"In cases of echinococcus infection of the uterine cavity, the symptoms may be essentially those of pregnancy. The uterus becomes enlarged and softened, the cervix presenting a bluish aspect. The womb enlarges, progressively and symmetrically, the breasts enlarge and may contain milk, while there are, not infrequently, reflex disturbances of the stomach. It is the occurrence of these symptoms which has generally caused infections of the uterine cavity by echinococcus to be looked upon as pregnancy, and the resulting cysts to be designated as degenerated ova. In practically all of these cases, however, the usual amenorrhea of pregnancy is absent, while the patient complains of more or less constant dribbling of blood from the uterus. While this is true, the fact must be recognized that infection of the uterine cavity may coexist with pregnancy, as was true in MacNeven's case, in which a large echinococcus cyst was expelled intact, during a true labor and immediately preceding the rupture of the amniotic sac. The exact diagnosis cannot be made without the demonstration of the hooklets."
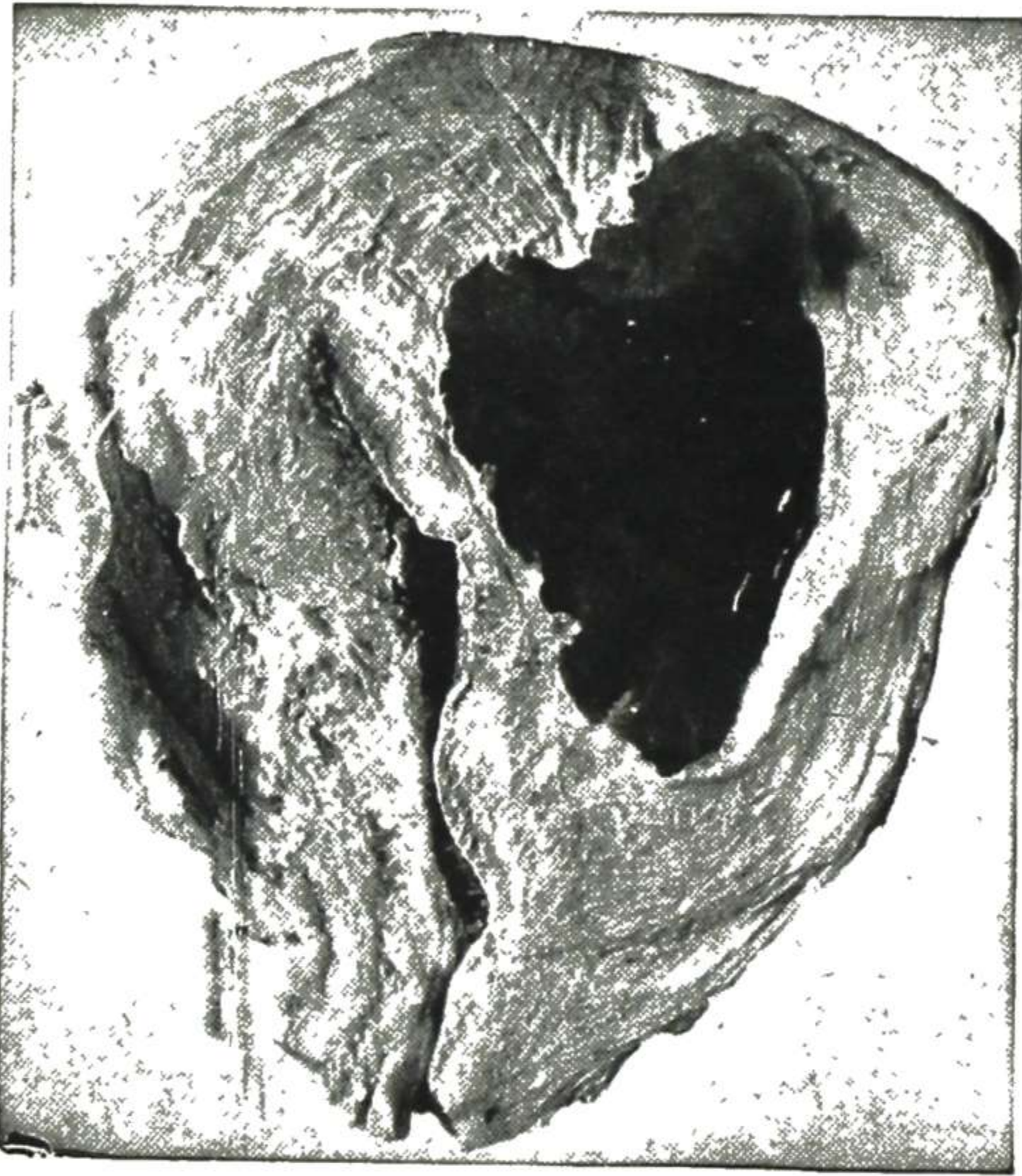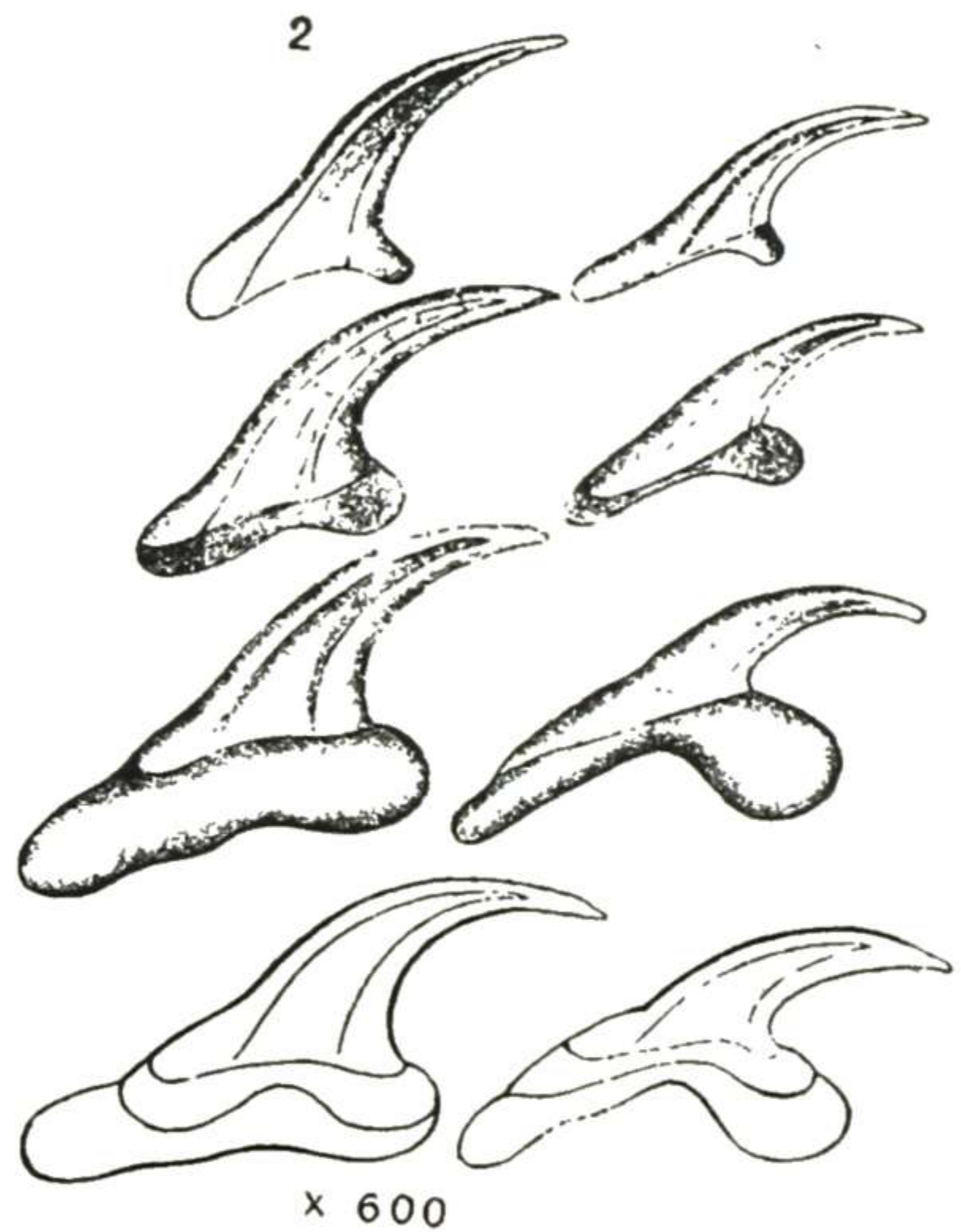


Fig. 702.



Fig. 703.

Fig. 702.—Echinococcus disease of the uterus. Gross specimen showing an echinococcus cyst of the uterine wall. (Turenne—*Surg., Gynec. and Obst.*)

Fig. 703.—Echinococcus hooklets. The diagnosis of echinococcus disease depends upon finding these characteristic hooklets in the cyst fluid.

Echinococcus disease of the uterus must not be confounded with the more common "hydatidiform mole," in which small cysts of varying size are found, and may be expelled in a large mass. The two affections are entirely distinct. The first (echinococcus disease) is due only to the echinococcus parasite in the uterus, while the second (hydatidiform mole) is due to degenerative changes in fetal membranes—the chorionic villi proliferating and becoming distended with fluid so as to form a mass of little cysts.

The differential diagnosis between echinococcus disease and hydatidiform mole is made by microscopic examination of pathologic structures—hooklets being found in the first and chorionic villi in the second.

The treatment of echinococcus disease of the uterus consists in the rupture and continual drainage of all cyst cavities. If the disease persists and is not associated with some contraindicating lesion, hysterectomy is indicated.

# NONMALIGNANT TUMORS OF THE UTERUS

Nonmalignant tumors of the uterus comprise myoma (including adenomyoma) and a miscellaneous group composed of other types, such as lipoma and the growths arising from remnants of the wolffian duct extending into the uterine wall.

## MYOMA OF UTERUS

Myoma of the uterus is a tumor composed of muscular and fibrous tissue. It is often spoken of as uterine "fibromyoma" and as uterine "fibroid." As Mallory has pointed out, it is a true tumor of muscle tissue, and the term "myoma" is the accurate designation.

Uterine myoma occurs more frequently than any other tumor in women. Kolb found that it was present in 20 per cent of women over thirty-five years of age and in 50 per cent of all women over fifty years old. Gusserow found 38 per cent occurred between the ages of thirty and forty years.

### Etiology

The persistent estrogenic stimulation of the uterus in the absence of pregnancy is supposed to be a factor in the causation of uterine myomas. The tumor is analagous to those growths which frequently enlarge the prostate in the male. The prostatic glands develop from the embryologic urethra and hence are not derived from muellerian tissue, but they grow out into the tissue at the junction of the muellerian duct with the urogenital sinus and part of this tissue is muellerian.

Myomas occur most frequently in middle life (period of sexual activity) though they may occur at any age. They are more frequent in the nonparous uterus. This is in marked contrast to carcinoma, particularly carcinoma of the cervix, which occurs almost exclusively in women who have borne children or had some other injury or irritation of the cervix.

The common association of hyperplasia of the endometrium with myoma would suggest excess estrin as the endocrine factor concerned. The work of Kaufmann and of Clauberg in causing small uteri in castrated women to grow to normal size by injections of large amounts of estrogenic hormone, is significant in respect to the excessive muscle growth in myoma. Nelson succeeded in producing multiple fibromyomas in 88 guinea pigs by long-continued injection of estrogens.

**Cell Derivation.**—Virchow believed that any muscle fiber in the uterus could, as a result of unknown stimulation, form a myoma. Ribbert's idea was that only certain fibers, which were not in complete growth-equilibrium, could form a myoma. Cohnheim championed the idea of embryonal rests as

the starting point for a myoma. The relation of certain early myomas to blood vessels has impressed many workers on this problem. This relationship suggests that the uterine myomas arise from disturbances in the growth of the embryonal blood vessels, from which the uterus and vagina originally derive their muscular tissue. Rosger, Kleinwachter, Sobotta, and others have traced the development of early myomas from blood vessels, and conclude that blood vessels control their origin and growth. According to Ewing, this idea has much to commend it, and he cites a case of his own in which there was striking evidence of the origin of the tumor masses from blood vessels. R. Meyer obtained specimens showing an uninterrupted transition from a normal muscle fiber to a myomatous fiber. Frankel believes that secondary
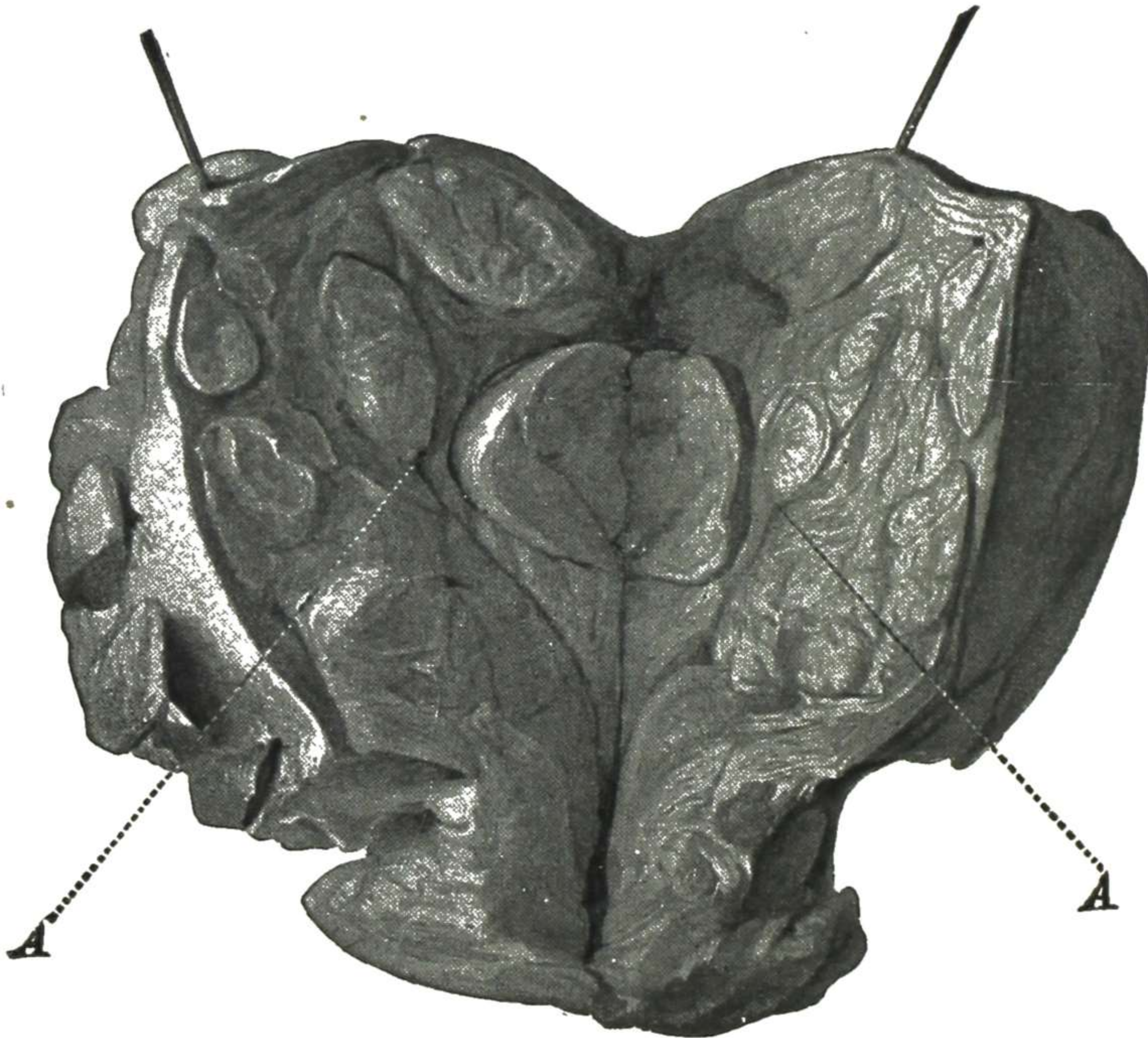


Fig. 704.—Multiple myomas of the uterus. A, The divided uterine cavity. Several of the myomas are approaching the peritoneum. (Bishop—*Uterine Fibromyomata.*)

myomas arise from daughter myoma cells in the middle layer of the capsule of the primary myoma, and stresses the importance of removing the entire capsule in order to prevent recurrence.

Histologically there are two type of myomas, namely, those composed of smooth fibers (leiomyoma), and those composed of striated muscle fibers (rhabdomyoma). The latter type is rarely found in the uterus.

## Structure and Complications

Myoma may occur as a single growth or there may be many tumors in a uterus so affected, as shown in Fig. 704. The interesting clinical features will be taken up under five headings: structure, relation to uterine wall, adenomyoma (adenomyosis), secondary changes, and complications and associated diseases.

1. **Structure.**—The myoma is composed of interlacing bundles of involuntary muscle fibers in a network of connective tissue (Fig. 705), the same type of tissue composing the uterine wall. At the periphery of the growth the fibers are arranged in concentric layers. The adjacent muscle fibers of the uterus, which make up the outer layer of the capsule, are also arranged in the same fashion. The capsule (Figs. 706 to 709) consists of three layers, the two already mentioned and a third which lies between them and contains the vessels. It is from this central layer that the daughter myomas (Frankel) are supposed to arise.
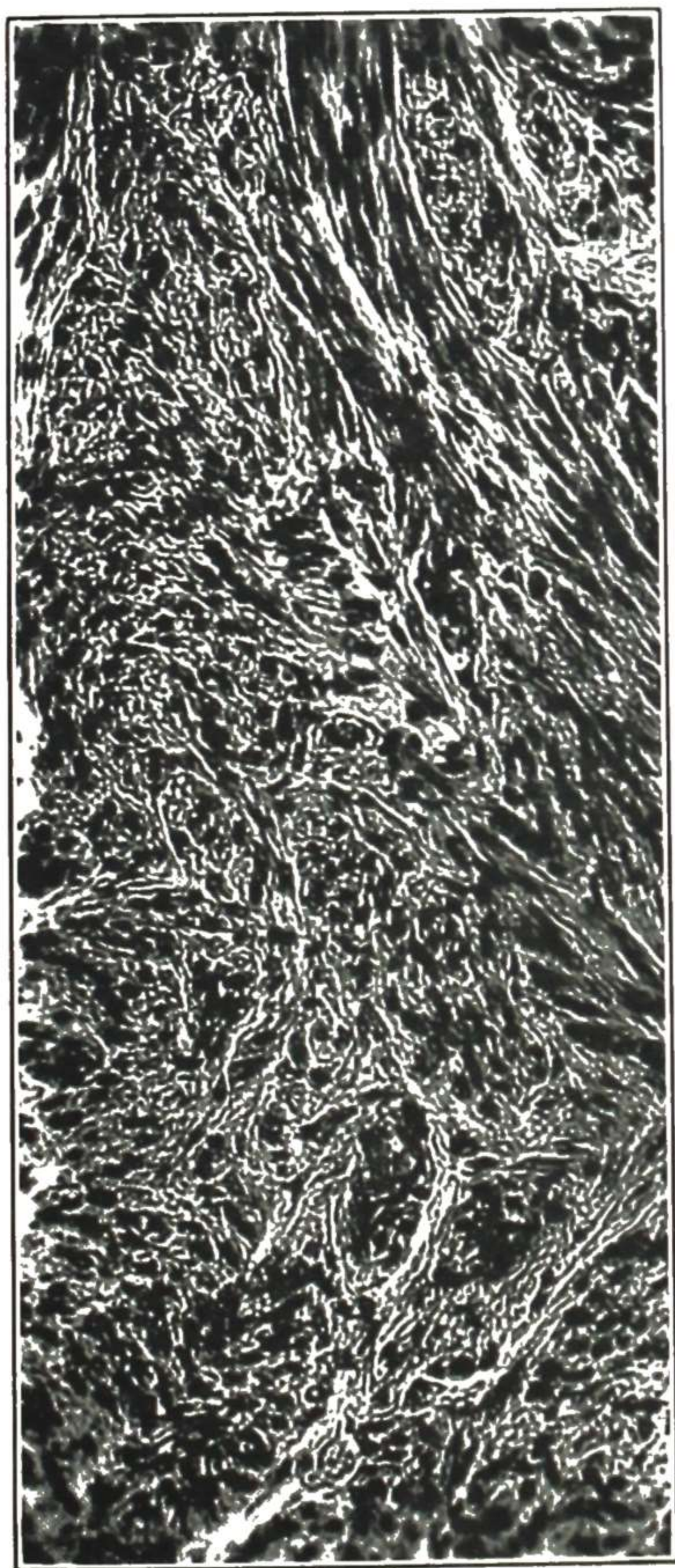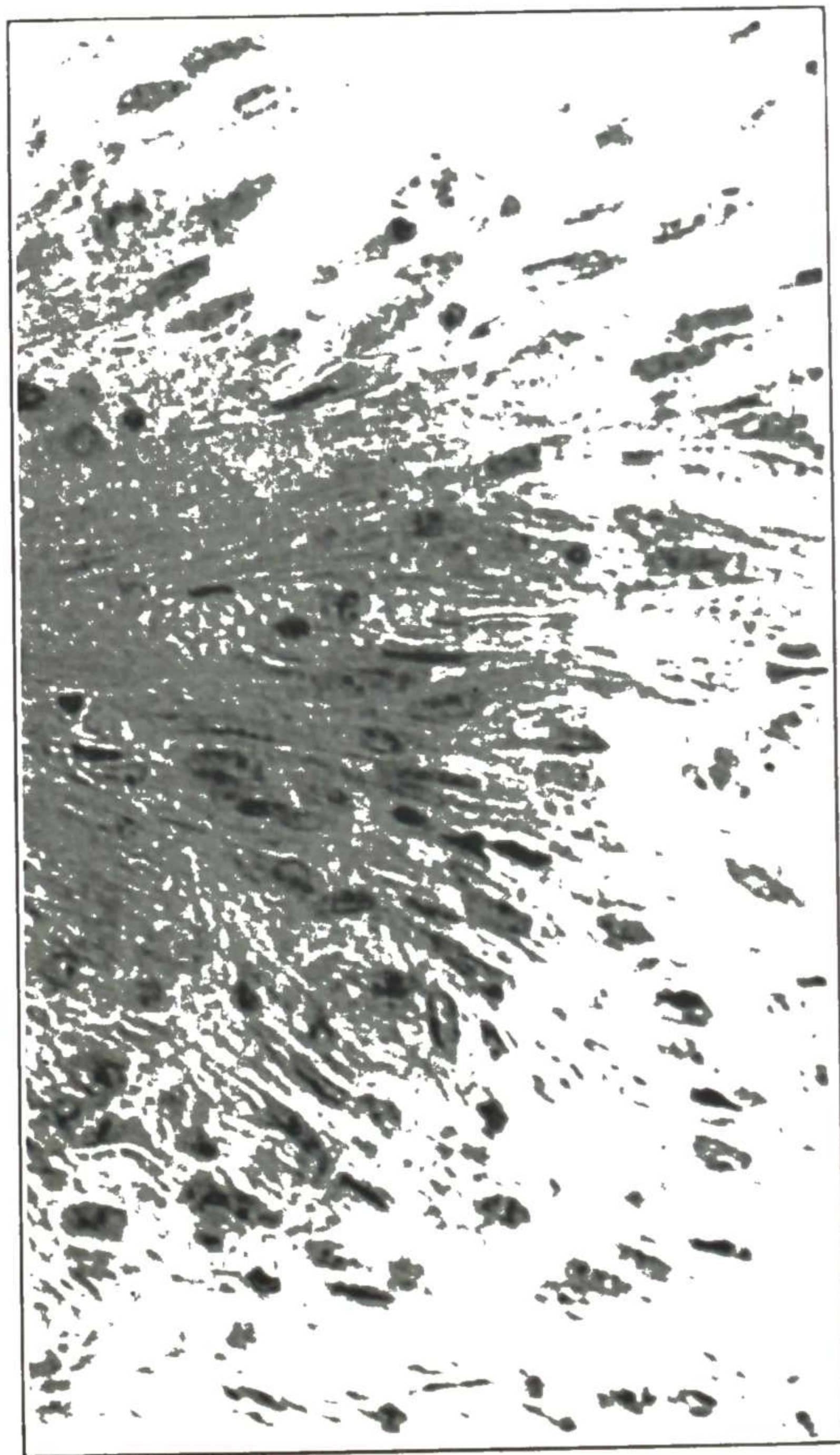


A.                                          B.

Fig. 705.—Microscopic structure of a myoma. A, Bundles of muscle fibers, extending in various directions. B, Higher power, showing muscle cells with rodlike nuclei. Gyn. Lab.

