by an intra-uterine tumor, especially a fibroid tumor, which is attached by a pedicle somewhere in the upper portion of the uterine canal, and whose body is within the grasp of the uterine muscle. Long-continued contractions of the uterus in the effort to expel the tumor may drag down the uterine wall where the pedicle is attached, first producing an indentation (Fig. 4908) and finally, as the tumor is extruded, complete inversion of the organ. This process may require several months, while the accident following labor occurs in a very few minutes.

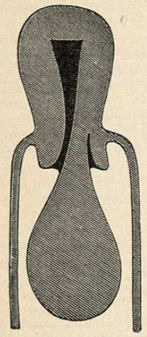

FIG. 4909.—Uterine Polypus. (Thomas.) The uterus is in its normal position. The sound passes into its cavity.

*Symptoms.*—The chief symptom is hemorrhage, which is persistent and often excessive in both varieties. Dragging, bearing down, irritability of the bladder and rectum, and a sense of fulness may be complained of in the chronic variety, while pain and collapse often accompany the hemorrhage of acute inversion.

*Diagnosis.*—In acute cases little difficulty will be found in recognizing a depression at the former site of the uterine body in the abdomen, and in the vagina a smooth regular tumor with a freely bleeding surface. In some complete cases it will be found that the uterine cervix and the cervical canal have entirely disappeared. In chronic cases in which the inversion is incomplete, a sound entering the cervical canal will serve to define the limits of the protruding body and its relation to the remainder of the uterine structure as felt above the pubis. When a polyp is present without inversion (Fig. 4909) it will be possible to demonstrate the fundus in its normal position. Obscurity is occasionally increased by inflammatory adhesions of the thick stem of a uterine polypoid tumor to the inner surfaces of the uterine canal (Fig. 4910).

*Prognosis.*—Reduction of the inversion is very seldom spontaneously accomplished. In recent cases the prognosis is good under well-directed efforts at replacement, although in chronic cases very great difficulty may be encountered.

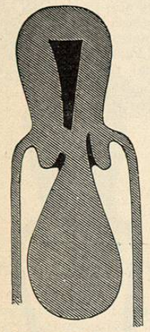

FIG. 4910.—Uterine Polypus. Adhesions around neck of polypus obliterate cervical canal.

*Treatment.*—In acute cases, under anæsthesia, efforts are made to dilate with the thumbs of the operator the contracted cervical ring, while at the same time the presenting fundus is indented and an effort is made to press it through the ring, one portion at a time. A variety of instruments have been devised, in the hope that by means of them the inverted organ may be restored to its normal relations. The end, which is cup-shaped, is designed to fit the fundus and to receive pressure transmitted through a stem which rests against the operator's body or is held in the hand of an assistant. Manual dexterity, however, combined with patience, will usually succeed in effecting the desired reduction, although the process is frequently a difficult one. In long-standing cases the dilatation of the cervical ring is a matter of much greater difficulty. Some device must be used which will make a slow and constant pressure upon the inverted fundus, after the tumor which produced the condition has been removed. In a few cases the reduction has been effected by opening the abdomen and drawing upon the uterine tubes and the upper portion of the fundus, while at the same time pressure was made from below. In this way more ready access is obtained to the contracted cervical ring for the purpose of dilatation; but reduction can usually be accomplished after repeated efforts without opening the peritoneal cavity. Finally, in some cases the wall of the uterus has been split longitudinally from within the vagina, and then, after reduction had been accomplished, the lips of the incision were united by sutures.

*George Erety Shoemaker.*

**UTERUS, DISEASES OF: MALIGNANT TUMORS.**—DEFINITION.—The malignant tumors here referred to, include the various forms of cancer and sarcoma, and deciduoma malignum. The general pathology of the several forms is given elsewhere in this HANDBOOK.

FREQUENCY.—According to the registrar-general of Great Britain in 1900, in England and Wales, 0.975 woman per one thousand of inhabitants died from cancer; and of all female deaths cancer of the uterus caused 1.3 per cent. In 1890 but 0.830 woman per one thousand of inhabitants died from cancer. In New York in 1890 the deaths from cancer in women were 0.37 per thousand of inhabitants, and in 1900 they were 0.43. These figures show the ratio of increase of cancer in women, most of the increase being in cancer of the uterus. It is needless to multiply the statistics.

And of all cases of cancer which occur in the body, William H. Welch found that the uterus was involved in 29.5 per cent. There is no means of accurately determining the ratio between true cancer, sarcoma, and deciduoma malignum.

Sarcoma and deciduoma malignum are very rare. The one fact which is impressively evident is the steady increase in cancer of the uterus. As the disease has been recognized for many years, this increase is real and not "apparent and due to more precise diagnosis."

