which a bundle goes up along the ovarian artery to the vertebral column, called the superior round ligament. The whole muscular expansion is capable of producing erection of the internal genitals, and it is probably also instrumental in adapting the fimbriæ of the tubes to the ovaries during ovulation

PELVIC INFLAMMATION.

It is intended to include under this heading all those inflammatory pelvic diseases which involve the Fallopian tubes, the ovaries, the pelvic peritoneum, and the pelvic cellular tissue—all those conditions described by the terms salpingitis, pyosalpinx, ovarian abscess, perimetritis, parametritis, peri-uterine phlegmon, pelvic abscess, pelvic cellulitis, pelvic peritonitis. These conditions are so intimately associated and so constantly complicate each other that it becomes impossible to treat of one without taking into consideration several or more of the others. Rarely does a pyosalpinx exist except it be complicated by a pelvic peritonitis, and in all probability a pelvic cellulitis, the peritonitis and cellulitis arising from the same source as the salpingitis, and not being independent lesions. The abscesses, for the most part, are results of the more advanced stages of these same conditions, and in themselves rarely exist as independent factors. It is hard to study these inflammatory productions without seeing a direct line of cause and effect. With our present knowledge of these matters it is no difficult thing to trace the infection from its inception, and to recognize its course in the lesions left behind as it pursues its destructive way.

It is our purpose, then, to deal with this subject as though treating a single disease—which in fact and in truth it is—and with each of the resultant factors as simply the same disease attacking, in its progress, the different anatomical portions of the female pelvis, leaving in each locality an apparently different and independent lesion, the lesions differing in accordance with the structure attacked, with the severity of the attack, and with the stage at which the progress of the disease has been stayed. It were just as rational to consider the peritonitis, the cellulitis, and the abscesses complicating an appendicitis as independent of the inflammation of the appendix as to separate these same conditions from the salpingitis. In the case of the appendicitis the infection comes from inside the appendix, and,

Perimetritis (old name Peritonitis) = inflam. of Pelvic Peritoneum
Parametritis (old name cellulitis) = inflam. of connective tissue

having passed through its walls, attacks first the peritoneum, and secondly the cellular tissue.

In the same manner does the infection which destroys the pelvis come from the Fallopian tube, only, instead of being compelled to pass through the walls of this organ, it the more readily finds its way through the fimbriated opening directly into the peritoneal cavity and secondarily into the connective tissue. The amount of destruction accomplished will of course be in direct relation to the severity of the infection. Some attacks will not proceed further than the Fallopian tube itself, and often even end there without suppuration. The inflammatory process may extend into the peritoneal cavity and confine its ravages to the peritoneum itself, or it may extend deep enough to involve the cellular tissue, causing this to break down and suppurate. The reason these differences exist in individual cases is only to be explained by the character of the infection and its virulence. At times two given cases will not progress in exactly the same manner, even where the origin has been the same. Some local condition may exist so as materially to modify the course of the disease in the one case, while the other one may proceed rapidly to an amount of destruction which can never be repaired, if not unto death itself. When it is fully realized that this whole group of diseases originates from a common point and from a limited variety of infections, the importance of a careful study and understanding of these becomes at once apparent.

Inflammations of the female pelvis and pelvic organs constitute a very large proportion of the diseases of women. They are the most destructive and dangerous, as well as the most incurable, cases that the physician has to treat, provided they once gain headway or have accomplished their ravages before they come under observation. At the same time, taken in their incipiency, they are readily retarded and cured. As in all other conditions, where it can be accomplished, it is much easier to prevent the subsequent ravages of the inflammation than to cure the resultant lesions. As a rule, after the fire has once swept over its course, such destruction has resulted that a cure short of surgical methods is out of the question, and at times even these are unavailing. Once allow a woman to contract pelvic inflammation with all its possibilities, and allow the disease to run into a chronic condition, the chances are that she will have acquired such a degree of invalidism as to feel the results for the rest of her life, even though the disease be removed. Many of these women

never, under the most favorable circumstances, regain their former state of health.

CAUSATION.—Pelvic inflammations arise almost without exception from either septic or specific infection. The exceptions are those rare cases in which the disease has had its origin in a sudden suppression of menstruation or where it is due to the irritation of neoplasms, such as fibroid tumors and ovarian cysts. Even in these exceptions it becomes a question at times whether or not the peritonitis, be it acute, has not originated from septic material contained in a diseased Fallopian tube or ovary. Chronic inflammation may readily be engendered by the irritation due to the presence of an abnormal growth in the pelvic cavity, but such a process seldom brings about such disastrous results as do the acute inflammatory attacks. The changes here are more of a gradual thickening and hypertrophy of the epithelial and interstitial elements, and there is little or no danger of resultant adhesions or abscesses. A very great many neoplasms are complicated by disease of the Fallopian tube. It is obvious what chances there are of a leakage of infective material from an enlarged and diseased tube. Even where there is no leakage through the fimbriated end, or no rupture of the walls of the organ, yet it is a well-known fact that the peritoneum about these members is peculiarly liable to attacks of inflammation, probably by extension of the disease directly through their walls. Any given case of pelvic inflammation complicating the growth of a neoplasm is always open to the just suspicion that there is, in addition to the new growth, a lurking infection in the Fallopian tube. In such a case the cause of the inflammation would again be sought in a septic or specific poison, brought about in much the same manner as are the vast majority of cases of pelvic inflammation. It is well known that the rupture of some cystic tumor, and the emptying of part or all of its contents into the abdomen, may give rise to this same character of trouble. These cases are, however, the exception, and usually, when they do occur, it is not difficult to differentiate them. Those cases which are apparently due to the traumatism incident to operations, the use of the uterine sound, the introduction of sponge tents, and other similar procedures are beyond doubt caused by the addition of septic poison to the traumatisms, and not to the mere wounds themselves. Careful use of ordinary antiseptic precautions will obviate any chance of such mishaps. If a patient is suffering from venereal disease, and a solution of continuity of the

mucous membrane, either of the vagina or uterus, is made in the course of an operation or an examination, it is hardly to be expected that there will be a universal escape from some of the disasters of a spread of the infection into the connective tissues through the open wounds so made.

If, however, the disease be cured prior to an attempt at operative procedures, or even if great care has been taken to disinfect the parts to be operated upon, the chances of infection are minimized. The same may be said of infection carried by dirty instruments during the course of an examination. It is extremely problematic whether or not many cases have resulted from such sources where even the most ordinary care has been taken with the implements used. A speculum or a pair of dressing forceps must be noticeably dirty to carry infection from one patient to another, particularly if the mucous membrane of the vagina is reasonably sound and healthy. The danger resulting from the use of a sponge tent is likewise due to a septic condition of the tent or of the vaginal or uterine canals; and so with most other instruments usually held accountable for the origin of pelvic inflammations.

As in the case of neoplasms, so in all cases that require the use of instruments, it is far more likely that there is already existing the source of infection in the Fallopian tubes, ovaries, or peritoneum than that the use of these instruments has originated the attack. If a woman has a diseased and possibly adherent Fallopian tube, especially if it be distended with pus, any manipulative interference will surely tend to relight an inflammation which has become quiescent, and has probably remained so for years. If the disease be originated by the mere use of the instrument, it is almost certainly not due to the introduction of septic or specific poison as an additional element in the case. It is problematic whether traumatism *per se* ever originates pelvic inflammation. The peritonitis due to sudden suppression of menstruation does not, as a rule, leave behind it any such traces as are left after an attack of septic peritonitis. The inflammation is of a frank, open character, without usually any tendencies to the exudation of plastic lymph, such as will not subsequently be absorbed. When such an attack has cleared up, there are left no microscopic lesions, except it be in the ovary itself, and here the changes are more likely to be of an interstitial character, such as follow chronic inflammation in these organs. Frequently these attacks do not amount to anything more than a severe congestion,

stopping short of true inflammation, rest in bed and depletion accomplishing a speedy and permanent cure. Pelvic peritonitis caused by venereal excess, independent of any other factor, is more than doubtful. The traumatism, it is true, incident to such excess would tend to foster such a result, but the continued relief from congestion due to the repeated normal terminations of coition would tend to promote anemia of the parts rather than congestion. As in the case of many other supposed causes, a previously diseased condition of the uterus or uterine appendages is in all probability at the bottom of the trouble, in which case it is easy to understand how the incidental and repeated traumatism would bring about the result.

Septic or specific infection of the genital canal is the cause of the vast majority of pelvic inflammations. Septic infection enters in one of two ways: either through wounds caused by operations (the use of tents, the use of the uterine sounds, specula, and other instruments) or through the wounds caused by childbearing and abortion.

Puerperal septicemia outweighs by far all the other sources of septic trouble, and compared with this source the others are practically nil. Puerperal septicemia rivals, and even exceeds, gonorrhea as an etiological factor in these diseases. The analysis made by Bernutz of 99 cases of pelvic peritonitis shows at a glance the two great factors in the production of pelvic inflammatory troubles:

43 occurred in puerperæ;
28 " after gonorrhea;
20 " during menstruation.

8 traumatic {
- 3 due to venereal excess;
- 2 " syphilitic disease of the cervix;
- 2 " introduction of the uterine sound;
- 1 " use of the vaginal douche.

This table is susceptible of considerable modification, and if the whole truth were known, it is more than probable that every case in it could have been traced to gonorrhea or post-puerperal septicemia, had as much been known of these troubles in the time when the cases were tabulated as is known about them at the present time. It is more than probable that in every one of the 8 traumatic cases and in the 20 recorded as occurring during menstruation, there was present in the pelvis a pre-existing inflammatory disease which was only awaiting some favorable opportunity to

develop. That twenty of the attacks took place during the menstrual period is only what could be expected. At this time there is a natural congestion of the pelvic organs; this congestion, added to the already existing inflammation, latent perhaps, but none the less real, would place the patient in the best possible condition for any outside influence to determine the resulting acute attack of pelvic inflammation. Forty-three of the cases are recorded as occurring in puerperæ, and twenty-eight after gonorrhea. A second glance is convincing that in all probability a few of the puerperal cases were caused by gonorrheal infection—just what proportion it is impossible to tell. The argument might, in fact, be brought to bear in every case of post-puerperal septicemia, that the woman had previously been infected with gonorrhea, else she would not have developed the puerperal disease. Such is undoubtedly the case in many instances, but, in spite of the great possibility of such an occurrence, there is yet a large proportion of cases which undoubtedly arise from a puerperal septicemia, entirely independent of venereal contamination; the proportion is fully as large as in that class where the cause is unquestionably gonorrhea. This is even true of many of those women whose husbands have perchance contracted a gonorrhea in their younger days before marriage. Because a man has once been afflicted with venereal contamination, it by no means follows that he always retains the disease, as has been contended by some writers, nor that he is sure to contaminate any woman with whom he has intercourse. Whether or not the gonococcus is the cause of gonorrhea, it is notorious that many discharges contain this factor without being able to reproduce the disease. It has been shown, also, that it is not possible to infect the healthy mucous membranes with the discharges from some cases of chronic gleet. On the other hand, experiments have been produced to show that quite the reverse of this is true. However this may be from an experimental point of view, certainly the relation of cause and effect in such a case as the following is apparent: A young and healthy woman is married to a man who some time previous to their marriage had contracted gonorrhea, but of which he was cured before the ceremony. She bears one, two, or three children successively, always making a satisfactory recovery and remaining in robust health. Following a third or fourth pregnancy she develops puerperal septicemia, and is ever afterward a sufferer. It can hardly be contended in such a case that gonorrhea

played a very important rôle in the production of the septicemia. Large numbers of women suffering from pelvic inflammatory diseases give practically the same history as this, less the fact that the husband had pre-existing venereal infection.

Generally, when a woman contracts gonorrhea the first step is the production of a vaginitis. As it is but a short distance from the vagina to the uterus, this is usually quickly traversed. Occasionally there is no vaginitis noticeable, the first lesion being an endometritis. The uterus, in case the infection is of puerperal origin, is the original seat of the attack. Whether or not the disease starts or exists elsewhere, an endometritis eventually develops in every case of gonorrheal or puerperal pelvic inflammation. This fact is important to bear in mind when it comes to the treatment of the disease, both as to prophylactic measures and as to the final cure, even though surgical treatment has been necessitated and carried out. Practically, the mucous membranes of the uterus and the Fallopian tubes are one and the same, the anatomical differences not amounting to more than a change in the character of the epithelium.

The disease has one unbroken line of membrane over which to extend and reach the peritoneal cavity, and it is only a matter of surprise that it ever confines itself to the lining membrane of the uterus. That it does so in many cases is, however, beyond dispute. If the infection be confined to the uterine body, the dangers of a peritonitis are very small, as the chances of the poison being carried through the uterine walls by way of the lymphatics are not great. The extension is nearly always by way of the Fallopian tubes, the exceptions to this being found amongst the puerperal cases; and even here an example is met infrequently. In such cases we would naturally expect the cellular tissue about the uterus to first become affected and to undergo suppuration. As a matter of fact, such conditions exist only occasionally, the cellulitis being almost universally secondary to the inflammation of the peritoneum.

One of the many proofs that the infection has proceeded directly from the tube itself, and not from the uterus by way of the lymphatics, is that it is rare to find traces of inflammation in the shape of adhesions on the anterior surface of the broad ligament, between this structure and the bladder. The evidences of the infection are almost universally found on its posterior surface, between the ligament and the sacrum. This would seem to be accounted for by

the anatomical position of the tube and ovary on the posterior surface of the broad ligament.

The more virulent the infection and the more rapidly it extends, the greater will be the chance of its reaching the peritoneal cavity through the open fimbriated end of the Fallopian tube; the greater, in consequence, will be the destruction to the various organs, and the more will be the chance of a fatal termination.

As the infection extends from the uterus, it spreads at once along the mucous membrane of the Fallopian tube, out of its fimbriated opening directly to the ovary and into the pelvic peritoneum.

Pathological Anatomy.—The inflammation engendered by the infection, whatever it may be, is in all respects the same whether confined to the Fallopian tube, the ovary, a part or the whole of the pelvic peritoneum and cellular tissue, or to the whole abdominal cavity. It is simply a question of anatomical limitation, the extent of limitation being determined by the character of the infection, its virulence, and the ability of Nature to quickly meet and confine it within a limited space. Usually, Nature is capable of meeting the invasion more than halfway, and she not infrequently shuts off the most important avenue of approach to the pelvic cavity by firmly sealing the fimbriated opening of the tube. If she be successful in accomplishing this, there is no very great danger that the inflammation will pass through the walls of the tube, and thus infect the pelvic cavity to more than a limited extent. The possibility of this must be borne in mind, as undoubtedly the inflammation has spread in this manner, but only, however, in particularly virulent cases. Such instances are the exception rather than the rule.

Whatever be the source or cause of infection, the results are the same up to a certain point, as in all inflammations. The moment the tissues are involved, there occurs first a congestion, followed rapidly by effusion. Resolution may or may not follow later in the progress of the case; the rule is that it takes place to a greater or lesser degree. If resolution does not occur, either organization or suppuration is the final step. Whether the inflammation be a superficial one, involving only the mucous membranes of the Fallopian tube or the serous membrane of the pelvic cavity, or whether it will extend into the deeper structures of these parts, will depend in great measure on the virulence of the attack and its rapidity of advance. For the most part, the disease invades, to a greater or

lesser extent, the connective tissues: as a matter of actual fact, few cases of salpingitis and peritonitis exist without some involvement of the deeper and looser tissues. The exudation occurs in two places: on the surface of the membrane and in the underlying connective tissue. In the Fallopian tube the mucous membrane excretes serum which collects and dilates the tube-cavity. This fluid is liable to either discharge itself into the uterine cavity through the uterine opening of the tube, or into the pelvic cavity through the fimbriated opening, or it may be retained and accumulated in consequence of both these openings becoming closed by the inflammatory process. Whether retained or not, it is extremely liable to undergo suppurative changes and terminate in pus-formation. Should this material empty itself into the uterus, it will drain into the vagina, and will eventually be disposed of in a comparatively harmless way. If it remains encysted in the Fallopian tube, we will have formed either a hydrosalpinx or a pyosalpinx; more usually the latter. The amount poured out is variable, depending upon the irritating properties of the infection. Should it discharge itself into the pelvic cavity, whether it has undergone suppurative changes or not, it is liable to set up an inflammatory condition of the pelvic peritoneum, even though this membrane is not already involved. The exudation into the connective tissue varies also in degree and kind. The greater the exudation and infiltration of inflammatory cells, the thicker and denser become the tube-walls. So thoroughly, in fact, may the walls be penetrated by the inflammation that the peritoneum covering them may become involved. The infiltration may subsequently become absorbed; it may remain and undergo partial organization or it may take on suppurative changes. Frequently, when to the naked eye a Fallopian tube appears to be perfectly free from suppuration, the microscope will show indubitable evidence of the infiltration of pus-corpuscles into its walls. This may, and does, frequently extend to the degree of rendering all the involved tissues so thoroughly friable as to cause them to break down under slight manipulation or under the pressure of a ligature. A ligature will at times cut through such tissue like a knife, the blood-vessels alone offering any great resistance, and even these give way in many instances. It is not at all unique to see the suppurative process extend so far that pus may readily be extruded from the cut surfaces of the walls of the thickened and diseased tube. Should the infiltrating products of the inflammation not be

absorbed, they may leave the tube in a permanently thickened and hypertrophied condition. There will result in this case an enormous overgrowth of the connective-tissue elements, with a possible permanent infiltration of inflammatory cells. Where the disease in the tube has extended to either of the above conditions, the peritoneum will have become sufficiently involved to throw out plastic lymph, which will undergo partial organization and form adhesions. Should the attack prove a mild one, in all probability the exudation will be absorbed and the case progress toward a complete cure. At times, where the disease in the uterus is quite severe, it will stop short of an inflammation in the tube, and after existing for a time as a congestion may gradually disappear altogether. It is no infrequent thing to find at the time of an operation that the uterus is badly diseased, and the tube is only, as yet, greatly swollen and deeply congested, but without showing any signs of infiltration. So also with the peritoneum. A badly crippled tube may exist, the fimbriated end becoming closed and adherent to the ovary, with the tube-cavity distended by a muco-purulent serum. The serous membrane may simply be congested, with no excretion of lymph, no adhesions, no true inflammation. The removal of the tube with its contained source of infection and irritation is amply sufficient to put a stop to further advance of the disease: before the patient is recovered from the operation all traces of the peritoneal congestion will have disappeared.

Should the inflammation have spread from the tube to the pelvic cavity, either by the extension of the disease from the tube through its fimbriated opening or by the subsequent pouring out of the excreted tubal serum, which has undergone muco-purulent changes or not, or by direct extension through the walls of the tube itself, the disease takes on exactly the same form as it would in any other serous membrane, differing only in so far as the anatomical features differ. The pathology of peritonitis is like that of inflammation of other serous membranes—first, congestion, then transudation of blood-serum, and, finally, an exudation of plastic material. Should resolution take place, these inflammatory products are disposed of by absorption of the serum and organization of the exudate. Organization simply consists in the development of the circulation in the exudates sufficient to prevent their degeneration. Should this not occur, they usually break down into suppuration. The exudation

of the serous membranes assumes one of three forms: *fibrinous*, *serous*, or *suppurative*.

In the fibrinous form, should two opposing surfaces touch each other, they will almost certainly become adherent until such time at least when the lymph becomes absorbed. If it does not finally disappear by absorption, permanent adhesions result, more or less dense and well organized in accordance with the original amount of lymph excreted and the activity of proliferation in the underlying endothelial cells of the serous membrane. The more extensive the involvement of the peritoneum, the more extensive will be the resultant binding together of its various surfaces. Should the exudation prove to be of the serous variety, adhesions are much less apt to form. Varying quantities of free serum, in a more or less changed condition, will be found in the pelvic cavity, and the serous surface will most likely be covered with flakes of lymph. The suppurative variety is simply an advanced stage of either of the other two. As to whether or not suppuration occurs, depends, again, upon the character of the infection. Occasionally the infection is so virulent that the case has progressed to a fatal termination before suppuration has had time to occur.

Should the inflammation involve the deeper tissues, as is almost always the case, effusion takes place into the cellular tissue. The extent to which this will occur is dependent directly upon the activity of the advancing inflammatory process. At times the effusion is slight in quantity, and causes but little distension of the loose areolar tissues; in other cases so much effusion is thrown out as to distend the connective tissues to their fullest extent. The greater the amount of effusion, the more hard and board-like will the part appear to the touch on a local examination. Should the case progress favorably, there will eventually be an absorption of these inflammatory products and the parts will return to a condition of health. Should anything supervene, on the other hand, to prevent Nature from absorbing and disposing of this serum in the ordinary way, it becomes denser and apparently makes an effort at organization. If infective germs should reach it from any direction, suppuration will take place and all hopes of a spontaneous cure will be lost, except through a prolonged and extremely hazardous illness. The extent of the suppuration does not altogether depend upon the extent of the infiltration, for the reason that after this process has progressed to the limits of the effusion it very frequently con-

tinues on, involving the healthy connective tissue, step by step, until eventually it may involve most of the connective tissue of the pelvis, and has even been known to discharge at the umbilicus.

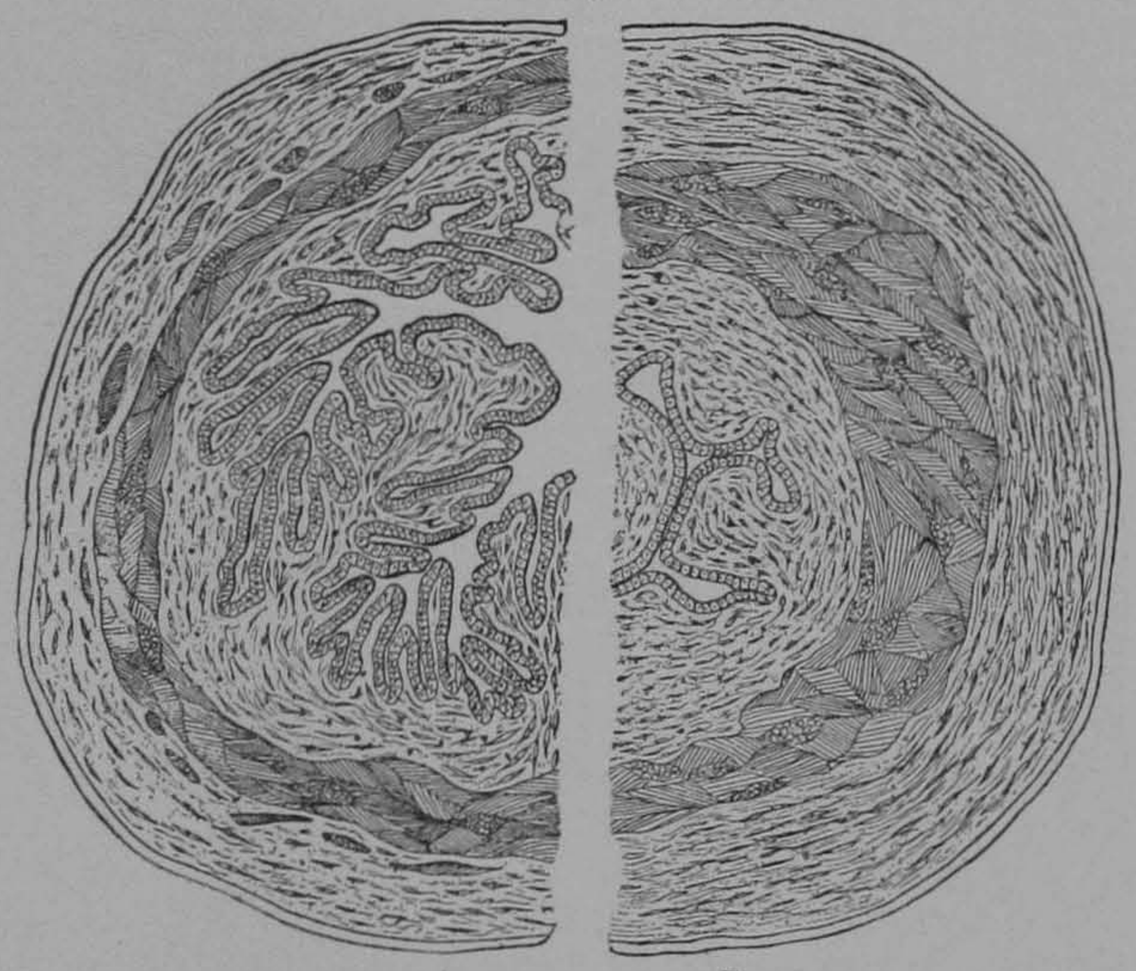
Except in a limited number of puerperal cases, the course and termination of a septic or specific inflammation of the uterus are as described. The few exceptions to this rule occur, as has been said, in puerperal patients. A woman contracts septicemia after childbirth or abortion, by having septic germs introduced into the uterus. The amount of septic material which will be necessary to contaminate a woman under these circumstances will probably be such as would have no effect whatever upon a healthy non-gravid womb. After the placenta has been removed there is left, to all intents and purposes, an open wound, or what would be an open wound were it on any of the skin surfaces of the body.

The incidental wounds due to traumatism add another element to the dangers of this variety of infection. The placental wound is peculiarly liable to pathological changes, for the reason that it is difficult of access and treatment, such as a similar wound elsewhere would receive. Again, the torn ends of the hypertrophied vessels and other tissues are disposed of by a process of degeneration which borders closely upon the pathological—a physiological process which the slightest amount of contamination by septic matter will change into a pathological one. Should such a wound once become septic, the enormously enlarged lymphatics stand ever ready with their gaping mouths to receive and convey into the deeper tissues the products of the suppuration. One would imagine, with the frequency of the occurrence of puerperal septicemia, that this condition would result frequently, when, as a matter of fact, it is the exceptional occurrence. If the septic products are taken up by the lymphatics, the chances are largely that they will be conveyed into the blood without any particular involvement by the inflammatory process of the walls of the lymphatic vessels or of the connective tissue binding them together or through which they pass. At times, however, some additional element seems to be introduced which causes the inflammatory process to rapidly pass along and about the walls of the vessels and lymphatics directly into the surrounding connective tissue, thus conveying the septic material primarily into the connective tissue and rendering any peritonitis which may follow secondary to the cellulitis. The fact of the existence of this class of cases (although of great rarity) does not detract

from the statement that in the vast majority of cases of pelvic inflammation the cellulitis is secondary to the peritonitis, and is consequently only of comparative importance. Usually the treatment directed toward the cure of the peritonitis accomplishes also that of the cellulitis.

Results.—The results left in the train of an inflammation beginning in the uterus, extending into the Fallopian tubes, and from thence into the pelvic cavity, are widely variable. In the tube they extend from a slight salpingitis to a pyosalpinx; in the peritoneal cavity, from a mild attack of local peritonitis to a general

FIG. 259.



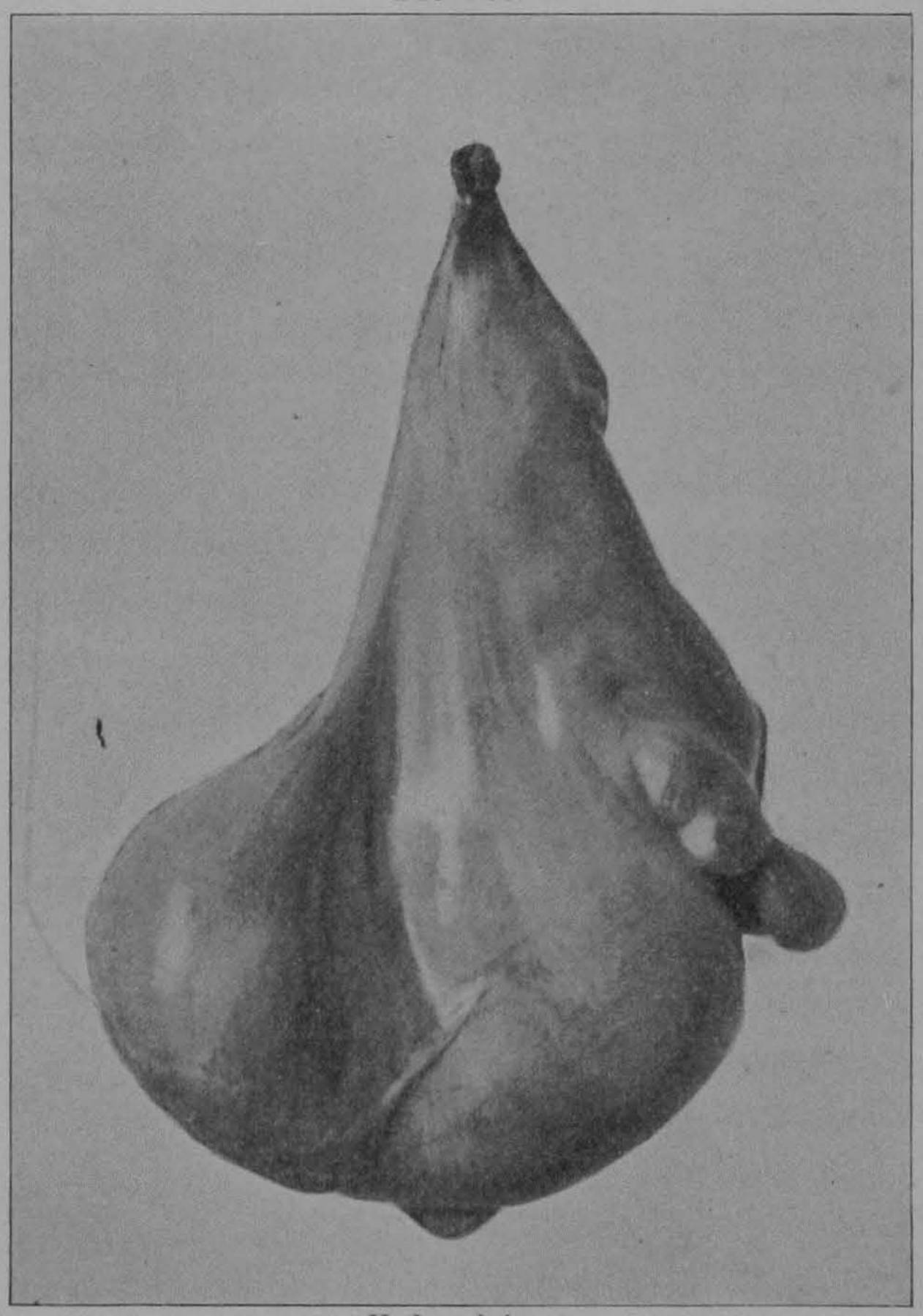
A B

Normal Fallopian Tube: *A*, section from the ampulla; *B*, section from near the uterus. Layers of the Fallopian tube: 1, upper and outermost layer, serous coat; 2, layer of loose connective tissue, richly supplied with blood-vessels; 3, muscular coat, much thicker near the uterus than near the ampulla. It is principally made up of circular fibres. Above and within it is reinforced by longitudinal fibres, some of which spread into the mucous layer; others (the most external) penetrate between the layers of the broad ligament; still others go to the hilum of the ovary or are prolonged to the fundus of the uterus; a few fibres penetrate to the inner layer. 4, mucous coat. The framework of this layer is embryonic connective tissue, rich in fusiform cells; it projects into the lumen of the tube in longitudinal folds which have been cut through obliquely in the section shown above. Near the uterus these folds are radiating, and give a star-shaped appearance to the lumen in the section. Near the ampulla they are longer and reduplicated, giving the lumen a jagged or toothed appearance on section. The whole surface of the mucous membrane is lined with simple columnar ciliated epithelium; the movement of the cilia is in the direction of the uterus.

suppurative peritonitis and cellulitis; in the ovaries, from a simple ovaritis to an ovarian abscess. In the milder forms of salpingitis the disease assumes the catarrhal type. Here the inflammation is confined almost, if not entirely, to the mucous membrane lining the Fallopian tube, there being oftentimes an accompanying congestion of the other constituent parts. The cause of the tubal involvement is always resident in the uterus, usually in the shape of an endometritis, and occurs by direct extension from one mucous membrane

to the other, the disease in the tube not always being so severe as that in the endometrium. The process exists in both an acute and a chronic form. Neither gives rise to any particular symptoms other than indirect ones, such as sterility. The acute form may run its course rapidly and be cured spontaneously, or may subside as the endometritis is relieved. On the other hand, it may continue indefinitely, and finally become chronic. During the existence of the inflammation, especially in the acute form, an excess of sero-mucous products is thrown out. Where there are no adhesions found, but the uterine and fimbriated ends of the tube remain patu-

FIG. 260.



Hydrosalpinx.

lous, these products are drained either into the uterine or pelvic cavities. Should their openings become occluded from any cause, as is at times the case, the sero-mucus accumulates, distends the tube, renders its walls thin, the tube becoming larger and larger as

the contents increase. The condition is then known as hydrosalpinx. The very mild cases seldom terminate in this manner, for the reason that there is not sufficient active inflammation to cause occlusion of the tubal openings. Where a hydrosalpinx exists, it is often found to be adherent to surrounding parts. The fact of the presence of a healthy, non-inflammatory tumor of reasonable size in the pelvis is not in itself sufficient to account for

FIG. 261.

Hydrosalpinx.

inflammatory processes arising in its peritoneal lining. Either the original inflammation, slight as it may be, has spread through the walls of the tumor, which have become much thinned, or there has been leakage of some of the tube-contents, which are acrid and irritating.

Should the inflammation become a chronic condition, which is the more usual procedure, the result is more apt to be a destruction of the ciliated epithelium lining the tube, and a consequent permanent crippling of that organ for its legitimate functions. The desquamation of the epithelium is also claimed to be a sequel of the exanthematous disease. To how great an extent this is true is uncertain. There is not the slightest reason why this mucous membrane should be more affected than that of other parts of the body. Where there has been a general and undoubted involvement of all the mucous tissues in the body there is no reason to expect that this particular one has escaped. Otherwise, the cause and

effect of these diseases are extremely problematic. It is this desquamation of the ciliated epithelium in the catarrhal salpingitis that is in great measure responsible for a large proportion of cases of sterility and extra-uterine pregnancy. The normal function of the ciliated epithelium is to carry all the tube-contents toward the uterus. If in consequence of its destruction the ovum is retarded in its progress until the spermatozoid is too enfeebled to perform its function, or if the ovum simply lodges in the tube and there loses its vitality, sterility must of necessity follow. Again, if the discharges from the altered and diseased mucous membrane are acrid and acid, neither the ovum nor the spermatozoid can survive, or at least they are so enfeebled when they meet that they fail to unite, or if they unite, fail to accomplish their destiny. Should the calibre of the tube be closed at any point throughout its extent, of course an insurmountable mechanical obstruction exists which it is impossible for either element to overcome. If the male and female elements should meet in the tube and the ovum become fecundated, the product of conception is very apt to lodge at some point along the course of the tube and continue its development.