The muscle cells themselves are somewhat longer and narrower than the ordinary uterine muscle cells. Their nuclei stain deeper than normal cells, as does also their cytoplasm. Their nuclei are usually long and the ends are rounded when seen longitudinally, while on cross-section they are round or oval or crescentic. Between the muscle cells are myoglia fibrilles which extend beyond the cells and interlace with fibrilles of surrounding cells. The muscle

tissue stains yellow and the connective tissue red when the van Gieson method is used. The fibrous tissue cells can be seen separating the muscle tissue into bundles by the forming septa. Numerous elastic fibers are present in the older tumors.

2. **Relation to Uterine Wall.**—The myoma is nearly always encapsulated. It starts as a small nodule in the muscular layer of the uterine wall (Fig. 706). As it enlarges there usually develops a distinct capsule, or layer of condensed tissue, which separates the tumor proper from the normal uterine wall surrounding it as previously explained. From this capsule it may be easily shelled out, except when there has been inflammatory infiltration of the capsule and tumor.
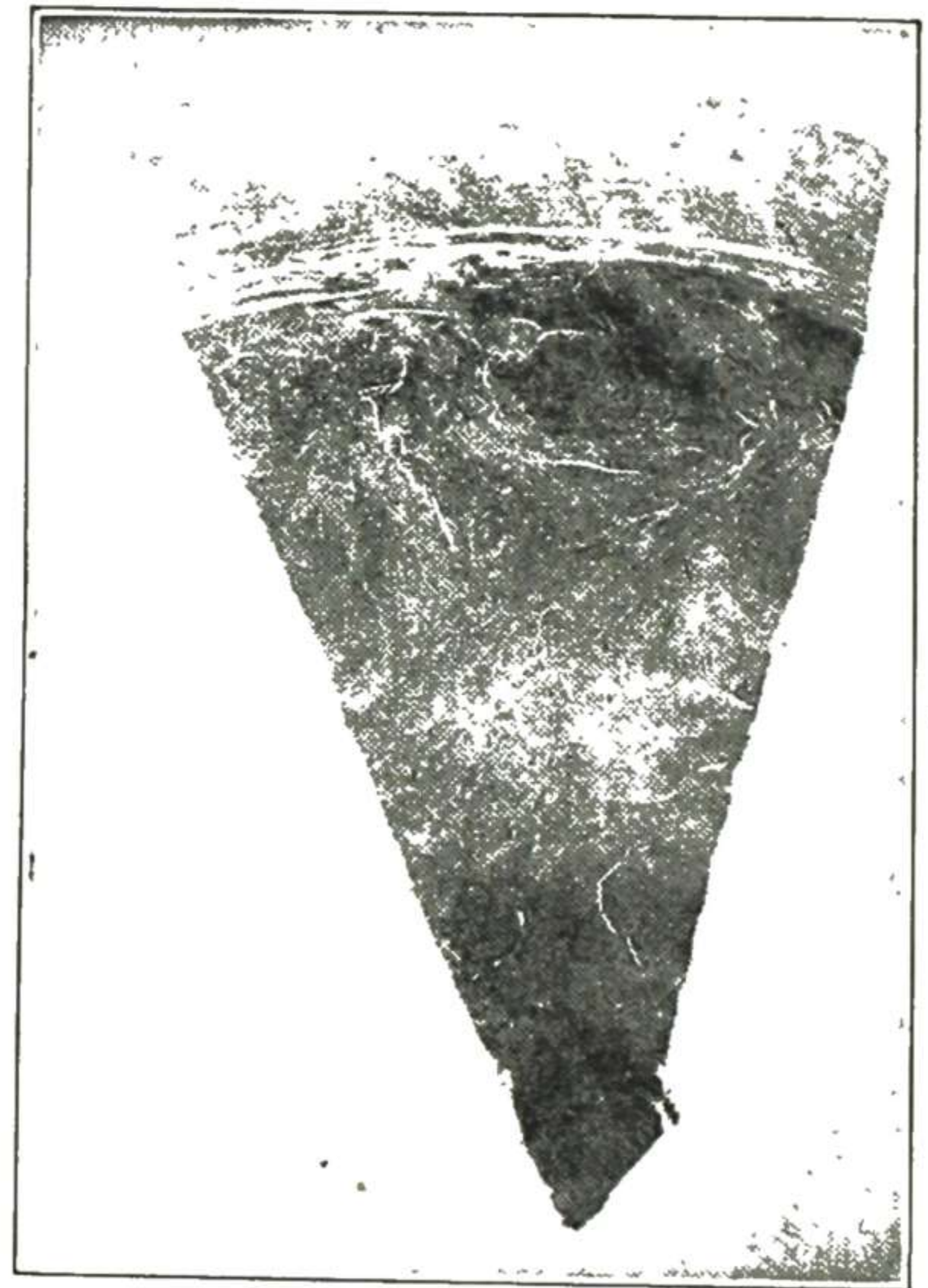


Fig. 706.



Fig. 707.

Fig. 706.—Photomicrograph of a small myoma, situated at about the middle of the uterine wall. The entire thickness of the wall is shown, the endometrium being at the left. The little tumor is distinctly encapsulated and has shrunken somewhat from the adjacent tissue, allowing the capsule to separate into layers. Notice the similarity in appearance of the tumor tissue and the tissue of the surrounding normal wall, due to the fact that they have the same elements and general structure.

Fig. 707.—The capsule of myoma. The layers of capsule have separated somewhat. Gyn. Lab.

As long as the tumor is surrounded by the muscular tissue of the wall, it is known as an **interstitial** or **intramural myoma.** They comprise from 60 to 70 per cent of the cases.

As the ordinary encapsulated tumor grows, it pushes in the direction of least resistance, stretching the muscular tissue around it and tending to push the muscular tissue aside. When it pushes aside the wall tissues and progresses toward the uterine cavity it may come in time to lie beneath the endometrium,

where it is known as a **submucous myoma** (Fig. 710). Submucous myomas comprise about 10 to 15 per cent of the cases. The proximity of the growth to the endometrium causes, in the latter, changes due to pressure. The glandular portion is narrowed, the surface epithelium flattened and missing entirely in some areas.

The submucous myoma may project farther and farther into the uterine cavity, until it is attached to the wall only by a pedicle, constituting a **pediculated submucous myoma** (Fig. 711). A pediculated submucous myoma may be forced into the cervical canal and later out into the vagina, as shown in Fig. 712. It may in this way cause partial inversion of the uterus, as indicated in Fig. 713, a fact that must be kept in mind when removing such a growth by vaginal excision. Occasionally the tumor will be forced outside the vagina, as in the case shown in Fig. 714.
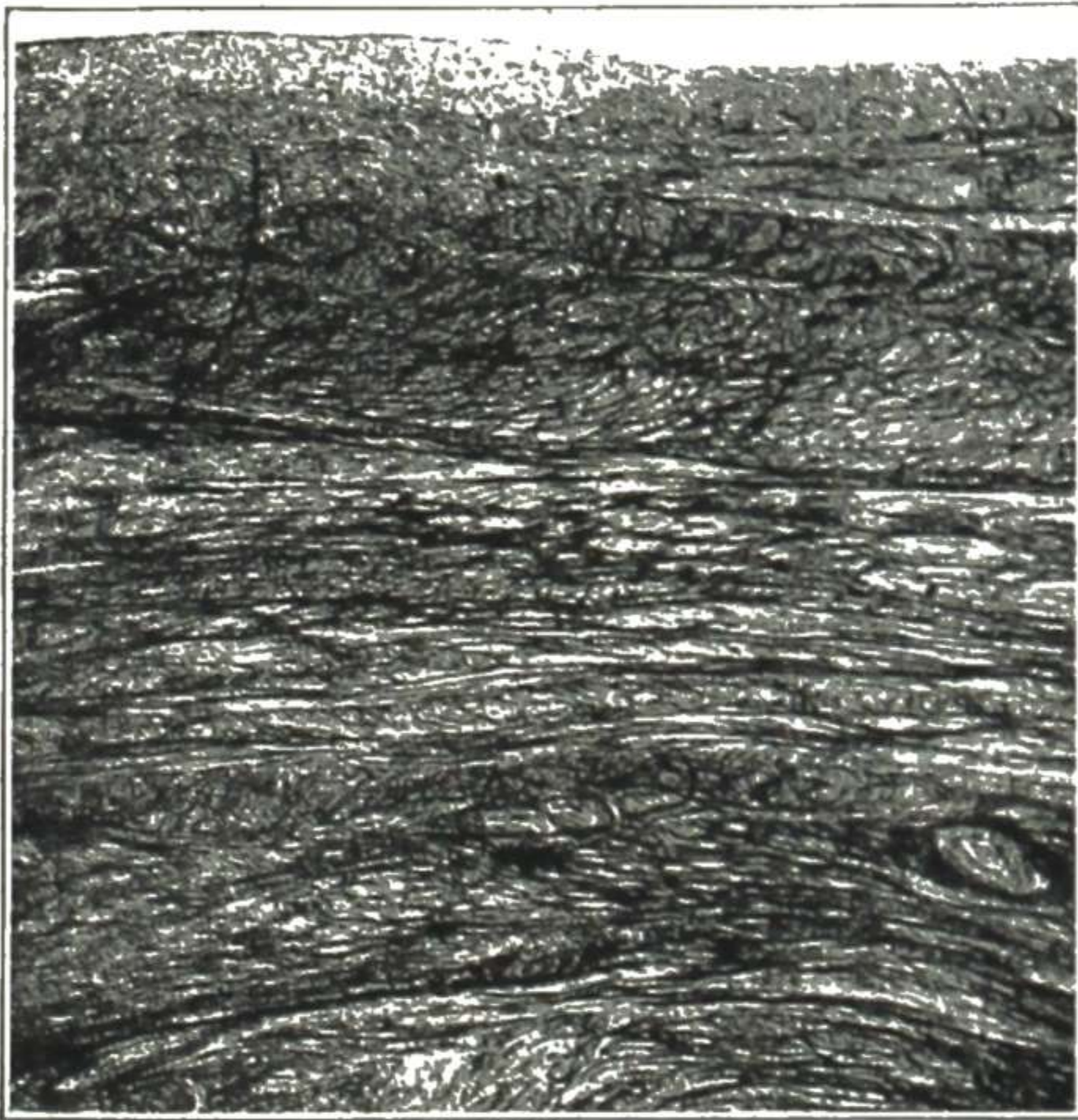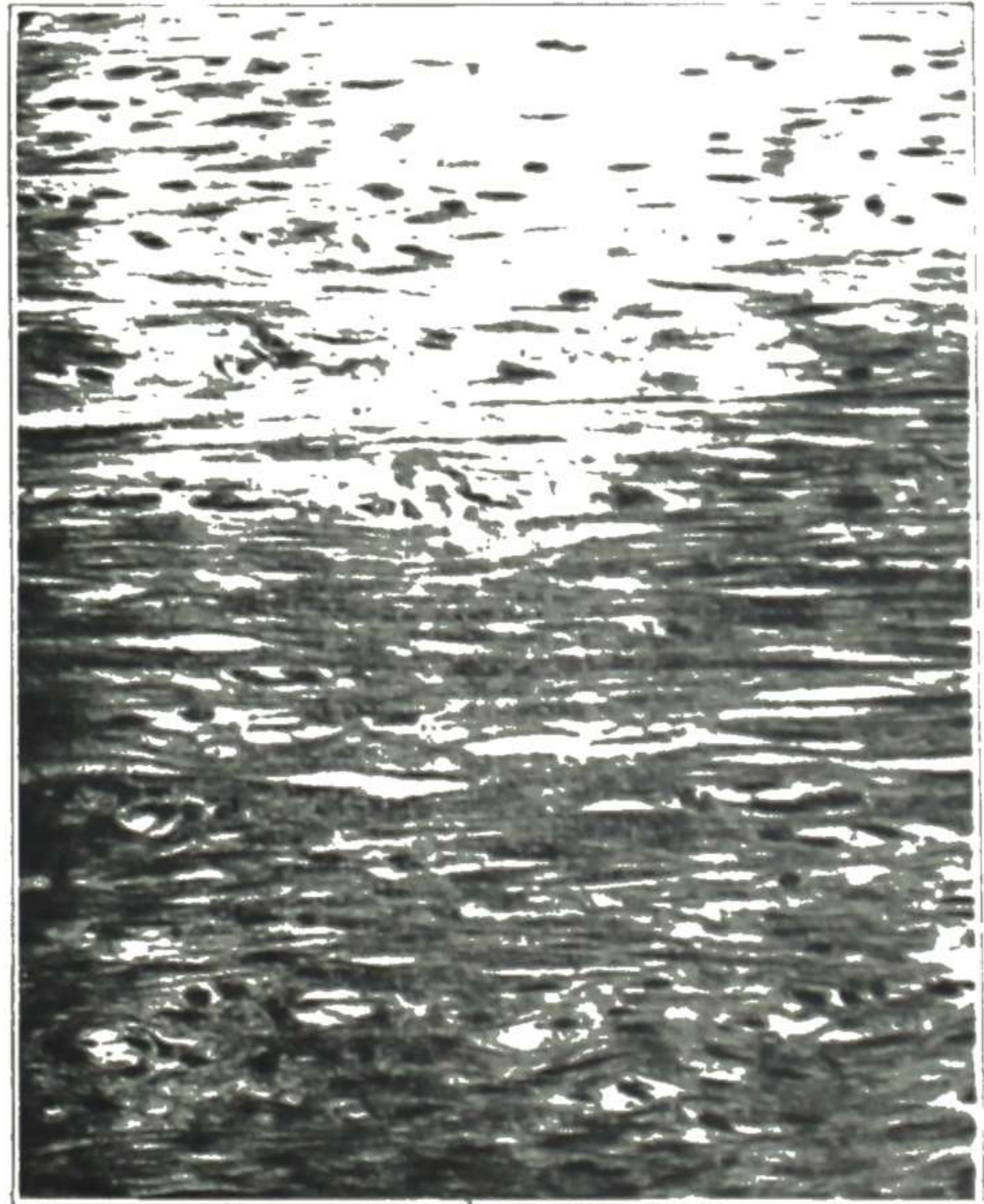


Fig. 708.      Fig. 709.

Fig. 708.—A view of an intact portion of the capsule shown in Fig. 707, under higher power. Notice the general longitudinal direction of the fiber bundles due to compression.

Fig. 709.—The same capsule, under still higher power, showing the general longitudinal direction of the individual fibers. Gyn. Lab.

On the other hand, if the myoma pushes outward as it develops it may come to lie just beneath the peritoneum, where it is known as a subserous or **subperitoneal myoma**. Several of these are shown in Fig. 704. They comprise from 20 to 30 per cent of the cases. This process of escape from the grasp of the muscular tissue may progress, the tumor projecting farther and farther beyond the outline of the uterus but still covered by the peritoneum, until it is attached to the uterus only by a comparatively narrow band of tissue, or pedicle, carrying the blood vessels and covered by peritoneum. It is then a **pediculated subperitoneal myoma** (Fig. 715).

In some cases adhesions to adjacent structures are formed, and through these adhesions the tumor may receive part of its blood supply. Occasionally

the pedicle of such a tumor is severed by torsion or otherwise, and the tumor is thus entirely separated from the uterus and receives its blood supply through the vascular adhesions. Such a tumor is known as a detached or ''parasitic'' or **wandering myoma,** and constitutes one of the curiosities of pathology. Many curious and instructive examples of parasitic myoma, as well as of all other types, are described and beautifully illustrated in that remarkable monograph by Cullen and Kelly, *Myomata of the Uterus.*

If a tumor which is escaping outward from the grasp of the muscular wall is so situated that it projects into the broad ligament, it is known as an **intraligamentary myoma.** If it projects in such a situation that it raises the peritoneum behind the uterus and passes back of the peritoneum, it is then called a **retroperitoneal myoma.**



Fig. 710.—A myomatous uterus laid open, showing submucous myomas encroaching on the uterine cavity and distorting it. Gyn. Lab.

The early stage of the myoma as an intramural or interstitial nodule, its gradual push toward the uterine cavity or toward the peritoneal surface as it grows, and the various relations to the uterine wall which it may occupy are summarized in Figs. 716 and 717.

Most myomas are found in the body of the uterus, as indicated in the various illustrations. In a certain proportion of cases the myoma is situated in the cervix. Bland-Sutton found in a series of 500 cases that 5 per cent were **cervix myomas.** These are more often single, and rarely project into
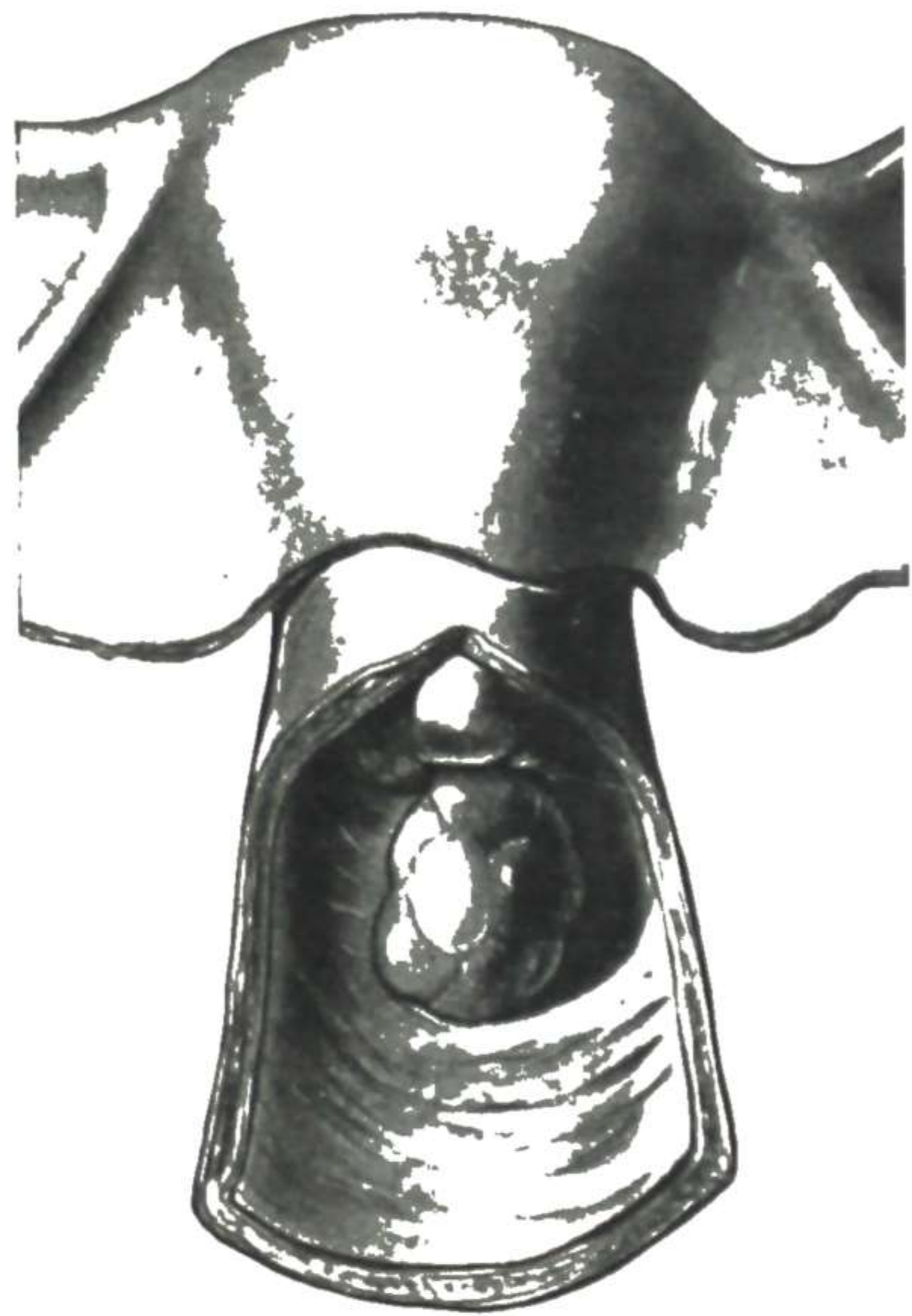
Fig. 711.