AGE.—In New York in 1890 fifty-seven per cent. of all deaths from cancer were below forty-five years of age. In 1900 fifty-two per cent. were below forty-five years of age. The statement that the disease occurs more frequently than formerly in young women is not correct. The apparent greater frequency is due to the fact that a diagnosis of the disease is now made earlier than it formerly was. The youngest woman having cancer of the uterus in the author's service was twenty-six years of age. The maximum number of cases occur above forty-five years of age. It is exceedingly rare before twenty-five years.

RACE.—No race is exempt. It is probable that savage races have it less frequently. The observation used to be made that the negress was exempt. Cullen has proven this not to be the case at the present time. Whether more mulattoes are now found than formerly, and that the pure-blooded negress is less liable, I cannot state.

CAUSES.—These are actual and contributing. The supposed actual causes of cancer are described elsewhere. The contributing causes are many.

(*a*) *Irritation and Trauma.*—The fact is undoubted that cancer of the cervix is rarely seen in the nulliparous woman, and in a number of instances in which it has occurred in them a trauma, such as dilatation, has preceded its appearance. It appears that nulliparæ have adeno-carcinoma of the body of the uterus about as often as mothers, but that squamous-cell epithelioma is seen most frequently after childbearing or other trauma.

(*b*) *Heredity.*—This is not now believed to be as potent a factor as it was formerly held to be. However, in about twenty per cent. of uterine cancers, another member of the family has had some form of cancer.

(*c*) *Locality.*—In an attempt to find the true cause for cancer all the circumstances under which it occurs have been sought. In these investigations it has been found that certain localities, and even certain houses, have an unusual number of cases. This has given rise to the expression "cancer zones." Those who seek to show the contagiousness of cancer point to these facts as corroborative of their views, but thus far most authorities believe that the unusual prevalence of cancer in certain localities is merely accidental.





CANCER OF THE CERVIX UTERI.—This occurs in two forms: as a squamous-cell epithelioma and as an adeno-carcinoma. Furthermore, either the vaginal part of the cervix or the cervical canal may be involved.

*Squamous-cell* epithelioma of the cervix is the most frequent form. Squamous epithelium multiplies upon the surface and invades the stroma. Occasionally the epithelial cells are found grouped together so as to form "epithelial pearls." One of the earliest changes in the epithelial cells is the increase in chromatin. The ingrowth of the epithelium precedes the outgrowth, but after a time the epithelium produces delicate filiform projections on the surface of the cervix. The papillary growths consist of branching stroma and epithelium, and are exceedingly vascular. After a time necrosis of the projections takes place and ultimately an ulcer occurs where formerly an outcropping was present.

At first the cervix is nodular and hard, and new vessels may be seen coursing across the nodules. The nodules are of deep color and unequal in size. It is in this state that the disease is seldom recognized. In the state of papillary excrescence the outcroppings appear as delicate papillæ, red in color, bleeding upon the slightest touch, and always pedunculate. They may be so numerous as to form, when massed together, what is appropriately described as a "cauliflower growth." The least touching of such a growth causes bleeding. The excrescence is generally covered by a foul-smelling pus, the result of necrotic changes, and at points minute blood clots may be seen. Without difficulty the finger can be made to penetrate the growth. As ulceration proceeds all traces of the cervix become lost. There is then present at the vaginal vault a cup-shaped ulceration surrounded by raised edges, the surface of the cavity being covered by pus, and the ulcer bleeding easily. The adjoining vaginal wall may be involved, or cancerous foci, the result of secondary "inoculation," may be seen upon the vagina, even at some distance from the cervix.

*Extension.*—Cancer of the cervix tends to extend bilaterally along the lymphatics in the broad ligament, downward into the vagina, anteriorly toward the bladder, and posteriorly toward the rectum. There is but little tendency for it to grow upward above the internal os, the body of the uterus being usually free even in those who have died from cancer of the cervix.

As the disease extends toward the broad ligaments, the glands lying over the obturator foramina, then those along the iliac arteries, and later the inguinal glands become involved. This glandular involvement is at first due to saprophytic and septic invasion, but later to the presence of cancer elements. It is also true that the epithelia occasionally appear in masses along the veins (Fig. 4911). Cancer of the cervix has little tendency to leave the pelvis. Not only is it at first localized in one part of the uterus, but even to the end it remains as a rule localized in the pelvis. After general pelvic involvement has occurred, all the various phases of pelvic suppuration may be presented: ovarian abscess, pyosalpinx, broad-ligament suppuration, suppurating glands, and peritonitis. The paths along which the cancer extends become ulcerated, and as a result fistulous openings into the bladder, less frequently into the rectum, may be seen. The ureters, for some strange reason, although surrounded by cancer, rarely become corroded.