Occasionally the inflammation of the tubal membrane assumes the hemorrhagic type and the excretions are mingled with blood. Provided these muco-bloody discharges empty themselves into the uterus, there will be no more difference in the result than if the excretion were merely mucous or serous. If adhesions close the ends of the tube, it becomes distended with the contained fluid, as in hydrosalpinx, and is then known as hematosalpinx. This occurrence is infrequent as compared with the formation of hydrosalpinx.

When the infection is more severe and extends into the Fallopian tube from the endometrium, involving almost simultaneously all the layers of the tubal wall, the resultant condition is more important as well as more dangerous. Exudation takes place into all the coats of the tube, and the inflammation extends even to the peritoneum. The openings into the tube may become closed or may remain patulous; usually they are occluded. The inflammatory products in the walls of the tubes increase. The walls vary in thickness in accordance with the amount of infiltration, in particularly bad cases being from a quarter to half an inch thick. Attempted organization may take place, the result being the production of an overgrowth of the connective-tissue elements, giving the tube a greater

or lesser consistency. The products of inflammation thrown out by the mucous surfaces are either discharged through the tubal openings or, if the openings are not patulous, are absorbed. The inflammatory products thrown out on the peritoneal covering of the tube assume the form of plastic lymph, and cause the tube to adhere to any other peritoneal surface it may touch. The tube itself adheres commonly to the uterus, broad ligament, and ovary: the fimbriated end usually grasps the ovary tightly, and the fimbria themselves may become destroyed by the disease.

This condition presents the disease known as chronic (adherent or interstitial) salpingitis. It must be borne in mind that this condition is distinctly different from those forms of pure chronic ca-

FIG. 262.

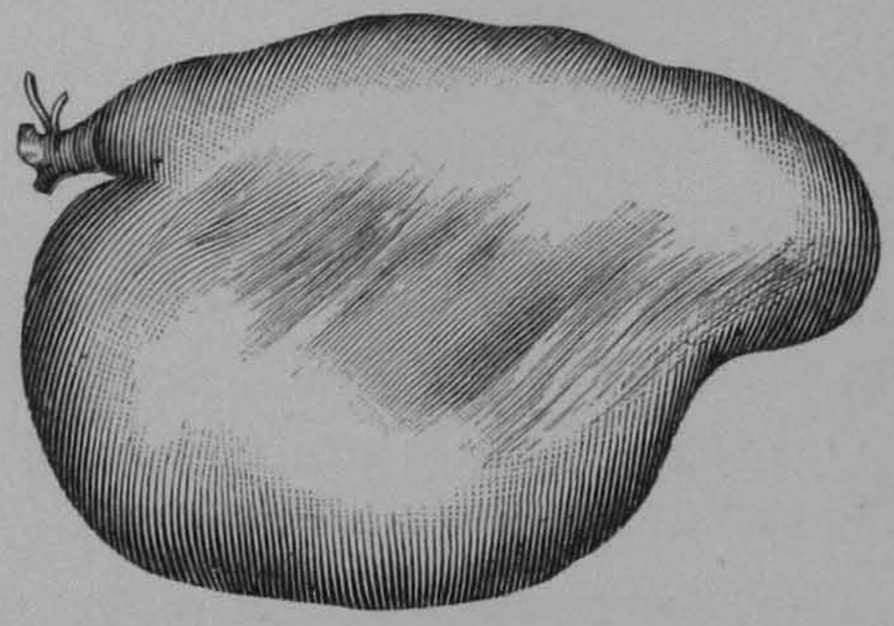
Chronic Interstitial Salpingitis and Ovaritis, with thickened broad ligament—so-called cellulitis.

tarrhal salpingitis in which the inflammation affects only the mucous lining of the tube, and results simply in a permanent alteration of that membrane, without particularly affecting the walls of the tube or its investing peritoneal covering.

Chronic interstitial salpingitis is nothing more or less than the mildest form of the same condition, which frequently progresses to the development of a pyosalpinx. If there be good drainage of the tube, there is not much danger of muco-purulent material accumulating. There may, it is true, be a certain amount of suppuration taking place, even the walls of the tube becoming involved. The result under these circumstances would be in accord-

ance with the patency of the tubal canal. If the canal remains patulous, the only additional harm will be the breaking down of the inflammatory products infiltrating the walls, and the consequent rendering of these friable, if they do not actually suppurate. This

FIG. 263.



Fallopian Tube and Ovary, showing adhesions.

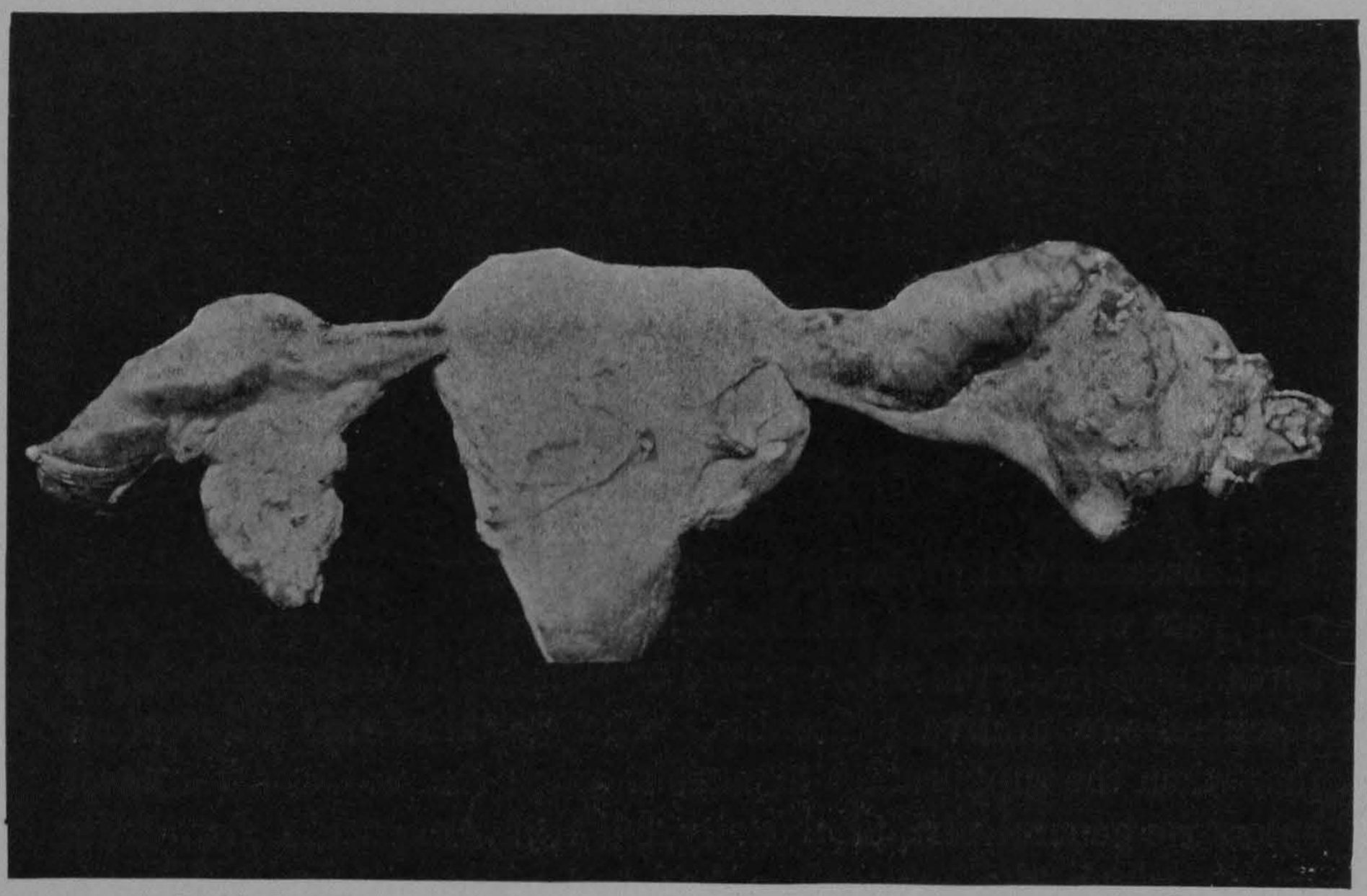
same process may extend into the lymph thrown out by the peritoneum, and cause the adhesions to become friable or even to suppurate.

Should suppuration occur, inflammatory products within the tube may drain away into the uterus, and the suppurative process finally cease, leaving the tube in its crippled adherent condition. The uterine opening will remain patulous long after the fimbriated opening is closed and the fimbria destroyed, for the reason that the peritoneum is much more delicate than the endometrium, and the irritation of the advancing suppuration will early cause it to throw out protective lymph, which will effectually seal the opening and protect the peritoneal cavity. The suppurative process may keep up indefinitely, the tube constantly discharging its muco-purulent contents into the uterine cavity and thence into the vagina. This is of no infrequent occurrence. The uterine opening may even become closed by light friable adhesions, the tube distend with its suppurative contents, until either the pressure of the over-distension causes the adhesions to give way or they break down from suppurative changes, the result in either case being a periodical discharge of pus from the tubes. The tubal openings usually become permanently closed by adhesions. If the tubal contents are small in quantity, they may eventually become absorbed; but this cannot be a common termination. It is not of infrequent occurrence to find the Fallopian tube distended with a broken-down, cheesy material. In these cases the watery elements of

the pus have been absorbed, and the solid portions have undergone a caseous degeneration. Such conditions are very apt to be due to tubercular changes. Were the constituent tissues of the tube healthy, there would be more probability of complete absorption. In the cases under consideration all the parts of the tube are so diseased and disorganized that their functions are for the most part suspended. However, certain cases are met with clinically in which no other interpretation is possible, and it may be put down as one of the probabilities.

When the contents are not absorbed, a true pyosalpinx results. The tube becomes distended with a greater or lesser quantity of pus

FIG. 264.

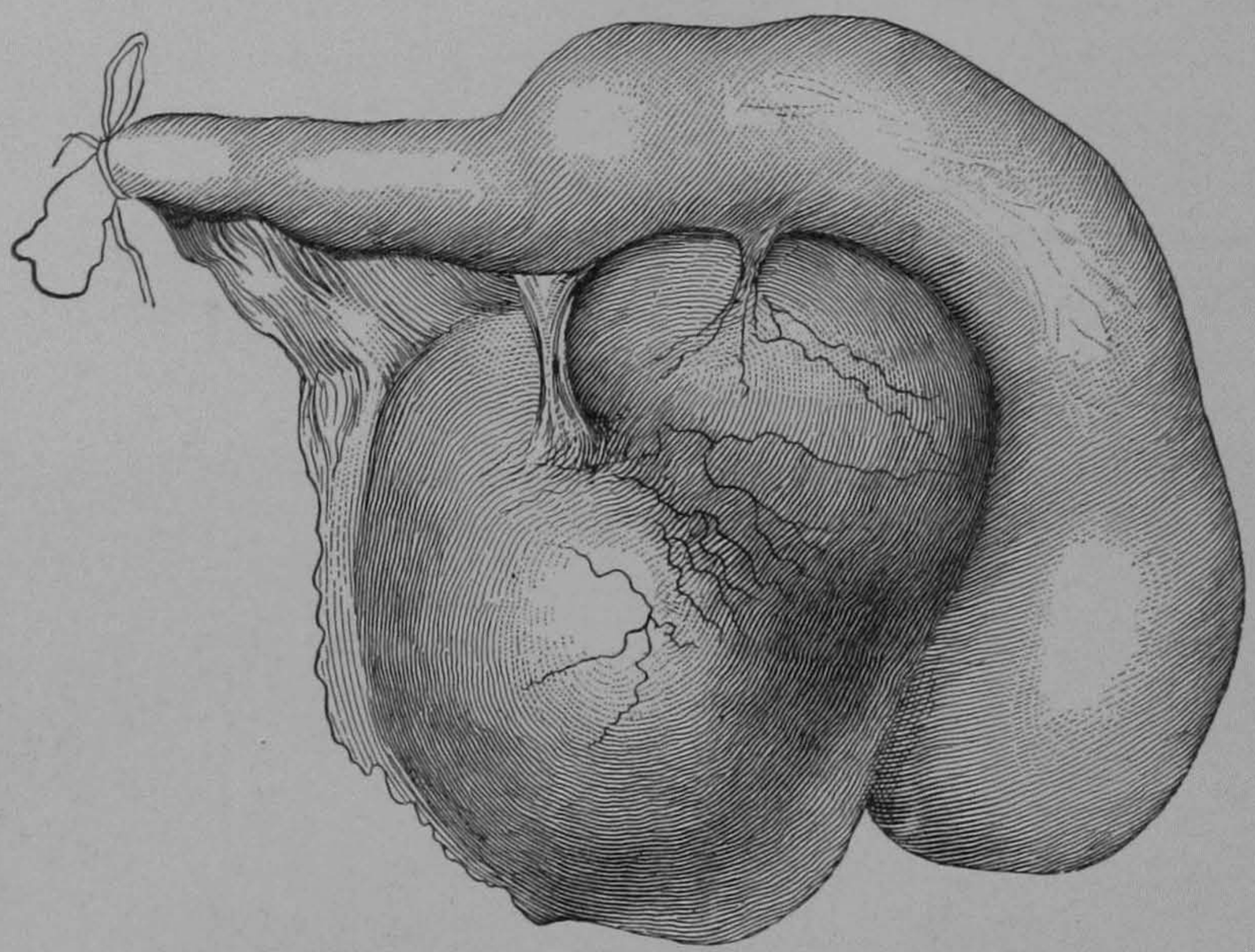


Double Pyosalpinx and Diseased Uterus, removed by Supravaginal Hysterectomy.

or muco-purulent matter. In such cases the inflammatory infiltrates in the tube-walls have most probably shared in the suppurative changes, rendering the walls soft and cheesy; the microscope will show them filled with pus-corpuscles. The peritoneal serum and lymph do not escape the suppurative changes. The pus may have worked its way directly through the tube-wall, and then infected the lymph, or the infection may have passed through the fimbriated opening of the tube, and in this manner contaminated the peritoneal elements. Small abscesses frequently result, in con-

sequence, in the midst of the adhesions, and on removal of the tube by abdominal section these abscesses, which are as often as not multiple, are opened, their contents soiling the field of operation. If the pus has passed directly through the tube-wall, these small

FIG. 265.



Pyosalpinx and Ovarian Abscess.

local abscesses will probably be the worst result. Should the infection pass out through the fimbriated opening, however, it may spread rapidly to the whole pelvic or abdominal cavity, and end in a general suppurative peritonitis. The reason of this difference is that when the suppuration extends through the tube-walls it never enters the general peritoneal cavity, but always meets the obstructing lymph which the peritoneum has had plenty of opportunity to throw out about the threatened point. This same obstruction is most always met with at the fimbriated opening, in which case the result is the same; but occasionally the infection itself travels along the tubal mucous membrane so quickly that it has time to escape before it can be closed in by the peritoneal lymph.

When the infection has once passed beyond the fimbriated opening of the Fallopian tube, it attacks either the ovary, the pelvic peritoneum, or both. Should it confine itself to the peritoneal investment of the ovary, it causes excretion of lymph, which binds that organ to the tube. The fimbriated end of the tube becomes

firmly attached to the ovary, not infrequently an abscess developing at the point of junction, which is known as a tubo-ovarian abscess. Should the infection penetrate the outer coat of the ovary or infect a ruptured Graafian follicle, there will begin and form in the ovarian stroma an abscess which may eventually reach even the size of an orange. Such an ovary is, as a matter of necessity, on account of the involvement of its peritoneal covering, densely adherent to all peritoneal surfaces which come in contact with it. Where there is no infection, but where the inflammation spreads from the tube and involves the ovary, this organ takes on changes of an interstitial character, which eventually cause such a destruction that there is little left of the healthy ovarian stroma. At times these organs assume much the character and appearance of hypertrophic scirrhosis; at others, an atrophic condition. In either case the function of the organ is much changed, even destroyed, and the ovary is most likely to give rise to very distressing symptoms.

The infection may pass along the Fallopian tube and infect the ovary, even to the extent of forming an ovarian abscess, without leaving behind more than a catarrhal condition in the tube. When the infection invades the peritoneum, it remains often a local affection, but in a reasonably large proportion of cases spreads until it invades more or less the whole of the pelvic peritoneum. It may, in fact, continue and develop into a general abdominal peritonitis. In attacking the peritoneum any one of these forms of peritonitis are likely to develop: the fibrinous, the serous, or the suppurative. The fibrinous variety is by far the most frequent form accompanying inflammatory diseases of the Fallopian tubes and the ovaries. The serous variety is most likely to be of the nature of that peritonitis which so often follows the performance of a cœliotomy; it runs its course usually in three or four days, and most generally ends fatally. It may, as a matter of fact, occur under any source of infection. The lesions in such a case, on examination, will be found to be universal but light adhesions between all the coils of intestines located in the pelvic cavity, as well as of all the pelvic contents. After the various organs are separated a few ounces of bloody serum will be found in the pelvic basin, and the peritoneal surfaces will be observed to be covered with flakes of lymph. The process has been too rapid for the formation of pus in many instances, and as a rule there is not a great deal of involvement of underlying connective tissue. The

fibrinous variety is the common one. The irritated and inflamed serous membrane begins at once to develop that great protector, lymph. This material precedes the infection, and, unless the advancing inflammation is too rapid, bounds it within certain limits. Frequently it confines the inflammation to the serous covering of the tube itself. The inflammation may have advanced further and involved the serous covering of the ovary and the broad ligament.

As the inflammation advances step by step it is continually met by the obstructing plastic material which the threatened and irritated peritoneum is throwing out for its protection, until, having spent its forces, it makes less and less effort at advance, and finally settles down within the limits into which the lymph has been able to confine it.

The extent of the destruction will have depended much upon the rapidity of the advance and the virulence of the infection. The lymph may have succeeded in confining it to the immediate neighborhood of the diseased Fallopian tube and ovary, or the inflammation may have spread to the whole of the pelvis, or in extreme cases to the general abdominal cavity. The inflamed peritoneal surfaces, wherever they come in contact, become glued together by the lymph. By the time the inflammatory forces have spent themselves, the serous membrane is infiltrated with the inflammatory products, resulting in its becoming thickened as well as being covered with lymph.

Should the case terminate in the most favorable manner, all the lymph and other inflammatory products would become partially absorbed, and the other parts return once more to a comparative condition of health. It is at this point that electricity has gained its greatest reputation. The lymph exists in considerable masses, and, as Nature begins to get rid of this accumulation, electricity comes in as an extra spur to hurry Nature's work. The result is in many cases a quicker absorption and an apparent cure, the facts being that the gross amount of lymph has disappeared, but the disorganized and adherent appendage remains, ready to relight the original inflammation upon the slightest provocation.

The fact is notorious that these chronic conditions are liable to repeated recurrent acute exacerbations of inflammation.

The more usual result, however, of such an inflammation of the pelvic peritoneum spreading from the Fallopian tube is to cause a broken-down and destroyed tube and ovary; both become enlarged,

PLATE XXVII.

Pyosalpinx and Ovarian Abscess, showing the remnants of universal adhesions.

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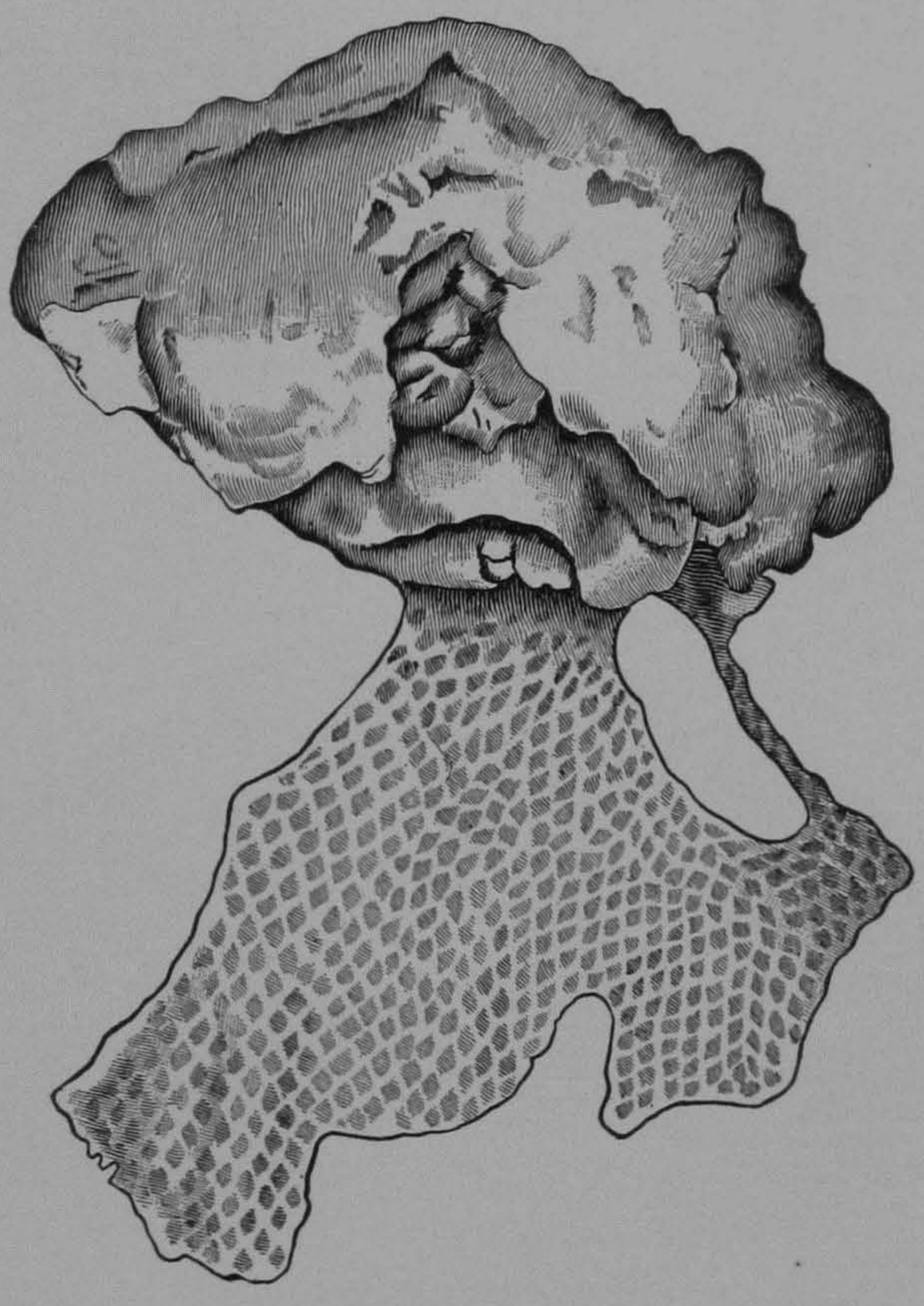
heavy, prolapsed, and adherent to each other, the broad ligament, the uterus, and the pelvic walls. One step further, and the superimposed intestines and omentum are involved, and become adherent on top of the diseased and adherent pelvic organs. At times there is no pus complicating the general destruction; at others pus is found in the Fallopian tubes, the ovaries, in the midst of the adhesions in which these organs are imbedded, or filling the whole pelvis. The Fallopian tubes themselves are so distorted that numerous separate pockets of pus are found in a single tube. As many as three such collections have been found in the same tube, each of

FIG. 266.



Broad thin Band of Adhesions (spider-web) hanging from an Adherent Ovary and Fallopian Tube. (Drawn from photograph.)

which contained a distinctly different variety of pus. As many as half a dozen different foci of suppuration have been found in the midst of the adhesions, and in a single Fallopian tube, all separate and unconnected with one another.

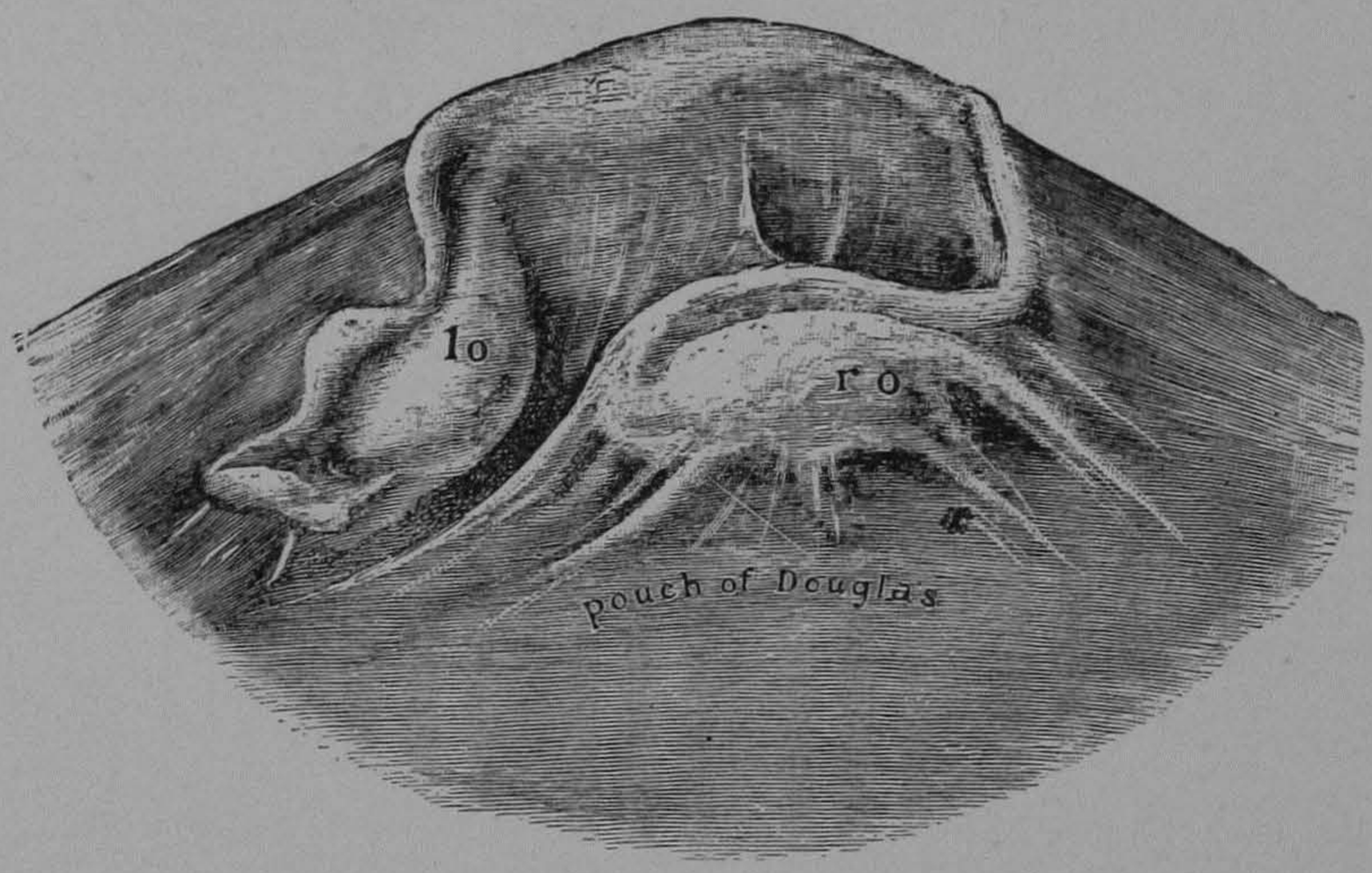
Should the infection not be virulent enough to cause suppura-

tion of the serum and lymph, this latter substance will undergo organization to a greater or less extent, with the result of leaving the surfaces which have come in contact permanently adherent. The adhesions thus found are variable in kind; clinically at least four varieties are recognized.

The Fallopian tubes, ovaries, and uterus, one or all, may be covered with a thin layer of false membrane, well organized and not at all unlike a spider-web, when spread out and held up to the light. The variety has well been called the "spider-web adhesion." The membrane is easily torn to pieces and destroyed if the finger is pressed through it while it is on the stretch. If, in attempting to break through, it is allowed to gather itself together like a bundle of sticks, it forms long shreds of adhesions which are exceedingly hard to tear, and in the tearing of which an intestine or bladder may easily be injured badly, its walls giving way at the point of the adhesions. They are the more difficult to deal with inasmuch as the organs are usually movable under them, and it is hard to get any fixed point from which to break through.

The next variety is that where any or all of the pelvic organs become fixed in the lymph in much the same manner as if they

FIG. 267.



Ovary Displaced and bound Down in the *Cul-de-sac* by Adhesions—adhesions of the spider-web variety, similar to those shown in Fig. 266: *ro*, right ovary; *lo*, left ovary.

were set down in a bed of plaster of Paris. The lymph organizes and from it is formed a new and apparently real peritoneal covering. Clinically, to the touch, the organ feels as though it had been congenitally developed in its displaced and distorted position. In

the case of the ovary the ovarian ligament is destroyed; where the Fallopian tube is involved the broad ligament has, to a greater or lesser extent, disappeared. The organs are immovably fixed, and can only be torn away from their position by an absolute enucleation, there being practically no pedicles to deal with: to all intents, the mass removed is a sessile growth, and must be dealt with as such. The cases in which this condition is found are usually old chronic ones.

The ordinary adhesion met with in the course of operations is what one might call the "bread-and-butter" variety. After the adherent surfaces have been freed from each other the appearance is not unlike the surface of two pieces of bread and butter which have been placed together as in a sandwich and separated. These adhesions are more or less firm as the case is an acute or chronic one. At times they are so solid that it is necessary to take the handle of the scalpel or other instrument in order that they may safely be separated; in other cases the finger will readily destroy them. Should the lymph going to form these adhesions become infected, they become more or less broken down, and are proportionately easy to deal with. This forms the fourth variety as seen clinically. Naturally, the only pathological difference between at least the last three varieties is the difference in the extent of involvement and organization. They all begin by the affected organs becoming imbedded in a quantity of plastic lymph. This lymph organizes or is partially broken down by the infectious poison. If it breaks down and fails to organize, the last clinical variety is produced. This variety usually accompanies acute pus-tubes. Should it fail to do more than make an attempt at organization, the adhesions will go to make up that variety which is the most common, the "bread-and-butter" variety, which generally accompanies chronic (adherent or interstitial) salpingitis. It is almost always possible in enucleating the organs in such a case to find the broad and ovarian ligaments and use them as a pedicle, although at times they are much shortened. If the case runs on into a chronic form, either of the last two varieties may develop, by absorption of the degenerative elements and by organization and contraction, into those varieties which resemble so much congenital conditions.

Finally, the lymph may break down into suppurating foci at one or more points, local abscesses being the result. These abscesses, being bounded by adherent lymph, are for all practical purposes

extraperitoneal, and yet they are as truly, from an anatomical point of view, intraperitoneal as if they were not limited at all. As a matter of fact, they exist from cavities as large as a pea to abscesses filling the whole of the pelvis, and only being shut out from the general abdominal cavity by the intestines and omentum at the pelvic brim, becoming involved in the advancing inflammation, lymph being thrown out, and these organs becoming firmly adherent over and about the pelvic inlet.

Unless the attack has been a mild one, the connective tissue immediately underlying the peritoneum is apt to become involved in the destruction. So intimately connected are the two structures that where the one is affected by such a serious process it can readily be understood why the other also becomes involved. As soon as this loose areolar tissue is invaded, the products of inflammation are thrown out into its meshes, and the parts affected become much thickened. The connective tissue of the broad ligament and that underlying the peritoneum which lines the pelvic floor are most apt to be affected. The infiltration, as usual up to a certain point, attempts to undergo organization, but mostly fails. It is either absorbed or suppurates.

Should it become absorbed, it would do so in conjunction with the absorption of the inflammatory products in the peritoneum and in the line of progress toward the cure of the whole pelvic inflammation. If organization partially occurs, a contraction of all the tissues takes place, with the result in some cases of almost total obliteration of the ligaments and contained connective tissue. This is the condition which has existed in those cases of prolapsed and adherent tubes and ovaries, where the ligaments have almost, if not entirely, disappeared and the organs remain practically as sessile masses. Cellulitis is essentially an acute or subacute as well as a secondary disease. It rarely occurs in the pelvis as a primary disease, and is just as rarely found as a chronic condition, except in the form of an abscess; which is not common. The abscesses and masses in the pelvis formerly looked upon as cellulitis are almost without exception contained within the peritoneal cavity; where the abscess does exist in the cellular tissue, it is generally an extension from a focus of suppuration in the peritoneum. It is said that in acute puerperal cases the infection, at times, extends by way of the lymphatics directly into the cellular tissue, and results in the formation of a true cellulitis and a true primary cellular-

tissue abscess. Examples of such cases have from time to time been placed on record by reliable authorities, but they must be of exceedingly rare occurrence, as the writer during the course of many hundreds of cœliotomies has failed to find a single example of the condition. In no case, except in suppurating cysts, has a pelvic abscess been observed which was not intraperitoneal, in the sense that it had originally developed in the peritoneal cavity.

These pelvic abscesses, whether of peritoneal or cellulitic origin, are extremely apt to burrow their way to the surface and discharge their contents in a more or less irregular manner. They have been known to empty themselves into the rectum, vagina, and bladder. The umbilicus, the saphenous opening, the pelvic floor, the labia, the pelvic foramina, have all served as means of passage for the pus. Cases have even been reported where the pus has burrowed through the connective tissue to the iliac fossa, and from thence to the diaphragm, finally rupturing into the lung. The spontaneous evacuation of pus by any of these sources, although a proportion of such cases go on to a good recovery, is a disaster, and the danger of such a result is one of the clearest of indications for the adoption of vigorous measures to ensure its prevention. The usual course of a case after such a mishap is a prolonged convalescence—just as commonly a long invalidism, followed by death. The sinus-tracks are long and irregular, and the abscess-cavities very incompletely drained. In the case of the rectum and the bladder the cavity is continually contaminated by the contents of these organs, and an already bad condition is rendered worse.