Fig. 712.

Fig. 711.—Two small myoma nodules in the uterine wall. There is also a polyp of the endometrium becoming pediculated, which is shown against the white paper slipped behind it.

Fig. 712.—A small pediculated myoma of the uterus, projecting into the vagina. (Montgomery—*Practical Gynecology.*)
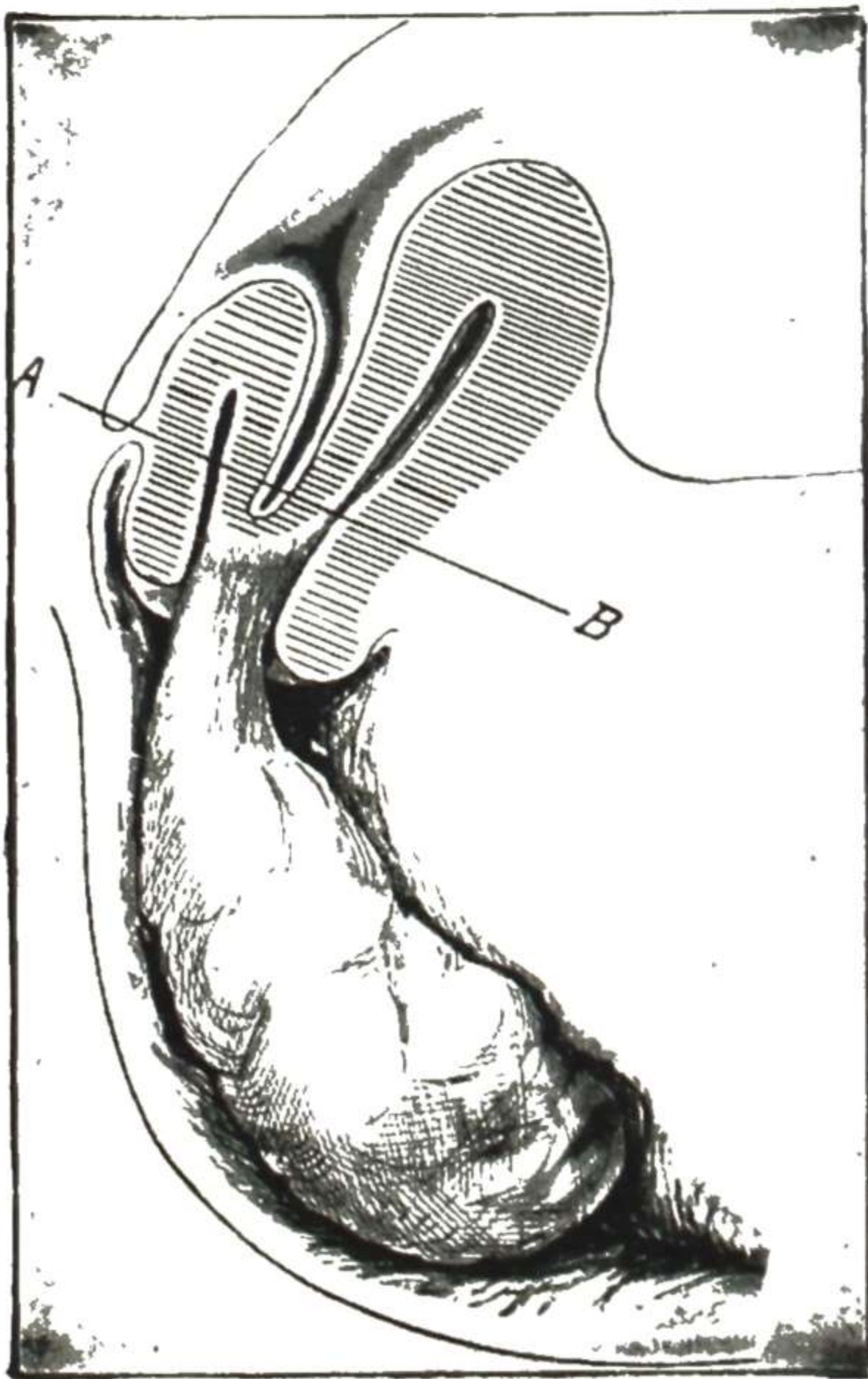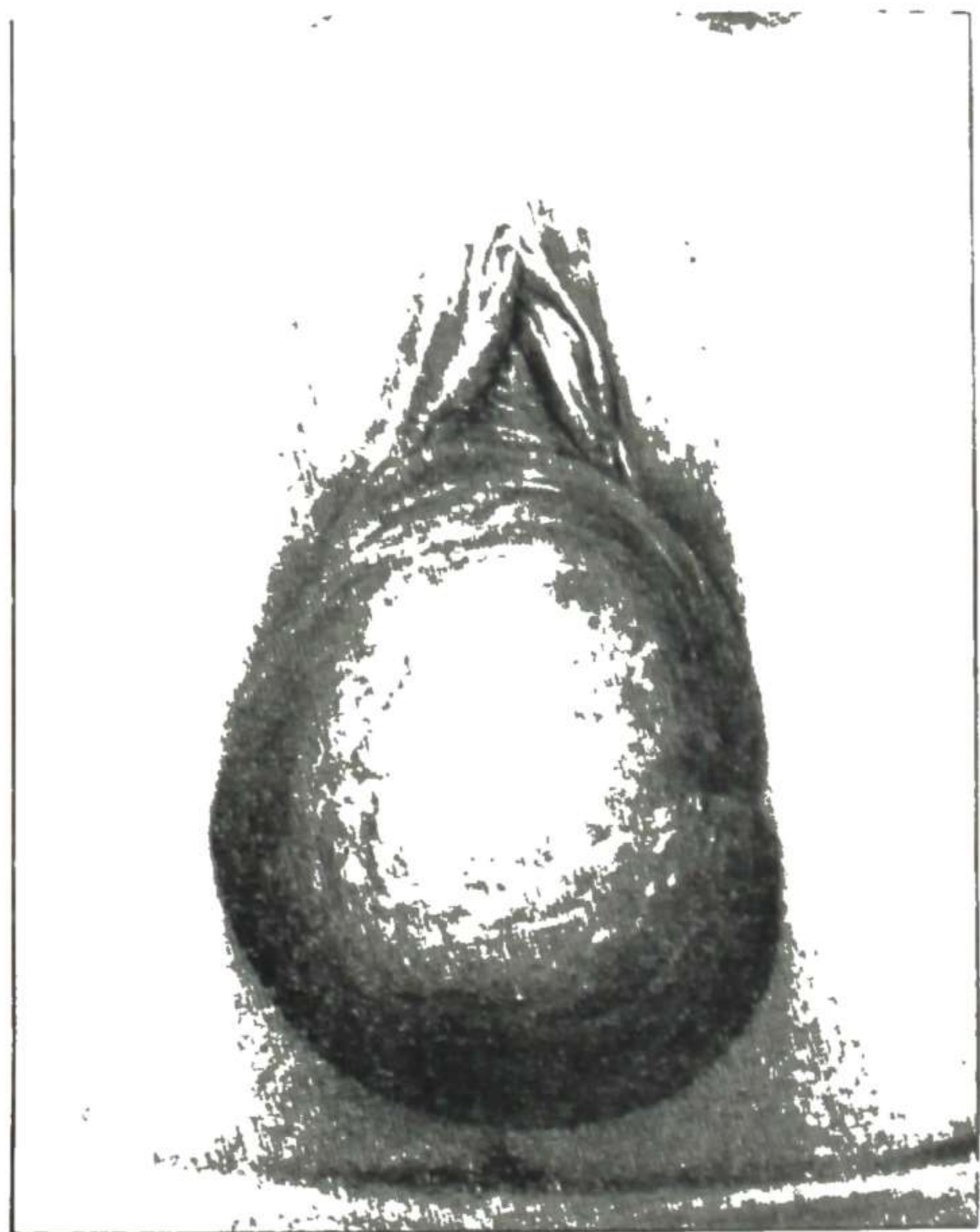


Fig. 713.

Fig. 714.

Fig. 713.—A pediculated myoma causing inversion of the uterus. This shows also a danger to be avoided in treatment. Amputation of the myoma by cutting across the pedicle at the level of the line *A-B*, would open the peritoneal cavity. (Thomas and Munde—*Diseases of Women.*)

Fig. 714.—A large pediculated myoma of the uterus, projecting outside the vagina. (Kelly—*Operative Gynecology.*)

the cavity, as the cervical cavity is small. They are usually comparatively small, but sometimes reach a size of eight pounds.

3. **Adenomyoma, Adenomyosis.**—In addition to the ordinary encapsulated myoma, there is a kind containing glands. These glands resemble the glands of the endometrium and are often surrounded or partly surrounded by a layer of endometrial stroma (Figs. 718, 719). The scattered islands of endometrial tissue exhibit the characteristic feature of the endometrium, that is, they men-
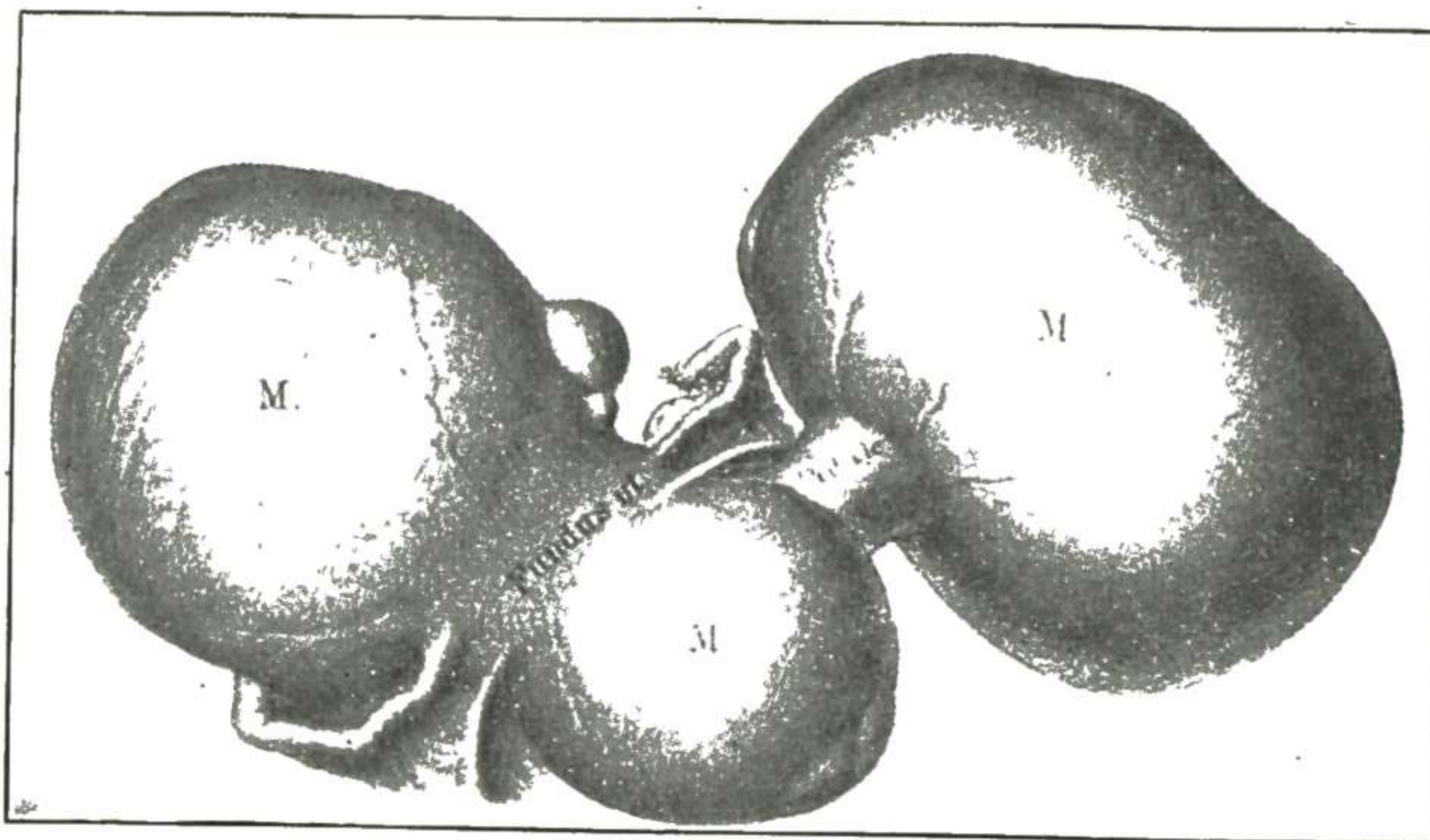


Fig. 715.—Subperitoneal myomas, showing the irregularity and distortion often present. (Kelly —*Operative Gynecology.*)
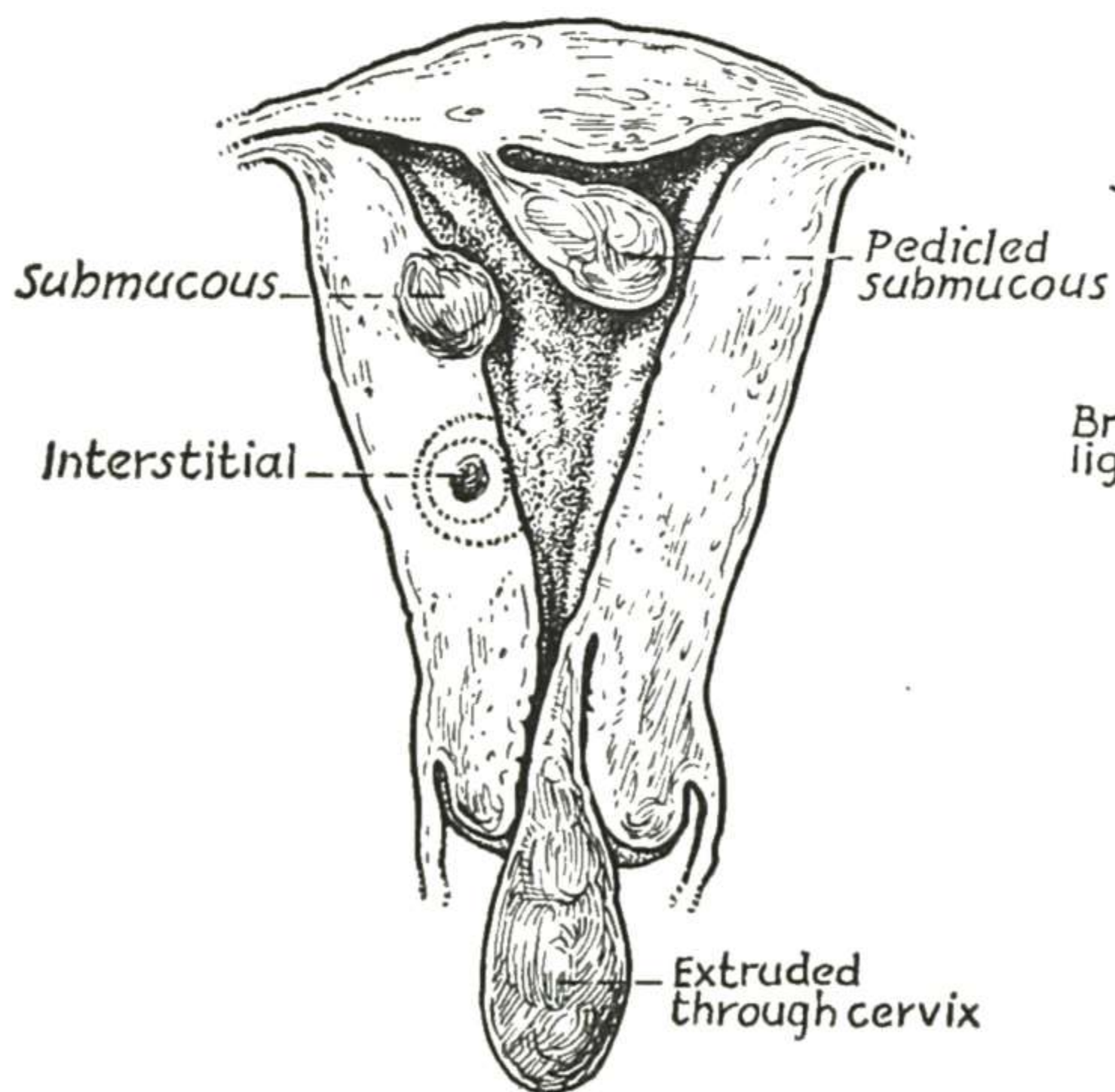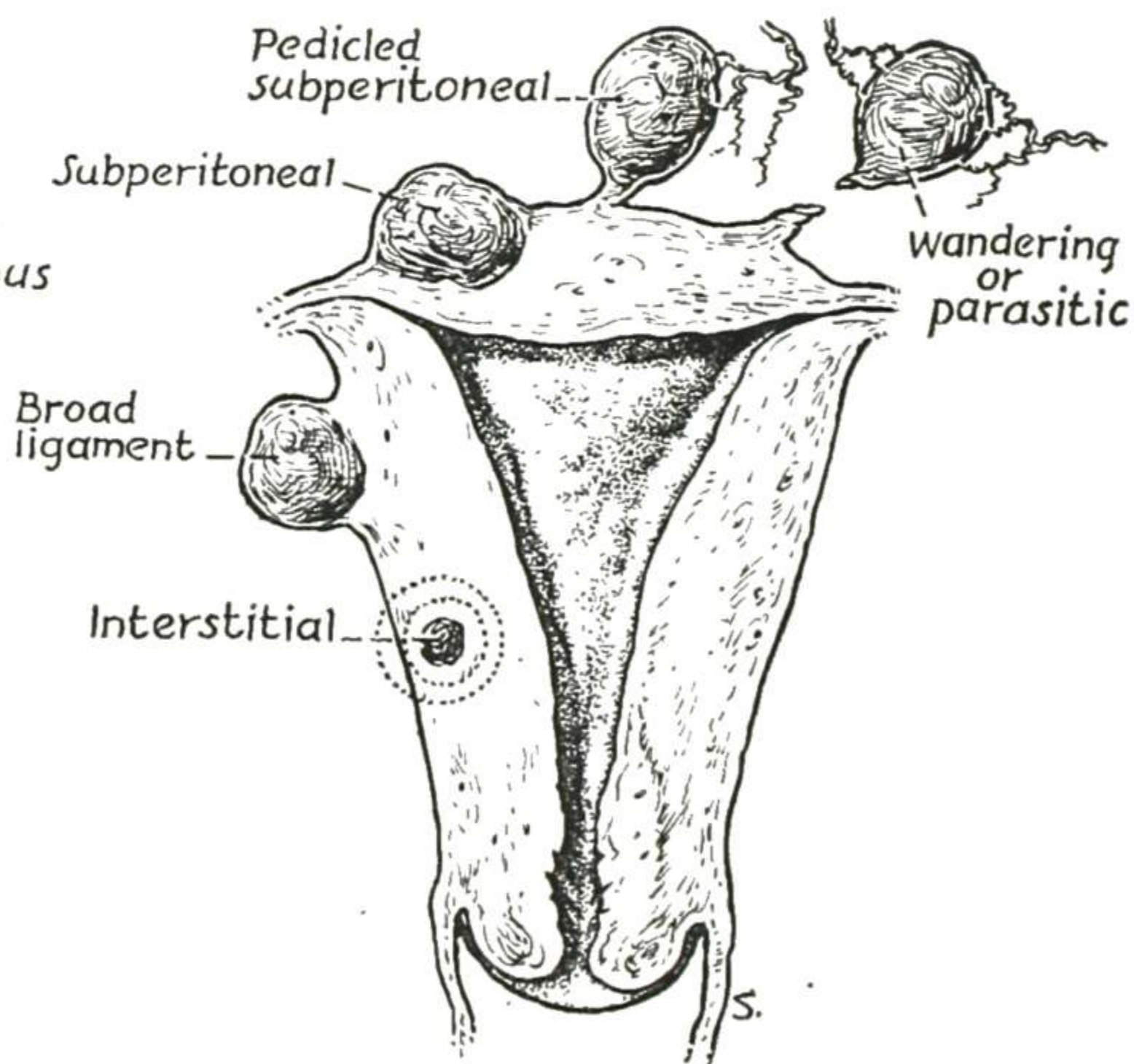


Fig. 716.

Fig. 717.

Fig. 716.—The development of different types of submucous myoma.
Fig. 717.—The development of different types of subperitoneal myoma.

struate. There being no exit for the menstrual blood, it accumulates in the closed glands, distending them and giving rise to much menstrual discomfort.

In its relation to the uterine wall the adenomyosis differs radically from the ordinary myoma. The gland growth is not encapsulated, as a rule, but penetrates the surrounding tissue in a way that makes separation very difficult. In the localized growths the margins fuse with the adjacent portions of the uterine wall, while some growths assume the form of a diffuse infiltration involving a smaller or larger part of the organ. Otherwise adenomyosis

bears the same relation to the wall as the ordinary myoma, i.e., tumors formed by the process may be interstitial, subperitoneal, pediculated subperitoneal, wandering submucous, and pediculated submucous. Extension of an adenomyoma to the surface of the uterus, or accompanying endometriosis, may form dense adhesions to adjacent organs.

