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BY

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AUTHOR'S PREFACE TO THE TRANSLATION

In the work we are now publishing we have endeavored to give as complete an exposition as possible of the diverse methods of treatment employed in gynecology. Although operative technic occupies pride of place, nevertheless non-operative treatment is also fully considered as there is a general return to-day toward this branch of therapeutics. For this reason we have considered it necessary to devote a place to minor gynecology, mineral water cures, kinestherapy, and electrotherapy. We have given special attention to procedures of choice and to the large number of our figures and diagrams, in endeavoring to illustrate each stage of an operation, whilst we have entered freely into operative procedures and the details of ante- and post-operative treatment.

We have briefly described the procedures of other gynecologists and the numerous references will enable the reader to secure the original texts.

With regard to the results or indications of the operations, we have always endeavored to consider their bearing on future pregnancies or the effect of pregnancies on the operations. We are of opinion that the work will be of value to all those who have to treat gynecological cases.

HENRI HARTMANN.

"TRANSLATOR'S PREFACE"

The fact that Professor Hartmann's "Gynécologie Opératoire" has met with so much success since its appearance, shows that in some special way it has met the wants of gynecologists and students in France. The characteristics which have thus commended the work are its eminent practicality and its conscientious exploitation of a domain of operative surgery hitherto imperfectly dealt with in this country.

In the task of translating I have endeavored to convey the author's meaning accurately by a rigid adherence to the original text.

In conclusion I beg to thank Professor Hartmann, to whom I submitted the translation during its growth, for his help and unfailing courtesy.

DOUGLAS W. SIBBALD.

British Hospital, Paris.

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PART I.

MEANS OF DIAGNOSIS AND OF TREATMENT EMPLOYED IN GYNECOLOGY.

CHAPTER I.

THE CLINICAL EXAMINATION IN GYNECOLOGY.

Summary: Interrogation.—Physical examination first of the abdomen; second of the vagina; third, examination after anesthesia in the left lateral position, in the standing position, in the genu-pectoral position; hysteroscopy.

Before proceeding to the direct examination of the affected parts, we should allow the patient to state the *reasons of her visit.* While doing this we have an opportunity of observing her and of forming certain impressions of her *general state*, of her condition of embonpoint or emaciation, and of the *color of her skin and her mucous membranes.* We are thus able to recognise in a greenish-yellow complexion, the subjects of chlorosis and amenorrhea; in the extreme pallor of others, victims of menorrhagia; a tired, pale, dull and almost earthy aspect suggests leucorrhea, "uterine facies"; in the yellow straw-colored complexion we recognize the subjects of cancer; the emaciated ovarian facies denotes cysts, and contrasts with the volume of the abdomen; finally a dull leaden-colored face suggests a condition of septicemia.

However, we should not wait too long listening to these preliminary examinations which are usually very long, rather confused, and which often enter fully into unnecessary details while neglecting points of capital importance; and thus give an idea of the general course of the disease and of the general condition of the patient, but do not generally lead to a diagnosis.

Therefore we should proceed to a rapid and methodical interrogation and not allow the patient to wander into uninteresting digressions.

1. Interrogation.

There is an advantage in conducting one's interrogation in a set order:

(1) **Menstruation.**—The primary questions should concern menstruation.

Some patients come to consult us for absence of menstruation or *amenorrhea.* In a young girl who has gone beyond the average age of menstruation, we must not necessarily conclude that we have to deal with a local affection. In chlorotic and lymphatic patients menstruation appears late; some months of patience and appropriate treatment will decide the question at issue. If the amenorrhea persists we must think of a local affection such as absence of ovaries, or uterus, or a genital imperforation. In the last named, at a given moment the whole of the menstrual molimen may come on (colic, pain in the kidneys, abdominal bearing down). At a more advanced stage, if the menstruation has previously commenced normally, amenorrhea may be symptomatic, of a grave general state or a cachexia (acute febrile affections, albuminuria, diabetes, tuberculosis, etc.); it may be due to a nervous cause and this is quite often observed immediately after marriage, or at a more advanced age, accompanied then by tympanites or abdominal polysarcia which may suggest to the doctor a pregnancy and may compromise his reputation. This is a condition of spurious pregnancy dependent on a nervous origin.

It is important to fix the date of the last menstruation. The mind of the gynecologist should be haunted by the idea of a possible pregnancy in the patient who comes to consult him. While on this subject remember that one may be deceived by the ignorance of the patient and her wilful deceit. In such a case as the latter the patient wishes an examination to procure an abortion sequence.

We should not only determine the date of the last menstruation, *but the dates of the two last* so as to be able to determine the non-interruption of the function. What the patient calls her last menstruation may in reality only be a symptomatic metrorrhagia of an abortion already passed or threatening. By finding out about the last two menstruations we avoid this pitfall.

Having cleared up this point, we should study the menstruation at all epochs during the patient's life. When did the first menstruation occur? Did it come without difficulty and without pain? How has menstruation progressed since? Does the patient suffer during menstruation? And if she suffers, do the pains come on before menstruation occurs? If the answer is yes, then we should suspect a probable ovarian lesion. Again, if the patient suffers, does she do so when the menstrual flow is established. In such a case we think of some obstruction to the flow of blood from the uterus; stenosis of the cervix, either congenital or acquired; uterine deviation, most often an anteflexion. If in the latter case, the patient describes that after an accouchement she has remained six months, a year, or two years without suffering the existence of a mechanical obstacle to the escape of the blood, more particularly an anteflexion of the uterus is almost certain. After the enquiry into the painful symptoms which may precede or accompany the menstrual periods, it is necessary to enquire as to their quantity and duration. As this quantity and duration varies in different women it is well to ask not only what actually comes away but also what the habit was formerly and to compare the two. It is thus easy to appreciate if there is really an exaggeration of the menstrual outflow, that is, if there is *menorrhagia*. Other important questions to be asked are: Does the patient lose blood in the intervals of the menstrual epochs, so-called "*metrorrhagia*"? Are the losses slight and intermittent? Is it a question of a simple oozing of blood, or is the flow considerable and continuous? The replies to these are sometimes exaggerated, so it is best to determine approximately the amount of blood lost by asking the number of diapers soiled during the day.

The study of the losses of blood is completed by enquiry into the character of the hemorrhagic outflow.

Does the woman lose fluid blood, or does it come away in clots? Is the loss accompanied by the expulsion of membranes, of "skin" as the patients say, or even of fetal remnants? All these questions are important; they often allow of diagnosis being made even before local examination: for example, abortion (woman young, loss with clots after an interval), mural fibroma,

menorrhagia in a woman somewhat older), or polypi (continuous metrorrhagia), cancer (a woman after the menopause having a hemorrhagic outflow, etc.).

(2) **Vaginal Discharges.**—Does the patient complain of "whites"? And if these exist, is it a question of a recent discharge or does it date back some months? Has it come on apparently without cause, or can the patient herself give it an etiology connecting it with some definite event in her genital life, abortion, accouchement, etc.? What are the characters of it? Is the discharge thick, ropy, viscous, odorless (cervical catarrh)? Is it purulent with an acid smell (simple vaginitis, the white discharge in anemic patients), or is it serous, sometimes lightly tinted, of a putrid odor (cancer)?

(3) **Swellings.**—Is the patient a virgin in the true gynecological sense? Has she had children? How many? Have they come at the term or before it? What sort of accouchements has she had? Have they been difficult? Has intervention been necessary? Has the perineum been torn? Has the parturition been regular and complete? Has the puerperium been complicated by accidents (fever, vomiting, distention of the abdomen, etc.)? Have there been abortions? What have been their results?

(4) **Pains.**—Although extremely variable in its intensity, pain is rarely absent.[1] Is the pain in the inferior part of the abdomen and is it median or lateral; or is it, on the contrary, a question of lumbar pains or of pains in the legs or a pain of coccygodynia? What are the characters of these pains? Is there true pain or simply a sensation of fatigue, of weight or a pain of uterine colic, tearing-down pains, which the patient who has been a mother compares always with the pains of parturition.

The conditions in which these pains occur have quite a special importance. We have already seen the significance of the pains which accompany or precede menstruation as regards other pains; the influence of repose or fatigue on them should

[1] It must not be forgotten in the study of pains in the region of the genital organs that hysteria may be the cause. It is necessary then to search for other signs (neurosis insomnia, mastodynia, intercostal neuralgia, etc.), remembering that hysteria and genital trouble may coexist, the latter keeping up or exaggerating the general symptoms of the former.

be noted. If the patient is relieved by rest in bed and only suffers when she walks, one is dealing with a metritis. If she suffers even during rest in bed there is probably a lesion of the adnexa. This shows how important it is to determine the conditions giving rise to the symptom, pain.

Pruritus, vulvar or anal, constitutes a last variety of the symptom, pain; it may be due to exterior cause (eczema, diabetes, parasites), to the irritant action of a leucorrheal discharge, or again simply to a nervous cause.

Having thus determined the different functional symptoms of the patient as regards her genital organs, it is necessary to complete the examination, to examine her remaining systems.

(5) **Extrauterine Symptoms.**—*Urinary troubles* are frequent; they may even dominate the clinical picture so markedly as to make one believe it is an essential lesion of the bladder that presents itself when really these bladder symptoms result from a lesion of the genital organs. It suffices, it is true, to determine with care the character of the symptoms observed to connect them with their true cause. If the pains appear more especially when the patient is upright and are more marked when she is fatigued, and if the urine is clear, without deposit, it is not a question of cystitis but simply of reflex bladder trouble, arising from some genital trouble that may be determined by physical examination. It must be noted, however, that the association of vesical and genital affections is frequent; it may be that the same agent has exercised its action on the urinary as well as on the genital apparatus or possibly resulting from a genital affection the bladder has been infected through its walls; or the bladder may simply be drawn on by adhesions following a pelvic peritonitis, etc. The importance of *rectal symptoms* is not so great. Constipation, and even the entero-colitis following it, is the habitual companion of gynecological lesions. It is often accompanied by gastric troubles also; in fact, these are rarely absent. The relation between *dyspeptic troubles* and lesions of the genital system is experenced daily. Vomiting and migraine are often enough observed. In many women there is besides an association of lesions of sundry systems, genital affection, flaccidity of the abdominal wall, enteroptosis, etc.

Recently a certain importance has been attached to the re-

search of a train of symptoms characterizing a faulty internal secretion of the ovary which Jayle gives as being characteristic of what he calls *ovarian insufficiency*. Together with menstrual troubles, amenorrhea and dysmenorrhea, there exist in these cases, a group of vasomotor, nervous, and trophic symptoms, heat flushings, enfeeblement of memory, modification of character, signs of neurasthenia and neuro-muscular asthenia, adiposity or, more rarely, emaciation.

2. Physical Examination.

It may seem, at first sight, to be useless or even somewhat ridiculous to impress the necessity of this physical examination; however, daily examples show that it is not at all a superfluous recommendation and that this elementary precept is but too often forgotten.

Its omission leads to very gross errors, of which it is easy to quote a few examples. A young girl comes before us with an abdominal tumor; one passes in review all possible tumors, pregnancy excepted? How can one consider the latter possibility in a young girl, carefully brought by her mother, and never even having menstruated? Considerations of every kind tend to show the impossibility of such a hypothesis. Yet on direct examination, however impossible pregnancy may have appeared, it is none the less present. Here is another case: A young girl who has not yet menstruated suffers from various strange symptoms with seemingly no cause and for which she has followed all kinds of treatment. Direct examination at once shows the existence of an imperforate hymen, causing a hematocolpos, thus giving the key to all the symptoms observed. There are examples even more curious of the utility of this direct examination. Munde quotes a case of twins, each treated for many months for persistent amenorrhea; on making an examination he found that they were in reality two men with hypospadias, whose true sex had not till then been recognized through want of sufficient examination.

There should be no hesitation then in making a direct examination in all cases where the symptoms observed direct the attention to the genital tract.

Examination of the Abdomen.—To make an abdominal examination, the patient should lie on a bed or on an examining table; the legs stretched out, the arms alongside the body. The patient should be directed to breathe quietly and to let herself relax the muscles of the abdominal wall, a condition much more difficult to obtain than would be believed at first sight.

Before beginning this examination, it should always be seen to that the rectum and bladder are empty. It is a good thing to provide one's self with a dermographic pencil so that one may at the time fix *the results of the examination by drawing on the integument* the outlines of the tumors which have been determined by the various methods of exploration. This outline has not only the advantage of giving to the observer a résumé of the results of his physical examination but it may also at the same time facilitate the diagnosis by giving a graphic representation of the most saliant and significant points, that successive and as it were "parcelled out" examination would not have made so clear.

This precaution having been taken, the abdomen is exposed.

Inspection.—Simple *inspection* serves to ascertain any modifications of the integument there may be (venous or lymphatic varices, pigmentation, streaks, etc.), the existence of a general enlargement of the abdomen or any limited projection. In this last case it is to be determined what the precise position of the swelling is, whether it is median or lateral, whether it is smooth or nodular, and if it moves or not with respiration. The form of the abdomen is sometimes of itself sufficient to suggest certain maladies; an abdomen of a flattened ovoid shape with bulging of the flanks suggests ascites; a bossy abdomen, jutting out markedly in front, a fibroma; an enormous belly falling down over the thighs, an ovarian cyst, etc.

Percussion.—By *percussion* one can determine the form of the zone of dullness, noting if this form is modified by changing the patient's position. It is thus possible by this mode of exploration alone to make certain diagnoses and to differentiate, for example, between an ascites and an ovarian cyst.

Palpation.—It is *palpation* which furnished, in most cases, most valuable and complete information. This palpation should

be done softly, not with the ends of the fingers but with the entire palmar surface of the hand[1] placed flat on the abdominal wall which is gently pressed in, encouraging the patient to breathe quietly and thus gain ground at each expiration.

With patience one can almost always triumph by the method against the muscular contraction which opposes the hand of the surgeon in pusillanimous and nervous patients.[2] On the other hand, the thick layer of fat which lines certain abdominal walls renders palpation as difficult in its execution as uncertain in its results.

In most cases, it is easy to determine by palpation the presence of a tumor, but sometimes one may have considerable doubt as to its exact position with reference to the different planes of the abdominal wall.

Ventral hernias are easily recognized by the bulging they make when the rectus muscles are contracted, by their total or partial reducability, and by the depressability existing between the separate recti.

When a true tumor is present, it is again easy to determine if it is parietal or intraabdominal by an exceedingly simple little maneuver. While the patient is lying down, ask her to sit up while the surgeon continue palpating the tumor. If the contraction of the abdominal muscles caused by this movement renders the tumor more prominent, at the same time not affecting its mobility in front of the contracted muscles, the tumor is premuscular parietal. If, while remaining prominent and clearly preceptible, the tumor is immobilized by the muscular contraction, one is dealing with an intramuscular parietal tumor. Finally, if the contracted muscle mask the tumor so that it is lost on exploration, it is a case of intraabdominal tumor. Having localized the tumor, its form, mobility, and consistence must be determined. Is it soft or hard; fluctuating or not? Sometimes palpation gives sensations of a quite particular significance, such as the crepitation characteristic of peritoneal rubbing. If the tumor hardens under the hand, one may be sure it is a case of gravid uterus. In

[1] The hand should be warm, otherwise a disagreeable sensation is caused by the application of a cold hand on the skin of the abdomen, which may cause defensive contractions of the abdominal wall hindering the exploration.

[2] One must guard against certain localized contractions which give falsely the sensation of a tumor.

other cases there is a sensation of a hard, mobile mass, striking against the walls at times, and seeming to float in a cavity; in brief, one has the sensation of ballottement. This is again in most cases an obstetrical symptom due to the movements of a fetus floating in the amniotic fluid. Certain tumors bathed in the liquid of an ascites may give a similar sensation.

Auscultation.—*Auscultation* has not much importance in gynecology. It is of importance in diagnosing pregnancy, and it is quite unnecessary to mention here the pathognomonic significance of the sounds of the fetal heart in this connection. The uterine souffle is of much less interest, because if it is met with in pregnancy it is equally of common occurrence in cases of large tumors, particularly fibromas.

Method of Genital Examination.—The patient is placed lying on her back, the legs flexed on the thighs and these flexed on the pelvis and placed in slight abduction. It is a good thing for

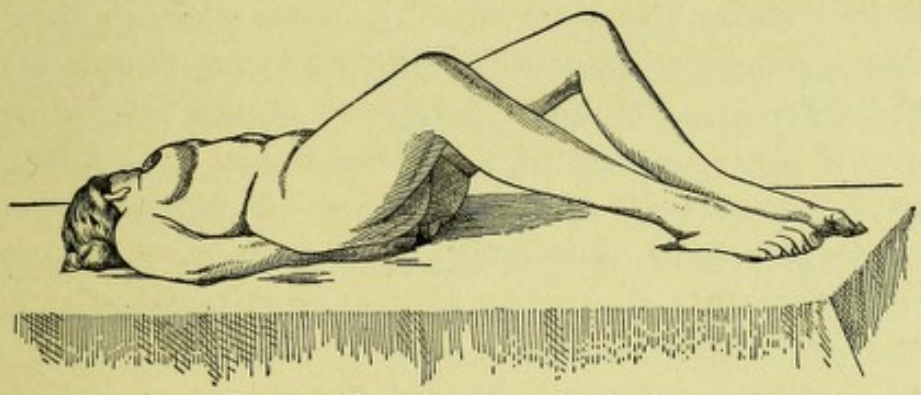


FIG. 1.—Patient in dorsal position.

the patient to place her closed fists under her so as to raise the pelvis slightly (Fig. 1).

Inspection.—One should start with the *examination of the vulva.* After having noted the aspect of the cutaneous side of the labia majora, separate them and examine successively the other parts of the vulva (labia minora, clitoris, vestibule, urethral orifice, hymen or carunculæ myrtiformes). The condition of the fourchette, which may be torn, should be observed, and before proceeding further with the examination it is as well to ask the patient to bear down which may cause some bulging indicating an anterior or posterior colpocele which did not exist before the effort.

Vaginal Examination.—After examining in this manner the vulva, the next thing to do is to make a *vaginal examination.* The hands should first be disinfected then methodically introduce the vaselined finger into the vagina by applying it first to the perineum and bring it gradually forward until it encounters the fourchette; it then suffices to lightly press on this to enter, a coup sur, the vagina.

Making its way gradually, the finger should explore the walls of the vagina, noting the state of the mucous membrane, the existence of ulcerations or of fistulous orifices that may be there, the protrusion of tumors, and, lastly, any foreign bodies. Continuing to insinuate the finger gently the surgeon meets the cervix. However inexperienced he may be, he recognizes it easily by its rounded form, its firm consistence usually compared to the tip of the nose where the cartilages of the lobules meet.

The condition of the vaginal fornices which surround it should first claim the attention. Any increase in their depth indicates prolapse. Normally the posterior fornix is deeper than the anterior. Its depth, however, should not be excessive; that would be indicative of a malformation or a false marital passage. The pliancy of these fornices should be noted at the same time, also their obliteration by a juxta-uterine tumor. In case of a tumor, its characters should be determined which can be better done afterward by a bimanual examination. Having rapidly acquired an impression of the condition of the vaginal fornices, the surgeon turns to the examination of the cervix. What is its situation? Is it near the vulva, indicating a prolapsed uterus? Is it lying "en masse" forward against the symphysis or backward toward the concavity of the sacrum? In which direction does the orifice look? Does it look, as it normally does, down and back? Is the orifice rounded as in a nullipara or punctiform at the end of a long and conical neck? Or is it, on the contrary, the transversely split orifice of a woman who has had children? It is narrowed or dilated and, in this last case, does it give passage to a polypus, or to an epitheliomatous intracervical vegetation, placental débris, or simply to the cervical mucous membrane in ectropion? Are there any tears present, and if these tears are commissural do they continue toward the

lateral fornix as cicatricial indurations? The examination of the cervix is finished by the appreciation of its volume and consistence, and any irregularities of its surface. This examination, more rapidly made than described, gives fuller information than may be acquired by inspection through a speculum however prolonged.

But, however precious the information acquired by this method of examination alone, it is not to be compared with a combination of this method and abdominal palpation.

Bimanual Examination.—*Vaginal examination* and *abdominal palpation combined* constitute the most precious of the methods of gynecological examination. This is really not a new method of examination; although every day in Germany one hears that the merit of having invented it some twenty years ago belongs to Schultze, we know in France that it dates back much further and that introduced by Rinzos at the beginning of the nineteenth century, it was later brought into general use by Velpeau and Courty.

To put into practice the *bimanual method of examination* the palmar surface of the fingers and not radial border of the index-finger should be used. One finger or better two, if the vagina is large, are introduced and kept in contact with the cervix. The external hand, placed flat on the hypogastric region, exerts progressive pressure on the abdominal wall, while the patient breathes gently and does not contract her muscles. It is of advantage to talk to her and gain her confidence. If the vagina is deep, the sacral region should be slightly raised by getting the patient to put her fists underneath, press firmly against the perineum the interdigital commissure, whilst the index-finger is in the vagina, the median in the internatal fold, and the thumb inclined toward the anal cleft. By this method one can lengthen the finger from 4 to 6 cm. The hypogastric hand endeavors to hook the fundus of the uterus and to seize the body which is supported by the fingers in the vagina pressing in the anterior fornix where the normally anteflexed uterus should lie (Fig. 2). If the body of the uterus cannot be discovered by this maneuver then it is not in its normal position; it is then probably retroverted and may be discovered by supporting it with the fingers in the posterior fornix. Once the uterus is seized it is easy by

combined palpation to appreciate its mobility in all directions, not forgetting that if the fixation of the uterus indicates a pathological condition an undue mobility may inversely of itself be a source of trouble.

After having thus established the situation and mobility of the uterus, by combined palpation one can appreciate its consistence and volume that may be expressed by comparing it

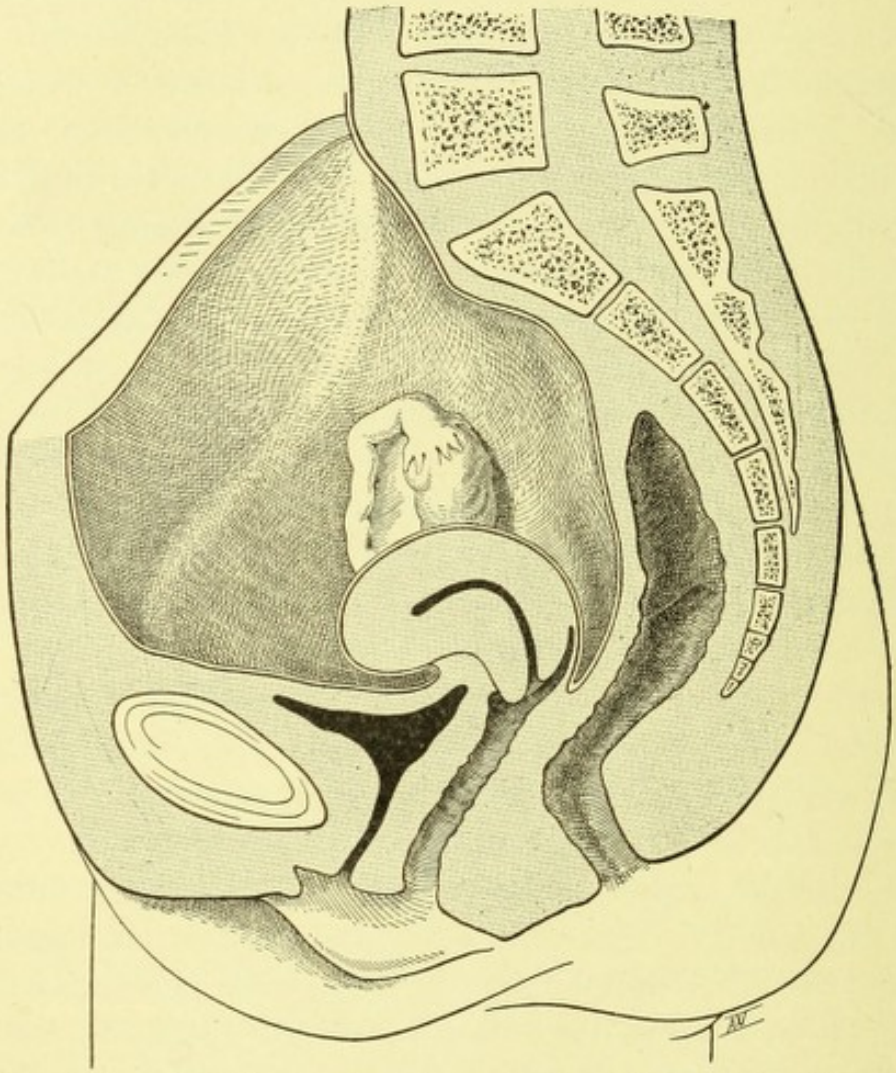


Fig. 2.—Section of pelvis showing the projection of the cervix into the vagina, the normal anteflexion of the uterus, also that the depth of the posterior fornix is greater than that of the anterior.

with the volume of a gravid uterus at a given period of gestation or by indicating the height of the fundus above the superior border of the pubic symphysis. Bimanual examination allows also the exploration of the broad ligaments and adnexa. To effect this, the vaginal finger should be placed in one of the lateral fornices and then pressing with the hypogastric hand the abdomi-

nal wall above the Arcus Fallopii of the same side endeavor should be made to seize the adnexa between the vaginal fingers and the external hand.