SYMPTOMS.—These vary in accordance with the anatomical parts attacked and the intensity of the inflammation.

The amount of suffering incurred by the patient will vary from a matter of slight discomfort to agony which is quite beyond description. There is no death from which a woman may die which is, in all its features, more distressing than a death from peritonitis, especially an acute septic peritonitis. The symptoms of each of the parts attacked are in many respects similar. The involvement of almost all the tissues of the pelvis follows as a complication wherever the brunt of the attack may fall. In other words, one tissue is seldom involved without all being more or less included; consequently the symptoms which would be induced by the attack of one tissue are present at the same time with those

which would be induced by the involvement of any or all the other tissues.

There are three symptoms which are present in greater or lesser degree in almost, if not quite, all cases of pelvic inflammation. Pain, hemorrhage, and uterine discharges usually dominate all other factors in cases in which suppuration has not supervened. Naturally, the temperature and pulse play a conspicuous part. When suppuration occurs, all the symptoms of septicemia are added to those already existing. In addition, symptoms referable to special organs and due most frequently to sympathy and reflex influences become at times prominent.

Salpingitis.—In acute or chronic catarrhal salpingitis the symptoms are seldom sufficiently prominent to give rise to any suspicion that there is such a disease present. In the acute form the patient will most probably feel a condition of general malaise, have some backache, with a possible headache; there may be a slight increase of the discharge coming from the vagina. No noticeable change takes place in the menstrual function, for the reason that this is already, in all probability, disordered from a pre-existing endometritis, and the lesion in the tube is too slight to add anything perceptible to the result. If at this time the temperature and pulse should be taken, the one would be slightly elevated, the other accelerated. No doubt in every acute case these symptoms are present to a greater or lesser degree, but in almost every instance the attack is so slight that it is passed over without notice, and the disease has soon settled itself down into a subacute or chronic form: in this condition the symptomatology is even slighter than in the acute form. The disease is so constantly associated with endometritis, being, as a matter of fact, almost always an extension of the uterine inflammation, that the symptoms of the primary disease are a great factor in obscuring those of the salpingitis. The fact that the disease has existed at all is usually only discovered when its results are made manifest. It is from this form of the pelvic inflammation that hydrosalpinx arises.

Hydrosalpinx.—The distension of the Fallopian tube with serum frequently exists without giving rise to any symptoms whatever. If the resulting tumor is not very large—and usually it does not reach a size greater than that of a Messina orange, although occasional cases are reported of enormous size—there is no particular reason that it should cause any disturbance. When it does so, it

will most generally be found that an inflammation, slight or otherwise, has invaded the peritoneum, and that whatever symptoms are present will be due in great part to the local peritonitis. Adhesions may result or not, this being determined by the character of the peritonitis. Should inflammation of the serous membrane complicate the case, it will give rise to pain, either slight or quite severe according to the grade of inflammation and the extent of the adhesions. Leucorrheal discharges are apt to enter as a factor into the case: the discharge is of a whitish character, and seldom if ever assumes a muco-purulent form. Should the discharge be muco-purulent, it is evident that it originates from the endometrial inflammation, and is not merely due to the congestion caused by slight local peritonitis. Menstrual disturbance is apt to be present, as is the case with most examples of pelvic inflammation; the flow is apt to occur too frequently and to be profuse.

Hematosalpinx—Should the exudate from the mucous membrane of the Fallopian tubes take on a bloody character and the openings of the tube become occluded, the result is an hematosalpinx. The symptoms of this disease differ in no way from those of the hydrosalpinx, or those of the adherent or interstitial salpingitis which will be described later. As in the latter disease, the greatest amount of its symptomatology is derived from the peritoneal involvement, and, as the extension of the inflammation to the serous membrane is of about equal occurrence in both, the symptoms are usually the same.

Interstitial Salpingitis and Ovaritis.—The name is given this form of pelvic inflammation for want of a better one by which to designate it. It is meant to include all forms of inflammation of the Fallopian tubes and ovaries, excepting those mild ones described under the name of catarrhal salpingitis and those described under tubercular salpingitis. Leucorrheal discharge will be the first indication of the trouble, and this will quickly be followed by pain. The vaginitis and endometritis which precede the salpingitis will have been ushered in with muco-purulent discharges. These discharges continue when the Fallopian tube becomes involved, and the only difference then to be noted is that there is added to them the discharges from the tubes. This addition is not sufficient under ordinary circumstances to be perceptible. Should the tubal discharges accumulate and distend the tube, it not infrequently occurs that the obstruction at the uterine end finally gives way, and there is consequently a gush of muco-purulent matter from

the uterus and vagina. One must be on his guard, however, against this symptom as indicative of an over-distension of the tube and its spontaneous discharge into the uterus. This is presumed to be one of the methods Nature has of curing pyosalpinx, and one which, if we are to believe all the reports in the literature on this subject, is extremely common. There is no doubt but that such a happy termination does occur in some few cases, but their frequency is questionable. The symptom oftentimes only exists in the mind of the attendant and the patient, and is due for the most part to faulty observation. Some slight temporary obstruction arises in the cervical canal, and the discharges accumulate in the uterus, only to be expelled as the patient assumes a favorable position; or, what is more common, there is an accumulation in the posterior cul-de-sac of the vagina, with a subsequent discharge on certain movements of the woman favorable to their expulsion. The symptom is most apt to occur in women who are confined to bed, the recumbent position favoring such a condition. Leucorrheal discharges are common to all inflammatory or congestive conditions of any or all of the pelvic organs. They are therefore not at all diagnostic, and are only of value as corroborative evidence. Their character varies as they are mixed or not with infection. The purely congestive discharges —such, for example, as precede menstruation and accompany pregnancy—are of a milky-white character; those which accompany gonorrheal infection or puerperal septicemia assume a muco-purulent character. It is this latter kind of discharge which almost always accompanies interstitial salpingitis. As a matter of fact, it is a combination of the excretions of the tubes, uterus, and vagina, and is made up of the suppurating inflammatory effusions, mucous and epithelial cells. The discharge is frequently acrid, and causes a pruritus of the vulva. Pruritus is not so common a symptom in these inflammatory diseases as we would be led to imagine from the amount of the discharges, their acridity, and the constancy with which they exist. So infrequently does it occur, in fact, that a grave doubt arises as to whether the pruritus is ever due to the discharge. Leucorrhea is as apt to appear in the same amount where the inflammation has attacked the tube alone as where the whole pelvic peritoneum is involved.

Pain is a constant companion of the pelvic inflammatory diseases. It varies in intensity with the tissues involved and the extent of the process. In cases of adherent salpingitis and ovaritis it is

usually located in one or both iliac regions, at times extending down the thighs, and is frequently accompanied by backache. It is severe or not as the attack is an acute or chronic one. Its character is variable, from a dull, heavy backache to a sharp, lancinating iliac pain, which does not come and go, but remains, for the most part, constant. Often it is due more to the irritation of the advancing inflammation than to any real involvement of the tubal or ovarian tissues. It is no infrequent thing in gonorrheal or puerperal endometritis to find that the iliac pain disappears after a thorough curettement of the uterus, proving that the inflammation has not yet passed beyond the uterine cavity. The sharp pains are mostly due to peritoneal involvement, and are a fairly sure indication that this membrane has been invaded by the actual inflammation, or at least is irritated by its near approach. The ovarian involvement is, however, responsible for a fair share of the condition. The dull, heavy pains, as the backache, are most probably produced by the infiltration of all the tissues with inflammatory products; possibly some of the elements of the peritoneal pain are added as a factor. Motion or pressure of any kind will aggravate this symptom. An over-distended bowel or bladder gives more or less distress, and the contraction incident to the emptying of either of them causes considerable suffering. Walking, riding, or jarring from any cause calls forth this complaint: even the erect position may be uncomfortable or unbearable.

Menstrual disturbances are universal. As a rule, menstruation appears too frequently, every two or every three weeks, and lasts from the usual time to eight or ten days: occasional cases last for so long as two weeks. It is important in weighing this symptom to inquire carefully into the past menstrual history. Not uncommonly, women present themselves for treatment in whom a frequent and prolonged menstruation is natural, and this condition must not be confounded with a pathological one. Where the flow has formerly been fluid, under the altered condition it is apt to become clotted and dark. The function is accompanied by pain, which may appear some days before the flow and last several days after it has ceased. Like all the other symptoms, this one is variable, and in not a few cases the flow is scant rather than profuse. Scanty menstruation is the exception in inflammatory diseases of the Fallopian tubes, but that it does exist is undoubted. Suppuration of the exudates and an accumulation of pus in the tubes have no very

perceptible influence upon these symptoms. Pain, hemorrhage, and leucorrheal discharges seem to depend largely upon the amount and character of the involvement of the serous membrane; certainly pain is almost absolutely dominated by this factor; possibly the altered mucous membranes have the most influence upon the other two symptoms. The three symptoms grouped together in conjunction, with a history of gonorrheal infection or of post-puerperal septicemia, are highly suggestive, and yet not much reliance can be placed on a diagnosis based upon this data. The three symptoms, alone or grouped together, accompany almost every disease to which the pelvic organs of the female are heir. These symptoms, however, taken in conjunction with certain local conditions, establish the diagnosis almost certainly.

As in all inflammations, the temperature and pulse are affected. Usually neither of them rises to any very great extent. During the first few days of the acute attack they may both be elevated considerably above 100°. As seen in the subacute or chronic condition, it is rather uncommon to note any great deviation from the normal where suppuration has not occurred or where the peritoneum is only slightly or not at all involved. If the attack has been ushered in with a chill or rigor, it is almost certain that either one of these two conditions exists. As a matter of fact, peritonitis and cellulitis almost always accompany and complicate the salpingitis, and consequently the symptoms of the two conditions always commingle.

The tendency of inflammation near or about the bowel is to inhibit peristaltic action, and constipation is the rule. As constipation is almost the natural condition of women, however, it adds little to our diagnostic resources. On the other hand, the bladder becomes irritable under the same condition, and the presence of the urine causes a frequent desire of the bladder to empty itself. Frequent micturition and constipation are common symptoms. Any irritation in the pelvis seems to give rise to gastric disturbances, and the inflammatory diseases are no exception. Symptoms of dyspepsia, especially flatulence, are very common, and, in fact, at times give rise to more distress than the symptoms referable more directly to the pelvic lesions. Distension of the intestines with gas occasions considerable pain at times—a pain which comes and goes, and which is distinctly different from the inflammatory pains.

Pyosalpinx and Ovarian Abscess.—Should the inflammation progress to suppuration, many of the symptoms are apt to become exag-

gerated, and in addition there is added the condition of sepsis. The woman begins to suffer from cold creeps, chills, or even a rigor; the temperature becomes elevated, ranging from 100° to 104°, or even higher; the pulse rises rapidly, and varies from 100 to 140 or more beats to the minute. The abdomen becomes swollen, due to distension by gas, the walls hard, unyielding, and exceedingly tender to the touch. The skin surface may become cold and clammy, the appetite destroyed, the sleep restless and unrefreshing. A general feeling and appearance of dulness, or even stupor, may supervene. The pain is more persistent and intensified, and is apt to assume a more or less deep, throbbing character. As time passes the woman's general condition gradually grows more and more serious. She loses many pounds of flesh and becomes greatly emaciated; her face has a distressed and shrunken appearance; her nervous system becomes shattered; she may or may not be confined to her bed. It might easily be concluded from these remarks that no great reliance could be placed upon symptomatology in the diagnosis of inflammatory tubal disease. Such is, in truth, the fact. It is absolutely necessary that the physical signs be determined by vaginal examination before the truth can be ascertained.

Peritonitis.—The symptoms attributable to this disease are a combination of those produced by the inflammation of all the other parts of the pelvis. As a matter of fact, the main symptoms attributable to pelvic inflammatory cases are produced by the inflammation of the serous membrane. Many of the symptoms described under different forms of salpingitis originate in or are increased by the peritonitis. Inasmuch as peritonitis to a greater or lesser extent complicates the inflammations of the Fallopian tube, the symptoms are practically the same, their severity depending much upon the extent of the lesion. If only the peritoneum covering the Fallopian tube be involved, then the symptoms will be similar to those already described. When the whole pelvic peritoneum is invaded, the pain is more acute; the temperature and pulse are more markedly elevated; the patient lies more comfortably with the knees drawn up, for the reason that it relaxes the abdominal muscle and takes away a considerable amount of the intra-abdominal pressure; the expression of the face is apt to be distressed; the abdominal muscles rigid and fixed; the whole abdomen tender to the touch; the intestines distended with gases, rendering the belly tympanitic; the appetite abolished and sleep impossible. Consti-

pation is absolute and there are eructations from the stomach. Such is a fairly typical description of a severe attack of pelvic peritonitis. There are, in addition, all the symptoms present which have been enumerated as accompanying inflammation of the Fallopian tube, together with those present when the cellular tissue is involved; which is generally the case. Should suppuration of the exudates occur, there will be added the symptoms of septicemia. The difference of these symptoms from those arising in a suppurating salpingitis will be more of degree than of kind. In the abscess forming in the abdominal cavity, either as a small pocket in the midst of the lymph or as a general abscess of the whole pelvic cavity, the absorption is apt to be more rapid than if confined to the Fallopian tube.

Cellulitis.—The symptoms attributable to this disease are indistinguishable from those of peritonitis. The two affections go hand in hand, and any attempt to classify their symptoms would only be theoretical. As a matter of fact, they cannot be distinguished clinically. A simple infiltration of the cellular tissue with inflammatory products would produce no other symptom than possibly a feeling of weight and fulness, but this discomfort would be so overshadowed by the severe suffering from the peritonitis as hardly to be noticed. In those rare cases in which primary abscesses occur in the cellular tissue, following or accompanying the puerperium, nothing distinctive is noticed until suppuration occurs, and then the symptoms are simply those of septicemia. An attempt to classify and compare, for differential purposes, the symptoms of cellulitis and peritonitis is of no more than problematic value; it is of no practical benefit. Clinically, the two affections are indistinguishable, for the reason that they always complicate each other, and their symptoms are so closely interwoven. The symptoms of cellulitis, which is mostly secondary, are few and unimportant and are completely overshadowed by the far more important and severe symptoms of the peritonitis, the primary disease.

Physical Signs.—In an attack of pelvic inflammation there is always a fairly regular routine followed, and the results are essentially the same, differing only in degree. Every case is in this respect a law unto itself, and in no two of them are the Fallopian tubes and ovaries equally degenerated and distended, nor are they always found in the same position. The physical signs are so

closely interwoven that all the elements must be considered together if they are to be viewed to the best advantage.

Catarrhal Salpingitis.—Physical signs are entirely absent. There is no infiltration of the tube-walls, and no peritonitis or cellulitis, with attendant exudate of lymph and infiltration of inflammatory products. The Fallopian tube is almost, if not entirely, as soft as in its normal condition, and if there is any enlargement, it is simply due to a mild congestion. For practical purposes it may be considered that in the average woman of ordinary size the Fallopian tube cannot be palpated. Such may be said to be the case also in catarrhal salpingitis.

Hydrosalpinx.—In this form of the disease the uterus may or may not be freely movable. Most frequently it is movable, as the Fallopian tube is either not adherent or so lightly so as not to affect the womb. The mobility of the uterus in health varies so much that it is often difficult to decide whether or not it is impaired. More frequently, both Fallopian tubes are involved, although it is no unusual thing to find only one side affected. By deep palpation to the sides of the womb a cystic tumor, varying in size and shape, will be felt. The tumor is elongated, and can be traced with the finger from the side of the pelvis to the uterine cornua. It is distinctly felt to be free from the uterus and independent of that organ. Usually, a sulcus can be recognized between the two. The examination may simply disclose a large cystic tumor with nothing characteristic about it; in either case the growth may be fixed by adhesions and rendered immovable, or it may readily be displaced in any direction. The opposite side may be found in the same condition, or the examination may disclose nothing as regards its involvement. It is often found in a state of simple catarrhal salpingitis.

Very much the same can be said in regard to that phase of the disease in which the tube is distended with blood, as has been said of hydrosalpinx. *Hematosalpinx* has no distinguishing features. It differs from hydrosalpinx only in that it is apt to be smaller, with thicker walls, and more likely to be adherent, and consequently immovable. The affection is most usually unilateral, and is often complicated on the opposite side by an interstitial salpingitis.

When the walls of the Fallopian tube are infiltrated with inflammatory products and its peritoneal covering involved, an

examination of the pelvis will reveal a condition depending upon the severity of the attack and the extent of its advance. The uterus will be found to a greater or lesser extent immovable, as well as enlarged. It will be adherent in a displaced position or not, depending upon its location in the pelvis at the time of the attack of inflammation. In the milder attacks the Fallopian tubes will be easily felt to the sides of the womb as hard, elongated cords, adherent, immovable, and extremely painful to the touch. The organ can readily be traced to the uterine cornua, and a sulcus may be felt between the two. The ovaries will be found about halfway between the pelvic wall and the uterus on either side, enlarged, hard, and adherent. The size of the tube and ovary, as well as that of the uterus, will depend upon the amount of involvement of the cellular tissue, but more particularly upon the extent of involvement of the peritoneum and the amount of lymph thrown out. A Fallopian tube and ovary which together appear *in situ* to be as large as a four-ounce bottle will not infrequently be found, on removal, not more than two or three times the natural size: the remainder of the bulk is found to have been made up of plastic lymph, which is to a great extent destroyed as the adhesions are broken up. The size of the womb is at times also more apparent than real, the enlargement being due also to the surrounding lymph. For the most part, however, the womb is actually enlarged by the inflammatory infiltrate into its walls, brought about by the primary endometritis. As often as not the uterine appendages are displaced, and may be found in any part of the pelvis. Both tubes and both ovaries have been observed on the same side, the one ovary being displaced in some manner, and found directly adherent on top of the opposite one. Not infrequently, when the uterus is retrodisplaced, either one or both appendages will be found posterior to this organ, and so high up as to be out of reach; they are consequently often overlooked. The disease is generally bilateral, and the same condition can be felt on both sides; at times, however, it is only unilateral. When there is acute involvement of the whole of the peritoneum on the floor of the pelvis, as well as of the connective tissue underlying it, a sensation of fulness in all directions will be felt, its hardness depending upon the amount of infiltration and the chronicity of the case.

Should the tubes and ovaries be distended with pus, they will be found on palpation in much the same condition as that just

described. If the pus be present in considerable quantities, the masses may fluctuate or give to the touch a sensation of softness, and in very exceptional cases may feel not unlike ordinary cysts. Should small abscesses exist in the lymph or connective tissue surrounding the uterine appendages, they cannot be detected. When these intraperitoneal abscesses extend and involve a considerable part of the pelvis, advancing even into the connective tissue, the whole pelvic vault conveys a hard, board-like feeling to the examining finger—a condition which extends as far as the finger in the vagina can explore. It is not uncommon to find an infiltrating ring higher up about the rectum. This ring is due to connective-tissue infiltration, and does not usually break down into suppuration. Through the abdominal walls a hard mass of no definite shape or consistency can at times be felt, which is made up for the most part by adherent intestines and omentum. Ordinarily, the infiltrating masses cannot be felt through the abdominal walls except with the patient under the influence of ether: only in cases of pelvic abscess do these large irregular masses rise into the abdominal cavity high enough to be felt readily by abdominal palpation.

DIAGNOSIS.—The establishment of the diagnosis of pelvic inflammation is difficult or not according to the stage at which the disease has advanced and according to the virulence of the infection.

Catarrhal Salpingitis.—It is not possible to diagnose this form of disease except by inference. Symptoms are so slight as not particularly to call the patient's attention to her pelvic organs unless she is already suffering from endometrial disease; in this case the symptoms caused by the infection of the uterine cavity will so greatly overshadow all those of the salpingitis that she will have no cause even to suspect that her Fallopian tubes are becoming involved. Even should the disease be suspected, there is no way in which the suspicion can be verified, for the reason that the Fallopian tube can only be palpated in exceptional cases, and even should it be felt, the changes in its tissue are so slight that they could not be distinguished by the touch. Later on, when sterility is demonstrated or a hydrosalpinx is discovered, the relation of cause and effect may be seen. The sterility may, however, be caused by intra-uterine disease, in which case, until the specimen is actually under the microscope, it is not always possible to make the

diagnosis, even by inference. An element of doubt would exist under the most favorable circumstances, rendering speculation or theory absolutely useless for practical purposes.

Hydrosalpinx.—It is always possible to come to the conclusion in this phase of the disease that there is present in the pelvis a tumor which does not belong there. It may even be possible in some cases to say positively that this form of the disease exists. Theoretically nothing should be easier, but practically many elements combine to defeat the desired result. The tumor caused by a hydrosalpinx is mostly unilateral, and will be found in the position which should be occupied by the Fallopian tube and ovary. If a tumor be found in this position and its character be doubtful, an examination with the patient under ether will often clear up the doubtful points. The walls of this neoplasm are thin and the tumor fluctuates. The amount of fluctuation will depend largely upon the size of the growth, the consequent thinness of its walls, and upon the number and density of its adhesions. At times it is entirely free from adhesions, and is as freely movable, within the limits of the mobility of the Fallopian tube, as would be an ovarian cyst. Should the tumor be a large one, it will assume a rounded shape not unlike a cystic ovary. On the other hand, when the tubal distension is limited, the resulting tumor will retain the elongated, tortuous shape of the Fallopian tube. The principal diseases that may be mistaken for this condition are small ovarian cysts, small parovarian cysts, hematosalpinx, and extra-uterine pregnancy. In hydrosalpinx the main features in the diagnosis are the elongated, sausage-like shape of the tumor; the fact that it can be traced to the uterine cornua at the position where the tube would naturally be found; the presence of the ovary independent of the tumor; and the fact that it is a cystic growth. The ovarian cyst is always rounded in shape, and there is no connection whatever between it and the uterus. The parovarian cyst is apt to be much less movable, and never has the elongated shape of the hydrosalpinx; neither has it any connection with the uterus such as described.

It is not possible to distinguish hematosalpinx by the physical signs, and the symptomatology is too unreliable to be trusted. The fact that the blood-tumor is more liable to be adherent is not sufficiently practical to be of much benefit. Extra-uterine pregnancy can generally be distinguished by its symptomatology and by watching its behavior as it grows. It is probable that more frequent mis-

takes will be made in the case of small parovarian cysts than anything else. After all has been said, failure oftener than success results in an attempt to diagnose hydrosalpinx.

Hematosalpinx.—What has been said in the case of hydrosalpinx is equally true of this disease. The same characteristics of the tumor exist, excepting that the hematosalpinx is not apt to become so large. However, as there are many cases of small hydrosalpinx, this point has no particular value. The tumor is elongated; it is connected at the uterine cornua, as is the case with the normal Fallopian tube; it fluctuates more or less satisfactorily; if the distension be only slight, this sign is worthless. The question of adhesions is also of dubious advantage, as any of the products of pelvic inflammation are almost certain to be adherent. The one sign which may be of advantage in the diagnosis of either hematosalpinx or hydrosalpinx is the division of the elongated tumor into compartments, or an apparent attempt in this direction. The healthy Fallopian tube is so divided, and it is frequently the case that a tube distended by fluid contents has two or more compartments. These can at times be appreciated by the touch, and in case they are a diagnosis can probably be arrived at.

Interstitial Salpingitis and Ovaritis.—Nothing is more deceptive than the symptomatology in pelvic inflammations. A woman may present herself complaining of all the symptoms of diseased, disorganized appendages, and yet an examination fail to establish such a diagnosis. A patient may give a history of having been married for some years and of having had one or more children. She has remained in good health until in her last confinement or miscarriage, when she has had septic trouble, indicated by a swollen and painful abdomen, together with fever; or her trouble may have begun with a well-marked attack of gonorrhea. From this time until she consults her physician she is not in good health. Pain is a constant companion, being referred to the iliac regions or the back. There is pain on coitus, defecation, riding in the cars, walking, or sitting down, and under any circumstances which will cause a displacement of the pelvic organs. The menstrual function, which was originally normal, is now profuse and irregular. Muco-purulent discharges exist; the patient suffers from chilly feelings at times, and loses flesh. The history in such a case is complete, and if the symptoms alone are depended upon to make the diagnosis, the most skilled physician will probably be often led astray. Such patients

continually report themselves, and a bimanual examination even under ether fails to confirm a diagnosis of pyosalpinx or of chronic interstitial salpingitis, although the entire pelvis may be exquisitely tender to the touch. In such cases, where the abdomen has been opened for exploration, the peritoneum and cellular tissues have frequently been found to be healthy, as far so a macroscopical examination could determine. It is altogether unjustifiable to send a patient to the operating-room, presumably suffering from the results of pelvic inflammation, without first having made a thorough and searching examination of the pelvic organs by bimanual palpation; and if there is any doubt as to the existence of any lesion, the examination should be made with the patient under ether. The combination of the symptomatology and physical signs will generally succeed in establishing a correct diagnosis in these diseases. However, unless one of the Fallopian tubes or ovaries can be palpated, and plainly demonstrated as being enlarged and diseased, the diagnosis cannot be said to have been established. The symptoms can generally be traced to a labor, a miscarriage, or an attack of gonorrhea. A very large number of the patients have had an "inflammation in the stomach," or give a history of having had typhoid or malarial fever in or following the puerperium; their symptoms have dated from or about this time; sterility is a prominent and constant feature. The principal indications of the underlying trouble are the pain and the disordered menstrual function, and not infrequently there is a history of one or more attacks of peritonitis. A vaginal examination usually discloses an adherent and more or less immovable uterus. In a goodly number of cases, however, the uterus will not be found fixed, but movable within certain limits. An attempt to displace the womb will elicit pain, whether it be adherent or not, the pain being caused for the most part by the dragging upon adhesions, either those involving the uterus or those encircling the Fallopian tube and ovaries. The pain will be greater or lesser in proportion as the inflammation about the parts has subsided.

To the right or left on both sides of the womb the Fallopian tubes and ovaries may be felt. The tubes are enlarged, thickened, and adherent. Attempts at displacing them result simply in causing pain; the whole pelvic vault is tender when the inflammation has not subsided. The Fallopian tubes will be felt as elongated, tortuous bodies in the position of the normal organs, extending from the

side of the pelvis to the uterine cornua. In some cases the ovary, from the fact that it is prolapsed to a lower level than that of the tube, forms the greater bulk of the mass presented to the examining finger; slightly deeper palpation will, however, usually disclose the elongated tube. Occasionally it happens that the uterus is retro-displaced, and the appendages are one or both of them twisted posterior to the fundus, and, unless the patient is under the influence of ether, cannot be distinguished. So closely attached are the appendages at times to the womb that the whole mass appears as one body, and it is only by the irregularity of the mass and the existence of a sulcus between the diseased appendage and the womb that the true condition can be distinguished. An examination by the rectum which permits of the examining finger being passed posterior to and above the uterus and broad ligaments will often decide these points, where no definite conclusion could be arrived at by the combined vaginal and abdominal touch. In the acute condition, where the appendages are surrounded by and buried in masses of peritoneal lymph and the cellular tissue is involved, they will appear to be of great or indefinite size. The whole vaginal vault may be so hard and board-like that it will be impossible to distinguish the appendages through the general mass of lymph. In the more chronic form, when the lymph and cellular exudate have in great part been absorbed, the tube may present itself only as large in diameter as an ordinary lead pencil. It is not very probable that there will be a failure to diagnose the disease, excepting where it has undergone suppuration and assumes more or less the character of a cyst. These enlarged and thickened tubes and ovaries, densely adherent and often surrounded by masses of peritoneal lymph and cellular exudates, taken together with the history and symptoms, can hardly be misunderstood. There are few conditions for which this disease is likely to be mistaken.

Every woman suffering with the lesions of a pelvic inflammation is liable from time to time to have the inflammation recur. Frequently the inflammation never leaves the parts, but remains as a low-grade chronic disease, ready to relight into an acute exacerbation on the slightest pretext. In other women it subsides entirely and the parts become quite free from pain. In such a case there is less likelihood of recurring acute attacks, but yet they do occur. A woman carrying diseased tubes and ovaries due to pelvic inflammation may be confined to her bed as often

as three or four times a year, for from two to eight weeks at each attack. Usually the recurrence is not so severe, and may not happen oftener than once every year or two; others only last a few weeks, frequently not even confining the woman to bed. Exposure to cold, excessive indulgence in coition, violence on the part of the husband, working tread-machines, hard work of a hundred and one different kinds, generally determines the exacerbation. During the menstrual period the women are peculiarly liable to these attacks. The physiological congestion of menstruation may very readily be turned into a pathological condition, and an inflammation result. Women afflicted with pelvic inflammations frequently suffer from attacks of apparent peritonitis which simulate to a great degree the true inflammation. The abdomen and pelvis at the time of the examination are found to be exquisitely tender, and not infrequently an investigation is rendered impossible. By persisting firmly but gently, at the same time calling the patient's attention to some other object, a pelvis and abdomen which would barely tolerate the approach of the hand may be brought to bear, without any complaint from the patient, a very free amount of manipulation. The hysterical element in these cases of long suffering is oftentimes great, and it must always be taken into consideration in estimating the amount of pain.

Pyosalpinx and Ovarian Abscess.—Should suppuration intervene, there is at once added the element of septicemia. The tube may contain but a few drops of pus, in which case the only additional aid to the diagnosis would be in the special symptoms produced by the absorption of the pus. Following confinement or miscarriage, a woman may have a slow and unsatisfactory "get up," or she may not get up at all. Her temperature remains in the neighborhood of 100° F., while her pulse-beats continue at about 100 or more. She has no appetite, suffers with pain in the lower part of the abdomen, sleeps restlessly, and has occasional creepy feelings. This condition keeps up for months, with a progressive loss of flesh—slight, it is true, but steady. An examination reveals a mild form of pelvic inflammation, with the usual lesion of the appendages. This condition, taken in connection with the history, fairly establishes the presumption that pus is present, if all other possible sources of suppuration are excluded, although it is impossible to detect any signs of it by the vaginal examination. Should pus accumulate in any great quantity, the Fallopian tubes soon distend,

and may at times reach the size of large sausages. Should the suppuration occur in the tube, in the lymph around the tube, or in the ovary, there would be little if any difference in the result. Wherever it is located, if the quantity be sufficiently large, the pelvic tumor fluctuates or the whole mass presents a semi-soft or boggy feeling. Not infrequently the fluid portion of the suppurating contents is absorbed altogether, leaving the tube filled with a cheesy material which may remain indefinitely and without causing any particular disturbance, other than by the mere presence of a foreign body in the pelvis. When such a case has been complicated by an inflammation of the peritoneum, the same condition may remain, and the patient suffer just as much as though the fluid had not been absorbed. Fallopian tubes of this character become at times the size of large sweet potatoes. It is exceedingly difficult frequently to distinguish pyosalpinx and ovarian abscess from some other pelvic diseases, notably extra-uterine pregnancy or abscess located in other parts of the pelvis. No two pelvic diseases are so frequently mistaken for one another as pyosalpinx and ectopic gestation. A careful study of the history of the patient is at times essential to a determination of the difference, and is of more value than the physical signs. Extra-uterine pregnancy produces symptoms which, if they can be elicited, are characteristic, but they are so frequently modified that it is difficult to distinguish them. The pain in the two diseases may essentially be alike, at least so far as a description of it can be elicited from the patient: the physical characteristics of the cysts are not dissimilar, both being semifluctuant, located in the same position, of the same shape, and of about the same size in the early stages of the pregnancy. The uterus is enlarged in both, the menstrual function is disordered, and the breast and stomach symptoms are not infrequently similar in either case. The casting off of the decidual membrane is by no means a constantly demonstrable feature of the extra-uterine pregnancy. The progressive growth of the tumor, if the patient be kept under observation sufficiently long, is very suggestive, if not positive evidence, of ectopic gestation.

Suppuration confined to the Fallopian tubes or ovaries is more apt to give a circumscribed tumor than suppuration in the plastic lymph or connective tissue. In the case of a pyosalpinx or ovarian tumor the tube-sac can be felt as a distinct body, adherent and immovable, it is true, but still a circumscribed tumor, with a distinct sulcus

between it and the uterus. The true pelvic abscess is quite the reverse, and oftentimes nothing definite can be made out, only a general fulness occupying the pelvis more or less, without any definite limitations, and so involving all the pelvic organs that none of them can be distinguished. In either case there may or may not be fluctuation.

Cystic tumors are distinguished from a pyosalpinx or ovarian abscess by the thickness of the walls of the latter, the more boggy feel, the septic symptoms, and the history. A tubal and ovarian mass confined to the pelvis, fluctuating, with thick walls, densely adherent, painful on examination, with a history of sepsis, can hardly be mistaken for anything but a tubal or ovarian abscess unless it be an extra-uterine pregnancy.

