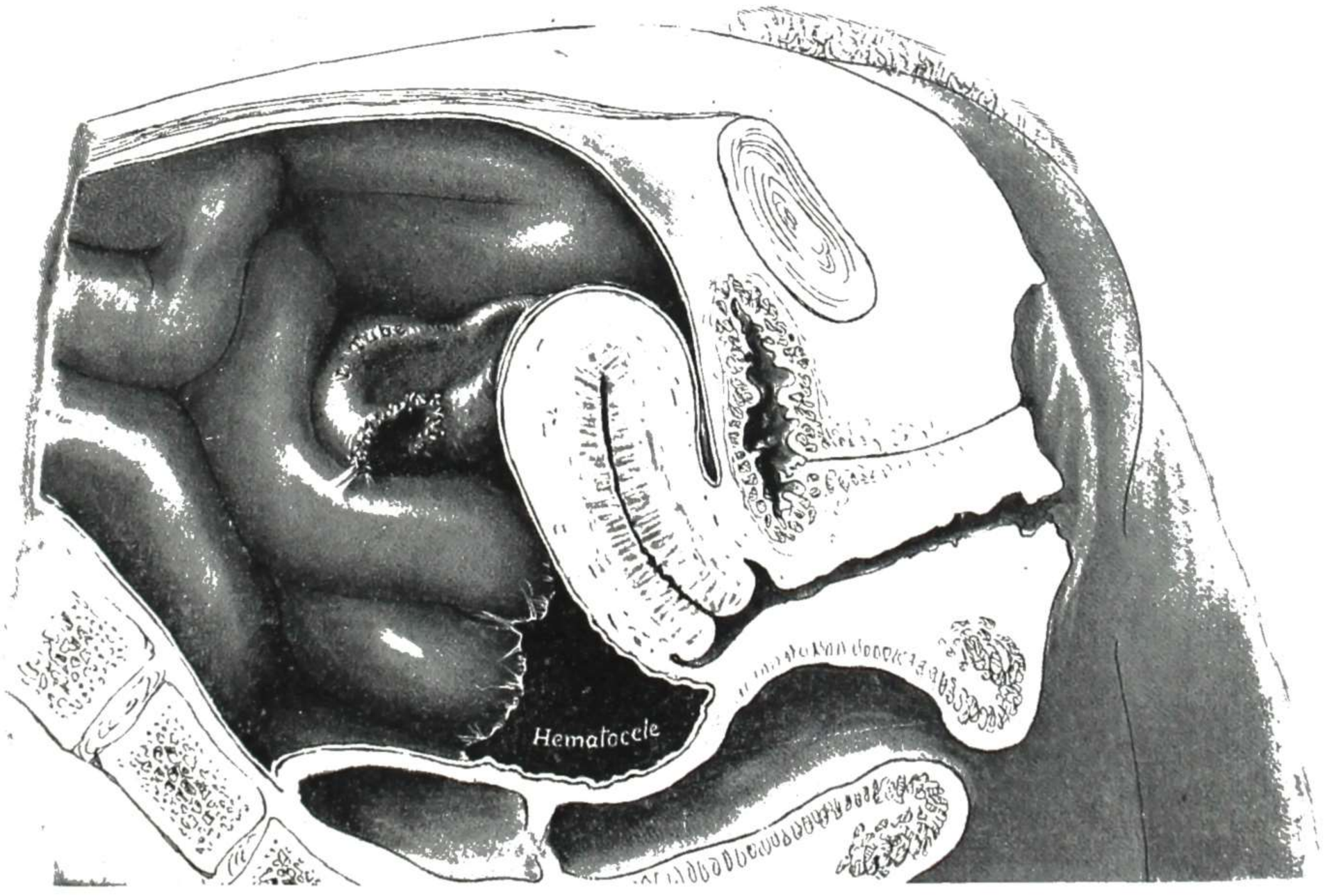


Fig. 800.—Pelvic hematocele. Indicating the condition where there has been a tubal abortion and the blood from it has gravitated to the cul-de-sac and become surrounded by exudate.

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. 801 and 802), a gradually increasing mass, accompanied by frequent attacks of pelvic pain and marked soreness. This class includes the

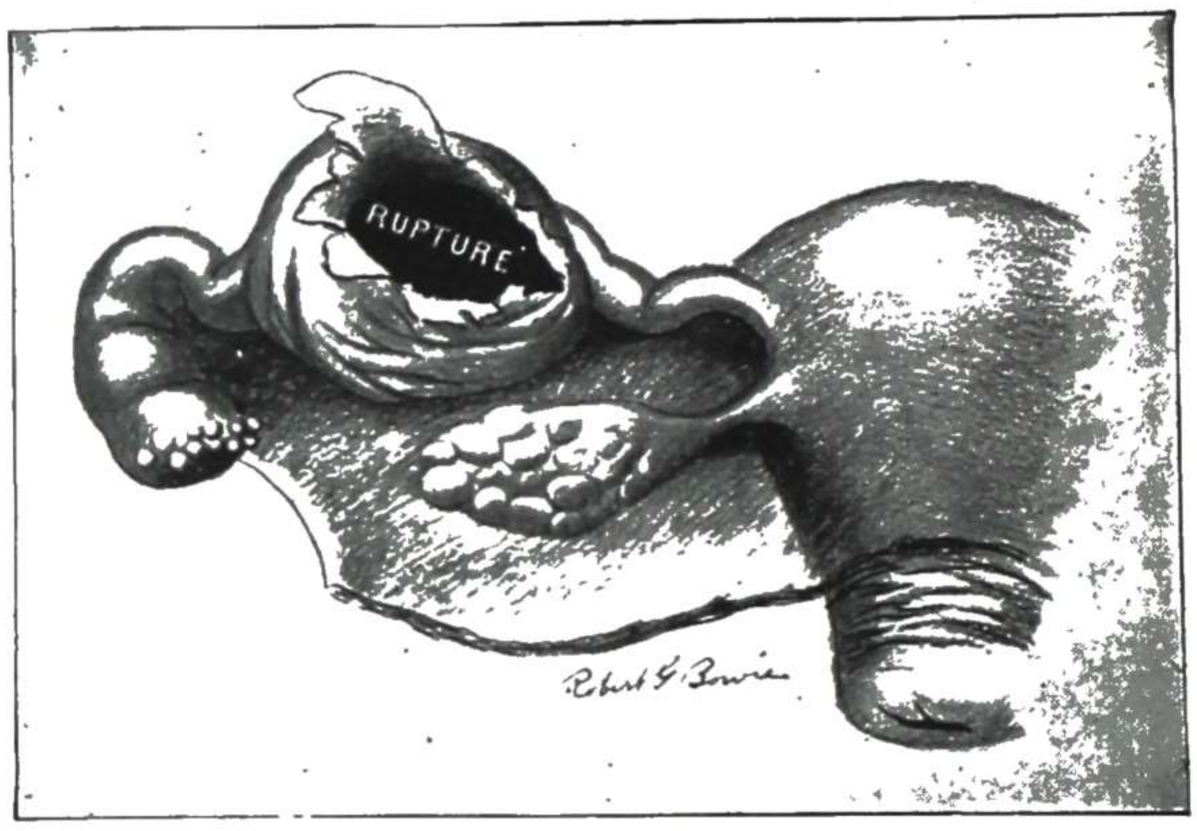


Fig. 801.—Tubal pregnancy, with rupture into the peritoneal cavity. (From Gilliam: Practical Gynecology.)

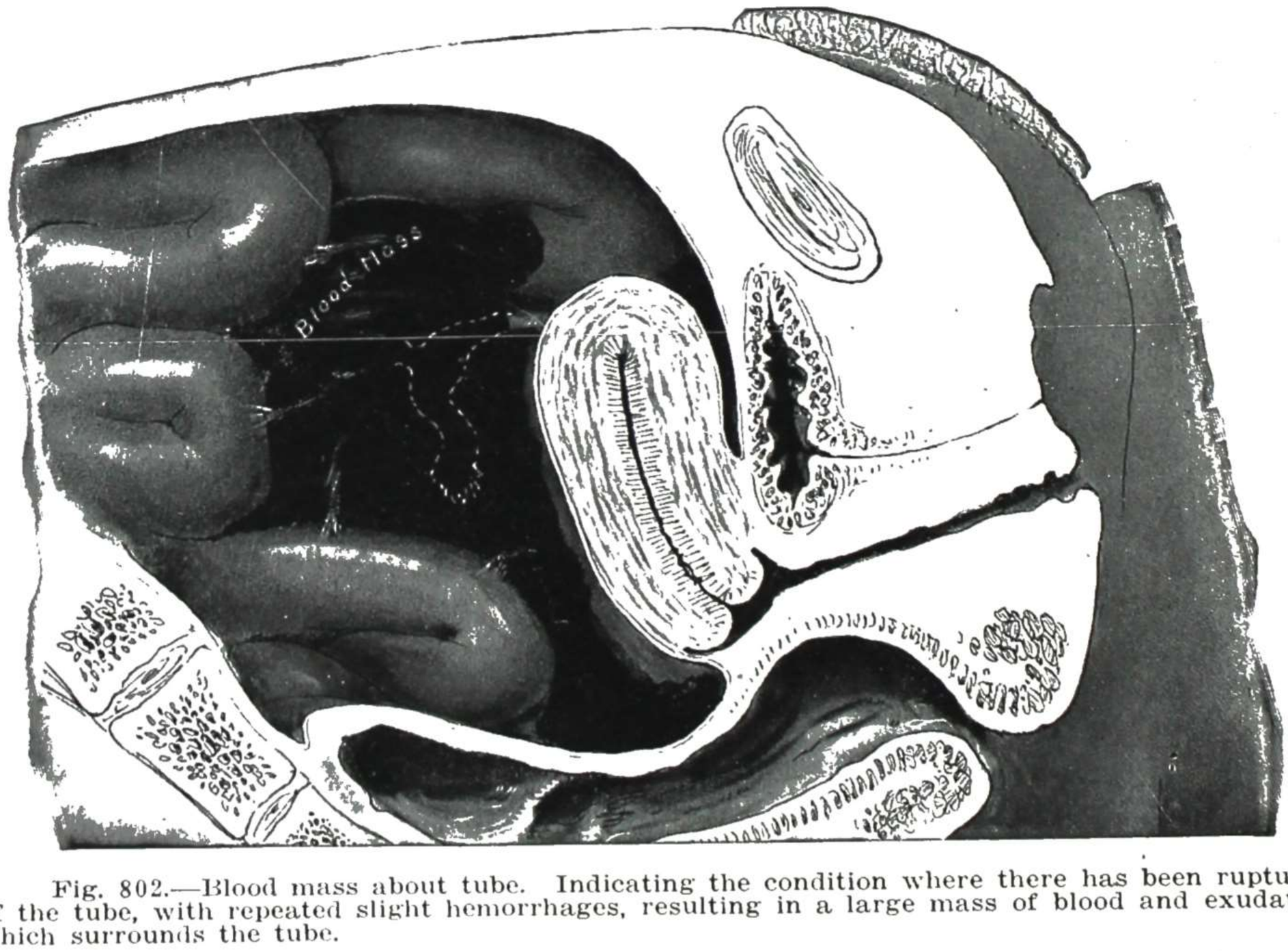


Fig. 802.—Blood mass about tube. Indicating the condition where there has been rupture of the tube, with repeated slight hemorrhages, resulting in a large mass of blood and exudate, which surrounds the tube.

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 in great quantity. It extends among the intestines and in some cases practically fills the abdominal cavity, as indicated in Fig. 803. 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

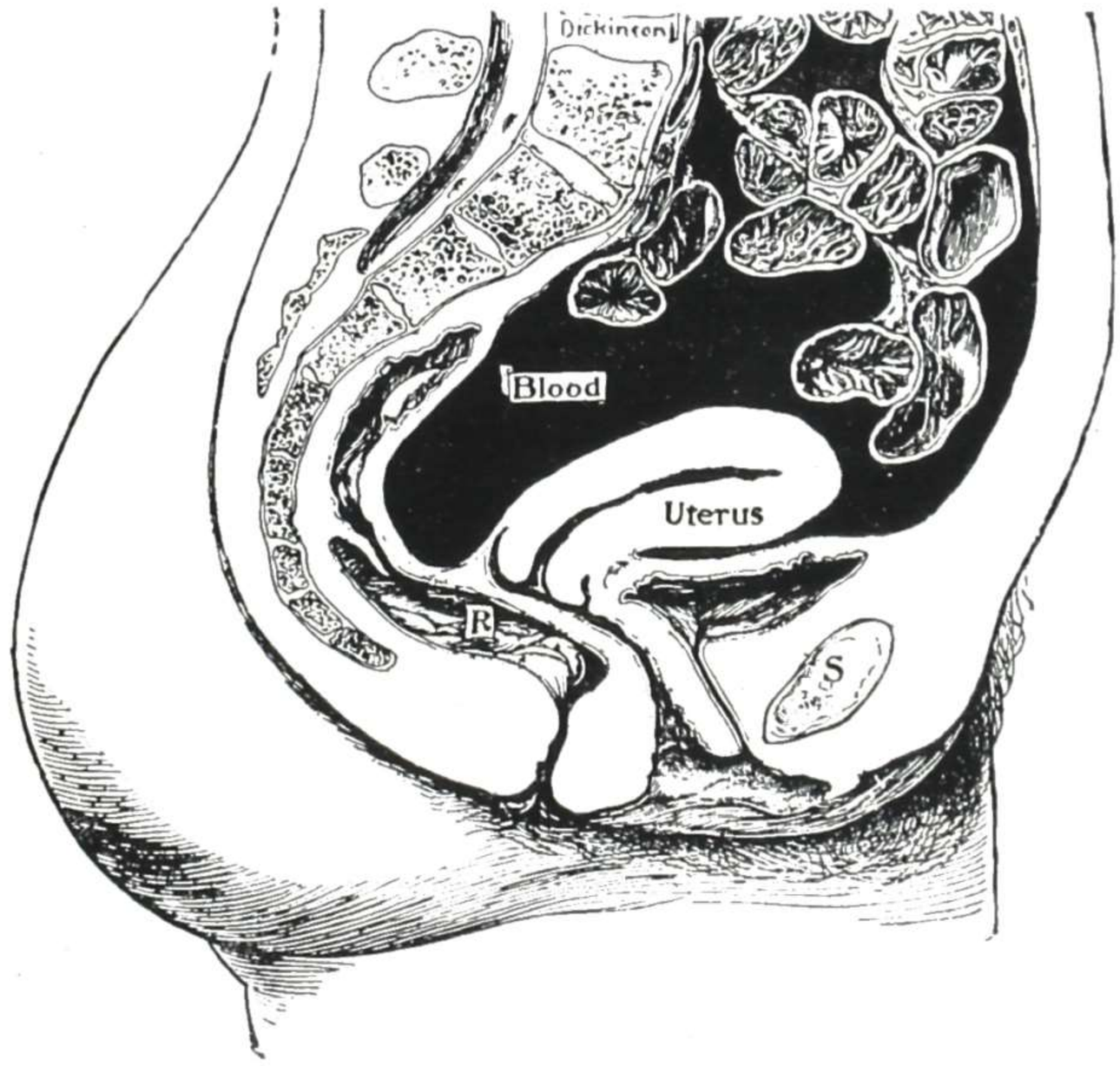


Fig. 803.—Tubal pregnancy with free intraperitoneal hemorrhage, showing a large amount of blood in the peritoneal cavity among the intestinal coils. This constitutes the "tragic" type, in which there is a sudden large hemorrhage and the patient goes into collapse. (From Dickinson: American Textbook of Obstetrics.)

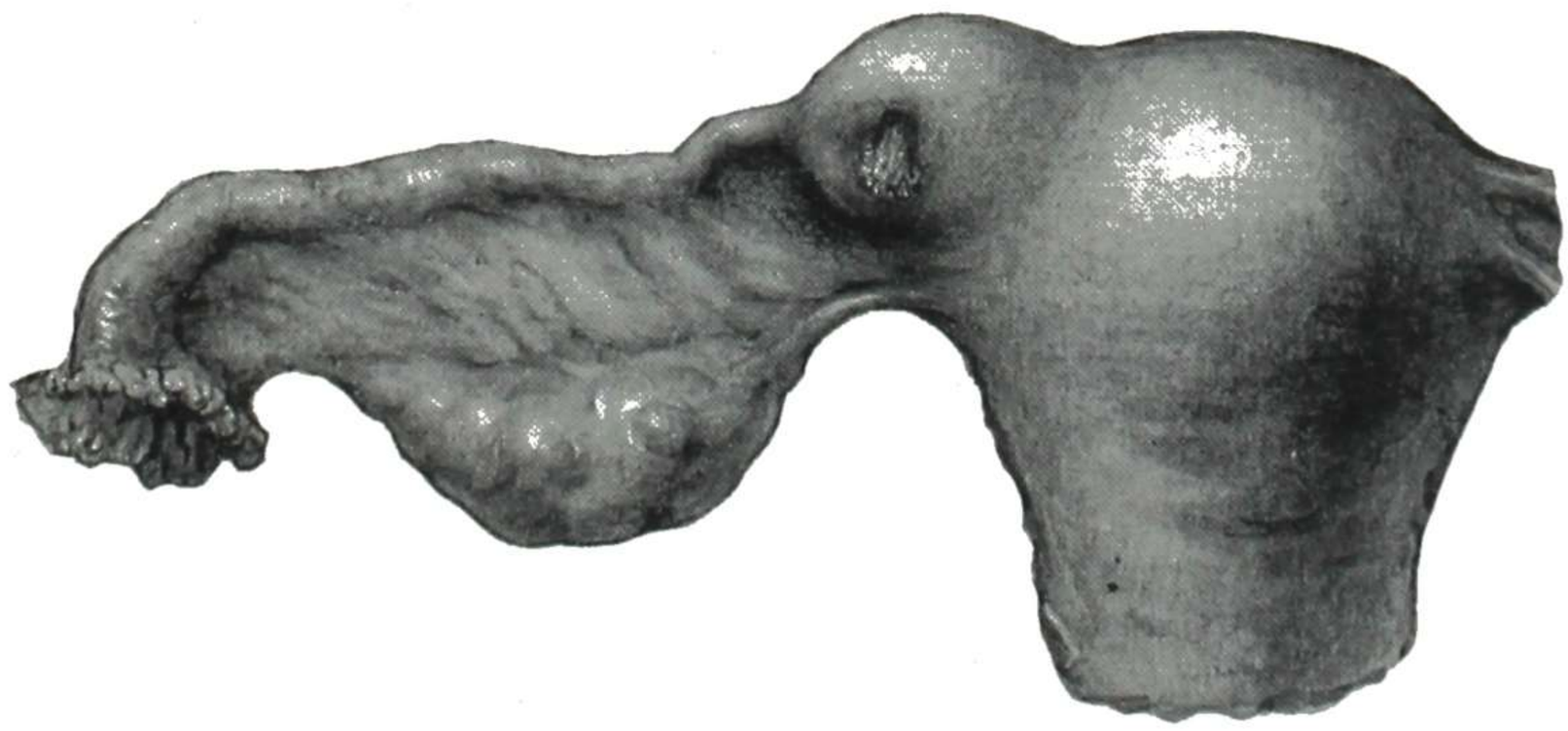


Fig. 804.—Tubal pregnancy in the narrow portion of the tube (isthmus) close to the uterus. This is the type in which the primary hemorrhage is likely to be very severe. Gyn. Lab.

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 developing ovum is situated near the uterus, in that portion of the tube known as the "isthmus," as in Fig. 804. 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.

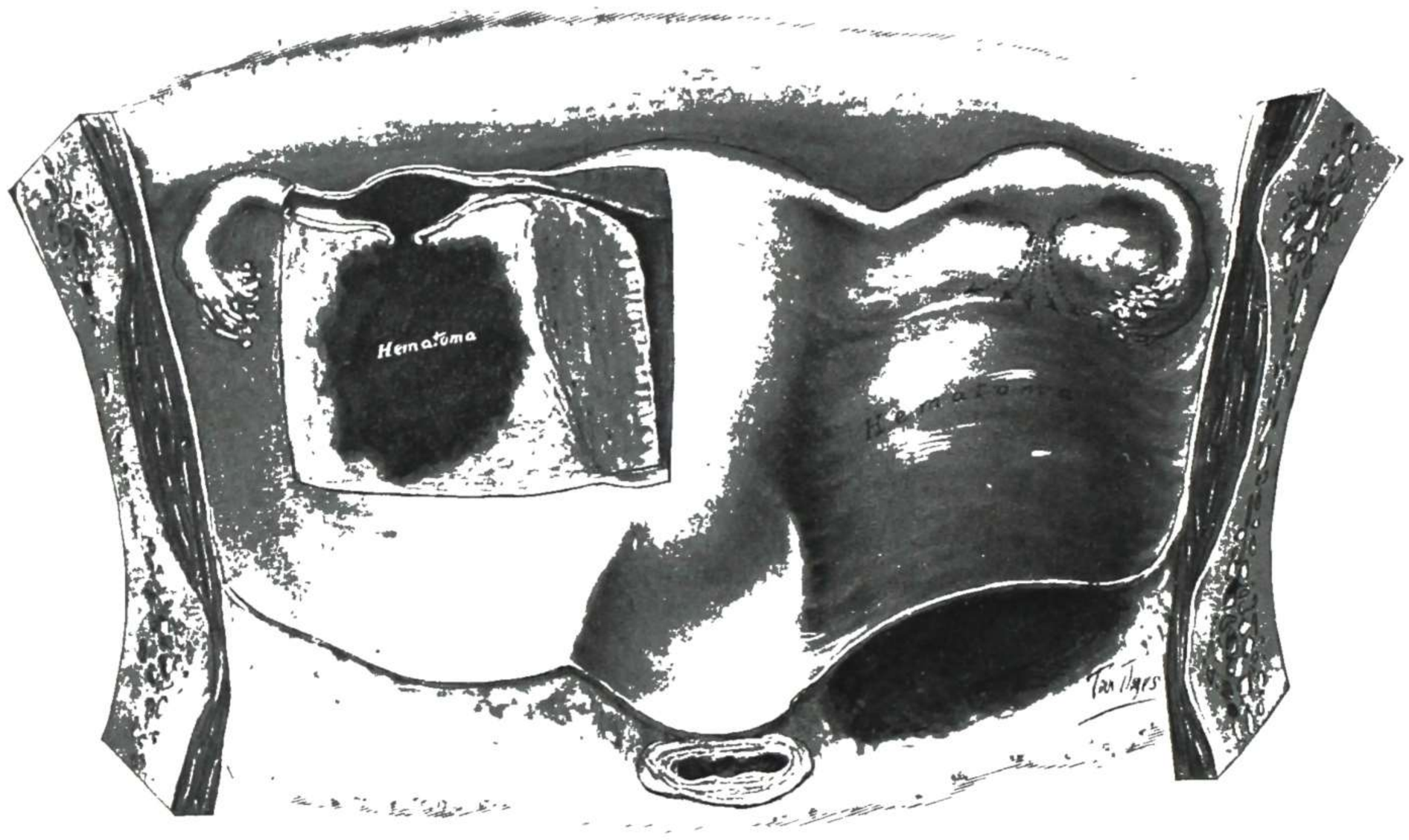


Fig. 805.—Hematoma. In the left broad ligament is indicated a small hematoma from rupture of the tube. In the right broad ligament is indicated a much larger hematoma.