The term ''adenomyosis'' is used as a general term for penetration of the uterine wall by endometrial glands, whether they come from the endometrium inside the uterus or from endometrial cysts of the ovary. The term ''adenomyoma'' is used to designate distinct tumor formation, which may, or may not, occur in the progress of adenomyosis. On the other hand, the process may be diffuse, as shown in Figs. 720 and 721 in which the endometrial glands penetrate the myometrium in all directions. In adenomyosis, epithelial elements in the form of gland tubules are scattered irregularly in the muscular tissue, and in these small closed cavities the endometrial elements menstruate at the menstrual time.
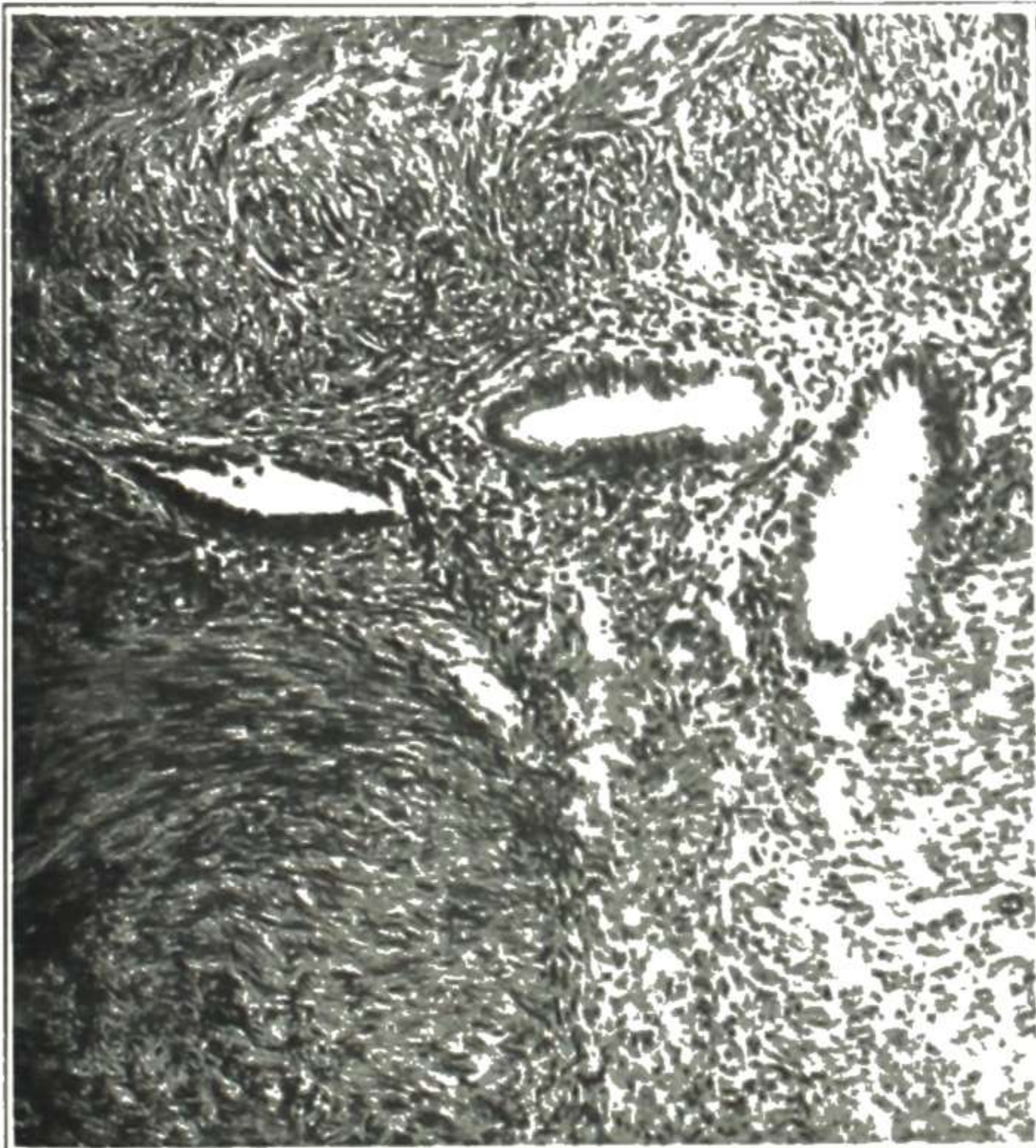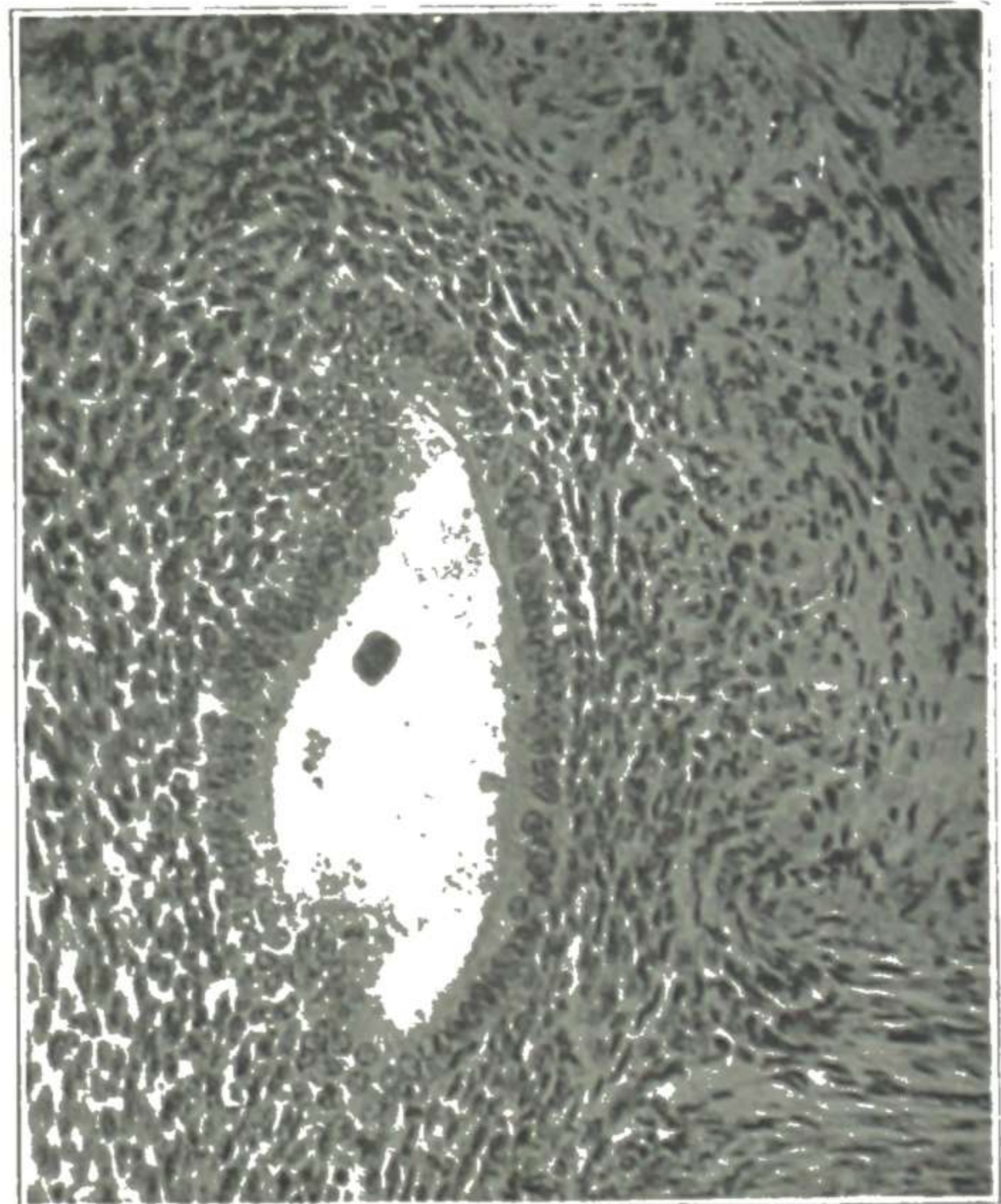


Fig. 718.

Fig. 719.

Fig. 718.—Showing typical glands in an adenomyoma. The specimen consisted of a very small subperitoneal myoma nodule, which was clipped off during the course of an abdominal operation without disturbing the uterus.

Fig. 719.—Higher magnification of a gland from the adenomyoma, showing the surrounding area of endometrial stroma. Gyn. Lab.

This blood accumulation in the closed gland tubes is a striking feature of adenomyosis, whether diffused or in the form of a local tumor (adenomyoma). Adenomyosis, diffuse or localized, is found in from 5 per cent to 6 per cent of myoma cases. It is found most frequently, according to Cullen, between the ages of thirty and sixty. The Mayo statistics show that 65 per cent of the married patients with adenomyosis had children.

There has been no satisfactory explanation as to why the endometrial glands invade the muscle. It is probable that after menstruation the remaining fundus of an endometrial gland grows a little deeper into the underlying muscle than usual and is pinched off from the overlying endometrium. Bits of endometrium may be carried deeply into the wall by the lymphatics or the veins, and then start to grow in the new location.

This extension outward of the glands into the uterine muscle area has been traced directly in a number of cases. Probably most of the cases of uterine adenomyosis arise in this way. The other method of origin is from ovarian endometrial cysts. The endometrial cyst forms adhesions to the uterus, and the endometrial tissue grows into the uterine wall

and thus starts an adenomyosis there. This method of origin accounts for those cases of adenomyosis at the peritoneal surface of the uterus entirely separate from any connection with the uterine endometrium.

The adhesions formed by adenomyosis are particularly serious, as these growths tend to infiltrate and fuse with adjacent structures. Adhesions thus formed with the rectum, bladder, and intestinal loops are very difficult of separation and constitute a serious menace in the operative treatment of adenomyomas, as they do in endometriosis.



Fig. 720.—Diffuse adenomyosis of uterus, gross specimen. The entire uterus shows thickening of the walls due to a coarse adenomyomatous growth, as shown in Fig. 721. Gyn. Lab.

**4. Secondary Changes.**—We have already given the primary structure of the different forms of myoma. In many cases there are found secondary changes in the tumor structure. Various types of degeneration occur. In fact,

it is unusual to find a large myoma without degeneration of some kind. Frankl believes that the cause for the frequent occurrence of degeneration in these growths is to be found in the course of the nutritive artery entering the myoma. He states that as the myoma grows it rotates in its capsule. This causes the artery, which formerly entered in a straight line, to be bent at a right angle



Fig. 721.—Section of the wall of specimen shown in Fig. 720. Notice the large gland areas extending through two-thirds of the wall. There is a peculiar coarseness of detail in these areas that causes the photomicrograph to resemble a drawing. Gyn. Lab.



Fig. 722.

Fig. 723.

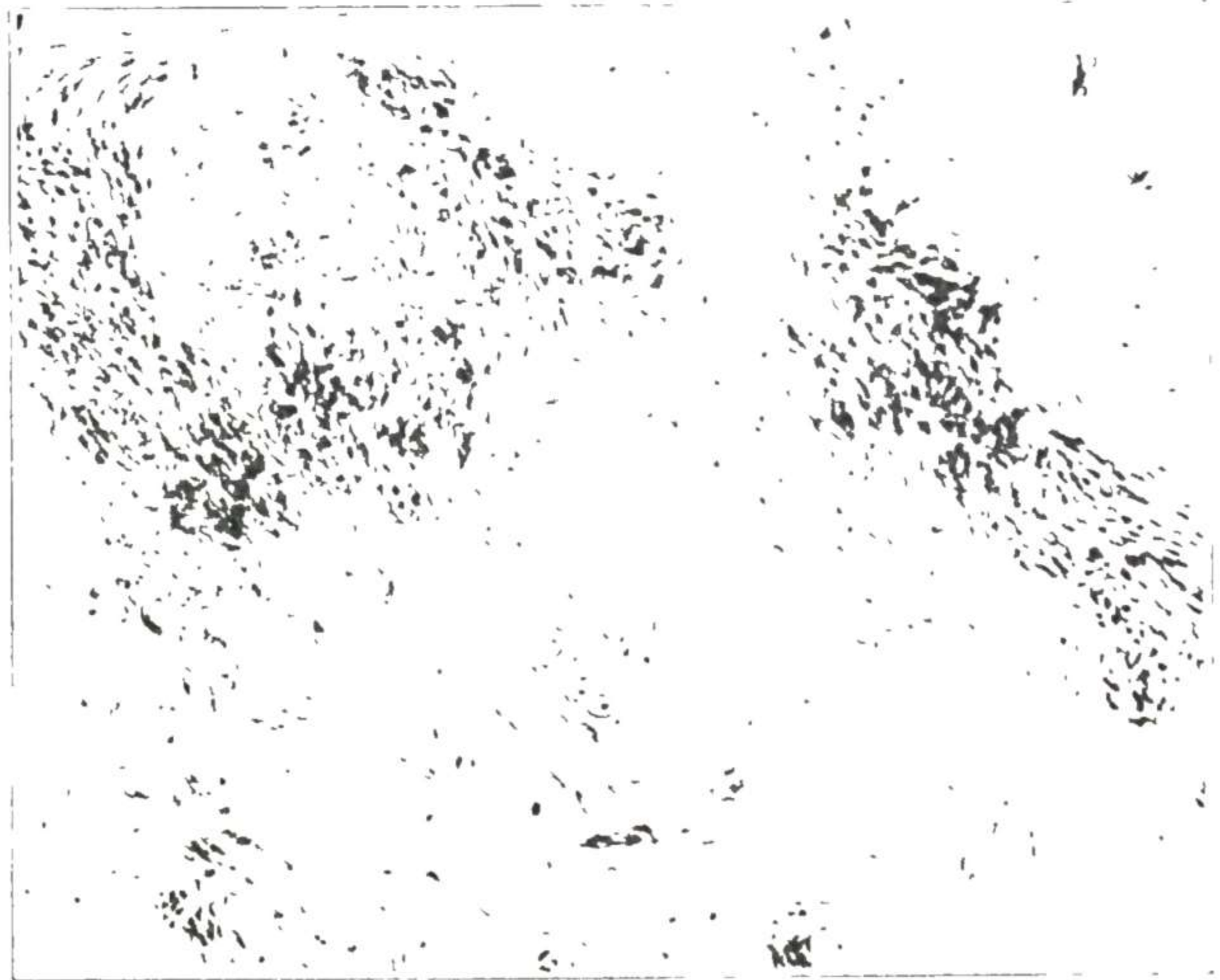Figs. 722 and 723.—Hyaline degeneration in a myoma. Fig. 722, Low power. Fig. 723, High power. Gyn. Lab.

at two places—first, at the inner surface of the capsule, and second, where it enters the tumor proper. With these two likely points of compression it is not surprising that the nutrition to the growth is frequently impaired and that the degeneration usually starts at the center of the tumor.

The secondary changes found on detailed examination of removed myomas include edema from circulatory disturbance, hyaline degeneration, red degeneration (a circulatory disturbance principally associated with pregnancy), myxomatous (mucoid) degeneration, cystic formation, suppurative necrosis, calcification, sarcomatous degeneration, and other rarer changes (atrophy, fatty change, amyloid change).
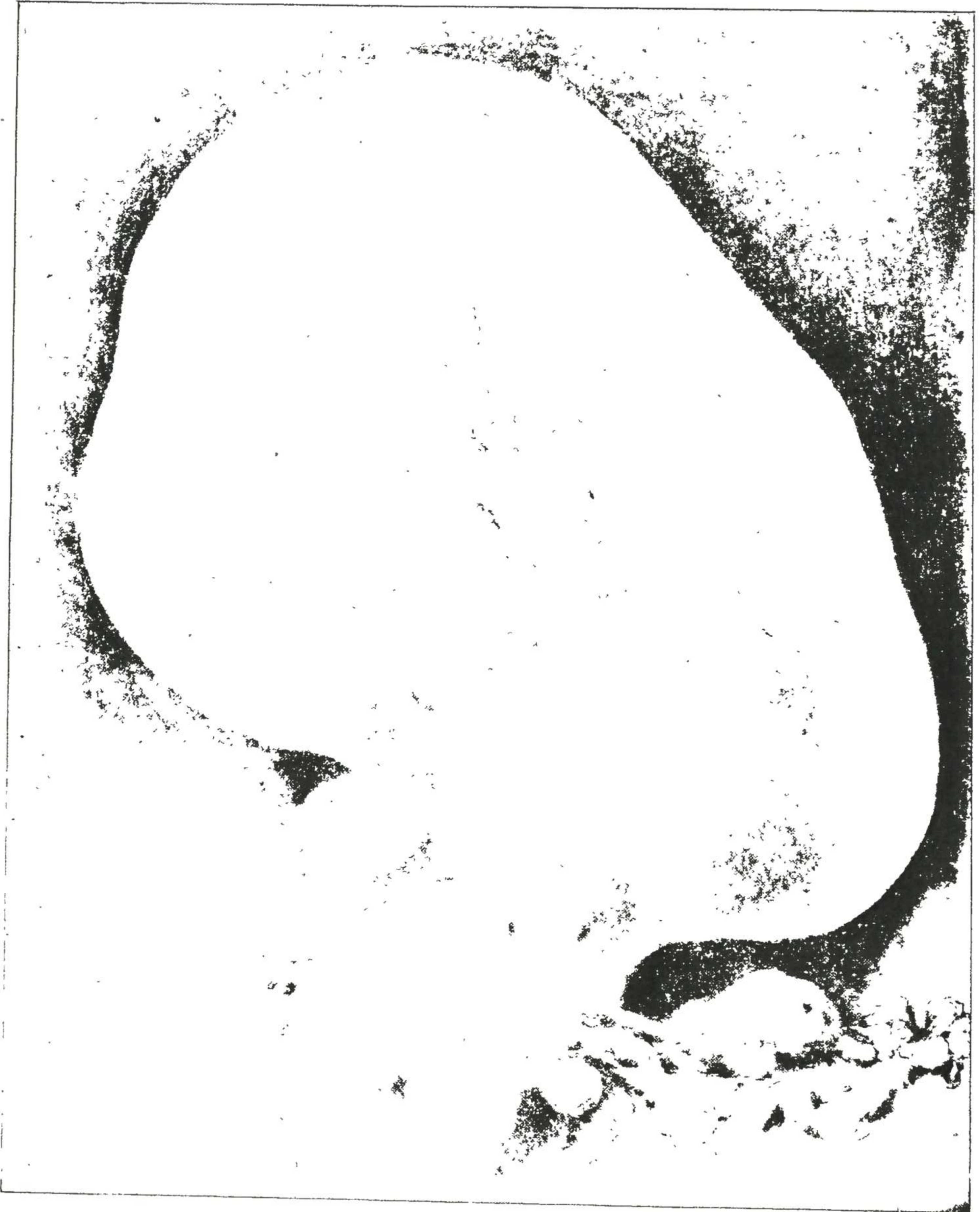


Fig. 724.—A subperitoneal myoma showing an unusually large area of the white stage of necrobiotic degeneration. Drawing made from the fresh specimen, shortly after operation by the senior author. The color reproduction is accurate. The strange whiteness was very striking in contrast with the normally vascularized portion. The necrobiotic part was firm throughout and presented a fairly uniform appearance—no cavities nor malignant areas. Gyn. Lab.

Fig. 725.—Red degeneration in a myoma nodule (lower one) so marked that it shows well in this ordinary photograph of the specimen. Gyn. Lab.



Fig. 726.—Red degeneration of a myoma. Drawing made from the fresh specimen shortly after removal by the authors. The tumor caused symmetrical enlargement of the uterus and was so soft that it gave perfect fluctuation. Examined after the abdomen was opened, the organ felt exactly like a pregnant uterus. However, the color of the peritoneal surface of the uterus had not the usual bluish tinge of pregnancy, and the record of persistent bleeding ruled out a normal pregnancy. Incision of the uterus revealed the condition shown above. The large, dark red mass was soft and edematous and much too large for the confining capsule of muscle wall Notice how it bulges and rolls out over the sides. Gyn. Lab.

The frequency of secondary changes in myoma is indicated by an analysis of 1815 reported cases, consisting of nine series of consecutive cases in which degenerations were noted. In this combined series secondary changes of some kind were found in about 20 per cent of the cases. Malignant disease, as sarcomatous degeneration or associated carcinoma, was encountered in 3.6 per cent, suppuration in 5 per cent, necrosis from other causes in 4.7 per cent, cystic change in 3 per cent, and some calcification in about 2 per cent.
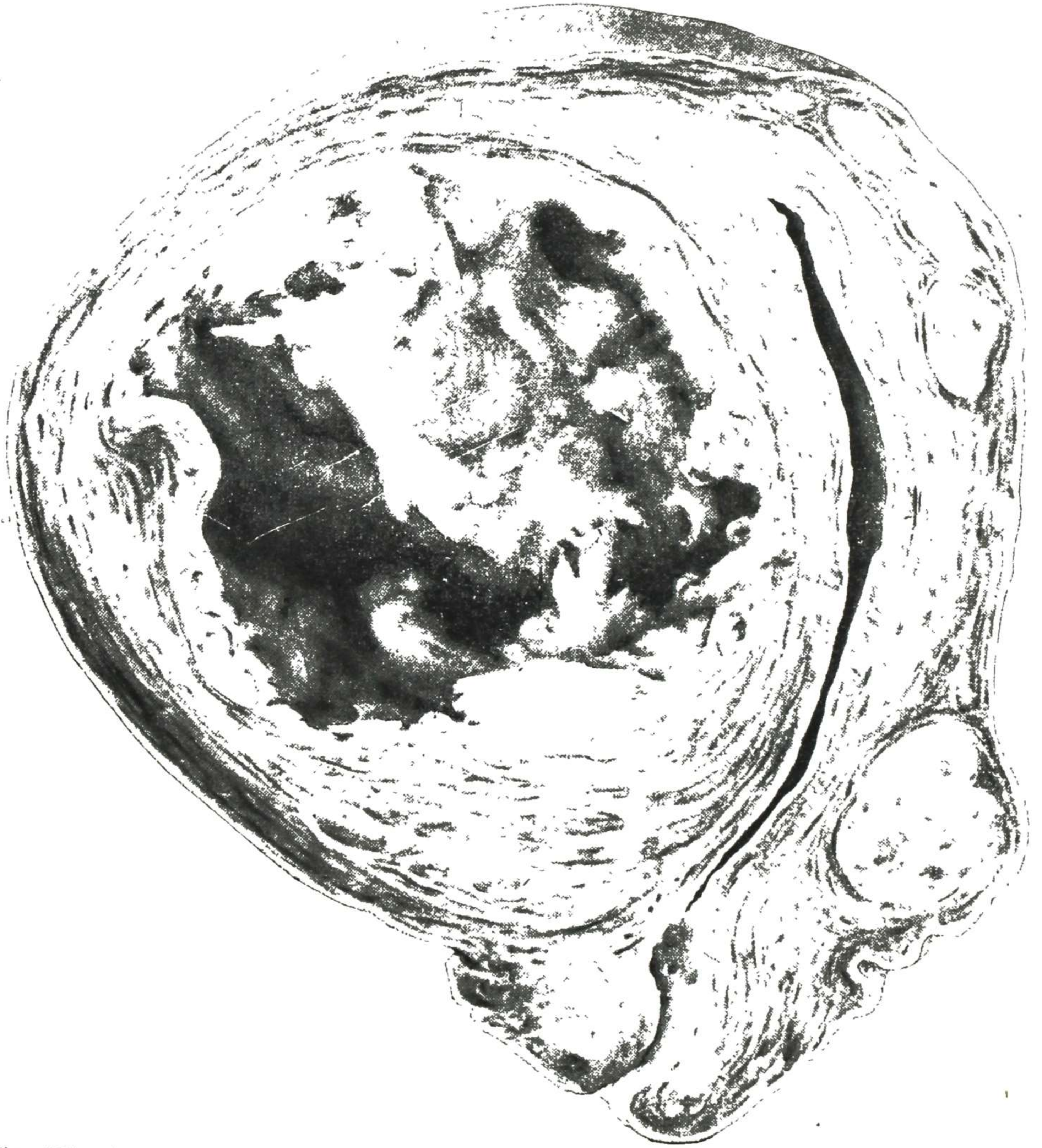


Fig. 727.—Cystic cavity forming in the largest of the numerous intramural nodules of a myomatous uterus.