Peritonitis.—Pelvic peritonitis in women rarely if ever exists without a pre-existing endometritis and salpingitis; among the exceptions it has been noted that an appendicitis has occasionally been the source of the disease. These cases are rare, and although the vermiform appendix has not infrequently been found in the pelvis perforated and adherent to the Fallopian tube and ovary, with abscesses in the surrounding lymph, yet it is always a question as to whether the inflammation started in the Fallopian tube or in the vermiform appendix. The diagnosis would rest in such a case almost entirely upon the history. Wherever the disease originates, the result has been observed to be the same —a salpingitis and a peritonitis. When the symptoms and diagnosis of salpingitis have been considered, about all that can be said about peritonitis has been told, for the reason that inflammation of the Fallopian tube and the symptoms arising from the combined disease originate mostly in the peritonitis. A salpingitis uncomplicated by an inflammation of the peritoneum would give rise to but few symptoms. Such is the case with catarrhal salpingitis, and even with its resultant lesion, hydrosalpinx. It is the peritonitis accompanying the salpingitis that causes the formation of the large masses of lymph, the subsequent adhesions and immobility of the organs, the pain, the leucorrheal discharges (in part), the disordered menstrual function, and, in fact, all the prominent symptoms of the disorder. The extent to which peritonitis exists in any given case is oftentimes problematic and can only be guessed at. The whole pelvis may be involved or the lesion may be limited to a fractional part of it. The less of the serous membrane involved, the less will be the pain and the fewer

the adhesions. In the acute stage of the inflammation lymph is thrown out about the parts affected, and the contiguous serous surfaces become attached to one another. These points can be palpated and a fairly clear idea of their extent obtained. The exudated lymph may be confined about the Fallopian tubes or ovaries, one or both, or it may be found that the loops of intestine and omentum overlying the pelvic inlet have become involved, and are adherent to each other and to the pelvic organs. This lymph exudation and adhesion is Nature's method of heading off an inflammation of the serous membrane, and it is interesting to note the repeated and continued exudation, as the inflammatory process overcomes the areas it has first attempted to protect, knuckle after knuckle of the intestine becoming glued together in front of the advancing infection, until the lymph has finally effectually stayed its progress. The result in bad cases is an indurated mass in the lower portion of the abdomen, overlying and dipping down into the pelvic inlet. With the patient's history and the presence of such a tumor it is not hard to realize the relation of cause and effect. Such a mass is usually more or less tympanitic and immovable. Under treatment, unless suppuration has occurred, these masses disappear to a great extent, leaving the intestine and omentum adherent, it is true, but as the lymph has been absorbed the mass has lost its hard, indurated character, and has assumed more nearly the usual characteristics of the soft intestine. In fact, as a distinct tumor the whole mass generally disappears; in some cases, on the other hand, it remains to the end. Should suppuration occur, this is the usual course. Suppuration of the tubal contents is very common, and is not infrequently associated with a breaking down of the peritoneal lymph surrounding the appendages at several points, resulting in the formation of one or more small abscesses about the appendages. These surrounding abscesses are commonly spoken of as occurring in the connective tissue, but they arise distinctly from and in the plastic lymph. It is not possible to diagnose their existence prior to an operation, unless they spread and become large enough to overshadow the tubal or ovarian abscess. Even then it is more than probable that they would be mistaken for an abscess, located in the Fallopian tube or ovary. As a matter of fact, they do not often become so very large, unless the infection has travelled fast and overcome the resistance of the obstructing lymph, forming a large pelvic abscess—intraperitoneal as a matter of fact, as are almost all the pelvic abscesses.

Fasting

It is possible at times to say that the pelvic abscess exists, but usually the distinction can only be made between a true pelvic abscess and a bad case of pyosalpinx by an experienced diagnostician, the points of difference being determined by the physician's personal experience and delicacy of tactile sense. As a rule, where there is a large indurated mass rising into the abdominal cavity free pus will be found in the pelvis; but this is by no means a sure sign. When the pelvis is full of free pus, the vaginal vault is apt to give a sense of fulness and induration in all directions, as if the whole pelvis were filled with a solid mass. This feeling extending more or less over the whole of the pelvic floor, none of the pelvic organs can be outlined; the uterus is fixed in its position, whatever that may be. Fluctuation may or may not be detected; frequently the pelvic floor is so hard and indurated that this sign is very uncertain. That a bad pelvic inflammation has existed, and that suppuration has occurred, are usually unmistakable. Anything further in the line of an exact diagnosis must rest on the particular features of the special case and the physician's dexterity and experience.

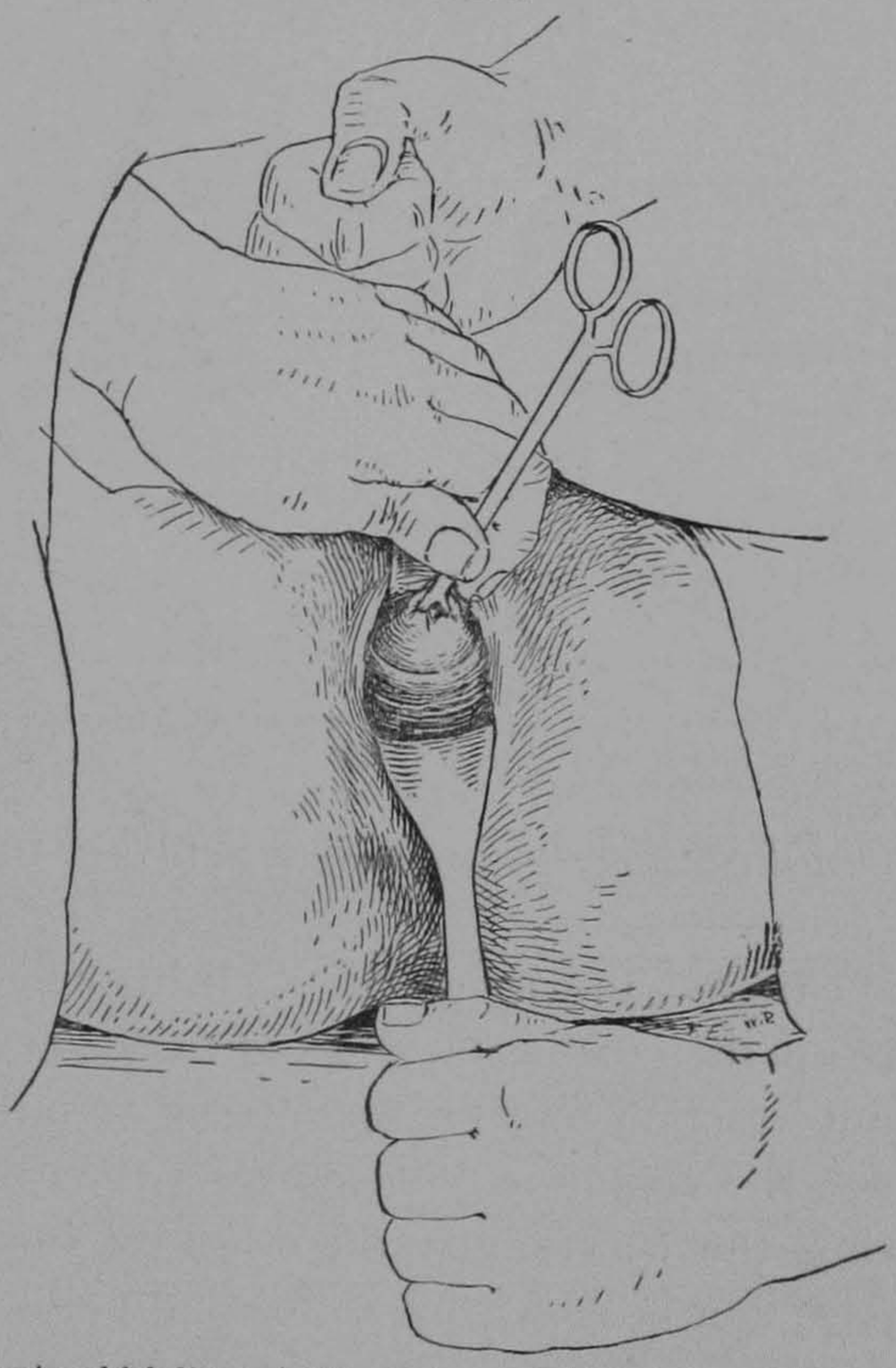
Cellulitis.—What has been said about peritonitis is also true of cellulitis. A few cases of this disease may arise in puerperal patients by transmission of the inflammation along the walls of the lymphatics and suppuration of the cellular tissue. Such cases are rare, and if they do exist cannot be diagnosed from the intraperitoneal pelvic abscesses, those which arise within the peritoneal sac from breaking down and suppuration of the peritoneal lymph and exudates. Inflammation of the cellular tissue always accompanies a severe peritonitis, and the two are indistinguishable from a diagnostic point of view. The cellular tissue in the broad ligaments becomes involved in the course of a pelvic inflammation, the result being a distension of the ligament by exudates and a destruction of the cellular elements by the inflammatory process. As the inflammation subsides, the ligament is contracted or destroyed, which result may be recognized at a subsequent investigation after the case becomes a chronic one.

The usual points of distinction between a pelvic cellulitis and a pelvic peritonitis, as formulated and compared in all works on gynecology, are misleading and worthless. It is utterly impossible for any one to make a practical distinction between these two phases of a common disease, and the formulæ as given only tend to complicate

the understanding of what is possible and what is clinically true. The difference is purely theoretical; practically and clinically they are part and parcel of the same disease—viz. pelvic inflammation. The cellular tissue rarely suppurates except in conjunction with the suppuration of the peritoneal exudates. When it does break down, it cannot be distinguished, short of operation, from other forms of pelvic abscess. The disease, except in the form of an abscess, never exists as a chronic condition; its resultant contraction of the broad ligament may exist and be recognized, but the cellular inflammation has ended in the acute attack by a destruction of the connective tissue.

After all methods have been exhausted there remain a certain small class of cases of pelvic disease in which a positive differentia-

FIG. 268.

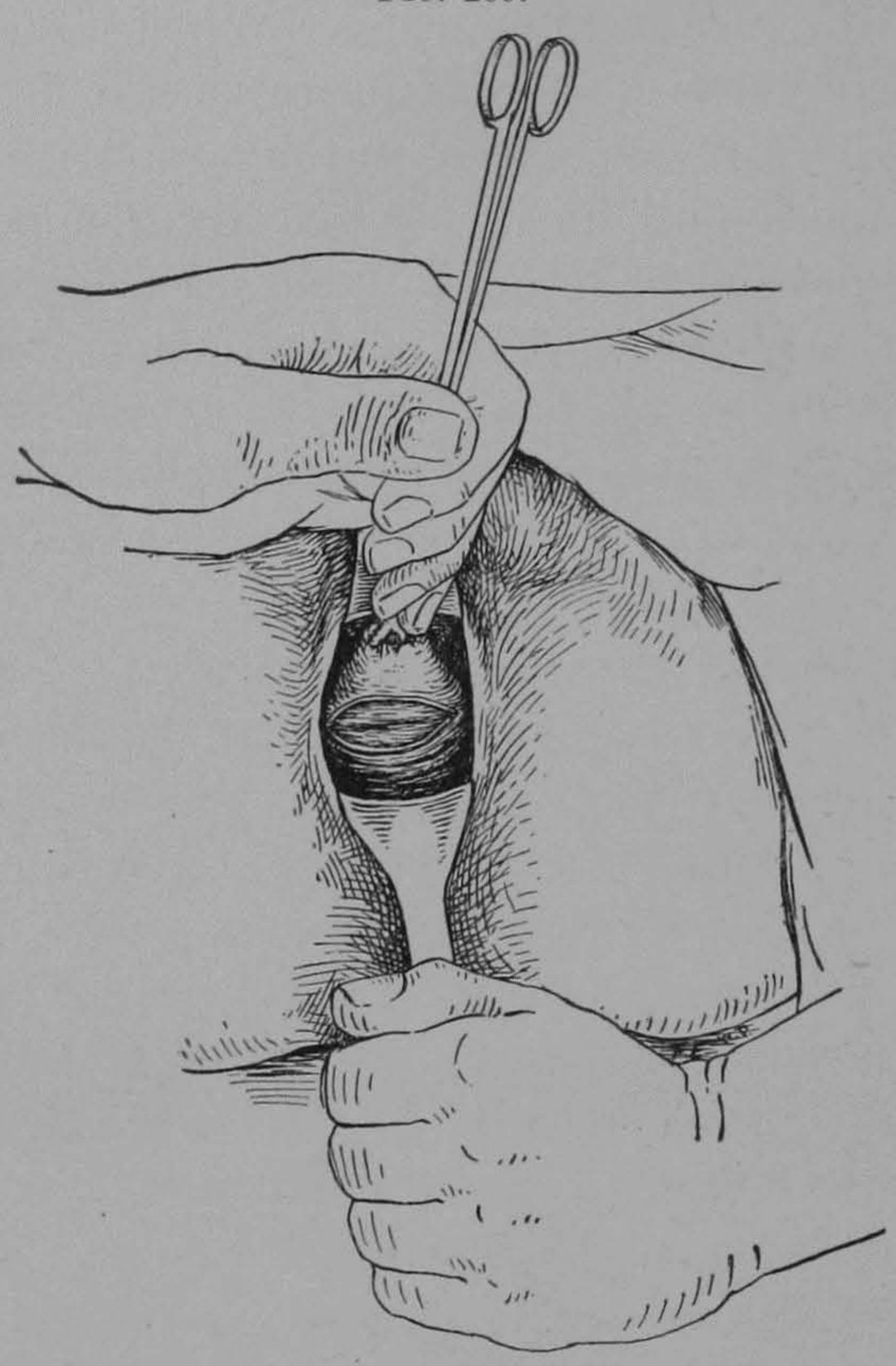


The fold behind the cervix which lies over the cervico-vaginal junction is well shown. The vagina is to be incised here. (From life.)

tion of the lesions cannot be made. The conditions are such that it becomes necessary to clear up the diagnosis and determine the pathological lesions. There are two ways of doing this: either by

laparotomy or by posterior vaginal section, as suggested by Pryor. Exploratory laparotomy is merely the usual first step as practised in every abdominal section and is described under that heading.

FIG. 269.



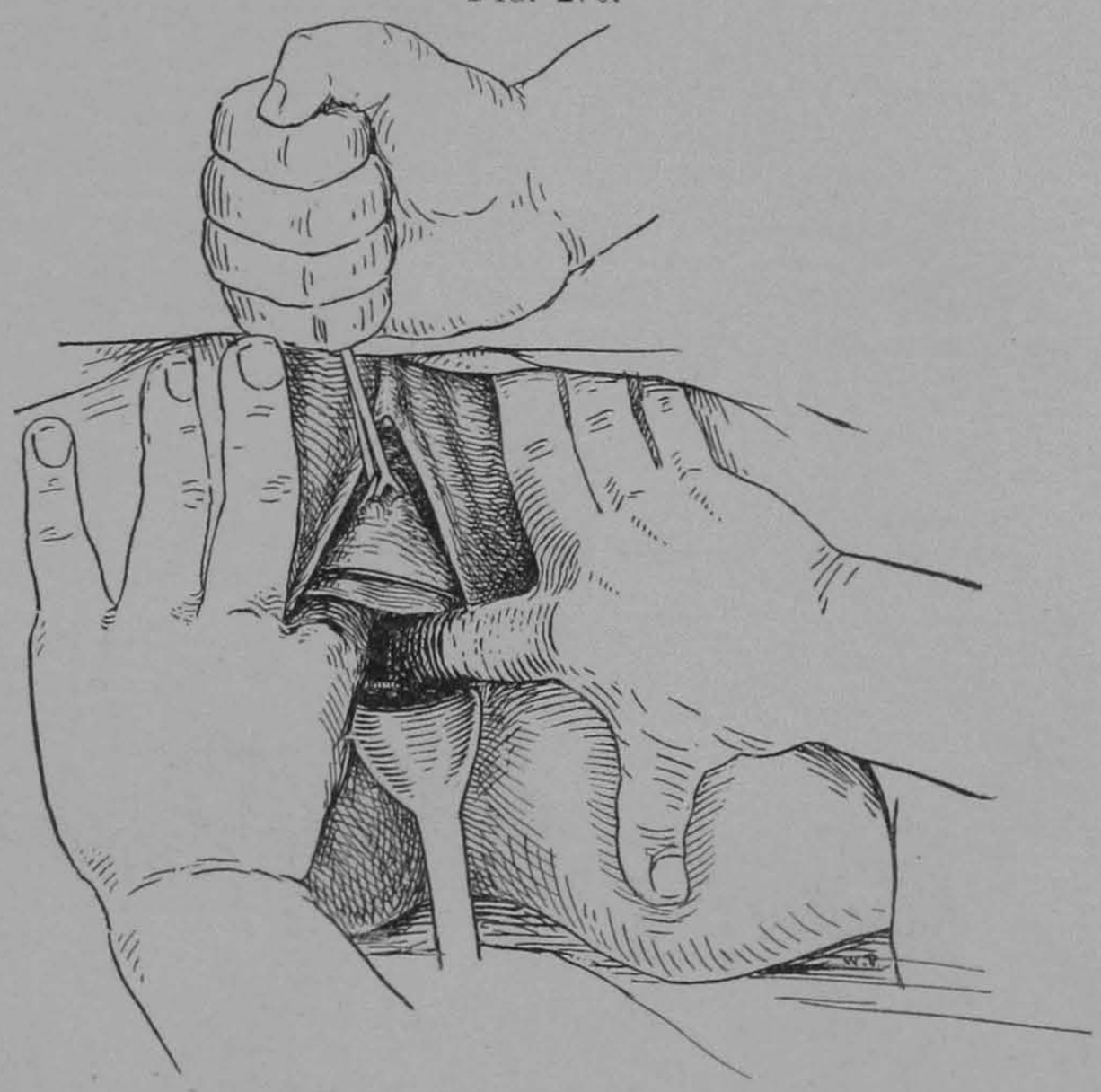
The vagina is incised, and the point at which the peritoneum is reflected from the uterus is shown as the deepest part of the cut. The peritoneum is to be torn through at this point. (From life).

Posterior Vaginal Section.—The patient is placed in the lithotomy posture.

The uterus is curetted and irrigated. All instruments employed in this procedure are then cast aside and the vagina is again cleansed. With stout, blunt traction forceps, the uterus is pulled down, and the point at which the vagina is reflected from the cervix is demonstrated by moving the cervix up and down in the vaginal vault. This point of reflection is shown by a crescentic fold which appears just behind the cervix when the cervix is shoved up (Fig. 268).

Picking up this fold in the middle with strong mouse-tooth forceps, the operator cuts through the vaginal mucous membrane. This incision is extended to each side, making a cut about an inch long. The scissors cut through the vaginal mucosa only. The posterior

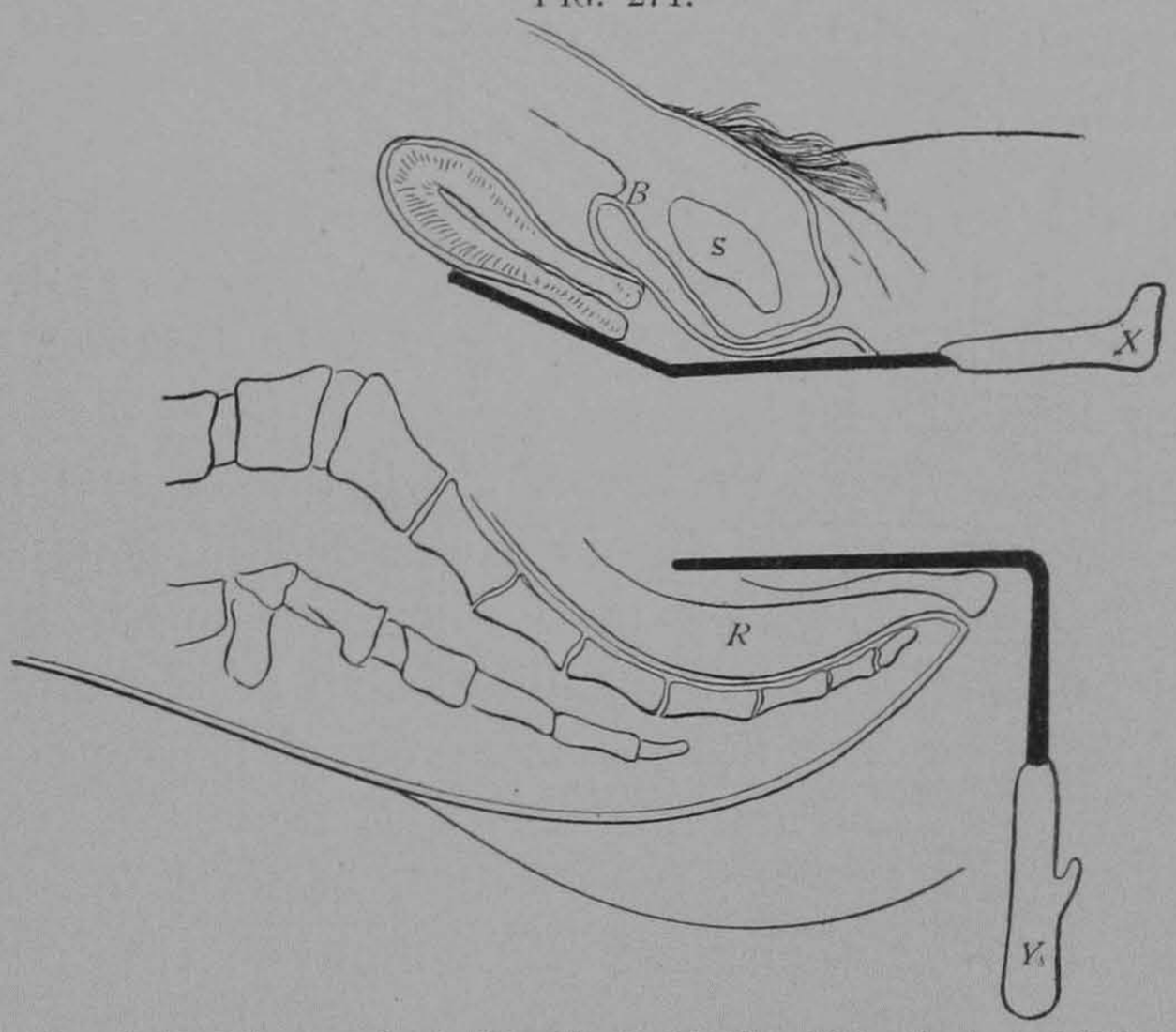
FIG. 270.



The index fingers are inserted into the opening in the cul-de-sac, and the incision is enlarged by blunt tearing with the fingers. (From life.)

flap is now grasped at its centre by stout forceps, and while making down-traction upon the uterus and this flap, the operator pushes his

FIG. 271.



The uterus is held up behind the symphysis (*S*) with the bladder (*B*) by the trowel (*X*), while the rectum (*R*) and the posterior vaginal wall are pulled down by the retractor (*Y*).

finger into the cul-de-sac up to the level of the internal os (Fig. 269).

If the finger has not already perforated the peritoneum, the cavity is wiped dry and the peritoneum picked up with forceps and cut with scissors. A digital examination of the pelvic contents is

FIG. 272.

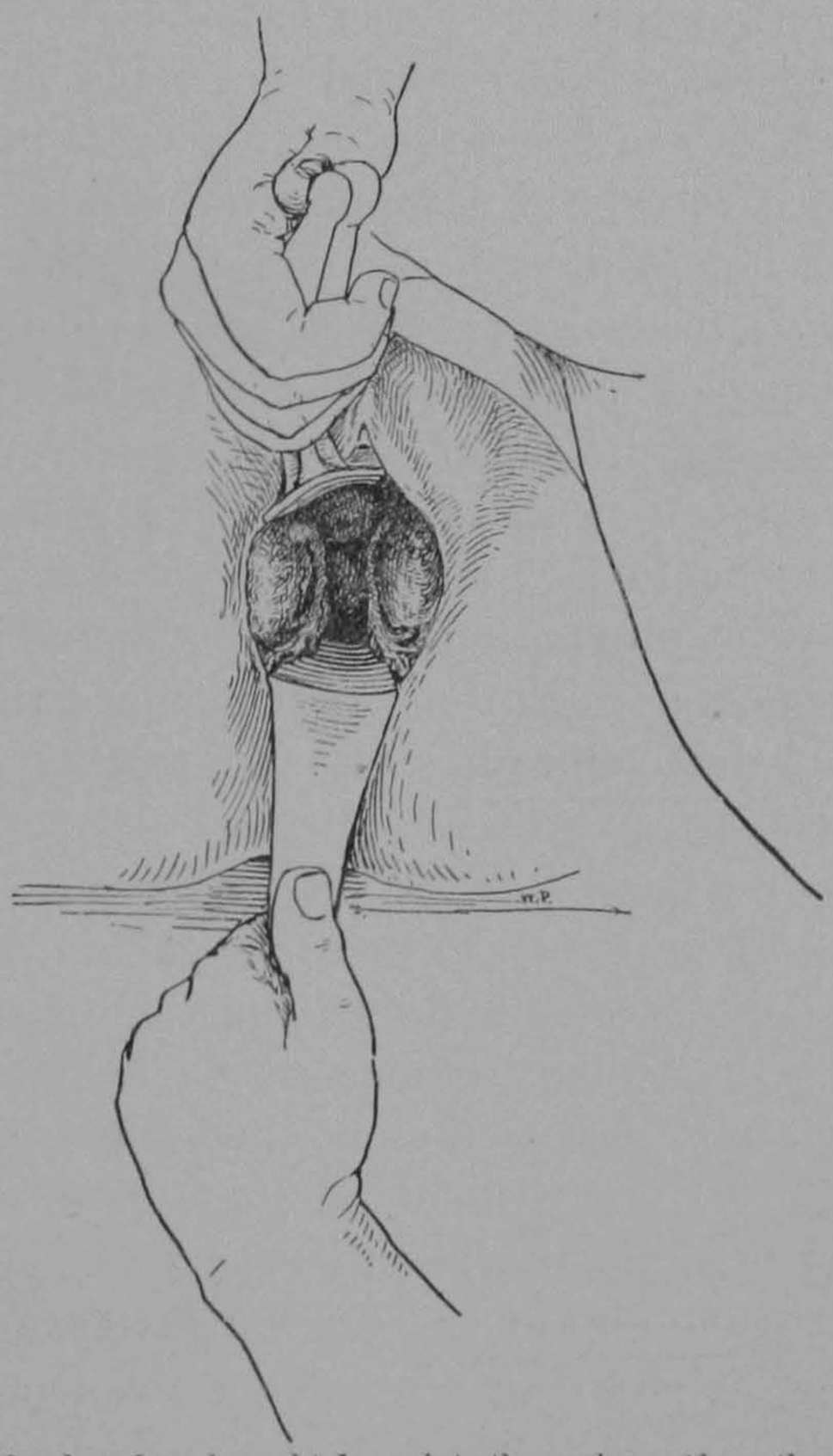
The cul-de-sac is opened. The posterior vaginal wall is held down by the retractor, while with the trowel the uterus is shoved up against the bladder. The space obtained is estimated by comparing the length of the operator's index finger with the distance between the blades of the retractors. In this case it was 2¼ inches. (From life.)

now made, still keeping up down-traction on the uterus. Having satisfied himself that an ocular inspection is necessary, the operator introduces two fingers into the opening in the cul-de-sac, and, separating them laterally, he tears the vaginal mucous membrane and peritoneum (Fig. 270). Very rarely will the vaginal mucosa be found so stout that he cannot do this. Should it be so, he will lightly touch it with a scalpel in the direction in which he wishes the tissues to separate. The medium blade of the long Péan retractor is introduced into the pelvic cavity, the forceps on the posterior flap are removed, and the cervix is freed from the traction forceps. The Péan-Pryor trowel is now inserted into the pelvis and the uterus forced up behind the symphysis (Fig. 271). This will widely open up the pelvic cavity. Into this opening a gauze pad, to which is attached a stout string, is inserted to prevent descent of the intestines and to catch any sero-sanguineous fluid.

The patient, still on the back and with legs bent upon the trunk,

is thrown into Trendelenberg's position (Fig. 272). By gentle manipulation with small gauze pads held by forceps the intestines and omentum are made to enter the abdominal cavity. When it is found that the intestines are adherent, they are gently freed. The whole pelvic cavity may now be readily inspected and the diagnosis is established. Even the vermiform appendix, if it be suspended in the pelvis, may be seen. The uterine appendages may be gently

FIG 273.



The adnexa have been freed, and are brought down into the vagina. Above them are coils of intestine. (From life.)

drawn into the incision and minutely inspected, and should any treatment be indicated which may be carried out through a vaginal incision, the operator is in a position to proceed at once with the proper manipulations.

Having satisfactorily examined the pelvis, all fluid is wiped away, the uterus again washed out, and packed full of iodoform gauze. Everything is removed from the peritoneal cavity, and a

loose plug of iodoform gauze is inserted just within the edges of the vaginal rent, which must fill the opening to prevent protrusion of small intestine. The uterus and this plug are replaced *en masse* and the vagina is filled with gauze. A self-retaining rubber catheter is inserted into the bladder, and the sphincter ani dilated. On the third day the patient is put in Sims' position and the uterine packing removed without irrigation. Whatever vaginal gauze has been taken out to do this is replaced by fresh dressing. The cul-de-sac plug is left in for from seven to ten days, according to the character of the case. It is removed and replaced under a short chloroform narcosis. In doing this the patient is in Sims' position. The operator must be careful to support the cervix anteriorly with the trowel, so as not to disturb the lymph behind the uterus. A second dressing is made a week later, without pain, and repeated until the opening closes. The patient is allowed to sit up in bed after the first dressing, get out of bed in two weeks, and becomes an office case in from two to three weeks. The peritoneal cavity is entered in from one to five minutes.

PROGNOSIS.—The prognosis of pelvic inflammations is variable according to the phase which the disease assumes, the character of the infection, and the manner in which it is treated. It may end in complete recovery, permanent crippling, or death. Catarrhal salpingitis usually undergoes a spontaneous cure, at times with a complete restoration of the tissues to their normal condition of health, oftener after the destruction and desquamation of the ciliated epithelium. Should the Fallopian tubes become occluded at any point, sterility is an accomplished fact, and either a hydro- or hematosalpinx a possibility. Even without occlusion of the Fallopian tube sterility is frequent, from the fact that the cilia, whose function it is to carry the ovum toward the uterine cavity, are lost, and the ovum may lodge at any point throughout the length of the tube, and there perish, or it may be so long delayed in its passage as to be too enfeebled to become impregnated when it meets the spermatozoid. Extra-uterine pregnancy is commonly accompanied by a history of long-standing sterility, and it is this disease which is supposed to be the cause of the misplaced conception. The ovum, lodging in the Fallopian tube, becomes impregnated by the spermatozoid, and, not being able to escape into the uterine cavity, develops in the tube.

If the ends of the tube remain patulous, there is no great danger

of an accumulation of the excretions, but should they become closed, a hydrosalpinx is almost inevitable, unless the excretions have ceased or the absorptive powers of the tube are equal to the occasion. Hydrosalpinx is not fraught with any great danger to life, and unless it becomes complicated by pelvic peritonitis is not liable to cause any great discomfort to the patient. It would act in much the same manner as would small unadherent ovaries. Should peritonitis supervene and adhesions result, the patient would suffer from long-continued pelvic distress and pains, and would be liable to secondary attacks of peritonitis. Hematosalpinx acts in much the same manner, it being more liable to inflammatory complications. Interstitial salpingitis always threatens life, for the reason that it is always complicated by pelvic peritonitis. The affected Fallopian tube is always occluded, either throughout its course or at its distal end, by the fimbria becoming adherent to the ovary. If both tubes are so affected, sterility is certain and permanent. The amount of danger to life will depend in great part upon the amount of the complicating peritonitis and cellulitis. If the infection has been a particularly virulent one, and has escaped out of the fimbriated end of the Fallopian tube before Nature has had an opportunity to build up a wall of obstructing lymph, it will probably infect the larger part of the pelvic cavity before its course can be stayed: should it escape into the abdominal cavity, a general peritonitis is likely to result, and death follow. Puerperal septic infection is more liable to have this termination than gonorrheal infection, although the latter claims its fair share of victims. Women who have acquired interstitial salpingitis, and in whom the disease has become chronic, are very liable to suffer from recurrent attacks of peritonitis. These attacks occur more or less frequently and with more or less severity. At any time they may develop into a general peritonitis and end fatally, or suppurative changes may be set up which will require a surgical operation to save the patient's life. So long as they remain quiescent they cause little more damage than that brought about by the constant pain. On the other hand, they may render the patient's life miserable, the only prospect of relief being either their removal or the menopause. It is an undoubted fact that the change of life, when it becomes established, brings relief and cure to many of these women: the disease, however, frequently accompanies delayed menopause, and is most probably the cause of the delay. Spontaneous cures other than by the menopause are rare; at the same time, it

cannot be successfully disputed that such is the case in a small proportion of cases.

Pyosalpinx and ovarian abscess are much more liable to be accompanied with recurrent attacks of peritonitis, and are consequently more serious lesions, than any of the other forms of disease of the uterine appendages. Usually they mean lifelong invalidism to the patient if she escapes primary death. Death is often the least of the consequences of this lesion. The patient drags along in a miserable condition of sepsis, with its resulting fever, hectic, and emaciation, until she dies of exhaustion or until the abscess has succeeded in finding an outlet into some of the neighboring viscera: even then her last state is hardly better than her first. Should the rupture occur into the uterus, a spontaneous cure may result, or the tube may refill and discharge repeatedly, all the while with the chance of its calibre becoming permanently closed. Should leakage take place from the fimbriated end into the peritoneal cavity, a general suppurative peritonitis may result, with its usual ending. Should, on the other hand, the pus find its way through the bowel or bladder-walls, a sinus will be formed which will most probably refuse to yield to any treatment short of surgical. This disease, at the best, means a lifelong invalidism to the patient, and is a constant menace to her life. Much the same may be said of abscesses in the pelvis due to peritonitis and cellulitis. Those occurring primarily in the cellular tissue, following labor, are said to run a rapid course, and generally end in death, unless they are recognized and provision made for the discharge of the pus. Even with this precaution many cases die. The same may be said to be true in a lessened degree of ordinary pelvic abscesses, although this form is apt to give sufficient time in which the physician may act. If these abscesses are properly opened and drained, the chances for the patient's recovery are good. Should they be neglected, the woman will either die from the exhaustion of septicemia, or the abscesses will open spontaneously in one of the many ways already described. Frequently it is impossible to obtain healing of the sinus tracks made by the burrowing of the pus from these abscesses, and, in spite of the fact that the abscess-cavity is emptied, the purulent discharge continues indefinitely, the patient eking out a miserable, lingering existence, only to die finally of exhaustion.

Treatment.—The treatment of pelvic inflammation is satisfactory in accordance with the stage of the disease and the manner

Prophylactic = preventive.

in which it is attacked. It is one of the preventable diseases, and if the infection is taken in hand in time it is perfectly amenable to treatment. After it has gained full headway it is only possible to ameliorate the symptoms, and finally, if necessary, to remove the resulting lesions. The treatment is prophylactic, palliative, and curative.