As the broad ligaments become involved, which involvement takes place, as a rule, more rapidly upon one side, the ureters become obstructed and hydro-ureter results. The rectum may be pressed upon and constipation result. When the rectum or bladder is invaded, the lesions of inflammation of these viscera may be present. The cervical growth may be so large as to block the cervical canal, causing retention of the uterine discharges and pyometra.

SYMPTOMS.—The writer believes that he has discovered a first early symptom of cancer of the cervix which has been furnished by all his patients who were intelligent and cleanly enough to observe such a symptom. Inasmuch as epithelioma of the cervix is characterized by a multiplication of epithelial elements and by increased vascular supply to the cervix, the earliest functional evidence of the disease *is a marked increase in the woman's habitual leucorrhœa, or the occurrence of a whitish leucorrhœa in those who have not previously had it.* In drawing out this symptom, the questioner should first determine the exact amount of discharge which is normal and usual to the individual. In refined women the toilet embraces a certain amount of and frequency in douching, every day or every few days. Without assignable cause such a woman will notice that her habitual leucorrhœa has become markedly increased, and that more frequent douches are needed to keep her tidy. In the case of an old woman whose glandular structures have

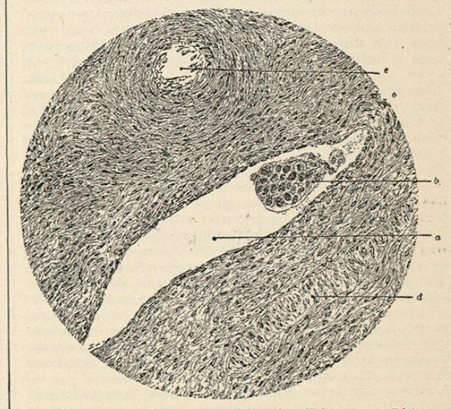


FIG. 4911.—Shows a Carcinomatous Mass in a Vein at some Distance from the Original Seat of the Disease. *a*, A vein containing a carcinomatous mass; *b*, isolated mass of carcinomatous tissue; *c*, transverse section of an artery; *d*, section through a vessel; *e*, muscular tissue. (Abel.)

shrunken with the menopause, a return of her forgotten leucorrhœa will be observed. Old women are apt to look upon this as an evidence of rejuvenation, a pathetically mistaken interpretation. The writer has given such prominence to this symptom in order that the attention of readers may be fixed upon it, and that more extended observations by other physicians may either corroborate or correct him. In his cases this symptom has preceded all others by from three to six months, months most valuable to the surgeon and to the woman. But as a rule women, accustomed as they are to vaginal discharges, seldom pay attention to an increase in leucorrhœa. The next symptom is a *change in the type* of the vaginal discharge. From being mucous and odorless, it now becomes watery and often has a putrid odor; or there may be an occasional muddy stain due to the admixture of blood. The menstruations are not altered in periodicity or in character. The presence of a putrid odor is always an indication of molecular death of tissue. Upon coitus, douching, straining, and lifting weights, or even after ordinary exercise, this muddy spotting of the underclothing may be noticed. The putrescence of the discharges and the intermenstrual bleedings become so marked that the attention of even the most indifferent woman is attracted to them. Up to this time the general health of the patient has not suffered. As the broad-ligament lymphatics become infiltrated, there is produced some pain, particularly if the obturator glands enlarge and press upon the obturator nerve. The pain is usually referred to a sacro-iliac joint or to the hip. Should the bladder be invaded, symptoms of cystitis supervene. As the pelvis

becomes generally involved, the symptoms of peritonitis appear. It is remarkable how extensive the uterine degeneration may be without pain being produced. About the time the putrescence of the discharges becomes marked most patients become anæmic or "cachectic." They are usually in good flesh, but the tissues assume a waxen hue The patient is easily fatigued and avoids physical activity. After a time the pelvic pain becomes so great that she lies down a great deal. The consciousness of emitting a disagreeable odor makes of her a recluse. The anæmia is progressive; the severe pains necessitate the use of opiates, and these induce intestinal disturbances; possibly rectal or vesical symptoms supervene, and the physical prostration becomes extreme. In about two years after the onset of the disease the patient dies, either from sheer exhaustion or from some complication.

Physical Signs.—In the stage of infiltration the cervix is nodular, the nodules being of irregular size, deeply colored and evidently vascular. They feel hard, but upon thrusting a probe against them, or seizing them with a bullet forceps, it is seen that they readily break down, exposing bleeding and granular-looking surfaces. The appearance of a nodular and large cervix in a woman past the menopause is significant of cancer, for at that age the cervix should be shrunken. If papillary projections are present, they will be found pedunculate and bleeding upon the slightest touch. They can be scraped off by the nail. The cervical tissue underlying them has the same friability as in the first stage. If the disease has progressed to the formation of a cauliflower growth, this presents itself as a granular outcropping from the cervix, exceedingly friable and bleeding easily. It is always pedunculate and lobulated. After the papillomatous projections have necrosed, there is left an excavated, foul ulcer. The cervix can no longer be detected as a separate structure, but in its place, at the vaginal vault, will be seen the ulcerated excavation; or in its place, particularly in elderly women, the production of connective tissue may predominate, and the place of the cervix be taken up by a puckered, scar-like tissue, "scirrhous cancer." This latter is a very rare condition.