To reach most easily the right adnexa it is best to have the right hand the vaginal hand, and *vice versa* to palpate the left adnexa it is best to make the vaginal examination with the left hand, in this manner always turning the palmar face of the hand toward the side to be examined.

Except in cases of special difficulty, as for example a very fat patient, one can thus palpate even healthy adnexa and appreciate their volume, consistence and mobility.

All these manipulations of the bimanual examination become much easier when the patient is placed *with the pelvis* elevated,

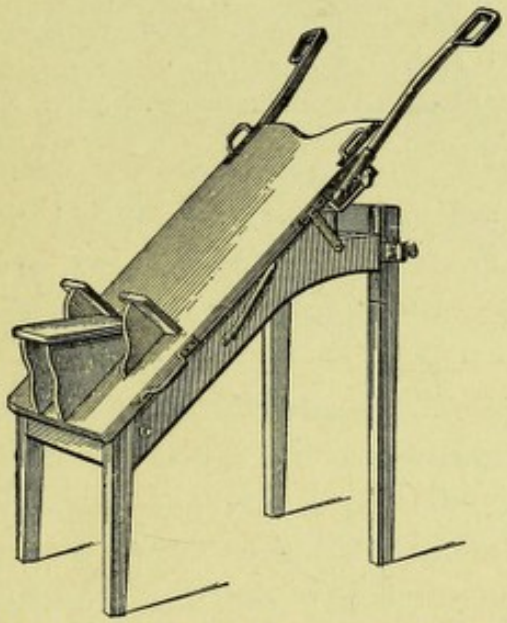


FIG. 3.—An adjustable table, with shoulder rests, used for pelvic examinations.

which position we have adopted systematically for all our gynecological examinations and which we obtain by aid of an extremely simple table capable of being tilted at will (Figs. 3 and 4).

The intestines fall toward the diaphragm; the pelvic cavity becomes empty; the uterus and its adnexa, held by their attachments to the pelvic floor, remain only in place and separated from the intestines which normally surround them, permit of being palpated with the greatest of ease. This position of elevation of the pelvis (45 degrees inclination) has also the advantage of emptying it of any tumors that may have fallen

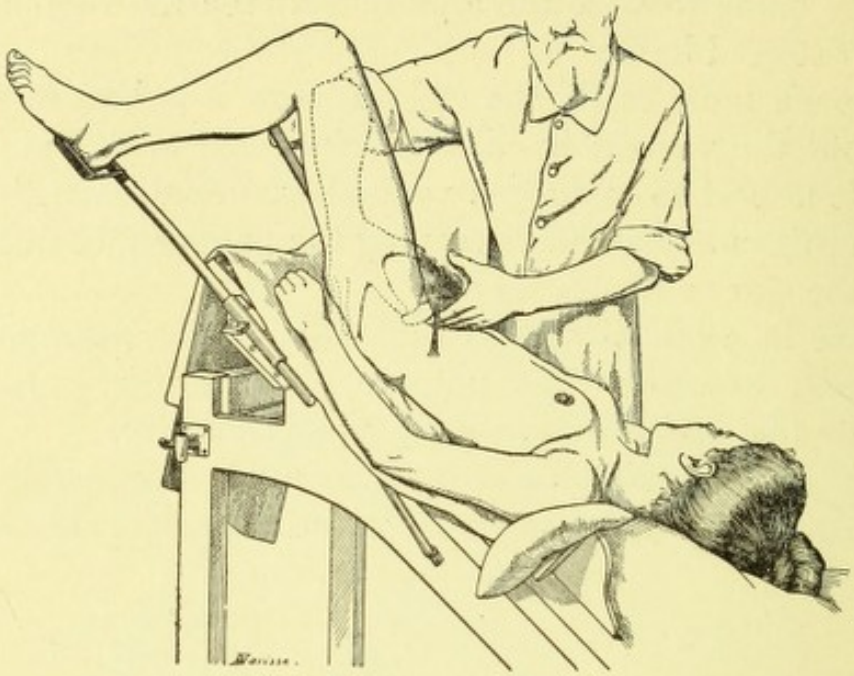


FIG. 4.—Bimanual examination with pelvis elevated.

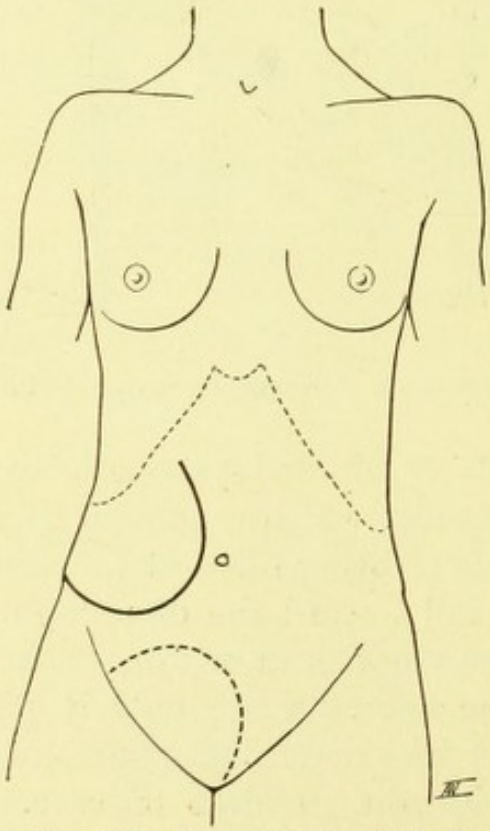


FIG. 5.—Hydronephrosis fallen into the pelvis; the dotted line marks the position the tumor occupies at the time of examination, the plain line the position occupied on elevating the pelvis of the patient.

into it (floating spleen, hydronephrosis in a movable kidney). Every tumor arising in the superior part of the abdomen returns to its place of origin when the pelvis is raised (Fig. 5). It can be understood all the advantages accruing from such a method of examination from a diagnostic point of view.

Rectal Examination.—*Rectal examination* is made in the ordinary manner. After having covered round the nail of the index-finger with soap, or better after having covered the finger with a rubber protector or one of gold-beater's skin, the anus and examining finger should be well vaselined. The finger is introduced at first in an upward and forward direction, then upward and backward so as to feel through the rectal wall, the cervix and body of the uterus. In pathological cases the bulging toward the rectum of collections in the recto-uterine pouch, also the roots of the sciatic, may thus be palpated. It is a method of examination particularly useful in virgins; in case of necessity, it is in most cases possible even in them to do a vaginal examination without defloration; it suffices to introduce the finger extremely gently without separating the legs. Exceptionally, in order to appreciate alterations in the recto-vaginal septum a combination of rectal and vaginal examinations may be indicated.

Examination with the Speculum.—The speculum does not give nearly such good results as the bimanual examination. With a little experience the latter informs us of all that we might learn by the use of the speculum and in addition gives us impressions of existing conditions which the speculum is unable to do. The part the speculum plays in an examination now-a-days is very restricted and is not regarded as of the same great importance as was the case during the last twenty years. Its use is contraindicated when any obstruction exists to its introduction, such as a hymen, an acute inflammation, any contraction, or in cases of vaginismus, or finally in the event of a recent wound of the vagina or vulva which the speculum might disunite. The forms of speculums are numerous;[1] they can be classified into three groups, the bivalve type, represented

[1] We do not describe here all the various models of specula. Those who are interested in the history of the speculum will find an article by Jayle (*Presse médicale*, February 10, 1904, p. 891) detailing its history from the time of Abbucasis to the present day.

by Cusco's; the cylindrical type generally employed is that of Fergusson; the "duckbill" or single-valve type is best known under the name of Sims. It appears useless to describe here these speculums which are in everyday use. (See Figs. 6, 7, 8 and 9.)

In a general way the valvular speculums have a fixed point at the level of the vulvar orifice where a screw or lever enables the

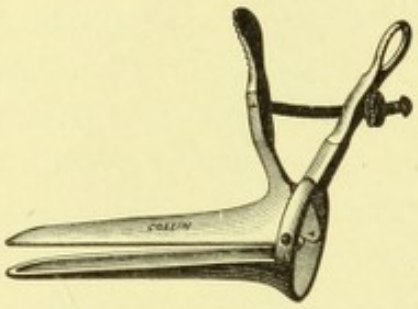


FIG. 6.—Cusco's bivalve speculum.

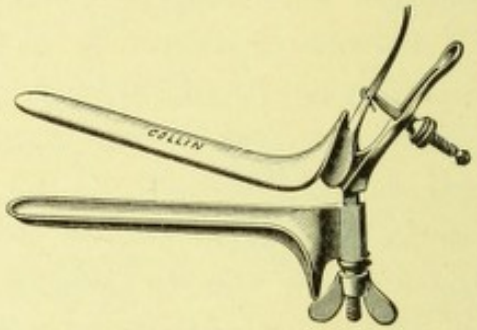


FIG. 7.—Jayle's bivalve with a double movement.

blades to be opened and thus distend the vaginal cavity without affecting the orifice at the vulva. The cylindrical speculums are made of vulcanized rubber, celluloid, glass, or of metal, and have one expanded extremity, while the other is shaped like the mouth-piece of a flute to facilitate its introduction and to accommodate itself better to the cervix, seeing that the posterior fornix is deeper than the anterior.

FIG. 8.—Fergusson's cylindrical speculum.

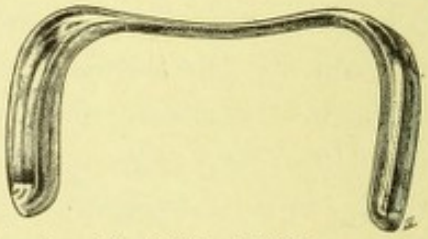


FIG. 9.—Sims' "duckbill" speculum.

In order to introduce a *bivalve speculum*, vaseline it first and having separated the labia with two fingers of the left hand, take the speculum in the right and introduce it in such a fashion that its "beak," so to speak, is parallel to the main axis of the vulva. One glides it past the vulvar orifice by strongly depressing the fourchette, thus avoiding contact with the region of the vestibule. Having passed the vulva a rotary movement is imparted to the speculum turning through a quarter of a circle by which the

blades come to lie in the horizontal plane and are advanced further into the vaginal cavity. In the majority of cases, if the vulva is large enough it is simpler to depress the fourchette strongly with two fingers of the left hand and introduce the speculum directly into the vagina. One should beware of pushing in the speculum recklessly, as the inexperienced usually do, *but direct it in the direction already ascertained by the digital examination per vaginam, a proceeding which should always be carried out as a preliminary measure.*

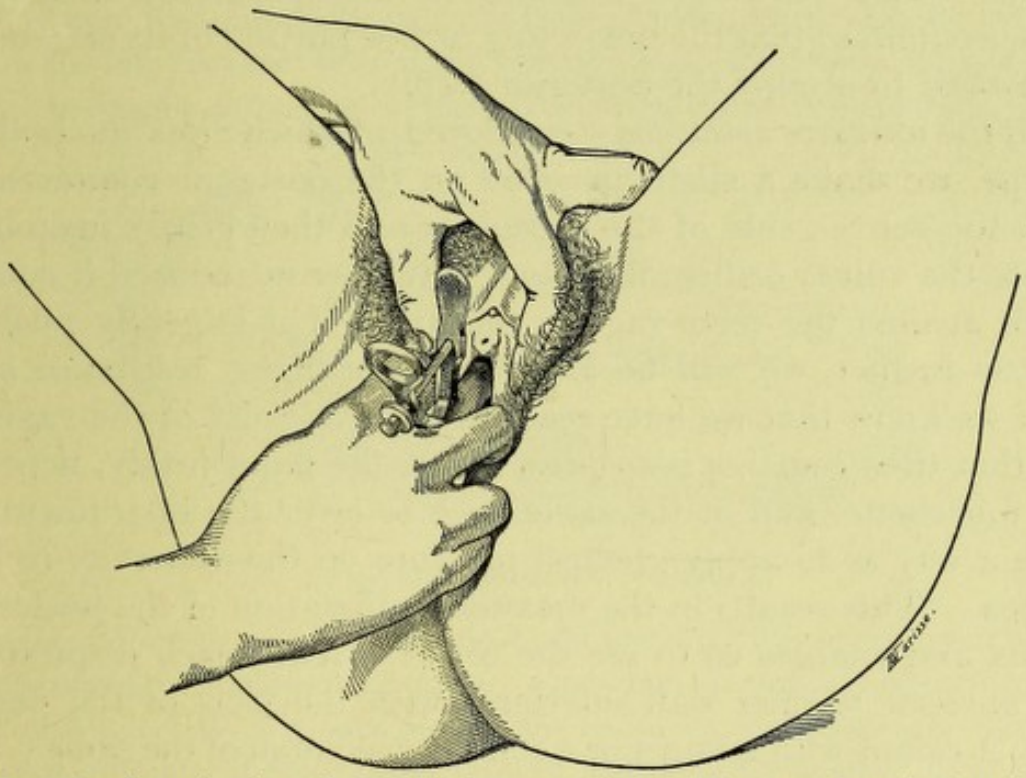


FIG. 10.—Introduction of the bivalve speculum. (The speculum is introduced obliquely in order to facilitate its entry into the vulvar orifice and then continued horizontally when once in the vagina.)

The examination of the cervix is rendered easier by keeping in the center of the visual field of the speculum the star-shaped formation produced by the folds of the vaginal mucous membrane. Having found the cervix, the two blades are more widely separated, by the screw or lever apparatus, to the extent required, but should avoid a too great separation, as this may produce an artificial eversion of the cervix, which may be mistaken for a pathological condition.

To remove the speculum, begin by allowing the two valves to fall together, without allowing them to meet; in order not to

pinch up the mucous membrane and to have an opportunity of examining the vaginal walls as they slowly fold at the extremity of the speculum. The instrument is withdrawn by a rotatory movement, the reverse of that employed in its introduction.

In order to introduce the *cylindrical speculum* firmly depress the fourchette and introduce the tip of the flute-like mouthpiece of the speculum below, thus avoiding catching the inferior part of the urethra above; the speculum is pushed on toward the cervix by progressive rotatory movements. Having found the cervix, which should be enclosed in the speculum, maneuver the speculum so that the projecting or free portion of its extremity is allowed to occupy the posterior fornix.

If the *univalve speculum* is employed, of which Sims' duckbill is a type, we make a slight pressure on the posterior commissure with the convex side of the speculum and then gently insinuate it into the vulvar orifice; then as it is further introduced it comes to lie against the recto-vaginal septum. If it is gently pushed a little further, we will be able to feel a slight resistance and then we know that we have reached the extremity of the vagina. All that then remains is to press down the hand firmly, depress the fourchette, and at the same time to lever the instrument in such a way as to apply greatest pressure on the extremity in the vagina. This results in the maximum dilatation of the posterior fornix and enables us to see the cervix. As at each inspiration the anterior vaginal wall interferes with the view of the parts, keep it raised with a finger or a smaller speculum of the same type, or with Sims' special instrument for the purpose.

3. Appendix.

In some gynecological cases the examination may be complicated by the necessity of the surgeon employing a special technic.

Anesthesia.—Vaginismus, a persistent contraction of the muscles of the abdominal wall, and troubles of a very painful nature justify us in the employment of anesthesia. Even for certain examination measures it may be used. Hegar frequently had recourse to anesthesia for this purpose. He would grasp the cervix with a tenaculum forceps, draw it down toward the orifice of the vagina, hand the forceps to an assistant, and then study the mobility of any tumors present and their relation to the uterus. We, however, believe

that by the bimanual examination and the Trendelenburg position, we can dispense with all these complicated maneuvers and with anesthesia, which latter is not without a certain element of gravity, and unfortunately suppresses much useful information which may be gathered from the investigation of the conditions of existing pain.

Left Lateral Position.—The examination in the left lateral position was formerly much employed by American gynecologists. The patient lies on her left side on a firm resistant surface, the head supported on a cushion. The left arm hangs over the edge of the table: the thighs and knees of both extremities are flexed and the right is more flexed and carried forward, as the pelvis is inclined toward the table, its movable contents fall forward toward the anterior abdominal wall, thus permitting the vagina distending. Sims' duckbill speculum is employed. Raise

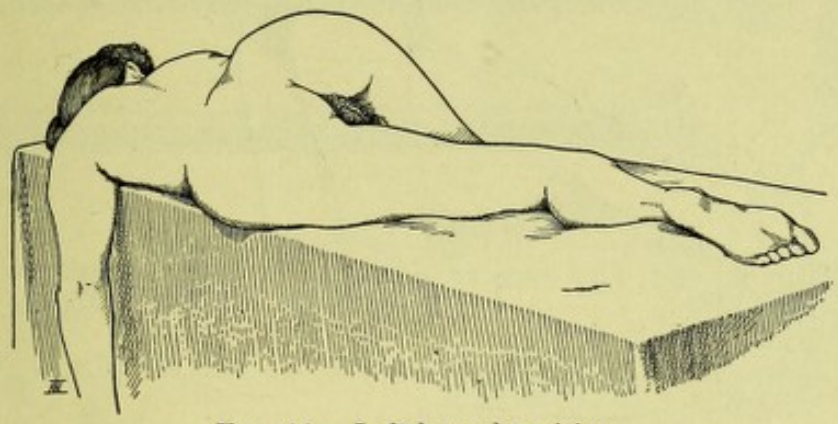


FIG. 11.—Left lateral position.

the labium major with the left hand and introduce the speculum with the concavity of the blade looking down. Once past the vaginal entrance, incline the instrument slightly back so that the concavity looks forward, and as it is gradually introduced, further support it continually against the posterior vaginal wall. When the blade is in place, hand it to an assistant who with his right hand draws it backward and slightly across the upper buttock, while with his left hand he raises the upper labium major and the upper buttock. This position permits of a good examination of the vagina. At all times when there are inflammatory exudates in the pelvis the uterus remains fixed and the vagina does not distend well. This mode of examination is not much employed in France.

Standing Position.—The patient's back rests against a wall or a piece of furniture. The surgeon kneels on his left knee, supporting his elbow on his semiflexed right knee, and in this position he makes a digital vaginal examination.

This method is indicated in special cases where one wishes to determine the degree of a prolapse and particularly to investigate the efficacy

of a pessary to remedy the prolapse; it is useful also to determine fetal "ballottement."

Knee-elbow Position.—In this position, greatly used in America, the patient kneels on the table, the trunk sharply inclined downward and forward; the head on the table is turned to one side or the other and the breasts as closely in contact with the table as possible. In this position the pelvic contents fall toward the anterior abdominal wall as in the left lateral position, but more markedly; also the moment that one partly opens the vagina by the introduction of a simple valve speculum, which lifts up the fourchette, the air enters and dilates the vagina, enabling us to examine its walls quite easily. It is the best position for the examination of a virgin.

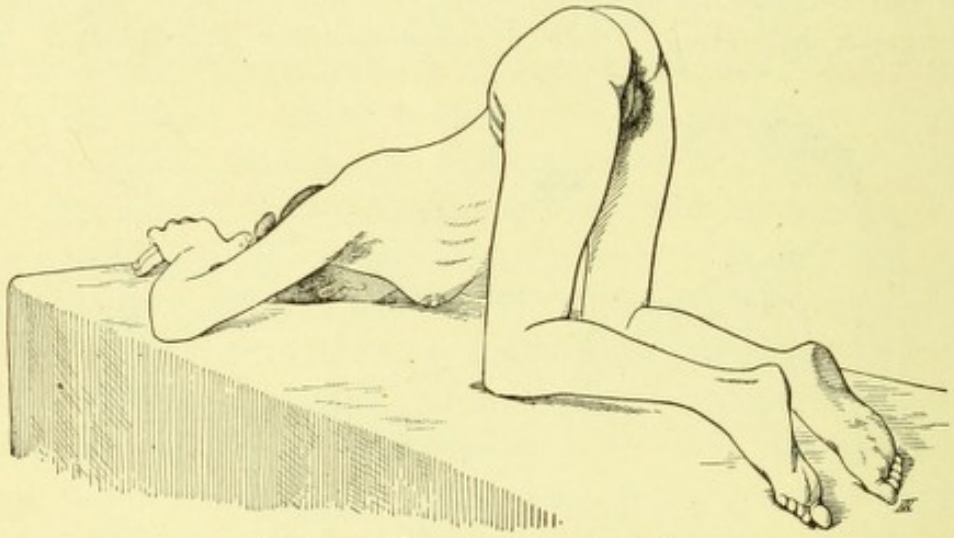


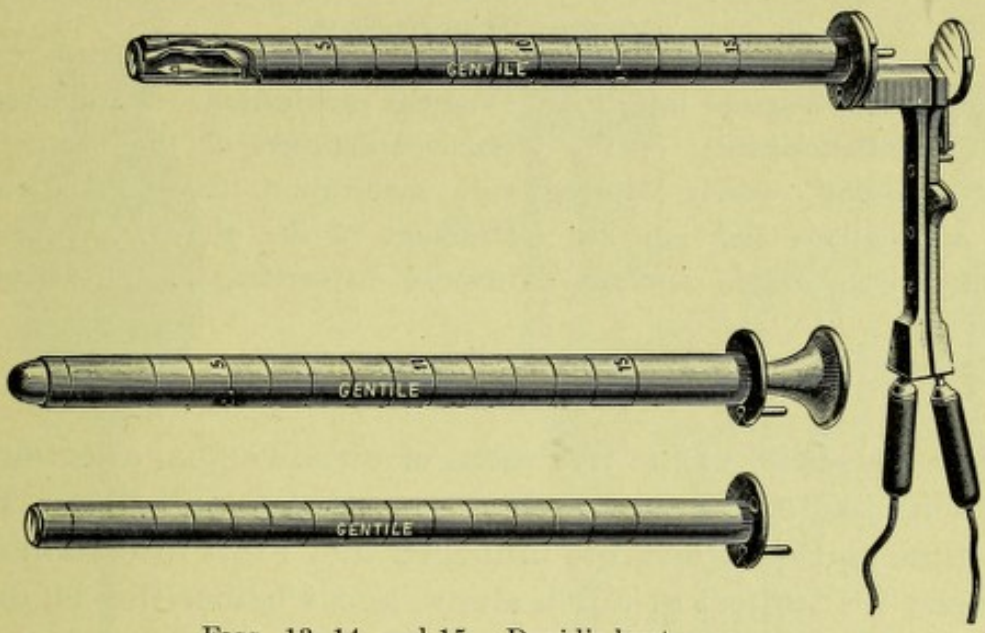
Fig. 12.—Genu-pectoral position.