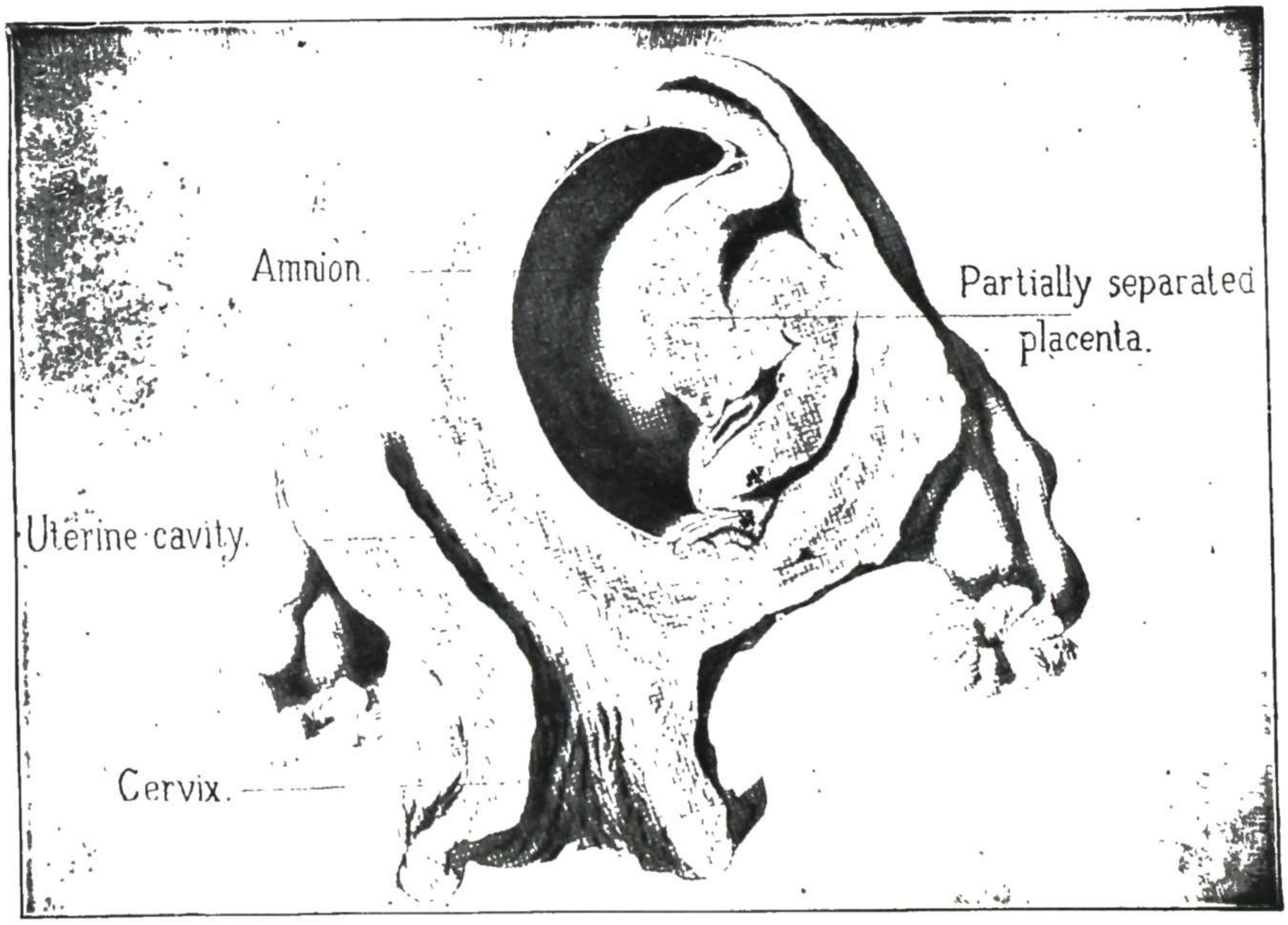


Fig. 806.—Interstitial pregnancy. (After Bumm, from Williams: Obstetrics.)

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.

805. 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." If this type of pregnancy is very far advanced (after four months), the difficulty in controlling the bleeding at operation is great; in a case of ours it was necessary to leave a pack in and marsupialize it. The recent development of absorbable cellulose gauze impregnated with clotting substances such as "Oxycel" or "Gelfoam" should facilitate the handling of these difficult cases.

7. Interstitial Pregnancy.—When the ovum lodges and develops in the interstitial portion of the tube, the resulting condition is known as "interstitial pregnancy." This is peculiar in that the development takes place within the wall of the uterus, though outside the uterine cavity (see Fig. 806). 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.

Dill and Martin have recently described this condition as "angular pregnancy" and they give an excellent review of the subject. They were able to find only 10 cases in 25,000 obstetrical admissions to the Gallinger Municipal Hospital covering a period of ten years.

8. Ovarian Pregnancy.—If the developing ovum is found within the ovary, it constitutes "ovarian pregnancy," of which there are less than 100 well-substantiated cases.

Mann, Meranze, and Leff reported the only case seen at the Mount Sinai Hospital of Philadelphia in a period of twenty-five years.

Spiegelberg in 1878 outlined the following criteria for true ovarian pregnancy: (1) The tube must be normal and intact and have no organic connection with the gestation sac. (2) The tumor must be connected with the uterus by the uteroovarian ligament. (3) The walls of the sac must contain graafian follicles and the albuginea of the ovary must pass directly into the tumor wall. (4) The embryo should be in situ.

It is through the courtesy of Dr. John Lucius McGehee of Memphis, Tennessee, who sent the specimen to me, that I reported the case shown in Fig. 807. An unruptured ovarian pregnancy was reported in 1948 by Preston.

9. Abdominal Pregnancy.—This is a general term to designate cases of pregnancy developing in the peritoneal cavity, with or without connection with the tube or ovary. A report, "Abdominal Pregnancy," was written by Beacham and Beacham with a review of twenty cases treated at the Charity

Hospital of Louisiana during an eight-year period ending in 1945. The incidence was one to 2,081 deliveries; there were nine cases of pregnancy of eight to nine months' duration.

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. Schumann cited an unusual case reported by Conaway in which the pregnancy went to term while confined within the tube.

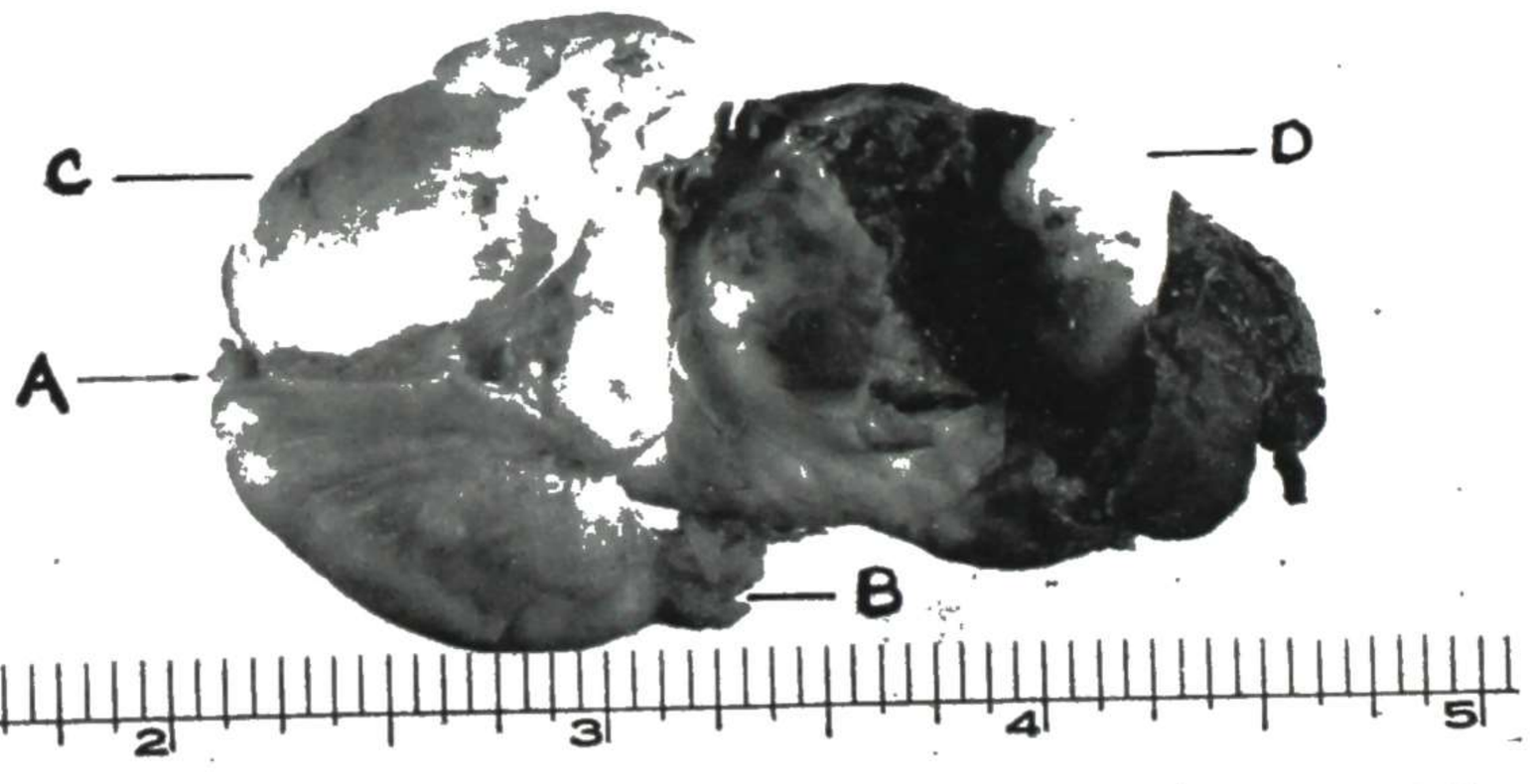


Fig. 807.—The tube is seen to the left of the picture with the uterine end of the fallopian tube at *A* and the fimbriated end of the tube at *B*. Note that this fimbriated end of the tube is not adherent to the ovary. The fetal sac in the outer portion of the ovary is easily seen and the embryo is present at *D*. The inner pole of the ovary is the portion labeled *C*. (Specimen through courtesy of Dr. J. L. McGehee, Memphis, Tenn.) (From Crossen: Am. J. Surg., December, 1947.)

Beacham and Beacham collected 46 cases from the literature and 9 from their series in which the age of the fetus was judged to be over 8 months; in these, 18 of the reported group and 2 of their own series lived. Many of the babies who live have clubfeet and other congenital abnormalities; Jarcho reports one child with bilateral pes valgus, congenital dislocation of the right hip, and inadequate development of the acetabulum in which all abnormalities were corrected surgically and the child was well and normal in other ways at eighteen months. This report appears in a most comprehensive review of "Ectopic Pregnancy With Special Referenee to Abdominal Pregnancy" by Jarcho. H. Hudnall Ware, Jr., gives an excellent review of late extrauterine pregnancies and reports thirteen cases of his own.

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.

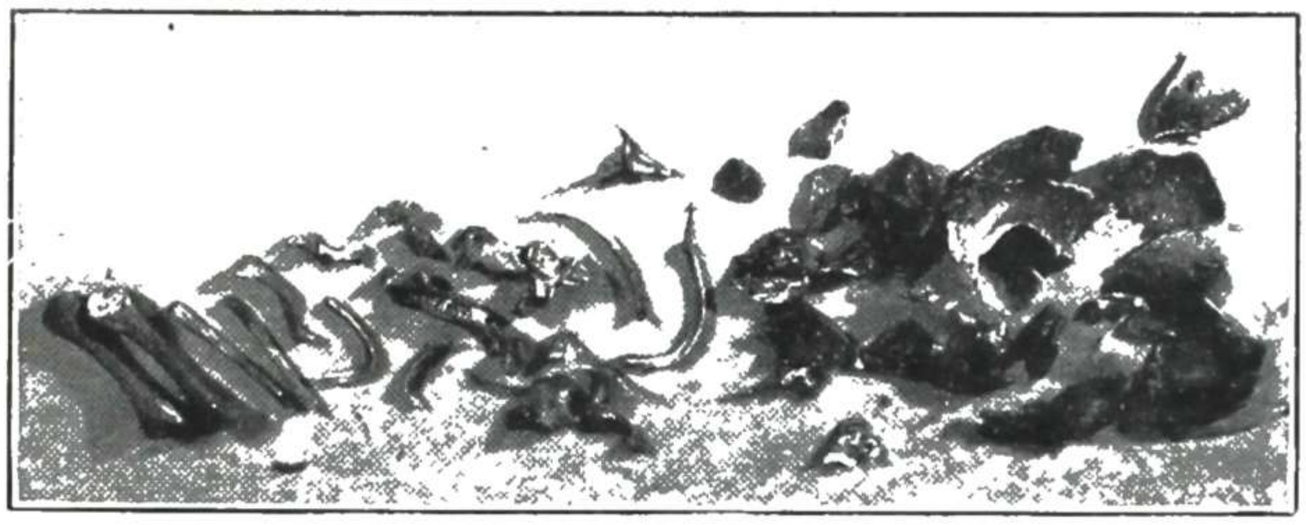


Fig. 808.—Bones removed from the rectum in a case of ectopic pregnancy. The ectopic pregnancy terminated by skeletonization of the fetus and extrusion into the rectum. (From Gustafson: J. A. M. A.)

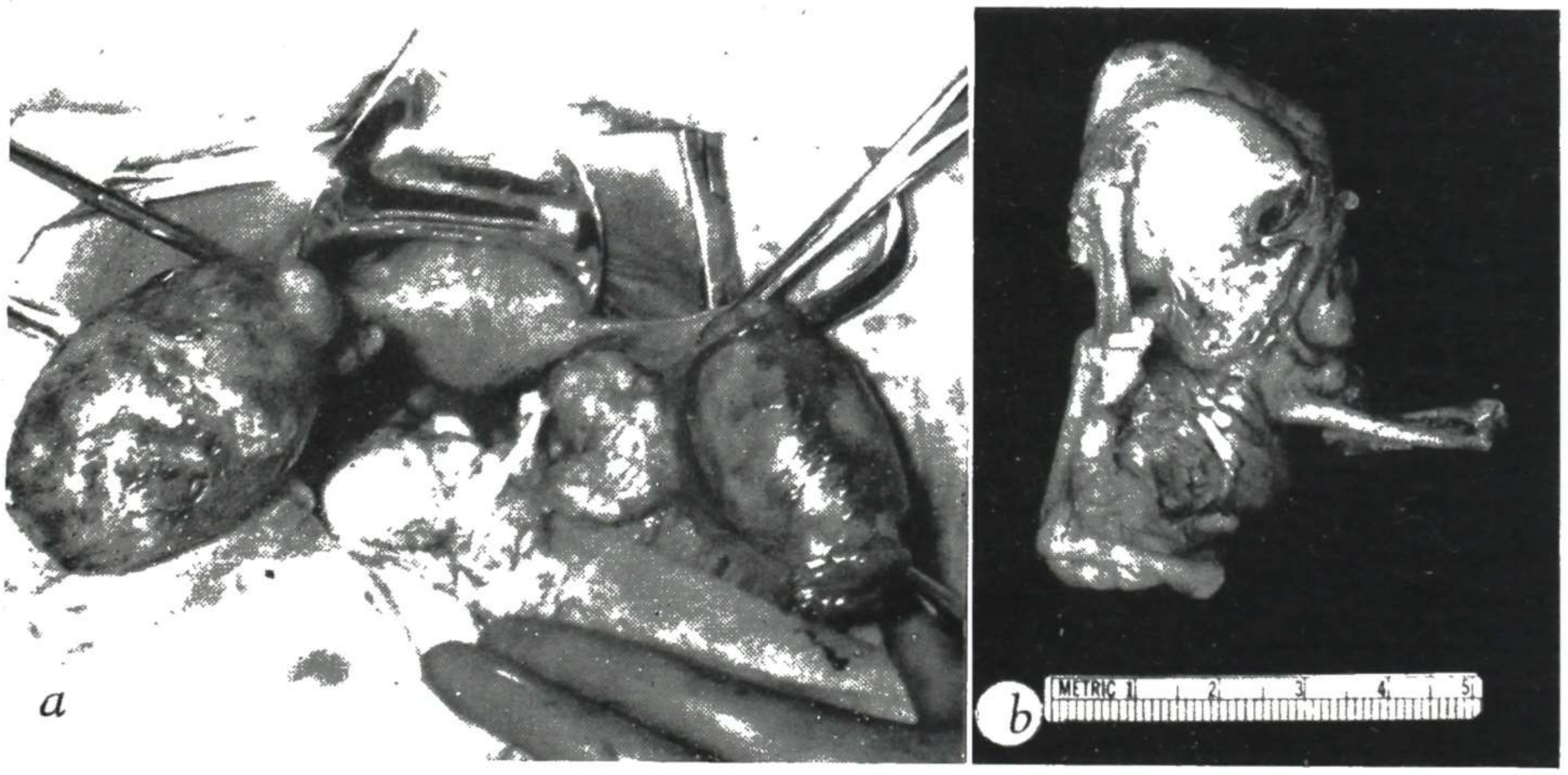


Fig. 809.—*a*, Lithopedion has been lifted slightly from its position in the cul-de-sac; the right fallopian tube was the site of a recent ectopic pregnancy, while the left tube contained organized placental tissue; *b*, lithopedion removed. (From Anderson, Counsellor, and Woolner: Am. J. Obst., August, 1951.)

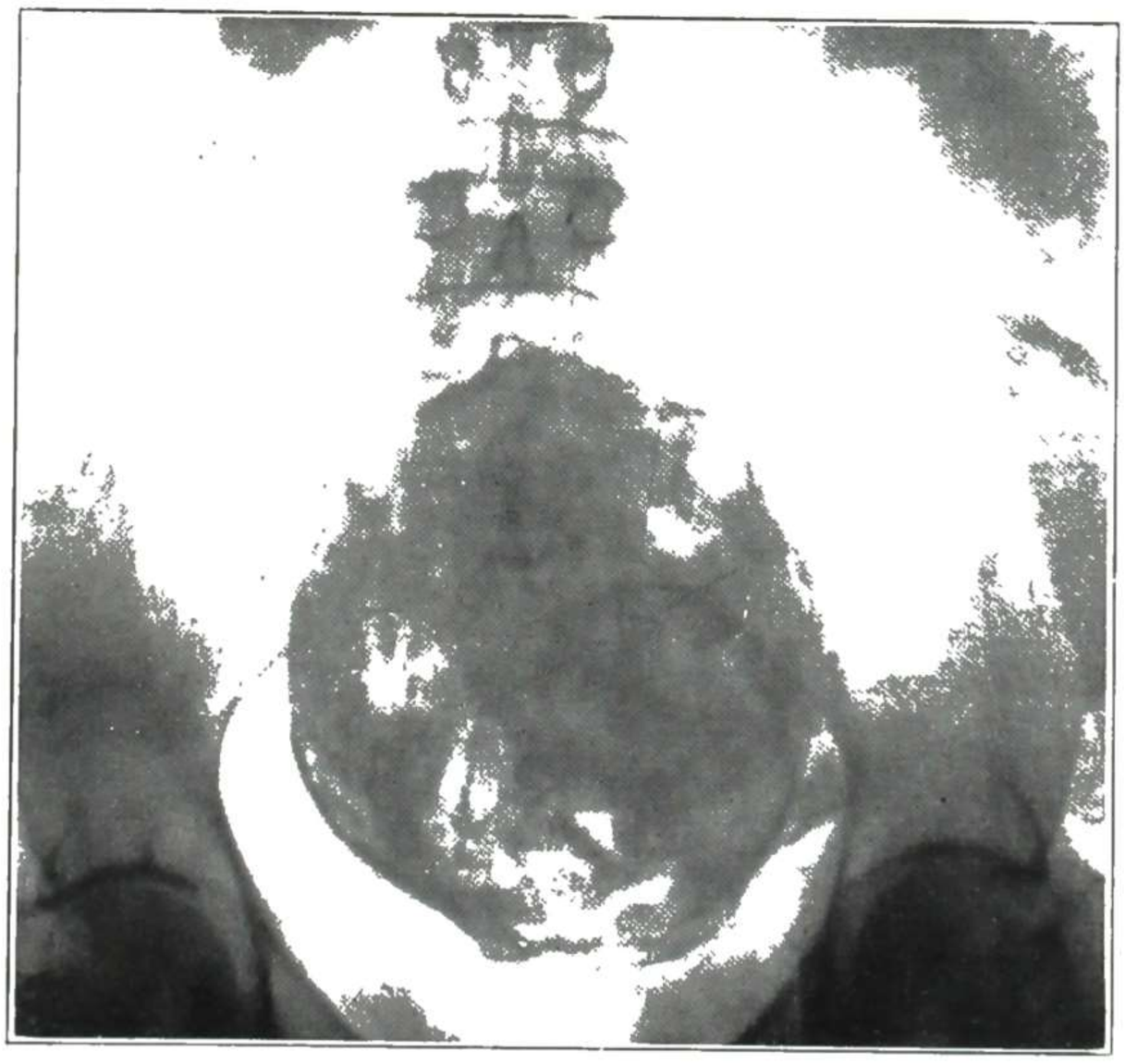


Fig. 810.—X-ray of a calcified tumor mass containing fetal bones. This was an eight months' extrauterine pregnancy, calcified and retained for forty years. (From Titus and Eisaman: Am. J. Obst. & Gynec.)