A frequent type of secondary change is *hyaline degeneration*. This process may go on to liquefaction, and hence is one of the etiological factors in the formation of cystic areas in myomas. Such a liquefied and cystic spot, if large enough to be felt on examination as a soft area, may throw doubt on the diagnosis of myoma. If the soft area be small, the surrounding solid portion of the

Fig. 728.—A large cystic myoma. (Kelly—*Operative Gynecology.*)



Fig. 729.—Necrosis of an intraligamentary myoma. (Hirst—*Diseases of Women.*)

myoma makes the diagnosis clear, but if the cystic part be large, as occasionally happens, it may lead to a mistaken diagnosis of ovarian cyst.

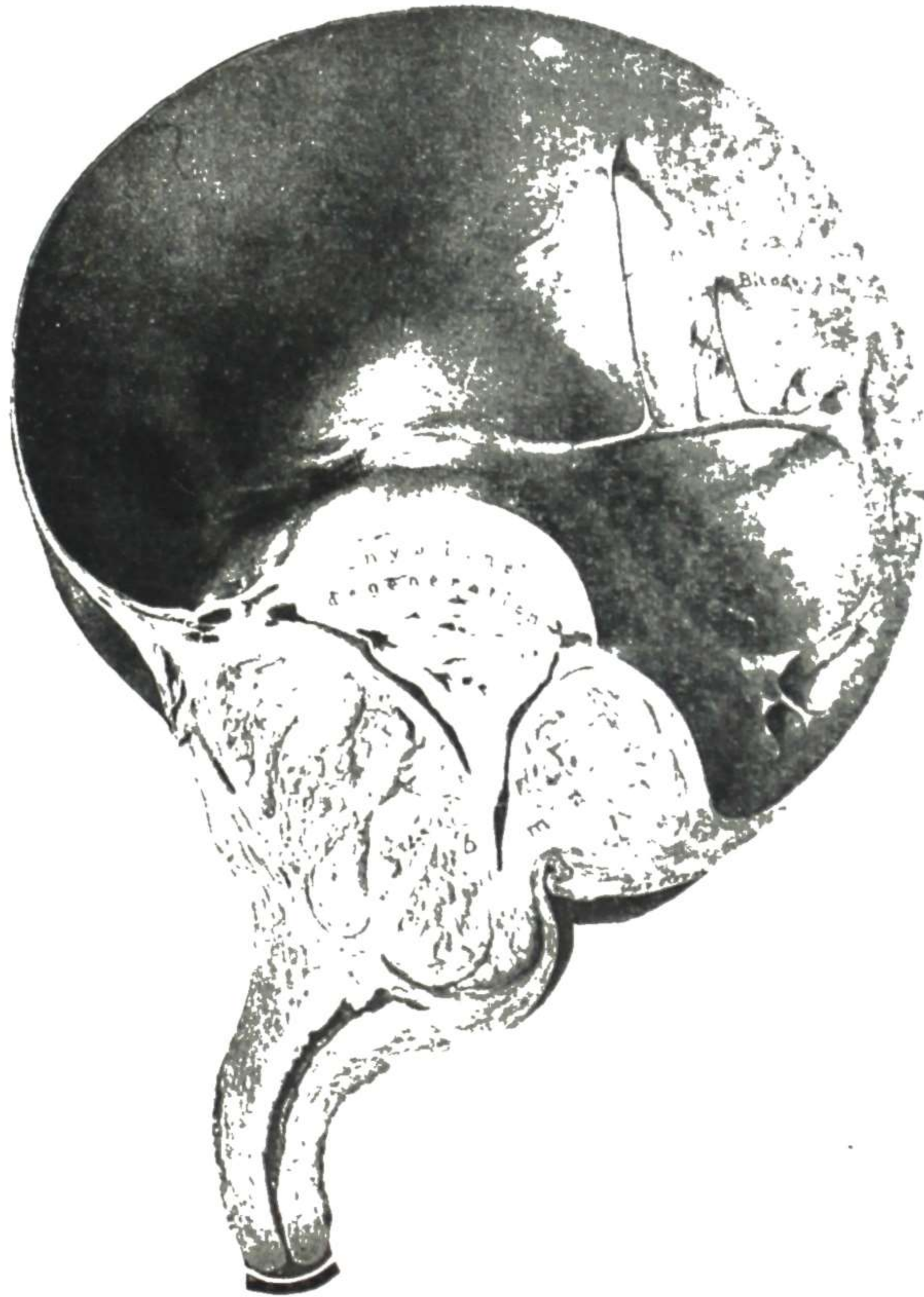In the early stage of this necrobiotic process, before the conversion into homogeneous translucent material, the affected area has a white appearance. This feature is shown microscopically in Figs. 722 and 723. Ordinarily an area
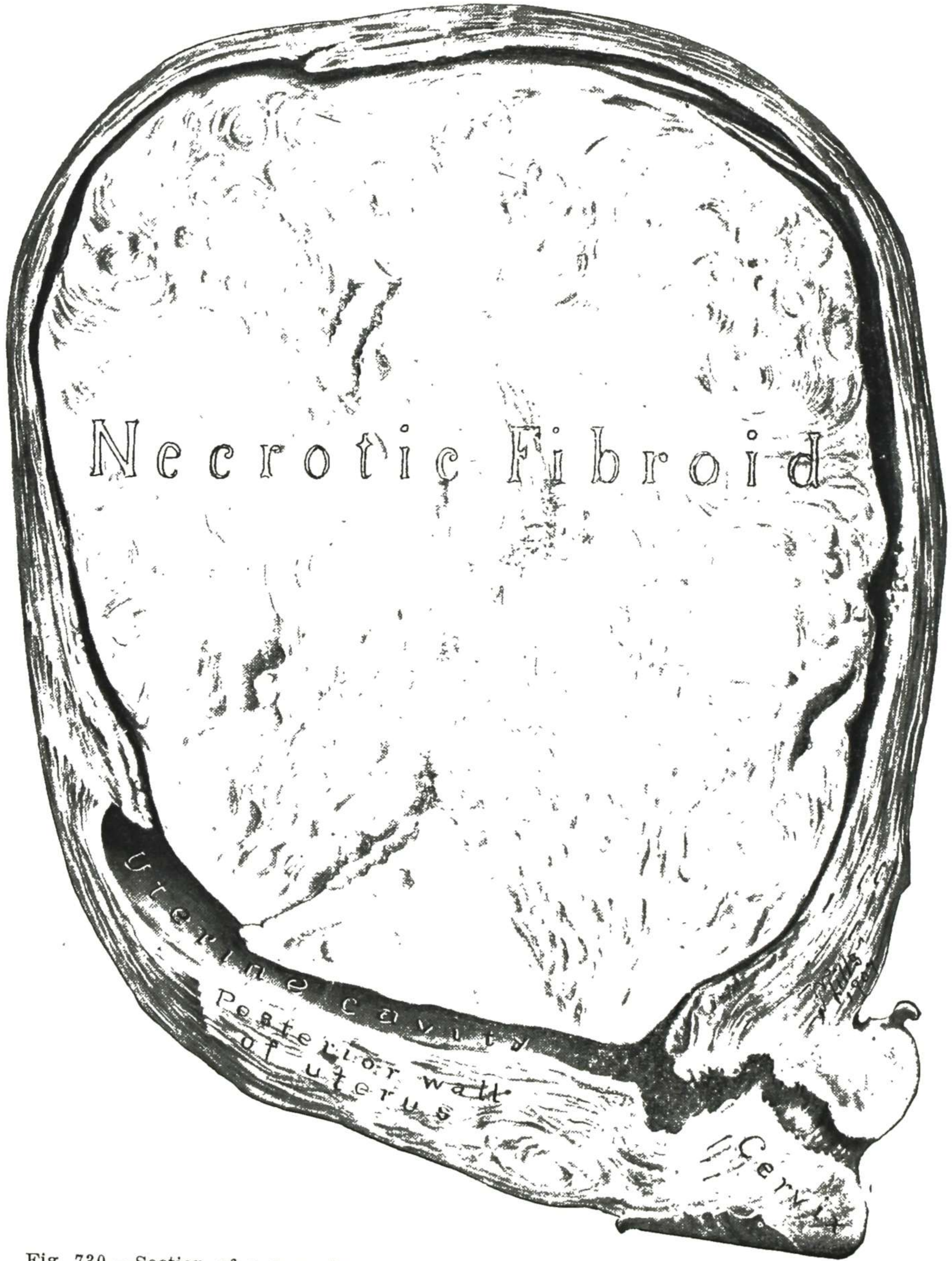


Fig. 730.—Section of a necrotic myoma. The senior author saw the patient in consultation with Dr. C. O. C. Max. There was a large myoma extending nearly to the umbilicus, which had become necrotic from infection due to the introduction of a uterine sound by a midwife for abortion of a supposed pregnancy. The patient was in a desperate condition. At the operation it was found that the necrotic myoma had perforated the uterine wall and was in contact with the omentum. This anteroposterior section of the removed uterus and tumor shows accurately the relation of the necrotic mass to the uterine wall. It was almost free in its suppurating bed. The perforation into the peritoneal cavity was at another part of the mass. Gyn. Lab.

progresses to definite hyaline material and on to liquefaction while new white areas are forming. Occasionally the early stage of the process affects a very large area at once, a beautiful specimen of which is shown in Fig. 724.

Another interesting secondary change is *red degeneration*. Though this is usually associated with pregnancy, circulatory disturbance about the tumor may cause it in the nonpregnant, as in the specimens shown in Figs. 725 and 726. The red color is due to marked hemolysis occurring in the tumor. Microscopically numerous fragments of blood cells are seen and, as to tissue cells, the central portion of the degenerated area shows cell outlines with no nuclei

Fig. 731.—A large pediculated submucous myoma which suppurated and the greater part of which became necrotic, only the shell remaining. This collapsed shell is seen lying in the vagina. Gyn. Lab.

(the so-called "ghost cells"), while toward the periphery the usual muscle cells appear. Myomas with *cystic formation* from noninfective necrobiosis are shown in Figs. 727 and 728.

In *infective necrosis,* the infection may reach the myoma from within the genital canal or from adjacent structure or by way of the blood stream. The ensuing inflammation causes swelling of the growth within its capsule, which in turn interferes with its circulation and leads to necrosis, which may involve a part of the tumor or all of it. A small area of suppurative necrosis is shown
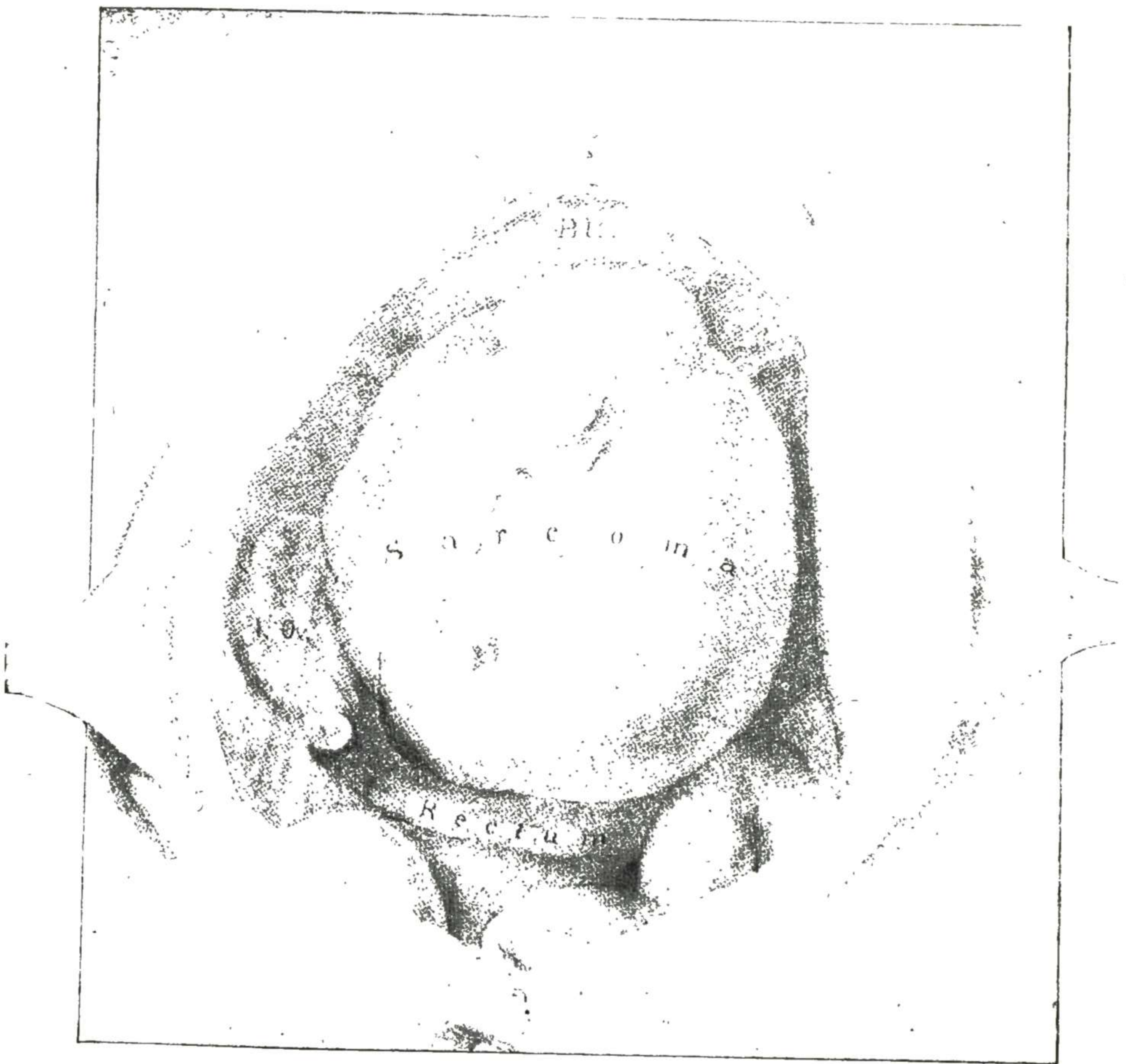


Fig. 732.—A sarcoma developing in the cervical stump, after a supravaginal hysterectomy for a supposedly simple myoma. After the development of the sarcoma the original tumor was sectioned and examined and several areas of sarcomatous degeneration were found in it. (Cullen—*J. A. M. A.*)

in Fig. 729. A striking example of massive necrosis, the result of a midwife's abortion attempt, is shown in Fig. 730. Submucous pediculated myomas are particularly liable to infective necrosis. In some cases this effects a cure, the suppurating disintegrating tumor being expelled, with subsequent gradual cessation of symptoms. In other cases the suppuration of the growth may lead to a serious condition with resulting general sepsis. In Fig. 731 is shown the collapsed shell of a very large submucous myoma which suppurated and became necrotic.

Sarcomatous change may take place in the interior of a myoma, which fact must be considered in deciding on and in executing the operative work. On account of this possibility all tumors removed, particularly the larger ones, should be opened for inspection as to gross structure (to decide whether or not cervical stump and adnexa also should be removed) and later submitted to microscopic investigation, so that if any sarcomatous change is present appropriate additional treatment may be carried out promptly. Fig. 732 shows a sarcoma which developed in a cervical stump a considerable period after supravaginal hysterectomy for a supposed simple myoma.



Fig. 733.—A small epithelioma of the cervix associated with myoma of the corpus uteri. In this case the most evident lesion was the myoma, but further examination revealed induration and irregularity about the external os, with some bleeding on examination. A piece of tissue excised from the suspicious area and submitted to microscopic examination showed epithelioma.

Calcification is not uncommon, and ossification may occur. They are easily recognized as stony or bony hard areas on cutting through the tumor. Fatty degeneration may occur, giving some areas of the cut surface of the myoma a yellow color and soft consistency.

5. **Complications and Associated Diseases.**—These are very numerous and very important, for a large proportion of the suffering and fatality in myoma cases comes from them. Some of these conditions are due directly to the myoma, some are due indirectly to it, and some have no etiologic connection with the

myoma, but are only associated affections. Some of them cannot be assigned exclusively to one group or the other; therefore, all of them will be considered together. For convenience they are divided into three classes according to locality—(a) in the uterus, (b) in adjacent structures, and (c) in distant organs.

a. In the uterus is found thickening of the endometrium, distortion of the uterine cavity, with atrophy of the endometrium at pressure points, and dis-
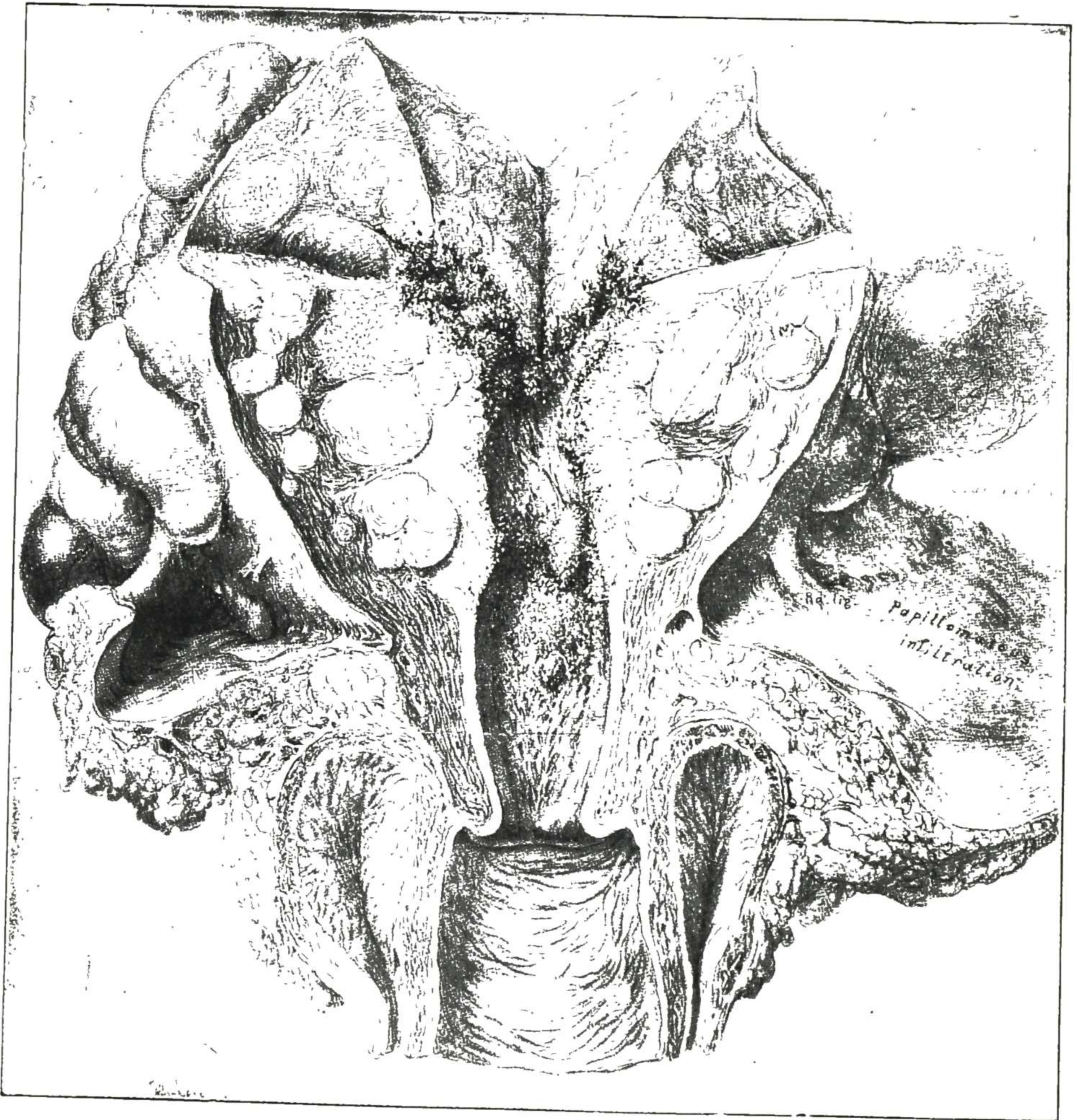


Fig. 734.—Large mass in pelvis formed by uterine myomas and carcinoma. (Cullen—*Cancer of the Uterus.*)

placements of the uterus from tumor growths. There may be marked distortion of the whole uterus. Carcinoma is an important associated disease that must be kept in mind and searched for. It may be present in the cervix (Fig. 733) or in the corpus uteri (Fig. 734). Pregnancy also is a rather frequent complication of myoma, either as an early pregnancy with a large tumor or as a more advanced pregnancy associated with a small tumor (Figs. 735, 736).