One has only to introduce through the orifice of the hymen (while the patient is in the knee-elbow position) a tube provided with a mandrin of 8 to 15 mm. ($\frac{1}{3}''-\frac{3}{5}''$) diameter. The tube being introduced, the mandrin is drawn out and the vagina distending as a result of the entry of air, it may be easily examined in its entirety provided the light is sufficient.

Hysteroscopy.—Hysteroscopy or uterine endoscopy was recommended in France by Duplay and Clado who used a tube and a photophore or light-producing apparatus. David,[1] who has recently taken up the study of this question, uses a tube with an internal light like Valentine's urethroscope, but closed at its extremity with glass to avoid contact of the lamp with the blood oozing from the uterine mucous membrane. The uterus is first dilated and then drawn down. The tube fitted with a mandrin is introduced into the uterus as far as the fundus; the mandrin is then withdrawn and replaced by

[1] Proutière (Z), *Contribution à l'étude de l'hystéroscopie. Th. de Paris*, 1898–1899, No. 69.—Beuttner, *Cent. Bl. f. Gyn.*, Leipzig, 1898, No. 22, p. 580.—David, *Annales de Gyn. et d'Obstét.*, Paris, Sept., 1908, p. 513.

the internal tube fitted with glass over its extremity. Once the lamp is in place, one can begin by examining the internal surface of the uterus, commencing at the fundus and then the rest of the cavity, gradually withdrawing and at the same time circumducting the instrument which enables the light



FIGS. 13, 14, and 15.—David's hysteroscope.
Above the instrument complete. Below the external tube with its mandrin and then the internal tube.

in the tube to make a complete tour, so to speak, of the whole of the uterine cavity.

Up to the present, this method of examination is not common. Personally, we have never had recourse to it.

CHAPTER II.

MINOR GYNECOLOGY.

Contents.—Vaginal injections.—Vaginal medication.—To tampon the vagina.—Catheterization of the uterus.—Dilatation of the uterus: first, rapidly; second, slowly.—Intrauterine medication (lavages, injections, local applications and caustics).—Drainage of the uterus.—Atmokausis.—Cestokausis.—Bier's method.—Pessaries.—Curetting of the uterus.

1. Vaginal Injections.

The simplicity of the treatment of utero-vaginal affections by injections has made this method one used for all time. For a long time the incontestable influence they exert in certain cases has been the subject of much study, and whether this be due to their mechanical or their therapeutic action is the question at issue. It is realized to-day, however, that a great part of their action is due to the heat they contain.

FIG. 16.—Douche-can for vaginal injections.

Instruments.—The ordinary douche-can is most generally used now-a-days. It consists of a can holding 1 or 2 liters (35 to 70 ounces), fitted with a cock at its base, to which one can fit a rubber tube about 2 meters long (7 feet) and about 1 centimeter (2/5 inch) in diameter.

The type most universally employed is the half cylindrical can with a cock projecting from its side. This can, generally

enamelled, is hooked on to the wall on its flat side or made to stand on a piece of furniture or even held by a handle.

There are also forms made for use while travelling; for example, Budin's apparatus (Fig. 17), the siphon-injector (Higginson's syringe), or Doleris' india-rubber bag.

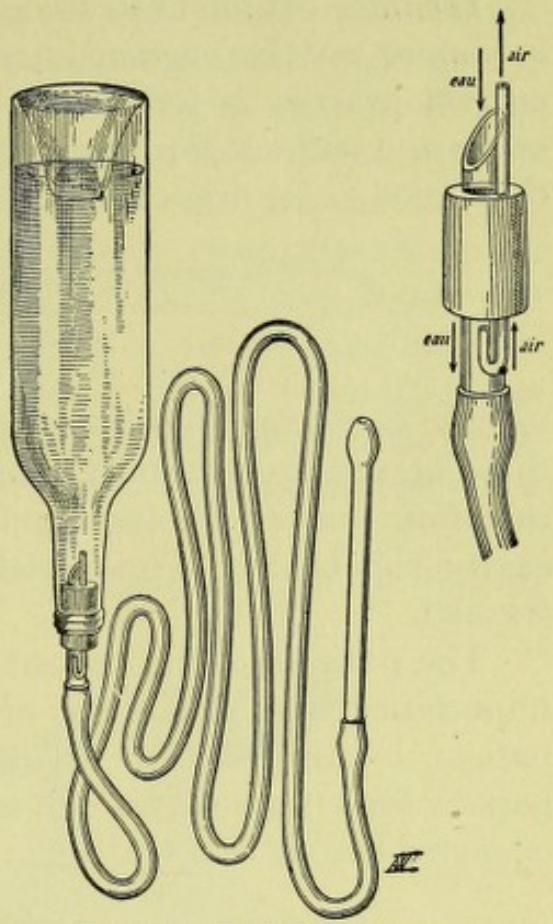


Fig. 17.—Budin's apparatus.

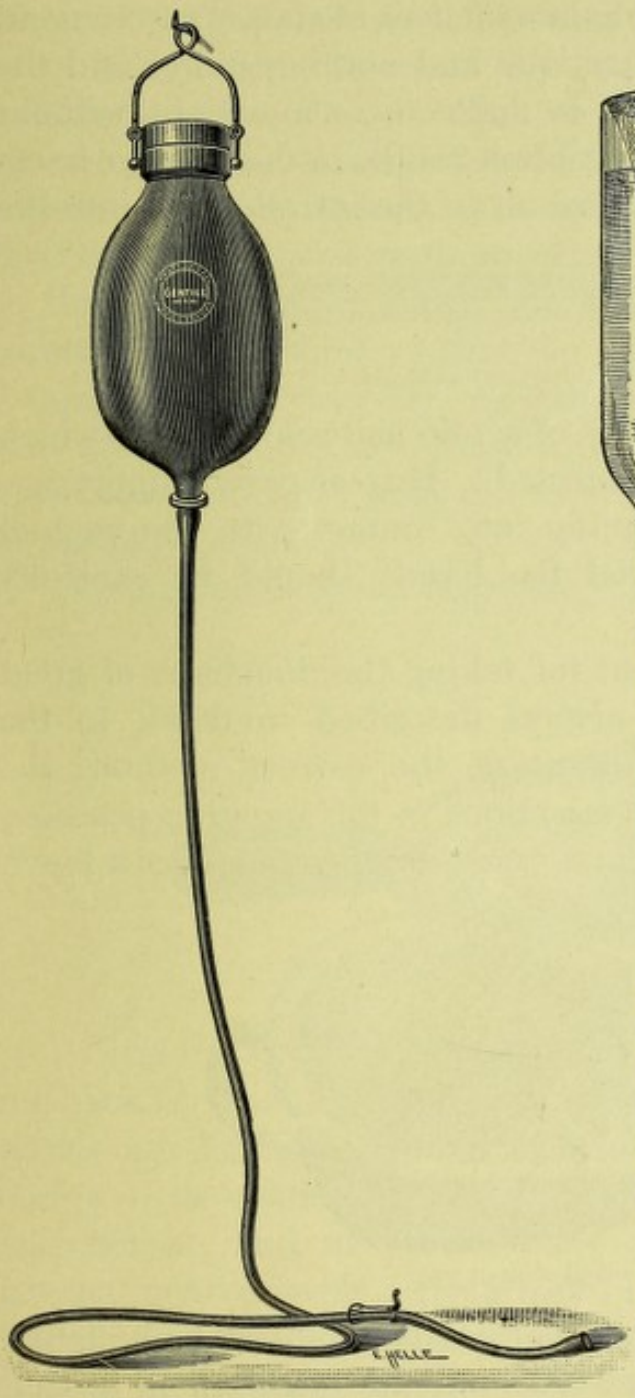


Fig. 18.—Rubber bag for vaginal injections.

It is unnecessary to describe Budin's apparatus and Doleris' bag, so we will briefly give the description of the siphon-injector or Higginson's syringe. It is a simple rubber tube with a hook-like extremity enabling it to be attached to the side of any vessel, and a bulbous projection about its middle which controls the amount of liquid passing through the tube according as little or increased pressure is placed upon the bulb.

Cannulas are usually made of glass, slightly expanded at their extremity, and having lateral openings and not terminal ones in order to avoid the projection of fluids into the cervix.

Technic.—It might be thought sufficient to simply recommend a woman to take vaginal injections and nothing more, and the current practice is for women to make these injections without cause and without care and this often results in doing more harm than good. An injection may result in the introduction into the

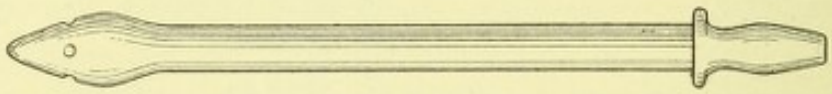


Fig. 19.—Glass vaginal cannula.

vagina, cervix, or uterine cavity of septic material, against which these organs are naturally protected. It is of great importance therefore that everything coming into contact with the vaginal cavity should be aseptic, and the hands should be carefully washed.

The position of the patient for taking the douche is of great importance and should be always described in detail to the patient by the doctor. Ignorant of the correct method, the patient sometimes makes the injections in the standing position, or seated astride of a bath or in a crouching position over a bowl.

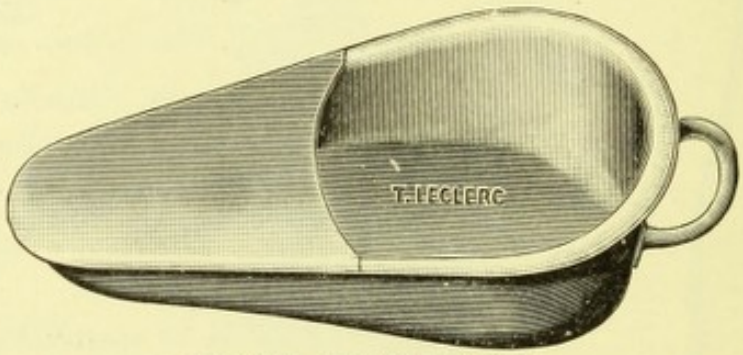


Fig. 20.—Bed-slipper pan.

Under these conditions the vaginal cavity is almost completely effaced by the abdominal pressure and the injection is unable to penetrate a very little distance, so that, if it be employed for its external effect upon the cervix, a fond illusion is the only result. All injections should be taken with the patient lying down, a vessel of appropriate form beneath the buttocks and perineum. This possesses the advantages of raising the pelvis and of causing the vagina to open out.

It is then freely irrigated and a certain quantity of fluid remaining in the cavity forms a sort of prolonged bath of undoubted advantage. The can is hooked up to the wall about 50 cm. (20 inches) above the level of the bed. Grasp the cannula at its base in order to avoid any contact with the free extremity, and then release the stop-cock on the tubing so as to drive any air out of the tube and to get rid of the first flow of water which is cold. The cannula is then introduced into the vagina, and directed at first backward, and then partly release the stop-cock so that the lotion is slowly allowed to run. Then rotate the cannula in the vagina so that the posterior, lateral, and anterior fornices are successively washed out. If the vaginal orifice contracts and does not allow the fluid to escape, lightly press down the fourchette with the cannula, so as to cause the vulva to partially gape.

Having finished the injection, ask the patient to lie flat on

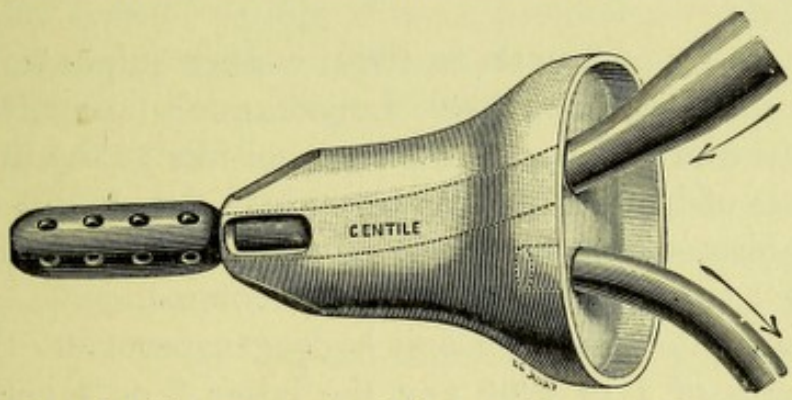


FIG. 21.—Double current cannula for very hot vaginal irrigations.

her back for about a quarter of an hour, or if she gets up immediately ask her to cough or bear down in order to evacuate the vagina of its contents which would slowly trickle away and wet her chemise, did we not observe this precaution. Wipe the external genitals with a clean towel or absorbent wool. Put the cannula in a vessel containing corrosive sublimate 1 per 1000 and replace the rubber tubing in the can, which is covered with a clean towel.

The quantity of fluid injected is about 1 to 1 1–2 liters (35 to 52 ounces). The temperature should be about that of the body. In certain cases it may be necessary to order very hot injections, about 48 to 50° (124 to 130° Fahrenheit), and it is noticed that while these are well tolerated in the vaginal cavity

they burn on running out. We adopt, therefore, certain precautions, and place on the perineum a sponge soaked with cold water or vaseline the skin surface well. If these means are insufficient, use a special cannula which permits of a back flow through a tube and allows no contact of the hot water with the external vulva and perineum. The figure admirably illustrates the apparatus used for this purpose. This special cannula is used when it is necessary to use large quantities of hot water; at Luxeil as much as 60 to 80 liters (105–140 pints) are used, and the irrigation lasts about 15 minutes.

The nature of the liquid employed need not detain us here, and it is ancient history now to use the division of injections into astringents, alteratives, emollients, and narcotics.

One is often restricted to the use of an aseptic liquid such as boiled water. Boracic acid, which is of such popular use that it is sold by grocers and other tradesmen, has of course no special effect.

Sublimate,[1] 1 or 2 parts to 4000; copper sulphate, 5 parts to 1000; alum, 30 parts to 1000; Labarraque's liquor, 25 parts to 1000; tincture of iodine, 1 or 2 teaspoonfuls to the liter; 1 or 2 teaspoonfuls of lysol to the liter, and laniodol, 1 part to 100, or using a tablespoonful to a liter of water and a solution of formaldehyde 1 to 10,000, have all been recommended.

Permanganate of potash and hydrogen peroxide, the former in a strength of 1 to 4000 and the latter 3 or 4 volumes, are strongly recommended.

Astringent injections are also useful: Decoctions of camomile, walnut leaves or oak bark are all useful. These decoctions have the advantage in that they force the patient to boil the water she uses. The active principle tannin is also used and about 3 grams (45 grains) are used to a liter (35 ounces) of boiling water.

Referring to alkaline injections we can recommend 10 grams (250 grains) of bicarbonate of sodium added to every liter of boiled water.

Indications and Contraindications.—Injections for cleanliness, so to speak, are useless. Used after coitus they are often

[1] The simplest method is to make packets of corrosive sublimate and a little tartaric acid to help it to dissolve, and add a coloring agent to avoid error (sublimate 0.50 tartaric acid, 15 grs. indigo carmin.

a cause of sterility. During pregnancy in healthy women they are injurious in that they diminish the bactericidal power of the vaginal secretions so clearly established by Doderlein, Kronig, and others. In addition, they may even cause abortion in exceptional instances. It is not our intention here to advise against vaginal injections, but merely to suggest more restraint in their use for purposes of cleanliness. They are of use in women who are wearing pessaries, and in such cases they should be continued even during the menstrual period, merely taking the simple precaution of giving them under gentle pressure and luke-warm so as not to excite uterine contractions. In such cases avoid the employment of drugs that might become deposited on the pessary and render it rough and irritating to the vagina.

As therapeutic agents injections have many indications as we will see further on in the treatment of vaginitis, some forms of metritis, and even of certain chronic periuterine inflammations. Hot injections with their vasoconstrictor action are indicated in all hemorrhages, metrorrhagias, and menorrhagias. There is reason to suspect their action in pelvic suppuration in the acute stage and in recent periuterine exudates, because they may determine an aggravation of the pain and of preexisting troubles.

2. Vaginal Medication.

Intravaginal medication in the form of applications is generally made after the speculum has been applied; perhaps as brushed out with (solution of nitrate of silver, tincture of iodine, etc.); perhaps as an insufflation (iodoform, alum, etc.); or as a tampon. For the last-named kind of application, by far the most employed, use a tampon of absorbent wool fastened to a stout piece of thread which should be of sufficient length to lie between the lips of the vulva, so that it may be drawn out by the patient at any time without recourse to the medical man's aid. The tampon, having been sterilized, may be a vehicle for the application of drugs in solution, ointment, or powder. After soaking the tampon in the solution to be used squeeze out the superfluous fluid so that it does not keep trickling away when once the tampon is in position. The most varied applications are

used, and of these glycerine deserves special mention. Introduced into gynecological therapeutics by Marion Sims, it rapidly demonstrated the possession of a special action. Eagerly absorbent of water, it excites an abundant aqueous flow, a sort of seromucous emission, and thanks to its hydragogue properties it is one of the best vaginal applications. It is used pure or with such agents as iodoform, 1 to 10; ichthyol, 1 to 20; resorcine, 1 to 10; acid lactic, 1 to 30, etc.

In order to permit patients themselves to introduce therapeutic agents, we advise, sometimes, the use of solid ovules with a glycerine base, which dissolve in the interior of the vaginal cavity.

Guinard has praised calcium carbure in cases of inoperable cancer. Having cleaned the parts, a piece of chloride of calcium is inserted into the os uteri and a tampon immediately introduced. The tampon is of iodoform gauze. After two or three days remove the tampon. The carbure of calcium is reinserted according as may be necessary. The method does not appear to have found many adherents.[1]

3. Tamponing of the Vagina.

The tamponing of the vagina has many indications:

(1) Application of an external application to the cervix and to a part of the vaginal mucous membrane.

(2) To maintain in the uterine cavity a solid pencil or bougie of some medicinal substance or a laminaria tent or a drain.

(3) To support a uterus which tends to prolapse or the reduction of a uterine deviation produced by manual manipulations.

(4) Arrest of uterine hemorrhage.

(5) As a means of reducing certain inflammatory conditions.

The first two cases of the tamponing will require no explanation; but we consider them as coming under the heading of a simple vaginal dressing which we have described under medication.

It is quite different when plugging is done for uterine hemorrhage. It must be done according to certain rules if we wish for success. We observe the same rules as in cases where we wish to support a uterus tending to prolapse; that is to say, we endeavor to get a stimulant action and to hasten the absorption of periuterine exudates. Tamponing for this latter was recom-

[1] Livet, The Employment of Calcium Carbure in Surgery. *Th. de Paris*, 1895–96, No. 403.

mended in the United States by Taliafero, and is often described under the name of columnization of the vagina.

Is the action of this agent as extensive as one would like?

We venture to affirm that it is, but as it is a method of treatment, incontestably anodyne, it can be tried in patients with an enlarged uterus with less true salpingitis than remnants of peritoneal exudates, described as Douglassitis, troubles insufficient in themselves to demand an operation of removal, but nevertheless giving rise to pain.

This plugging is carried out in the following manner: First, place a large tampon in the posterior fornix and then successively smaller tampons in the anterior and lateral fornices. These tampons should fill up the fornices and be on a level with the external os. They should be firmly rolled and compact in order to compress well. Their being placed in position is the most important part of the columnization; this is carried out by filling the vagina entirely with tampons moderately compact. In order to pack the vagina use tampons of wool and gauze impregnated with glycerine and dusted with iodoform.

Restricted to the above typed case and methodically applied, such columnization may give good results, and any patient with a retroflexed uterus, who cannot put up any longer with a pessary, will be able once more to wear one after the lapse of a varying interval during which this methodical plugging of the vagina is carefully carried out.

4. Catheterization of the Uterus.

Instruments Required.—Uterine catheterization or hysterometry can be carried out with simple urethral bougies or special instruments called sounds. Gum elastic urethral bougies may

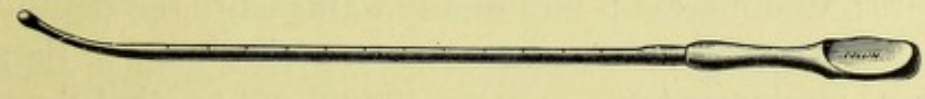


FIG. 22.—Malleable sound without index.

be used in sizes from 8 to 12. Sounds may be rigid or, better, malleable. The body is usually about 15 cm. long (6 inches) with a smooth olive tip, mounted on a narrowed neck and having a flattened anterior surface graduated with centimeter indices.

The indicator fitted to most sounds is to our idea useless and

renders them difficult to clean, and presents no advantage whatsoever.

Technic.—The employment of the sound should always be preceded by a bimanual examination, and we can thus determine the direction the sound should take by ascertaining the exact position of the uterus.

The sound may be introduced resting on the finger or through a speculum. It should be introduced very gently. Generally at a depth of about 2 to 5 cm. (4/5 to nearly 2 inches) the resistance of the isthmus is felt. Having passed this point, the sound glides on to the fundus which, normally, hardly sensitive, may be painful in certain inflammatory conditions.

Now attach a dressing forceps to the sound at the level of the external os; then withdraw both dressing forceps and sound, and it is easy to measure off the depth of the cavity of the uterus.

Whatever the means employed, it is important to observe precautions such as the absolute asepsis of the hands and the sound, the bimanual examination as a preliminary to ascertain the probable situation of the uterus, and extreme gentleness in the manipulations.

All acute inflammations of the vagina or cervix contraindicate this examination.

The smallest suspicion of pregnancy is an absolute contraindication.

By observing these precautions many complications which too often occur may be averted, such as pain, colic, abortion, perforation, and septic complications.

Indications.—The introduction of the uterine sound may be used to determine the *situation* of the uterus, to ascertain the existence of *certain pathological conditions* of the uterine cavity (structures, tumors, etc.), and finally to measure the depth of the uterus. It is useful to introduce it as a preliminary to the introduction of laminaria tents in order to find out to what depth and in what direction these should be entered. The normal depth is 5 cm. to 5 cm. 5 (about 2 to 2 1/5 inches) in nullipara, 6 cm. to 6 cm. 5 (about 2 2/5 to 2 4/5 inches) in multipara, and may be as much as 8 cm. (3 1/5 inches) in metritis, 8 to 10 cm. (3 1/5 to 4 inches) in puerperal subinvolution, and 15 to 20 cm. (6 to 8 inches) in a uterus containing fibroids.

Only the metallic sound can give positive information regarding the direction of the uterus. In a general way this may be determined by the bimanual examination, but there are cases where the sound is a great help to the diagnosis, as, for example, in a uterus with a fibroid in the anterior wall simulating an anteflexion of the organ (Figs. 23 and 24).

FIG. 23.—Uterine anteflexion.

FIG. 24.—Fibroma of anterior uterine wall, simulating, during palpation, a uterine anteflexion (see Fig. 23). Diagnosis was made with the sound.

The sound enables us to diagnose a stricture, a partial or complete obliteration of the uterine cavity, or an intrauterine tumor such as fibrous polyp.

The information we get, in such a case as we have just cited, by the use of a sound is always obscure and incomplete, and only intrauterine palpation can give precise information.

We may use the sound to reduce uterine displacements, revolving the instrument in the uterine cavity. This is now-a-days very rarely done.

In short, the uses of the uterine sound, at one time regarded as very many, are now-a-days very restricted and of much less importance than was imagined twenty-five years ago.[1]

5. Dilatation of the Uterus.

There are two varieties of dilatation: rapid and slow.

1. Rapid Dilatation.

Instruments.—Rapid dilatation may be accomplished with dilators or graduated bougies.

[1] We differ very widely from Huguier, who in finishing his work said: The uterine sound will some day occupy a place in the diagnosis of utero-ovarian troubles that auscultation and percussion occupy to-day in the diagnosis of cardiac and chest complaints. *De l'hystérométrie et du cathétérisme utérin*, Huguier (P.-C.).

Varieties of uterine dilators are many. These are those with two or three blades, and some of these have a series of transverse grooves on the external surface of the blades, which prevents slip-

FIG. 25.—Dilator with two blades.

ping and enables them to cope with the elasticity of the uterine muscles.