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. 808 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. 809, *a*, and outside in Fig. 809, *b*. 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. 810.

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.

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 and signs suggestive of an ectopic pregnancy are as follows:

1. **Pain** seems to be the most constant symptom; it was present in 92 per cent of the 130 cases reported by Bell and Ingersoll, and the chart (Fig. 811) shows the incidence of pain, bleeding, and weakness in the 1,059 cases reported by Beacham et al. Fig. 812 from the latter article shows the distribution of the pain and the type of onset.

2. A **missed period** is usually given as one of the important points in diagnosis, and Beacham found that 37.5 per cent of his patients were six to eight weeks beyond their period. Bell and Ingersoll, on the contrary, found that one of their most striking findings was the almost universal absence of amenorrhea as interpreted by the patient or physician. There are, however, some disturbance in menses and irregular bleeding associated with pain. Careful questioning is needed to determine whether there has been a missed period. After two months other signs of pregnancy are present.

3. **Bleeding** was the second most dependable symptom and in most cases it is preceded or followed by pain. 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.

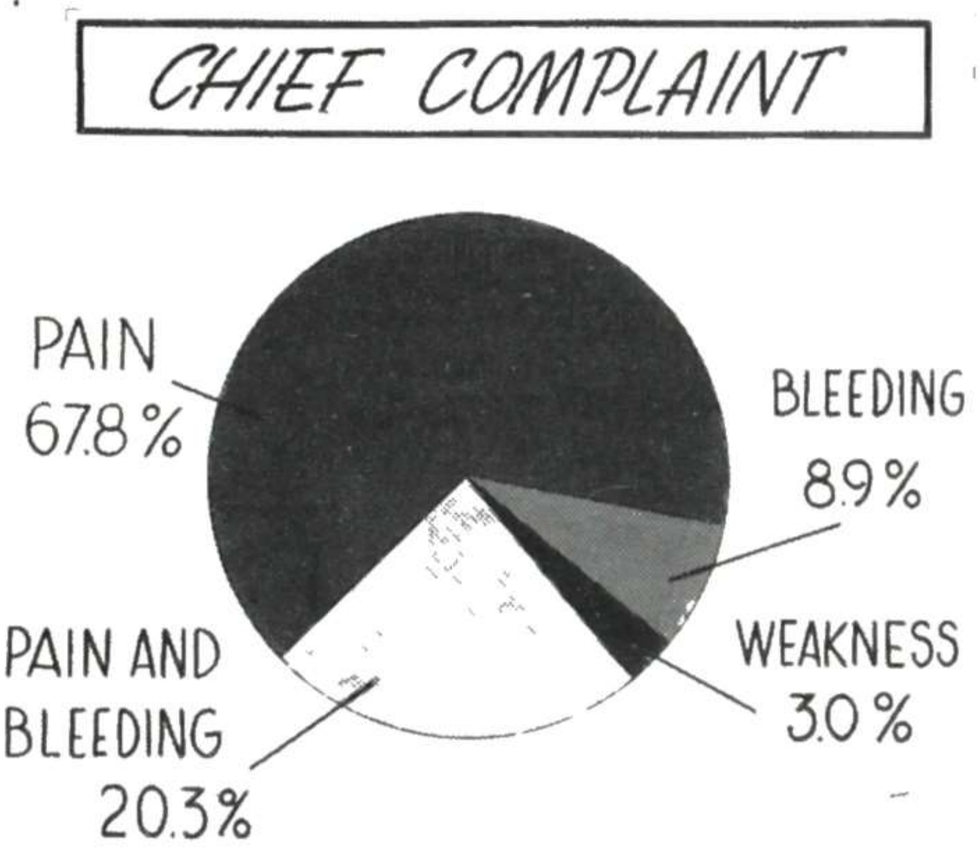


Fig. 811.

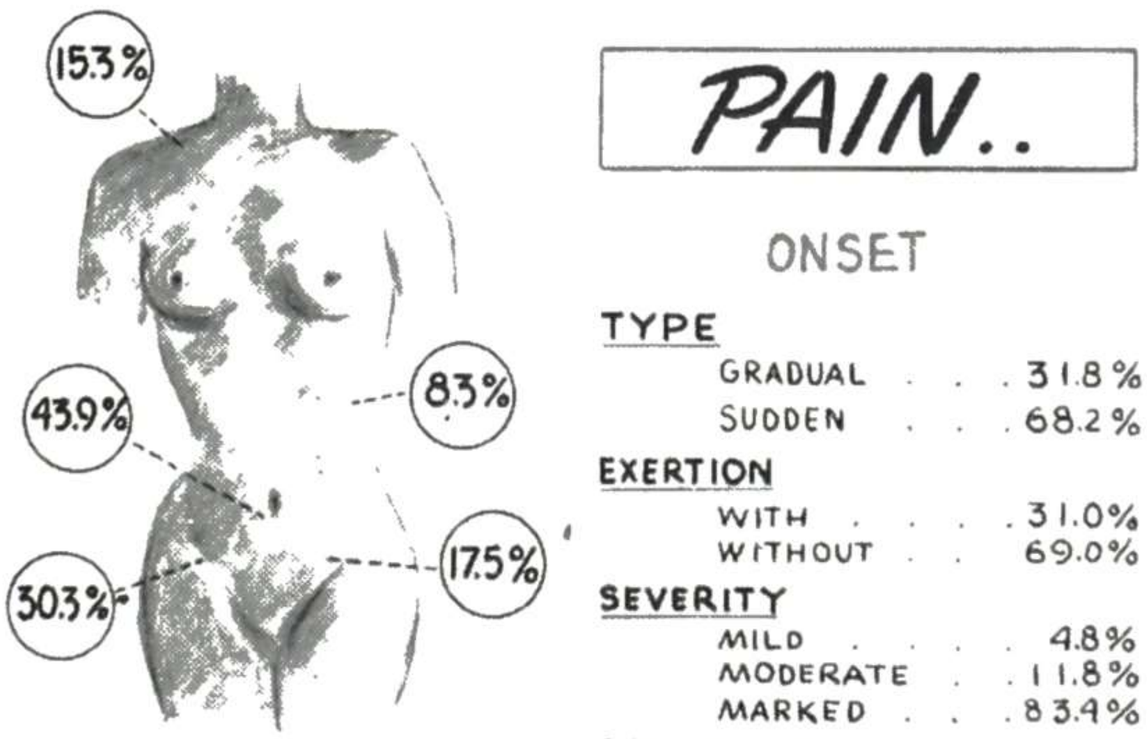


Fig. 812.

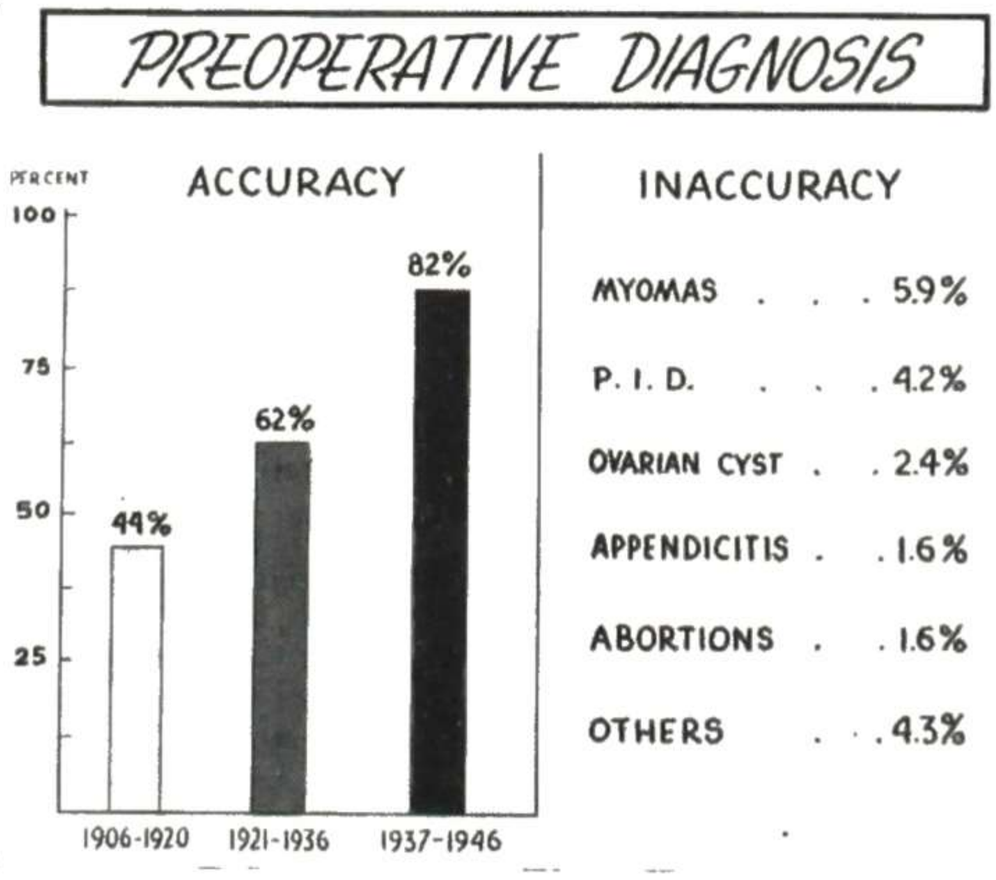


Fig. 813.

Figs. 811 to 813.—(From Beacham, Collins, Thomas, and Beacham: J. A. M. A., Feb. 7, 1948.)

4. A **tender mass** may be well out in the adnexal area or in against the uterus laterally or posteriorly. The cervix is tender on motion and the abdomen is tender. In the absence of an inflammatory condition, pain on bowel movement and pain on motion of the cervix strongly point to an ectopic pregnancy.

5. **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. In the series mentioned above, 13 to 15 per cent of the cases were in shock when first seen.

Other aids in establishing a diagnosis are the pregnancy test and culdocentesis (cul-de-sac puncture) and curettage.

The pregnancy test, if positive, merely indicates the presence of a pregnancy, but if intrauterine pregnancy can be ruled out in a case with a tender adnexal mass, it is strongly suggestive of an ectopic pregnancy.

There have been many and varied opinions of the wisdom of utilizing cul-de-sac puncture as an aid in diagnosis of extrauterine pregnancy. It has been felt that the danger of infection outweighed its value as a diagnostic measure, but the excellent results obtained in recent series without harmful complications have established it as a valuable aid in diagnosis in cases where there is blood in the cul-de-sac. In 1951 Beacham and Beacham in an excellent article giving technique (illustrated in Chapter 11) reported on the results in 500 cases of culdocentesis done at the Charity Hospital in New Orleans. In the 194 cases in which hemoperitoneum was present, failure to obtain blood on aspiration occurred in 4.8 per cent. In over 500 aspirations, misinterpretation led to unwarranted laparotomy in 6 cases, but there were no deaths from misdiagnosis or complications. There were two cases in which needling might have been involved in causing abscess, but both of these had findings compatible with pelvic infection at the time of the needling.

The technique used by these workers is given in Chapter 11 together with the method of interpreting the findings. The improvement in the accuracy of the preoperative diagnosis over the years is seen in Fig. 813. In their more recent paper the accuracy for 92 cases aspirated over a period of thirteen months, ending February, 1950, was 95 per cent. Word, in a recent series, had a 90 per cent accuracy in 53 cul-de-sac punctures.

Curettage is discussed below.

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 or has some spotting or abnormal flow. 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 pregnancy test 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. (4) Curettage may be helpful if decidua with no villi is formed; however, if the decidual cast has been passed prior to the curettement, there may be no decidua present.

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 surprisingly 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 com-

bination 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.

An 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. Nandi reported a case of combined full-time intrauterine and extrauterine pregnancy with survival of the mother and both children.

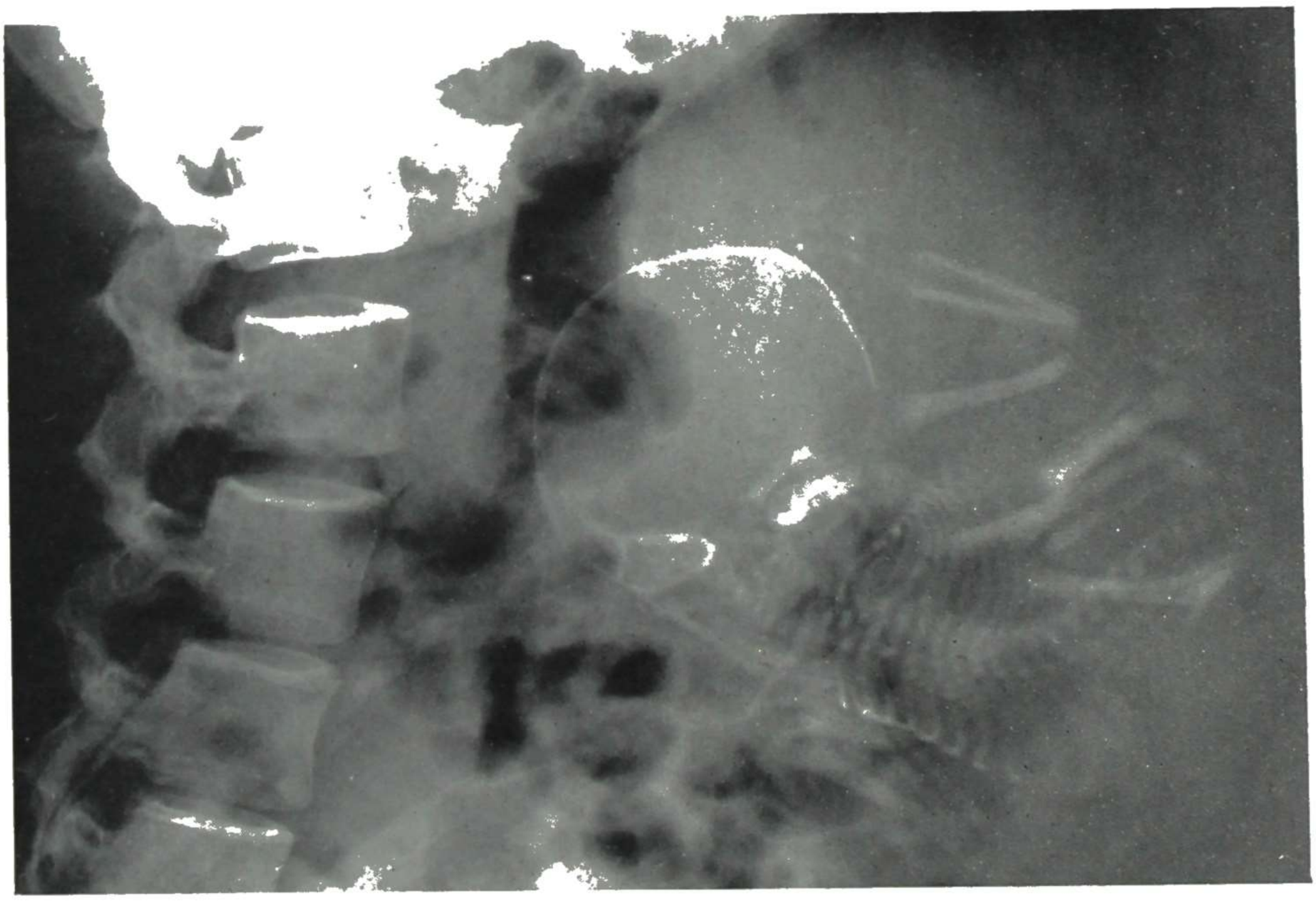


Fig. 814.—This is a case of abdominal pregnancy showing the so-called "flying fetus" attitude of the fetus. (Courtesy Dr. Willard Allen.)

The bizarre position of the fetus seen on x-ray has been termed a "flying fetus"; Fig. 814 shows a case of Willard Allen's.

A rare type of ectopic pregnancy is that occurring in the cervix. Schneider reviewed the literature up to 1946 and added two cases of his own. The diagnosis is conclusive only in cases where it is possible to prove that the placenta lies exclusively within the cervix. In reviewing the reported cases Schneider found only 10 proved cases, and with the two he reported the total came to twelve. These patients usually bleed early in the pregnancy, and the diagnosis is made by exposing the cervix and removing the mass from it; then by pal-

pation the internal os is found closed, showing that the pregnancy is entirely within the cervical canal. Packing will usually control the bleeding. Vogt, Forster, and Travis had one such case at St. Louis City Hospital (Fig. 815).

Another rare condition is pregnancy after a supravaginal hysterectomy; Melvin Roblee had one such case on the service at Washington University. The placenta was implanted in the lower uterine segment and cervix, and the amniotic sac was encased beneath the bladder peritoneum which had been sewed over the cervical stump.

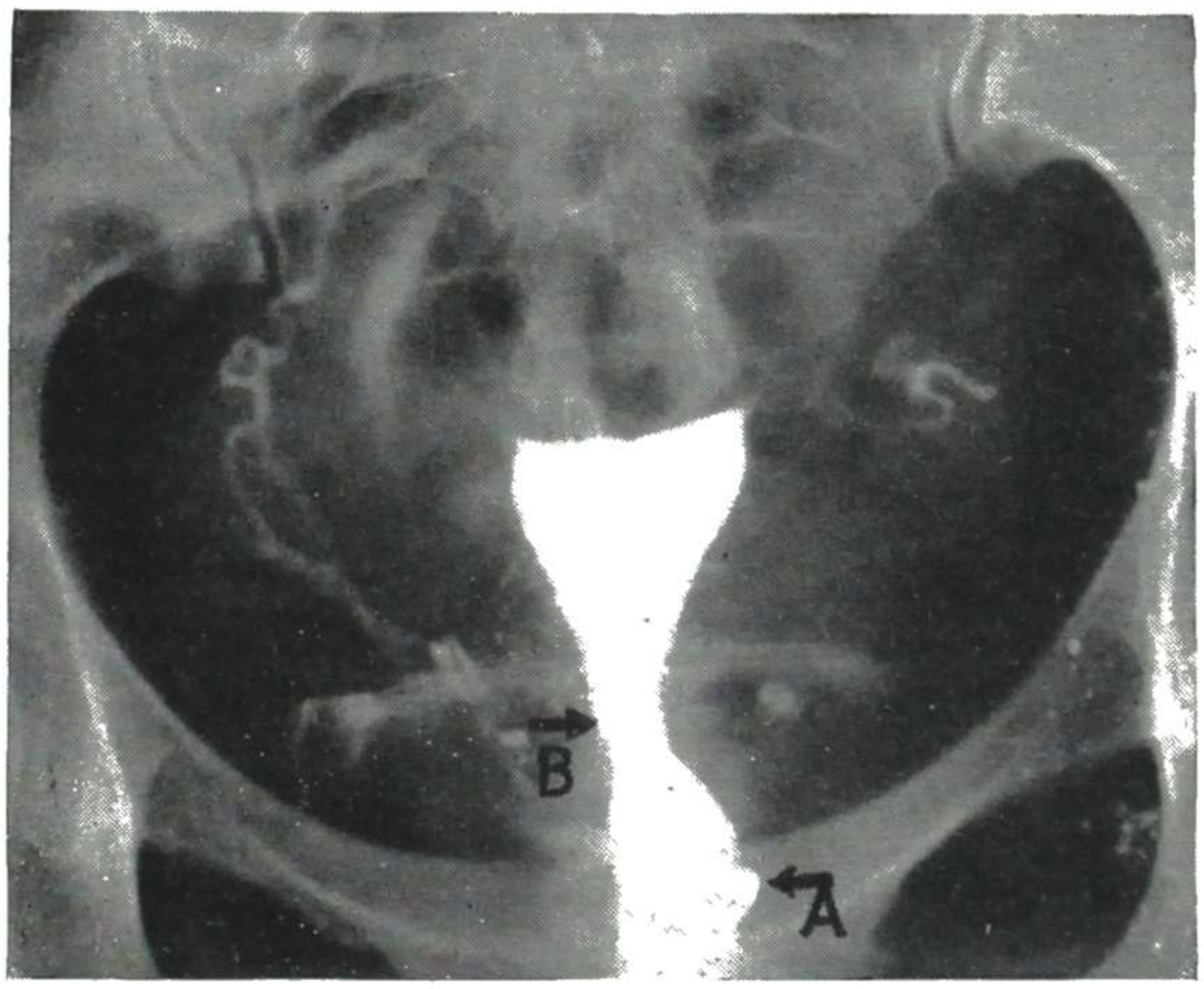


Fig. 815.—Hysterosalpingogram using sodium iodide showing cervical ballooning and retrograde venous flow of the opaque solution, six days following dilatation and curettage. *A*, Cervix. *B*, Internal os. (From Vogt, Forster, and Travis: Med. Bull. St. L. U., April, 1952.)