*Pain.*—As stated, some patients have little pain, but in the later stages of the disease pain of some sort is usual. It may be limited to the pelvis or may radiate to the distribution of the obturator or sciatic nerves

*Strength.*—Little outward sign of cancer is present until the new growth begins to break down. Then the patient loses flesh, owing to the excessive elimination of nitrogenous material. The muscles fade first, and the fat more slowly. The cachexia is due to absorption of poisonous toxins from the cancer, and to the progressive loss of appetite. Slight leucocytosis is present and the percentage of hæmoglobin lowered.

*Pulse and Temperature.*—As the patient weakens, the pulse quickens upon the least exertion. In the latter stages of the disease there are irregular rises of temperature.

Diagnosis.—In the earliest stage this is to be made from the nodular condition of the cervix, due to cystic degeneration and stellate lacerations; in the papillomatous stage, from condylomata, sloughing polypi, exaggerated conditions of "erosion," and hypertrophy of the cervical glands; and in the stage of ulceration, from tuberculous and chancroidal ulcers, or those due to pressure. Cancerous nodules are exceedingly friable; and if a bullet forceps is hooked into one, it tears its way through upon the exhibition of even a slight traction. The same thing will occur with cystic degeneration of the cervix if much force be used; but when the cystic cervix tears, the gelatinous contents of the cysts are evacuated, whereas a bleeding granular surface is left if the nodule be cancerous. It is interesting to note that cystic degeneration to a marked degree and cancer rarely coexist. The elevations produced by stellate lacerations of the cervix are firm, and have the same consistence as the rest of the cervix

Upon superficial examination, "erosions" of the cervix (cervical folliculitis), particularly if this part of the uterus be torn and everted, resemble cancer in the first of the papillary stage. The surface of the "erosion" is raised, as is that of the cancer; but in cancer each papilla exists as a separate structure, always pedunculate, bleeding upon the least touch, and easily scraped off with the finger nail. None of these features of cancer is present in erosion. Furthermore, beneath carcinomatous papillæ the infiltrated cervix is brittle, while the stroma beneath an "erosion" is increased and the tissues are more firm than normally. Parenthetically, a criticism of the term "erosion" may be uttered. It is an absolute misnomer, for not only is there no erosion or loss of substance, but, on the contrary, there is hypertrophy of the glands. Condylomata of the cervix are firm, covered by epithelium, and, unless ulcerated, do not readily bleed. Sloughing polypi present themselves as single pedunculate growths, exceedingly soft, and as a rule very much larger than the single papillary excrescences of cancer. They often present ulcerated surfaces, but are usually covered by a firm epithelium, giving them a glistening appearance, entirely unlike cancer. Polypi arise from the lining membrane of the cervix, and the cervical stroma is not involved.

Syphilis of the cervix is exceedingly rare, as is chancroid. In a suspected case of syphilis, antisyphilitic treatment gives prompt results, and chancroid is usually accompanied by similar ulcers in other parts of the genitals. In all doubtful cases a portion of the suspected tissue should be excised and submitted to a competent pathologist. Tuberculosis of the cervix is usually secondary to tuberculosis of the vagina or of the body of the uterus.

Old scirrhous cancer of the cervix strongly simulates the cicatrization found about lacerated cervices, but here again the tenaculum shows the disintegration of the cancerous cervix.

In removing tissue for examination, as much of the cervix should be amputated as possible; in any event, the pathologist should be furnished with a section which includes all the elements of the cervix, basement membrane as well as glands.