To the dilatation of the cervix, which is obtained by these dilators, many gynecologists prefer progressive dilatation by a

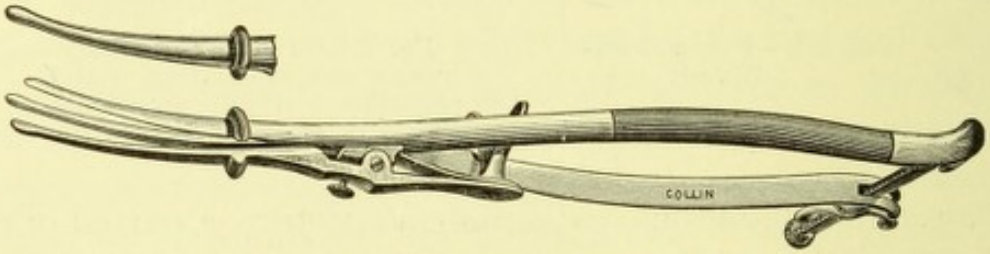


FIG. 26.—Dilator with three blades.

series of cylindrical bougies, of which the best known type is that of Hegar. They are made of hardened gum or better of metal, and their length exclusive of the handle is 12 to 14 cm.

FIG. 27.—Dilator with transverse grooving on the external surface of the blades.

(about 4 4/5 to 5 3/5 inches). In order to diminish their number, we recommend the double variety; that is, two bougies of successive sizes united in one by their bases (Fig. 29).

FIG. 28.—Hegar's bougie.

The diameter of the bougie is 1 to 2 mm. and increases successively 1 mm. in each bougie.

Collin has recently produced cylindro-conical bougies which are easier to introduce than Hegar's.

If a dilator or bougie is used, one should be provided with a tenaculum forceps for grasping and drawing down the cervix and also with a uterine sound.

Technic.—The intestine is emptied the day before by a laxative or enema; the vagina is washed well with soap and irrigated with an antiseptic solution such as 1 in 2000 sublimate.

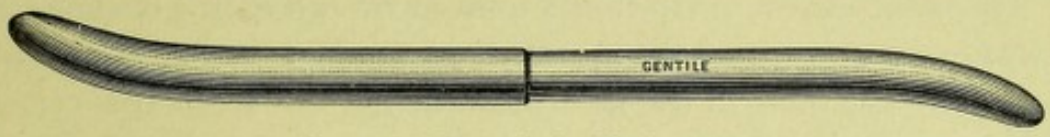


FIG. 29.—Hegar's double bougie.

As the dilatation does not take long, chloride of ethyl is sufficient, and one should only have recourse to chloroform or ether if it is impossible to obtain sufficient relaxation with the first named.

In virgins, the index-finger must be gently introduced to avoid tearing the hymen. Having reached the cervix glide the tenacu-

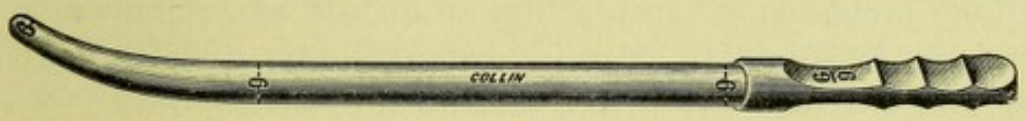


FIG. 30.—Collin's cylindro-conical bougie.

lum forceps along the finger and draw the cervix gently down to the vulva. When the hymenal orifice is small, the tenaculum forceps may be guided to the cervix by a finger placed in the rectum. In a married woman the cervix is taken hold of after pressing down the posterior vaginal wall with a Sims' speculum.

Having got the cervix down to the vulva, determine with a

FIG. 31.—Prepared laminaria.

sound the direction of the uterine canal, and the knowledge thus acquired helps greatly in the introduction of the dilator.

Introduce the dilator gently into the os externum. If at the level of the externum a resistance is felt, don't press on, but slightly withdraw the instrument and reintroduce in a direction where no resistance is felt. It is always dangerous to force a

dilator on because one may perforate the posterior wall of an anteflexed uterus.

Having introduced one instrument, the cervical canal is in a sense dilated, then the instrument is rotated a little in order to dilate another part, and so on until the whole circumference has been dilated. It is then withdrawn.

The next size is introduced and so on we continue until the dilatation is equal to a diameter of 1 cm. (2/5 inch). A greater dilatation may lead to the laceration of the cervical canal.

With bougies the procedure is the same and done with the same precautions. The bougie is well lubricated and is introduced slowly without forcing and with slight rotatory movements, when the pressure of the uterine walls is felt. The os internum often is very resistant, but it is overcome by a gradual pressure on the instrument and by modifying more or less its direction, at the same time being very careful to avoid sudden pressure which may lead to a perforation of the uterus.

Each bougie is left in position an instant and replaced by the next number above it. It is important to introduce each instrument and not miss any with a false idea of saving time.

If a bougie cannot be introduced, replace it by the preceding one, and leave it in some seconds. The tissues gradually accommodate themselves and with a little patience the recalcitrant bougie will be found to enter quite easily.

2. Slow or Gradual Dilatation.

Instruments Required.—Formerly gradual dilatation was produced by the progressive accumulation of little tampons of iodoform wool bound together or by the introduction of prepared cones of sponge, but now-a-days use laminaria tents, which one can obtain anywhere already prepared.

These laminaria tents are preserved in iodoform and ether, which has the double advantage of protecting them from the hygrometrical influence of the air, and of slowly impregnating them with an antiseptic. It is important to have a series each of different caliber. A great number are sometimes preserved in one bottle but this practice is disadvantageous in that it is difficult to identify a laminaria tent of the size we want and there is

a risk of infecting the others from an instrument imperfectly sterilized.

The manufacturers have striven to prepare sterilized laminaria, which are put up in sealed tubes containing a little vaseline in order to facilitate their introduction. The instruments required are a speculum, a tenaculum forceps for traction, a tent introducer, and some tampons.

Technic.—First determine the position of the uterus by a

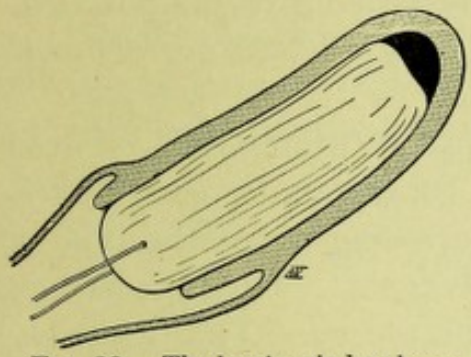


FIG. 32.—The laminaria has been well introduced into the uterine cavity and protrudes from the external os. It has successively dilated the cervix and body.

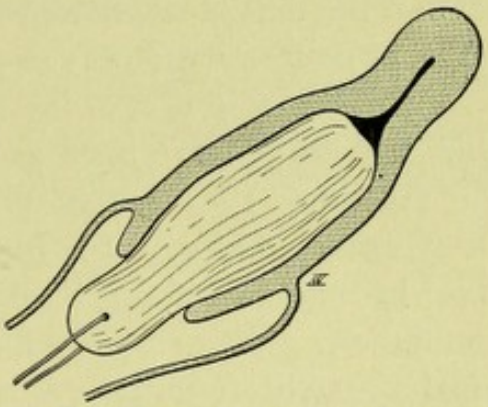


FIG. 33.—The tent insufficiently introduced has succeeded in dilating merely the cervical canal to great dimensions.

bimanual examination or even by using the uterine sound. The laminaria tent, if too stiff, is plunged into a hot solution of sublimate and is given the necessary inflexion already ascertained by the preliminary examination.

Having done this the speculum is put in place, the tent seized

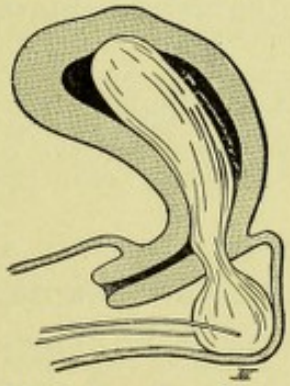


FIG. 34.—The laminaria pressed in an anteflexed uterus, has, in dilating, perforated the posterior lip of the cervix.

in a tent introducer and is gently passed into the uterine cavity. The extremity should go well past the internal os, and one can hardly feel satisfied if a laminaria stem has penetrated hardly 3 or 4 cm. into the uterus.

It is a mistake frequently made by beginners, especially in cases where metritis exists accompanied by enlargement of the cervical canal.

The laminaria penetrates to a certain depth, and then the operator feeling a resistance caused by the os internum comes to the conclusion that he is dealing with a small uterus and dilates only the cervical portion. It is always of use to ascertain beforehand the depth of the uterus by catheterization with a soft bougie. When the tent is in place, put in two vaginal tampons to retain it. It is of course absolutely essential for the patient to remain in bed.

The introduction of the tent is quite easy when its correct caliber and curve have been ascertained.

At times its removal may present some difficulties. These may arise pushing in the tent too far. Its extremity being invisible, instead of seizing it directly and drawing it out the tape is pulled on. This should be lying in the vagina. The tape breaks and the tent remains imprisoned in the uterus. The case may become more complicated when, for example, in a strongly anteflexed uterus a tent too forcibly introduced into its cavity may lead to perforation of the posterior lip of the cervix, as a result of pressure and then comes to lie in the vaginal posterior fornix. Incision of the cervix may be necessary in order to extract it.

Quite frequently it is the custom *to combine slow and rapid dilation.* Having obtained with one or two successive tents, a relative dilatation and a relaxation of the uterine tissues, bougies are introduced to obtain sufficient dilatation for the insertion of a finger.

Indications.—While in America the rapid dilatation is preferred, we believe that in the majority of cases the slow dilation is the most satisfactory.

It exposes the uterus less to tears and perforations, and in addition presents some definite advantages.

Dilatation by laminaria lasts longer than that obtained by dilators or bougies. In addition, it exercises an important tonic action on the uterus, rendering the tissues more relaxed and supple. Rapid dilatation should be restricted to those cases where dilatation of the uterus is a matter of urgency and to complete the slow dilatation already obtained by tents.

Uterine dilatation may be done with the object simply of

diagnosis in order to feel the lining membrane of the uterus, or exceptionally for an endoscopy. It is mainly done for therapeutic purposes. It may in certain cases form the basis of treatment, as, for example, in strictures of the cervix, of uterine dysmenorrhea, and of sterility. Generally it is merely the preliminary but indispensable part of another operation (uterine curetting, removal of a polyp, etc.).

6. Intrauterine Medication.

Under the generic term of intrauterine medication is included lavage of the uterus, the application of medicated bougies, intrauterine cauterizations, injections, drainage of the uterus, vaporization.

1. Intrauterine Lavage.

Intrauterine lavages enable us to introduce a considerable current of fluid which, apart from its antiseptic action, which is variable and depends on the nature and quantity of the anti-

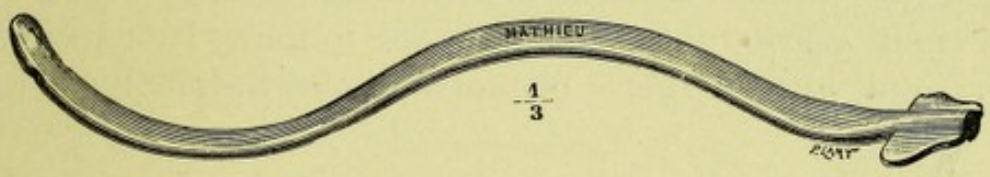


FIG. 35.—Pinard's catheter.

septic employed, exercises also a mechanical action on the contents of the uterine cavity (placental debris, products of secretion).

The operation may be carried out (1) in the puerperal condition; (2) in the non-puerperal condition.

a. Intrauterine Lavage in the Puerperal State.

Instruments.—We require a bowl, a pair of volsellum or tenaculum forceps, and a cannula. Immediately after the accouchement, when the cervix is widely open, we may use the vaginal cannula, or Pinard's glass catheter. At a later stage it will be necessary to use a special cannula of which various models can be obtained. All should fulfill two conditions.

1. The extremity should be slightly bent in order to easily engage in the normal uterus partly anteflexed.

2. The cannula should be of the double-current variety, enabling entry and evacuation of fluid to proceed simultaneously.

In France, Budin's and Doleris' instruments are generally

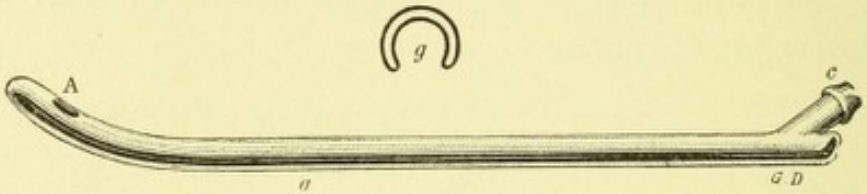


Fig. 36.—Budin's catheter.

the most used. Budin's catheter is very simple. It consists of a tube for conveying fluids into the uterus. This tube is grooved and the groove serves for the evacuation of the fluids.

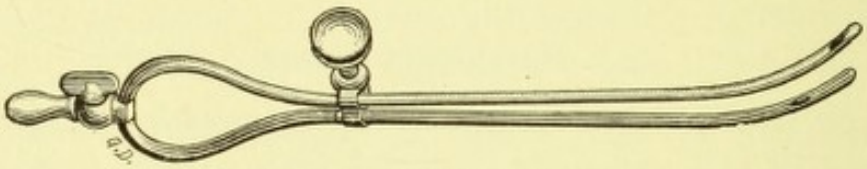


Fig. 37.—Doléris' catheter.

Doleris' catheter consists of two arms, each of which serves as a canal for the introduction of the lotion. It is introduced closed, and once in place one manipulates the small screw and

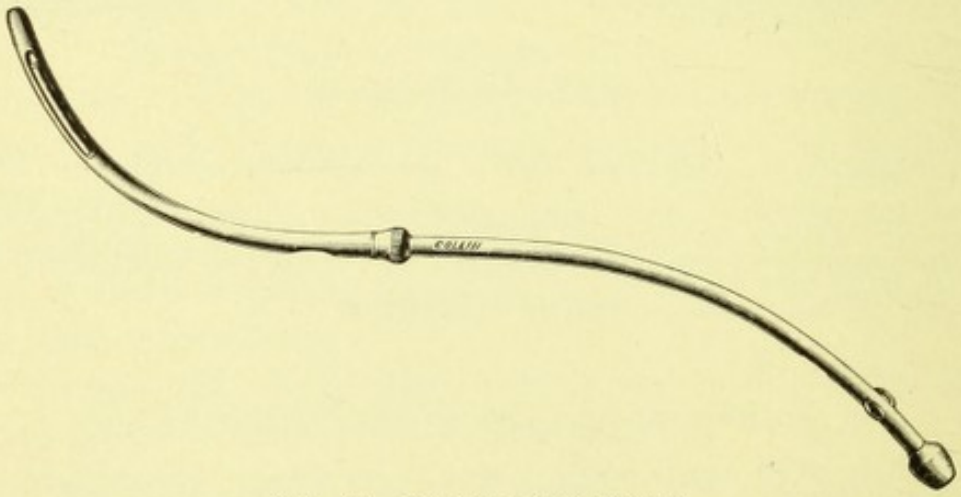


Fig. 38.—Bozemann's catheter.

thus separates the two arms, in this way widening the cervical canal and creating a way of escape for the fluid.

If the uterus is small, we may use Bozemann's catheter, described in German text-books under the name of Fritsch. It

consists of two tubes, one contained in the other, the smaller serving for the introduction of fluids and the other for their evacuation.

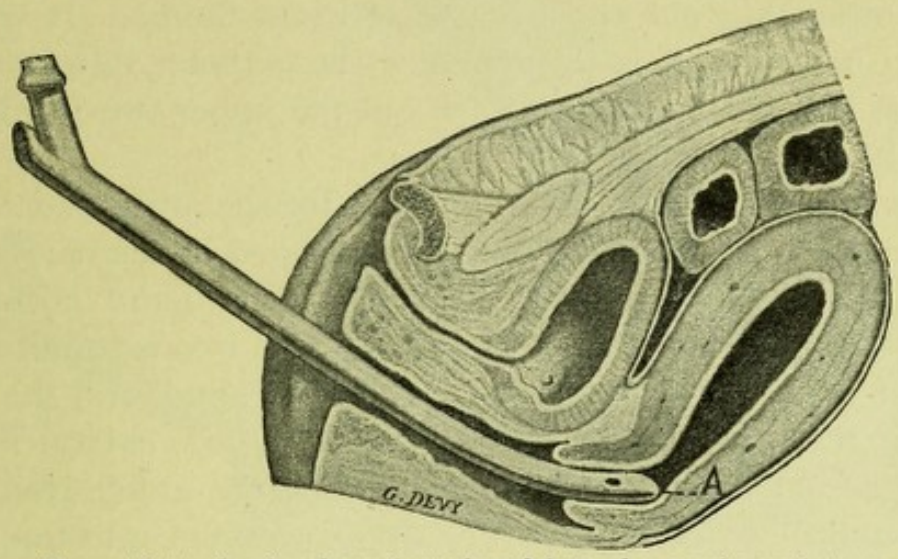


FIG. 39.—The catheter having been introduced into the cervix, resistance at A is met with by reason of the anteflexion of the uterus.

Technic.—The catheter should be introduced through a speculum having first drawn down the cervix and fixed it.

It is important to remember that normally the uterus is ante-

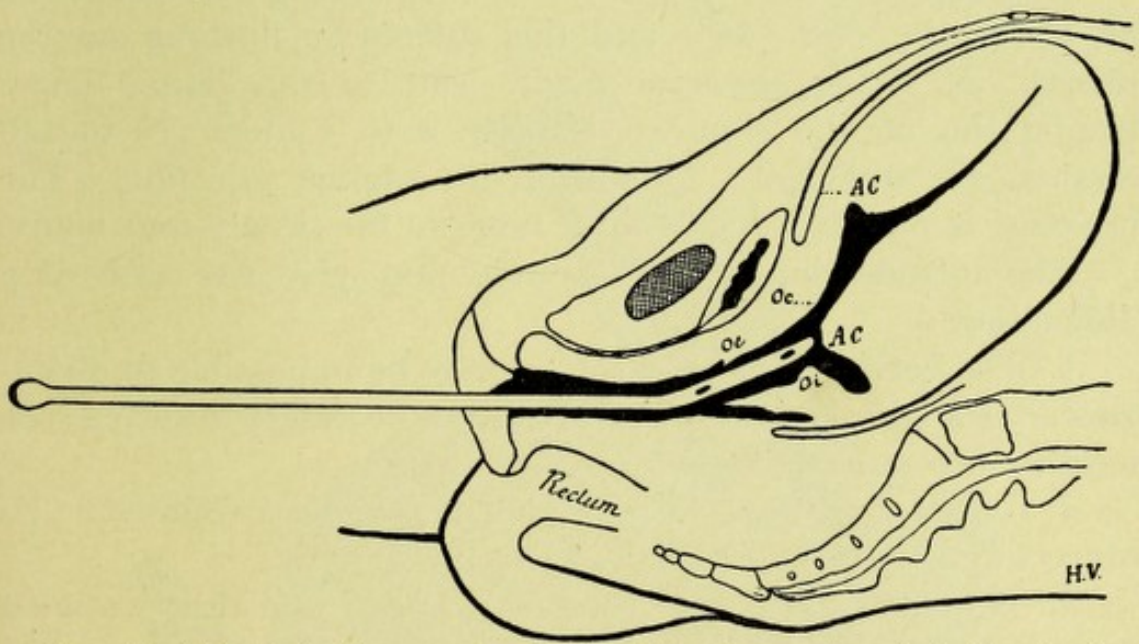


FIG. 40.—(Varnier.) The upper two-thirds of the uterus are in a state of contraction. The catheter meets with resistance at the pseudo-sphincter, AC, corresponding to the interior part of the contracted zone.

flexed and if one pushes on straight ahead after having engaged the catheter in the cervix, there is always a risk of perforating the posterior wall (*vide* Fig. 39). It is important also to remember

that after the accouchement and delivery, the uterus retracts unequally; while the two upper thirds contract forming the globe so well known to all accoucheurs, the inferior segment and the cervix often thin out and become soft and flabby. It will thus be seen how easy it is to introduce the catheter into this lower segment and not be able to wash out the upper two-thirds at all (Fig. 40).

It is important to observe the rules for the introduction of the instrument. Once the catheter has engaged in the cavity of the cervix, straighten the uterus by placing the left hand on the hypogastrium and depress it. Then lower the free extremity of the catheter (as in the diagram) with the right hand, and the instrument is then gently introduced into the uterine cavity (Fig. 41). The hand on the abdomen has reduced the anteflexion of the uterus and in order to introduce the instrument into the uterine cavity, depress the free extremity in the direction of the arrow.

If the catheter is stopped by a uterine contraction, press upon the pseudo-sphincter thus created, with the finger, and the catheter will glide without difficulty to the fundus (Fig. 42).

A light pressure of water is obtained by raising the douche can 30 to 40 cm. (12″—16″) and this suffices for flushing out the uterus. A strong pressure might lead to the liquid penetrating the uterine sinuses. Usually 2 to 4 liters (70 to 140 ounces) are sufficient. Finally give a vaginal injection. The injection is repeated two or three times in the twenty-four hours.

The introduction of the cannula may give rise to certain difficulties.

1. The cervix being very soft, it may be impossible to distinguish it from the vaginal walls. It will be necessary in such a case to introduce several fingers.

2. The cervix may be contracted and the os closed. To overcome this introduce some of Hegar's dilators.

3. The uterus may be flexed or deviated and then we must draw it down with volsellum forceps.

Pinard and Varnier have used, in certain cases, continuous irrigation. This measure to-day has been abandoned but has been of undoubted service in cases of certain rare forms of pseudo-membranous puerperal metritis.

In order to carry out continuous irrigation, we must have a

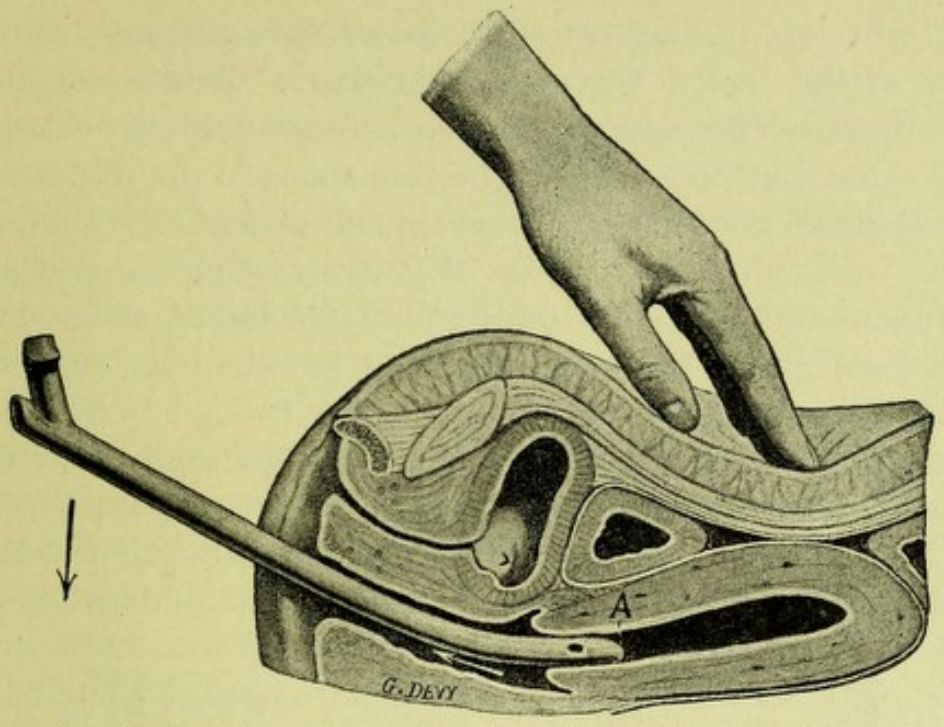


FIG. 41.—The hand on the abdomen has reduced the anteflexion. To penetrate the cavity with the catheter, depress the full extremity in the direction of the arrow.