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. 800).—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. The pregnancy test becomes negative in several weeks.

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 prob-

ably 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 hematocele 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 Intraperitoneal Hemorrhage (Fig. 802).—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 Intraperitoneal Hemorrhage (Fig. 803).—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 immediately 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 ½ grain 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 border line 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. 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. It is preferable, however, to use other blood for the transfusion, and leave the fluid peritoneal blood to be absorbed from the peritoneal cavity.

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. Because of the almost universal use of blood banks by hospitals, plenty of blood should be available, and it can, if necessary, be given through several veins at the same time so as to obtain a rapid replacement of blood loss. The decrease in mortality can be attributed, to a large extent, to the availability of blood and antibiotics. The mortality in Beacham's series was reduced from about 6 per cent to 2 per cent following the introduction of the blood bank.

5. Pelvic Hematoma (Fig. 805).—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 to get 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*. As a general rule, it is best to ligate the cord close to the placenta and leave it in, closing the abdomen without drainage. If, however, it is wholly attached to removable structures, it can then safely be removed.

The mortality in abdominal pregnancies in Beacham's series was zero for the 19 cases operated upon, and that of Ware was 25 per cent in 12 cases.

OTHER PELVIC 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 hematocele." 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.

In order to determine the subjective reactions produced by experimental introduction of blood into the peritoneal cavity, Mengert et al. introduced intraperitoneally varying amounts of blood and other fluids into patients on whom a laparotomy was scheduled the following day. On introduction of 300 c.c. of fluid or blood, the patient complained of fullness of the abdomen and a desire to belch. When more than this amount was injected, the patient complained of moderate to severe pain. After the initial injection it was possible to reproduce the pain by injection of much smaller amounts of blood. In every instance this pain disappeared within two hours but the tenderness to deep palpation persisted somewhat longer. Their conclusions as to the clinical value of this work were as follows:

> "It may be stated that in patients with suspected intra-abdominal hemorrhage, continuance of the complaint of fullness and pain indicates continuing or repeated hemorrhage. The pain response of the patient depends on her emotional threshold, and apparently on the quantity and not the character of the injected material. In three patients

with massive accidental hemorrhage, the complaint of pain or fullness was conspicuously absent. Apparently the shock resulting from loss of quantities of blood into the peritoneal cavity dulls the sensorium, and therefore abolishes the reaction of pain.''

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. Taniguchi and Kilkenney give in tabular form the signs and symptoms found in 19 cases of hemoperitoneum due to rupture of a corpus luteum. 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 cysts 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 are 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. It has been stated that pelvic tuberculosis is invariably due to the bovine type of bacillus and that the source of the infection is rarely found in the lung or the intestine. Jedberg in 191 cases found that 179 were bacteriologically positive. One hundred and sixty-six were of the human type, twelve were of the bovine variety, and the remaining one was unidentified owing to secondary infection. There may be secondary involvement of the tubal peritoneum and adjacent structures. It is usually bilateral.

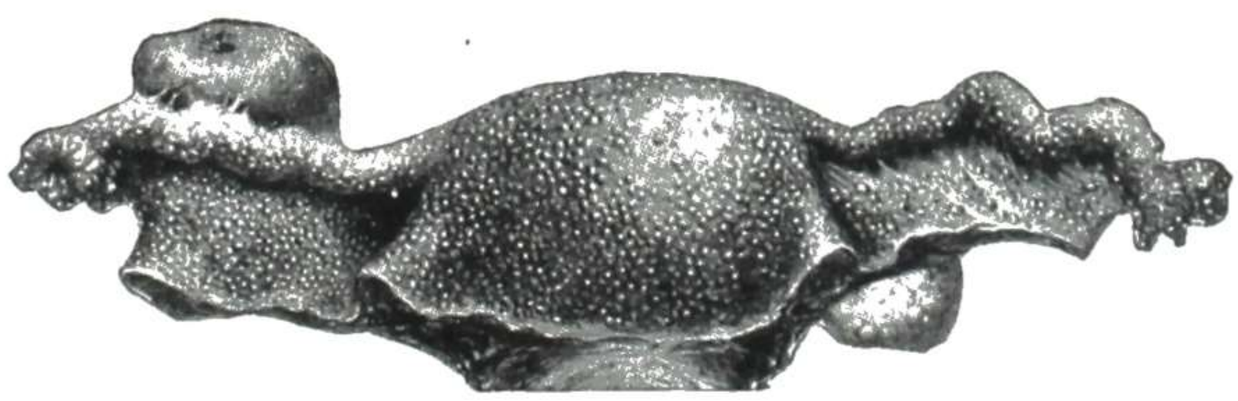


Fig. 816.—Peritoneal tuberculosis. (From Kelly: Operative Gynecology.)

The ovaries seem to have some resistance to this infection, but when they are involved it is usually by extension from the infected tubes. Associated uterine tuberculosis was found in about 50 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. It is now generally recognized that endometrial tuberculosis is more common than formerly suspected (Sharman; Sutherland; Russell et al.; Levine and Kurland) and that the tubes in these cases are frequently free of the disease. This brings up the still unanswered question as to whether the lesions in the lower genital tract and endometrium may not be the primary focus of the infection. As mentioned in Chapter 6, Wood found that the tubes were involved in 100 per cent of the cases of endometrial tuberculosis. Certainly in by far the majority of cases the tubes are involved secondary to a focus elsewhere, and in every case a distant primary focus (usually in the lungs or intestinal tract) must be ruled out before the pelvic lesion can be considered primary. Occasionally the primary lesion in the lung or elsewhere has been asymptomatic and has healed before there was any clinical evidence of it; then later, due to some general or local lack of resistance, this original focus becomes active and hematogenous

spread occurs. Direct spread to adjacent organs and the peritoneum may occur (Fig. 816). Uterine tuberculosis is considered under uterine diseases in Chapter 6.

Pathology

In his book *Gynecological and Obstetrical Tuberculosis,* Jameson describes three forms of intratubal tuberculosis: (a) miliary tuberculosis of the mucosa, (b) chronic fibroid tuberculosis, and (c) chronic diffuse tuberculosis.

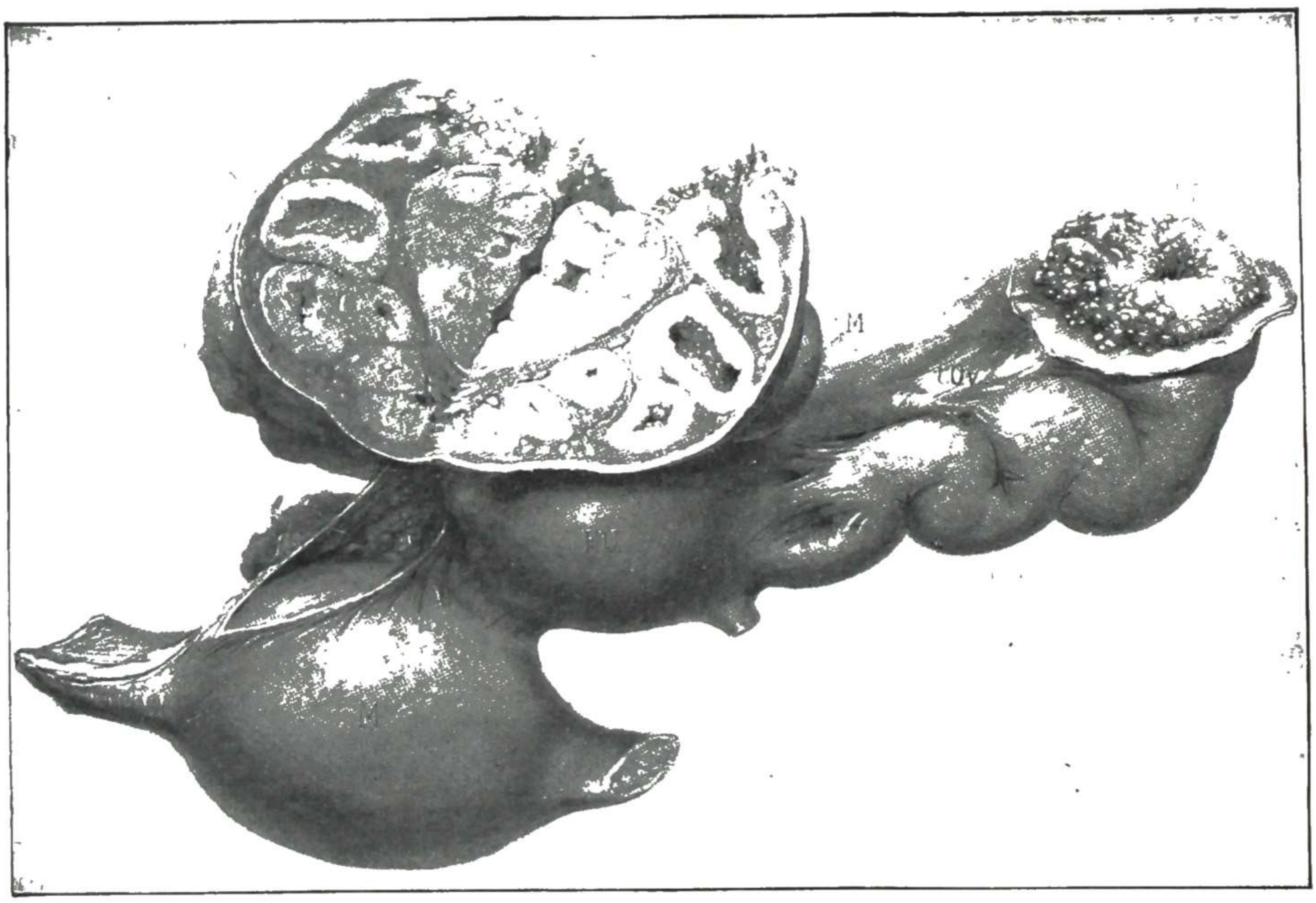


Fig. 817.—Tubal tuberculosis. (From Kelly: Operative Gynecology.)

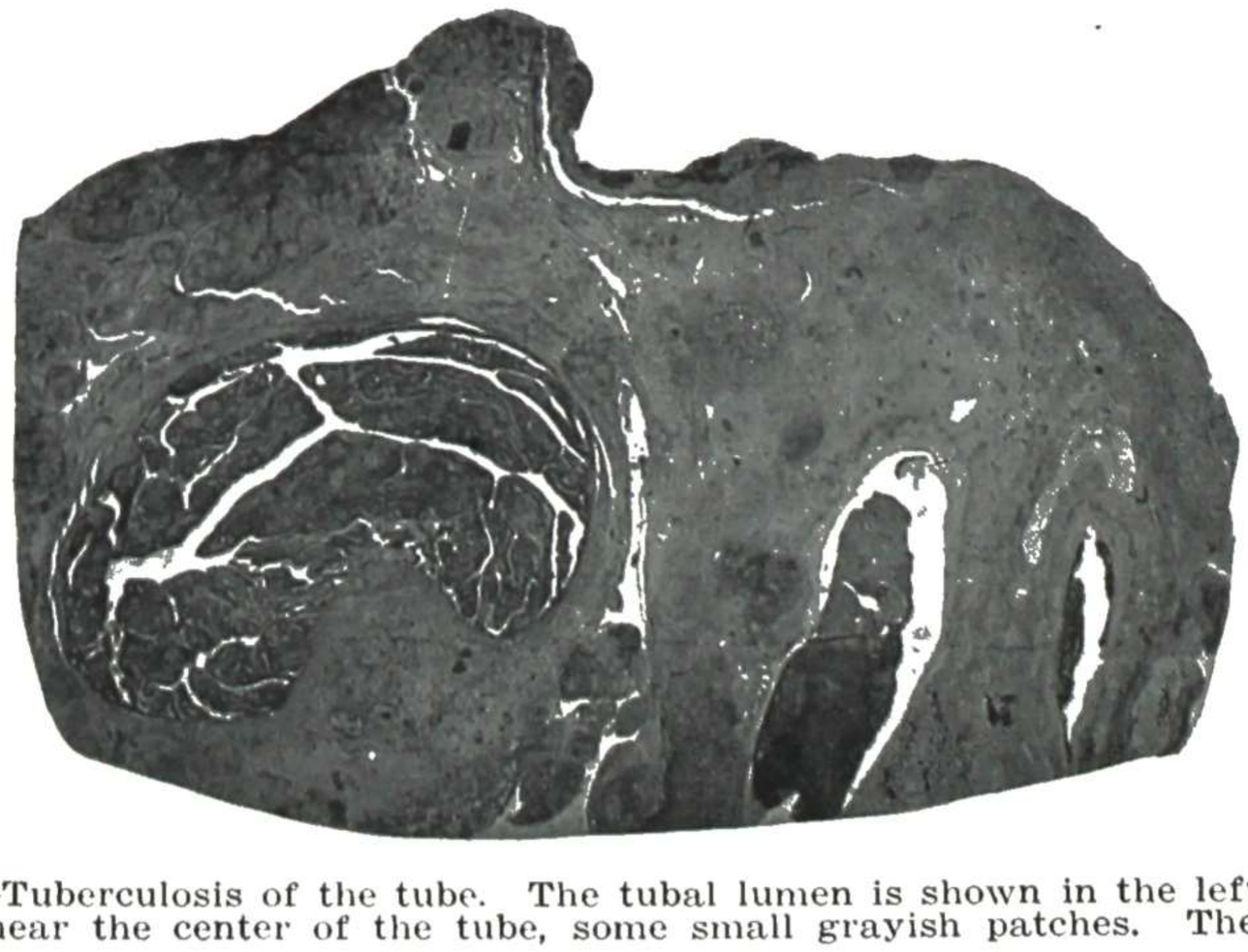


Fig. 818.—Tuberculosis of the tube. The tubal lumen is shown in the left half. Notice in the solid area near the center of the tube, some small grayish patches. These are tubercles. Gyn. Lab.

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. 817 and 818.

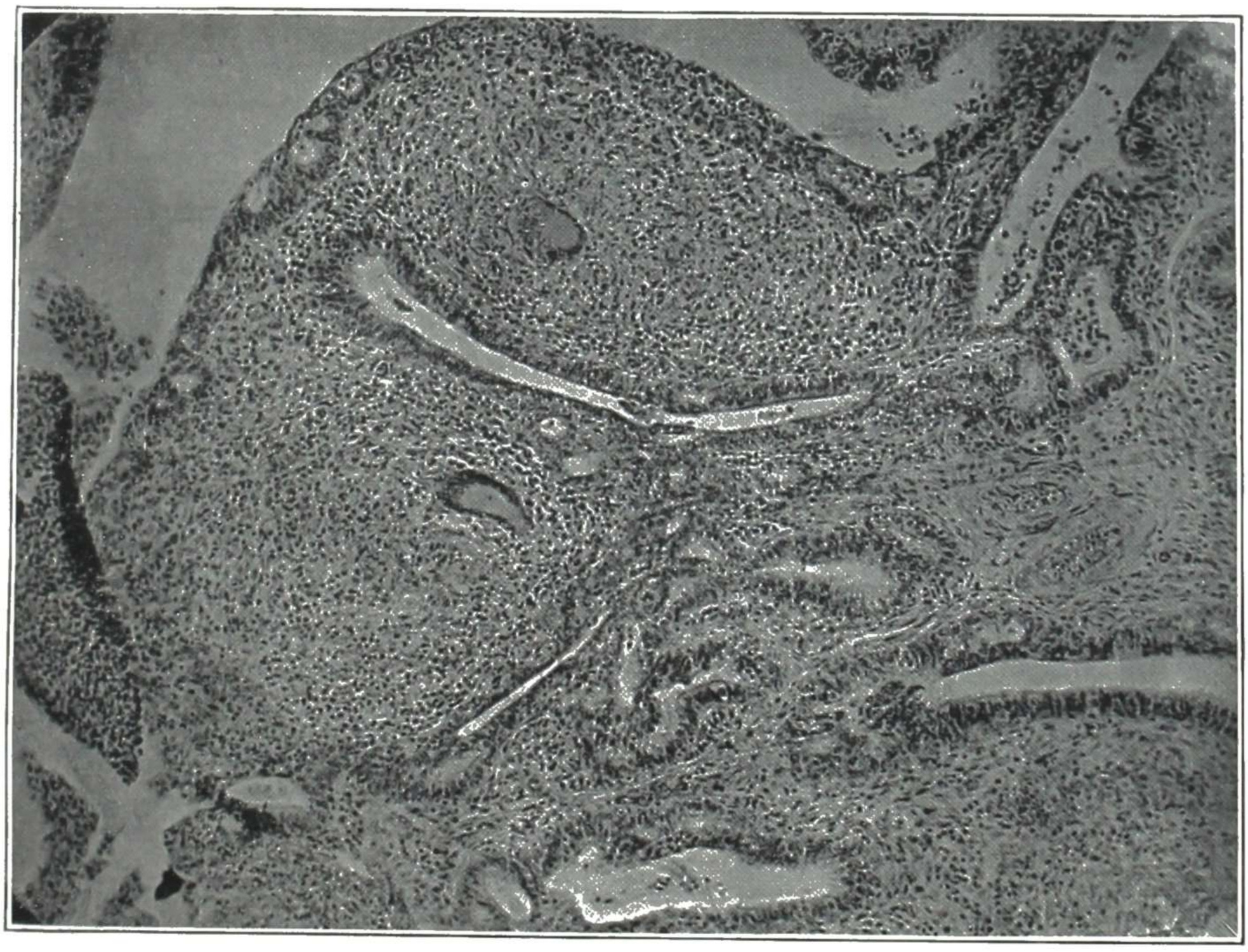


Fig. 819.—Tuberculosis of the tube. High power of the specimen shown in Fig. 818. Notice the typical tubercles containing giant cells. Gyn. Lab.

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. 819.

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 ex-

amination unless routine sections are made from different parts of the tubes. It is not an uncommon experience to have a diagnosis of tuberculosis on microscopic examination of tubes or myomatous uteri in cases where the operator had no suspicion of the presence of tuberculosis. In a recent review, "Genital Tuberculosis in the Female," Haines discussed the incidence, etiology, and pathology, and Stallworthy discussed the clinical features of this disease.

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.

As noted in Chapter 2 under the use of oily solutions for hysterosalpingorrhaphy, Rubin called attention to the fact that in some cases a foreign-body reaction occurs with numerous giant cells present and this is sometimes incorrectly diagnosed as tuberculosis.

Incidence

In some of the older reports the incidence of tuberculous salpingitis in cases with salpingitis was given as 5 to 6 per cent, but in more recent series it is given as 1 to 3 per cent. Hundley et al., in 1,069 cases with salpingitis, found 19 cases due to the tubercle bacillus, an incidence of 1.7 per cent. His series covered the period from 1939 to 1949, and he feels that the lower rate is due to better education on the whole subject of prevention and mass x-ray screening of the population. Vierira in Chile found an incidence of 1.9 per cent of 1,710 gynecologic patients and 14.7 per cent of those with pelvic inflammatory disease.

The age incidence in 40 cases of pelvic tuberculosis studied by Russell et al. was within the age group from nineteen to thirty-nine, with only two cases occurring after thirty-nine.

Symptoms and Diagnosis

As with tuberculosis elsewhere in the body, pelvic tuberculosis may be completely asymptomatic. A careful history is essential as the patient's primary infection may have occurred years ago when she was a child and it may be completely quiescent when seen with the pelvic lesion.

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. Hundley et al. diagnosed one-third of their cases preoperatively.

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. Infertility is one of the most constant findings in tubal tuberculosis. In his studies Sharman found an incidence of 5 per cent of endometrial tuberculosis in routine endometrial biopsies for sterility, Sutherland found an incidence of 1 per cent, and Russell had an incidence of 1.3 per cent.

There is a difference of opinion on the question of diagnostic curettage in cases of suspected tubal tuberculosis. In one-third of Russell's cases of tubal tuberculosis the endometrium was not affected.

The danger with curettage is that it may cause a miliary spread of the disease, but Russell feels that if the procedure is preceded and accompanied by streptomycin medication, the diagnostic value of biopsy far outweighs its potential danger. Prolonged unexplained amenorrhea should always be suspected of endometrial tuberculosis.

4. Evidence of tuberculosis elsewhere was detectable in only 7 of the 40 cases reported by Russell et al., though a careful history revealed primary early infection in many other cases. Night sweats, gradual unexplained weight loss, and other symptoms of tuberculosis merit a meticulous investigation of all possible sources.