**b.** Under changes in adjacent structures come salpingitis, hydrosalpinx, and pyosalpinx. Also, compression and inflammation of the ovaries. There may be troublesome pressure on the bladder or ureters or pelvic vessels or rectum.

Adhesions to various important organs in the pelvis and lower abdomen constitute an important form of complication frequently found in myoma cases.

**c.** The changes in distant organs concern principally the heart and the kidneys. These changes are often serious. The frequent association of heart disturbance with advanced uterine fibroid has attracted much attention. The proportion of cases showing heart disturbance is striking.



Fig. 735.



Fig. 736.

Fig. 735.—Myoma and pregnancy, the tumor forming the most of the mass. (Dudley—*Practice of Gynecology*.)

Fig. 736.—Myoma and pregnancy, the pregnancy forming the larger part of the mass. (Norris, after Simpson—*American Textbook of Obstetrics*.)

Winter had 266 consecutive cases examined for heart diseases and found heart disturbance in 40 per cent. In five series carefully examined (Winter 266, Strassmann and Lehmann 71, Boldt 79, Fleck 325, Webster 210), the number showing heart disturbance varied from 25 to 47 per cent, averaging 38 per cent for the whole 951 cases. Of course, a certain number of these heart disturbances would have been found in any series of patients. But making due allowance for these the number is too marked and constant to be a mere coincidence. The exact connection between the two has not been worked out. But whether the heart disturbances are due principally to the chronic anemia from hemorrhage or to the direct action of some toxin produced in the myoma, or constitute simply an associated product of the same conditions that produced the myoma—whatever the cause—the fact remains that they are there and must be reckoned with.

Some of these are minor functional disturbances but, on the other hand, many are of serious import. That such is the case is shown by Baldy from the records of the Gynecian Hospital. In the series of 3,413 operations, sudden postoperative death due to circulatory disturbance occurred 16 times. Thirteen of these sudden deaths occurred in the 366 fibromyoma cases, while the 3,047 other operative cases furnished only 3 such deaths. It occurred 36 times as frequently in the fibroid cases as in the general run of operative cases.

Other visceral degenerations from the chronic anemia, from pressure on the ureters and from other effects of the myoma, produce fatalities due really to the myoma but attributed to other causes.

## Symptoms and Diagnosis

The **symptoms** given by the patient are, in the usual order of their appearance, (1) menorrhagia, (2) leucorrhea, (3) pressure symptoms, (4) pain and, (5) a lump in the lower abdomen.

1. *Menorrhagia.*—This is usually the first disturbance noticed, particularly in submucous and interstitial growths. There is much variation in the menstrual disturbance. Usually the flow is increased, but sometimes it is diminished. Emmet, in a series of 216 cases, found the menstrual flow decidedly increased in 50 per cent, unchanged in 20 per cent, lessened in 16 per cent, and irregular in 13 per cent.

2. *Leucorrhea* is usually present after a time, especially in the submucous and interstitial growths.

3. *Pressure Symptoms.*—These are indefinite, simply an indication that there is some slight disturbing element in the pelvis. The patient has some bladder irritability and a feeling of weight in the pelvis. There is usually constipation. After the tumor becomes large, marked pressure symptoms occur.

4. *Pain* appears later. It is usually present as a backache (lumbar or sacral) or as pain in the lower abdomen or a thigh pain on one or both sides. The pains usually come and go at first, and are worse when the patient is on her feet and also at the menstrual periods.

5. *Lump.*—In a large proportion of the cases, after some months or years a lump is noticed in the lower abdomen. If the mass is smooth, however, it is surprising how large it will sometimes get before the patient notices it. Of course a mass with nodular projections is usually noticed as soon as it begins to distend the lower abdomen. In a certain proportion of cases, the mass, even when large, is still too deeply placed in the pelvis to be appreciable to the patient, and in some cases (small submucous myoma) the mass is not appreciable to the physician, even on careful bimanual examination, though there may be much bleeding and distress.

The **diagnosis** of uterine myoma must rest on the examination findings, for the symptoms are not distinctive. Taking up the points as given in the chapter on Examination, we find as follows in the case of a fibromyoma:

1. *Position of Mass.*—In the central part of the pelvis and extending from there toward one side.

2. *Size of Mass.*—May be any size, from one barely palpable in the wall of the uterus to a large tumor filling the abdomen.

3. *Shape.*—Individual tumors are apparently spherical, but as they project from the uterus or grow beside each other, they form a mass of very irregular contour, usually presenting several distinct bosses or rounded projections outside the general outline of the mass.

4. *Consistency.*—Firm, usually much harder than the adjacent uterine wall. Occasionally part of a tumor will undergo cystic change—but even then the greater part of the mass is usually solid.

5. *Tenderness.*—Not tender, unless incarcerated in pelvis or pressing on nerves or accompanied with inflammation.

6. *Mobility.*—The tumor and uterus are movable together up and down in the pelvis, but they are not movable separately unless the fibroid is pediculated.

7. *Attachment.*—Attached in the uterine region and free elsewhere, unless complicated. But there may be conditions which fix the whole mass, due to the tumor itself or to inflammatory or other complications. A subperitoneal myoma with a long pedicle may be mistaken for a growth from some of the abdominal organs. The pedicle connecting the mass with the uterus can usually be felt on deep bimanual palpation. In a difficult case, a useful expedient is to have an assistant grasp the tumor and draw it up into the abdomen while the examiner makes deep bimanual palpation in search of the pedicle, which is thus made tense and is more easily felt. Occasionally a myoma becomes detached from the uterus or has such a long pedicle that it appears free, but that is rare.



Fig. 737.

Fig. 738.

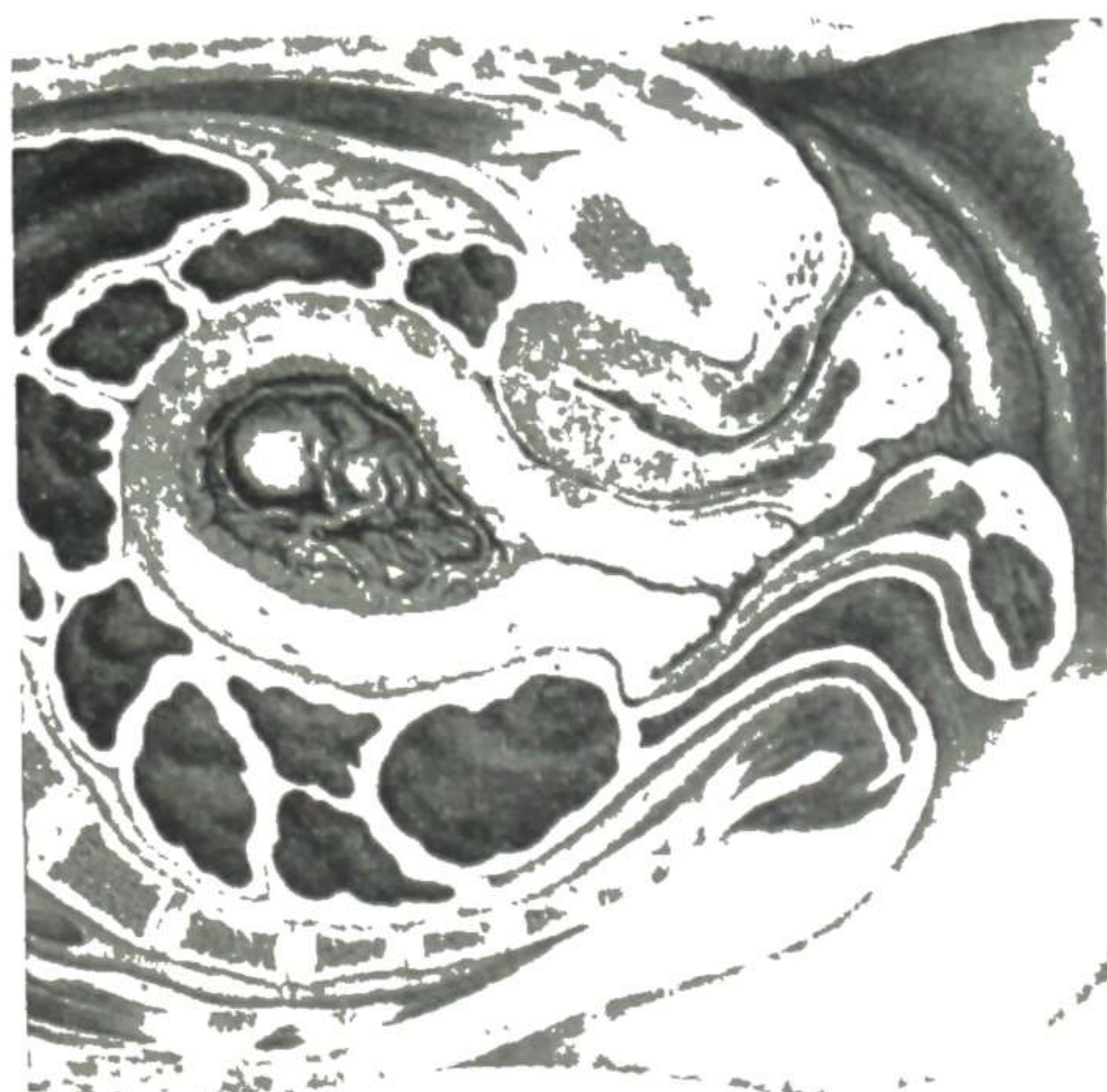Fig. 737.—Early pregnancy with marked retrodisplacement of uterus. (Edgar—*Practice of Obstetrics.*)

Fig. 738.—Early pregnancy with moderate retrodisplacement of uterus. (Edgar—*Practice of Obstetrics.*)

When making the diagnosis of myoma of the uterus, the following conditions and questions must be considered:

A. PREGNANCY must always be considered in any enlargement of the uterus, and the normal and abnormal conditions of pregnancy must be kept in mind. An enlarged retrodisplaced pregnant uterus which is still fairly firm because the pregnancy is early (Figs. 737, 738) may be mistaken for a myoma. This particular condition is responsible for most of those embarrassing situations in which, with the abdomen open, the surgeon finds that his "fibroid" is a pregnancy.

Farther along in pregnancy, the marked irregularity of the enlarging uterus occasionally found, as shown in Fig. 739, may lead to a mistaken diagnosis of large myoma with cystic change. On the other hand, a large myoma occasionally simulates the shape of the pregnant uterus, as in Fig. 740, and

if there is cystic change there may be simulation also of the cystic and solid areas of the pregnant uterus and contained fetus. An interesting article could be written on the prenatal care and obstetric waiting hours expended on large myomas. The senior author recalls particularly one such case in which he was called in consultation the second day of "labor."

B. OTHER DISEASES PRESENTING A MASS OR INDURATION, which may be mistaken for a myoma. The more common of these diseases are salpingitis with exudate, pelvic cellulitis, hydrosalpinx, pregnancy, extrauterine pregnancy, pelvic tuberculosis, ovarian or parovarian tumor, cancer of the uterus.
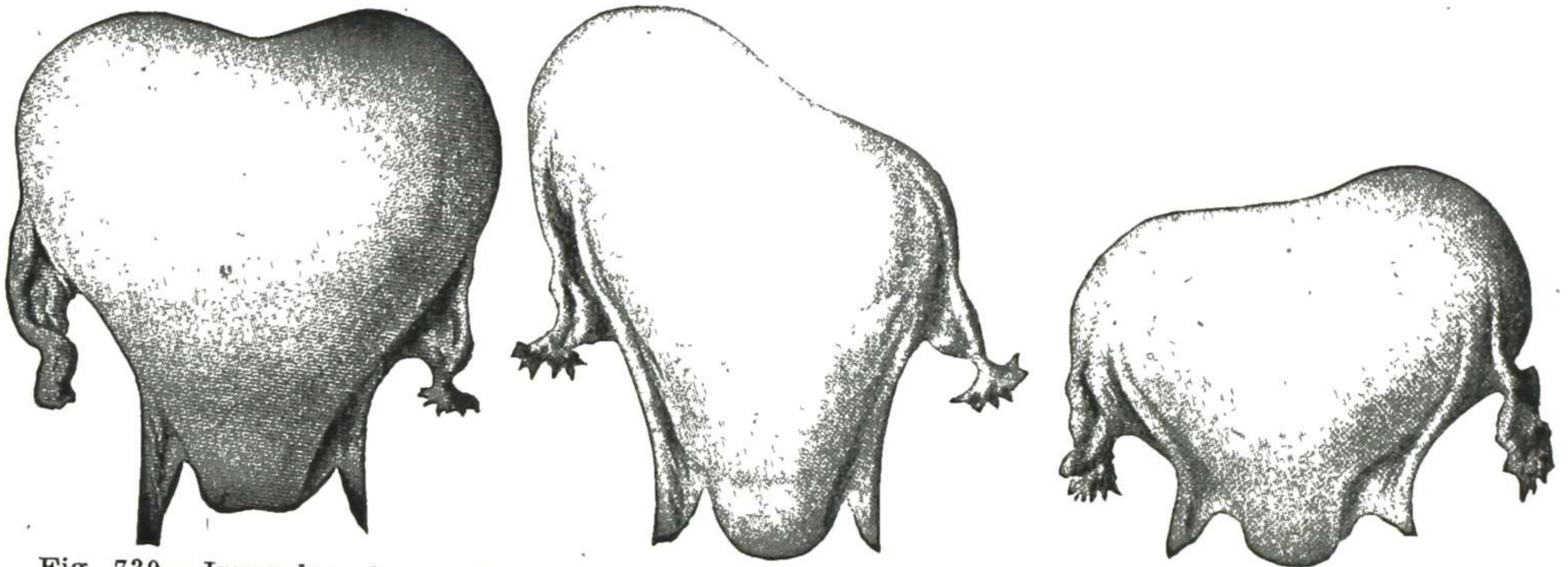


Fig. 739.—Irregular shapes that pregnant uteri may present, and which may lead to mistakes in diagnosis. (Edgar—*Practice of Obstetrics.*)
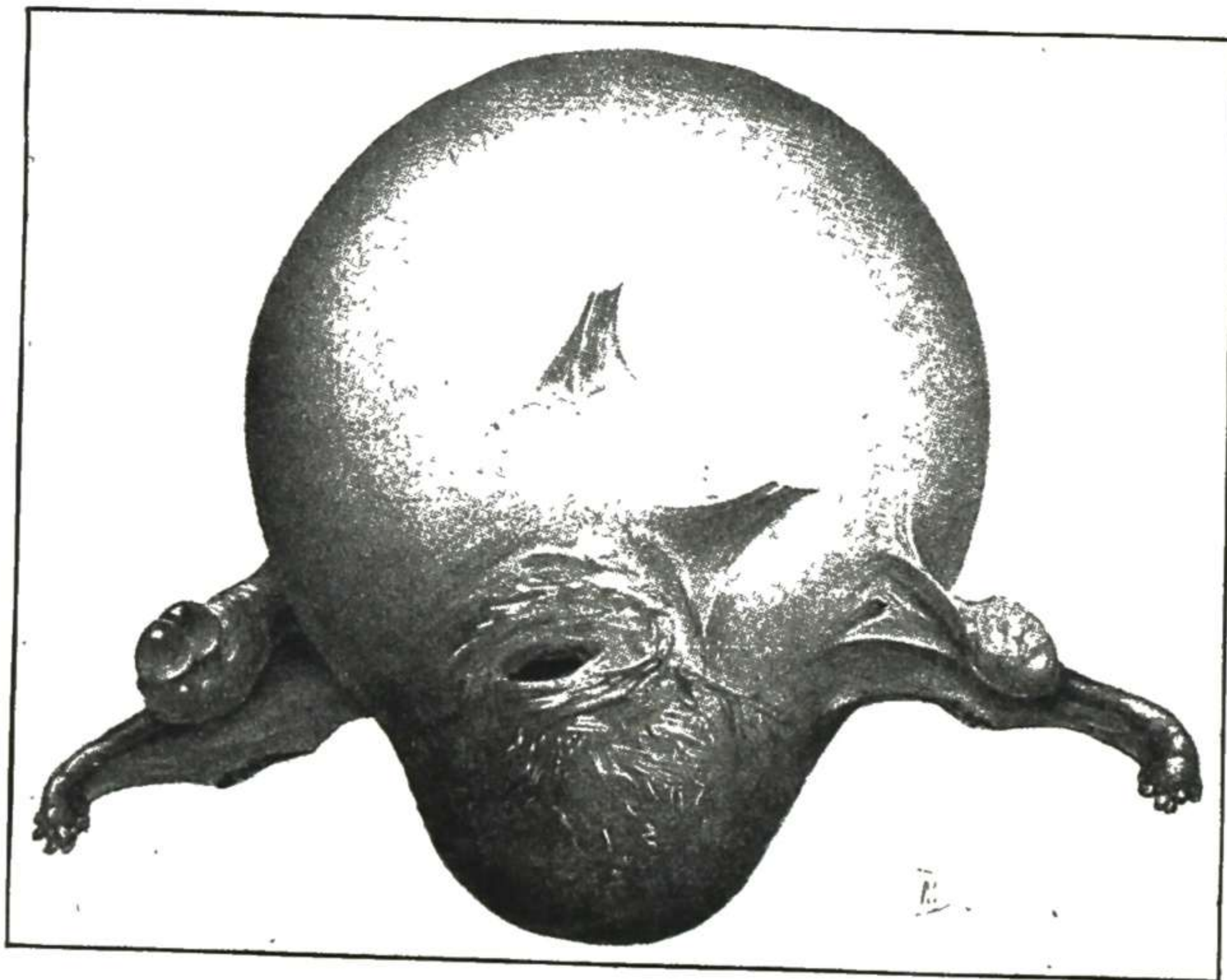


Fig. 740.—Uterus symmetrically enlarged from myomas. This might be mistaken for a pregnant uterus, on account of the close resemblance in shape. (Kelly—*Operative Gynecology.*)

C. DISEASES OF THE UTERUS WITHOUT A MASS OR INDURATION, which may be mistaken for myoma, principally on account of bleeding. For example, retrodisplaced uterus with chronic endometritis, chronic endometritis with subinvolution, carcinoma of corpus uteri, tuberculosis of uterus, prolapse of uterus, inversion of uterus (Figs. 741 to 749).

D. MYOMA WITH COMPLICATIONS. In a case presenting anomalous symptoms, the condition may be a myoma complicated with pregnancy or extra-

Fig. 741.

Fig. 742.
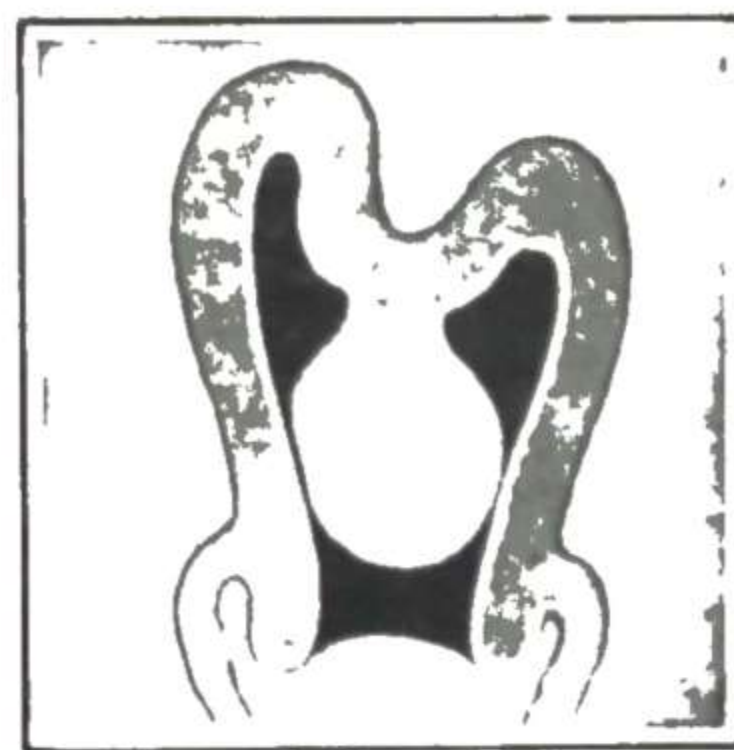
Fig. 743.