The prevention is embraced in the treatment and cure of the infection while it is still confined to the vagina and to the uterus. If the vaginitis or endometritis be taken in time, the disease may readily be stayed and a pelvic involvement prevented. This is true of the majority of cases, but it must be borne in mind that there is a certain proportion, of puerperal patients particularly, in whom the infection travels so rapidly that the serous membrane is involved before the physician has time to realize that the danger is seriously threatened; this is also true of a small proportion of gonorrheal cases. In spite of the existence of these exceptional cases, it is a lamentable fact that the majority of pelvic inflammations are preventable, and that the attending physician is only too frequently responsible—if not for sins of commission, at least for sins of omission. If a patient be suffering from gonorrhea, it should always be attacked vigorously and scientifically, ever bearing in mind that the mildest case may result in irreparable damage to the pelvic peritoneum, and may even result in death. The vagina must be exposed throughout its whole extent and thoroughly treated, and, if the endometrium becomes involved, it should receive equally prompt attention. The methods of treatment of these troubles will be found fully expounded in the chapter on Inflammatory Diseases of the Uterus. Infection starting in the uterus from a post-puerperal sepsis should never be neglected. General treatment as it is too often indulged in by the physician is only playing with fire, and, like the proverbial child, his fingers are frequently burned. Every woman who after a labor or a miscarriage has an elevation of temperature and pulse, together with discharges which smell badly, provided conditions other than sepsis are excluded, should at once have an antiseptic vaginal douche. Should the temperature and pulse not fall to normal or thereabouts after several such douches repeated at half a dozen hours' interval, the syringe should be carried to the fundus of the uterus and a similar injection made into the cavity of the womb. If after repeating this treatment several times in the twenty-four hours the patient's symptoms have not

Curettage.

Curettage

Page 210.

subsided or become markedly better, the physician is committing an inexcusable blunder if he does not thoroughly curette the whole of the cavity of the womb, irrigate it, and render it as aseptic as possible. Should all cases of gonorrhea and puerperal sepsis be treated on these common-sense principles, pelvic inflammations in women would be far rarer than they are at the present time. To just the extent of intelligence with which the physician treats these cases will he have the fewer cases of pelvic trouble originating in his practice.

Should the disease once invade the Fallopian tubes, it is beyond local treatment, and it is largely a matter of chance as to how far it will spread and how much damage it will succeed in doing before being brought under control. In Nature's hands lie the most effective weapons for combating the inflammation, and practically all the physician is able to do is to aid by placing the patient under the most favorable circumstances possible and giving Nature every chance to succeed in her fight. In the acute form of the disease two objects must constantly be kept in mind: the force of the inflammation must be weakened in every possible way, and Nature must be left unhampered to wage the fight. As in every inflammation, rest is absolutely essential. By "rest" is meant sexual as well as physical quietude. The woman should be placed in bed, and kept there until the attack has subsided: sexual intercourse should not only absolutely be prohibited, but even the approach of the husband, sufficient to excite pelvic congestion, must carefully be guarded against. Many an attack of threatened pelvic inflammation has been precipitated by indiscretions in these directions. During the menstrual periods the greatest caution is necessary. The congestion incident to this period is physiological, but in a patient who is threatened with a pelvic inflammation, or in one in whom the inflammation is actually in existence, it may readily be converted into a pathological state and the inflammatory attack be precipitated. Rest cannot be obtained perfectly if the bowels, especially the sigmoid flexure and rectum, are allowed to become overloaded with fecal matter. The hard, scybalous masses which form under these circumstances are a continual source of irritation. Woman is naturally a constipated animal, but these masses are the more apt to form, inasmuch as the peristaltic action of the bowel is in great part inhibited by the inflammation of its serous coat. It becomes a matter of prime importance, then, to empty and keep the lower bowel free from accumulations of fecal matter. Absolute

Scybalum (Pl. Scybala) = hard, lumpy faces.

rest having been secured, depletion is next to be obtained. The intestinal tract is the most adapted of all sources for bringing about this result. The free use of some drastic purgative will best conserve the purpose. Possibly some one of the magnesium salts is the best drug for this use. Magnesium sulphate, administered in doses of a teaspoonful, dissolved in a small quantity of water, a saturated solution being preferable, each hour, for from six to ten doses, will usually produce the desired result. Should the salts be rejected, as they sometimes are, any other purgative may be substituted. The bowel will incidentally be emptied of its fecal contents, and large and repeated watery stools will result. The amount of damage done by friction set up by the peristaltic action of the intestines will be far outweighed by the good done by the general and local depletion. The watery stools are produced by drawing on the fluid element in the blood-vessels from all over the body, but particularly from those near and connected with the intestinal tract. The withdrawal of this fluid lessens the blood-supply to the inflamed parts, and at the same time creates such an intense demand for fluid in the vascular system that the inflammatory exudates are taken up the quicker. A pelvic inflammation which is just starting is often cut short by this procedure, and it is at times surprising to see the amount of relief experienced by patients, as demonstrated by the cessation of pain and the absence of the anxious expression of the countenance. One free movement of the bowels will in some cases act more promptly in this direction than will several hypodermics of morphia. There are certain cases, however—usually those who have been suffering for some time before having come under treatment—whom the treatment will not relieve, it matters not how many times the bowels are moved. Inflammations in the pelvis are like inflammations in any other part of the body: if depletion is not applied until the trouble is chronic, there is little to be expected from it; in the acute stage it is invaluable. Magnesium sulphate

It is not possible to keep up purgation indefinitely, and especially if the patient be not particularly strong, care and discretion must be used in this direction. It is well, if the woman can stand it—and the vast majority of them are able to do so—to procure one good purgation consisting of six to ten free watery stools. After this the bowels may be kept soluble daily by administering a laxative once in the twenty-four hours. After purgation hot vaginal douching is perhaps the best method of securing continued depletion of the pel-

vis. If the douches be given properly, they will go a long way toward effecting a speedy reduction of the inflammation; if they are given improperly, they will only render matters more complicated. Douches as usually employed by the profession at large were far better done away with altogether, as they only tend to render the pelvic inflammation worse. The primary effect of the application of hot water is to cause a congestion and the determination of large quantities of blood to the parts, as any one can demonstrate for himself by placing his hands in hot water and noting how puffy they become. If the water be sufficiently hot and the hand be held in it long enough, the tissues will begin to shrink, and what is commonly known as the "washerwoman's hands" will be the result. This condition is brought about by the secondary action of the hot water; that is, contraction of the soft tissues. This contraction renders the calibre of the blood-vessels smaller, and drives a very considerable proportion of the blood out of the parts so affected. The more profoundly this action is produced and the longer it is kept up, the more complete and lasting will be the depletion. It is this secondary effect of the hot water that it is desirable to produce in the pelvis. The more thoroughly the blood is driven away from the parts, the sooner will the inflammation subside; the more frequently the action is brought about, the sooner will the blood-vessels acquire sufficient tone to limit the amount of blood they will hold and its powers of exudation. For the successful accomplishment of this object there are a few rules which it is imperative to keep in mind and carry out: The water must be hot, from 100° to 110° F., and to be sure that it is of this temperature a thermometer should be used. The water must be of sufficient quantity to produce the desired secondary action; for this purpose at least a gallon should be used at each injection. It must be applied directly and continuously to the parts to be affected; for this purpose the patient should lie in the recumbent dorsal position while the douche is being administered. It is important that this rule be observed, for the reason that should the woman assume a crouching or sitting position all of the water runs away as quickly as it is injected, barely coming in contact with the vaginal vault, the very part which it is desirable to reach. With the woman lying flat upon her back and the knees drawn up, the posterior portion of the vagina will be distended with water, and there will always be a residual amount *in situ*, which is constantly bathing

Recurrent syringe, with protective shield.

the parts and is kept at the proper temperature by the continued injection. The douche should occupy from fifteen to twenty minutes in its application, and can best be taken in the bath-tub, if the patient is able to be up and about, and is forced to use it without the aid of a second person. The syringe, of whatever kind used, must have a hard-rubber nozzle, as metal, being a good conductor of heat, will burn the parts if the water is used as hot as is needed. These douches may be administered two or three times a day, and may be continued for an unlimited time, depending on their effect and the way in which the patient progresses; but in beginning them, it must be remembered that they are apt to cause a patient to feel exhausted; in fact, a patient is occasionally found not to be able to use them at all on this account.

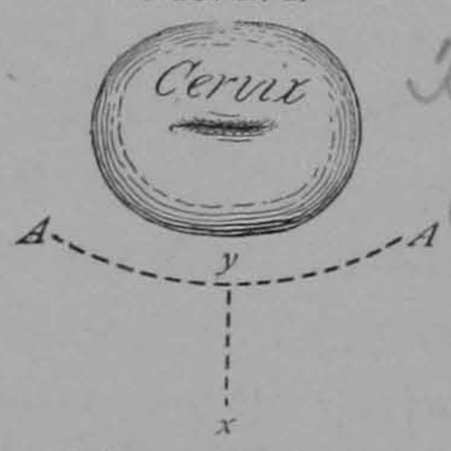
Depletion may be obtained with advantage in certain cases by direct bloodletting. A free scarification of the cervix will not infrequently, early in the acute cases, give an immense amount of relief, and may even materially limit the extent and severity of the attack. This aid in the treatment is much neglected at the present day, but it will at suitable periods in an attack of pelvic inflammation be found of great service. If the treatment is attempted, it should be done in a thorough manner. The cervix uteri is to be well exposed by the aid of a speculum, and deeply punctured at a number of points, so as to cause free bleeding. Ten or fifteen punctures are none too many, and from three to six ounces of blood will not be too much to withdraw; it will, in fact, be difficult to obtain so much. It may be desirable to have the depletion continue for some little time, and if a light glycerin tampon will not aid the actual flow of blood, it will withdraw a portion of the watery element from the surrounding tissues, and thus in a mild way contribute its aid toward a continued depletion. It is not advisable or necessary to use all these methods of depletion in every case of pelvic peritonitis: they are the best methods at our command, and must be used with judgment as the indications for them arise in particular cases. In the acute form of the disease, when there is considerable induration, it has been proposed that an aspirating needle be thrust into the mass through the vaginal vault and the serous exudates drawn away. It is claimed that the depletion thus obtained will end the attack in a very short time. The amount of good derived by this measure will not be commensurate with the risks of carrying infection on the needle and thus causing suppuration.

Should the pain become so great as to be unbearable before the inflammation has subsided sufficiently to give relief, it is eminently proper to administer an opiate for its temporary action. It is well to remember that opium in any form depresses the heart, lessens the excretive and absorptive powers of the tissues, and inhibits peristaltic action of the bowels, all of which effects are contra-indicated in these diseases. It is exceedingly desirable that excretion and absorption should be free and that the bowels should remain soluble. For these reasons, if it becomes necessary to use an opiate —and it should only be used if absolutely necessary—that form is to be selected which will cause the least harm, and it is to be administered in as small quantities at as long intervals as is compatible with obtaining the effect desired. Morphia, used hypodermically, is least objectionable of all the forms of opium. Frequently one dose of an eighth of a grain is sufficient, but it may be necessary to repeat it at intervals of five or six hours for several doses. One injection of morphia in this dose will often relieve the patient of her intense pain until a movement of the bowels can be secured, when, as a rule, there will be no necessity for its repetition. The one dose can do no possible harm; it does not even delay securing the desired movement of the bowels.

Counter-irritants are not of any great importance in the acute form of the disease, but when it has assumed more of a subacute or chronic condition, they have their uses. Iodine applied freely to the vaginal vault and over the lower part of the abdomen once a day will give a certain amount of relief; whether it be actual or imaginary matters little; it can do no possible harm, and at least gives the comfort of the knowledge that something is being done. While not a great deal of reliance can be placed upon it, yet it is occasionally a matter of difficulty to explain the apparent cause and effect between the application of the treatment and the resulting relief. It is so uniformly used in conjunction with other treatment that it is sometimes hard to say whether or not it accomplishes good. Turpentine stupes and poultices to the abdomen do no harm and little good; what good they do accomplish is incidentally through the heat which accompanies their application, and is more mental than real: the good derived from blisters is hardly sufficient to counterbalance the amount of suffering they cause. These are all remedies which are very generally used, and serve as well as anything else to keep the patient satisfied that every possible thing is being done for her.

Little or no attention need be paid to the pulse and temperature, other than to watch them closely in order to note the progress of the disease. They are symptoms which will take care of themselves, and never call for any especial treatment: they will fluctuate with the inflammation, but seldom rise sufficiently high, or remain high long enough, to cause any organic changes in the tissues, unless pus be present. Under any circumstances the disease is to be treated, and not its symptoms. Antipyretics are never indicated, and only when sepsis arises are heart-stimulants called for. Diuretics and diaphoretics would have their places for purposes of depletion were there not much more prompt and efficient means at our disposal. Diet and drink are both important elements in the treatment. The diet should be light, but nourishing—of such a character as to make as little fecal matter as possible, at the same time not to furnish an excess of fluid. It is well for the first few days of the attack that fluid should be withheld as much as possible, so that the inflammatory excretions may the more quickly be absorbed. The patient should be kept confined to bed until all pain and local tenderness has disappeared. If this line of treatment be carried out systematically and carefully, there is a chance in a certain proportion of cases that a permanent cure may result and the parts be restored to a fair condition of functional health.

FIG. 274.



Henrotin's Operation

The cul-de-sac incision is made from *A* to *A*. If more room is desired, the incision is extended down the median raphé of the vagina from *y* to *x*.

Should this treatment fail to stay the acute disease, posterior vaginal incision, as suggested by Henrotin, may accomplish the result. The procedure is accompanied by little danger. The object is to open the connective-tissue spaces about the uterus, and, after breaking up adhesions and penetrating any masses of exudate met with, to drain the resulting cavities. The operation consists in making an incision, moderately circular, close to or rather slightly on the posterior surface of the cervix, and to dissect back the vaginal mucosa through the cellular tissue to a point beyond which the wounding of the uterine artery seems improbable. The incision never extends beyond the outer limits of the cervix. If necessary, more room may be gained by joining this incision with another one running directly backward in the median raphé of the vagina, care being taken not to penetrate sufficiently deep to wound the rectum. With the exception of the incision

through the vaginal mucosa, all manipulations are made with the finger exclusively. The disengaged hand being placed upon the abdomen, the operator proceeds as in making a bimanual palpation, and with the index finger of the vaginal hand gradually penetrates the tissues in the direction of the centre of the affected region, whether this be laterally in the broad ligaments or posteriorly in the peritoneal cavity. All exudates are penetrated, all adhesions are broken up, and free drainage established. The cavities entered are packed loosely with sterile gauze, the free ends of which are left hanging in the vagina. The whole vagina is loosely packed with gauze. The dressing is removed only after three or four days, at which time the cavities are gently irrigated and the packing renewed. This is repeated several times at two days' intervals, after which merely a daily vaginal douche is required. The operation takes from five to ten minutes only.

Frequently, in spite of the most careful treatment, the result will only be a relative one, and although the inflammation may subside after weeks' or even several months' treatment, yet masses of the exuded lymph, together with the disorganized Fallopian tube, remain, and the inflammation may be relighted at any time, when the whole treatment will have to be gone through with again. In certain cases the inflammation never entirely subsides, but the woman is a constant sufferer from pelvic pain and discharges. She eats little, sleeps badly, and coitus is more or less painful, as is also walking or jolting of any kind. Such patients will apply for relief after years of constant suffering. An examination will disclose a condition of insterstitial salpingitis, masses of unabsorbed exudates, and a tender pelvis. The woman is able to be on her feet attending to her daily work, but is often a wreck of her former self. It is possible in many of these women to greatly improve their condition, provided pus is not present in the pelvis. Their relief naturally will only be tentative, for as long as the exudates and diseased appendages remain, they are liable under favorable circumstances to a return of all their aches and pains. The object to be aimed at in the treatment of these cases will be to bring about an absorption of the inflammatory exudates and to accomplish a subsidence of the inflammation. In these women rest, especially sexual rest, is essential to success. The only sure way of accomplishing this is by separating husband and wife, so that there may be no temptation: for this reason, where it is possible, a hospital is the best place to carry

out the treatment. When this is not possible, tamponing is quite effectual—in fact, is the only safeguard. The patient must be guarded as much as possible from over-exercise, especially the use of sewing- or similar machines. The clothing must be warm and dry, and all exposures to cold carefully avoided. The bowels should be kept soluble, and an occasional purgation for its depleting effect is indicated. Depletion may be obtained also by the use of the hot-water injections, as in the acute form of inflammation, but to result in any good it will be necessary to use them systematically and for a long period of time: they should be used once or twice daily for months. Glycerin tampons, alternating with counter-irritation over the whole vaginal vault by painting with iodine, are of service if properly used. In fact, the tampon can be utilized, after the parts have been painted with iodine, with advantage. Dry tampons are frequently serviceable, even aside from their use in preventing coitus. The weight of a heavy and engorged uterus, retro-displaced, dragging upon tender and adherent ovaries, together with any movement of the pelvic organs caused by walking or riding, is a constant source of distress, pain, and backache. If the patient be placed in the knee-chest, or even the lateral position, and the whole pelvic mass of diseased and adherent organs be allowed to gravitate toward the abdominal cavity, a tampon of some soft yielding material can be so placed as to fill the whole of the vagina, or even the posterior portion of it, care being taken not to pack it hard enough to cause trouble by its pressure. When the patient stands on her feet the pelvic organs gravitate back again toward their former position, but the tampon now receives their weight and holds them somewhat above their former level, if only for a fraction of an inch—sufficient at least to take the drag off the adhesions. In a certain class of cases the relief obtained from this procedure is remarkable. It is essential that the tampon be of some soft, elastic, unabsorbable material, and that it be placed so as not to make too much pressure. Surgical cotton absorbs moisture, loses its elasticity in a few hours, and becomes a hard foreign body in the vagina. In addition, it shrinks, so that it loses its effect so far as giving support is concerned. Wool is the best material for this use. The tampon is much superior to a pessary for accomplishing this end. But the fact that a pessary at times gives relief to the patient suffering from pelvic inflammatory disease is only explainable in this way. In spite of the fact that

a Smith-Hodge pessary will give relief in some few cases, it is a dangerous instrument to use in this disease. If an ovary is prolapsed, the pressure of the hard pessary will render its use unbearable from the pain it causes. Should a fall or jar occur while the pessary is *in situ*, it might readily transmit so much of a blow as to light up a latent inflammation or to rupture a cystic tube or ovary. A tampon is preferable in every way, and it may be put down as a good and safe rule that a pessary should never be employed in the presence of pelvic inflammation. Tampons, when used, should be removed at least every other day, and the vagina thoroughly cleansed and dried before a second one is introduced. If the tampon is thoroughly impregnated with some dry powder, such as boracic acid, it will keep sweet and clean the longer.

Where the application of iodine and glycerin has failed to relieve the pelvic pains and tenderness, ichthyol has been used. Ichthyol, either in its pure state or mixed with glycerin in equal parts, and applied on a tampon to the vaginal vault, has succeeded in relieving the tenderness in some cases when everything else has failed. These applications in order to accomplish any good must be made at least twice a week for the course of several months or more.

General medication accomplishes nothing directly; although potash, mercury, and other remedies have been lauded for their specific effect, there is no drug which, given internally, will have the slightest effect upon the inflammation or its products. The absorption of the infiltrates and exudates will greatly be aided as the condition of health of the patient is good or bad, and every effort should be made to build up the general health to as nearly a normal condition as possible. General tonics and alteratives, combined with a proper regulation of the bodily functions, a well-ordered diet, limited but healthful exercise, and slight stimulation when indicated, is the proper course of general treatment to follow. It aids in the cure simply by placing the tissues of the body in a favorable condition for performing their work, and by giving Nature a chance to rid the parts of the inflammation and its products.

Many of these patients are very much run down and have lost a considerable amount of flesh: they consequently need building up. Amongst other remedies for this purpose, electricity and massage have their place. General galvanism given daily for its

tonic and stimulating effect, together with general massage, is indicated. It is not necessary to submit the patient, as a general thing, to a strict course of "rest treatment," as the good effects of this method may be obtained by a very material modification, and the woman may be up and about, attending to a moderate amount of work, sufficient to keep her body and mind occupied, without allowing herself to become over-fatigued. Electricity applied locally to the pelvis is of very indefinite value. In the acute attack of inflammation it has no place, and its use can only result in harm. When the force of the inflammation has subsided and it has settled itself down into a subacute or chronic condition, electricity may at times be used with advantage. It will ~~occasionally~~ relieve the symptoms of pain and uterine hemorrhage when other remedies have failed, and, on the other hand, it will often fail to give relief to these symptoms; in fact, it will render them worse, when other remedies will bring about the desired effect. The relief obtained from this remedy is, like all others, merely temporary: it never cures the lesion, it simply relieves the symptoms, and, the disease being still present, the symptoms are liable at any time, under favorable circumstances, to return. It is claimed for electricity by its votaries that large pelvic inflammatory masses will shrink and disappear under its use. Such is in truth the case, but when we consider of what these masses are composed, it is easy to see why the remedy has been of service in causing them to disappear. They would have disappeared under any other proper method of treatment as well. In an acute attack of peritonitis great quantities of lymph are thrown about the diseased tubes and ovaries, forming large masses, which on palpation through the vaginal vault give an idea of size to the tube and ovary which is out of all proportion to their real size, the bulk of the tumor being made up of lymph-exudate, and, at times, exudates into the connective tissue. As the inflammation subsides, Nature causes an absorption of these exudates to a great extent, with the result that the pelvic mass gradually diminishes until nothing but the adherent tube and ovary remain; the appendage at times is quite small. In fact, the case under these circumstances has now assumed the chronic form of adherent interstitial salpingitis. It is this natural function of absorption which electricity stimulates and aids—nothing more, nothing less. In addition, the soothing effect of the galvanic current gives in a certain proportion of cases great

relief to the pain, while the uterine contraction induced by the stimulation of the uterine muscle, together with the direct effect of the cauterization upon the endometrium if sufficient current be applied, gradually lessens the amount of blood lost. As an aid in the treatment of cases of subacute or chronic pelvic inflammation the procedure is valuable: it is to be regarded as an additional remedy, only one of many, to be used as simpler and easier forms of treatment fail or are slow of accomplishing their object. In using this remedy the galvanic negative current should be selected, and the application may be made either intra-uterine or intra-vaginal, the latter being the safer. Where it is desirable to aid Nature in absorbing exudates and relieving pain, the current should not be stronger than the patient is able to bear without much pain; the application is to last but a short time, and is to be repeated two or three times a week. A good average application of the galvano-negative current, and one which is usually well borne, is in the neighborhood of fifty milliampères applied for about three minutes. When the hemorrhage is excessive, it is better to use the positive pole, and the application should be made intra-uterine. Weaker currents, twenty to thirty milliampères, are to be used where the galvano-positive current is selected, for the reason that this is much more painful than the galvano-negative and is not so readily borne by the patient. Even though the current is not sufficiently strong to cauterize the lining mucous membrane of the uterus, yet the positive pole coagulates the albuminoids of the tissues and causes contraction of the uterine muscles, in this way lessening uterine hemorrhage, and cutting off the blood-supply. It is only by its judicious and careful employment that any good can be obtained from the use of electricity: the careless or ignorant use of it may readily do more harm than good. It is essentially a remedy the use of which will for the most part remain in the hands of the specialist; it is of little use to the busy general practitioner, as the apparatus is complicated and expensive, and very considerable time and care must be spent in the application.

Massage has a much more limited use in pelvic inflammatory lesions, and is more dangerous in unskilled hands. It requires no especial apparatus. In the acute stages of the disease it has no place whatever, but its greatest use is in the chronic form, where there is a considerable quantity of unabsorbed exudate and lymph. The manipulations of the masseur act as exercise to the parts and

stimulate absorption. Under careful and very gentle movements it can readily be seen why in this way pelvic masses disappear or become smaller. Its use is decidedly objectionable even in this class of cases, for the reason that it is impossible to say whether or no there be pus in the midst of the mass. Many a Fallopian tube which is not much larger than normal contains pus or purulent material. The application of friction, pressure, or kneading in such a case may readily result in the leakage of some of the tubal contents into the abdominal cavity: even were there is no purulent matter present, the manipulation might very easily relight a subacute or chronic inflammation into an acute attack. It is claimed for the treatment that the pus from a pus-tube may be caused to escape into the uterine cavity and a cure thus be effected: it is much more likely that the pus would first escape through the fimbriated ends of the tubes or rupture take place in the walls of the abscess. In addition to the dangers attached to its use, its application is very painful unless the greatest care or the most delicate touch is employed. Even then some cases are for a long time intolerant of the necessary handling of the parts. The treatment is altogether too dangerous for the general practitioner to employ, and its use will always be confined to the hands of the few. Massage in these diseases consists in kneading the pelvic masses and applying friction to them to cause their absorption, and in moving the uterus in different directions to stretch and free its adhesions. The manipulation is carried out with one hand pressing through the abdominal wall and one or two fingers of the second hand in the vagina. The vaginal fingers are used mostly for lifting up and fixing the uterus or pelvic masses; the manipulations are carried on in great part by the abdominal hand. The reverse is true, however, in exceptional cases.

When suppuration has accompanied an attack of pelvic inflammation, the treatment which has been detailed, and which is applicable to some cases of the disease in its non-suppurative and non-cystic forms, is not to be considered. In these cases all the symptoms of septicemia are added to those which accompany the inflammation, and frequently the patient's life is threatened, if not immediately, at least remotely and constantly. Should the pus be confined to the Fallopian tubes, Nature occasionally relieves the danger by allowing it to escape into the uterine cavity. It has been proposed to take the hint from Nature as to the method of

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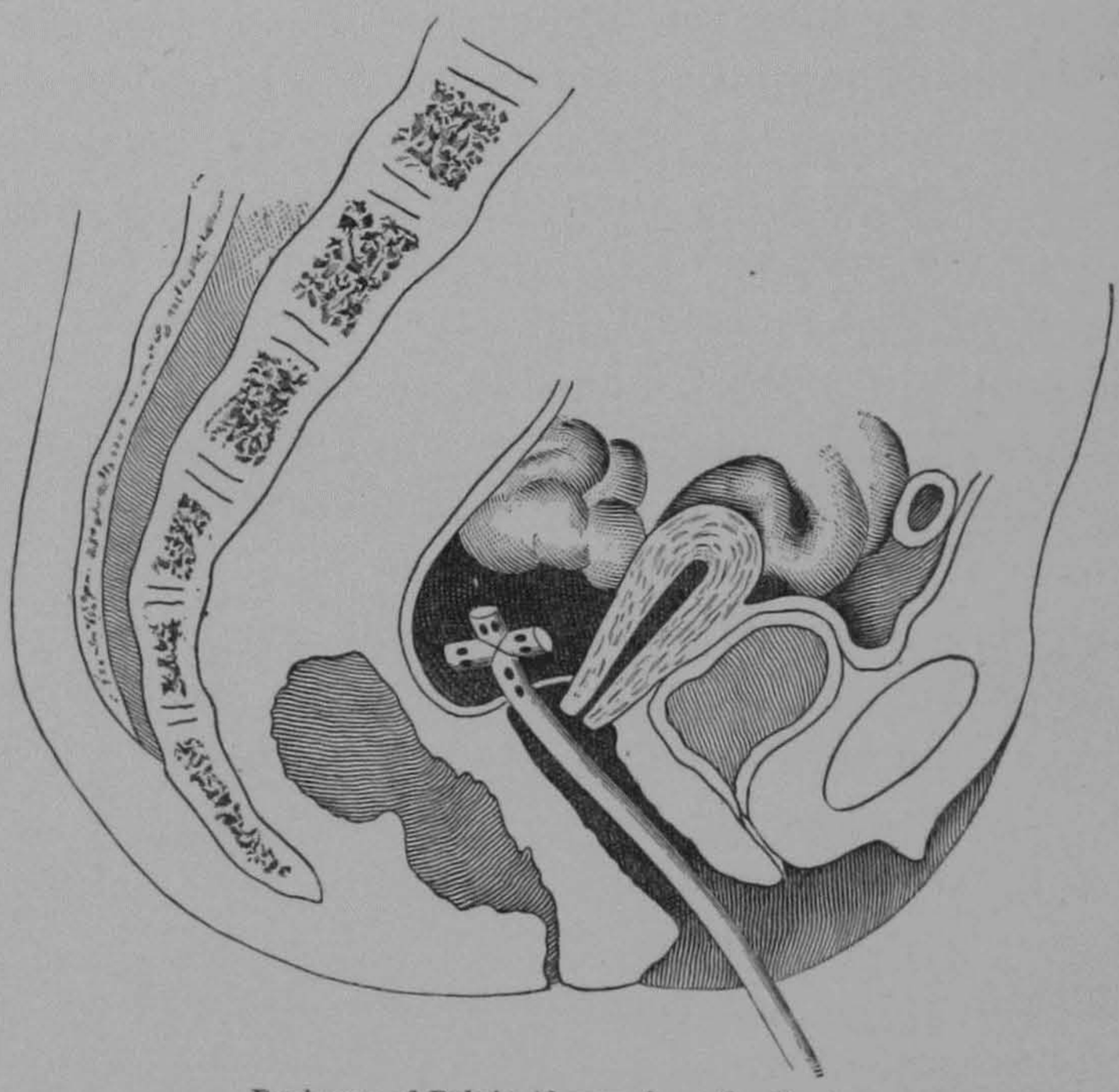
treating pus-tubes, and accordingly the treatment of aspirating the Fallopian tubes by passing an instrument into the uterus, and thence into the tube through its occluded uterine opening, has been advocated. Could the procedure be carried out with any degree of safety and certainty, it would offer a method of cure in a certain proportion of cases which would at times be satisfactory, and at the same time not be attended with the dangers of abdominal section. The objection to the treatment which should condemn it to oblivion is the uncertainty, nay almost impossibility, of passing the instrument. The catheter or probe, whichever it be, is of necessity small in diameter—so small that it would be just as liable to perforate the diseased and softened uterine wall as the occluded opening in the tube, even if the point which that opening occupied could be found:

FIG. 275.



Drainage of Pelvic Abscess from the Vagina.

the manipulations necessary to accomplish the operation would be attended with so much traumatism and movement of the diseased parts that the inflammatory process might very readily be relighted or an abscess-cavity ruptured. If for no other reasons, the treatment should be utterly condemned; but pelvic abscesses are so notoriously multiple that the mere emptying of one of these pockets of pus would have no effect on those remaining, and there would be no

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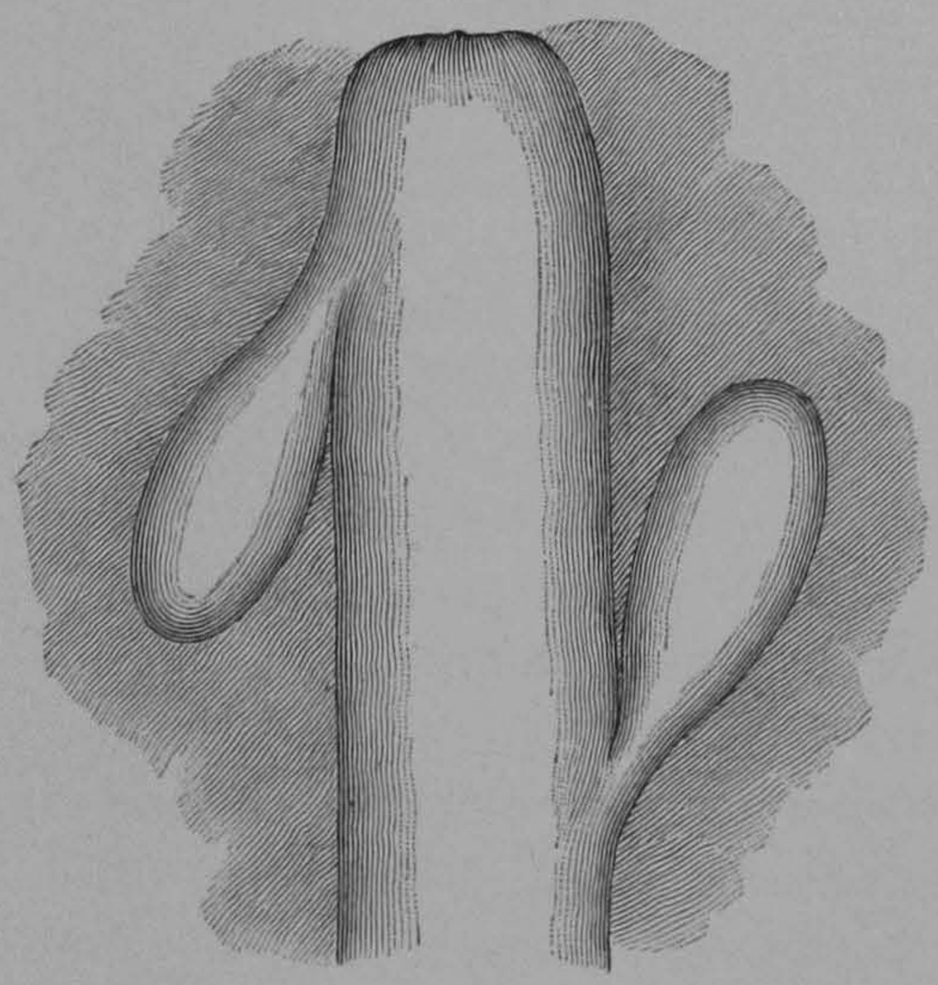
possible way of assuring one's self that some accumulation did not remain behind, it matters little how many had been drained. Where pus exists in the pelvis, there is but one treatment to be considered: evacuation by a surgical operation. A pelvic abscess should never be given an opportunity to evacuate itself. There is a point of election for the opening which, if left to Nature, will rarely be chosen. When pus exists, it should be evacuated at once; delay is unjustifiable, either for building up the patient or for any other reason. The patient will not improve as long as she is continuously absorbing septic matter, and the longer the delay the worse will be her condition for operation. If the abscess be an accumulation of pus within the pelvis *independent* of the Fallopian tube or ovary, be it either altogether intra-peritoneal or involving the cellular tissue, it is best to evacuate it without opening the general peritoneal cavity: the vagina is the one point at which this is feasible and proper. Even in those exceptional cases where the abscess has risen into the abdominal cavity, and it is possible to open it above the pubis without entering the general peritoneal cavity, the vagina offers the

FIG. 276.