5. Wetterdahl in 1924 emphasized the point that patients with tubal tuberculosis have an elevation of temperature during the menstrual period, while those with other types of tubal infection do not show a similar variation. Many studies on the premenstrual rise of temperature have been made with varying conclusions, due no doubt to the fact that there is a normal rise of temperature at that time.

6. Menstrual disturbances are common, especially oligomenorrhea, dysmenorrhea, and menorrhagia. Sutherland, in 1,000 cases of abnormal uterine bleeding, found 10 cases of unsuspected endometrial tuberculosis.

7. 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 glycerin, 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 tests 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?

8. The diagnostic value of cultures of the menstrual flow was investigated by Halbrecht. In 16 women in whom the diagnosis of endometrial tuberculosis had been established by biopsy, 60 cultures were made of the menstrual discharges, and 12 of these were positive for *Mycobacterium tuberculosis.* Five primarily sterile women with negative biopsies showed the bacillus in five of 287 cultures of menstrual blood, and three of 112 cultures of intermenstrual discharge were positive. Kirchhoff et al. obtained positive cultures in 10 of 19 proved cases of genital tuberculosis, and 8 of the 9 cases missed had tubal but no endometrial tuberculosis.

9. Hysterosalpingograms may give some clue as to the diagnosis; most of the evidence has been obtained in cases being investigated for sterility. Though most reports state that there is no typical appearance in cases of tuberculosis, Ko-Chi Sun found rather constant topographic characteristics in six cases in which he made his diagnosis from the hysterosalpingogram. Russell et al. found that the procedure produced no unfavorable reaction in the 18 cases in which they used it, but they felt that it was of little diagnostic value. Ekengren and Rydén diagnosed 75 cases of tubal tuberculosis by the use of salpingograms. In a recent article Rozin discussed the value of x-ray in the diagnosis of genital tuberculosis.

Treatment

The treatment of pelvic tuberculosis depends upon the extent of the disease and the age of the patient. Halbrecht found that the "latent" form discovered by curettage in which there was no palpable evidence of tubal or ovarian involvement responded favorably to streptomycin therapy. In young patients who are asymptomatic with no discernible focus elsewhere, one is justified in withholding further operative procedures, but the patient should be kept under close observation because of the overwhelming evidence that endometrial tuberculosis is rarely primary.

When there is involvement of the tubes and the peritoneum, removal of all the pelvic organs was formerly advised, but in recent years, especially in young patients, it has been found that usually one ovary and sometimes both can be safely conserved; if, however, there is definite involvement of the ovaries, they should be removed. If the involvement is limited to the tubes and endometrial tuberculosis has been ruled out, bilateral salpingectomy with preservation of the uterus may be adequate in young women.

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. The question of operation is based upon a careful preoperative medical evaluation of the case in order to discover distant foci, in the lung or elsewhere. If there is extensive lung involvement, the question as to whether the patient will be benefited or harmed by laparotomy must be decided, and this frequently requires a test of medical therapy in a sanatorium.

When operation has been decided upon, it should be preceded and followed by streptomycin and para-aminobenzoic acid therapy. The dose of these drugs advised by different workers varies. Sered, Falls, and Zummo found that 0.5 Gm. twice a day for six to eight weeks preoperatively made the surgical difficulties usually encountered in genital tuberculosis less formidable, and this treatment was continued after the operation for at least three weeks or longer. Ryden treated a group of 33 sterility patients in whom tuberculosis of the endometrium was found by combinations of streptomycin, para-aminosalicylic acid, and chaulmoogra oil. All of the patients were cured, but 3 had relapses, and the average duration of treatment until negative findings were obtained varied from 28 to 75 days. The antibiotic treatment was followed by operation in 13 patients, usually in an effort to restore fertility. Halbrecht reported on the use of streptomycin in 12 cases. J. A. Stallworthy, in a personal communication, said that of six women with tuberculosis of the tubes and endometrium treated in his department with streptomycin and para-aminosalicylic acid, five have been apparently cured.

Dr. Seymour Monat of our department at Washington University was kind enough to give me the following report on 11 patients with pelvic tuberculosis on the services of Barnes Hospital and Koch Hospital treated by him with streptomycin and para-aminosalicylic acid (PAS).

"A total of 11 patients have been treated thus far with streptomycin. All 11 patients had endometrial and tubal tuberculosis, 2 patients had added cervical disease, and 4 patients had pelvic tuberculous peritonitis. Nine of the 11 patients were completely asymptomatic, and the remaining 2 had evidence of low-grade pelvic inflammatory disease. *None* of the patients had coincident pulmonary disease demonstrable to x-ray.

"In all patients the diagnosis was established prior to hysterectomy by a preliminary diagnostic dilatation and curettage. Thus it was possible to study the efficiency of the antibiotic in ridding the endometrium of the tubercles and associated granulation tissue.

"The impression gained thus far is that streptomycin is very helpful in reducing the number of tubercles and the activity of the associated inflammatory response in the endometrium (and presumably in the tubes as well). However, in 2 of the cases followed for a period of 17 months, tubercles reappeared after they had once been completely eradicated according to sequential endometrial biopsies; the latent period in each case being approximately 12 to 15 months. Consequently the remaining cases were first treated by a preliminary course of 1.0 Gm. of streptomycin given daily and 10 Gm. of para-aminosalicylic acid a day for a period of 3 months followed by a complete abdominal hysterectomy and bilateral salpingo-oophorectomy. Review

of the endometrium and tubes in the laboratory following their removal disclosed evidence of healing as shown by fibrosis and hyalinization of the tubercles with a diminution of the cellular lymphocytic response.

"The most interesting case in this series has been the following:

"A 32-year-old gravida iii, para iii white woman had delivered her third baby in another hospital. Because of prematurity the baby spent the entire hospital course in an isolette and had no further contact with the mother. The baby expired with tuberculous meningitis on its forty-second day of life. The mother, who had been running a low-grade fever, was then curetted and found to have extensive endometrial tuberculosis as well as cutaneous tuberculous metastases. She was admitted to Koch Hospital where evidence of pelvic peritonitis (mild ascites and adnexal masses) was found. Treatment consisted of bed rest, high vitamin diet, etc., and 1 Gm. streptomycin with 10 Gm. PAS for a period of 90 days. Fever and peritoneal signs subsided within 6 weeks but the skin lesions were more stubborn and required ultraviolet-ray therapy in addition before they finally disappeared completely by the 85th day. The patient spent an additional 3 months in the hospital under sanatorial care before being discharged. Endometrial biopsies performed every two months revealed an absence of tubercles and the reappearance of normal cyclic endometrium. She was followed in this manner for 16 months, when one of the biopsies turned up positive again. She was then readmitted to Barnes Hospital, given a short course of preliminary streptomycin therapy and subjected to a panhysterectomy. Sections of the endometrium revealed a small area of disease located in one of the uterine cornua, but the tubes did not show any active disease (at least in the sections obtained).

"The case is presented to show that while streptomycin is very valuable in controlling the disease temporarily, it apparently does not effect a lasting cure."

At the present time Dr. Monat is obtaining endometrial biopsies on all women entering Koch Hospital, which is a hospital for tuberculosis cases, in order to determine if possible the incidence of endometrial tuberculosis in women with proved general tuberculosis. The treatment schedule is also being varied as new facts are discovered in the treatment of general tuberculosis, and at present he is using 1.0 Gm. streptomycin twice a week for four months. It is felt that this dosage schedule is less apt to result in streptomycin-resistant cases and that it is equally as effective as the daily administration of the drug. As can be seen, the treatment has not yet been crystallized, but with the advent of newer and more effective antibiotics and with reports on larger series it is hoped that definite indications and dosage schedules will be forthcoming.

In an editorial in the *Journal of the American Medical Association* the use of the isonicotinic acid derivatives in the treatment of tuberculosis is discussed and a word of caution is given. The main danger lies in the possibility that physicians will attempt to use these drugs as the sole form of therapy to the exclusion of accepted time-tested methods. Another danger is the well-established fact that the tubercle bacillus may develop resistance to the antibiotic, and this has been reported to occur after two to four weeks of therapy.

Supravaginal hysterectomy was formerly advised because it was felt that complete hysterectomy would be more apt to be followed by a tuberculous sinus, but subsequent reports have not proved this assumption to be valid. The abdomen should be closed without drainage unless there is a large collection of pus.

Prior to the discovery of streptomycin, King employed tube drainage when pus was encountered and found that the sinuses healed under conservative treatment with sanatorium care and heliotherapy. Jameson advised roentgen radiation postoperatively, as previously advocated by Edling and Wetterdahl, and found this to be a marked improvement over operation alone.

In 1936 Lenz and Corscaden collected reports of over a thousand cases of pelvic tuberculosis treated by small doses of x-ray and concluded that it alone was superior to surgery in cases where the tuberculosis was localized in the pelvis with little or no ascites, and that it was useful postoperatively in cases with ascites. Campbell, basing his conclusions on the use of x-ray in experimentally produced pelvic tuberculosis in dogs and his results in the human being, felt that it was an important aid in treatment of this condition.

Orlandini made a ten-year survey of the results obtained by x-ray therapy of tuberculosis of the female genitalia at the Institute of Radiology of the University of Parma. The x-ray was used either alone or in conjunction with surgery in 138 cases, and, of these, 80 per cent showed either clinical cure or improvement.

To my knowledge there has been no series of cases reported in which x-ray has been combined with streptomycin therapy. Roentgen therapy should be limited to proved cases of pelvic tuberculosis in which operation is contraindicated because of coexistent active tuberculosis in other organs especially the lungs, cachectic cases, cases in which operation is refused, cases in which relapse occurs due to incomplete operation or adhesive peritoneal tuberculosis.

In chronic sinuses, experimental work with streptokinase and streptodornase has shown that these enzymes will in some cases liquefy the exudate, permitting it to be withdrawn so that healing can occur, but its use is still in the experimental stage.

Pregnancy in the tube affected with tuberculosis was reported by Stevenson and Wharton and they collected eight cases from the literature. Since their report an additional case was reported by Busby and Fisher. Gunn, Nagley, and Beven reported a case of acute miliary tuberculosis with meningitis during pregnancy, successfully treated with streptomycin and para-aminosalicylic acid.

Postpartum genital tuberculosis was discovered in six cases by Sutherland. Guinea pig inoculation was positive in 5 of the 6 cases and in all five the bacillus was found to be of the human type. The endometrium was involved in all of these cases; adnexal masses were present in three of them; only one had lung involvement.

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

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

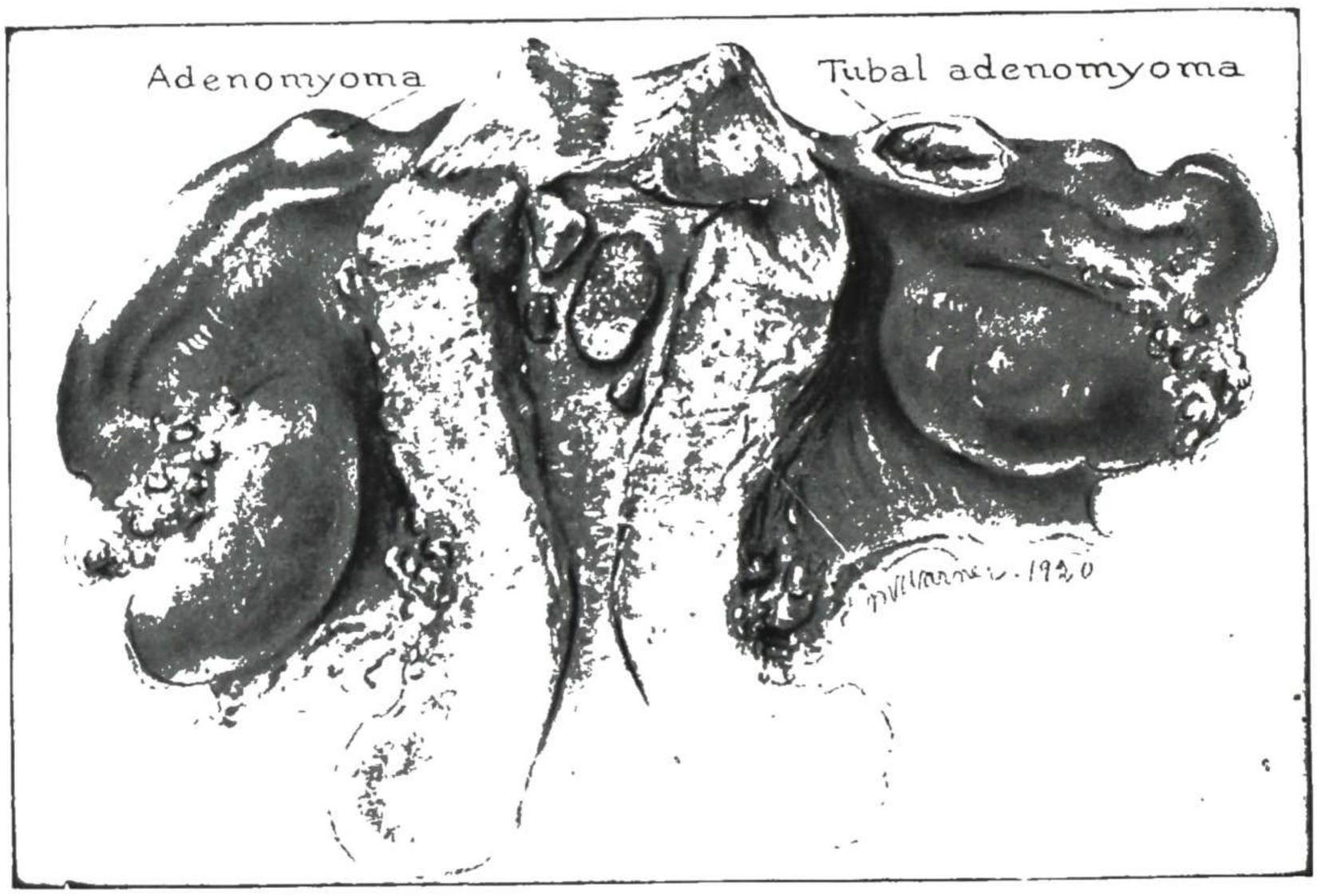


Fig. 820.—Adenomyomas of the fallopian tubes. (From Hahle: Surg., Gynec. & Obst.)

A. *B.* *C.*

Fig. 821.—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. (From Mahle: Surg., Gynec. & Obst.)

The other benign tumors of the tube are solid tumors. The most common is the adenomyoma. Fig. 820 shows adenomyosis of the tubes, and Fig. 821 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. In 1945 Mitchell and Mohler compiled 449 cases from an extensive review of the literature, and in 1950 Hu, Taymor, and Hertig added 17 additional cases from the literature and 12 of their own, making a total of 478 reported cases. In going over the literature since 1945, I was able to find an additional 65 cases up to 1952 which were not included in either of the above reports. This would bring the total reported cases to five hundred and forty-three. In 1952 Carpenter and Jameson added six cases and Weekes et al. another seven cases.

In five of the collected series where the incidence in relation to the number of gynecologic admissions was given, among 18,380 admissions there were 23 cases of primary carcinoma of the fallopian tube. Mitchell found one case in 6,747 salpingectomies, whereas Emge reported an incidence of 0.3 per cent in operations where the tubes were removed. It is one of the rarest of pelvic malignancies, the incidence varying from 0.16 per cent (Lofton) to 0.31 per cent (Hu et al.). 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.

Hu et al. classified their cases according to the histological picture into three groups:

Grade 1. Papillary

The pure papillary growth is confined to the lumen of the tube, transition between normal and malignant cells is clear, and there are few mitotic figures.

Grade 2. Papillary-Alveolar.

In this grade there is the glandular formation and invasion of the tubal wall.

Grade 3. Alveolar-Medullary.

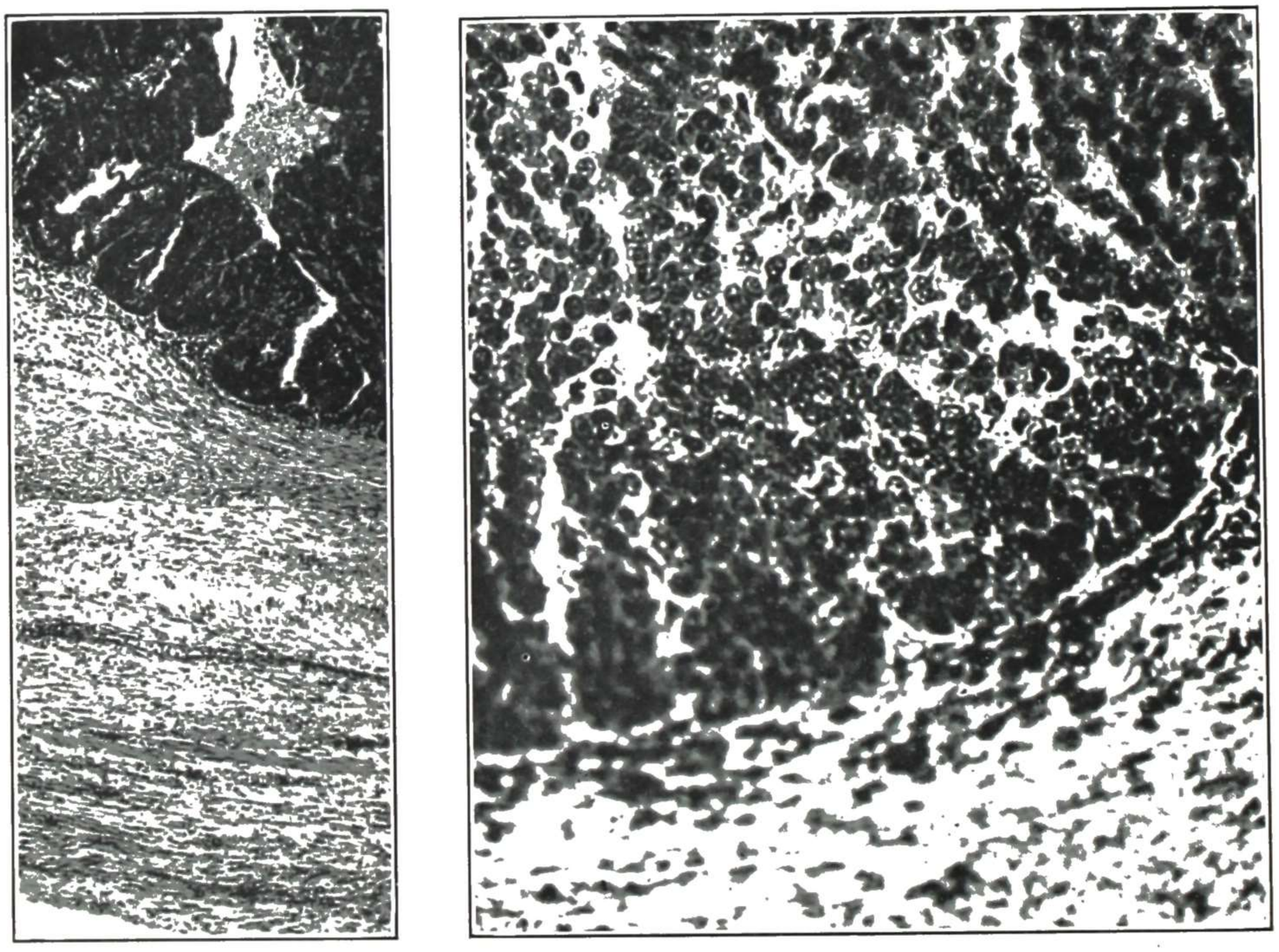
The growth is solid, there is a lack of papillary projection, and the cells are of the medullary or glandular pattern. There is always definite invasion of the lymphatic vessels of the tubal wall.

Greene and Gardner reported a case of preinvasive carcinoma of the fallopian tubes picked up by multiple sections through a very small tumorous area in the removed tube.

The most frequent symptom associated with carcinoma of the fallopian tube is hydrops tubae profluens or, as designated by Besserer, "hydrorrhoea tubae profluens." Latzko called attention to this in 1915, and Ruge found it present in 25 per cent of 182 cases. It is thought to be due to intermittent opening of the distended tube and discharge of its contents into the uterus. Associated with it there is disappearance of the pain and of the mass. Besserer

reported the profuse vaginal discharge present in four of his ten cases. In the one unreported case which we treated, the leakage from the vagina was so profuse that the patient was sent in for repair of the urethra for what was thought to be urinary incontinence. The differential diagnosis was made by collecting the watery discharge which could be seen coming from the cervix, and analyzing it. Since the advent of cytological methods the positive diagnosis of tubal malignancy should be made preoperatively with increasing frequency.

The treatment for carcinoma of the fallopian tubes is complete hysterectomy and bilateral salpingo-oophorectomy and this should be followed by x-ray therapy.



A. *B.*

Fig. 822.—Carcinoma of the tube. *A*, Low power. *B*, High power to show the character of the cells. Gyn. Lab.

In regard to prognosis, results in general are poor. In the series reported by Hu et al., two in their Grade 1 survived, one living for twenty-eight years; four in Grade 2 survived; and all in Grade 3 were dead by two years. In most series, however, the prognosis is not as good as it has been in this series, for the diagnosis is frequently not made until the condition is advanced. Now that the cytological methods of examination have been perfected, it is hoped that more of these cases will be picked up and an early diagnosis made.