Fig. 741.—Beginning inversion of the uterus.
Fig. 742.—Submucous myoma with short pedicle.
Fig. 743.—Submucous myoma and beginning inversion.
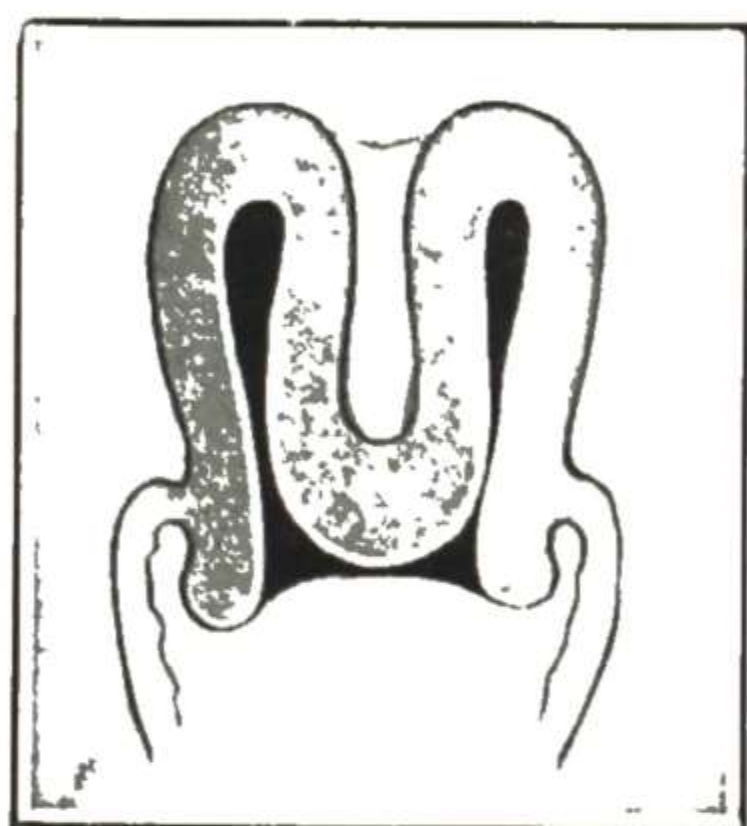


Fig. 744.
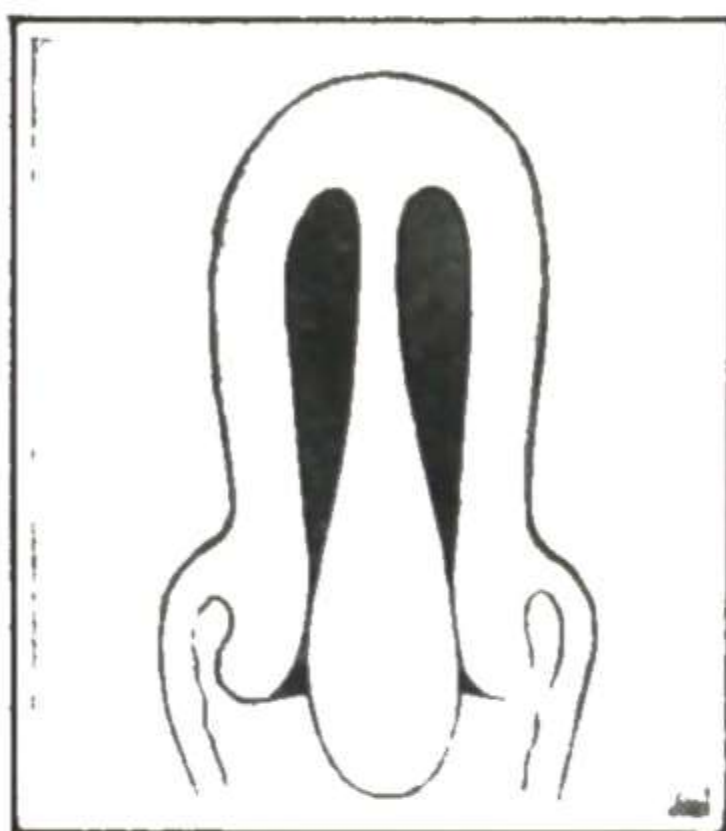
Fig. 745.
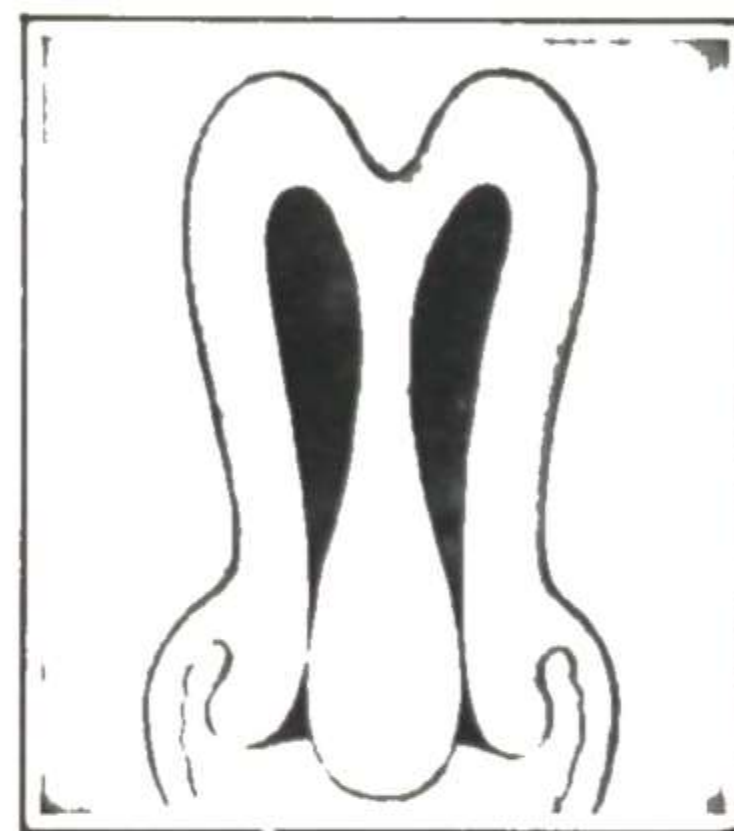
Fig. 746.

Fig. 744.—Partial inversion of uterus.
Fig. 745.—Submucous myoma with long pedicle.
Fig. 746.—Pediculated myoma and partial inversion.
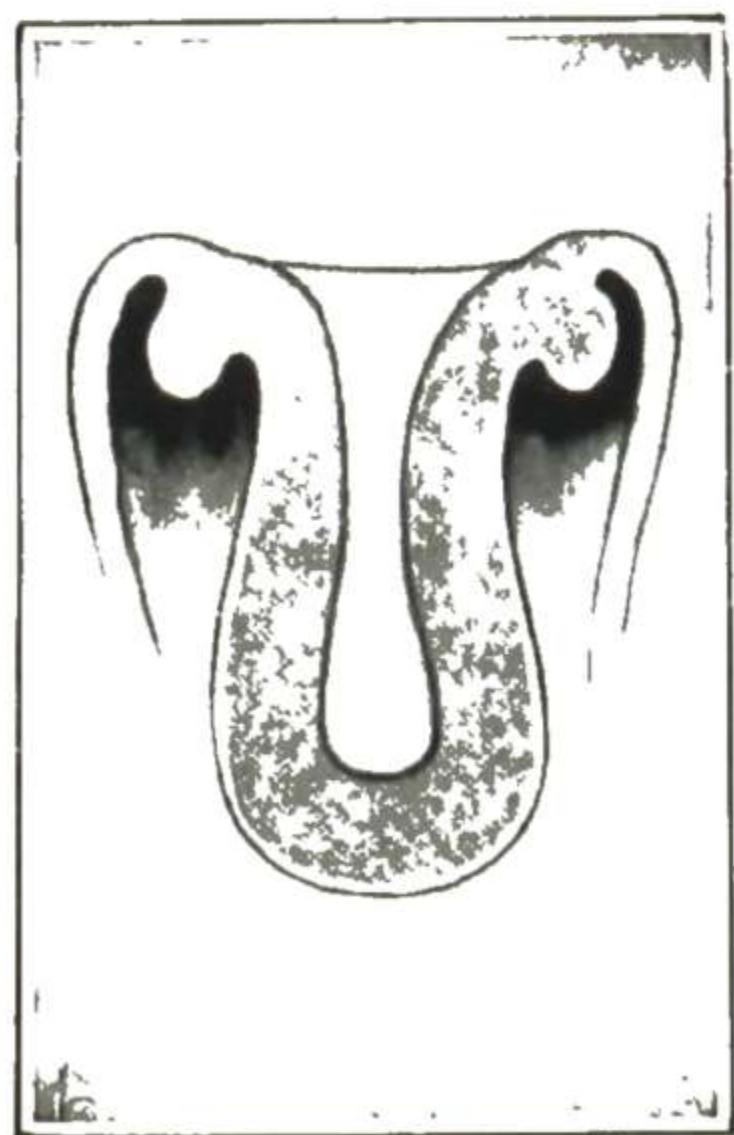


Fig. 747.
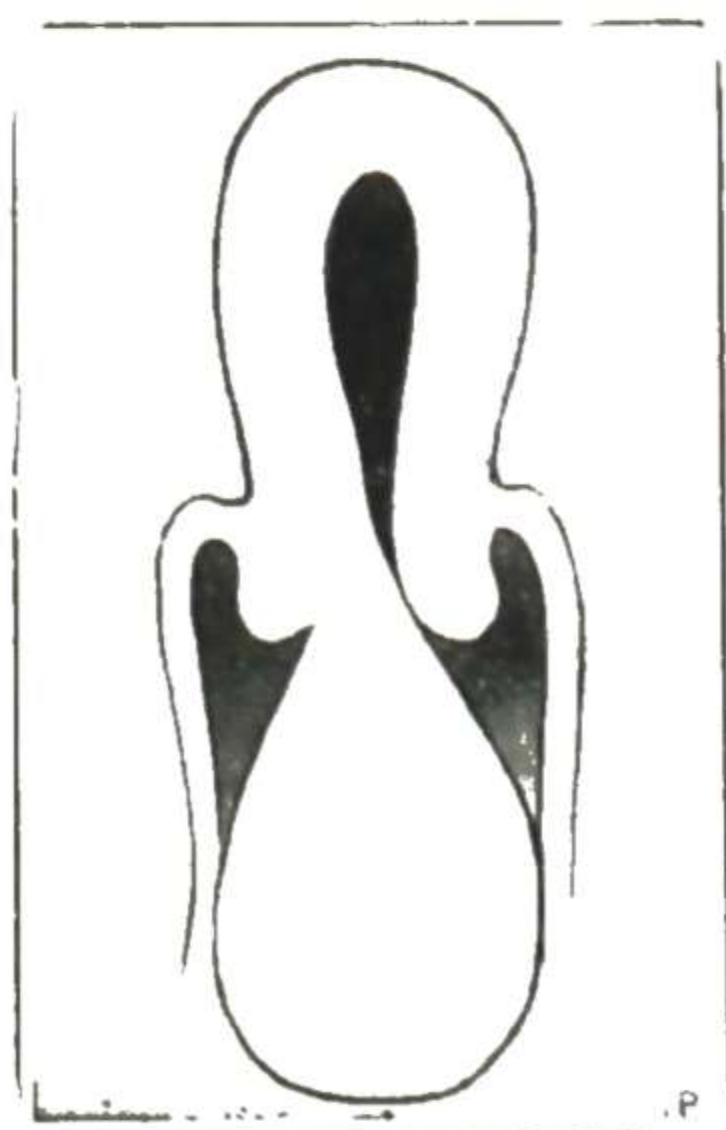
Fig. 748.

Fig. 749.

Fig. 747.—Complete inversion of uterus.
Fig. 748.—Pediculated myoma filling upper part of vagina.
Fig. 749.—Complete inversion of uterus, with a pediculated subperitoneal myoma occupying the normal site of the uterus

Figs. 741 to 749.—Diagnosis—inversion and pediculated myoma. (Dudley - Practice of Gynecology, Lea and Febiger.)

uterine pregnancy or salpingitis or ovarian tumor or broad ligament tumor or malignant disease of the uterus or retrodisplacement or ascites. When a cul-de-sac mass is present, consider the possibilities shown in Figs. 750 and 751.

E. ADDITIONAL QUESTIONS. After it has been established that a uterine myoma is present, the following points are to be considered:

1. Does the myoma cause all the symptoms? If not, what symptoms are caused by it? What causes the other symptoms?

2. What is the relation of the tumor or tumors to the uterine wall and cavity?

3. What is the relation of the tumor or tumors to the other pelvic organs and to the pelvic wall and to the peritoneum?

4. What complications are present —particularly pregnancy, malignant disease, pelvic inflammation, heart disease, kidney disease?

5. What has been the progress of the disease in this case, and what will probably be the further progress?
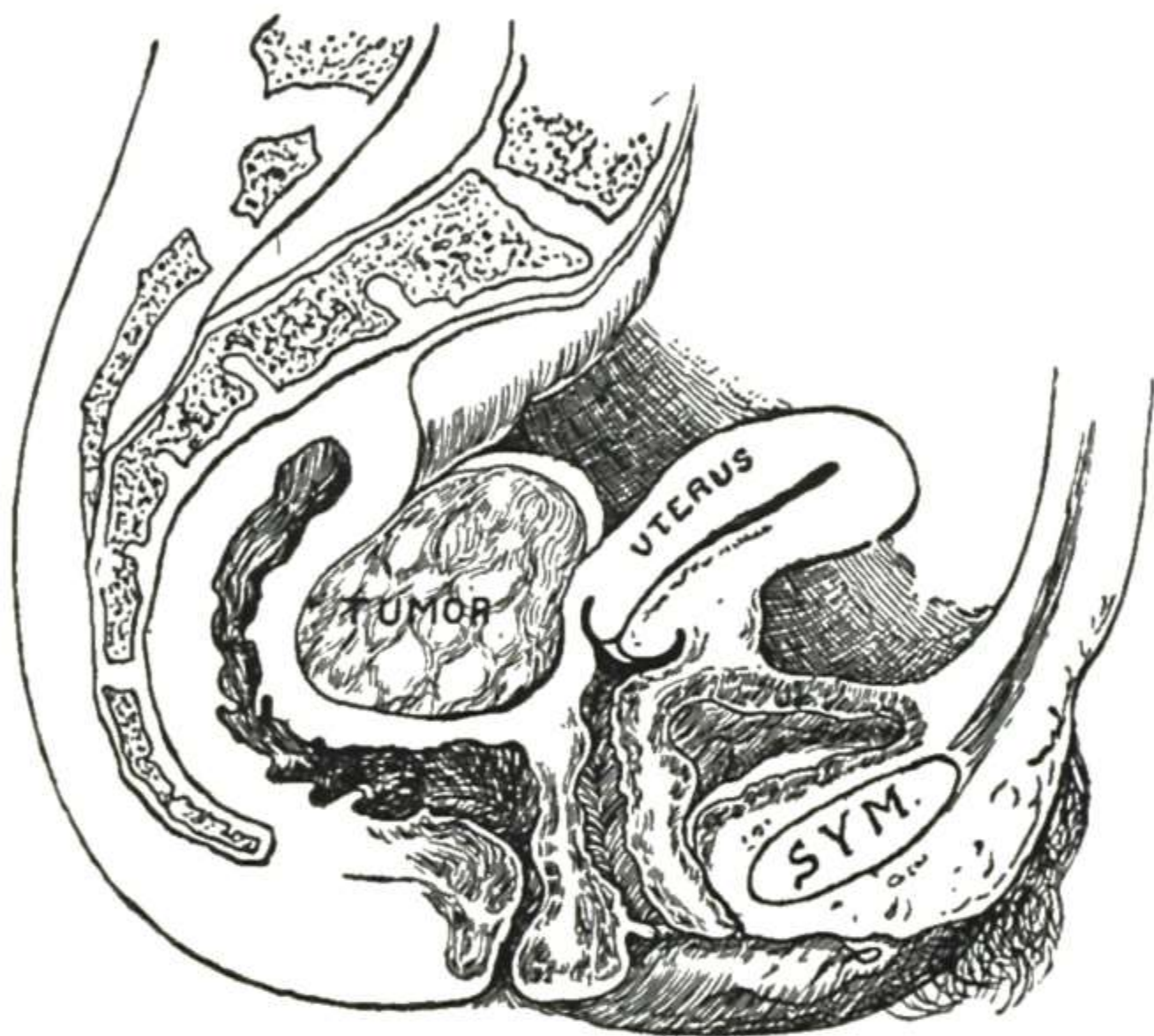


Fig. 750.

Fig. 751.

Fig. 750.—A myoma forming a mass behind the uterus. (Montgomery—*Practical Gynecology.*)

Fig. 751.—A retroflexed uterus and a myoma forming a mass behind the cervix. (Montgomery—*Practical Gynecology.*)

In cases where it becomes important to know definitely whether or not the tumor is submucous and the extent of its encroachment on the endometrial cavity, the cavity may be outlined by x-ray with injection of opaque material. The distortion of the cavity is shown, and the size and location of the myoma are indicated by its filling-defect. There is a certain amount of danger connected with injecting material through the genital tract into the peritoneal cavity, particularly just preceding abdominal operation. Though the danger is slight and these valuable methods of obtaining required information are carried out regularly in suitable cases, the fact of some risk must be kept in mind, and such preoperative peritoneal invasion should be carried out only when the need for the additional information justifies it. This opaque injection is principally useful in outlining the uterine cavity in cases involving decision for or against myomectomy, in the hope of preserving sufficient uterus for subsequent childbearing.

## Treatment

In regard to treatment there are three propositions to be considered:
(A) no treatment, (B) palliative treatment, and (C) curative treatment.

### A. No Treatment

A certain small percentage of myomas are discovered by accident, i.e.,
during a pelvic examination for symptoms not due to the fibroid. The myoma
is small, has caused no symptoms, is not likely to cause symptoms soon, and is
not likely to aggravate the symptoms due to the other trouble.

Such a tumor requires no treatment, and it is just as well, as a rule, that
the patient be not informed of its presence. She should, however, be kept
under observation, to see whether there is any increase in the growth. Explain
the condition to the husband or other responsible relative, that your skill be
not called in question should the patient be examined by some other physician
and the presence of a tumor announced.

There is one class of small myomas that the authors feel constitutes an
exception to this rule. When situated in the lower part of the uterus, a myoma
of any considerable size is a dangerous matter in the childbearing period. If
pregnancy should take place, the tumor will probably increase in size and may
become a serious menace to labor at term. Again, a cervical myoma is likely
to cause symptoms (bladder, rectal, or menstrual) at any time, even though
small. Such a tumor in a married woman should be removed. If not com-
plicated by tumors elsewhere in the uterus, it may be approached from the
vagina and removed by a comparatively simple operation.

### B. Palliative Treatment

Palliative treatment is symptomatic. It is directed toward relieving the
disturbances occasioned by the fibroid and making the patient more comfort-
able. The principal disturbances requiring the palliative treatment are the
bleeding and the pressure symptoms.

The palliative measures are (1) tonic measures, (2) uterine astringents
and endocrines, (3) vaginal treatment, and (4) curettage.

1. **General Tonic and Hygienic Measures.**—The better the patient's general
health, the less the annoyance from the myoma. Consequently, there should be
employed laxatives (as in pelvic inflammation), tonic medicines, avoidance of
long walks, rest at the menstrual periods, douches as indicated by discharge, and
a general regime to improve the general health and diminish pelvic congestion.

2. **Hemostatic Remedies.**—These are employed when needed on account of
extra menstrual flow or intermenstrual bleeding. The use of the various hemo-
static remedies to control uterine bleeding is considered in detail under men-
orrhagia and metrorrhagia in Chapter XIV.

3. **Vaginal Treatment.**—Antiseptic vaginal douches are required in cases
presenting leucorrhea or bloody discharge. Vaginal packing may be needed
to check bleeding temporarily or to raise an impacted tumor out of the pelvis.

4. **Curettage.**—Curettage may control bleeding temporarily in those cases
in which the bleeding is due to hyperplasia of the endometrium. In many
cases, however, the cavity is so distorted that the curette can only wound

parts of the wall here and there without removing the entire endometrium. In addition to this uncertainty of controlling the hemorrhage, there is danger of infection of the uterine wall or infection and necrosis of the growth, leading to an exceedingly dangerous condition. Schroeder reports a case of necrosis of a submucous tumor, the capsule of which had been torn by the curette.

In carefully selected cases, curettage may be advisable, partially as a diagnostic measure, but there must be a clear understanding of the dangers incident to it and good reason for taking the risk. In the hands of those experienced in the selection of cases and in the use of the curette, the probability of any serious complication from a clean curettage is not great. But there is great risk in careless intrauterine instrumentation in these cases, even the simple introduction of the uterine sound (see Fig. 730).

### C. Curative Treatment

In the curative treatment of myomas, three measures are employed— **radium, x-ray,** and **operative removal.** These are not antagonistic or exclusive one of the other. Rather they are supplementary. Each has its field in which it is clearly the best treatment. The edges of the fields merge, of course, giving classes of cases in which the choice is not strongly one way or the other.

**Radium.**—Radium is the preferable form of treatment in the following classes of cases:

1. In uncomplicated small and medium-sized myomas in patients in the menopause or near the end of the childbearing period. Persistent bleeding is usually the serious symptom in these cases, and this is promptly controlled by radium, which checks all bleeding, menstrual or otherwise. Nearly all properly selected cases prove amenable to this treatment. In approximately 400 reported cases, satisfactory results were secured in about 95 per cent.

In the cases of myoma apparently suitable for radium treatment, complicating carcinoma of the endometrium must be excluded by curettage. This is very important as illustrated by the following two cases close together. Each case presented myoma nodules of the size and type suitable for radium treatment. Following the usual custom at radium application, a curettage was made and the tissue sent for routine examination. The laboratory showed complicating endometrial carcinoma, and this diagnosis was confirmed in each case by the findings in the removed uterus. In one case the associated carcinoma was rather extensive and in the other case it was still confined to a small area.

Painful conditions in the pelvis are not likely to be relieved by radiation. Consequently when the myoma is causing pressure pains, on account of size or location, or when there are inflammatory or other conditions making pain a prominent symptom, operation is preferable.

In young women the importance of preserving ovarian function is a contraindication to radium or x-ray. In such cases, operative removal of the myoma is the preferable form of radical treatment. Myomectomy is performed if conditions are favorable, in order to preserve the childbearing function, and in unfavorable conditions the uterus is removed along with the tumors, with **preservation of ovaries.**

**2.** In patients with kidney, heart, and other complications giving undue operative risk, radium may reasonably be tried in the somewhat larger growths.

In these complicated cases, also, carcinoma of the endometrium should be excluded by curettage, if possible. Of course, in these seriously complicated cases, general anesthesia is to be avoided. In the authors' experience the curettage and radium application may in most of these cases be accomplished under morphia-hyoscine analgesia. In the exceptional cases where necessary this analgesia may be supplemented by local infiltration anesthesia of the cervix.