Treatment.—If the uterus be movable and the disease limited to the cervix, the uterus, ovaries, tubes, and parametric tissue should be removed, either by way of the vagina or by way of the abdomen. In some cases there are distinct contraindications to a radical operation. In such the high amputation of Sims, accompanied by the use of the galvano-cautery, may effect a cure. No internal medication is of avail, except the continuous ingestion of thyroid extract. This, taken in doses of five grains, t.i.d., p.c., not only tends to hold the disease in abeyance for months, but also may cause it to disappear *for a time.*

Adeno-Carcinoma.—The cylindrical epithelium of the cervical canal often extends downward upon the face of the cervix, and this form of cancer may appear upon any portion of the cervix having cylindrical epithelium; but as a rule it occurs within the external os. The disease begins as a submucous, nodular accumulation of cellular elements, proceeds to the production of papillæ, and ulcerates. Or the ulceration may begin before papillæ make their appearance. Not only are the epithelial cells enormously multiplied, but there is also great increase in the glands of the cervix. The papillary excrescences may block the cervix and produce pyometra, but ulceration usually begins before this occurs. The entire supravaginal cervix may be riddled with sinuses, and yet the os externum appear normal. Sloughing and necrosis begin early, and altogether the progress of adeno-carcinoma is more rapid than that of squamous-cell epithelioma. Peritonitis and adnexal lesions also occur more frequently, owing to blocking of the cervical canal, followed by septic endometritis; and cancerous involvement of the bladder occurs more frequently and earlier. The disease is more frequent before the menopause.

*Symptoms.*—As a rule the first symptom is an increase in the woman's habitual leucorrhœa and in the amount of cervical mucus secreted. As in the case of squamous-cell epithelioma, the indifference of women to any discharge from the vagina causes them to pay no attention





to this important first symptom. Therefore the usual symptom which brings these patients to us is an offensive discharge. Blood-staining of the clothing, occurring between menses, is not seen so early as in squamous-cell epithelioma, because the involved field is within the cervical canal and protected against trauma. Therefore patients with adeno-carcinoma first present themselves with the disease far advanced. The menses are unaffected by the cancer. Women with cancer of the cervix, particularly this type, have been most prolific. The disease is rare in the nulliparous. Pain is not present until the disease has extended outside the uterus.

Upon examining a patient with adeno-carcinoma of the cervix the disease may be seen upon the surface. If it is not visible upon the surface, the introduction of the sound produces sharp bleeding. In fact, so dense is the normal cervical mucosa that it will tolerate a marked degree of trauma without hemorrhage.

*Diagnosis.*—Tuberculosis of the cervical canal presents all the local signs of adeno-carcinoma. As a primary affection it is exceedingly rare, but must be borne in mind as a possibility. Sloughing polypi present themselves in the form of ulcerated projections, while adeno-carcinoma appears as an excavation when active ulceration is in progress. Small submucous myomata projecting into the cervix may be felt with the finger as hard nodules, not at all resembling cancer. The cervix treats polypi and fibroids projecting into its cavity as foreign bodies, and as a rule it becomes widely gaping.

When the diagnosis is difficult a portion of the cervix may be scraped or cut away and submitted to a pathologist.

*Treatment.*—If the disease has not extended outside the uterus and there are no contraindications to a radical operation, abdominal ablation of the uterus and adnexa is indicated. Cases are rarely met with early enough to admit of the vaginal operation being successfully performed.

Cancer of the Uterine Body.—This occurs in from six to ten per cent. of all cases of cancer. It is the form of cancer which nulliparous women usually have. The type is nearly always the adeno-carcinomatous. The disease begins at one point in the endometrium, and from there tends to spread. The lesions are similar to those in the cervix—slender papillary outgrowths from the surface of the endometrium, underlying which is a spot of infiltration. The papillæ may entirely fill the uterus and cause marked enlargement of the organ. The uterus becomes soft and boggy. As the cancer grows and sloughs a septic endometritis occurs, and pelvic lymphangitis and salpingitis are common sequelæ.

*Symptoms.*—About three-fourths of the women are past the menopause. The first symptom is sometimes bleeding, sometimes a watery discharge. This may appear as a spotting of the clothing, or a rather sharp hemorrhage may occur. If the patient is menstruating, the menses are increased, and shortly she has intermenstrual leaking of blood. The uterus resents the presence of the growth, and irregular uterine cramps are often observed. Some patients complain of lancinating pains shooting through the uterus. Cancer of the uterine body produces early in its course symptoms which attract the patient's attention; therefore the cases are seen early. Furthermore, it is of slower progress than cancer of the cervix; and, as the corpus uteri is free from attachments to other organs, extension outward does not occur so soon as in cancer of the cervix. Cancer of the uterine body extends through the lymphatics and not by progressively invading the tubes and ovaries. About half of the women are sterile.

*Diagnosis.*—Sloughing uterine polypi, sloughing submucous fibromyoma (particularly if cystic), hypertrophic endometritis, retained bits of placenta, tubal pregnancy, uterine sarcoma, tuberculosis of the endometrium, all produce symptoms similar to those arising from corporeal cancer. I shall not attempt a detailed statement of each of these diseases for the purpose of drawing fine distinctions in the gradations of the symptoms. The sole positive test is the microscopic examination of the scrapings secured by a curette

*Treatment.*—Unless too firmly fixed in the pelvis by glandular involvement, the uterus should be removed by way of the vagina. Recurrence after three years takes place in only about thirty per cent. of the cases. If all the operations could be done in the first few months, recurrence would be rare. In cases too far progressed to admit of a radical operation, the uterus should be curetted and cauterized by the galvano-cautery.