The papillary **carcinoma** (Fig. 822) 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.—In 1946, Scheffey et al., in an extensive review of the literature, found 21 cases of primary sarcoma of the fallopian tubes and added a case of their own. Since that time, one case was reported in 1948 by Cabrera and Guzman. The gross and microscopic figures are taken from Dr. Scheffey's

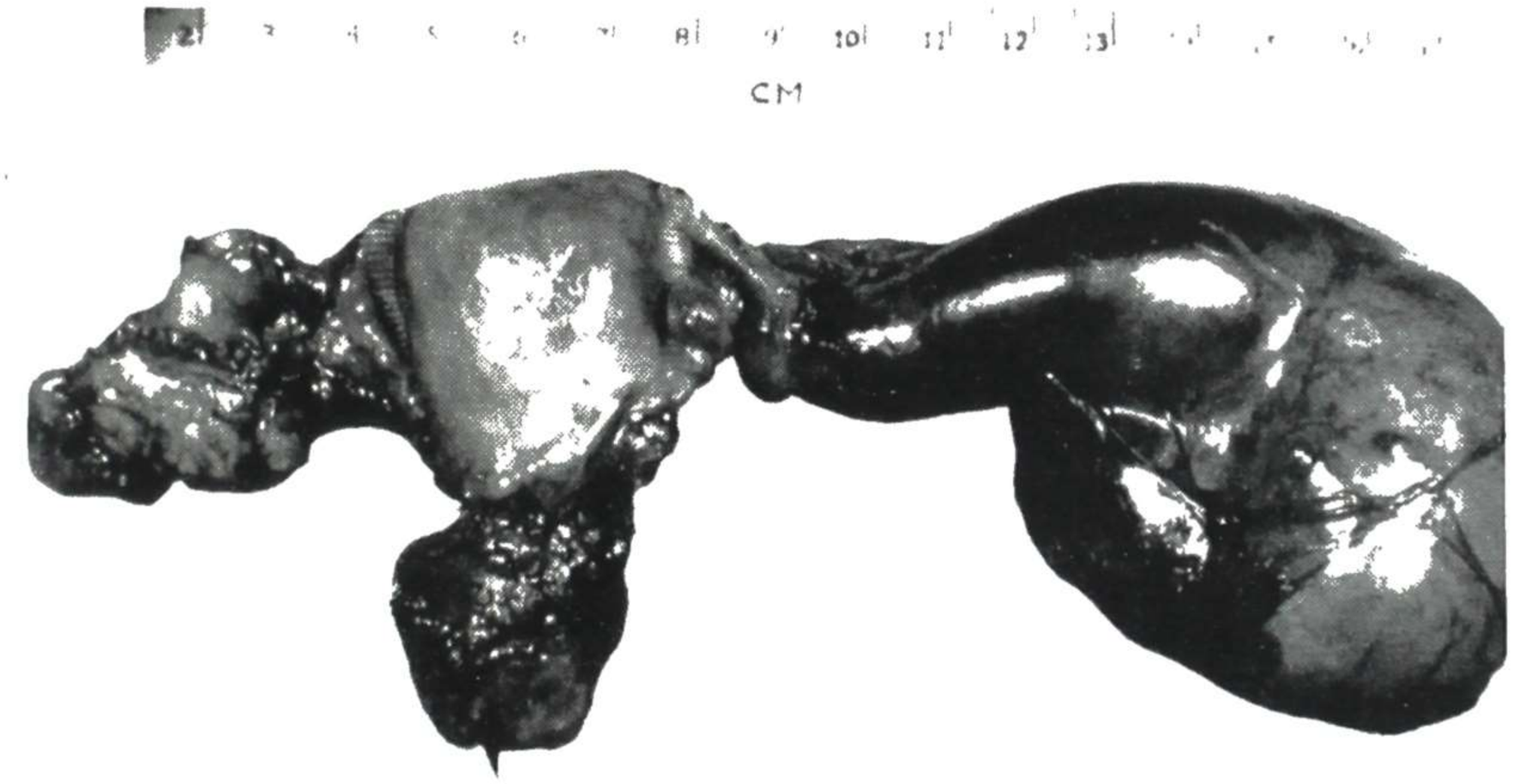


Fig. 823.—Anterior view of removed uterus and adnexa showing sarcoma of left uterine tube and the enlarged right tube. Both ovaries adherent. Uterus atrophic.

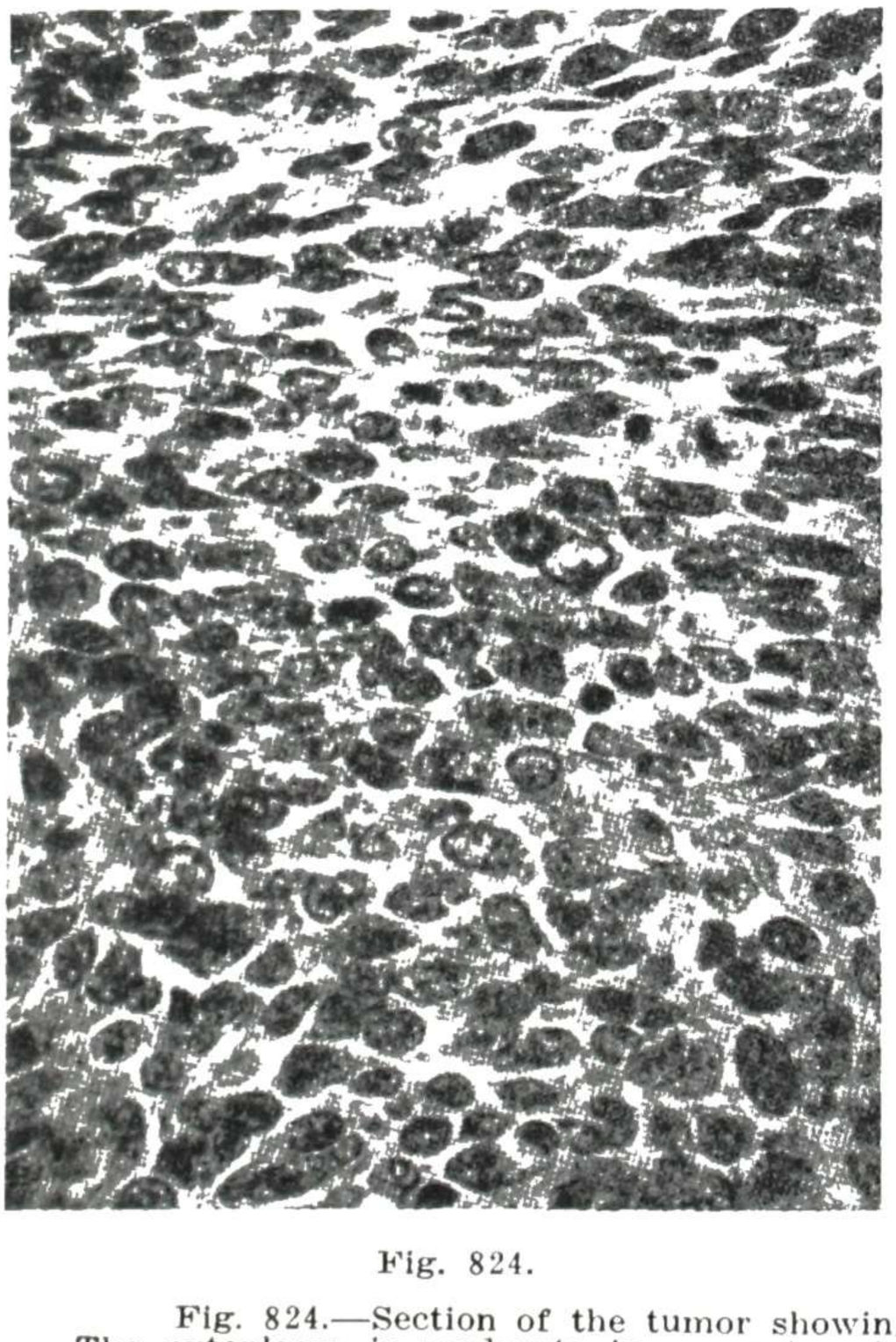


Fig. 824.

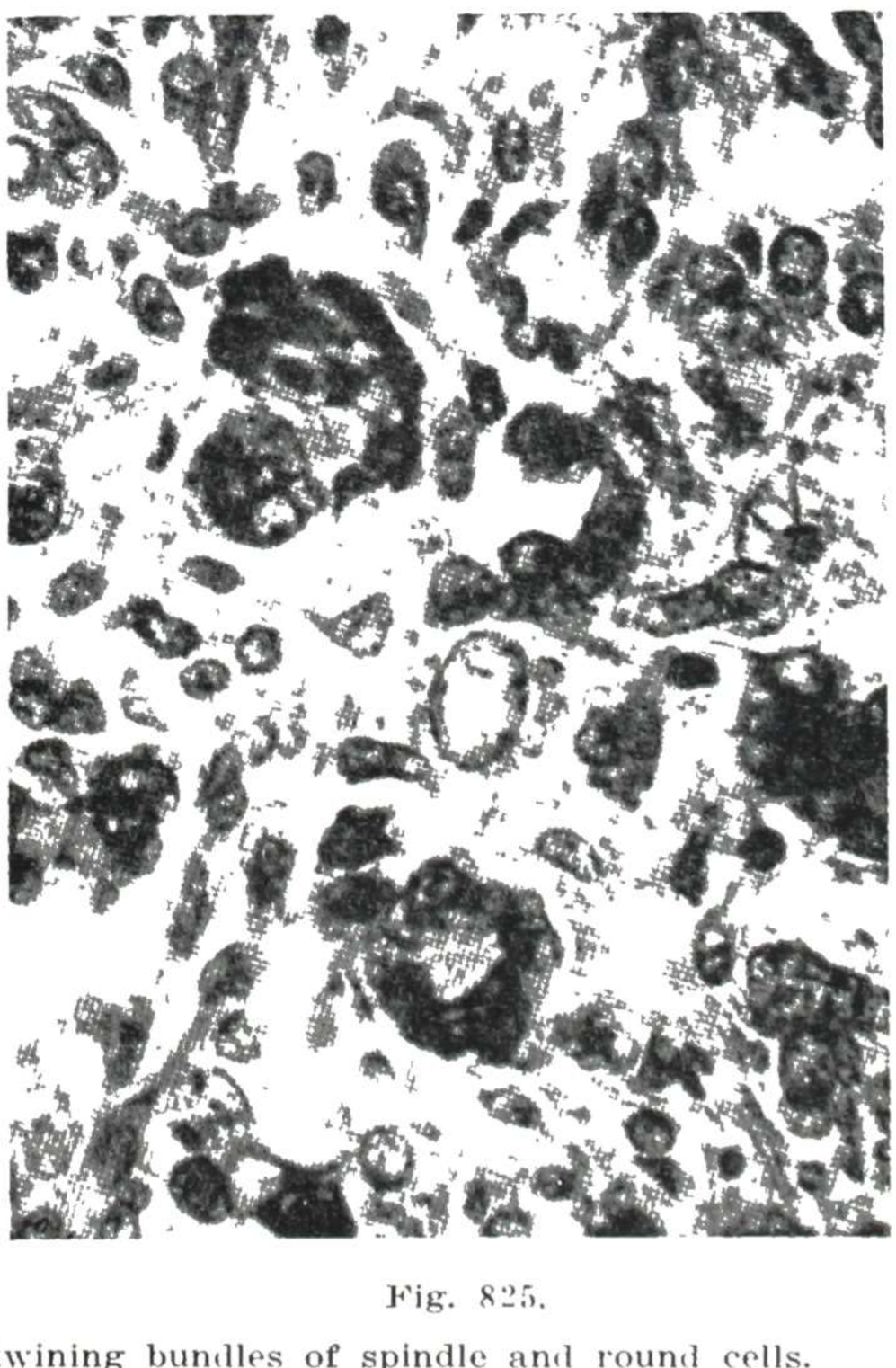


Fig. 825.

Fig. 824.—Section of the tumor showing intertwining bundles of spindle and round cells. The cytoplasm is moderate in amount and the nuclei are large, deeply stained, but rather uniform. (Hematoxylin and eosin, ×400.)

Fig. 825.—Section of the tumor in another area showing extreme pleomorphism with many bizarre single and multinucleated giant cells. (Hematoxylin and eosin, ×400.)

(Figs. 823 to 825 from Sheffey, Lang, and Nugent: Am. J. Obst. & Gynec., December, 1946.)

article (Figs. 823 to 825). 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. 826, and Figs. 827 and 828 from our service.

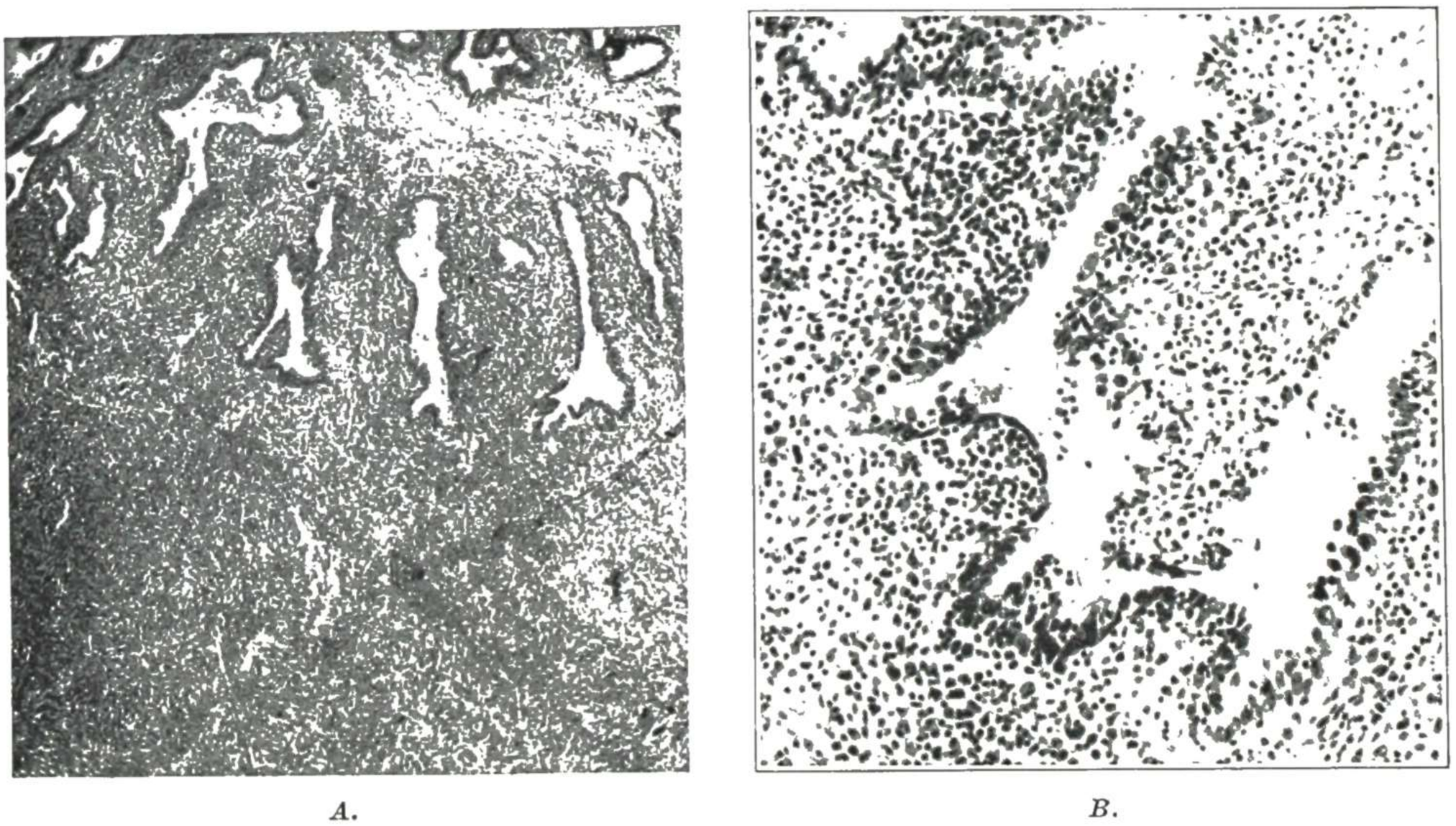
Secondary carcinoma or sarcoma may occur and is usually due to direct extension from some nearby organ.

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 chorionepithelioma 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.



A. *B.*

Fig. 826.—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.

TORSION OF ADNEXA

Torsion of the approximately normal tube and ovary occurs occasionally, giving rise to attack of pain in that region. In 1927 Eastman reviewed the subject detailing and analyzing the reported cases; in 1938 Goldberg and Olim compiled the cases to that date, and in 1946 Kelberg and Randall reported 42 cases of torsion of the adnexa associated with adnexal tumors.

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

Fig. 827.

Fig. 828.

Figs. 827 and 828.—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. Fig. 827 shows the twist in the pedicle. In Fig. 828 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.

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. 827 shows the condition found in a patient operated on by Dr. H. S. Crossen for a small adnexal mass with attacks of pain which would come and go without apparent cause. Fig. 828 shows the specimen with the torsion untwisted. Fig. 829 is from a case reported by Flickinger and Masson.

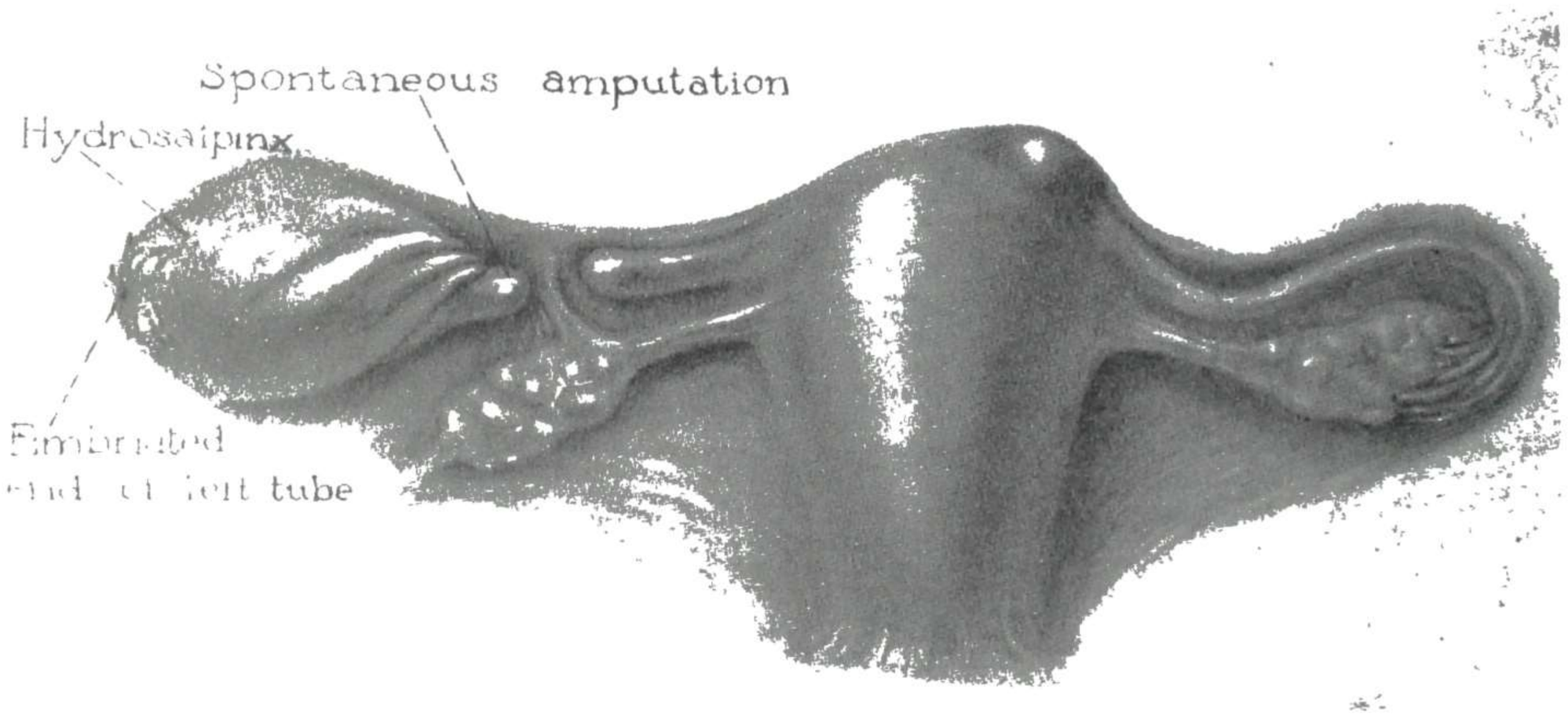


Fig. 829.—The condition found at operation: Amputated left fallopian tube and associated hydrosalpinx of distal segment. (From Flickinger and Masson: Am. J. Surg., December, 1917.)