In the handling of radium cases we have developed a special method of suturing the radium in place, so as to facilitate easy removal. The details are as follows:

*Special suture facilitating removal.* After introduction, the radium is fastened securely in place by a suture passing first through one side of the cervix, then through the rubber tubing, and finally through the other side of the cervix, as shown in Figs. 752 and 753. The suture is not tied at this time. The ends are left long, and later are tied over the vaginal packing. A moderate vaginal packing is then placed, the bulk of it being back
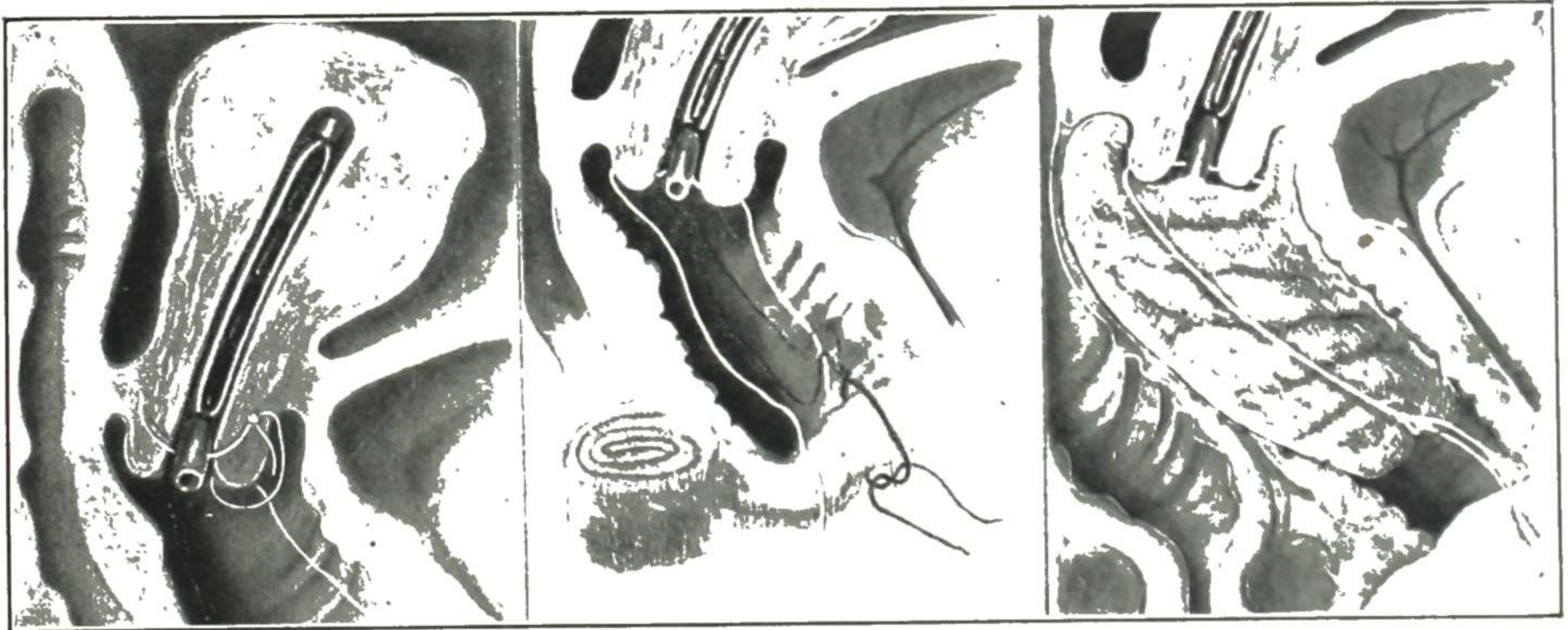


Fig. 752.          Fig. 753.          Fig. 754.

Fig. 752.—Radium implantation for myoma. Fastening the radium package securely in the uterus by a method which permits easy removal with very little disturbance to the patient. Passing the suture through the cervix and the rubber tubing.

Fig. 753.—Suture passed, and ends left long and brought outside. The end of the gauze packing is tied to the radium string.

Fig. 754.—The packing in place and the suture tied over the packing. This is the only knot in the suture. This arrangement holds the packing in place and also permits easy removal later. (Crossen and Crossen—*Operative Gynecology.*)

of the cervix to push away the rectum and posterior vaginal vault (Fig. 754). It is not necessary in these myoma cases to push the bladder and rectum far away by an extremely tight packing requiring a retained catheter, as must be done in carcinoma of the cervix on account of the large dosage necessary and the location of the radium.

It is well to use vaseline-gauze for this packing, so as to avoid the vaginal irritation resulting from ordinary gauze pressed against the vaginal wall for a considerable period. After the packing is in place, the ends of the holding suture are tied over, as shown in Fig. 755. This method of arranging the suture is to facilitate easy removal of the radium without much disturbance of the patient.

*Removal of radium.* One hour before the time for the radium removal the patient is given a hypodermic of ¼ gr. of morphine and one ampoule of hyoscine. At the time of removal the patient's hips are brought to the edge of the bed, the end of the suture is caught with a forceps, and the suture-loop over the gauze is brought into view (with or without a speculum as needed) and cut with scissors (Fig. 755). Then a pull with the

forceps holding the suture end will pull out the whole suture, as there is no knot in it. This releases the packing and the radium, which are then removed (Figs. 756 and 757).

*Aftercare.* On account of the circulatory and other disturbance from the curettage and radium treatment, often combined with conization, the patient is kept in bed a couple of days. If there is no special local disturbance, she is then allowed up, and the activity is gradually increased so that she is ready to go home in from three to six days after the radium is removed. Getting the patient home quickly is not the main object, but giving the radium treatment safely and with minimum deleterious effect. Undue early activity, adding congestion to that already present from the radium treatment, may cause local disturbance that would not otherwise occur.

**X-Ray.** The very large growths in patients presenting undue operative risk are best handled by deep x-ray therapy. In most cases this will, after a time, stop the bleeding temporarily and give a chance to build up the patient for operation. If she cannot be gotten into condition for operation, continua-
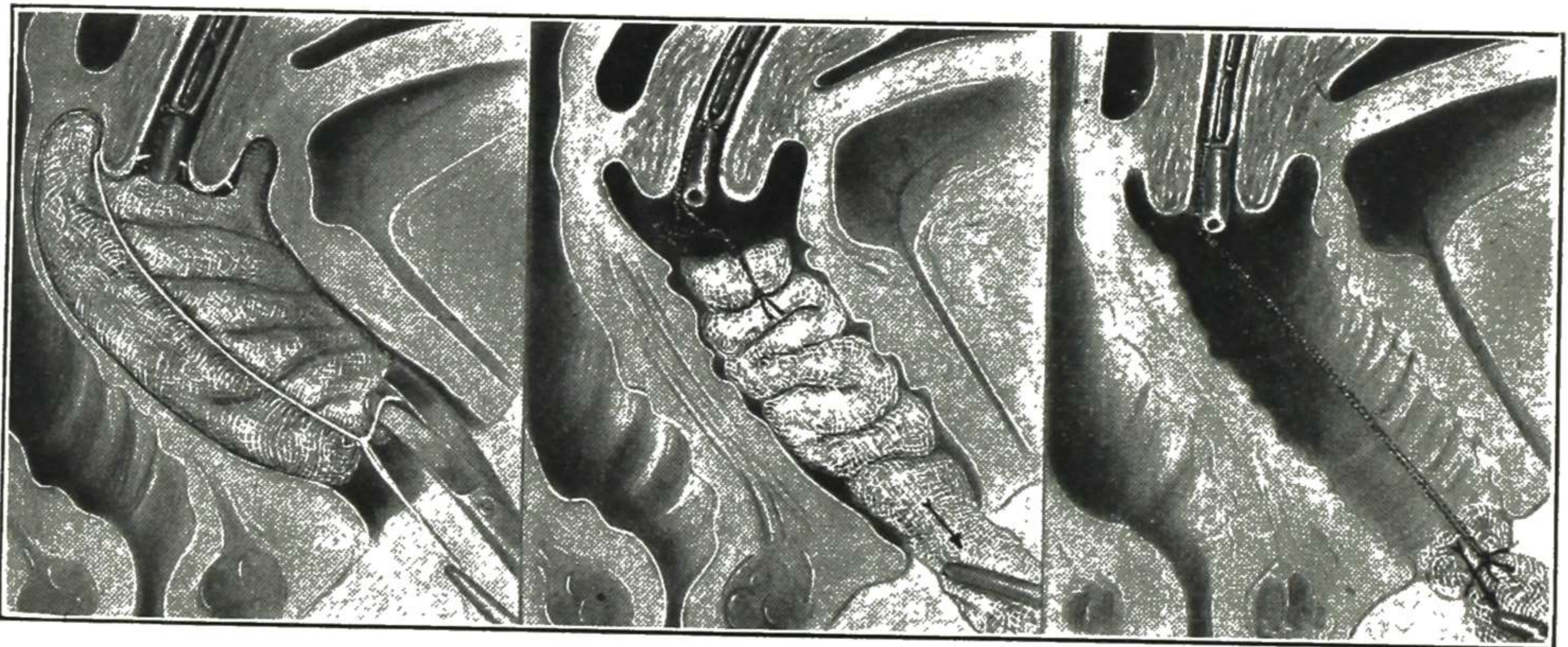


Fig. 755.                    Fig. 756.                    Fig. 757.

Fig. 755.—Removal of the radium. Cutting the suture over the gauze packing near the vaginal entrance. This releases the suture, so that it may be pulled out, and also releases the packing and the radium, as explained in the text.

Fig. 756.—Removing the packing. As the end of the packing comes out, it brings out the radium string which is tied to it.

Fig. 757.—The radium string brought out. Then a firm steady pull on the string brings out the radium package. (Crossen and Crossen—*Operative Gynecology.*)

tion of the x-ray treatment may stop the bleeding permanently and diminish pressure symptoms by shrinking the growth.

If preferred, the smaller growths also may be treated by x-ray instead of radium, if the patient has had a recent curettage excluding malignancy.

**Operation.**—Operative removal of the myoma is the preferable form of treatment in three classes of cases, as follows:

1. The large growths, from the size of a grapefruit and upward, are generally best handled by operation. It is not practicable to fix an arbitrary limit of size, as other conditions have a bearing on the decision. For example, pediculated subperitoneal growths are not so favorable for radium or x-ray treatment as growths embedded in the uterine wall and hence must more often be removed by operation. Again, a single large growth is not so favorable for nonoperative treatment as a myomatous uterus enlarged to the same size by a number of small nodules.

2. In young women in whom preservation of the childbearing function and of menstruation is desirable, myomectomy is the preferable form of treatment, where any serious

treatment at all is necessary. In many of these cases the myomas may be removed with-out disturbing the functions of the uterus. A point to be kept in mind, however, is that when the abdomen is opened it *may* be found necessary to sacrifice the uterus in order to remove the tumors completely. Hence myomectomy should be advised only after careful consideration of all the features of the case. If the growths are not of a size and location necessarily interfering with pregnancy or labor, it would be well to try first to check the bleeding by other means, such as curettage and internal medication. If these measures fail, it may be advisable in exceptional cases to employ light doses of radium or x-ray, with the idea of giving just enough to control abnormal bleeding but not enough to affect ovarian or uterine function seriously. But in spite of advances made in the regulation of dosage and the enthusiastic assumptions of some authorities, this use of these measures must be with very decided caution. If the x-ray is used, it is preferable to apply it to one side only, so that one ovary will remain unaffected.



Fig. 758.      Fig. 759.      Fig. 760.
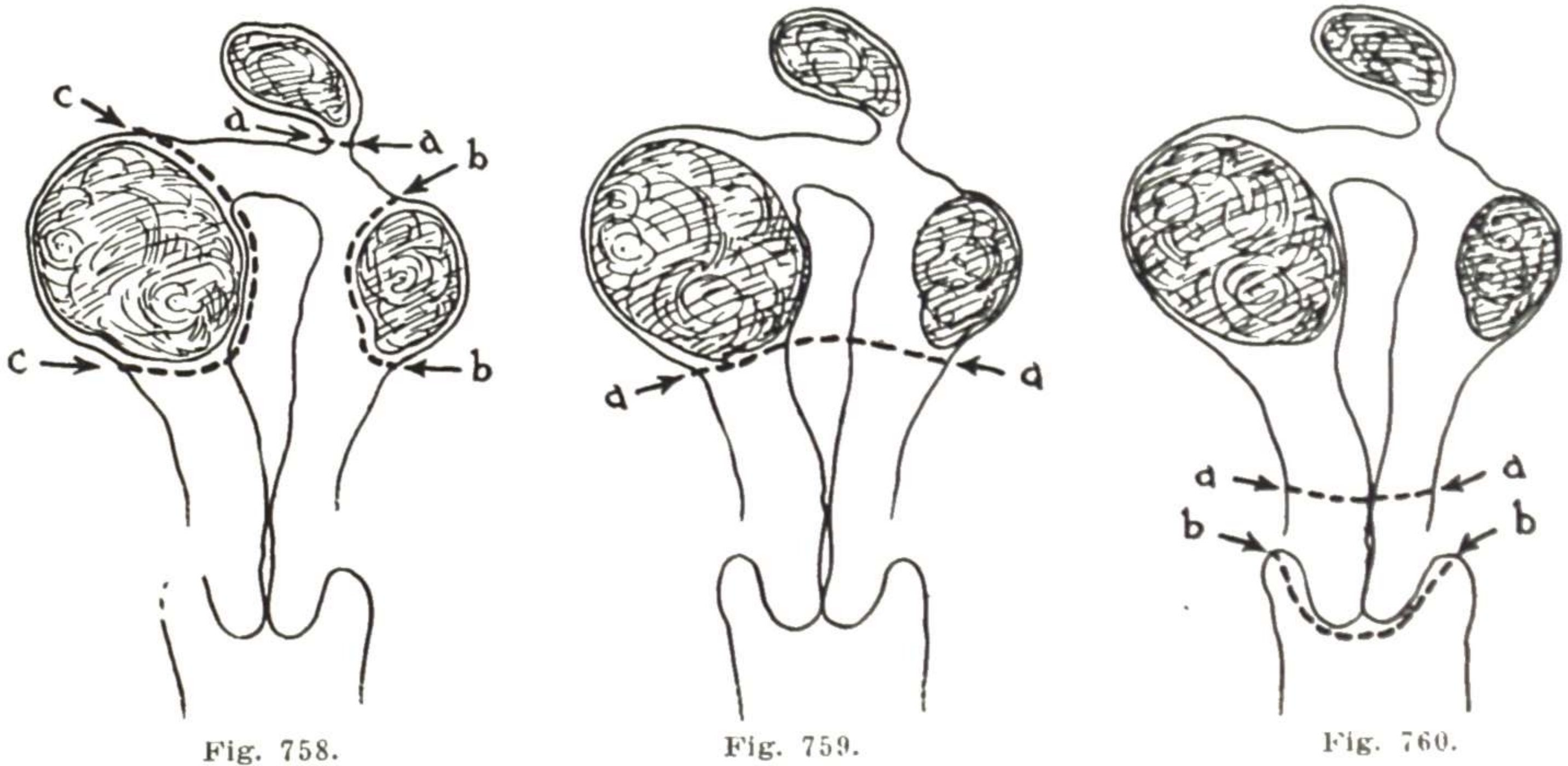
Figs. 758 to 760.—The principles involved in the different types of abdominal operation for uterine myoma.

Fig. 758.—Myomectomy—for a pediculated subperitoneal myoma, for a sessile subperitoneal myoma, and for a myoma that extends to endometrium. Fig. 759. Partial hysterectomy—preserving a considerable part of the corpus uteri and endometrium in the hope of preserving menstruation. Fig. 760. Hysterectomy—supravaginal hysterectomy and complete hysterectomy.

3. In complicated cases the complications often make operation advisable in a growth which if uncomplicated would be suitable for radium or x-ray treatment. The complication may be inflammation of some adjacent structure, for example, appendicitis or salpingitis. Such associated trouble is found in a considerable proportion of the cases of myoma. The complication may be inflammation or degeneration of the myoma itself. Degeneration is common in the larger growths, especially in the subperitoneal masses. A myoma that takes on growth after the menopause is probably undergoing a degenerative change of some kind and should be promptly removed if the patient is a safe operative risk.

The various operative measures looking to the removal of the growth are as follows (Figs. 758 to 760):

**Myomectomy.**—Removal of the tumor or tumors and preservation of the uterus.

ABDOMINAL MYOMECTOMY.—Enucleation from the outer surface of the uterus.

VAGINAL MYOMECTOMY.—Enucleation from the cervix or from within the uterus by splitting the cervix.

**Total Hysterectomy.**—Removal of the tumor and of the entire uterus, including the cervix. This is carried out through the abdomen or through the vagina, as thought best in the particular case.

**Supravaginal Hysterectomy.**—Removal of the tumor and of the body of the uterus, leaving the cervix. This is, of course, carried out through the abdomen and is ordinarily employed only when the cervix is in good condition. If, on account of poor operative risk or special intrapelvic conditions encountered, it is employed when there is chronic cervicitis, the cervicitis area should be removed by conization from below at the close of the abdominal work or later, on account of the danger of cancer development.

## PREGANCY AND MYOMA

The association of myoma with pregnancy is always a matter for serious concern, though many patients get along without trouble.

The treatment to be employed depends on the size and location of the myoma and the stage of pregnancy at which the patient is seen.

When the tumor is in the upper part of the uterus and is of small or medium size and not causing much trouble, it should be let alone until after parturition.

When the tumor is so large or so situated (cervix myoma) that it precludes the possibility or probability of full-term delivery per via naturalis, the treatment turns somewhat on the stage of pregnancy. If the patient is seen in early pregnancy, hysterectomy is the safest plan of treatment. In some exceptional cases the tumor may be so situated that myomectomy (abdominal or vaginal), with hope of continuing the pregnancy, is justifiable.

Reis and Sinykin report a series of eighteen myomectomies during pregnancy with sixteen of the patients going to term. They give the following conclusions:

"1. The indications for myomectomy are acute degenerative changes, hemorrhage, infection, twisted pedicle, or rapid growth together with encroachment upon the birth canal.

"2. The recommended technique must include (1) minimal handling of the pregnant uterus; (2) the myomectomy with the uterus in situ if possible; (3) complete avoidance of the uterine cavity; (4) careful hemostasis and peritonization; (5) removal of only the guilty fibroid.

"3. Myomectomy during pregnancy is a comparatively safe procedure for both the mother and the fetus and should be performed promptly whenever indicated."

If the patient is seen, for the first time, in late pregnancy, it may be advisable to postpone operation until full term or nearly full term, with the hope of saving the child by cesarean section.

Of course, there are all gradations in seriousness, from the cases in which it is almost certain that there will be no trouble to the cases in which full-term delivery by the natural route would be absolutely impossible. It is the middle class that contains the cases which furnish the most puzzling problems. When seen in early pregnancy there is an uncertain factor, namely, the probable extent of development of the myoma during pregnancy. This makes it difficult in some cases to decide just which line of treatment is preferable. In cases of doubt, after giving due consideration to the various aspects of the case, the rule is to await developments.

A numerous class of myoma cases complicated by pregnancy is that in which the patient has one or more myomas that give no particular trouble until she becomes pregnant. After the patient has been pregnant three or four months the symptoms become so acute and threatening that operation is required.

## MISCELLANEOUS GROWTHS

Nonmalignant tumors of the uterus other than myoma are rare. Ritter and Stringer report a case of **lipoma** and review the subject. The following quotation is from their article.

The histogenesis of fatty tumors of the uterus has not, as yet, received definite interpretation. Von Franque views it as an example of metaplasia. Merkel believes they arise from displaced embryonic mesoderm. Knox considers them as supporting Conheim's theory of embryonic rests, which in developing, produce fatty tumors. Brunings' belief coincides with that of Lockyer who expounds the premise that lipomas of the uterus are the result of the transformation of muscle bundles into fat. In addition, the Wolffian duct theory of Wilms and the growth of true fat along nerve and blood vessels from adjacent structures have been brought forward as possibilities of pathogenesis.

Elkin and Hawthorn have reviewed carefully the various theories of histogenesis and conclude that the question involved is whether the tumor is composed of true fat cells arising from a lipoblast or whether some other type of cell such as connective tissue cells has undergone fatty infiltration. They favor the lipoblastic origin of these tumors. Meyer and Sydel believe they arise from displaced embryonic mesoderm. Starry feels that they must represent either the type of connective tissue cells commonly found in the uterus or that they represent some specially differentiated type of lipogenic connective tissue cell. In reviewing these theories, it is noted that they form two groups, the question being whether lipomas of the uterus arise from a true fat cell, the lipoblast, or whether or not a metaplasia of a different type of cell occurs, it being infiltrated with fat globules and transformed into fat-bearing cells.

This instance of a fatty tumor of the uterus reveals a mass of fat-containing cells supported by connective tissue stroma and surrounded by a thin capsule of connective tissue and condensed uterine muscle. Nowhere in multiple sections of the primary tumor mass have there been discovered muscle, cartilage, or other tissue elements. All the cells are mature fat-containing units and nowhere can there be noted evidence of metaplasia or fatty degeneration. In direct contrast, the adjacent typical leiomyoma contains no fat-bearing cells or fatty change of any kind. The evidence presented is directed in favor of a true lipoma of the uterus.

Humphrey and Mustard report a case of well-defined **lipoma** of the uterus, with a carcinoma in the same organ. Weitzman, Sheer and Polayes report a **papillary cystadenoma** of the uterus, apparently arising from wolffian remnants in that organs. The following quotation is from their article:

In the opinion of the authors, this tumor is probably of wolffian body origin. Notwithstanding Cullen's view that one cannot differentiate from the histologic picture a wolffian or müllerian origin of intramural cysts, the histologic picture of this newgrowth is apparently not of endometrial or tubal origin as evidenced by (a) the failure to trace continuity to either of these structures by serial sections as well as by (b) the absence of endometrial stroma in the tumor. On the contrary, the histologic picture of the newgrowth more closely simulates that of the epoophoron (wolffian body rests). This is in conformity with the observation of Ivanov, whose work shows the part played by the wolffian body in the formation of the uterine wall. Mercadé has demonstrated that the location of these wolffian body rests may be at the cornua, in the fundus, or along the lateral wall of the uterus. The structure and location of the mass in this case therefore may be considered a papillary cystadenoma of wolffian body origin and as such should be recognized as distinct from the adenomyomas of heterologous origin.