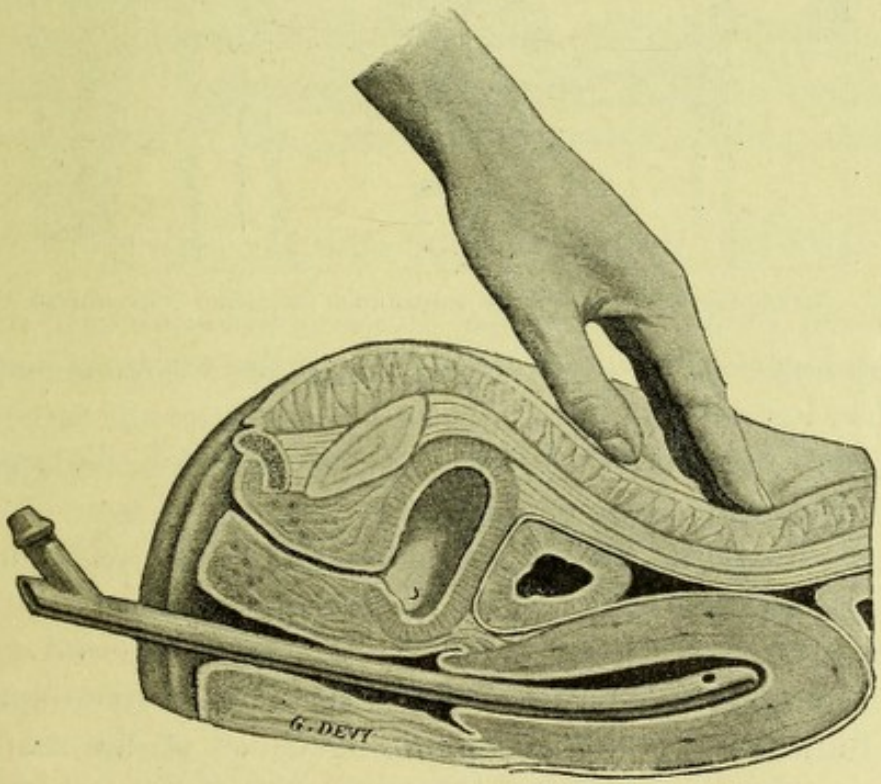


FIG. 42.—Catheter in the uterus.

bed with a spring mattress. Place on it two mattresses, each folded on itself and separated so as to leave a space fall in the middle of the bed. Cover each mattress with waterproof or some impermeable material and so arrange the free extremities of the same that they meet in the free space in the middle of the bed and direct the fluid into a receptacle beneath it.

The reservoir used may be of glass or of china, and should hold about 20 liters (700 ounces). It is raised about 50 cm. (1 1/2 feet) above the bed and fitted by a rubber tube to the catheter (Fig. 43).

Complications.—A series of complications may occur during an intrauterine irrigation.

1. *Perforation of the Uterus.*—This may occur at the level of the inferior segment, perhaps, when force is used to overcome

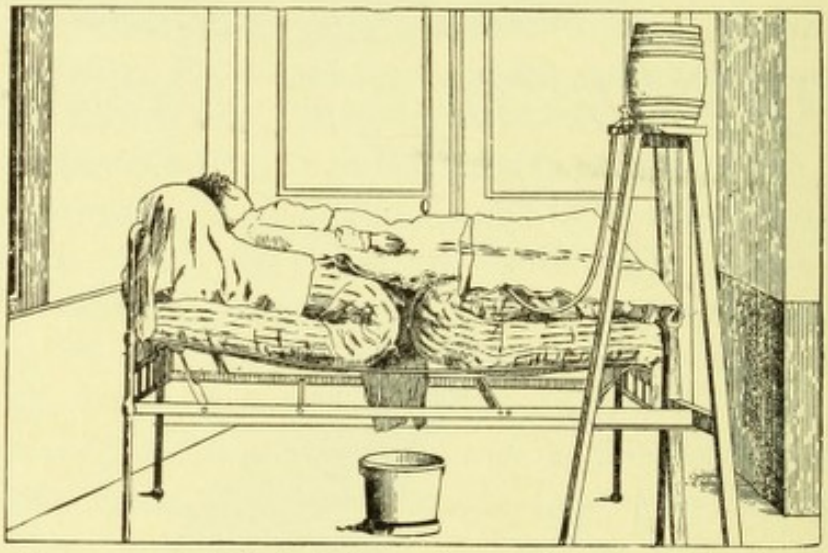


Fig. 43.—Arrangement of the bed for continuous irrigation (Pinard and Varnier).

the resistance or may be at the fundus, if the uterus is very septic or if it has lost its tonicity.

2. *Penetration of Fluid into the Peritoneum.*—To avoid this always use a light pressure of fluid.

3. *Introduction of Fluid or Air into the Veins.*—It is a matter of prudence not to flush out with anything of a toxic nature during uterine inertia, but to our mind it seems an exaggeration to fear the use of hydrogen peroxide during the four or five days immediately following an accouchement, because of the sinuses not having completely closed and the possibility of gas bubbles entering them.

4. *Nervous Complications.*—Such nervous complications as shivering, dyspnea, cardiac distress, syncope, convulsions, etc., are still imperfectly explained. If these occur, withdraw the cannula, lower the patient's head, and carry out the treatment of shock.

Secondary *complications of intoxication*, due to the absorption of the antiseptic employed, have been cited.

Indications and Contraindications.—Intrauterine flushing out has two main indications—hemorrhage and septic infection.

To combat hemorrhage, first curette the uterus manually or digitally, and then inject from 3 to 5 liters (105 to 175 ounces) of sterilized water at 48° Centigrade (125° Fahrenheit). This will produce a hemostatic retraction of the uterus.

To combat *septic infection* accompanied by fever or retention or fetid lochia, the irrigation should be carried out with water to which iodine has been added (1 or 2 teaspoonfuls of French tincture of iodine (French Pharmacopeia tincture of iodine is 10 per cent.; B. P., 2 1/2 per cent.) to 35 ounces or 1 liter of water) or with permanganate of potash 1 to 1000, or with chlorinated water (3 tablespoonfuls of the "liqueur de Labarraque" to the liter) or with hydrogen peroxide 5 volumes.

The intrauterine injections are contraindicated in rupture or perforation of the uterus, even when only suspected or if a previous injection has produced nervous complications.

b. Intrauterine Lavage in the Non-puerperal State.

These injections are generally carried out after a preliminary dilatation. A red rubber urethral catheter may then be used, and of course the customary douche-can.

If the uterus has not already been dilated, we have recourse to one of the special instruments such as the combined dilator-injector of Aug. Reverdin or that of Jayle. As the arms of the catheter are applied to the right and left sides of the uterus, these parts are not well irrigated, so it is as well to have another form of the same instrument in which the blades open perpendicularly.

In this manner by the alternate employment of both forms, we can be assured of a complete irrigation of the uterus.

The most varied solutions are employed, such as 1 to 2000

permanganate of potassium; biniodide or sublimate of mercury, 1 to 4000; argenti nitras, 1 to 2000; zinci chloridi, 1 to 200; lysol, 1 to 200, etc.

The most important point to ascertain is that the solution employed can easily escape from the uterus.

Complications may occur during irrigation similar to those already observed in the puerperal state, but they are much rarer.

2. Intrauterine Injections.

The intrauterine injections have been recommended by many gynecologists in the treatment of metritis. We may use the

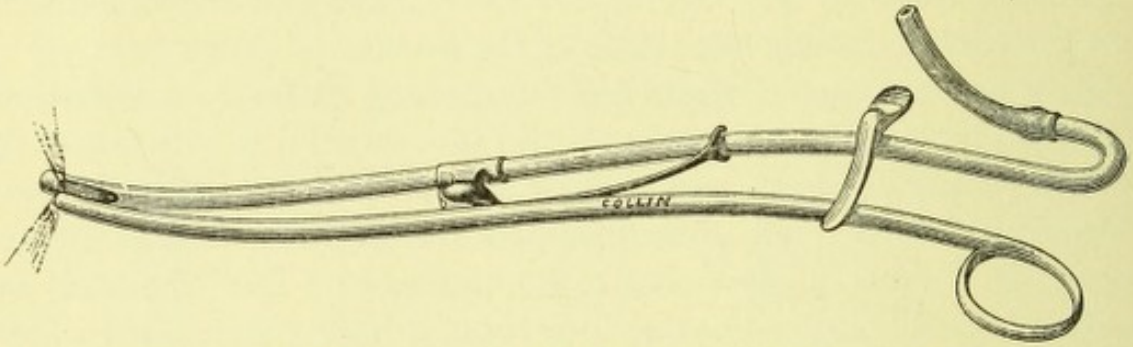


Fig. 44.—A. Reverdin's combined dilating and flushing catheter.

most varied solutions: Silver nitrate, 5 to 25 per 1000; protargol, 5 to 25 per 1000; chloride of zinc, 5 to 50 per 100; copper sulphate, 5 to 10 per 100; perchloride of iron, 50 to 100; tincture of iodine, 20 to 100; ichthyol, pure or combined in equal parts with glycerine.

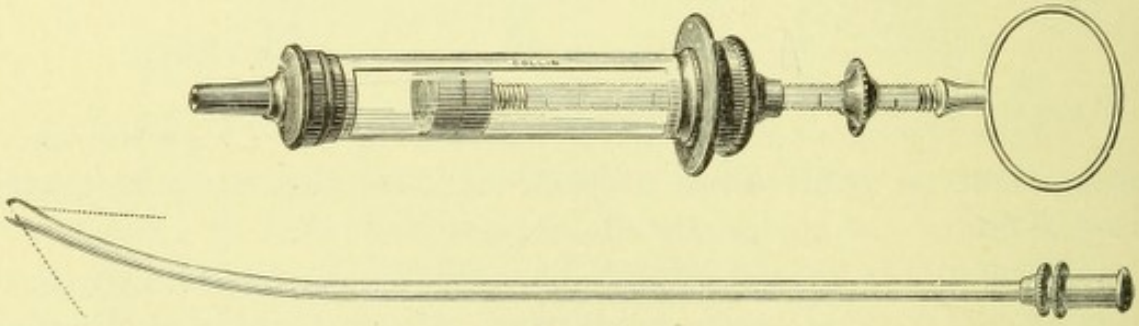


Fig. 45.—Braun's syringe

These irrigations must be made always with a well dilated cervix and only a small quantity of solution introduced at a time.

To carry the injection out, in Germany, Braun's syringe of hardened rubber is used. One can also use the syringe.

If a caustic solution is used, as a preliminary measure put a tampon of wool behind the cervix in order to protect the vagina.

These intrauterine injections are not absolutely harmless. Menge has collected thirty instances of death after the use of Braun's syringe. Deaths have occurred after its use in doctors' consulting-rooms or even in the street, when the patient is returning home. It can be understood what a commotion such accidents would cause, following on a treatment considered by the family and friends as absolutely simple—used only to give a little relief.

These accidents are occasioned by the penetration of the solution into the tubes and then into the peritoneal cavity and this penetration has been experimentally demonstrated by such men as Doderlein, Zweifel and Menge.[1] There is, therefore, good reason to abandon these injections.

3. Application of Medicated Bougies and of Caustics to the Uterine Cavity.

Medicated bougies or pencils which are introduced into the uterine cavity are formed of a paste-like material, quite firm at ordinary temperature, but which softens in the uterine cavity and then is liberated from this pasty material the active ingredient.

One of the most frequently employed is the iodoform pencil or bougie:

℞.—Iodoform, 20 grams=5 drams.
Gum arabic,
Glycerine,
Amidon, aa 2 grams=30 grains.
For 10 pencils.

Pencils of ichthyol are frequently used.

Caustic Pencils.—One of the most frequently used forms is that of *Dumontpallier contained in Canquoin's paste* (chloride of zinc 1, rye flour 2). The pencil weighs 1 gram (15 grains) and is surrounded by a piece of tin in the portion which would lie at the

[1] Döderlein, before doing vaginal hysterectomies, made a series of intrauterine injections with coloring agents and determined therewith the immediate presence of these solutions in the tubes and peritoneal cavity. An objection was raised to this, viz., that this penetration was due to manipulations of the uterus during the course of the operation. However, Zweifel and Menge have observed the same occurrences in abdominal sections and have seen the colored solution appear at the opening of the tubes without any manipulation of the uterus at all.

internal os. It may be introduced into the uterus and allowed to remain there. During the month following the cauterization, it is important to pass a catheter with an olive tip, frequently, in order to avoid the production of atresia. Numerous complications such as stenosis, obliteration with amenorrhea and hematometra, dysmenorrhea, and troubles in the adnexa have caused the almost complete abandoning of these pencils, which enjoyed for some time an unmerited vogue.

Silver nitrate pencils are introduced and left in the uterus; also those of corrosive sublimate (corrosive sublimate 1, talc powder 0.5, tragacanth gum 0.3, water and glycerine, q. s.).

All these caustics, in which one is unable to control the action, should be abandoned.

It is not the same with Filhos bougies which are applied to the treatment of cervical catarrh. The employment of these pencils consisting of Vienna paste solidified and placed in leaden tubes, has been popularized quite recently by L. G. Richelot.

A slender tampon of absorbent wool is placed in the posterior fornix; the leaden tube is cut with a knife and the caustic is forced out about half a centimeter (about 1/5 of an inch). Holding the closed end of the tube in a pair of forceps, the caustic is applied for some time to each part of the cervix, waiting until the mucous membrane thus attacked becomes blackened and begins to bleed. It is applied to the whole cervix and particularly to those parts, here and there, where the trouble is most aggravated. From time to time, wipe the end of the caustic and lift up the pulpy substance which covers over the cervix and continue until the eschar formed is black and everywhere well formed.

This operation lasts from 3 to 5 minutes and afterward an iodoformed tampon is placed against the cervix.

Cauterization is either slightly painful or painless; in any case pain ceases after the third or fourth application. The patient can return to her home, but she should rest in the extended position, if possible, all day long. On the following day she should take out the tampon and make one or two injections daily of boiled water.

The cauterizations are renewed every five or seven days, always waiting until the eschar has completely separated.

The number of cauterizations varies from eight to twelve.

Between the little operations if the area dealt with has cicatrized completely, the volume of the cervix is reduced and its form satisfactory.

Probes for Applying Caustics.—These are numerous and of every imaginable form. It would appear to us that the best is to use a metallic stem with a flexible end which is spirally grooved. As a result of this flexibility this probe can follow the deviations of the uterine canal and reach the fundus, without need for a preliminary dilatation.

Around the probe a thin wisp of wool is rolled, being careful to use only one piece, so as to be able to withdraw the whole in its entirety. The wool is left in the form of a tuft at the end of the probe in such a manner that the liquid caustic, being expressed

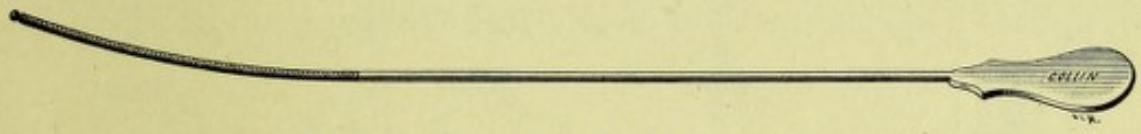


Fig. 46.—Probe with flexible extremity.

by pressure against the fundus of the uterus, can flow over the whole length of the mucous membrane. The wool rolled around the stem of the probe should extend down low enough so that it lies below the vaginal portion of the cervix, thus enabling us to seize it with a pair of forceps and to be certain of removing both probe and wool together.

Chloride of zinc may be used in 50 to 100, nitrate of silver 50 to 100, tincture of iodine, perchloride of iron, and formalin 25 to 100.

It is absolutely necessary for each cauterization to pass the probe gently around two or three times. As a dressing, place a tampon of iodoform against the cervix. Don't practice cauterization too often, and let eight or ten days elapse between each one.

7. Drainage of the Uterus.

The placing of a drain in the uterus is done in order to keep the cavity well open in order to facilitate the discharge of secretions.

For this purpose we use glass tubes pierced with small holes (Fehling), metallic tubes (Lefour), metallic drains (Petit), etc.

The fixation of these drainage apparatus in the uterus is secured by passing silk or horsehair stitches through the lips of the cervix.

These measures of permanent drainage are contraindicated whenever there exists the least inflammatory state of the adnexa. It appears to us to be hardly necessary to state the indications as we have never had recourse to it. We have only had occasion to use this drainage after intrauterine intervention and then we used a simple rubber drain which was held in place by a tampon placed against the external os.

8. Atmokausis.

Under the name of atmokausis (ἀτμος, vapor) we wish to designate a special method of physical cauterization in which the

Fig. 47.—Lefour's tube.

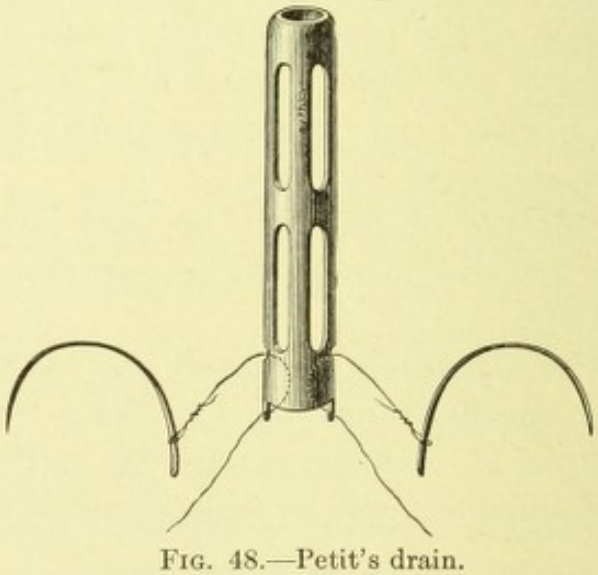


Fig. 48.—Petit's drain.

cauterizing agent is simply steam.

First used in Russia by Sneguiref, atmokausis has been principally employed in Germany where it has been the subject of numerous works principally by such men as Pincus and Duhrsen.[1]

Instruments Required.—Sneguiref simply used a boiler and a reservoir for the steam, and a rubber and a metal tube. Duhrsen

[1] L. Pincus, Atmokausis und Zestokausis, Second Edition, Wiesbaden, 1906.

introduced into the uterus two concentric tubes, of which the external was a bad conductor of heat in order to avoid burning the cervix.

Pincus' apparatus is the most used. The generator is a small boiler capable of a pressure of 2 1/2 atmospheres. Its cubic contents are 600 c.c. and it is cylindrical in shape. Attached to the lid of the boiler is a graduated thermometer capable of registering up to 120° C.; second, a safety valve which releases the steam at 115°; third, a

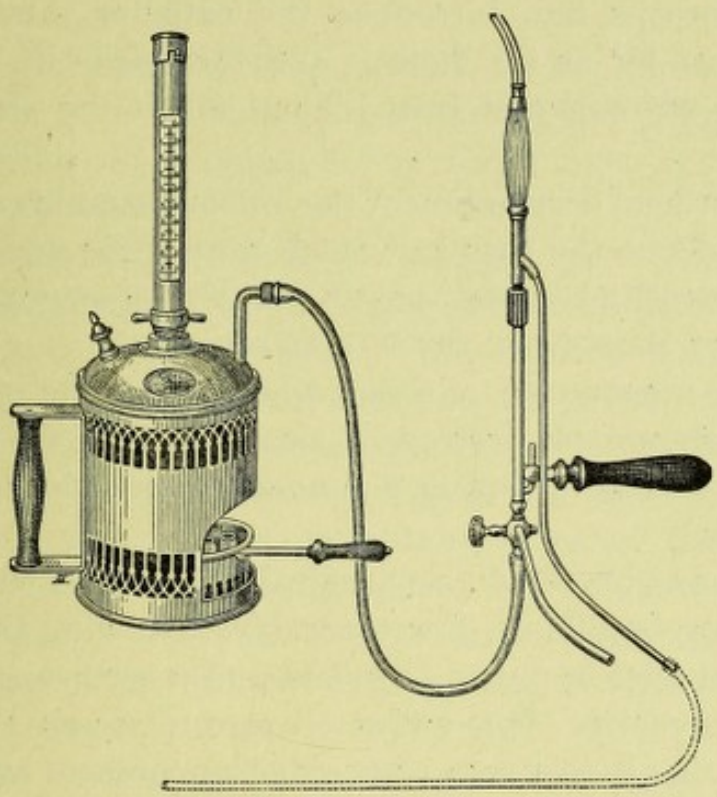


FIG. 49.—Pincus' apparatus.

metal tube raised to a certain height in order to avoid the projection of water into the rubber tube to which it is attached. This rubber tube is specially strong and is strengthened by a woven band around it. It is connected by a tube with the steam pipe. It is 75 cm. (30 inches) to 1 meter (39 inches) long and terminates in a stop-cock with three valves, which may close off the boiler and permit the steam to escape or to enter the uterine catheter.

This catheter consists of two tubes, one contained in the other. The internal is pierced with small openings along its whole length of 3 cm. ($1\frac{1}{5}''$) and it conducts the steam. The

external tube, closed on its convex side, is pierced in front by three elongated windows and through these the steam escapes. Place on the end of the uterine catheter tips of various forms to accommodate to the length and curve of the uterus.

A cover protects the cervix.

Technic.—Anesthesia is not required for atmokausis. The cervical canal should, as a preliminary, be dilated by laminaria tents or Hegar's dilators.

Having introduced the speculum, seize the cervix with a volsellum forceps and introduce the catheter into the uterus. Push it on as far as the fundus and then draw it back a little so that the extremity is free. Then allow the steam to pass through.

If a superficial destruction of the mucous membrane is desired, such as would be the case in women during the period of sexual activity, Pincus advocates passing a jet of steam at 115° C. during a very short time, say 5 to 15 seconds.

After the menopause, in a case where the whole of the mucous membrane should be destroyed, steam at 105° C. is used, but it is allowed to pass during a longer period of time, that is 2 to 3 minutes.

There is an immediate discharge of a dark fluid which reminds one of strong bouillon. For some days following this operation the necrosed part becomes detached and a sero-sanguineous discharge takes place. It is not at all rare to see an elevated temperature similar to that seen after an accouchement and caused by retained lochia. In event of a rise in temperature flush out the uterus with a double current catheter.

The regeneration of the mucous membrane occurs in the same manner as after a curetting if some isles of mucous membrane have been left.

Complications.—Complications have been cited as a result of intrauterine vaporization, some immediate and some consecutive.

The *immediate complications* are burns to the vagina, to the vulva, and to the external surface of the cervix. There is less risk of producing these with Pincus' apparatus than with that of Duhrsen, which has no rubber tube for the evacuation of the steam and allows the steam to go out alongside the catheter in the cervical canal.

The accidents which occur later are the stricture of the cervix, the complete or partial obliteration of the uterine cavity, death by perforation of the uterus,[1] and inflammation extending to the diseased adnexa.

Indications.—Atmokausis has been employed in the treatment of hemorrhagic metritis, septic puerperal metritis, fibromas and menopause hemorrhages. It has also been used to cause a retrogression of an incompletely involuted uterus, to treat subacute gonorrhea, etc. Pincus advocates it for disinfecting retained placenta.

There is a manifest exaggeration in the indications of the method; it is quite certain that when we are faced with a placental retention or a decidual hemorrhagic metritis, the indication is to empty the uterus.