Abscess-sacs opening into the Bowel. Opening obliquely above and below the level of the sac.

better point of operation, as it gives just as good an opportunity for irrigation and a better one for drainage. This of course presupposes that disease of the uterine appendages has been excluded—a diagnostic feat which is rarely accomplished. The opening should never be made in the rectum, as has been proposed, even though the abscess be pointing there. The abscess-cavity can neither be

irrigated easily through the rectal opening, nor can fecal matter be prevented from entering into it. Even where the opening occurs into the rectum spontaneously, it is slow to close in cases in which it ever does so. Where the opening is higher than the sacs, it is practically impossible to prevent fecal matter from entering, in which case closure is hopeless. There is one almost insurmountable obstacle to this method of treating pelvic abscesses, barring exceptional cases. It is rare that one is able to say whether or not the ovary or Fallopian tube contains pus. Should either do so, a possible subsequent abdominal section would become necessary, and it would then be complicated by the fistulous opening, which is always serious and which might prove fatal. As a matter of fact, the cases of pelvic abscess without ovarian or tubal suppuration are rare, and the inferences are all in favor of there being involvement of these organs, especially when the etiology of the disease is taken into consideration. In view of these facts, the proper treatment of pelvic abscess is usually by abdominal section, under which circumstances the parts can readily be explored, the exact pathological condition noted, and the appropriate treatment applied. The operation from above amounts to little more than opening an abscess, and the certainty of complete evacuation that it gives the operator and patient is a great desideratum.

Where the pus is confined in the Fallopian tube or ovary it has been recommended that vaginal puncture be practised for its evacuation. This method of treatment is so full of objection that it is best never to recommend it. Where vaginal puncture would probably be the better procedure for unskilled hands in a general pelvic abscess, especially one which required such immediate evacuation that a skilled operator could not be obtained, it is not the proper procedure in abscesses confined to the uterine appendages and the lymph immediately surrounding them. As has been already said, this variety of pelvic suppuration is rarely confined to one cavity, but consists of a number of small pockets, none of which communicates with the others. The Fallopian tube itself may contain as many as three distinct and separate pockets; the ovary forms a cavity of its own, and two or more pockets are often found in the lymph in which the Fallopian tube and ovary are buried. The chances of more than a partial evacuation of the pus being obtained would be very scanty indeed. This objection has been recognized even by the advocates of this method of treatment, and for the purpose of

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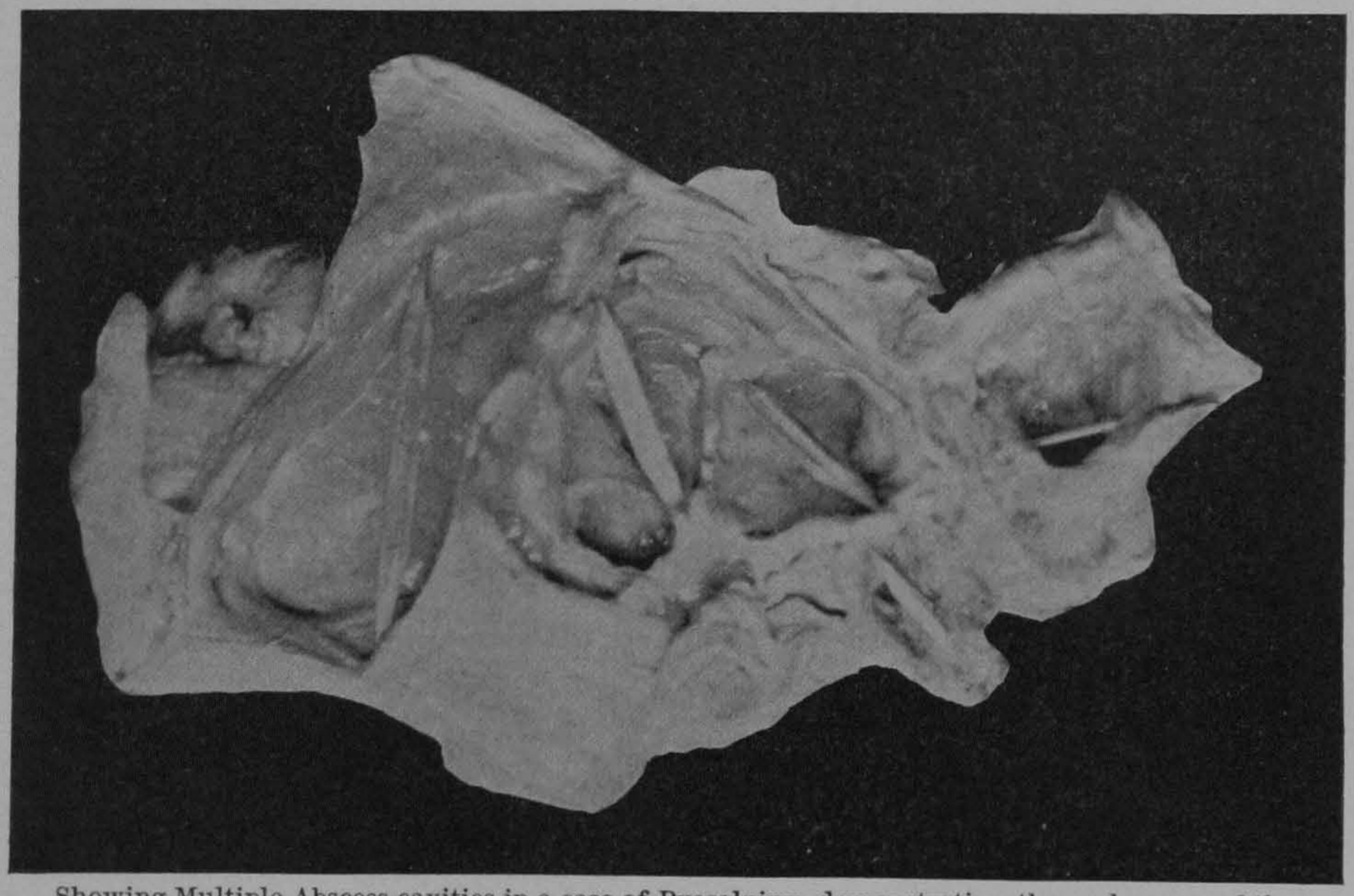
overcoming the difficulty they have gone so far as to advise that the abdominal cavity be opened, the parts explored, the various abscesses located, and each punctured in turn from the vagina. If the abdominal cavity be opened, it would seem the height of folly not to complete the operation. But even with the abdomen opened it is at

FIG. 277.



Showing Multiple Abscess-cavities in a case of Pyosalpinx, demonstrating the uselessness of the treatment of tapping and draining.

times absolutely impossible to locate all the abscess-cavities before the parts are enucleated. Even in the few cases in which the pus could be thoroughly evacuated the broken-down abscess-sacs, cheesy Fallopian tubes and ovaries would remain behind to cause the patient a long chronic invalidism, should she ultimately recover. The best results which one could hope to obtain from this method of treatment would leave the patient in exactly the same condition as a woman who has suffered from a pelvic inflammation, and after its subsidence had been left in a condition of chronic interstitial salpingitis and ovaritis. She would ever after carry a disorganized Fallopian tube and ovary, and would be liable to recurring attacks of pelvic inflammation, any one of which might result in suppuration or in death. Purulent salpingitis and ovaritis, unless they end in death in from a few days to a week, are chronic conditions, and give ample time to allow the physician to obtain competent assistance for performing an abdominal section.

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The treatment of those rare accumulations of pus within the pelvis which are extraperitoneal, and which do not involve the uterine appendages, differs in no way, in its first steps at least, from the treatment of the intraperitoneal abscesses. It is impossible to make a diagnosis of this condition prior to an abdominal section. When the abdomen is opened and the abscess-walls are found to be movable enough to be brought into the abdominal incision, it is best to aspirate, empty the sac thoroughly, irrigate the cavity with hot water, stitch the opening in the sac to the abdominal incision, and place a drainage-tube into the cavity.

Should it be found, as is usual, that the sac could not be brought sufficiently high to be stitched into the abdominal wound, a vaginal incision should be made, the pus evacuated, and the drainage established from below. Until the abdomen has been opened and the diagnosis established this treatment manifestly is improper unless involvement of the Fallopian tubes and ovaries can with reasonable certainty be excluded. Should it be thought desirable after the diagnosis has been established, a second incision could be made above Poupart's ligament and the abscess-cavity reached by dissecting down into the cellular tissue below the reflexion of the peritoneum, pushing the peritoneum forward, as in operations on the bladder or for ligating the iliac vessel, and in this manner reaching the accumulations. The vaginal opening, however, where possible, is to be preferred.

The ultimate treatment of pelvic inflammation is abdominal section in those patients who do not fully recover from the primary attack, and are left with their uterine appendages so diseased and disorganized that the symptoms produced by their presence either threaten life or so disable the woman as to incapacitate her for her daily vocation, and render her life a burden. It matters little whether pus be present or not, as many women suffer more from chronic interstitial salpingitis than they would from pyosalpinx or ovarian abscess. It would be well in the case of many patients, where there is no pus, to first try the medicinal treatment already described, but in this we are forced to make a distinction between the poorer and better-class patients. It has often been objected that no such distinction should be made, but it is well known that a given amount of involvement and destruction in a woman who can afford to undergo the time, trouble, and expense of a necessary course of treatment will give little or no permanent trouble, where a similar

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involvement in the case of a woman who is not able to afford the treatment will render her life miserable and will give rise to recurrent attacks of peritonitis, each one increasing the local condition and endangering the life of the sufferer. Even were they both to suffer the same amount, the rich woman can afford to go to bed and become a semi-invalid, while the same thing to the poor woman often means starvation for herself and children, or the poorhouse. Though the operation is a dangerous one, the physician is justified under such circumstances to counsel a poor woman to take the risks, with the chances of regaining her health and putting herself in a condition to bear the burden of life, where he would probably hesitate to advise the well-to-do patient to undertake the operation—not, at least, without a long and thorough trial of the medicinal—if it may be so called—treatment. If a patient's symptoms can be considerably ameliorated by treatment, she will often prefer to bear the lesser ills of her condition, than what to her are the greater ills of a surgical procedure. Unless a woman is subject to recurrent attacks of peritonitis, the disease may be left *in situ* without any danger to life, provided always that pus be not present: in these cases it is simply a matter of comfort or discomfort with a patient. Many of them suffer so much pain that they will accept an operation as soon as it is proposed to them, it matters little what the risk is, while in the case of others the idea of an operation is so horrible that they will rather bear any amount of suffering than even consider the radical procedure. The question of operation is one which must be left for the patient's decision, the facts having been placed fairly before her. The dangers of an operation for pelvic inflammatory disease in the hands of trained gynecologists are not much greater than those which attend each severe recurring attack of peritonitis. It is not possible to say just what the death-rate amounts to, but an honest investigation would find it not much below 10 per cent. in the hands of the many. In the hands of a few it reaches a lower limit. The fact that the woman is having recurrent attacks of peritonitis is one of the strongest indications that an operation for the removal of the appendages is required. It is not possible to lay down any hard-and-fast rule by which one may be guided in deciding for or against an operation; each patient presents her own individual peculiarities, which must be taken into consideration. It can only be said that so long as the diseased appendages remain in the pelvis the woman is not cured: she is only relieved

for the time, and at any moment a new attack of inflammation may be lighted up and the original condition be reproduced.

The Operation.—Abdominal section is the only method of removing the uterine appendages in pelvic inflammatory diseases, whatever may be said of their removal by other methods for other conditions. Their removal by the vaginal operation is extremely difficult and in many cases would be impossible. The operation is divided into two stages: the opening of the abdominal cavity, and the removal of the appendages. The preliminary step, opening the abdominal cavity, is common to all abdominal operations, and will be found described in the chapter on Technique. There is no danger to be met with until the peritoneum is reached, and then only in case there is adhesion of the omentum or intestines. This fact can readily be determined by picking up the peritoneum between two pairs of hemostatic forceps, and rolling it between the fingers. The merest nick will allow the air to rush in, when if the intestines are not adherent they will drop back into the abdominal cavity. If either the omentum or the intestines are adherent to the parietal peritoneum, they are to be separated carefully by gradually inserting the finger between them. The omentum may be found adherent over the inlet of the pelvis and greatly thickened by inflammatory infiltrate. If such be the case, it must be freed gently with the fingers, care being taken not to tear the bladder or the adherent loops of intestines. It is usually easy to begin at the lower edge of the omentum to free it, working upward from the pelvis toward the umbilicus. When it is tightly adherent to the bladder and its lower border cannot clearly be defined, it is well at times to begin above and work down toward the pelvis. The finger should be passed high enough in the abdominal cavity to reach a point where the omentum is free; then, with the finger between it and the intestine, it can be separated with more safety than from below: if when the bladder is reached there is any uncertainty as to where that organ ends and the omentum begins, as is at times the case, the apron can be ligated and separated at a safe distance above the doubtful point.

If when the omentum is loosened it is found that it is sufficiently torn to cause free bleeding, the oozing points should be caught up with a pair of hemostatic forceps and ligated. Should there be a number of bleeding points, time will be saved if a ligature be thrown about the omentum above these and the included

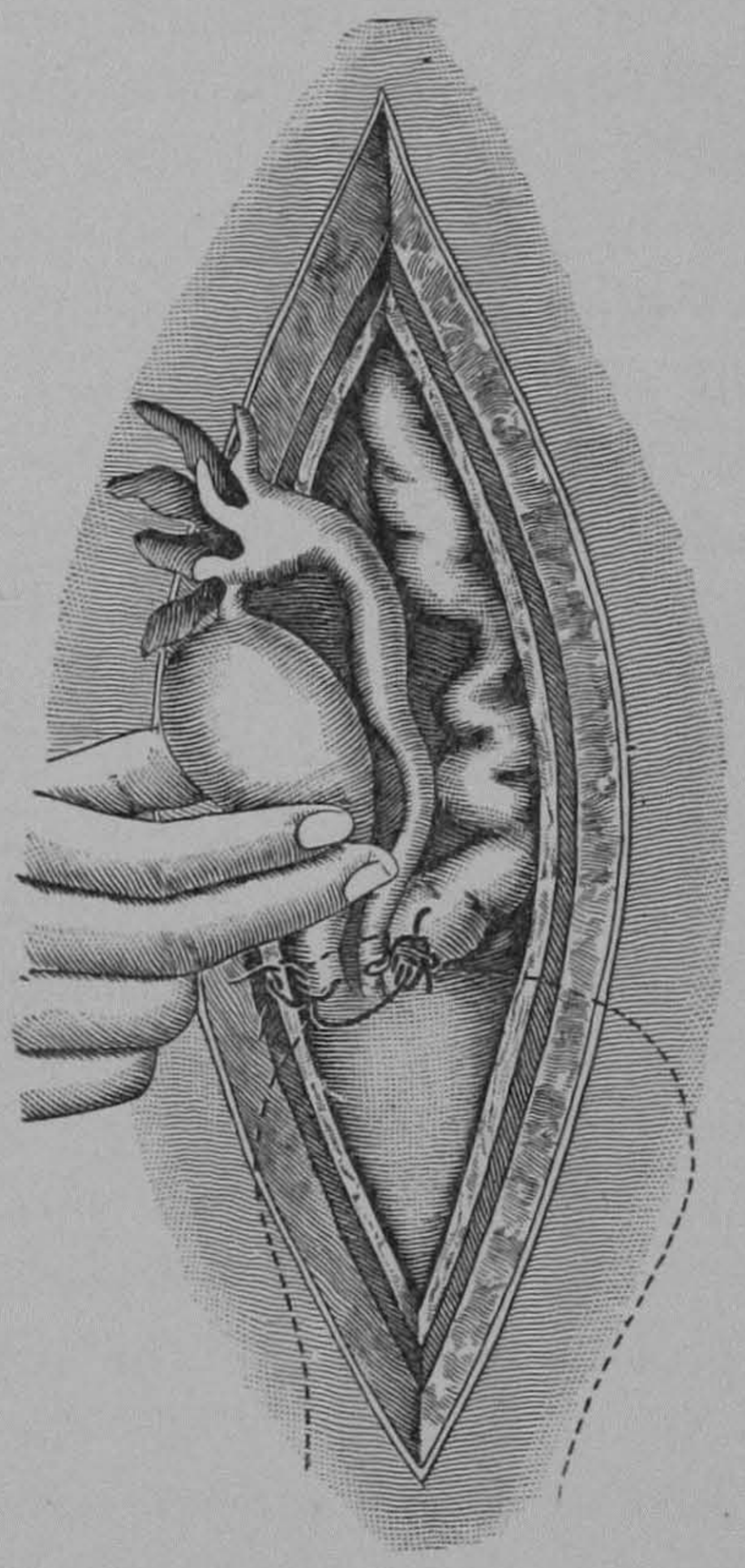
portion amputated. This is of especial importance and advantage if it is thickened by inflammatory deposits. After having disposed of the omentum, the intestines must next be dealt with. If they are unadherent, the finger passes down through them into the pelvis, locating first the uterus, and then the Fallopian tubes and ovaries. Should the intestines be found adherent, they must first carefully but completely be freed from all points of attachment. The adhesions may exist at but a few points, and easily be broken; on the other hand, they may be most extensive, and so solid that separation can only be accomplished with great difficulty and danger of rupturing the bowel-walls. Every loop of intestine which overhangs the pelvis, even the vermiform appendix, has been found to be involved in the general mass. The separation of these, especially if deep in the pelvis, is much facilitated by using the sight in addition to the touch. One of the great advantages of this is that the operator can be absolutely sure of what he is dealing with, and can see any commencing tear in the bowel-wall in time often to avoid a serious injury. The elevated hip—Trendelenberg—position allows the use of both touch and sight, and any surgeon who would willfully neglect the advantage to be derived from the combined use of these two senses does not do his whole duty to his patient. It is in this point of separating adherent intestines deep in the pelvis that the position gives its greatest advantage and becomes invaluable. The adhesions are freed by one finger being gently but firmly inserted between the first knuckle of intestine which is adherent and the organ to which it is fast. A to-and-fro motion will often succeed in loosening it when a steady pressure at one point will accomplish nothing. If the adhesion is stubborn at one point, the finger glides to another and another, until it finds a weak point from which to begin: after the beginning is made the rest is comparatively easy. At times it will yield easily on top; at others the first point of weakening will be found by passing the finger to the sides or even under the part. As each knuckle is freed it should be brought into the abdominal incision and carefully scrutinized. The points at which the adhesions existed will be found stripped of their peritoneum: if these points are small and not bleeding, they may be ignored; if bleeding freely, a few superficial stitches of silk or catgut will bring the edges of the peritoneum together and stop all flow. Exposure to the air for a short while may in itself stop it. If the serous and muscular coats are both torn through, stitches should be so placed

as to turn the doubtful point into the bowel, and any possible danger of future perforation at these points will be obviated. When the intestines are all freed and properly treated, they, together with the omentum, are crowded back toward the diaphragm and a large sponge placed in the abdomen, so as to keep them out of the pelvis while the operation is completed: the sponge does the additional duty of absorbing any blood or septic material which may flow toward the abdominal cavity during the course of the subsequent manipulations. Should the bladder have become injured, it should be repaired before proceeding further. Each and every step of the operation is to be completed fully before proceeding to the next, so that no point in the technique may be forgotten in the final steps of the operation, or complications will arise to embarrass the subsequent steps. It is well to locate and note the condition of both appendages before beginning their enucleation, and usually it is best to free both of them and the uterus before beginning to place the ligatures. If this be done, the parts can be brought more fully and easily into the abdominal incision, and there will be less likelihood of the first ligature becoming loosened while adherent parts are being separated on the opposite side. In the enucleation the finger glides about over the parts until it finds a weak point or a point at which it can be passed down deeply into the pelvis. It is essential that this should be posterior to the broad ligament, between it and the sacrum. The Fallopian tubes and the ovaries are situated on the posterior surface of the broad ligament, and the adhesions will almost always be found at this point. The finger should glide between the appendage and the sacrum. It is well where possible to follow the curve of the sacrum, keeping the palmar surface of the finger—or fingers if two be used—toward the pubis, sweeping the finger from one side of the pelvis to the other and in this manner freeing all adhesions to this bone. This will allow the fingers to pass under the ovaries, tubes, and uterus if it be retrodisplaced, and they can be stripped loose and lifted out of the pelvis with comparative ease. The aim should be to get the finger to the lowest point in the pelvis and work upward, and not from above downward. However, at times one is forced to work first at one point, and then abandon it and go to another and another, coming back finally to the original one. It is only by educating the fingers to the work that it can be performed accurately. In making the enucleation care should be taken to do as little damage as possible to the broad

ligament, as it bleeds freely wherever injured. It may be necessary at times to ligate the one side before enucleating the opposite one, on account of the bleeding. If this should be the case, care must be taken not to loosen the ligature while completing the work. As soon as the appendages and uterus are freed the ligatures are to be placed and the diseased parts removed. The Fallopian tube and ovary are caught firmly in one hand and drawn well through the abdominal incision, while the other hand passes the pedicle staff containing the ligature through the broad ligament, it being well to pass it below the loop of the round ligament, which will readily be observed on the anterior aspect of the tense broad ligament. If this be done and care be taken not to cut the loop of the round ligament when the Fallopian tube and ovary are removed, there will be less danger of the ligature slipping from the stump. As soon as the ligature staff has perforated the broad ligament the staff is withdrawn and the silk left *in situ* as a double ligature; the double end is then cut, and hangs as two separate threads perforating the broad ligament. The two strands of silk are so twisted that when their respective ends are tied, one around each half of the mass, they form a figure-of-eight, each half compressing one-half of the pedicle, and the two halves being drawn closely to each other. While placing the ligature the broad ligament should be held well up into the wound, but as the knots are tied tightly, the assistant who is holding the mass should relax his hold and allow the broad ligament to retract, else when the mass is cut away there will be a strong tendency on the part of the broad ligament to pull down through the ligature, thus causing hemorrhage. Care is to be taken that the Fallopian tube is included in the ligature up to the uterine cornua. In some cases it is necessary to include uterine tissue in order to get a pedicle healthy enough to hold the ligature without cutting through, and at times it cannot be done even then. Frequently the ligature cuts through the pedicle like a knife, completely amputating it. It becomes necessary then to pass a ligature, by means of a curved needle, deep into uterine tissues at the cornua in order to control the bleeding. The same procedure may become necessary on the side of the pelvic wall. In such cases the proper treatment is the complete removal of the uterus, together with the appendages. Patients with such lesions, when the appendages alone have been removed, are prone to return for treatment, suffering with leucor-

rheal discharge, pain, and continued bleeding: the uterus in such cases is often found to be still enlarged, and the writer has on several occasions been compelled to remove it in order to accomplish a cure. When the uterine appendages have been sacrificed the uterus is a useless organ: in case its retention should necessitate drainage on account of its mutilated and torn condition, in case its tissues be contaminated so as to threaten a subsequent or immediate infection,

FIG. 278.



Ligation by Figure-of-eight Ligature of the Fallopian Tube and Ovary.

in case it be so enlarged and diseased as to seem fairly probable that in future it will be the source of disagreeable or dangerous symptoms to the patient, it may be removed by intra-peritoneal amputation without hesitation. The ultimate results following the hysterectomy will be in a large number of cases superior to those following double ovariotomy alone.

The Staffordshire knot, or the so-called Tait knot, is an exceedingly dangerous one, and should be avoided, especially by beginners. The knot is so complicated that it is difficult to tie, and should any

one part of it be applied inaccurately and lightly, the whole loop is liable to become loose. Occasionally the pedicle is so large that it is not safe to include it all in one ligature. It is then best to tie in sections, quilting it from side to side as the cobbler does in his work. When the ligature has been firmly secured, the Fallopian tube and ovary are cut away, leaving sufficient of a button to ensure that the ligature will not slip off. After cutting away the appendage the stump should be seared with a Paquelin cautery as an antiseptic precaution. There is always a small portion of the lining membrane of the tube protruding from the centre of the stump often containing septic matter, which it is much safer to destroy than to leave free in the torn and denuded pelvis. When the ligatures are tightened, usually all free hemorrhage ceases and the only bleeding is merely an oozing, which will stop of its own accord in a short while. It may be advisable to place a ligature about some point which bleeds with especial freedom, but usually one or two of these at most are all that will be required. The points which will be most persistent and troublesome are those on the uterine surface. Wherever they are, if they are picked up with a pair of hemostatic forceps, and a ligature carried under them with a curved needle, they can readily be controlled. During the enucleation there should be no hemorrhage which is alarming, and generally it is better to ignore entirely what there is and finish freeing the adhesions with the certainty that the bleeding will end as soon as the ligatures are secured about the pedicles. Should the bleeding become alarming, it is because the ovarian artery has been severed, and it is best to secure the vessel by passing a ligature around it. If a needle be passed through the broad ligament near the pelvic wall and the ligature secured, and another one through the broad ligament near the uterus and secured, the vessel will be caught at both ends. The enucleation may then be finished and the mass tied away in the usual manner. There is neither necessity nor occasion for packing the pelvis with gauze or sponges to control hemorrhage during the course of the enucleation: such a procedure is not needed in the case of venous bleeding, and can only delay and impede the operation, while in arterial bleeding it will only control the hemorrhage as long as the pressure is kept up. The bleeding vessel must be ligated as soon as the gauze is withdrawn, and the result of its use is simply the loss of valuable time.

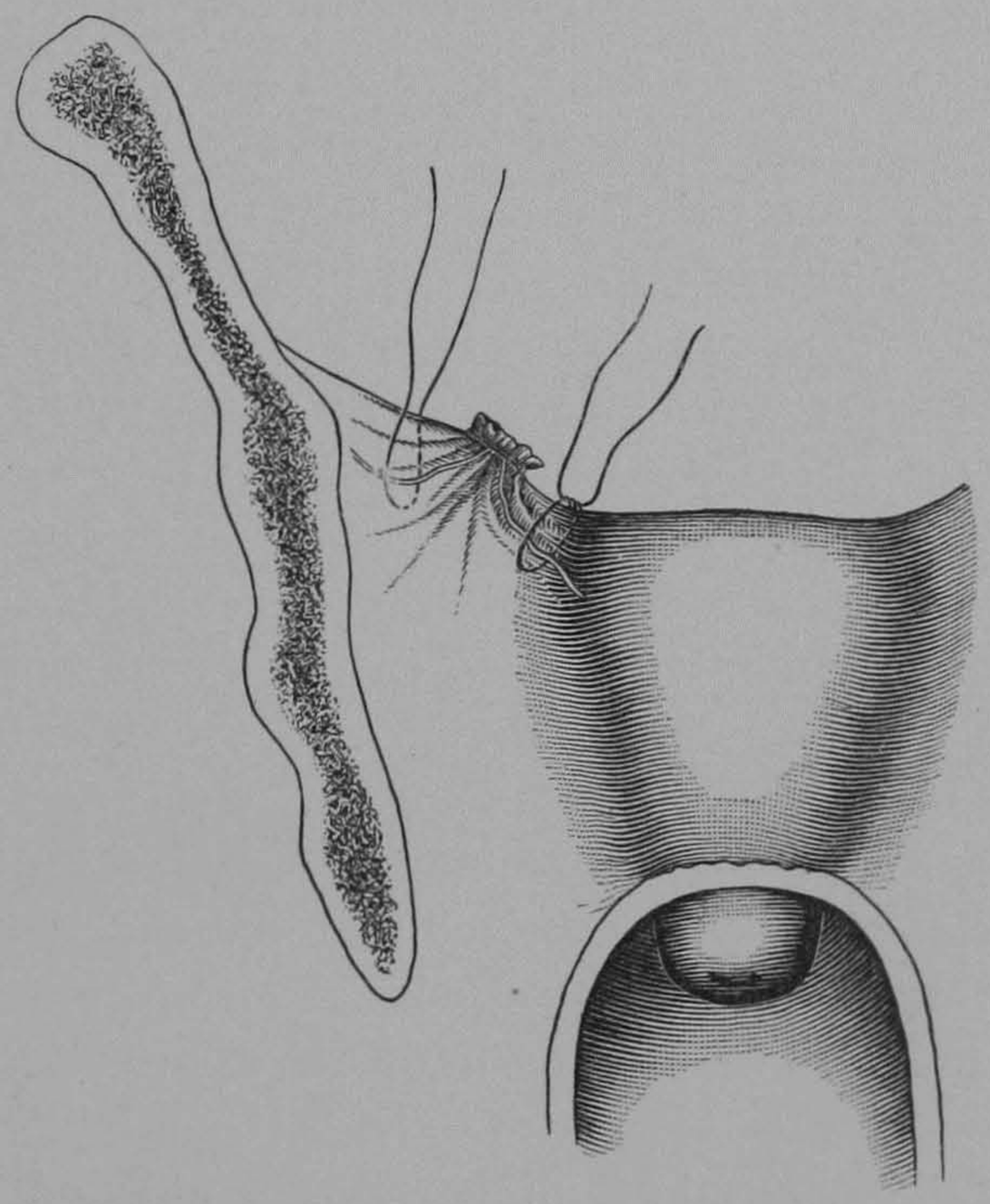
If during the course of the enucleation the Fallopian tube or

ovary, or both, be found distended with fluid, either purulent or otherwise, it may be well to empty them with the aspirator, so as to avoid their rupture during the operation, and consequent soiling of the torn and bleeding parts with septic matter. If possible, however, it is better to remove the tumor without emptying it, as an enlarged ovary or Fallopian tube is easier to handle and enucleate than a small or collapsed one: care should be observed, however, not to rupture it. Should it rupture and the parts become bathed with the contents, or should one or more pus-pockets be found in the lymph surrounding the appendages and evacuated into the general pelvic cavity, the parts must be washed out thoroughly and all traces of the fluid removed. If the intestines and omentum have become soiled, they must also be washed carefully. For this purpose a long-nozzled irrigator is carried to the bottom of the pelvis, and several gallons of hot water are passed through it. To carry out this procedure two fingers of the one hand are placed in the upper angle of the abdominal incision to hold the intestines back toward the abdominal cavity; the nozzle of the irrigator is then pressed toward the lower angle of the incision; a funnel is thus formed through which the water from the bottom of the pelvis gushes freely, bringing with it all the pus, blood, and other débris which has been left there. The heat of the water acts in addition as a good hemostatic to the oozing points, and tends also to combat any threatened shock. While the irrigation is being carried out the fingers should play freely among the intestines, washing them thoroughly. The use of Trendelenberg's posture has in great measure done away with the necessity for irrigation. With this position the whole pelvis and all its contents are so thoroughly exposed to the eye that all débris can be removed with a sponge. Where irrigation is used the patient, for obvious reasons, should never be in the Trendelenberg posture. Before closing the abdominal wound a last look at the stump should be taken in order that any tendency to slipping or loosening of the ligatures may be noted and corrected. Should there be any doubt about their perfect safety, a ligature can readily be thrown around the ovarian artery on each side of the stump with the aid of a curved needle, thus rendering assurance doubly sure (see Fig. 279). It is seldom during the course of an operation of this kind that the ureters are injured: such accidents have happened, however, and this possibility must always be borne in mind. (See Injuries to Ureter, chapter on Diseases of Bladder, Urethra, and

Ureters.) When large surfaces of peritoneum have been denuded and there is free oozing, when septic matter has soiled the seat of the operation, or where a bowel has been badly damaged, drainage is at times indicated. Drainage is probably more often required in this class of operations than in any other in abdominal surgery. A drainage-tube of glass or gauze is passed to the most dependent point in the pelvis and brought out through the lower angle of the abdominal incision. The incision is closed, preferably with a silkworm-gut suture, although the character of the suture is immaterial, provided it is surgically clean.

Frequently during the course of an operation the question arises whether or not certain parts should be removed. If it be necessary to remove the Fallopian tube on one side, its accompanying ovary had better go with it, and *vice versa*. Either Fallopian tube or ovary by itself is useless, and both are possible sources of future

FIG. 279.



Stump after removal of Uterine Appendages, showing double ligation of Ovarian Artery.

danger. Should the appendages on one side be healthy, it is unwise to remove them together with the diseased ones on the opposite side, for the reason that it renders the woman sterile and brings on the menopause with all its attending nervous phenomena. In spite of

the fact that some good surgeons contend for the removal of both ovaries, it is better that the patient take the risk of a second operation for the removal of the remaining one if in the future it become diseased. If the Fallopian tube is not already diseased, there is no good reason that it will become so if after recovery from the abdominal section the lining membrane of the uterus be treated and the endometritis cured. It becomes necessary, in any event, to adopt this course in many cases after the appendages have been removed, in order to secure a complete recovery. The disease originated in the uterus, and the fact that it has spread to the Fallopian tube and the pelvic peritoneum is no reason why it does not still exist intrauterine. As a matter of fact, many of these patients are not cured until the womb has been curetted and treated by alterative and stimulating applications.

The question often arises as to whether an operation should be performed in the presence of an acute peritonitis. If one have the choice, it were possibly best to operate in the quiescent state; but if any indications for a speedy operation exist, no hesitation need be had on account of the inflammatory attack; its cure will be assured on the removal of the appendages. The large masses of plastic lymph which accompany it are broken down and disappear in the course of the enucleation: within twenty-four hours the pulse and temperature, which were high at the time of the operation, approach the normal, and the patient convalesces within forty-eight hours. Neither need menstruation be a bar to operation. When both appendages have been removed, there is always a spurious menstrual flow within two days after the operation. The only possible disadvantage would be that the operation might be slightly more bloody on account of the pelvic congestion—not, however, more than if an acute inflammatory attack were in progress.

Vaginal Hysterectomy is preferred by some surgeons in the radical treatment of pelvic inflammations. The operation is in every way inferior to abdominal section in that it, of necessity sacrifices the uterus, is a more difficult and prolonged manipulation, is more uncertain in the removal of all portions of diseased organs, is inapplicable to certain phases of the disease—for instance, complicating vermiform appendix inflammation—and in the fact that injuries to the hollow viscera, which occur far more frequently by the vaginal route, are incapable of being repaired short of an additional abdominal section.

PLATE XXVIII.

FIG. 1.