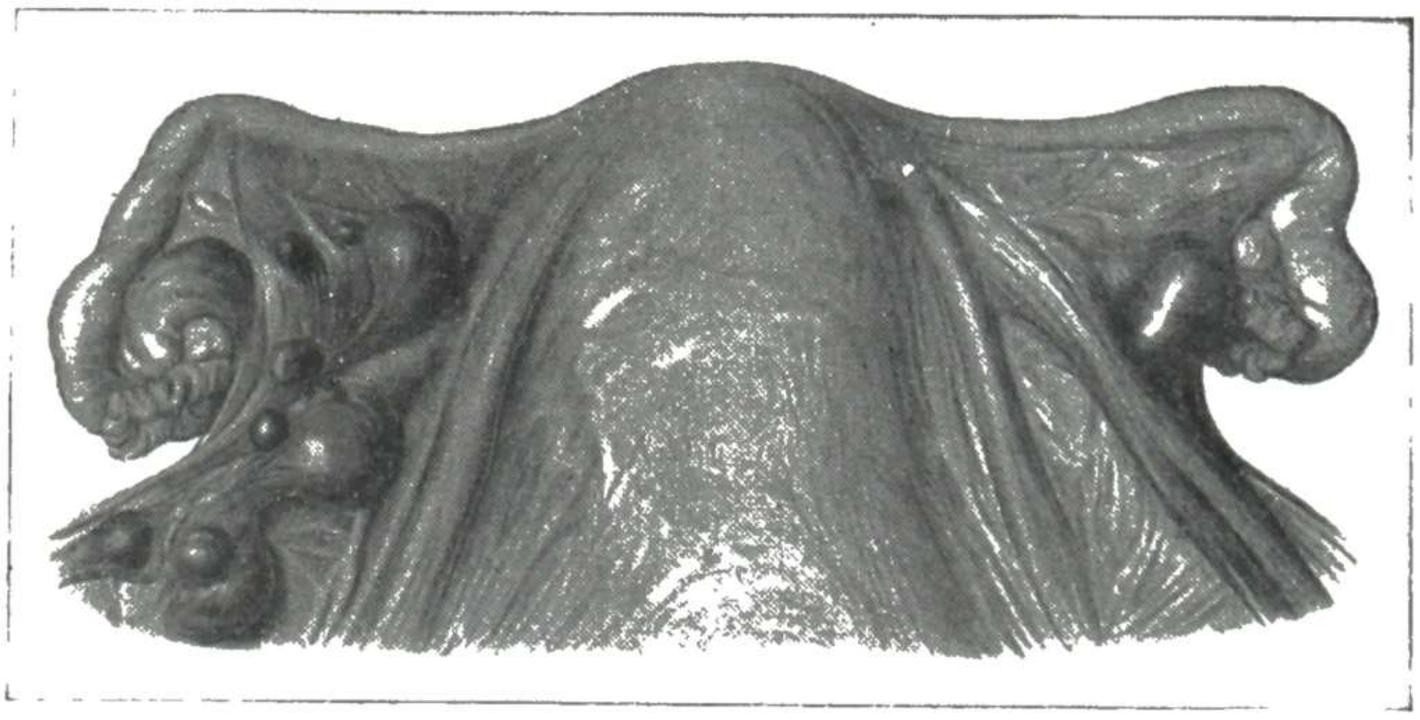


Fig. 830.—Thrombosed veins of the broad ligament. (From Schaeffer: Hand-Atlas of Gynecology.)

VARICOSE VEINS OF BROAD LIGAMENT

Occasionally the veins of the broad ligament are found markedly varicose, as shown in Fig. 830, 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 ligament 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.

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 of 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.

Hodgkinson and Christensen reported 3 cases of varices of the ovarian vein which ruptured during pregnancy, causing death in two of the cases. They collected 72 cases from the literature in which this accident occurred.

MISCELLANEOUS RARE CONDITIONS

The miscellaneous conditions, found in the pelvis less frequently, will be considered in the following order: brucellosis, actinomycosis and coccidioidomycosis, trichomoniasis, granuloma inguinale, 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.

Herrell and Barber, in a report of the combined use of aureomycin and dihydrostreptomycin, advised an average daily dose of 3 Gm. of aureomycin by mouth in divided doses every six hours. The dihydrostreptomycin was given intramuscularly in divided doses, the average daily dose being 2 Gm. This combined treatment was continued for twelve to fourteen days, and in four acutely ill patients the recovery was prompt, with no recurrence. There were no toxic manifestations associated with the treatment. More recent reports by Ralston and Payne and by Harris on the use of aureomycin and chloramphenicol showed that between 80 to 90 per cent had a partial or complete recovery. Harris discussed the side effects of these antibiotics and stated that it is necessary to have these patients under careful observation during, and for long periods following, treatment. The adult dose advised by Ralston and

Payne of either antibiotic varied from 18 to 27 Gm., spread out over a period of seven to twelve days, the average dose being 50 mg. per kilogram of body weight, the first four to twelve hours, followed by 0.5 Gm. every six hours. In children the total dose was 9 Gm.

The many angles in the diagnosis of brucellosis are too complex to discuss here; an excellent review of the criteria for diagnosis has been presented by Griggs (see references).

Actinomycosis.—Actinomycosis or ray-fungus infection in the pelvis is rare; there are probably no more than 150 case reports in the literature. Though rare, this infection is a very serious one and every gynecologist and general surgeon should be acquainted with the findings so as to know how to diagnose and treat it. It was formerly thought that both the *Actinomyces bovis* and the *Actinomyces israeli* could cause this infection in man. More recent work by Erickson and later by Thompson has confirmed the fact that these are two distinct cultural types of anaerobic actinomyces and that the *Actinomyces israeli* is the cause of actinomycosis in human beings.

There are two types of pathologic lesions described: the hard type in which there are the typical sulfur granules; and the soft type, in which the colonies of actinomyces assume a raylike arrangement of filaments around the periphery of the growth; these colonies have a club-shaped appearance. This type is probably due to the genus Nocardia.

There are very few cases of isolated uterine infection reported in the literature. In reviewing the literature it was found that in some cases the uterus was involved, but it is usually secondary to involvement of the tubes and ovaries. Eighty per cent of the cases occur in rather young adults.

Actinomyces are normal inhabitants of the gastrointestinal tract and mouth, and it is thought that they only invade in cases where there has been some damage to the mucosa of the gastrointestinal tract. It is probably in this way that the organism by direct extension involves the pelvic organs, though sometimes the original lesion has healed. It may also spread through the blood stream and in rare cases through the lymphatics. In rare cases such as the one reported by Jaffe where the cervix only was involved and in a case of ours where the endometrium alone was involved, the infection probably came directly through the vagina. The majority of cases in this country have been reported in the Mississippi Valley area.

When the tubes and ovaries are involved, the gross pathological picture shows a matted mass honeycombed with numerous abscesses and granulomatous tissue. The pus taken from a sinus and from tissue of the surrounding structures usually will contain the sulfur granules (Fig. 831). These are not found, however, in the soft type of involvement.

The clinical picture of actinomycosis infection, in the early stages, is not different from that of other types of infection. Seven of the eight patients reported by Paalman, Dockerty, and Mussey complained of abdominal pain in the lower part of the abdomen usually located on one side. The pain is usually associated with some fever. These patients frequently have been operated on before. All eight of the patients reported by Paalman et al. had previous operative work and only one of them had a diagnosis of actinomycosis prior to the time when they were treated by these authors. Three of the cases were

seen on the ward service at Washington University Medical School. In one of our own, in which there was pelvic involvement, there was an indefinite tender mass present and there was a long history of increasing disability. There are usually intermittent periods of acute exacerbation. In cases of this type that do not respond to the treatment for ordinary chronic pelvic inflammation outlined above, actinomycosis should be suspected. In most of the

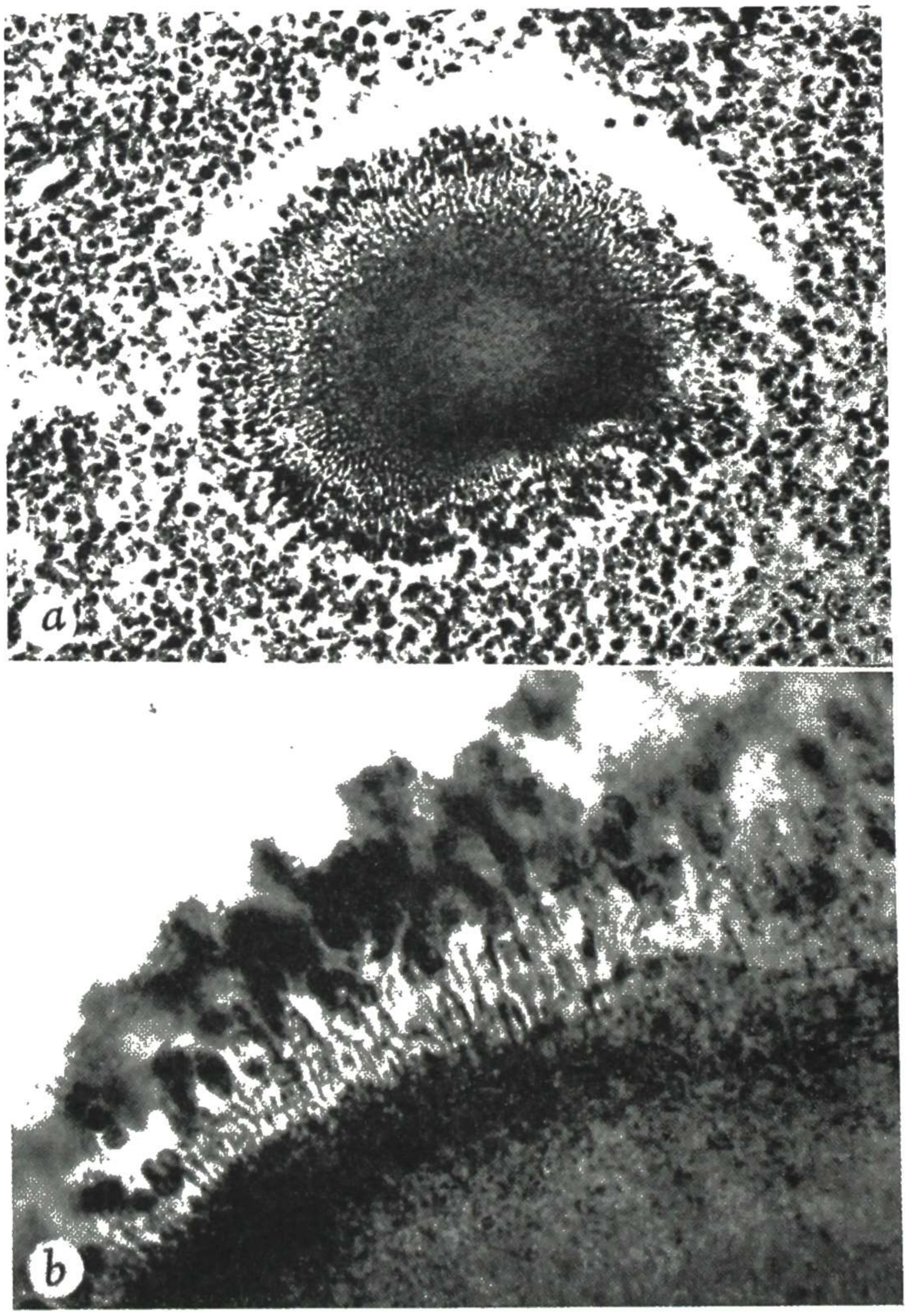


Fig. 831.—*a*, Typical actinomycotic colony in section of an ovary (hematoxylin and eosin, ×240). *b*, Detail of the peripheral club arrangement at the edge of a colony of actinomyces organisms (hematoxylin and eosin, ×900). (From Paalman, Dockerty, and Mussey: Am. J. Obst. & Gynec., September, 1949.)

cases there has been a gradual loss of weight similar to that found in tuberculosis of the pelvis. Paalman et al. found that the usual serological tests, complement fixation reaction, skin tests with culture filtrates, were of very little help, and they state that the diagnosis is best made at the time of operation by microscopic examination of fresh tissue or bacteriological studies of

the pus. Of course, if sulfur granules are found, then the diagnosis is easy; however, these are not always evident in the mass. Greenblatt stressed the importance of routine anaerobic and aerobic culture techniques, recommending a media containing sulfhydryl compound. However, in the eight cases studied by Paalman et al., bacteriological studies in seven cases showed only five positive. In our case the anaerobic and aerobic cultures were negative.

In regard to treatment before the advent of antibiotics, best results were obtained by combined therapy, including surgery, x-ray therapy, and systemic administration of either thymol, potassium iodide, or, in some cases, Diasone. Putman, Dockerty, and Waugh, in a follow-up of 108 cases of abdominal actinomycosis, found that the rate of cure prior to sulfonamides and penicillin was 16 per cent; with sulfonamides the rate was increased to 38.7 per cent, and with penicillin (in 24 cases) cure or improvement was 95.8 per cent. Along with this therapy supportive measures should be used such as iron, vitamins, trace elements, and minerals, plus transfusions if needed. Large doses of both penicillin and sulfonamides are needed over a prolonged period of time, extending from one to three months. Local lavage with 3½ per cent iodine and penicillin is indicated when there is an open cavity. In our case of actinomycosis of the endometrium, which has not as yet been reported in the literature, the patient received a total dose of 7,970,000 units of penicillin and 88 Gm. of sulfadiazine over a period of a month. The patient received an additional 5,000,000 units of penicillin during the course of the next month at home, and approximately half of the amount of sulfadiazine which she had taken in the hospital. Endometrial curettage two months after starting the treatment showed no actinomycosis of the endometrium and the aerobic and anaerobic cultures were negative.

McVay and his co-workers successfully treated one case of cervicofacial actinomycosis with aureomycin, and Littman et al. reported cure of a case of pulmonary actinomycosis with chloramphenicol.

Coccidioides immitis, an infection of the female genital tract, has been reported twice, once by Page and Boyers and a previous case by Jacobson, though four maternal deaths from general infection with this organism were reported by Smale and Birsner. In the case reported by Page and Boyers, the patient was evidently primarily infected through a cut on the hand while digging for archaeological ruins in the Tucson area. The disease is endemic in the southwestern part of our country. The uterus, tubes, and one ovary were involved; surgical removal of the organs resulted in a complete cure. Figs. 832 and 833 show a typical lesion obtained from one of the removed tubes; the complement fixation and skin tests remained positive in spite of removal of the infected tubes.

Trichomoniasis.—The *Trichomonas vaginalis* has been found in the uterus and tubes and peritoneal cavity in association with trichomonas vaginitis.

Lymphogranuloma.—Lymphogranuloma inguinale may appear in the fallopian tubes. D'Aunoy and Schenken reported 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 checkup revealed a suspicious histologic

structure. Frei tests were then made with two different antigens, and the reaction was strongly positive with each. See also Chapter 3.

Donovanosis.—Granuloma inguinale has been known to invade the tubes or ovaries in only six cases, one of which was reported recently by Marmell

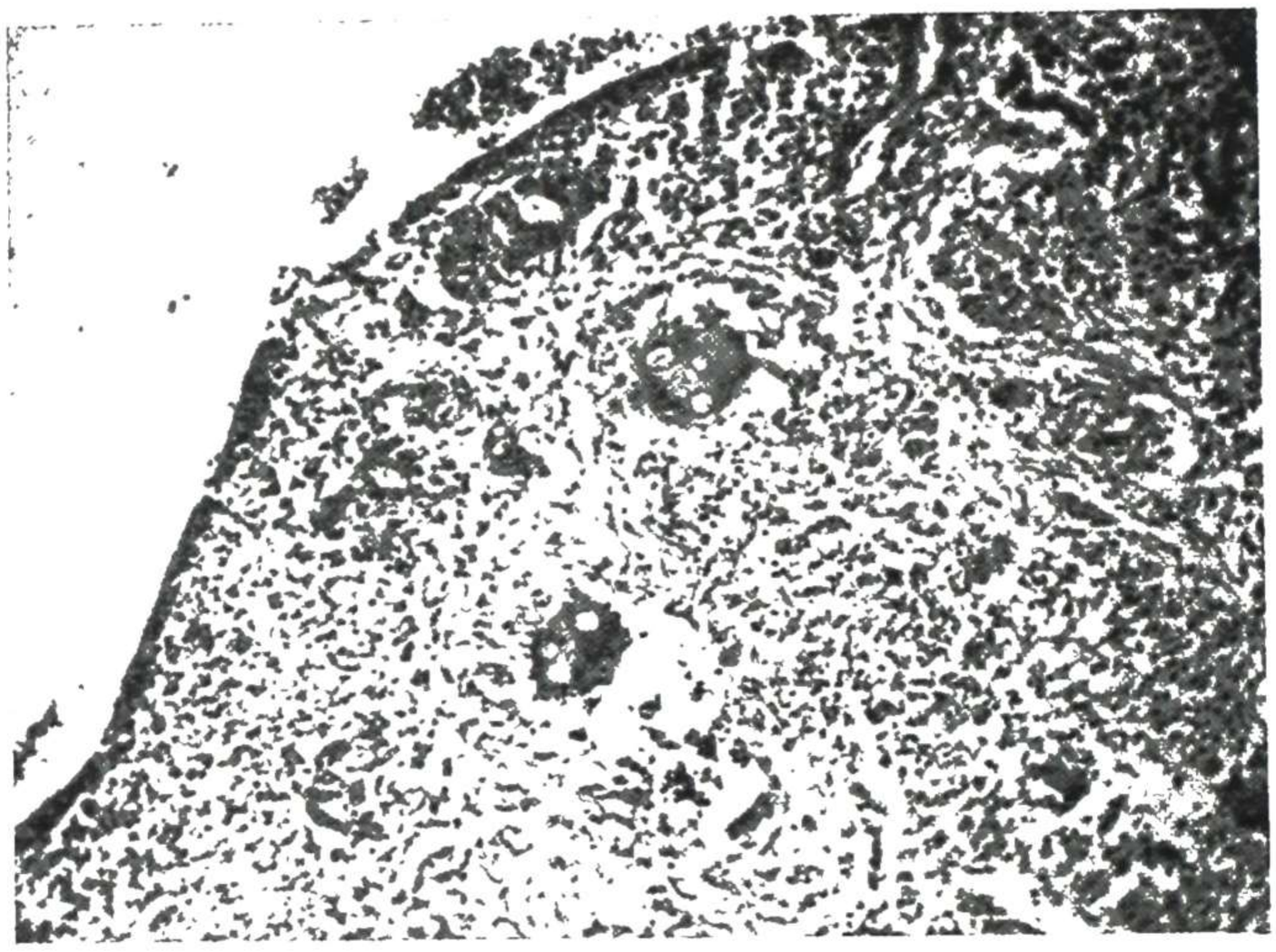


Fig. 832.—Wall of right tube (×120) showing tubercles containing *Coccidioides immitis* in giant cells. (From Page and Boyers: Am. J. Obst. & Gynec., August, 1945.)

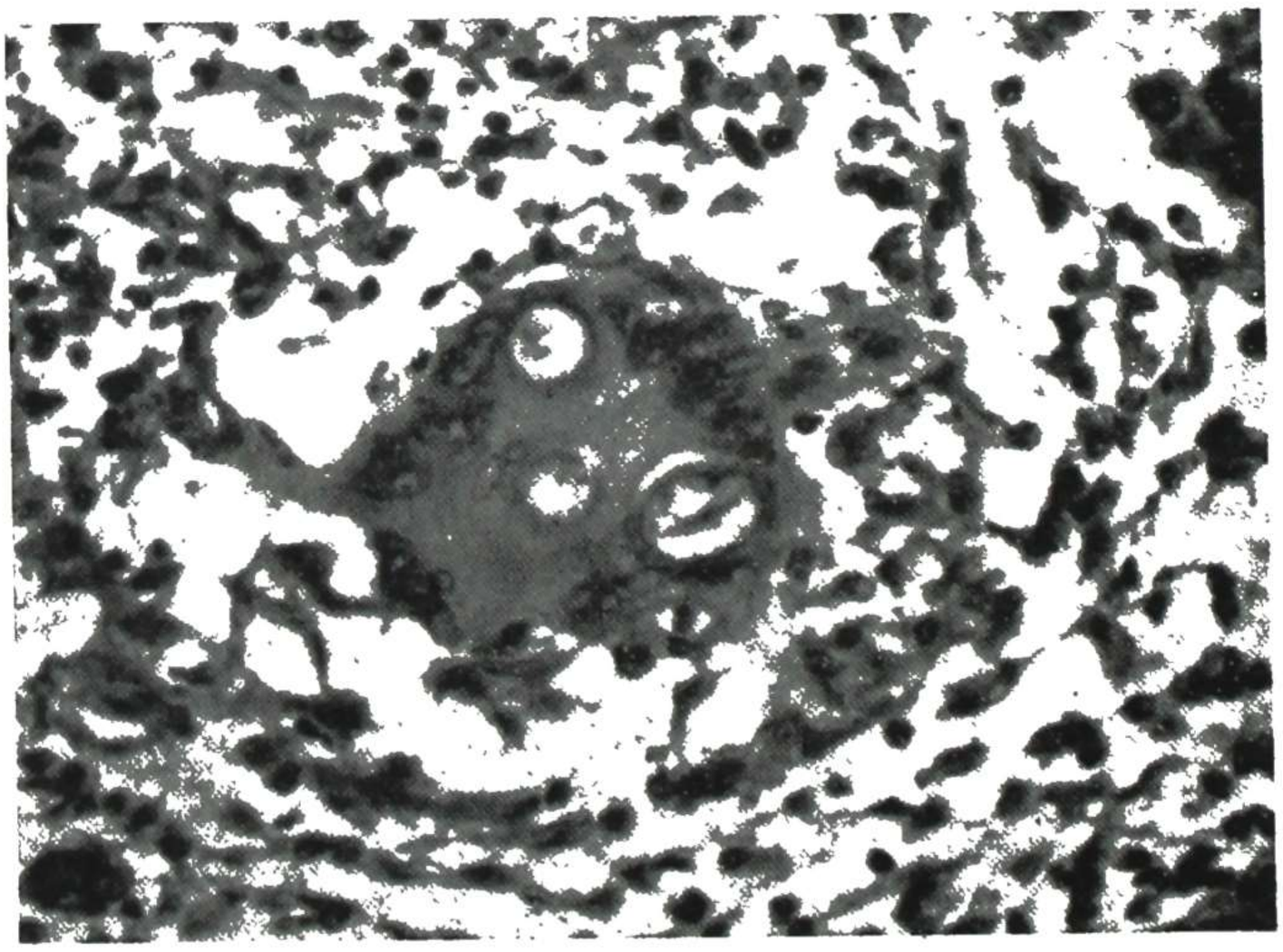


Fig. 833.—Details of a giant cell (×500) containing three organisms. (From Page and Boyers: Am. J. Obst. & Gynec., August, 1945.)

et al. Treatment of this case consisted of removal of a large tuboovarian abscessed mass of the left side and cornual resection on the right. After operation, 1 Gm. of aureomycin was given twice daily for a total of 29 Gm. of oral aureomycin. In spite of the fact that all previously reported patients died of the disease, their patient showed no recurrence of the disease five months after operation.