Atmokausis appears to us to have the great inconvenience of being a blind method, whose action is with difficulty regulated.[2] Doderlein and Kronig reproach the method very deservedly, because it does not act uniformly on the whole of the uterine cavity; their researches have shown that while at the level of the point corresponding to the opening of the tube a deep eschar is produced, the mucous membrane in other parts is macroscopically and microscopically intact. We believe that it is a method which is only allowed to exist, owing to the contraindications of other forms of intrauterine treatment. Doderlein and Kronig think that one should rightly try it in hemorrhagic endometritis which curetting has not cured, in hemorrhages occurring in leucemia, where intervention of a larger order is dangerous, in those of diabetes, hemophilia, Werdolf's disease, or where there is a contraindication to anesthesia and in hemorrhages occurring at the menopause when there is certainly no neoplasm present.

[1] In a case of Van der Velde and Treub, Pincus' apparatus was used. The steam at 105° C. had been passing about 1 minute. Peritonitis supervened as the result of a perforation of the fundus. There was found to be total necrosis of the mucous membrane and in certain places superficial necrosis of the muscle.

[2] Flatau has made a series of examinations of uteri freshly removed. He states: (1) That the temperature indicated by a thermometer plunged through the uterine wall into its cavity varies between 70 and 80° C. when the thermometer on the generator marks 105 to 110°. (2) That the results are extremely variable, the mucous membranes being at times hardly touched, sometimes entirely destroyed, the intensity of the cauterization depending much less on the duration of the steam vaporization than the size of the uterine cavity, of the anatomical variety of the metritis, of the variable contents (presence or absence of blood), of the uterine cavity. (Flatau, *Monatschr. f. Geb. u. Gyn.*, 1899, T. II, p. 337.)

Zestokausis.—Under this name Pincus describes a method of cauterization by dry heat. The instrument is introduced into the uterus and the interior only is heated by a circulation of steam which does not come into actual contact itself with the uterine tissue. It is employed in dysmenorrhea and incomplete involution of the uterus. The results published are still too few for us to give any opinion on this form of treatment.

9. Bier's Method.

The production of local hyperemia which constitutes the characteristic of Bier's method for the treatment of inflammation is carried out in three ways, viz., the application above the

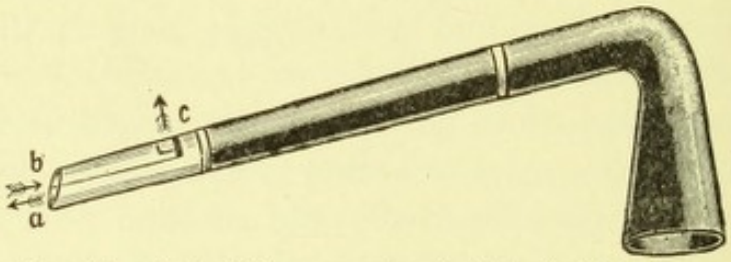


Fig. 50.—Rudolph's apparatus for hot-air injections.

diseased part of a constricting band, by the action of heat, and by aspiration.

The last two procedures have been applied to uterine troubles, in particular to inflammation of the cervix.

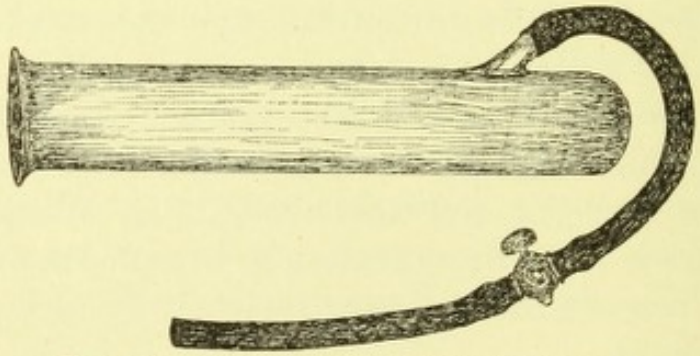


Fig. 51.—Eversmann's cupping apparatus.

In order to produce the thermic action, J. Rudolph[1] has produced an apparatus like a bent trumpet. The expanded end consists of metal and it is attached by a joint of amianthus to the tube portion which consists of wood (Fig. 50).

The terminal part in wood is divided by a septum into two

[1] Rudolph (J.), Die Bier'sche Staaung in der gynäkologischen Praxis. *Zentr.-Bl. f. Gyn.*, Leipzig, 1905, p. 1185.

compartments. The heat gets to the cervix through the lower part *a*, then flows into the upper chamber *b* and goes out through a special orifice at *c*.

If the cupping apparatus is used the best is that of Eversmann,[1] consisting of a glass cylinder closed at one end. This is applied to the cervix and by means of a rubber tube and stopcock attached near its extremity air can be exhausted from it.

10. Pessaries.

Pessaries are instruments designed to keep the uterus in its natural situation.

History.—In ancient times pessaries were employed to remedy prolapse of the uterus. In place of the apples and oranges which were used in the middle ages by women to prevent prolapse, appropriate apparatus was introduced to remedy this condition. In a book written by A. Pare we find a description of pessaries and their method of employment. Since the study of uterine deviations has begun, Neugebauer has been able to collect 400 different forms. Since the great extension of operative gynecology, pessaries have been almost completely given up. Some gynecologists, Kustner in Germany and Bantock in England, have protested recently against this abandoning of pessaries. In actual practice, doctors in France hardly ever advise the use of pessaries and if they do they content themselves with advising the patient to buy a ring at an instrument shop. If she is advised to have a little operative intervention, she sometimes goes directly to the instrument maker's who furnishes her with an apparatus the dimensions of which are such as to render it useless and the application is probably improperly made, if she is not taught how. It is quite evident that the doctor is wrong in being so disinterested in the pessary, and, although he should not attach so much importance to it as was the custom long ago, still he should act as an intermediary between the instrument maker and the patient—a state of affairs which would assist the woman greatly.

The Various Types of Pessaries.—There are three great classes of pessaries:

[1] Eversmann (J.), *Ibidem*, p. 1467.

1. The *vagino-abdominal pessary* is applied in the vagina and is fixed to an external part which is supported from the abdomen.

2. The *vaginal pessaries* which are entirely included in the vagina.

3. *Intrauterine pessaries* which penetrate into the uterine cavity.

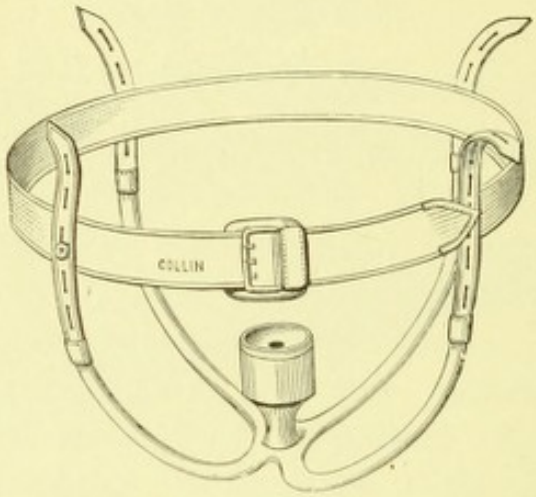


Fig. 52.—Borgnet's pessary.

We will not discuss the last variety as so many complications may be set up by their use that they have been abandoned.

Vagino-abdominal Pessaries.

These pessaries, sometimes called hysterophores, are used to support the uterus in prolapse.

They consist of a pad, a ring, a sort of ampulla which supports

Fig. 53.—Insufflating bag.

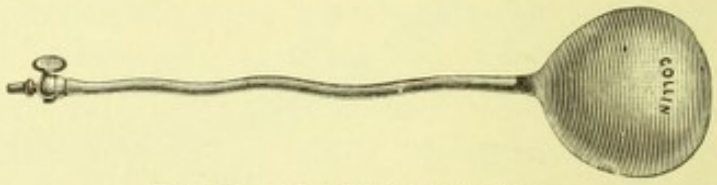


Fig. 54.—Gaull's air pessary.

the cervix and which is fixed to the abdominal belt of various forms.

Vaginal Pessaries.

Their variety is considerable. Among those most employed we will cite that of Dumontpallier, those of Thomas, Hodge,

Smith and Schultze. The last named has made a profound study of uterine deviations and their treatment. Patients still sometimes use, most often on the advice of their doctor, the india-rubber sphere, which is blown up when once in place. This pessary, like all those of soft rubber, has the disadvantage of easily altering its shape (Figs. 53 and 54).

Dumontpallier's Pessary.—It consists of a sort of watch spring covered over with rubber (Fig. 55).

FIG. 55.

FIG. 56.

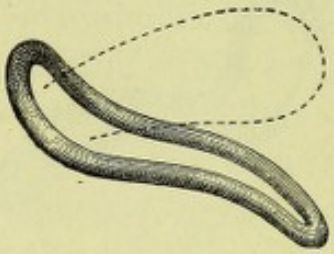


FIG. 57.

Hodge's Pessary.—This pessary has the form of a rectangle, with the angles rounded and is doubly curved (Figs. 56 and 57).

Gaillard Thomas' Pessary.—It has the shape of a Hodge

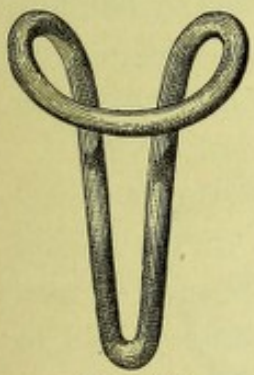


FIG. 58.

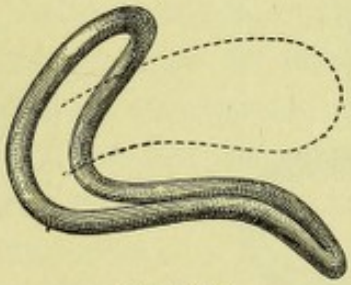


FIG. 59.

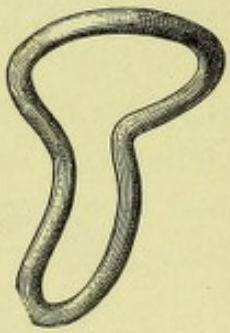


FIG. 60.

pessary in which the posterior arc is markedly thickened (Figs. 58 and 59).

Albert Smith's Pessary.—Also the same form as the Hodge except that the inferior part is narrowed (Figs. 60 and 61).

These three varieties of pessaries act indirectly on the cervix by the tension of the surrounding parts.

Schultze's Figure-of-8 Pessary.—The upper loop of the 8 is smaller than the other. It embraces the cervix but not too

tightly, while the lower loop, proportioned correctly to the vaginal capacity, is held by the vulvar orifice which prevents its expulsion forward. This pessary has a direct action on the uterus. Grasping the cervix it forces it backward (Figs. 62 and 63).

Schultze's Sledge-formed Pessary.—The sledge-formed pessary consists of a posterior portion which embraces the cervix and a

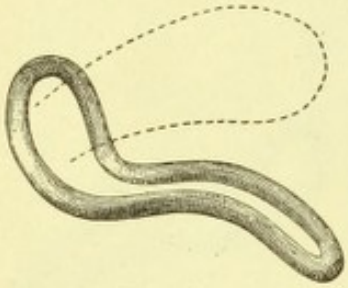


Fig. 61.

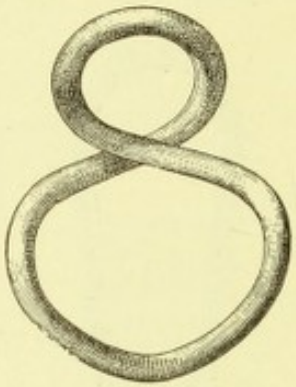


Fig. 62.

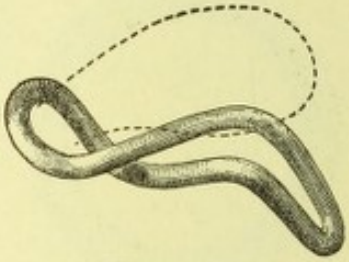


Fig. 63.

widened anterior portion which fits anteriorly into the anterior fornix (Figs. 64 and 65).

These different models of pessaries are generally made beforehand in hardened india-rubber. It is much better to model the pessary on the conformation of the vagina. Marion

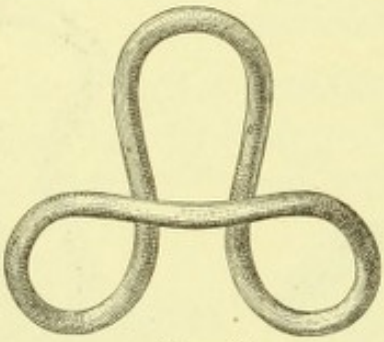


Fig. 64.

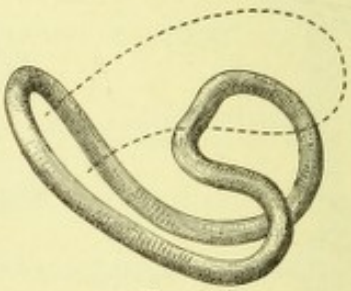


Fig. 65.

Sims used to do this and made his with rings consisting of an alloy of tin and lead. Schultze prefers rings of celluloid which soften easily in warm water and then preserve the form given them. They have the advantage of being light, smooth, and their polish is not altered by the vaginal secretions.

Mode of Introduction and Details to Observe.—Whatever be the form of pessary used, commence by replacing the uterus. The pessary used should be large enough to be in contact with

the vaginal walls, but not too large so that they are distended. It is, as a preliminary, allowed to rest some time in hot water, vaselined well and introduced.

Dumontpallier's pessary is the simplest to introduce. One has only to bend it between the thumb and first finger and then introduce the upper part into the posterior fornix. Then relax hold of it and it will spontaneously take its position. The pessary will be found lying at the extremity of the vagina completely surrounding the cervix like a crown. If it does not spontaneously find the correct position, it may be easily manipulated with the finger.

Both fornices being distended, this pessary immobilizes the uterus and maintains it in a good direction, at the same time preventing invagination of the vagina and preventing prolapse.

In order to make it very efficacious in its action the vagina must be sufficiently distended; also it is necessary to choose a ring whose dimensions are proportioned to the canal.

In order to introduce Hodge's pessary it should be presented, so to speak, in the antero-posterior plane which corresponds to the greatest diameter of the vulva. The ring having passed the vulvar orifice one gives the instrument a turn through a quarter of its circumference, and then carries it on till its annular extremity lies deeply in the posterior fornix. The inferior extremity should rest a little below the urinary meatus.

The abdominal pressure tends to force the pessary into the horizontal plane; under these conditions, the posterior extremity, falling down somewhat, stretches the posterior vaginal wall and leads to the drawing back of the cervix and the levering forward of the body of the uterus.

The rigid pessaries when of correct dimensions should not distend the vaginal walls excessively; it is a good plan to be able to pass one's fingers between them and the vaginal wall in order to avoid unpleasant complications.

Once in place make certain that the pessary retains its position when the patient stands up.

Then ask the patient to go through a series of movements, bending forward and backward, sitting down in a crouching position, etc., so as to be sure of the pessary remaining in position.

After several days, reexamine the patient to see if the pessary is still in good position and does not cause any unpleasant or painful sensations. The pessary should only give evidence of its presence by the relief it affords.

Thus, as the patient does not feel the pessary, always warn her of its presence, and don't allow her to forget its existence and leave it indefinitely in place at the risk of leading to ulceration and even perforation of the neighboring cavities.

Daily injections of boiled water with perhaps, if necessary, the addition of a little carbolic acid, lysol, permanganate of potash, are useful to keep the pessary clean and to prevent the accumulation of spermatic fluid and secretions of the cervix upon it.

Dumontpallier's pessary should be taken out every day, washed and replaced by the patient, but this cannot be done with other varieties of pessaries which have to be introduced by the doctor.

The great majority do not prevent coitus; their presence is not even suspected by the unwarned spouse.

The duration of leaving a pessary in place depends upon the substance of which it is made. Rubber pessaries not vulcanized become altered soon.

As a general rule it is useful to take them out from time to time, every one or two months, and examine the vagina for erosions of the mucous membrane, which may occur without the patient being aware of it.

Complications.—A series of complications may occur varying from the simple calcareous incrustation of the pessary to the formation of vesico- or recto-vaginal fistulæ, resulting from inflammation and ulceration of the vagina. Cases have been cited also of inflammatory periuterine swellings, and also strictures preventing the withdrawal of the pessary, etc.[1]

All these complications can easily be avoided if one takes the precautions we have cited above.

Nous will again assert that we reject absolutely the pessaries

[1] Neugebauer has collected 364 cases of complication produced by pessaries, 42 vesico-vaginal fistulæ, 37 recto-vaginal fistulæ, 13 combined vesico- and recto-vaginal fistulæ, 2 utero-vaginal fistulæ, 1 utero-vesico-vaginal fistula, 3 perforations of the urethra, 1 perforation of the small intestine, 4 perforations of pouch of Douglas, and 11 penetrations of vaginal pessaries into the uterus.

with an intrauterine stem. Winged pessaries of the type of Zwank are still greatly employed in Germany, but happily have not yet been used in France. They are very frequently the starting-point of ulceration, because the patients do not take them out at night as they should and the continual pressure of the wings rapidly ulcerates the mucous membrane.

Unvulcanized rubber pessaries become encrusted with great ease; to avoid this take them out and wash them very frequently.

As for other pessaries, if the pressure they exercise on the vaginal wall is not too considerable and if sufficient cleanliness is observed, complications are rarely observed.

Indications.—In principle all cases of prolapse should be operated upon if there are no contraindications in the general state (diabetes, obesity, cardiac or pulmonary affections). In practice a great number of elderly women, to whom one has advised surgical intervention, promptly go to an instrument maker to buy a pessary with an external support, which procures the required relief. If one talks with a pessary maker one can learn of the enormous number of such apparatus he sells apart from those ordered by medical men, and also of the number of women who treat themselves quite independently of medical advice.

If one finds a case of complete prolapse of the uterus due to one of these vagino-abdominal pessaries, one can give relief to the sufferers by applying a pessary which supports the uterus and at the same time corrects the deviation, because it is most frequently retrodeviated as well as prolapsed. For this purpose Schultze's sledge pessary is the instrument of choice.

Apart from these troubles caused by a retrodeviation, the pessary can also render service if there are not any concomitant inflammatory phenomena, if the perineum is sufficient to insure its stability and if the vagina has not undergone the alterations of senility, such as rigidity and atrophy, which expose it to ulceration and the conical form which does not permit the application of the instrument.

With the exception of these cases a pessary, well fitted and applied, may lead not only to redressing the deviation but also to the cure of the condition. This is the opinion of Kustner and others who have carefully studied the question. Gradually the

means of fixation of uterus become more and more strengthened, and the uterus can maintain itself in a good position. The successes which our operative measures have secured, in that a rapid cure is accorded to the woman who earns her living, should not make us forsake the orthopedic treatment in women of comfortable circumstances.

As a general rule, according to Kustner, the pessary must be worn from several months to several years until the uterus of itself occupies the normal position. If a pregnancy occurs take the pessary out at the fifth month.

Hodge's pessary or Smith's suffices in a great many cases; if a marked relaxation of the posterior fornix is diagnosed, Thomas' pessary is preferable.

In principle, Schultze's pessary is the best because it may be modified according to circumstances and particularly when the cervix is not in the sagittal plane. In such a condition one can avoid pulling on the cervix by making the figure of 8 a little more oblique; but this advantage is at the same time an inconvenience because it is more difficult to shape and can only be applied by practised hands.

11. Curetting of the Uterus.

The curetting of the uterus has for its object the emptying of its cavity of pathological products, and of removing in part or "in toto" the mucous membrane which lines it.

History.—It was introduced into practice by Recamier in 1846. Its practice was afterward abandoned and later restored to a place of honor in the treatment of malignant tumors by Simon in 1872, and in cases of endometritis by Hegar, Kaltenbach, and Olshausen in Germany, and by Doleris in France. This renaissance of curetting has been followed for many years by a great abuse in its employ. To-day its employ is justly more restricted, but nevertheless its indications are still very numerous.

Technic.—Providing there is no call for immediate action it is as well to choose one's time. We operate five or six days after menstruation and prepare the patient with a bath, an evacuation of the intestine, and a preliminary dilatation of the uterus.

The last-named measure has the advantage of creating a roomy canal which permits an easy manipulation of the curette and a way of escape for intrauterine secretions; it diminishes also the irregularity of the cervical canal, levels the surfaces and renders the actions of the instruments more efficacious.

A curetting, if it is performed without the preliminary dilatation, is often incomplete and constitutes a poor operation. With the exception of the puerperal condition we advise the slow to the rapid dilatation. One can use uterine dilators or bougies to complete the dilatation commenced with laminaria tents.

Dilatation produced slowly has the advantage of making the uterine tissue more flexible and of avoiding the tears which follow on an attempt to make the uterine canal of the dimensions we recommend. In addition, note that the cavity dilated by slow methods contracts on itself much less rapidly than one dilated just at the moment of the operation which to our mind constitutes still another advantage.

Anesthesia.—While recognizing that one may practise curetting without anesthesia it is nevertheless painful enough to justify its use.

Besides suppressing pain, anesthesia permits the drawing down of the cervix and a relaxation of the abdominal wall, which is of use during the operation.

In obstetrical curetting, particularly when the patient is enfeebled by repeated hemorrhages or by a severe infection, anesthesia is contraindicated. However, if one has to deal with a pusillanimous patient, one may be permitted to give a few inhalations of chloride of ethyl.

Operation.—The patient is placed in the dorso-sacral position with the buttocks resting on the extremity of the table, the legs placed in supports and the thighs flexed and abducted.

We next proceed to the cleansing of the region of operation. It is useless to shave the mons veneris. It is sufficient to shave the labia majora. The vulva should afterward be well cleansed with soap as also the vagina. Finally these parts are thoroughly irrigated.

The surgeon sits facing the vulva, having to his right the instruments and on his left an assistant ready to take a dilator or to manage the cleansing process.

Having found the cervix, depress the posterior vaginal wall with the speculum and take out the laminaria tent. Then seize the cervix with tenaculum forceps, grasping the posterior lip

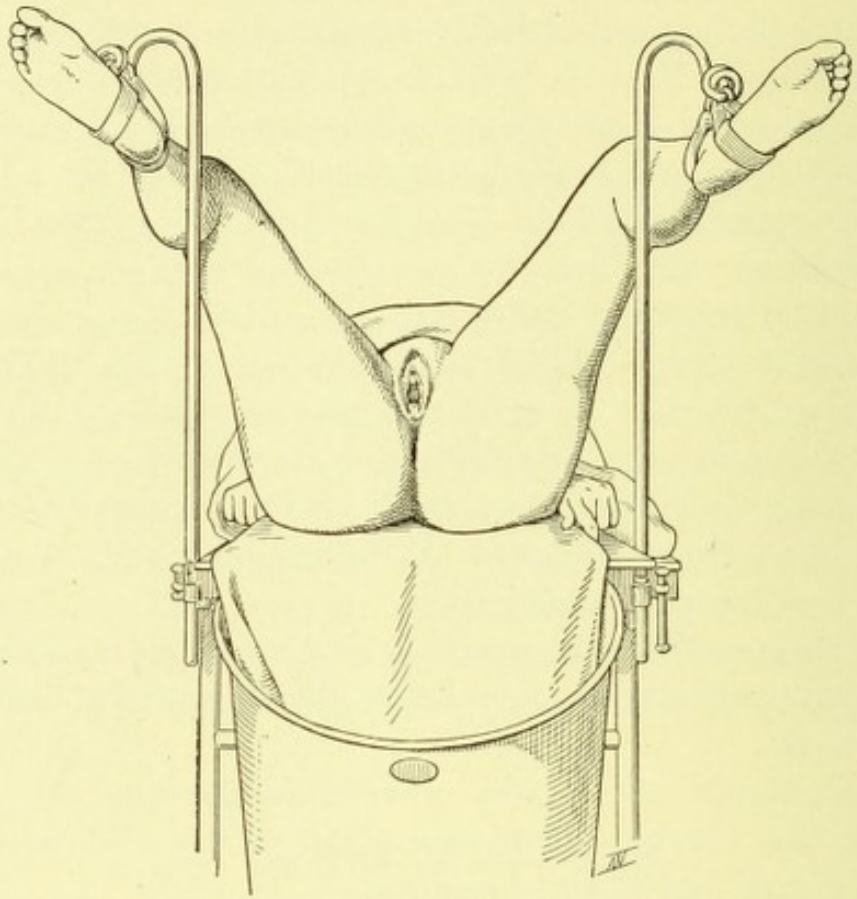


Fig. 66.—Patient in position for curetting.

generally about 1 or 2 cm. ($\frac{2}{5}''$—$\frac{4}{5}''$) from its free border, in order to avoid tearing it. We have given up the bullet forceps,

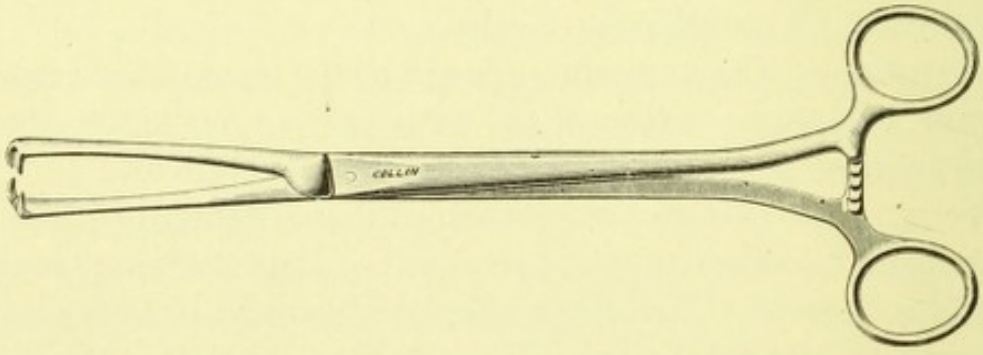


Fig. 67.—Tenaculum forceps for drawing down the cervix.

which tears the cervix so easily; also those forceps with sliding ratchets because these form in the interior of the cervical cavity a troublesome projection. Having seized the cervix, draw

it gently and gradually down to the vulva. A second forceps is placed on the anterior lip and the posterior speculum is taken out.