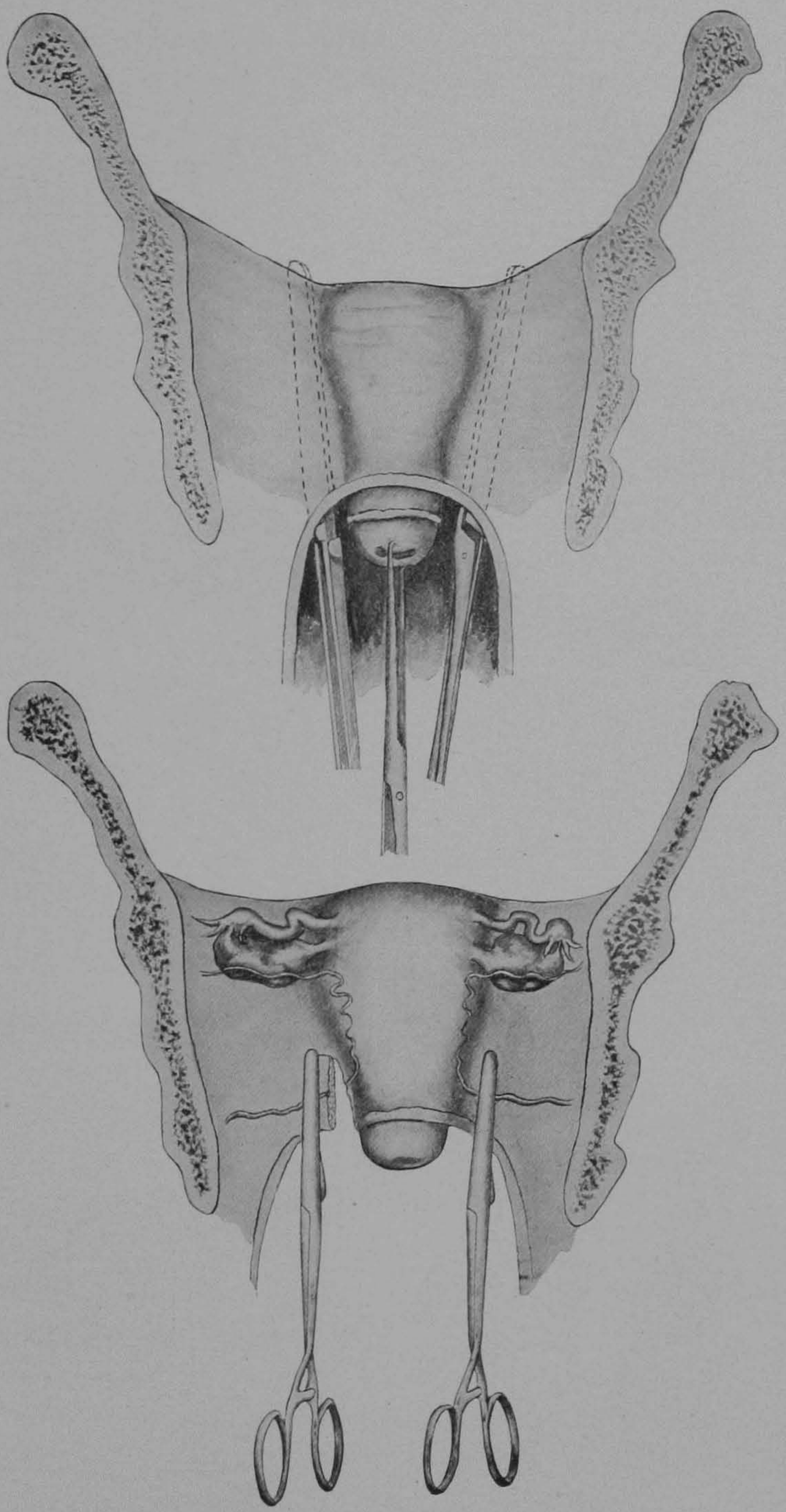


FIG. 2.

FIG. 1.—Vaginal Hysterectomy with Clamps. Single-clamp operation.
FIG. 2.—Vaginal Hysterectomy with Clamps. Multiple-clamp operation : first step.

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Operators who make frequent use of the vagina as a route to the treatment of diseases of the pelvic organs adopt this method, not only for cases of pelvic inflammation, but for patients suffering from uterine and ovarian displacements, ovarian neoplasms of small or even moderate size, and small fibroid tumors, as well as various other pelvic ailments.

FIG. 280.

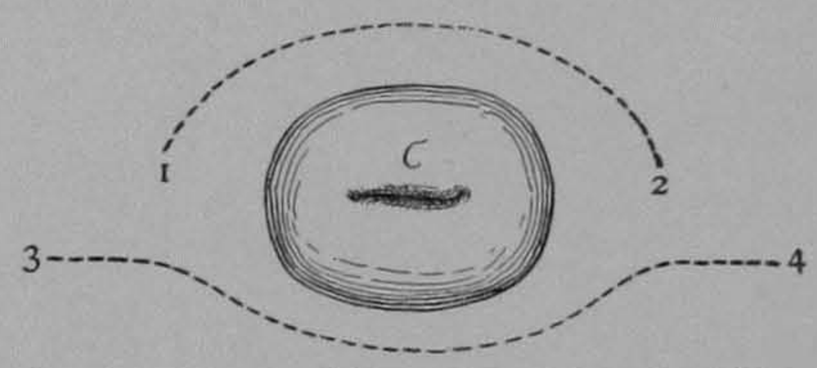
Vaginal Hysterectomy: opening the posterior cul-de-sac, and suturing the peritoneum and the mucous membrane together to control bleeding.

Whilst many gynecologists have fixed upon the vagina as the best channel through which the pelvic organs should be treated surgically, yet unanimity does not exist with regard to the technique of the operation. Some surgeons, at the head of whom stand Péan and Richelot, secure the broad ligaments, either in section by several catch forceps or as a whole by a single clamp on either side. Many, perhaps the majority of American surgeons, have adopted the multiple clamp procedure. This is usually a more rapid mode of operating than by the ligature, and the clamps are kept on only from thirty-six to forty-eight hours.

It having been determined that there exists disease of the uterus and adnexa of a degree sufficient to warrant their removal through the vagina, the operator proceeds in the following manner:

The patient is placed in the lithotomy position. The uterus is curetted and irrigated, but not packed with gauze. The cervix is grasped by a very heavy pair of traction forceps. A firm hold upon the cervix is essential. The posterior cul-de-sac is opened in the same manner as already described and illustrated in the article on posterior vaginal section (see Figs. 268–273). The operator then makes a thorough digital examination of the pelvic contents. If the adnexa are found adherent, they are loosened before any attempt at extirpation is made. At times it will be found impossible, owing to their high attachment, to reach the adherent adnexa. When the operator has loosened all adherent structures by means of his finger he proceeds to separate the uterus from

FIG. 281.



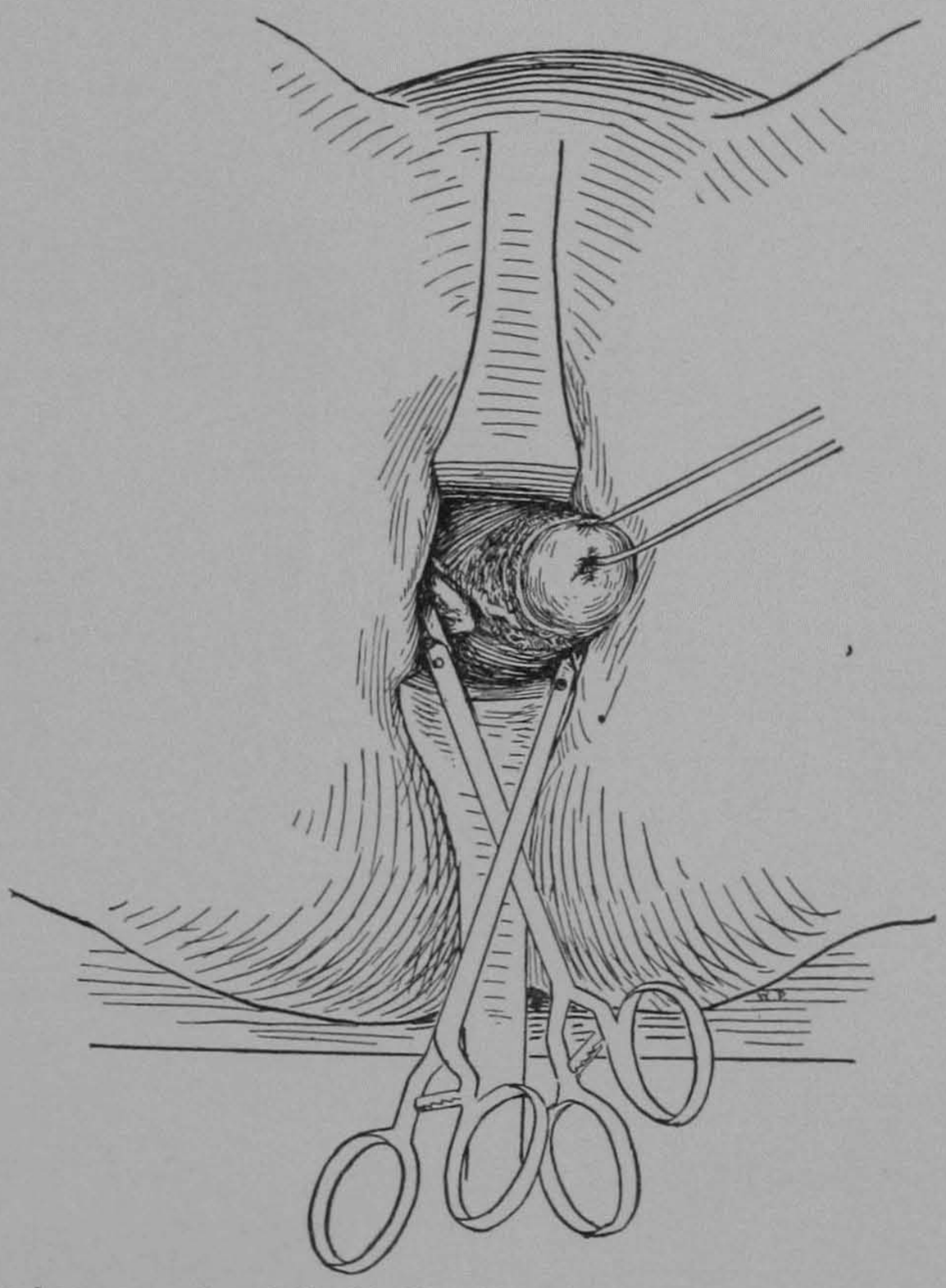
1-2, the anterior incision; 3–4, the posterior incision; *C*, cervix. It will be noticed that the incisions do not meet.

the bladder. With a pair of stout scissors a semicircular incision is made through the mucous membrane at the cervico-vaginal junction, the operator cutting toward the cervix. This incision on each side stops short of the median line. Still making firm downward traction upon the uterus, the operator pushes up the bladder away from the uterine tissue, being careful to keep his finger points and nails pressed hard against the uterus in order to avoid tearing the bladder. If it be possible to do so, the bladder should be separated entirely from its anterior attachments to the uterus and the peritoneal cavity entered in front. When the operator has succeeded in doing this, the middle finger of each hand is introduced between the bladder and uterus, while the index fingers are inserted into the cul-de-sac. Upon separating the hands to each side, the loose tissues on each side of the uterus are shoved away, such as the bladder and ureters. This is done to the extent only of freeing the uterus at the sides. The uterus will now hang by its broad ligaments, round ligaments, and a narrow strip of vaginal mucous membrane upon each side. The arterial supply has not been interfered with or disturbed. Introducing the middle and index fingers of the left hand so as to grasp between them the broad ligament of the left side,

the operator shoves the tissues at the left of the uterus outward, and seizes with the hysterectomy forceps the uterine artery between the uterus and his fingers. The same thing is done on the other side. These two forceps will secure the uterine arteries. With scissors the tissues between each forceps and the cervix are severed almost to the point of the forceps.

So far, the operation has been comparatively easy. The next

FIG. 282.

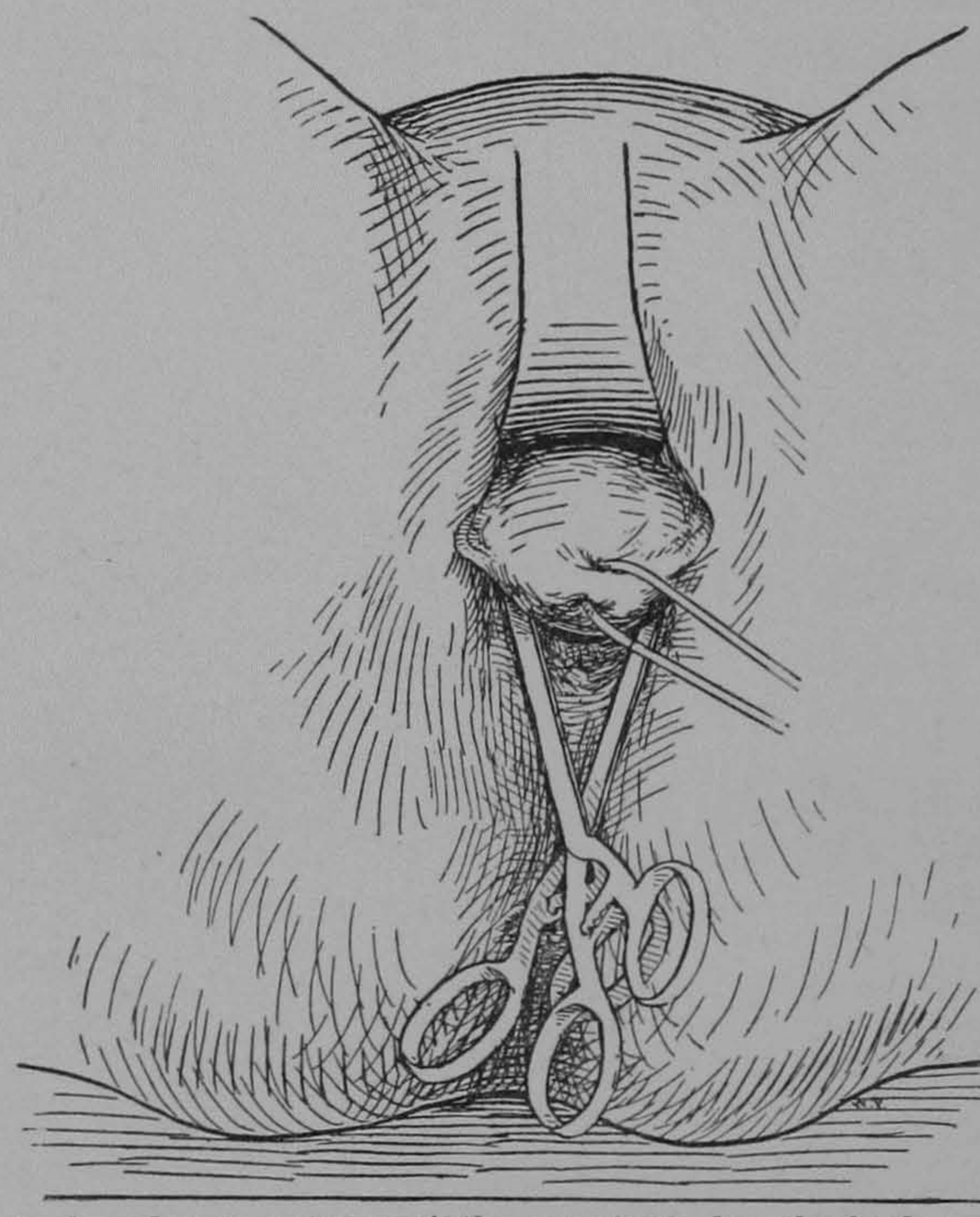


The cul-de-sac has been opened and the bladder dissected from the uterus. The uterine arteries are grasped by forceps and the cervix has been dissected from the lateral stumps. (Photograph of operation.)

step is to secure the ovarian arteries outside the diseased adnexa. All retractors are removed. If the operator can antevert the uterus, he does so. As the corpus uteri appears beneath the bladder, the latter is lifted up with the fingers or a short speculum and a firm grasp is taken in the anterior uterine wall with traction forceps. As the corpus uteri comes still farther into view, another pair of traction forceps grasp it above the first pair and pull it still farther forward. The operator removes the first pair of traction forceps

and catches the body of the uterus above the second pair. In this way, step by step, the corpus uteri is made to emerge beneath the bladder, so that the fundus and tubes may be seen. In accomplishing this, all down-traction upon the cervix must be avoided. In fact, the body of the uterus will rotate forward more readily if the cervix be pushed up with the fingers. When the operator has the tubes in view, the adnexa upon the woman's left are pulled beneath the bladder through the vesico-uterine incision until they

FIG. 283.



The cervix has been shoved up so as to permit the operator to drag the fundus out beneath the bladder. Both cornua uteri are shown with the attached tubes. (Photograph of operation.)

lie in front of the uterus. Standing up, the operator grasps the broad ligament outside the ovary with the thumb and index finger of the left hand, the index finger being posterior to the ligament, and applies the hysterectomy forceps from above downward, so as to grasp all the broad ligament between its upper edge down to the tip of the forceps on the uterine artery. The uterus is then cut loose upon this side. After freeing the uterus upon one side, the adnexa of the other side are pulled in front of the uterus, the fingers grasp the broad ligament, and the broad ligament is clamped from above downward. The uterus and adnexa are now cut away.

If it appears more convenient to retrovert the uterus, this can be

PLATE XXIX.

FIG. 3.

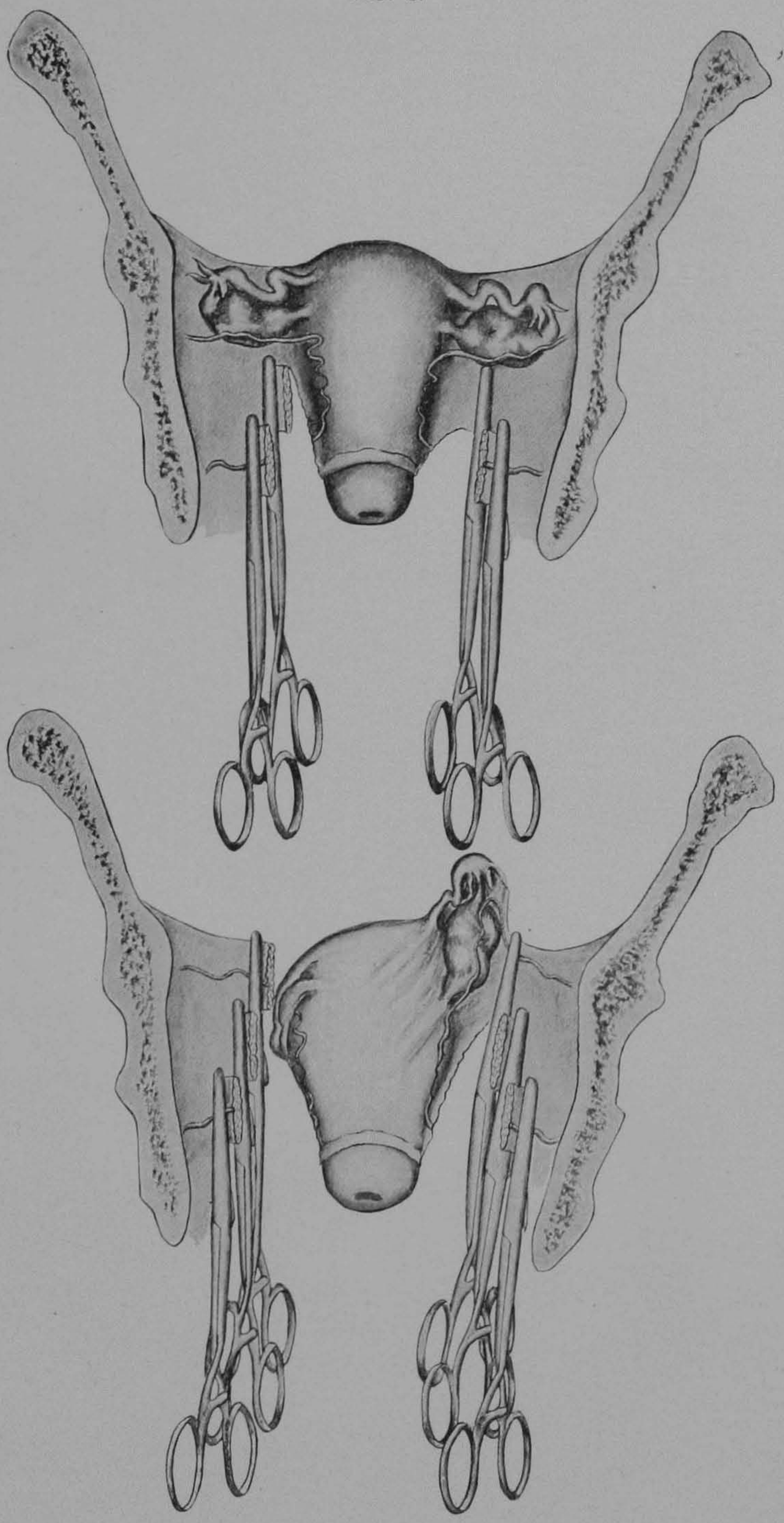


FIG. 4.

FIG. 3.—Vaginal Hysterectomy with Clamps. Multiple-clamp operation: second step.

FIG. 4.—Vaginal Hysterectomy with Clamps. Multiple-clamp operation: third and final step.

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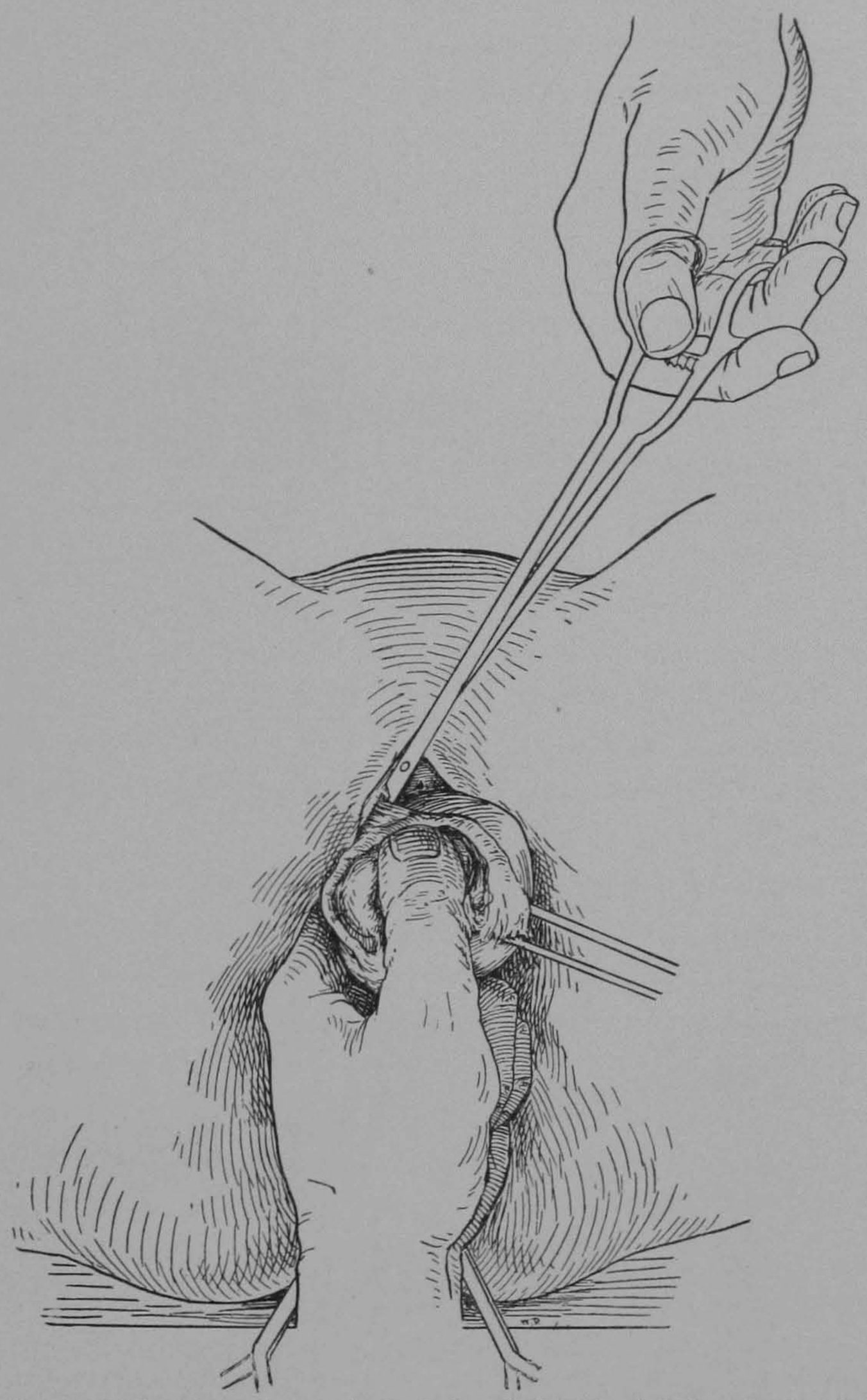
done by starting the process with a heavy male sound introduced into the uterus, and then progressively grasping higher and higher upon the posterior uterine wall with blunt traction forceps. Hav-

FIG. 284.

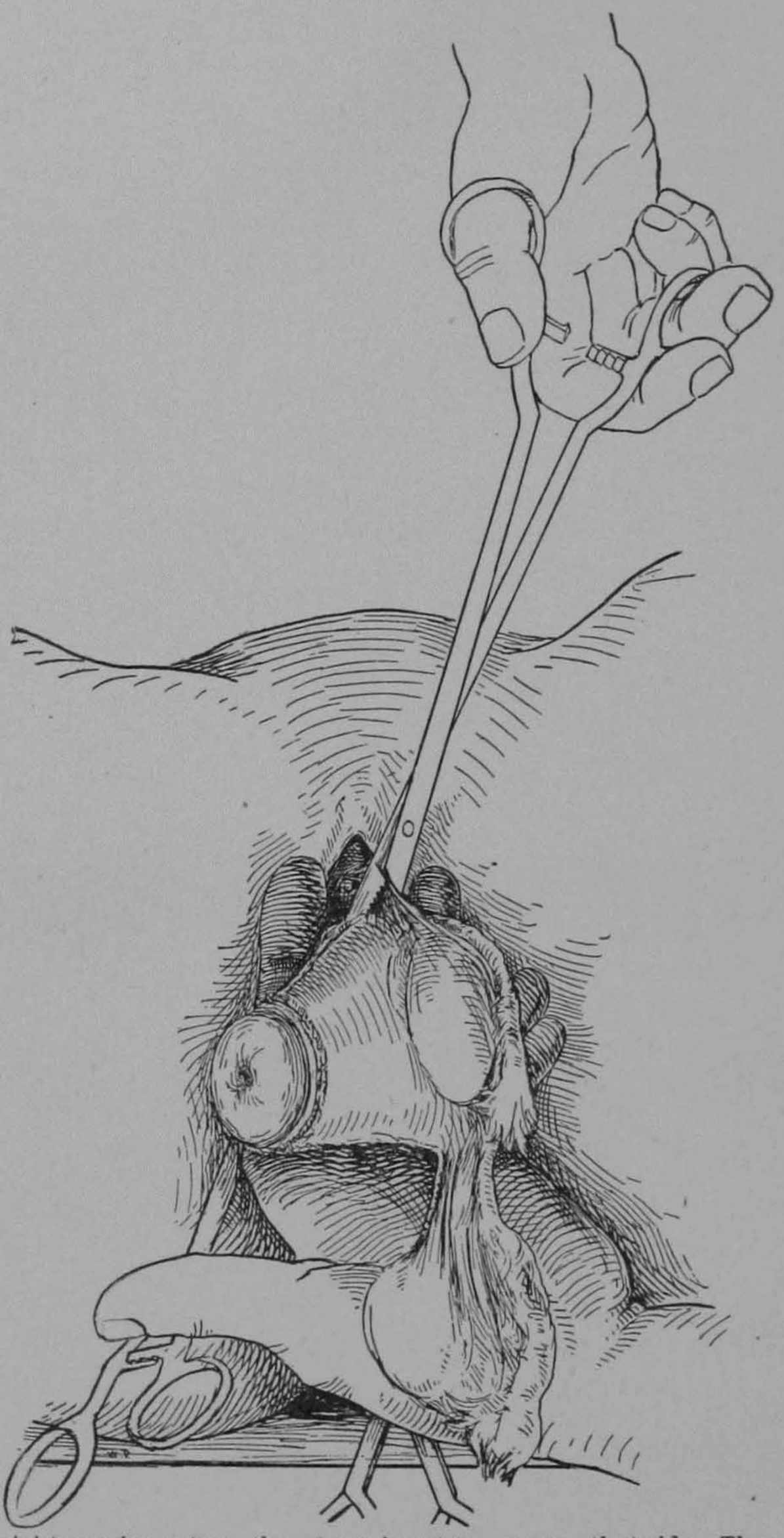


After delivering the fundus, the entire uterine body is pulled to the right in order that the left adnexa may be seized. The operator's thumb rests on the ovary, while his two first fingers grasp the corpus uteri. The forceps are being applied to the right ovarian artery. Notice the absence of retractors. (Photograph of operation.)

ing brought the fundus uteri out through the posterior cul-de-sac, the adnexa are pulled into the vagina and the ovarian vessels clamped.

Introducing two fingers of the left hand behind the uterus, the operator grasps the adnexa on the woman's left and pulls them down to a position posterior to the uterus, and places a pair of hysterec-

FIG. 285.



Having clasped the right ovarian artery, the uterus is cut away upon that side. The operator rotates the uterus, so that the cervix is delivered and the posterior surface of the uterus presents. He grasps the left broad ligament between his index and middle fingers, and applies the forceps to the left ovarian artery. The method of applying these forceps is shown. (Photograph of operation.)

tomy forceps on the broad ligament from above downward in such a way that the tip of one blade of the forceps is felt by the palmar surfaces of the fingers which are holding the uterus and adnexa. Applying the forceps in this way, he avoids grasping a possible

prolapsed knuckle of intestine. This pair of forceps will secure the ovarian artery on the left side. The uterus is now freed upon the left side by cutting between the forceps and uterus with scissors. It is often necessary to use several pairs of clamps on each side of the uterus in order to secure the ovarian arteries. Every step of this work should be seen, even to the application of the forceps, so that the intestines may not be wounded. Having released the uterus entirely on one side, the operator grasps the adnexa upon the right with his left hand and pulls them downward and to the left, so that the adnexa and uterus lie in the hollow of the hand, the right broad ligament being grasped between the thumb and index finger. Standing up, the operator introduces the forceps from above downward outside the fingers which are holding the tissues, so as to grasp all that part of the broad ligament between the tips of the forceps on the uterine artery and the top of the broad ligament. The uterus is then cut away and removed.

It is while working to secure the ovarian arteries that the operator fully appreciates the advantages of having freed the uterus and adnexa from all adhesions before he applies any forceps upon the vessels. If he has failed to do this or cannot do it, he will find the operation most difficult. The one great essential to a smooth vaginal hysterectomy is to free the uterus and adnexa before hemostasis is begun.

The specula are next introduced. Holding the bladder up and depressing the perineum and posterior vaginal wall, the operator introduces a gauze pad into the pelvis and pushes the intestines away from the stumps secured by his forceps, so that he may make a careful inspection of the stumps and see if any bleeding is going on. If the adnexa have been thoroughly freed before extirpation is attempted, it will be seen upon completion of the operation that the bite of each pair of forceps is in the upper part of the vagina. No forceps, if possible, should ever be applied so as to project up into the pelvic cavity among the intestines. The gauze pad supporting the intestines is now removed, and a piece of iodoform gauze is inserted between the forceps and the wall of the vagina on each side to prevent pressure-slough. The operator now takes squares of iodoform gauze, each about two inches wide and three inches long, and introduces one piece along the side of the forceps on the left, a little above their tips. This piece of gauze is supported by a smooth, narrow speculum introduced to the right of it, the dressing forceps removed,

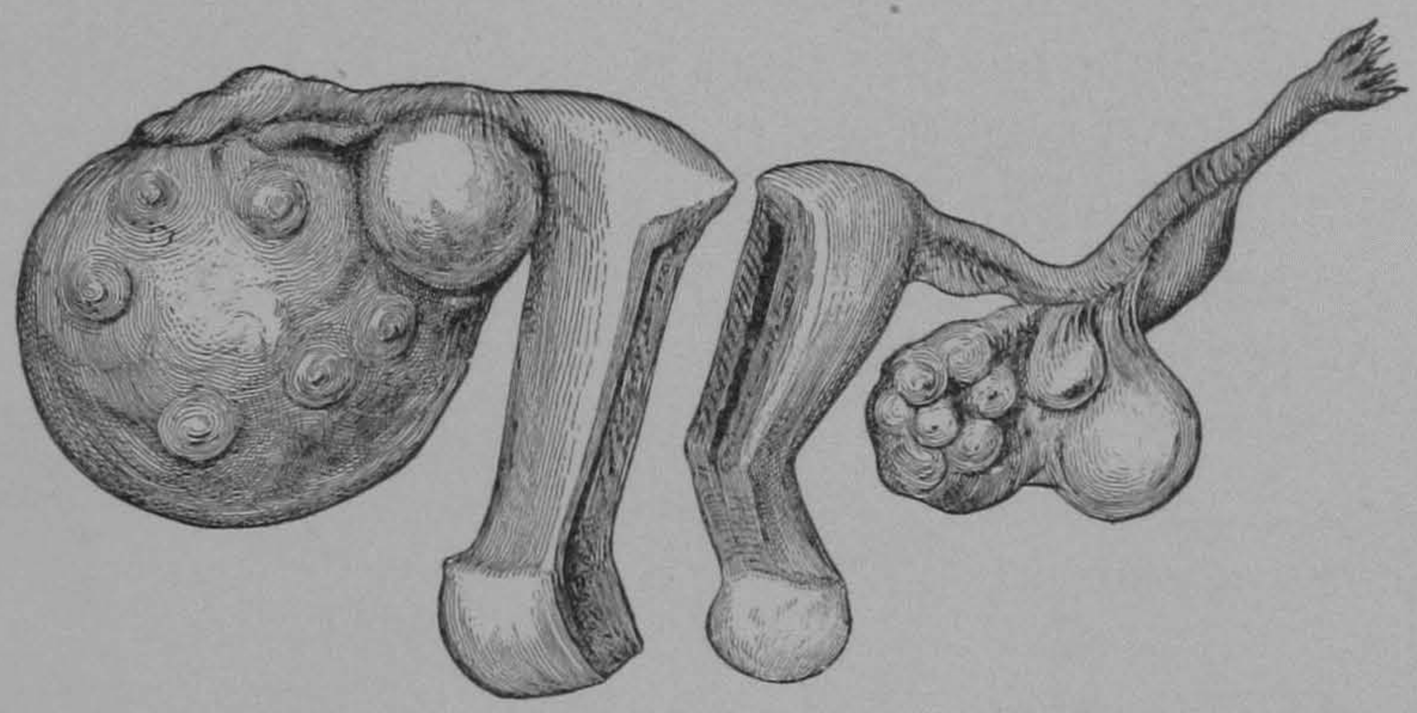
another piece of gauze introduced alongside the speculum, the speculum withdrawn, and this piece of gauze also supported; and in this way the operator proceeds from one side to the other, filling the opening in the vagina entirely with iodoform gauze, which projects a little above the points of the forceps. A few more pieces of gauze are introduced lower down in the vagina, so as to fill it to the vulvar orifice. Sterilized gauze is wrapped around all the forceps and tied. A self-retaining catheter is introduced into the bladder and pinned to a piece of plaster fastened to the skin above the pubes. The sphincter ani is dilated and the patient put to bed.