*The Operative Treatment of Carcinoma of the Uterus.*—This is of two very distinct and markedly differing kinds: those procedures which may be called radical, and those which are solely palliative.

Indications for the Various Radical Operations for Cancer of the Uterus.—*Cancer of the Cervix Uteri.*—As a general proposition it may be stated that whenever malignant disease of the cervix is discovered and is limited to the uterine tissue a radical operation is indicated. In certain cases the general condition of the patient may be so poor that to subject her to a grave operation would be fraught with too great danger. Advanced lung disease, nephritis, and mitral disease, as a rule, contraindicate ablation of the cancerous uterus. As a converse proposition, it may be laid down that whenever the cancer has extended beyond the uterine tissue, radical work is out of the question. Such extension reveals itself in a greater or less density in the pericervical tissues, fixity of the cervix, and, remotely, glandular enlargements. But these conditions are also brought about by inflammatory lesions, and these latter must be eliminated as causes for the fixity of the cervix before the propriety of a radical operation can be determined. There is a surgical rule, with its corollary, that all operations for cancer shall proceed through normal tissues, and that no radical operation shall be attempted unless the section of the tissues can pass outside the cancerous field; for the scope of any proposed operation is determined not so much by the fact that this or that fraction of tissue is involved in the cancerous invasion as by the tendency of cancer to recur after removal. And the merits of any operation for the relief of this condition are determined by the ultimate results rather than by the immediate. Good ultimate results are not to be expected when the cancer has extended beyond the uterus. And, furthermore, the less the involvement of the uterus itself, the better the remote results following operation. Therefore cancer which is diagnosticated only by the microscope is less likely to recur than that which is revealed by the symptoms which it produces. So, then, the earlier cancer is diagnosticated the clearer the indications for radical operation and the better the results from such operation, both immediate and remote. Even when bimanual examination demonstrates that the uterus is perfectly movable, cystoscopic examination will often show that the cervico-vesical wall is involved. This involvement will cause rounded elevations beneath the vesical mucosa.

The great problem which confronts the surgeon is the determination of the distance, from the cancer field, to which his section of the tissues must proceed. It may be stated that in epithelioma the tissues may be severed closer to the involved field than in adeno-carcinoma. Whether this clinical observation is due to the lesser virulence and slower progress of epithelioma, or to the fact that as a rule epithelioma is usually, because of the nature of its growth, discovered sooner than adeno-carcinoma, I do not know. But it is my belief that epithelioma of the cervix is far less malignant than adeno-carcinoma. However, the rule in operating is to keep as far away from the cervix as possible. There are two routes for operating upon cancer of the cervix the vaginal and the abdominal. And of all cases of cancer of the uterus which come to us for treatment, scarcely ten per cent. can be subjected to any radical operation.

(*a*) *Indications for the Radical Vaginal Operation.*—These are to be found in the immediate mortality and in the ultimate results.

The death rate from vaginal hysterectomy in cancer of the cervix should not be more than five per cent. It is

most difficult to determine precisely the ultimate results because so many patients are lost sight of, and the groups of cases falling into the hands of different operators vary so much in the extent of the involvement. Of all cases operated upon by the vaginal route, about sixty per cent. recur within the first year after operation. Of the remainder, not more than twenty per cent. are free from recurrence after five years. And these results are found by those who are thorough masters of technique.

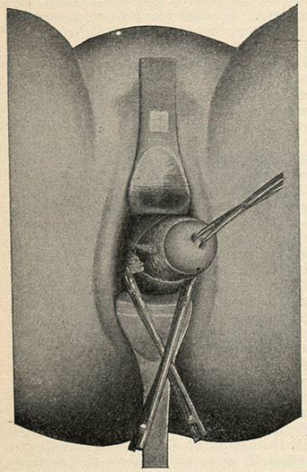

FIG. 4912.—The Forceps Operation for the Removal of a Cancerous Mass through the Vagina. The forceps are shown grasping the bases of the broad ligaments. All the tissues have been cut so as to free the cervix upon all sides. (Pryor.)

Vaginal hysterectomy for cancer of the cervix is an operation which can be rapidly performed and does not necessitate a profound degree of narcosis. It is therefore indicated in those who are aged and who would not for other reasons stand a more severe and prolonged operation. If it is indicated at all, it is in old women, in very stout women, and in those with nephritis or cardiac disease who are suffering from epithelioma. It is the author's belief that a less severe operation gives results equally good remotely and far better immediately. I refer to the high amputation of Dr. John Byrne. And when we reflect that the radical vaginal operation is limited to cervical cancers which have not extended beyond the uterus, while the procedure of Byrne is applicable, and always with benefit, to all cases in which the disease has not actually invaded the bladder or bowel, we can see the greater value of Byrne's operation.