The drawing down of the cervix has the advantage of straightening the uterine canal, of facilitating the introduction of instruments and of suppressing the oscillatory movements given to the organ during curettage manipulations.

With the hysterotome one can find out the direction and depth of the uterine cavity. If the dilatation is insufficient it may be

FIG. 68.—Uterine curette.

completed with the aid of Hegar's dilators; then one can proceed to the curettage.

There are a great number of models of curettes. Specially useful are those of moderately sharpened edge.

It is well to have two or three of different calibers. In order to enter into the uterine cornua, a little ring curette is very useful.

To be quite efficacious, curettage should be methodically done. One should begin by pushing the instrument gently in until it comes into contact with the fundus. Then proceed to curette both walls of the cavity from above downward. First of all the soft tissue is removed, the debris of the inflamed mucous mem-

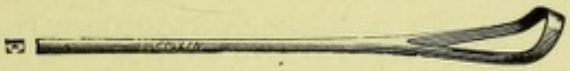


FIG. 69.—Ring curette.

brane. One repeats the manipulation on the same wall several times until one feels the special grating sensation described in France under the name of "cri uterin," a sensation which is of touch rather than of hearing. One should support the wall which one curettes with the aid of the index-finger of the left hand introduced into the fornix corresponding to the anterior or posterior wall of the uterus which one is scraping.

The curette should be brought out to the external os with each sweep of the curette in order to bring out of the cavity the clots and mucous membrane debris.

From time to time wash the curette with sterilized water

or an antiseptic solution in order to empty it of the scraping which fills its cavity.

At the level of the cervix where the epithelial crypts are deeper and lesions more pronounced than elsewhere the curettage should be more particularly energetic. One should be particular to scrape also the angles of the uterine cavity with care, and for this purpose the ring pessary is best.

Generally the uterus contracts during the curettage; exceptionally its cavity increases in size and the curette misses the resistance it felt a moment before and one is led to think of uterine perforation. One must then immediately withdraw the instrument and press through the abdominal wall the uterine globe which can easily be seen; as a result a certain quantity of blood comes out and the organ contracts again and one is enabled to continue the curettage.

We are accustomed to finish with a curette attached by a

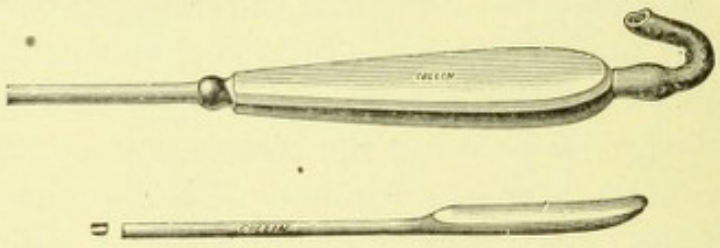


Fig. 70.—Irrigating curette.

tube to an irrigating can, which combination has the advantage of emptying the cavity of debris and at the same time completes the cleansing of the angles of the uterus.

After douching in this manner, cauterize the uterine cavity with a mixture of creosote and glycerine (creosote 1 part, glycerine 2 to 5 parts) or with a solution of chloride of zinc (1 to 10).

Doleris has introduced a special brush for this stage of the operation. We use a simple vaginal dressing forceps armed with some hydrophile wool. Having impregnated the wool with some caustic fluid, we successively rub the walls of the uterus, executing movements from below upward and of rotation. The portion of wool we use should extend far enough down the forceps in order not to entirely enter the uterine cavity, the

neglect of this precaution often leading to the catching of the wool just above the cervix when the forceps are withdrawn.

During the cauterization be careful to place on the posterior fornix a tampon of wool in order to catch the excess of the caustic fluid which may discharge and burn the vagina.

Finally, drain the uterine cavity. A gauze drain is generally used, but we prefer a rubber drain. Once the gauze is well saturated with the products of the secretions, there is a risk of complications resulting from retention provided the gauze has not been accurately placed in contact with the uterine walls. A stick of iodoform has also been recommended for introduction into the uterus.

As a last precaution we tampon the vagina lightly with iodoform gauze.

After-treatment.—Excepting the occurrence of complications

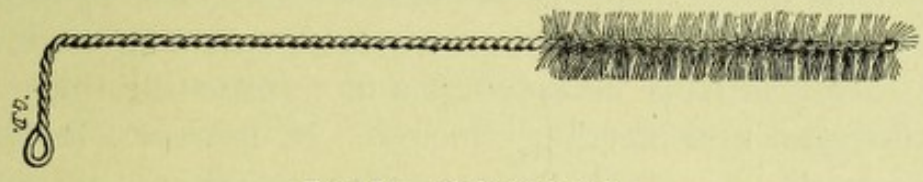


FIG. 71.—Doléris' brush.

such as arise of temperature we remove the dressings on the third day. If there is well marked oozing through the vaginal tampon, we change it earlier. We take out the tampon, irrigate the vagina freely, and insert a smaller drain into the uterine cavity and again lightly pack the vagina with iodoform gauze. The second dressing is usually done on the sixth day and after that the uterine drainage is dispensed with. About the ninth day we relinquish the vaginal tamponing and give once daily a free vaginal irrigation. The patient should have the bowels opened on the third day.

The confinement to bed should generally be about ten days; perhaps it may be necessary to prolong this interval to three weeks where there is an imperfect involution of the uterus, and for special reasons. It is of advantage to restrain from sexual communication for about six weeks.

Complications.—Curettage may be the cause of certain complications, those produced during the operation and those resulting more or less from it.

Perforation.—The operator may perforate the uterus. This accident is most apt to occur when the curettage is done at a time approaching confinement.

There is generally little danger if the operator stops at once and places a drain or an iodoform gauze drain immediately in the uterine cavity.

Cases have occurred of operators making veritable ruptures in the uterine wall. In a case reported by Hoffmann, the epiplocele engaged in the wound in the uterus and penetrated as far as the orifice of the cervix. Hessert[1] was obliged to open the abdomen and resect a segment of the intestine, which the curette had injured. Many a time the suppuration of the pelvic cavity has been recorded.

Hemorrhage.—It is rare to find that the bleeding accompanying curetting assumes proportions which cause inquietude. If a serious hemorrhage is produced during the operation, it generally results from a too superficial curetting and it can best be dealt with by completing and terminating the scraping of the diseased and bleeding mucosa. If, however, the hemorrhage persists, it might be necessary to do an intrauterine tamponing.

Secondary hemorrhages coming on some days after the operation are exceptional and result from infection of the uterine cavity.

Infection.—Complications of infection result from a faulty technic. It behooves the surgeon to avoid them.

If one observes after curetting a slight rise of temperature, this may be due to a defective drainage. It is possible that the gauze plug is acting as a tampon and preventing the uterine secretions escaping. It is therefore indicated to remove the plug and replace with a drain. A fall in temperature to 37° C. or 98° Fahr. is the result.

Graver complications of infection may come on as a result of the operative or postoperative septic involvement of the raw surface created by the scraping away of the mucous membrane. This septic endometritis is combated with free intrauterine douches repeated several times a day. If these septic compli-

[1] Hessert (William), Accidental Perforation of the Uterus during Curetting. A case with bowel injury and resection of four feet of the small intestine. (*Am. Journal of Obstetr.*, Phila., 1905, T. L, p. 26).

cations persist, we may have to perform hysterectomy in order to avoid a generalized infection occurring.

In other cases, finally, the temperature rise results from an involvement of the adnexa. This condition should be treated with absolute repose, administration of opium and ice to the abdomen.

Sterility, Stricture and Obliteration of the Uterine Cavity.—Sterility has been known to come on after curetting. This results most often from atresia or even a partial or complete obliteration of the uterine cavity. The way this condition is brought about can be easily understood. It is known how the mucous membrane rapidly regenerates, after curetting, by the multiplication of the cellular elements which line the recesses of the crypts of the mucous membrane and are ordinarily spared by the curette. If the curetting has been too violent, these cellular regenerative nests may be destroyed. In such a case, a fibrous cicatrix is produced or even a complete fusion of the walls, leading to stenosis or obliteration. This may even extend to the uterine cavity "in toto." These strictures or obliterations lead naturally to dysmenorrhea and sterility.

We combat this condition by slow progressive dilatation. If the stricture is situated interiorly, near the external os, a plastic operation is indicated.[1] In case of extensive strictures or complete obliteration, with the existence of very painful complicating dysmenorrhea, hysterectomy is the only chance. There are complications which we have never observed and which could only arise by a brutal curetting and consequent injury of the actual uterine muscle.

Generally the mucous membrane regenerates rapidly and reforms its accustomed structure. The primary menstruation is simply retarded about a month and pregnancy may come on and continue normally.

Failures.—The failures of curetting result most often from a faulty technic, faulty asepsis, an ill considered indication, an existing cervicitis, a suppurating metritis, an inflammation of the adnexa, a postoperative reinfection, insufficient dressing, or a too rapid recommencement of sexual communication.

If the employment of curetting is strictly limited to cases

[1] See further on the "Operations on the Cervix."

where it is really indicated, and we will see later its indications; failures will be seen only in quite exceptional cases.

Indications.—Curettage may be indicated in:

(1) The puerperal state.

(2) Outside the puerperal state.

(1) *In the Puerperal State.*—The primary indication of curetting in this state is *evacuation of retained products*, portions of membrane, placenta, etc., resting in the uterine cavity. If there is a *free hemorrhage*, this evacuation should be done immediately after the passage of the fetus; in the absence of complications, one should wait twenty-four to thirty-six hours to see if the evacuation will not occur spontaneously.

Generally speaking, the finger is preferable to instruments. A curette may scrape the placenta without loosening it and may leave it "in toto" in the uterus. The finger, however, feels what it is doing, feels what it has to detach, and finds the line of cleav-

Fig. 72.—Blunt curette for puerperal curetting.

age. There is no question that when large placental masses remain in the uterus, one should have recourse to *digital curetting*.

To do this the cervix must not be closed and one should be able to palpate through the abdominal wall to get the necessary contra-pressure so as to carry out a good intrauterine palpation.

In general, one uses a combination of finger and curette, using large and blunt instruments and manipulating them with great lightness of touch.

When the digital palpation shows all the placenta is removed, is it necessary to curette the rest of the cavity? This question is discussed. Some say that the curette destroys the mucous membrane and even the muscle, that it opens up vessels already thrombosed and prepares a way for infection, and that it suppresses a degeneration useful for the regeneration of the mucous membrane.

It appears on the contrary that decidual retention favors hemorrhage, the secondary development of metritis and of

polyps, and that curetting, after the evacuation of the large debris with finger, presents nothing but advantages.

If one is face to face with an abortion of six to eight weeks, one has recourse solely to the curette.

The second indication of curetting during the puerperal state is the *development of complications of sepsis.* We have quoted the objections to the curette. The danger of perforating a softened uterine wall, of detaching a thrombus, or of bringing on a profuse hemorrhage, the impossibility of removing all the septic tissues, the risk of generalizing the infection by causing the organisms to penetrate the open vessels and by destroying the line of defence against the bacterial infection.

There is some truth in all these objections. Certainly, in severe infections, the uterine wall is often softened, particularly at the level of the placental insertion; but, by using a broad blunt curette and by palpating through the abdominal wall the external surface of the uterus and at the same time manipulating the instrument in its interior, we are enabled to avoid these perforations. Hemorrhage has never appeared to us in alarming quantities and has always ceased on giving an intrauterine douche of hot water. The only objection remaining is that of a general septic infection. It is certain that a rise of temperature frequently occurs on the evening of the day when intervention was carried out in a septic uterus, but this falls in a few hours and the patient feels better. The curette, by emptying the uterus of a large quantity of microbes and decaying tissues impregnated with septic organisms, gets rid of these organisms and more or less removes the "milieu" of culture where they best develop.

We are advocates of curetting, while recognizing that the indications have been exaggerated. It is certain to have been abused in the past, especially when used after the first elevation of temperature following an accouchement. For this condition it is quite sufficient to perform a full antiseptic intrauterine irrigation to see the fever disappear. If it persists, and above all, if it is suspected that portions of membrane, placenta, etc., remain, or there are septic lochia, empty the uterus completely, curetting it.

After the eighth day, curetting, according to some accoucheurs

and particularly Pinard,[1] is more harmful than useful, but at that period the infection has gone beyond the limits of the uterus and intrauterine interventions can only bring about an extension of septic organisms and the provoking of salpingitis, phlebitis, etc.

This opinion seems to us exaggerated. If salpingitis and phlebitis appear to come on after a curetting on the seventh day or twelfth day, these conditions may have caused the original rise in temperature and incorrectly diagnosed at the time of curetting and only apparent some days later. It cannot be argued that because these conditions come on secondarily that they necessarily follow as a consequence of intervention.

It is most important, before concluding the curetting, to find out the cause of the fever. It seems certain that after the first week, this fever seems to be connected with an extrauterine trouble and we must investigate this. But if nothing exists to cast suspicion on an extrauterine condition and if on the contrary the presence of a uterine discharge leads one to think of the putrefaction of some retained product, there should be no hesitation. A rise of temperature during the first day or two following should lead us to think of an intrauterine trouble and curetting has its value then. It is necessary to irrigate with antiseptic solution later, once the uterus has been emptied, and place in a drain to secure discharge of the uterine secretions.

It is very evident that when profound toxemia exists and a cellulitis, phlebitis or a peritonitis manifests itself, the question of the indication of curetting does not come forward.

On the contrary, when after an operation there has been a temporary amelioration of symptoms and complications reappear, the indication is for another curetting.

(2) *Apart from the Puerperal State.*—Apart from the puerperal state, curetting can be carried out as a means of exploration, as a curative treatment, and as a palliative treatment.

A. *Exploratory Curetting.*—In certain cases of uterine hemorrhage of an insufficiently determined origin, and particularly if an intrauterine epithelioma is suspected, one should, without delay, curette. If it is a question of simple inflammation, that

[1] See the discussion of the Société d'obstétrique, de gynécologie et de pédiatrie of April and May, 1905, and also Pasturaud, La curettage à la clinique Baudelocque. *Th. de Paris*, 1905–1906, No. 38.

will be the best means of curing it; if it is a question of epithelioma, the diagnosis may be made early enough to hope for a cure with a radical operation.

Curetting should always be done completely. In the first place, because it will only lead to a cure, if all the diseased parts of the mucous membrane are removed; in the second, because a cancer at the beginning may be localized to only a small part of the cavity, and if the curetting is not complete, it may pass unperceived. In short, we reject completely and absolutely all curette explorations which are done without preliminary dilatation and remove a small piece of tissue for examination.

B. *Curetting as a Curative Agent.*—The triumph of curetting as a means of cure is chronic hemorrhagic endometritis. Curetting can also render service in hemorrhagic glandular hypertrophies observed even in virgins and certain cases of sterility; combined with dilatation, it is often enough observed to be followed by conception. American gynecologists freely accept this as an indication for curetting. The existence of inflammatory conditions of the adnexa contraindicate curetting; a slight intervention in the uterine cavity even may lead to the lighting up of these troubles and be the origin for the provoking of a pelvic peritonitis.

C. *Curetting as a Palliative Agent.*—Curetting has been practised often enough under the heading of palliative treatment in order to combat hemorrhages connected with little fibromata. We do not feel inclined to advise it in these cases—seeing that only a temporary relief is obtained in these cases and the patient is exposed sometimes to inflammatory complications following the treatment, such as the deformation of uterine cavity, badly drained, and often infected, which may perhaps lead to these complications.

On the contrary, in cancer, may be of the cervix or of the body, curetting is most useful when abundant hemorrhages exist, and also fetid discharges. By suppressing for a time the cancerous outgrowths, the patients are greatly relieved.

The first sweep of the curette sometimes brings on an abundant hemorrhage and as no means exist to stop it we must rapidly continue the operation. If all the friable cancerous masses are removed, hemorrhage stops of itself. If some debris from the cer-

vix still remain fixed and float about in the cavity, excise them with the scissors, attach artery forceps and tie, if one can, the bleeding vessels. When the curetting is finished and the cavity well cleansed, pass the thermo-cautery over its walls and tampon with iodoform gauze which may be removed in three or four days. It is sometimes astonishing to see the way in which the parts recover, and where at the vaginal fundus one had left a cavity, quite irregular in outline, a sort of cervix re-forms which would give no suspicion of the previous existing conditions. The patients are greatly relieved, become more healthy looking, and increase in weight and for the time believe themselves cured.

Unfortunately, at the end of a variable period, the old troubles once more appear, either the hemorrhagic losses or others. Again one may recommence curetting and if not to prolong life, make it more pleasurable.

In the course of these curettings one may open the recto-uterine sac (pouch of Douglas) as a result of cancerous extension. This accident is not so grave as one would think *a priori*. It suffices to insert an iodoform gauze drain at the level of the perforation to see the healing rapidly proceed.

The opening of the bladder itself, much rarer than the other, closes as a rule spontaneously in a brief period. Nevertheless, we advise to abstain from intervention when we find by examination a propagation of the disease to that organ. This is even more to be observed when the rectum is involved.

In closing, we should like to add that the curetting of cancer is still indicated as the first act in the big operation of excision, and this we will deal with later in the various procedures of hysterectomy.

CHAPTER III.

PHYSICAL AGENTS IN GYNECOLOGY.

Summary.—Electrotherapy (instruments, physiological bases, indications).—Kinesitherapy.—Hydrotherapy.—Mineral waters.

1. Electrotherapy.[1]

Electricity has many and varied uses in gynecology. It would be wrong to imagine that electrotherapy is of as great a magnitude as the medical and surgical therapy. Electricity has its place among other agents in the treatment of the diseases of women, and its indications are supported by experiments now quite old, and by the more recent developments of electrophysiology. This latter science's development has considerably diminished the empiricism in electrotherapy, and among the gynecological indications there are hardly any which cannot be supported by rational and precise experiment and observation.

The majority of affections demand, in their electrical treatment, few instruments of a simple nature, which could be the property of every practitioner. Those are rarer which require an outfit of instruments of a more complicated nature, and which consequently constitute more the arsenal of the specialist.

Instruments. Physiological Bases.—With a good pile battery and a constant current, the gynecologist is in a position to do a great deal. If he possesses in addition a means of procuring high frequency currents, and an X-ray apparatus, he will be able to do everything. These latter lie, however, more in the province of professional electricians and are besides very difficult to transport.

A good battery for the production of a *continuous current* should comprise about thirty elements. The most practical type is the bisulphate of mercury pile, the price of which is moderate and its longevity remarkable. These instruments are always

[1] All the electrotherapy text has been drawn up by M. Zimmern, professor of physics, Paris University.

furnished with a graduated scale, which enables us to use the current at a desired strength, also with a measuring instrument, milliampere-meter, the electrotherapeutist's scale, as it has been called, which enables us to find out at any moment the intensity of the electrical application we are making.

Two electrodes, one fixed to the copper pole (+) of the bat-

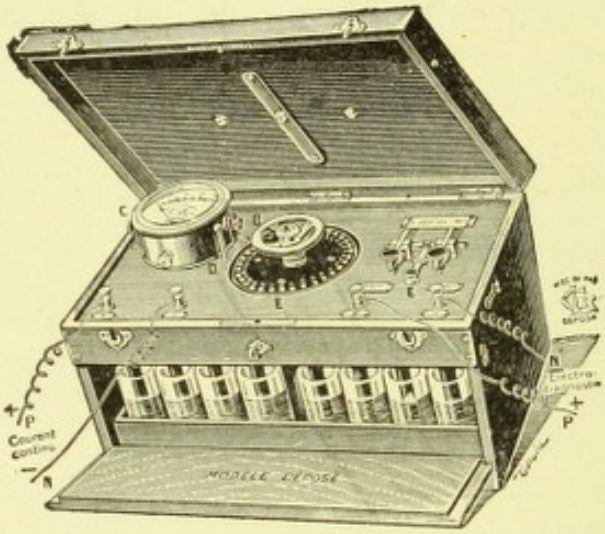


Fig. 73.—Portable battery of bisulphate of mercury (Lézy's model).

tery, the other to the zinc (−) form the contact of the current. Two wires place these in communication with the instruments which carry the current to the tissues. These instruments are called electrodes.

The electrodes are either metallic or spongy. The latter consist of a metallic plate covered over with several layers of hydro-

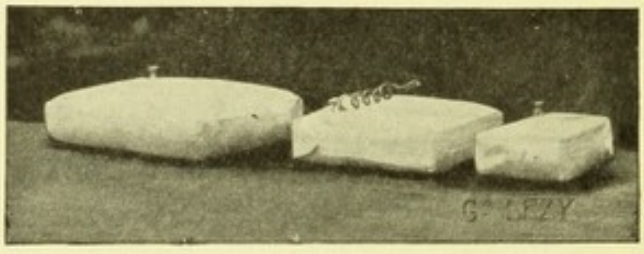


Fig. 74.—Spongy electrodes.

phile gauze or even better of plaited hydrophile cotton. These are plunged into lukewarm water which is to a certain extent retained in the meshes of the tissue. They are generally applied to the abdominal wall. As these electrodes have no special action at the seat of contact, but are only of use to create the electric

circuit on the abdomen, they are called indifferent electrodes, in contradistinction to those others which are introduced and applied to a point in the genital canal and are called active electrodes.

Active electrodes are made of metal or of horn carbon. They are shaped like sounds and are made of platinum, copper,

Fig. 75.—Active electrode.

zinc, nickel, or silver. They are fixed on a conducting handle, which the doctor holds, and surrounded by an isolating sheath which in intrauterine manipulations protects the vaginal walls from the effects of the current.

The carbon sounds are shaped like a little reed. Their stem is isolated. Of the two extremities one, M, is attached to the conducting wire, the other, C, carries the current into the uterine cavity.