Sometimes, when the adnexa of one side are so firmly attached to the intestines, or are so large, or the vulva so small, that the operator cannot loosen both adnexa to his satisfaction, he may proceed as follows: If the difficulty be limited to one side only—for example, the right side—he may free the adnexa on the left side, secure the uterine arteries on both sides, and the ovarian artery on the left side outside the ovary and tube; he then cuts the uterus free on the left side. Having done this, he introduces a pair of forceps close to the uterus upon the right side where the adnexa have not been freed, and removes the uterus and adnexa of the left side, leaving in the tissues which embarrassed him. It will now be found that he will have room for removing under the guidance of the eye the remaining adnexa. In doing this the operator will secure the ovarian artery outside the ovary and tube, and this will render the pair of forceps which were applied between the uterus and right adnexa unnecessary, so they are removed.

If the tissues are very soft, so that down-traction cannot be made without the forceps tearing through, or if the adnexa of both sides be so firmly attached, or other difficulties exist which render it impossible for the operator to free the adnexa on either side, he proceeds as follows: Having entered the cul-de-sac and after separating the uterus entirely from the bladder, he secures the uterine artery on each side with forceps, and with blunt scissors splits the uterus in the middle line up its anterior face; as he cuts each fraction of an inch, it will be noticed that the cut surfaces turn out, and these he grasps on each side with blunt traction forceps and pulls down. Alternately cutting through the centre and going higher and higher up with his traction, the operator will arrive at the fundus uteri; he then splits the posterior surface of the uterus with scissors. Very little bleeding is produced, and only parenchymatous in volume.

Shoving the right half of the uterus and the right adnexa into the pelvis to one side, the operator proceeds with the enucleation of the adnexa on the woman's left, and, when he has them freed, nothing remains for him to do but to secure the ovarian artery on that side by applying forceps from above downward. The same thing is

FIG. 286.



Ovarian cyst, cystic ovary, and uterus removed *per vaginam* by hemisection. Old nullipara.

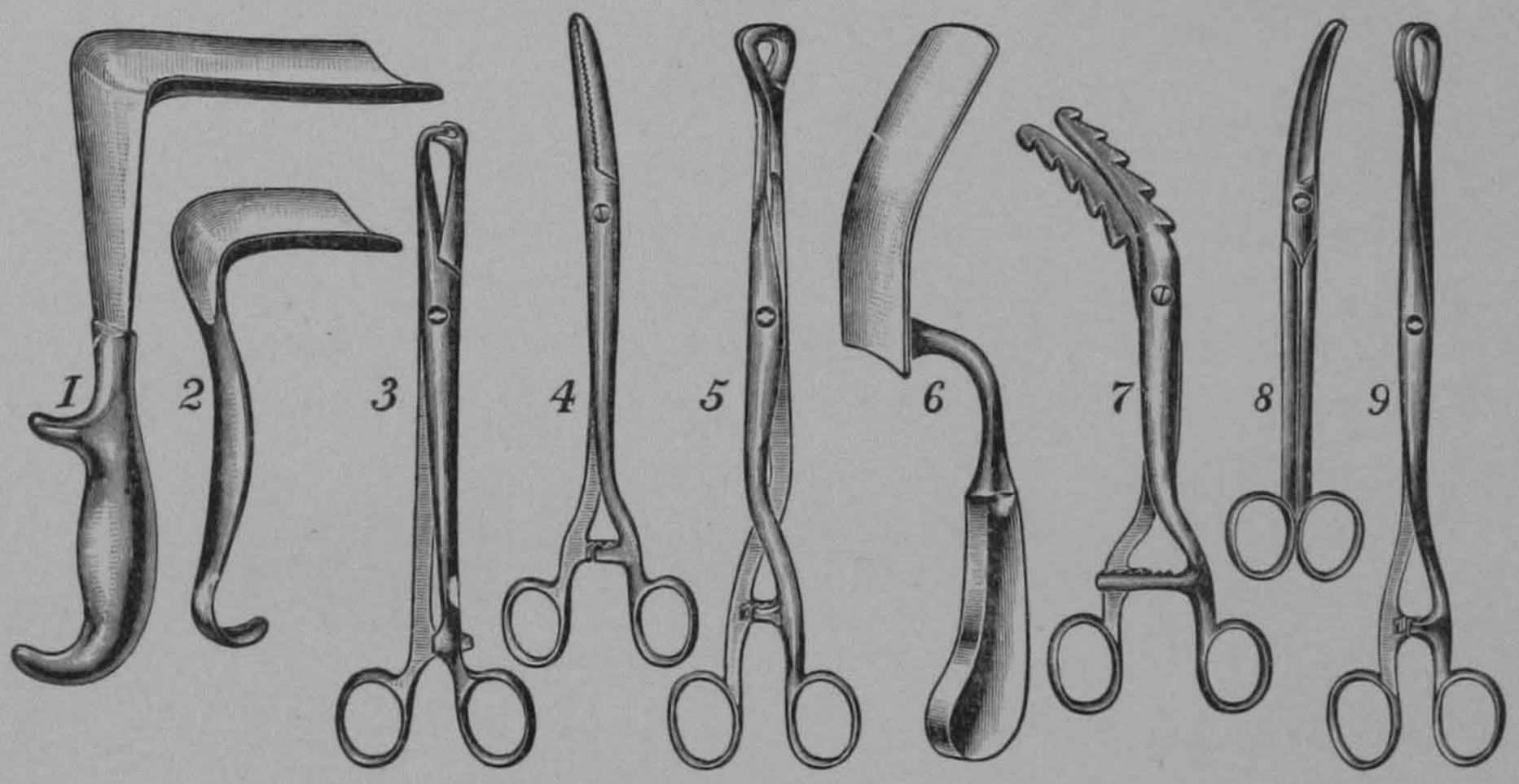
done on the other side. In other words, the operator, meeting with difficulties that he cannot overcome altogether, divides the difficulties by splitting the uterus.

When the uterus is very large, the operator may proceed as follows: Having opened both the posterior and anterior cul-de-sacs, he secures the uterine arteries with forceps. The cervix is now cut loose upon each side almost to the points of the forceps. It is now split bilaterally up to the point of the forceps. Grasping each flap with traction forceps, the operator amputates the anterior lip and seizes the stump, and the same is done with the posterior half. Or he may leave the posterior lip for traction purposes when the uterus is soft. He now splits the anterior wall of the uterus as high up as he can, and from each side, as he ascends, he cuts small triangular pieces of tissue, being careful not to wound the uterine-ovarian anastomosis on each side. If small fibroid nodules are met with in the uterus, they are dug out. Ascending the anterior uterine wall in this way, and removing cautiously all tissues to the lateral angles, the operator takes away piecemeal nearly all of the anterior half of the uterus. He has already secured the uterine arteries, and if he can grasp the ovarian now, he should do so and remove the rest of the uterine tissue, the adnexa being attended to later. The object of the morcellation is to enable the operator to reach the ovarian

arteries, and this he cannot do until he has removed all uterine tissue which blocks his way. In some cases quite large fibroid tumors are removed by the vagina.

Certain details connected with this operation may be elaborated. In the first place, special instruments are necessary, and chiefest of these are the hemostatic forceps. The bite should not be long—not over one and a quarter inches—and the points of the forceps should come together when the first catch is closed. The point of the forceps should always meet before the rest of the bite closes. This is very essential, otherwise the operator will find that when he crowds the forceps into the tissues and closes them an imperfect grasp is secured by the upper portion of the forceps, while the points do not

FIG. 287.



Instruments used in cul-de-sac exploration and vaginal hysterectomy.

constrict the tissues at all. This accident may cause the death of a patient from hemorrhage. No case should be put to bed after operation until the operator has seen the ends of every tissue he has severed and assured himself that there is no arterial bleeding.

If there be found a fistulous tract between a pus-tube or ovary and the rectum, sigmoid flexure, or small intestine, and this be so small that it can be sutured, stitches are to be taken in it. If the fistula be too large for suturing from the vagina, the operator should, after completing his vaginal operation and dressing the vagina, open the abdomen and repair the wounded bowel or vermiform appendix if that be seriously injured. Injuries to the bladder should be repaired at once.

If it is thought desirable before placing the packings, the forceps

PLATE XXX.

FIG. 1.

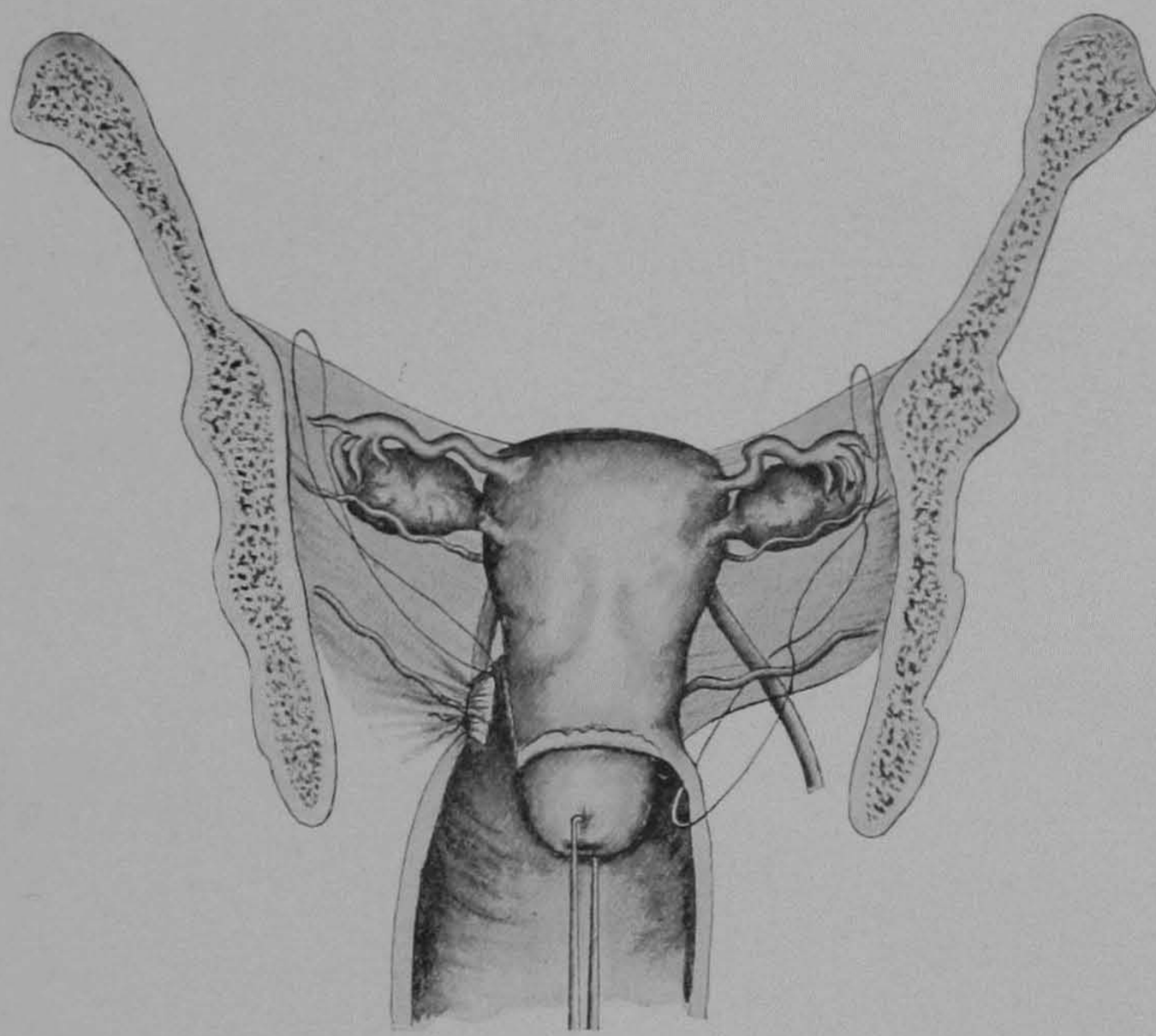


FIG. 2.

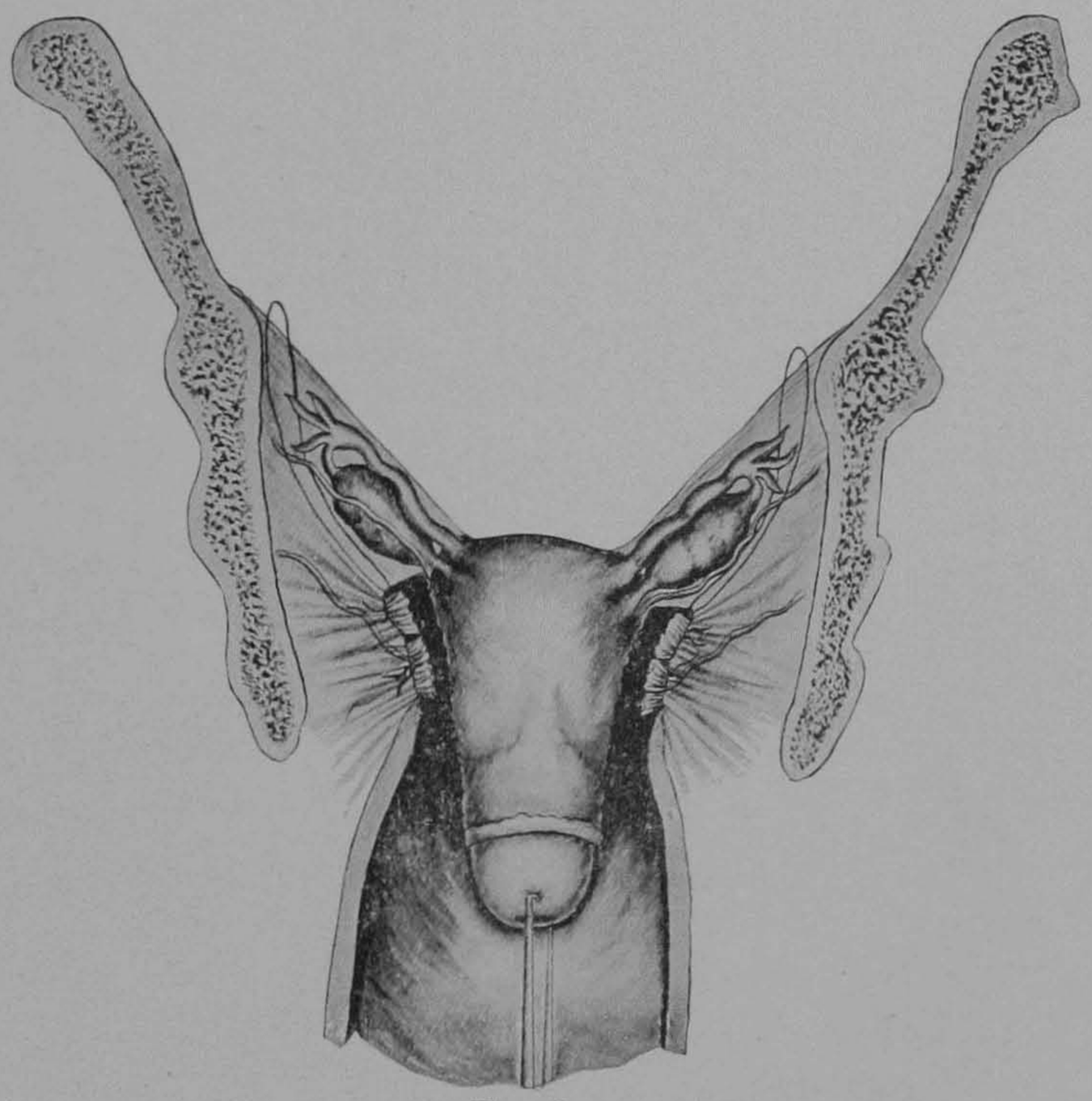


FIG. 1.--Vaginal Hysterectomy with the Ligature : first step.
FIG. 2.--Vaginal Hysterectomy with the Ligature : second step.

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may be removed and replaced by ligatures, either silk or catgut. In this case the stumps are drawn well into the vagina and the dressings introduced as already described. Or if the pelvis be a non-infected one, the vaginal vault may be closed by sutures (Plate XXI. Fig. 4), which, passing through the stumps, hold them fast in the vagina and prevent their retraction into the peritoneal cavity. This is the better method of finishing the vaginal operation.

The dangers of vaginal hysterectomy, however performed, are sepsis, hemorrhage, vesico-vaginal or recto-vaginal fistula, and injury to the ureters.

Where both appendages have been removed, the menopause usually becomes established. There are, however, frequent exceptions to this rule, and patients return to the surgeon complaining that they are bleeding at regular intervals, and just as profusely as before. The cause for this has not been satisfactorily explained as yet. The explanation has been advanced that a small ganglion of nerves existed at the angle formed by the junction of the Fallopian tube and the uterus, and that there had been a failure to include and remove this ganglion with the appendage. Practical experience has long since proved the falsity of this theory. It has again been contended that an ovary—a third one—was left behind, but this has also been proved to be untrue: these cases of continued bleeding are quite frequent, while but few men have ever seen the mythical third ovary, in spite of the fact that an eminent German authority states in his book that it is possessed by about every tenth or twelfth woman. Some few of these patients are relieved of the flow by a thorough curetting of the endometrium: in others this procedure has no effect. Usually, after a shorter or longer interval, menstruation, which at first remained fairly regular, becomes scanty, and finally disappears, the cause for its continuance remaining a mystery.

The relief following the removal of the uterine appendages is not always the same, nor is the best result obtained immediately. If it is only necessary to remove one side, the menstrual function continues much the same as usual, and many of the benefits of the operation are realized at once. Of course the aches and pains, which occur more from habit than from any real lesion, continue to a certain extent until the patient returns to a good condition of general health. This requires time and building up. Should both sides have been removed, all the nerve-symptoms of the menopause appear within a few weeks after the operation, and the

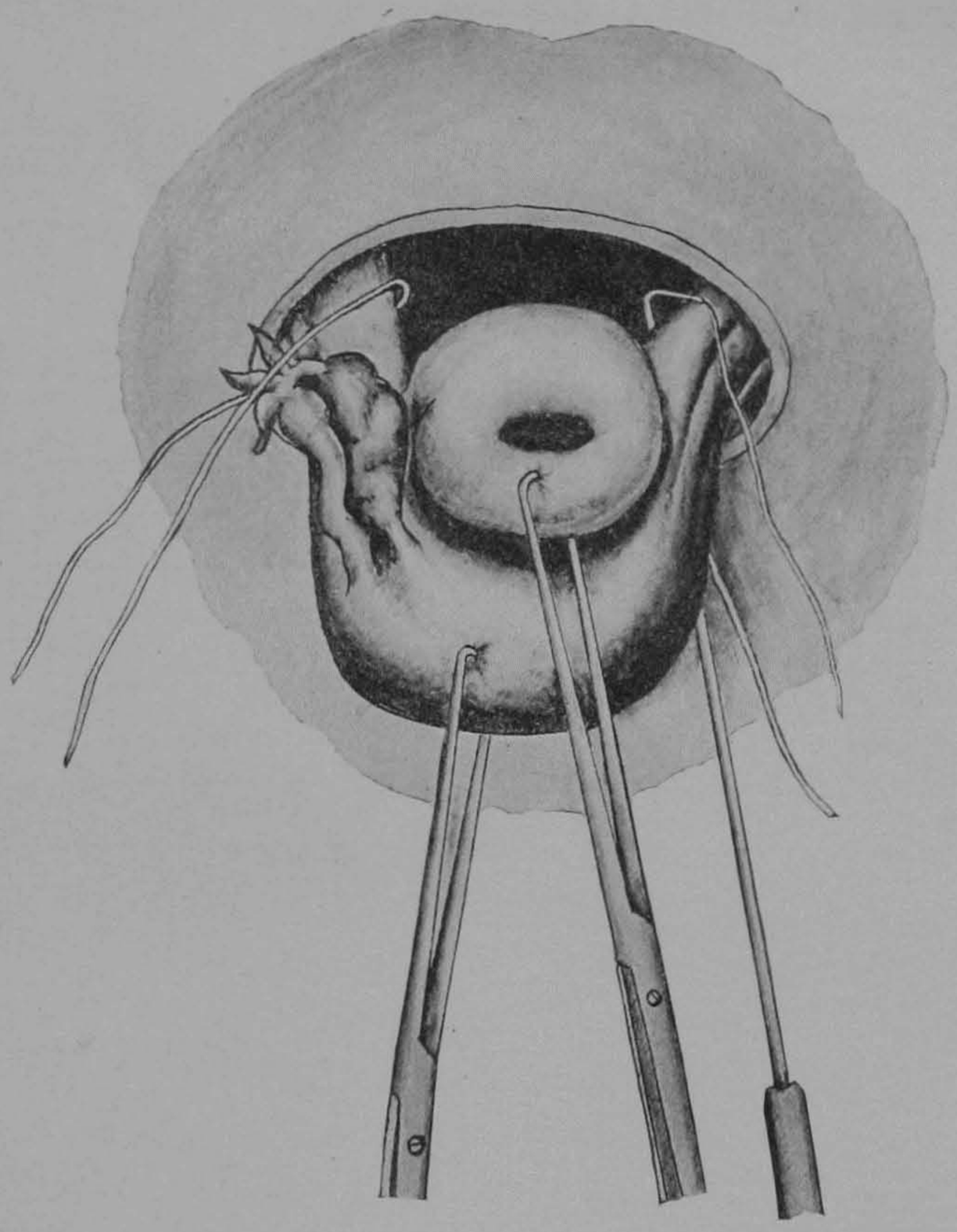
and comparatively so: where she was a chronic invalid before, she is now able to be about and attend to her daily duties. The great trouble with surgeons is that they expect too much from the operation, and lead their patients to do the same. This is a great mistake. So much local damage has been done by the inflammation, and the general health is so wrecked, that the woman will never again be the same well woman she once was: such a result is neither to be expected nor obtained in very many instances. An absolute cure should never be promised; only relative results can safely be counted upon.

The pain which so often remains with the patient after the operation cannot always be accounted for. At times the omentum or intestine may become adherent to some denuded spot or to the stump. The dragging, incident to the peristaltic action would then give rise to pain. Frequently it is due to intestinal colic or to the compression of the nerve-filaments by the ligature. In some cases it is impossible to account for the pain on any other ground than that it was not originally caused by the ovarian or tubal disease, but resulted essentially from a nerve-disease from the first. An operation for the removal of the uterine appendages for pain as the only indication is rarely justifiable. Whether or not there has been a pelvic inflammation, the surgeon should always be able to demonstrate positive disease of the Fallopian tubes and ovaries by a bimanual examination before counselling a surgical operation for their removal. The pain may be the result of a pelvic inflammation, but it does not follow that the removal of the appendages will cure this symptom, unless the appendages are diseased and can be shown to be the seat of the suffering.

Some of the worst and most hopeless cases of pelvic inflammation recover after an operation. This is particularly so in pus cases. It is surprising to note how quickly they rally even when they have appeared to be most desperate. For this reason no woman should be refused the chance of recovery because she may seem too far gone

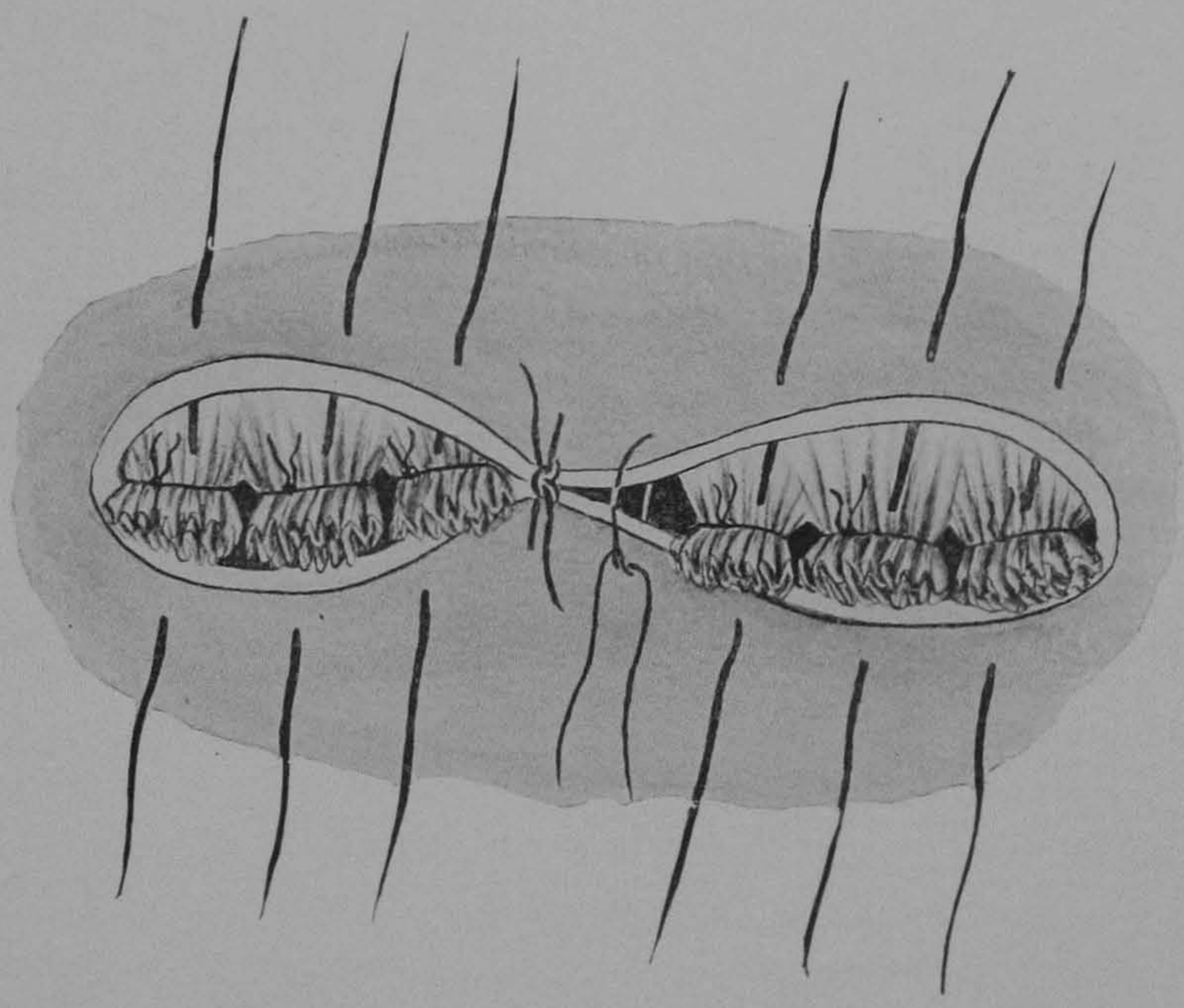
PLATE XXXI.

FIG. 3.



Vaginal Hysterectomy with the Ligature: third step. Fundus dragged into vagina prior to placing final ligature.

FIG. 4.



Vaginal Hysterectomy with the Ligature: stumps drawn into the vagina, with sutures in place ready to close the opening in the vaginal vault.

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for relief: unless she is actually dying there is hope, and a conscientious surgeon should offer her the last chance, forlorn as it may seem. The operation often means little more than the opening of an abscess, but, whatever it amounts to, a short etherization and a short operation frequently makes the difference between life and death with a patient: what is done should be performed as quickly as is compatible with safety, and the patient gotten back into bed. Should the enucleation give promise of being a long or hard one, and the patient apparently unable to stand it, it were better to empty out the pus and place a drainage-tube, leaving the completion of the operation to some future time when the woman is better able to sustain the shock of the necessary manipulations.

From time to time different substitutes have been sought for the removal of the appendages in pelvic inflammation. It has been proposed to open the abdomen, break up all the adhesions, and allow the parts to remain *in situ*. Again, it has been stated that it was proper to free the adhesions of a Fallopian tube containing pus, and squeeze the pus into the uterus by stripping the tube with the fingers. The fimbriated end of the tube being cut away and its cavity washed out, the cut end is stitched into the abdominal opening or the mucous and serous membranes brought together over the denuded portion. All manner of such procedures have been practised in the name of conservatism, each and every one of them being, in fact, more tedious and more dangerous than the complete removal of the diseased and destroyed appendages. The only justification of such surgery would be subsequent pregnancy. As yet there is little reported which is encouraging from that standpoint. To open the end of the Fallopian tube, which Nature has sealed to prevent the further escape of infectious matter, is only to invite the infection of the whole pelvic if not abdominal cavity. Fortunately, Nature again seals the opening with plastic lymph within a few hours after it has been returned to the abdomen, and the whole procedure has been nullified so far as the results expected are concerned. Such surgery is useless in this class of diseases, and can only end in disappointed hopes. The moment the parts are returned to their position in the pelvis they re-adhere.

Is there, then, no hope of a cure for these women short of the removal of the appendages? If they are able to bear their sufferings until the change of life is established, Nature will effect a cure. Pelvic inflammatory disease is essentially an affection of youth and

middle age; it seldom occurs in virgins or after the change of life. After the menopause it gradually becomes inactive, and finally ceases to give rise to any symptoms. As to whether or not a patient be advised to wait for this natural cure will depend much upon her suffering, the length of time she has to wait, the condition of her general health, and her station in life. A well-to-do woman could readily tide over a few years more or less with comparative comfort and safety, while her less fortunate poor sister would be forced to call upon the surgeon for relief.

The changes which take place in a woman following the removal of both uterine appendages are the same as follows the natural change of life—none other, none less. The woman is sterile; she was usually sterile at the time of the operation, and would never have been anything else. Often the sexual appetite is increased; rarely diminished, as is commonly supposed. The increase is simply the return of the woman's natural condition. Her pain and suffering and ill-health had inhibited the sexual appetite; these being removed, the appetite returns in full force. Gradually over the course of years the appetite fades in exactly the same manner as it does following the natural menopause. In some women it is lost in a few years, in others not for many. The woman takes on a growth of flesh and becomes more matronly; otherwise there is no change —no coarseness, no growth of hair on the face, no harshness of the voice, no masculine appearance.

As a result of neglected pelvic suppuration, pus frequently finds its way to the surface and discharges; oftener the patient dies of exhaustion and septicemia before this result is attained. Fistulous openings may appear in the rectum, the small intestines, the vagina, the bladder, the perineum, the abdominal walls, and the gluteal region. If the abscess has been unattended with involvement of the uterine appendages, sinuses will probably close and all signs of suppuration cease. If, on the other hand, the appendages are involved in the suppurative process, as they most frequently are, the sinuses will remain open in spite of all that may be done by way of medical treatment; the discharges continue, and the patient gradually becomes more and more exhausted and emaciated, until she finally becomes bed-ridden, and dies after a long period of suffering and misery. The treatment of such cases is unpromising. Abdominal section with removal of the abscess-sac is the only alternative, however bad the case may be. When the pelvis has

been cleansed of the diseased appendages which form the focus of suppuration, there is of course a sinus opening into the pelvic cavity. This is a source of great and threatening danger to the woman for the first twenty-four or forty-eight hours after operation, but it is a risk which she must necessarily assume: there is no avoiding it. The sinus should be well irrigated from within the pelvis outward in whatever direction it runs, and it should be disinfected as thoroughly as possible throughout its whole course. If it passes through any considerable amount of tissue, it is well to introduce a drainage-tube into its outer end, so as to ensure the flow of suppurative material away from the pelvic cavity. The mouth of the sinus in the pelvis is to be thoroughly scraped, cleansed and closed by a few catgut stitches. Nature will in a few hours add additional barriers to any infection entering the pelvis by sealing the opening with plastic lymph. Should the opening be into the bladder or bowel, the edges of the perforation are carefully to be prepared and closed with stitches. It is possible that the condition of the bowels will be so bad that in the case of the small intestine a portion must be resected. When the opening is too low down in the rectum for closure, a drainage-tube must always be placed at the point of opening, and the bowels kept perfectly quiet with opium for three or four days, so that no fecal matter may escape before the opening is sufficiently closed by lymph.

It is possible in a goodly number of these extreme cases to get a good result, and when the patients do pass through the operation safely, it is surprising to see how quickly they regain their health up to a certain safe point. At times they are so badly wrecked that perfect recovery is a matter of years. The adhesions are so extensive and dense, the patient in such a low physical condition, and the damage to viscera so irreparable in many cases, that they are unable to stand the necessarily prolonged operation or they succumb to septic peritonitis. This, however, should be no reason for staying the surgeon's hand so long as he can give a reasonable chance of cure to a respectable proportion of such cases. These cases invariably die if left alone, and each one cured is a life snatched from the grave.

The sooner the general profession becomes thoroughly imbued with the vast importance of the whole subject of pelvic inflammation, and acts intelligently upon the principles here laid down, the sooner will we have to face a lesser number of such terrible examples of neglect and ignorance.