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 scolices, 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.

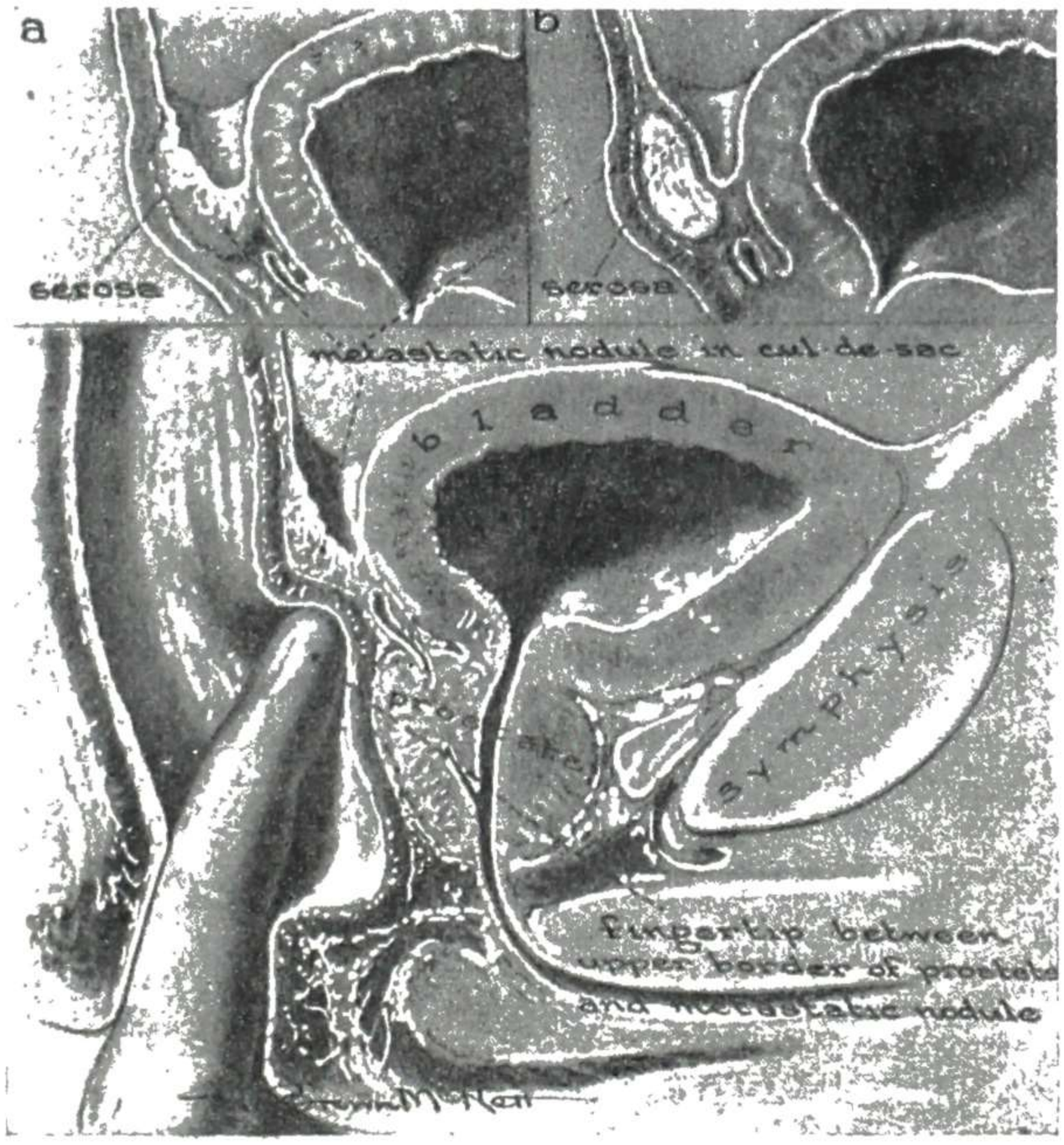


Fig. 834.—Sagittal section, showing the tip of the finger between the prostate and a growth in the cul-de-sac; *a*, supraserosal mass and, *b*, subserosal mass. (From Bacon: J. A. M. A.)

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. 834.

Retroperitoneal Masses.—J. R. Miller presented an instructive article calling attention to growths and other masses arising from the various organs and structures, and gave details of illustrative cases. There are many reports of retroperitoneal growths and deceptive masses, but the conditions are so varied that systematic classification is not satisfactory.

Connective Tissue.—In the connective tissue and contained structures there may arise various tumors, including lipoma, fibroma, myoma, adenomyoma, lymphangioma, hemangioma, and sarcoma. Flickinger and Masson reviewed the literature of retroperitoneal tumors of the broad ligament and reported five lipomas occurring in their practice. We recently removed a huge lipoma in this location, which extended outside of the pelvis and under the sigmoid colon. It was attached firmly to the pelvic wall. Also, inflammatory masses here may be bizarre in symptoms and in examination findings, particularly psoas abscess from tuberculosis of the spine. Fig. 835 shows a large chordoma reported by Reich and Nechtow.

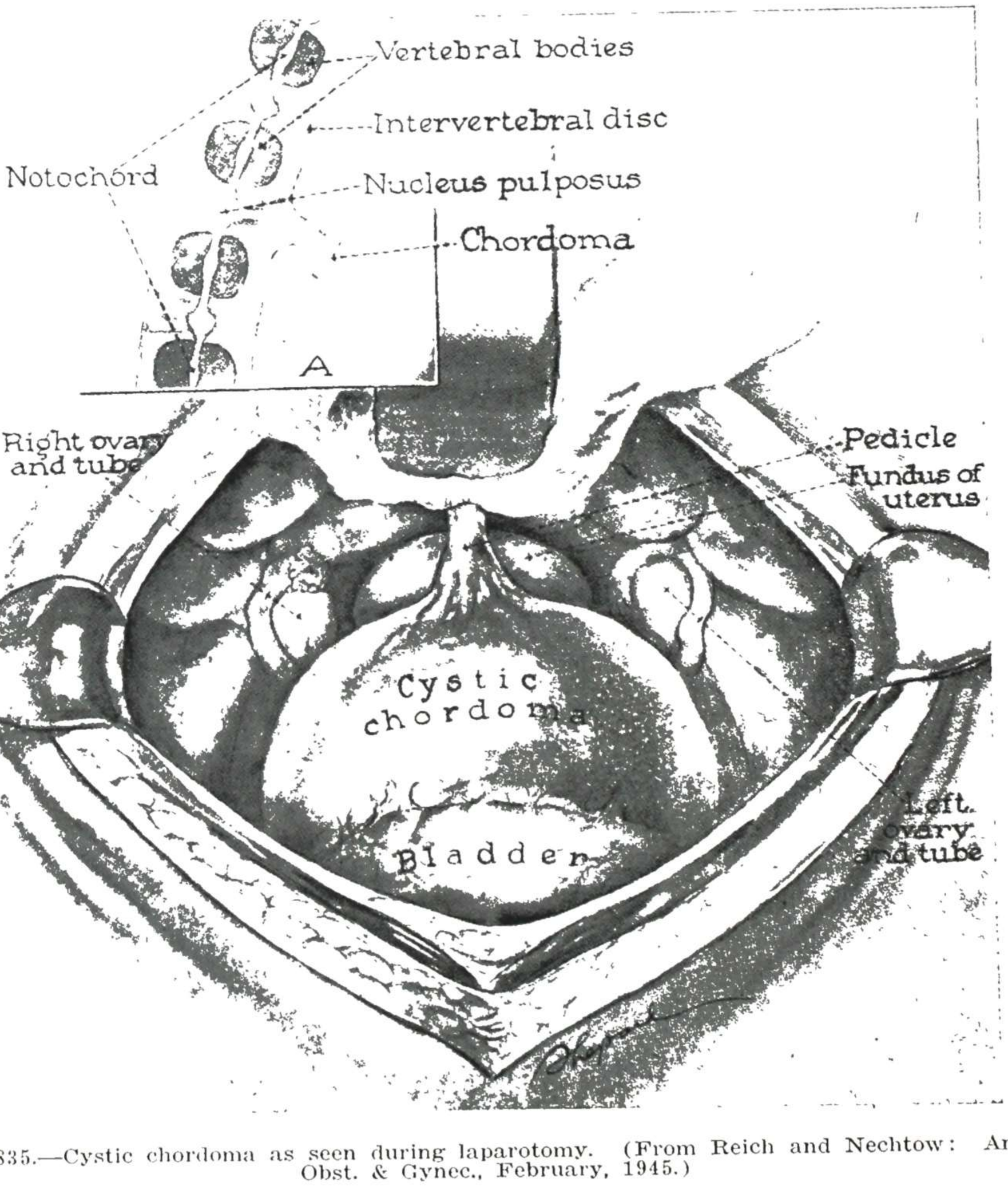


Fig. 835.—Cystic chordoma as seen during laparotomy. (From Reich and Nechtow: Am. J. Obst. & Gynec., February, 1945.)

Pelvic Walls.—Varied types of tumors arising from bones, muscles, fascia, 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.

Fig. 836.—Presacral tumor demonstrates expansion of retrorectal space and forward displacement of rectum. (From Melody: Am. J. Obst. & Gynec., May, 1952.)

Fig. 837.—Lateral view of pelvis by soft tissue technique. Arrows indicate outline of presacral epidermoid cyst. The presence of gas in the rectum shows its extreme upward displacement by the cyst. (From Melody: Am. J. Obst. & Gynec., May, 1952.)

Displaced Organs.—The several terms "ectopic kidney," "fused kidney," "horseshoe 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.

DIAGNOSIS.—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

Fig. 838.—X-ray film showing a catheter in the peritoneal cavity. It had been there since an abortion twenty-six years before. (From Hill: J. Missouri M. A.)

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 may prove of material assistance when, with the abdomen open, one is trying to determine relations and connections and the safest plan of attack.

Melody gives some excellent diagnostic points in an article on presacral epidermoid cysts in women. In Fig. 836 is shown a presacral tumor expanding

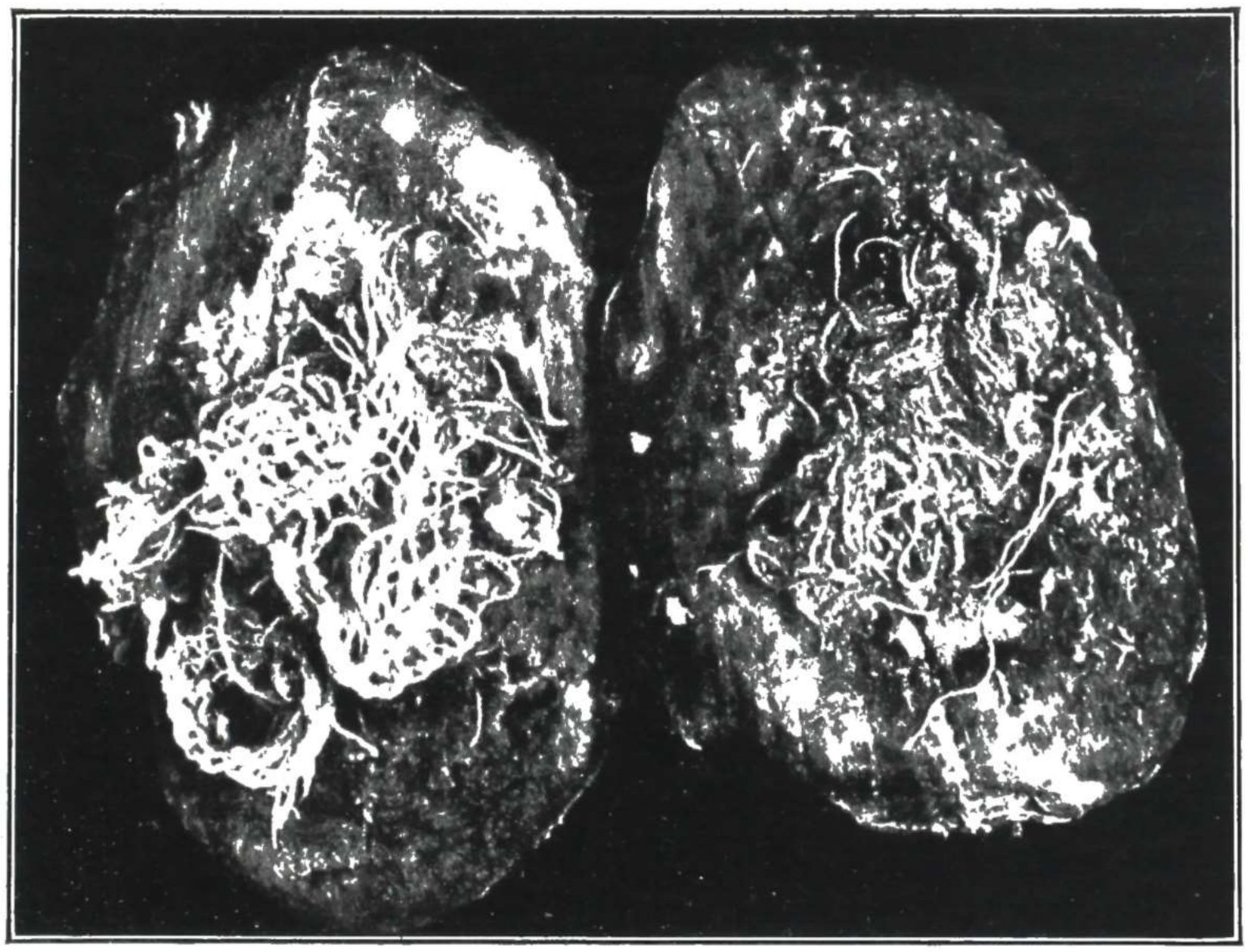


Fig. 839.—Encapsulated sponge removed after fourteen years. The capsule has been opened, and the mesh of the gauze is clearly seen. (From Watson and Desnoes: J. A. M. A.)

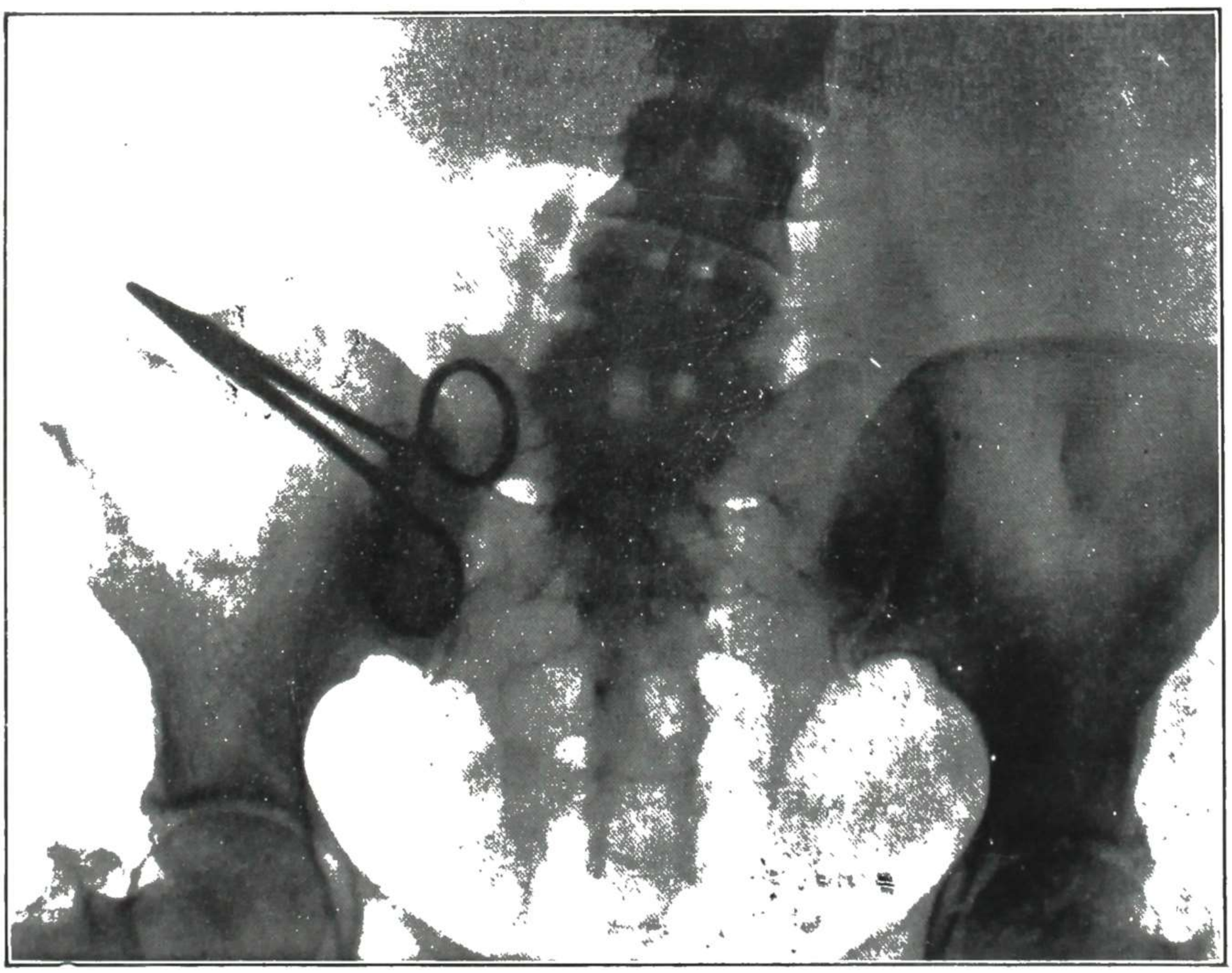


Fig. 840.—X-ray film showing a forceps (hemostat) in the abdomen four years after an abdominal operation. The patient was supposed to have a tumor, till x-ray examination revealed the forceps.

the retrorectal space and displacing the rectum forward. X-ray visualization of the rectum may demonstrate forward displacement by the space-occupying tumor. Fig. 837 shows a lateral soft tissue x-ray of a presacral epidermoid cyst.

Ependymomas from the pilum terminale have been reported. We have had a case of carcinoma of aberrant thyroid tissue in the rectovaginal septum extending laterally retroperitoneally and filling the pelves; to my knowledge this is the only case of this kind reported (Fig. 349).

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 findings excites suspicion or operative removal reveals its character.

Attempts at abortion are responsible for a large proportion of the foreign bodies in the pelvis. Fig. 838 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. 839 and 840 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 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 Dr. H. S. Crossen 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, and consequently 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 checkup and to come immediately if there should be any marked disturbance. A checkup 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 evi-

dently 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, was considered in detail by Dr. H. S. Crossen in a monograph (*Foreign Bodies Left in the Abdomen*).

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Chapter 11

DISEASES OF THE OVARY AND PAROVARIUM

Tumors constitute the principal lesions occurring in the ovary, and of these about 95 per cent are cystic. There occur also infections, mostly secondary inflammation, and endocrine disturbances with important functional and structural results.

Satisfactory classification of ovarian pathologic changes has long been one of the problems of systematic gynecologic teaching. The reason for this lies in the complexity of the organ's structure and physiology and the resulting complexity of its pathologic activities. The principal difficulty is with the great variety of benign growths and near-growths, some of which are real neoplasms and others only retention cysts.

In our previous edition we presented a classification of ovarian pathological conditions based upon causes as far as they were known at that time. In the intervening years there has been a great deal of work done on the classification of ovarian tumors. The material for such classifications has been gathered from Fischel's fundamental work on embryology of the ovary and also from the work of Robert Meyer, Schiller, Novak, and others. In 1947 Spencer and Reel presented an excellent classification based on the histogenetic origin of the tumors, and we have included it here because of its value in clarifying the origin of the tumors. We feel, however, that there is a need for a clinical classification of ovarian conditions for it is seldom possible to be sure of the type of tumor or cyst one is dealing with prior to operation, and even with the abdomen open microscopic examination is frequently necessary before the particular histogenetic derivation of the tumor can be determined. Hence we are offering the classification below and hope that it will be of help in clarifying the situation.

Clinical Classification of Diseases of the Ovary and Parovarium

CONGENITAL ANOMALIES
- Absence of Ovary
- Agenesis of Ovary
- Accessory Ovary

PROLAPSE OF OVARY AND CIRCULATORY CHANGES

INFECTIONS
- Inflammation (gonococcus and ordinary bacteria)
- Tuberculosis, Syphilis, and Rarer Infections

DISTURBANCES OF FOLLICULAR FUNCTION
- Follicular Atresia
- Follicular Cysts. Stein-Leventhal Syndrome
- Corpus Luteum Cysts
- Theca-Lutein Cysts. Follicular Atrophy