*The Operation.*—The patient is placed on the back in the lithotomy posture. All necrotic and cancerous tissue about the cervix should be scraped and cut away. The cervix is then closed by a series of heavy silk sutures. These effectually prevent soiling the wound by cancer elements and furnish excellent traction strings. The uterus must be removed *en masse*, and without hemisection and morcellation. The cervix is now entirely circled either by the scissors or by a cautery knife, preferably the latter. The line of incision must be as far away from the cervix as possible; posteriorly at the lowest limit of the pouch of Douglas, laterally near the ureteral lines, and anteriorly at that point beneath the bladder which will just escape entering that viscus. Approximately this cuff of cervical tissue will not be over one-fourth of an inch in depth. The posterior, anterior, and lateral vaginal walls are retracted by assistants, one of whom pulls the cervix down. The operator now carefully dissects up the vaginal cuff by means of toothed forceps and scissors. He next enters the posterior cul-de-sac and extends the lateral margins of this incision by his fingers until the bases of the broad ligaments are reached. Into this posterior opening a gauze pad is introduced to catch fluids and prevent prolapse of the intestines. The operator then turns his attention to separating the bladder from the uterus. This must be accomplished slowly by means of the toothed forceps and scissors; more rapidly by using the index finger to peel up the vesical tissues.

When the vesico-uterine fold of peritoneum has been severed, the lateral borders of the anterior incision are extended by means of the fingers. The uterus now hangs by its lateral supports only. It is important to release the ureters from their associations with the loose tissue about the cervix. This is accomplished by gently shoving the tissues away from the cervix first on one side, then on the other, anteriorly and posteriorly. It may be doubted whether the ureters can be laterally displaced in this manner. I have many times demonstrated it upon the cadaver. This separation of cervix from ureters is still further increased by drawing down the uterus and lifting the bladder with the trowel. While this is being done one index finger is introduced behind the uterus, and the tissues upon one side, then upon the other, are grasped by forceps. The bases of the broad ligaments upon each side are in this manner grasped, together with the uterine arteries. Before the forceps are locked they should be slowly worked outward as close to the ureters as possible and without wounding them. After locking the forceps the tissues are cut close to them up to the points of the forceps (Fig. 4912). These two forceps must also embrace the insertions of the utero-sacral ligaments. The uterus now hangs by the tops of the broad ligaments and by the round ligaments. In order that these may be secured without risk of wounding the gut, the cervix is released and the body of the uterus delivered beneath the bladder (Fig. 4913). The ovaries are drawn out also and held by suitable forceps. A forceps is then applied from above downward upon the right side outside the ovary, with its points lapping the forceps below and internal to it (Fig. 4914). The broad ligament and round ligament are cut and the uterus swings out of the pelvis. It is an easy matter now to grasp the ovarian artery on the left side and remove the uterus (Fig. 4915). If the operator prefers to do so, he may now substitute ligatures of stout tendon for the forceps. These ligatures are passed by the large aneurism needle first to the bases of the broad ligaments and then to the tops. I always ligate the round ligaments separately to guard against their pulling out of the loop of the ligature, thus loosening it and causing secondary hemorrhage. Care must be exercised in removing the forceps lest the stumps slip away from the operator. He should attach a fine artery forceps to the cut end of the artery, and then, as an assistant loosens the large forceps, the operator ties down hard and makes the second knot as rapidly as possible before the elasticity of the stump loosens the first knot. My individual preference is for the use of the forceps exclusively. If this is done, the

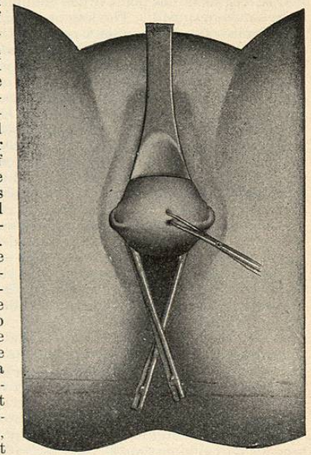

FIG. 4913.—The cervix has been pushed up, and the fundus uteri is shown pulled down beneath the bladder. The insertions of the Fallopian tubes into the fundus are shown. (Pryor.)





wound is dressed as in the similar operation for pus. If ligatures are used, these are cut short and the stumps allowed to retract upward. The centre of the wound is then closed by several sutures of tendon, which unite the anterior and posterior cut edges of the vagina.

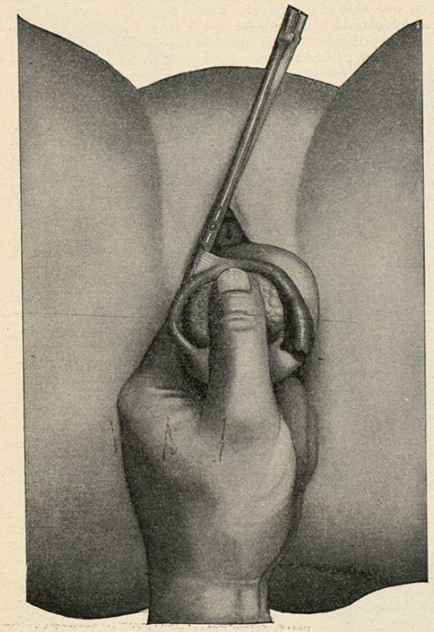

FIG. 4914.—The retractors have been withdrawn and the right ovary and tube are shown grasped by the thumb in front of the fundus uteri. The forceps is grasping the top of the right broad ligament. (Pryor.)

Intra-abdominal pressure will force the peritoneal edges together. A snug drain of iodoform gauze is inserted upon each side up to the stumps of the uterine arteries so as to prevent prolapse of the intestines or omentum, and the vagina is loosely packed with iodoform gauze. If ligatures are used the stumps do not slough, while forceps, if left on, always cause sloughing. It is because of this effect of forceps that I always use them. With ligatures the stumps remain vitalized, while with forceps they come away. Therefore forceps remove more tissue than the ligatures, and broad removal of tissue is what we desire when operating for cancer. The dressings are removed and renewed at the end of seven days.

*(b) Indications for Abdominal Ablation of the Cancerous Uterus.*—Inasmuch as the abdominal operation allows the operator to secure the ovarian vessels at the pelvic brim and the uterine arteries outside the ureters; and, further, as by this operation not only the individual lymph glands, but also the lymph channels in the broad ligaments and the greater part of the vagina, if this should be found necessary, can be removed, I always perform this operation for cancer of the cervix if a radical operation is indicated. The operation permits the broadest section of tissue in an uninvolved field with accurate removal of lymphatics, thus complying with the first surgical requisite. It further admits of this being done under a preliminary hæmostasis, and the vessels and lymphatics are severed before the uterus is subjected to any squeezing, thus eliminating the possibility of extrusion of the cancer elements into the absorbents. Furthermore, complications can be better dealt with by this route. The abdominal route permits the surgeon to remove all those structures to which cancer normally extends and in which it has a tendency to recur. In some quarters there is a tendency to apply the vaginal operation to the early cases, reserving for the abdominal operation those in which there are complications, or in which extension of the cancer outside of the cervix has taken place. If cancer were free from the tendency to recur, such a selection might be proper, but by adopting such tactics the operator is neither just to the operation nor to his patient If the abdominal operation is the preferable procedure for accomplishing all that surgery can accomplish for this disease when complications already exist, it is, I believe, still more strongly indicated in the early cases. No one has the right to rob a patient suffering from cancer of even a fraction of a per cent. of immunity from recurrence. In all cases it is the surgeon's duty to do the most radical operation possible, provided this complies with the surgical and anatomical requirements of the case and does not carry a prohibitive mortality. A woman with early cancer has a greater right to a radical operation than one with the disease in a later stage, for her chances of recovery and of acquiring immunity against recurrence are greater.

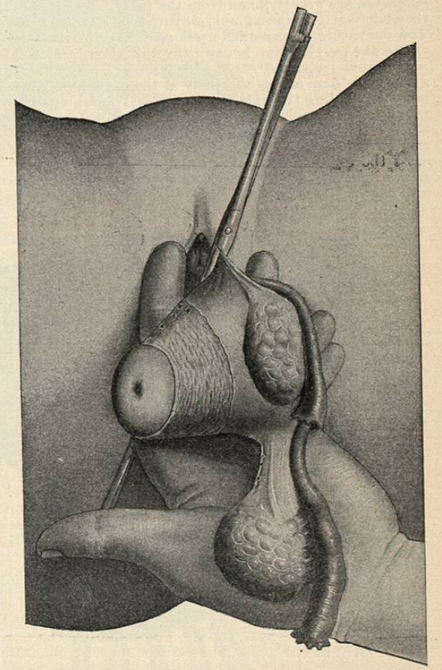

FIG. 4915.—Upon cutting the uterus loose upon the right side, it is made to swing entirely out of the body, so that its posterior surface presents itself, and the forceps is shown grasping the top of the left broad ligament, the last pair of forceps to be applied. (Pryor.)

The operation has been before the profession for too short a time justly to estimate the ultimate results. It has been performed by me thirty-four times with three deaths, 8.8 per cent. mortality. In no case in which the