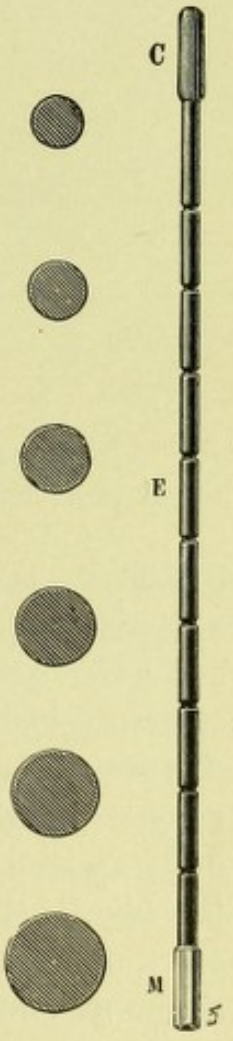


Fig. 76.—Carbon electrode.

At other times the carbon sounds are utilized not as intrauterine electrodes, but as vaginal ones. In such cases they are enveloped in a triple layer of hydrophile cotton, and later are soaked in water, in order to transform them into spongy electrodes and in order not to injure the walls of the vagina by cauterizing them. They are introduced into the posterior vaginal fornix.

The electrode covered with moistened hydrophile cotton is exclusively reserved to vaginal applications. The plane electrodes on the contrary are used for intracervical or intrauterine applications.

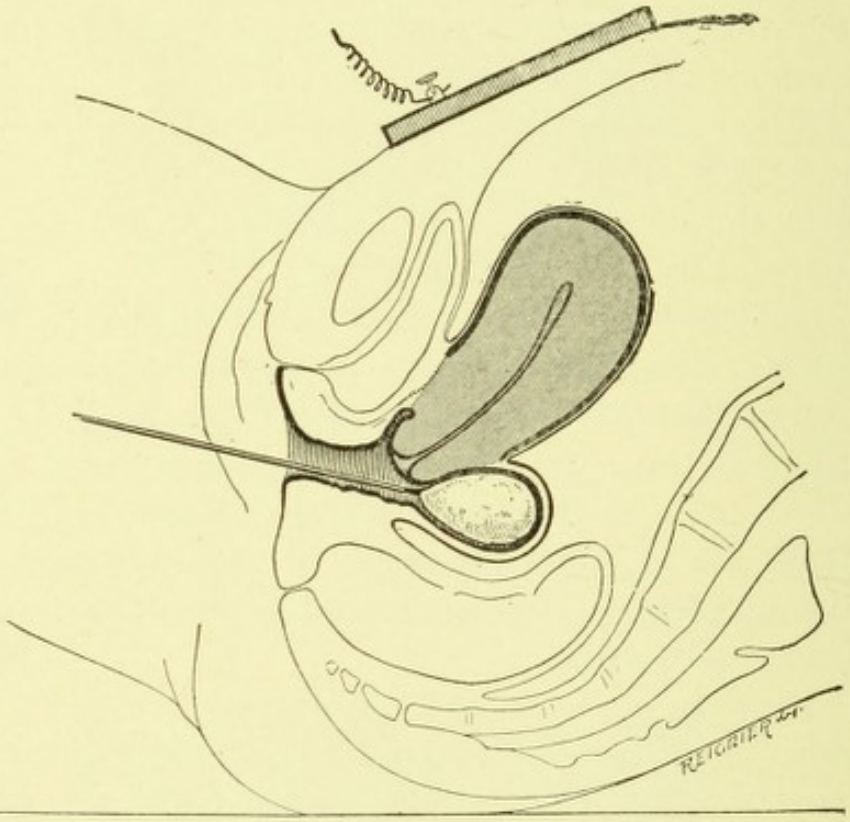
It is generally easy enough to introduce a hysterometer, at least into the cervical canal, without inspection. The speculum is usually more troublesome than useful. With the second and index-fingers of the left hand, a little gutter is formed along which the instrument is made to glide into the cervical canal. In certain cases the conformation or flexion of the uterus prevents its penetration

farther, but it is at times possible, either by depressing the fundus of the anteflexed uterus with the right hand placed on the abdomen, or by inclining the cervix posteriorly with the hysterometer itself, to introduce the instrument right up to the fundus.

These manipulations, be it understood, are made with patience and gentleness and it is useless to add with a perfect aseptic technic of hands and instruments.

The physiological properties of the continuous current are *chemical* and *motor*.

(a) *The chemical actions* may be understood from a study of



. Fig. 77.—Vaginal application. The electrode is in the posterior fornix.

electrolysis. It is known, however, from the study of these phenomena that we may compare the organism to an electrolyte consisting of chloride of sodium; in other words, to a substance decomposed by the continuous current. Physical chemistry teaches us that a solution of sodium chloride contains fragments of molecules called ions and literally charged with electricity. Some are positive, some negative and if the number of + is equal to the number of − ions, they neutralize each other, and the solution is electrically neutral. Now, if by passing a current through

such a solution one can create a difference of the potential, the + ions or anions go to the negative pole and the − ions or cations to the positive pole. On contact of the two poles the electric discharges destroy each other and the molecular fragment deprived of its electrical charge becomes a free atom. At the positive pole in our above considered electrolyte, the atom Cl. will be deposited and at the negative pole the atom Na. By a secondary reaction these atoms will enter into combination with the water of the electrolyte with the result that at the positive pole we get a forma-

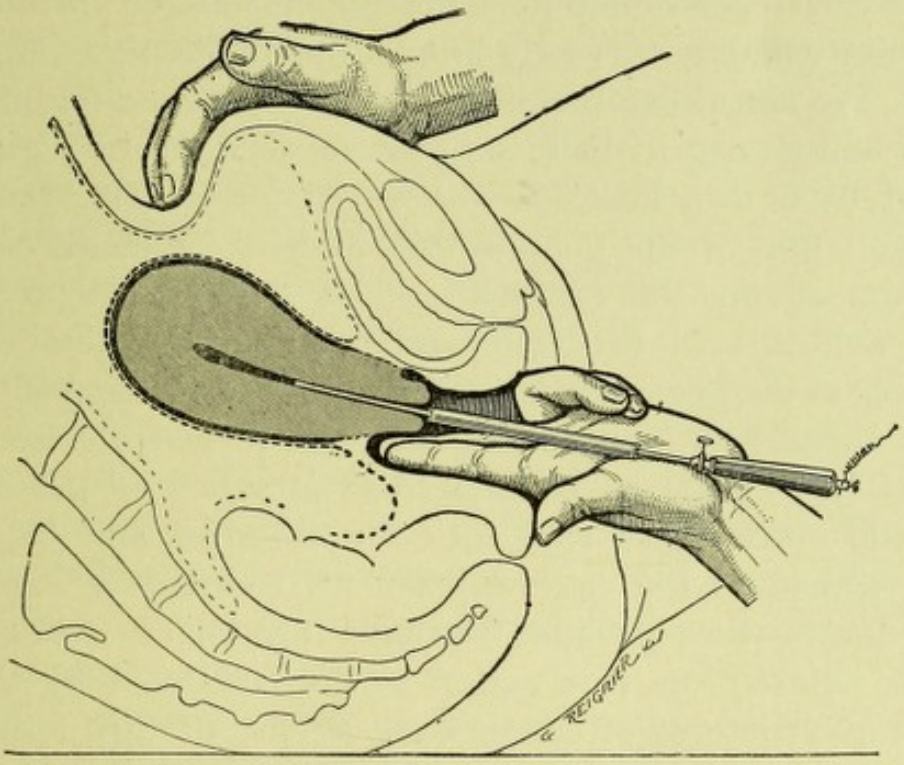


Fig. 78.—Intrauterine application. The right hand presses down the fundus of the anteflexed uterus.

tion of hydrochloric acid with a liberation of oxygen and at the negative pole, soda with liberation of hydrogen. These elements, in proportion to their production, exercise what is known as a tertiary action on the tissues, which varies either according to the pole (acid cauterization at + pole and basic cauterization at the − pole) or according to the concentration of the acid or the base formed. A feeble concentration and a feeble current produce only modifying effects; a powerful concentration and powerful current produce caustic effects.

The positive pole is above all employed as an acid caustic in order to modify the uterine mucous membrane, but its essential utility springs from its coagulating properties attributed to the

acids formed. This is, at least, a theory which has long held pride of place, but which is opposed by the feeble coagulating power of hydrochloric acid.

It would appear that the negative pole produces clinically analogous hemostatic effects and of such a kind that it has been thought necessary to furnish another explanation of the arrest of uterine hemorrhages by the continuous current.

The importance of the negative pole springs from the fact that, placed in contact with sclerosed or cicatricial tissues, it changes their consistence by a process still unknown, but undeniable and which is currently known under the name of *sclerotic action*. We can prove this action in the following manner: Cut a hard-boiled egg in half; stand it on its base in a glass surrounded by a thin layer of water. Make contact between the water and one of the poles of the pile with a metallic electrode, and connect up the pointed end of the egg with a metallic rod, which is held vertically and in communication with the other pole of the pile. If this rod is attached to the positive pole and a current of 5 to 10 milliamperes turned on, no change occurs. Now, however, if the rod is attached to the negative pole, it is observed to sink into the albumen and by its own weight transfixes the egg. This is an elementary experiment which shows the specific flexibility producing action of the cathode. Based on this action is the treatment by the electrolysis of strictures of canals such as the urethra and esophagus, etc.

The action of acids developed at the positive pole is made use of in actions on the tissues when platinum, nickel or carbon hysterometers are used. But if metals like copper, zinc or silver are used, there is a simultaneous attack of the metal by the hydrochloric acid and the formation of a metallic salt which is in all probability an oxychloride of the metal used. This new body then behaves as an electrolyte, that is to say, the ions are displaced, and the positive ions are drawn toward the cathode. The result of this is that the metal—a positive ion—penetrates more or less deeply into the tissues. This action, formerly described under the name of *cataphoresis* or *interstitial electrolysis*, is known to-day as *electrolytic introduction of metallic ions*.

The silver ion is one of those which is said to be most effica-

cious. Its employment in electrotherapy by the gynecologist has preceded by a lengthy period the therapeutic agents colloidal, protargol and collargol, etc.

The zinc ion was introduced by Leduc, as possessing most precious coagulating properties and is consequently used in uterine hemorrhages.

(b) *Motor Actions.*—It is known that the sudden closing or breaking of a continued current produces a contraction of striated muscle. This contraction is sudden and rapid as lightning. If a continuous current passing through a muscle is suddenly broken, the striated muscle contracts at the precise moment of the break while the passage of the continuous current has no action upon it.

It is not the same with non-striated muscle. A break or a rapid closing of the continued current is without any influence on the elements unprovided with fibrillar substance. The sarcoplasm only permits of being excited by a stimulus extending over a longer duration, that is to say, by an extended wave. Those who practice electro-diagnosis know that while striated muscle normally replies to the short closings and openings of a current, when degenerated it demands a prolonged stimulus. The muscular contraction is in these cases a slow and worm-like movement. Thus we see that degenerated striped muscle behaves as smooth muscle does normally.

It is the extended wave of the continuous current which is suited to the intestines and which is employed in the so-called electric douche; this same is also best suited to the stimulus of the smooth uterine muscle, when its contractile powers are about to be stimulated.

Let us add that the excitability of smooth muscle fiber proceeds more or less for some time after the application and it is exhibited in the intestine by increased peristalsis and in the uterus by an awakening of its muscular function.

Such are the essential physiological principles on which are based the application of the continuous current in gynecology.

High frequency currents result from the discharge of condensers. Generally their tension is raised by an apparatus called a resonator, at the extremity of which a current or spark is received. Appropriate electrodes complete the installation. These high

frequency currents create modifications in the local circulation. For this purpose, they are used as anti-congestion agents and to hasten the repair of wounds. Note, also, that a remarkable analgesic power accompanies these actions.

The spark has been recommended as a cancer cure, and the great advertisement it received enables us to omit its description. However, we have learned that the electric spark does not destroy the neoplasmic cell and that all the good results said to come from fulguration may be attributed partly to the simple removal, partly to the cicatrizing or ulitic[1] action, as we have called it, of the high frequency current.

The X-rays have also their use in gynecology. It is known how these invisible rays are produced from electrical energy by its passage through a rarefied gas. Their injurious action on the integument and the radio-dermatitis produced has formed the basis of numerous therapeutic experiments. As the result of much patient work contributed by all the leading radiologists of the world, we learn that X-rays possess a specific action, which is elective on the cellular elements of the blood, the spleen, the genital organs and skin. A sufficient charge of X-rays will destroy the white corpuscles, the white cells of the spleen and medullary cavities and the cellular elements of the testicle, spermatogonia and spermatocytes, the ovules, and epithelial tissues. These strictures are broken down and reabsorbed.

The sensibility of epithelial tissue in direct contact with X-rays has led to their employ in treatment of neoplasms where much success has been obtained. Unfortunately the very rapid absorption of the rays by the superficial strata limits their action at any depth, and it would seem to be of little use for deeply seated neoplastic growths.

It has been suggested that X-rays may be used for rendering women sterile, but it has been held by others that such a liberty of practice would be a great social evil. There is no doubt that the danger is a great one, but a knowledge of radiology would be required and that could only be acquired by those who made a profound technical study of the subject. The application of sufficient exposures to the ovary in order to secure an atrophy of the corpora lutea would also demand some special means to

[1] From οὐλή, cicattix, and πλασσειν, to form.

correct the effects produced on the tissues intervening between the skin and the ovaries.

Indications.—With a knowledge of these elements of physics and physiology, we will be able to grasp the principles of electrical treatment. In the first place we will study the functional troubles; in the second place, the organic troubles of the genital tract.

Functional Troubles.—In vaginal applications the *continuous current* has been successfully employed in *amenorrhea* combined with *infantilism* and *aplasia* of the genital organs. A dozen or twenty sittings, bi-weekly, lead at times to a sufficient modification in the nutrition of the organs afflicted with aplasia as to enable them to recommence their functions.

The nervous forms of amenorrhea are treated with *static electricity*. Bouilly, in one of his clinics, has especially drawn attention to the role that static electricity may play in favoring menstruation or to stimulate that function in young lymphatic girls of neuropathic family or those brought up in defective hygienic conditions.

Nervous dysmenorrhea may be successfully treated in the same manner, and, above all, in obstruction by stenosis or atresia of the cervix that the efficacy of electrization is remarkable. In such a case the flexibility producing action of the pole is the agent we use. The electric sclerosis produced by intracervical applications of the negative pole is best done with Hegar's dilators. The gradually increasing flexibility of the cervical tissue will render its dilatation easy, and a rigid cervix sclerosed by prolonged inflammation, or bound down by cicatrices will become transformed in some weeks into a flexible and extensible organ.

It is a rule that, from the first menstruation on, the pains, connected with the stenosis, become more or less greatly reduced. This lessening becomes more and more marked in the successive periods.

By its simplicity, ease and harmlessness this procedure presents strong advantages over manipulations aiming at the autoplastic repair of an orifice, as also over the dilatation with Hegar's dilators which only act mechanically and do not alter the tissues.

In closing this chapter on the functional indications of electricity, I would like to draw attention to the astounding rapid-

ity with which radiotherapy and the high frequency current, singly or combined, cause the disappearance of such localized *pruritus* as the vulvar variety.

Organic Lesions.—When Apostoli, in 1884, proposed the continuous current of a high intensity for the cure of *fibroma*, gynecological surgery had not attained to that perfection that asepsis and operative technic have since given it. Statistics of that epoch bear witness to the dangers of surgical intervention; it is not then surprising that such a mode of treatment was received with favor, a palliative one it is true, but relatively harmless.

To-day Apostoli's method has fallen into oblivion. Some observers have entirely discredited it as it was thought that its introduction might be a rival to surgery. Such a point of view is entirely wrong; really, the electrical treatment of fibromas is only an auxiliary role in such cases as are inoperable or where an operative contraindication exists. The great principle "Every fibroma producing complications, once recognized, should be removed" is to-day the only line of conduct for the practitioner, and it is only in cases where, for some particular reason, an operation cannot be carried out that we have resource to the palliative means the continuous current offers us.

Electrical treatment, therefore, is used in inoperable cases (tubercular, albuminuric and cardiac); it should also be used in cases where the size of the tumor or widely extended adhesions render the operative treatment impracticable. Sometimes the proximity of the menopause is sufficient reason for deferring surgical intervention, or even the desire of a young woman to become a mother. In such cases we can more or less make an attempt at electrization in order to combat the most alarming symptoms in the particular case, viz., hemorrhage. It is not often that in complications of this kind we get much help from electricity.

There are, however, circumstances which contraindicate the employ of electricity; they are diseased adnexa around a fibromatous uterus (ovaro-salpingitis, acute or purulent). There is no need to lay stress on the dangers that electricity may cause in such conditions.

The operative procedure in electrical treatment of fibromata

is quite difficult and demands much technical training. The principal part of the operation is the introduction of the sound (which is made of platinum or carbon) as far as possible into the uterine cavity. The passage of the continuous current of a strength of 50 to 150 milliamperes, according to the amount tolerated, and finally the extraction of the hysterometer. Each sitting should last about 8 to 10 minutes. With two sittings per week the electrical treatment of a fibroma demands from two to five months.

In cases where the sound cannot be introduced, for instance in those cases where it might be deemed necessary to test the patient's susceptibility beforehand, the intrauterine applications are replaced by vaginal galvanization.

It is difficult *a priori* to understand the action on the fibroma; but we must not forget that its efficacy is purely symptomatic, that it does not modify the volume of the tumor, as has been claimed, but that it diminishes the congestive condition, and may thus reduce the edema, lessen the twitching pains, and the sensation of bearing-down and the vesical compression and at times cause complete disappearance of the hemorrhage.

What is the process upon which this hemostatic action depends?

Apostoli thought it was a specific action of the positive pole, a coagulating action combined with a caustic one, leading to a mechanical obliteration by the formation of eschars. However, this hardly explains how a little instrument like the platinum or carbon sound can be capable of exerting its influence over such an area as the internal surface of a myomatous uterus. Fredericq, to whom we owe importance in histology on the alterations engendered by electrolysis, declares that the action of the instrument, as seen under the microscope, is confined to hardly visible points.

We have proposed in our thesis[1] a theory of the action of the continuous current, quite different from all previous ones and based on physiological experimentation. Keiffer's work on uterine physiology has rendered clear that the uterine muscle may be considered as an enormous outgrowth of the muscular coat of the utero-ovarian vessels.

[1] Zimmern, Uterine Hemorrhages, Their Electric Treatment and Excito-motor Action of Electricity, Paris, 1901, Baillière et Cie.

It is known that the middle layer of the uterine muscle fibers contains some vascular lakes limited by an epithelial layer which rests directly on the muscle. The role of the muscle fiber at the moment of delivery is besides well known; recall for a moment the classical picture of "a thousand living ligatures" which cut off the hemorrhage and now there is no doubt that the uterine muscle fiber gradually becomes the seat of very active peristaltic movements, as the result of the prolonged passage of the continuous current.

The fact is proved by the colic of which women complain after their seance of electrization, by the facility with which one effects the formation of a pedicle in submucous fibromata treated by electrical means and also the rapidity of their expulsion. On the other hand, two bitches are submitted to uterine curetting, and one of them is electrolized while the other is kept as a control; if at the end of forty-eight hours hysterectomy is performed in both cases, the control case is found to have an abundant hemorrhagic infiltration throughout the mucous and submucous tissues while in the curetted and electrolized case the vessels appear to be empty of blood.

The result of observations seems to be that by its excito-motor action the continuous current acts on the muscular fiber of the uterus. Without doubt this muscle fiber is frequently inhibited in its function as regulator of menstruation by the presence of the obstruction of the fibroma or, in other cases, in virtue of Stoke's law, it is reduced to atony by inflammatory troubles of the mucous membrane, which coexist so frequently with fibromata.

The treatment of *metritis* is an important chapter of gynecological electro-therapy.

We will pass over false metritis, congestions occurring at the menopause, and metritis of virgins which offer to the electrical therapeutist such an extended field of action, but whose number forces us to pass over them in silence in this survey.

We pass now to the true metritis.

The continuous current in chronic metritis has given such sufficiently constant and lasting results that this method of treatment may be classed among the best of minor gynecology.

Two methods lie before us, viz., intrauterine electrolysis with

non-acid corrosive electrodes, and the electrolytic introduction of certain ions, known as the old interstitial electrolysis.

The technic is practically analogous to that which we briefly described above in connection with fibroma. The vaginal applications, notwithstanding, are only indicated in certain cases of hemorrhagic metritis. The contraindications resulting from the condition of the adnexa are the same as before. Finally, from the point of view of the intensity of current, generally one employs about 50 to 80 milliamperes, exercising discretion of course according to the susceptibility of the patient. A series of four to twenty sittings, according to the condition, generally causes a cessation of the pains, of the hemorrhages, and of the leucorrhea.

Apostoli thought that the development of acids in the neighborhood of the positive electrode in the uterine cavity produced modifications of important structures in the mucous membrane, and even led to its replacement by new tissue. Further, the tonic action exercised by the continuous current on the muscular fiber appears to Apostoli as particularly apt to bring about contractility of the uterine muscle and thus fortunately to influence the circulation of the organ.

This excito-motor action on the uterine muscle, to which we give a preponderance of action seeing its hemostatic effects on fibromata has perhaps, equally, from the standpoint of its action in metritis, an influence greater than one would at first suspect. In endometritis, the uterine muscle is directly or indirectly affected by the inflammatory process. It is highly probable the returning activity of the uterine muscle brings about important circulatory changes in the organ, consequently improving its nutrition and favoring the carrying of material necessary for the defence and repair of the anatomical elements of the diseased mucous membrane.

As it is difficult to admit that the entirety of the uterine cavity can be influenced by the products of electrolysis, still, remembering that intervals elapse between the sittings, it is probable that during these periods some portions of the diseased endometrium propagate their diseased state to neighboring areas which have since become healthy; and this explains why metritis affecting the body is so difficult and so long to cure.

The conditions are not the same in cervical endometritis.

Here the sound is embraced by the neck, and in a few sittings the effect of the poles, aided by diffusion, is evidenced on practically the whole of the internal cervical surface. As is well known, an old metritis tends to become limited to the cervix, and as the majority of such cases come to the electro-therapeutist, we can understand the action of electricity in the cases cured by these means.

The electrolytic introduction of "ions" into the substance of the uterine mucous membrane merits being taken into consideration because, with the exception of electrolysis, there are no therapeutic means to bring about the certain penetration of such an active substance below the epithelial surface.

The interstitial electrolysis of silver has been advocated by Leduc, Boisseau and Rocher. The zinc ion has been quite recently advocated by Leduc as both an antiseptic and hemostatic agent. Attempts have also been made with copper electrodes (Gautier), iron (Regnier), and aluminium (Debedat), but further experience has not justified their use. The strength of current used with these electrodes is generally quite moderate. It is better not to use more than 50 milliamperes. Each sitting should last from 6 to 10 minutes.

From the foregoing it will be seen that the electrolytic procedures we use in the treatment of metritis are four in number; simple intrauterine electrolysis where the positive or negative pole is actually employed according to the effect desired, and the electrolytic introduction of either the silver or zinc ion. Let us now consider in which circumstances we would employ either the one or the other.

It is a rule to use positive electrolysis when the metritis is complicated with menorrhagia or metrorrhagia. In such conditions we are probably dealing with a corporal metritis. In addition, with the purpose of obtaining the caustic action on the greatest possible surface of the uterine mucous membrane, it will be found most useful to use carbon electrodes, choosing the largest size one can conveniently introduce.

The use of carbon is particularly to be recommended in old metritis and fungoid metritis, where the hemorrhagic losses are combined with vegetations on the surface of mucous mem-

brane. Where the positive electrolysis fails, the indication is to try the zinc ion.

When the metritis is accompanied by menorrhagia only, a condition of atony of the uterine muscle is generally found too and if the tonicity of the muscle is restored, the hemorrhage ceases. A few vaginal applications, utilizing the excito-motor power of the current only, will be found sufficient.

In metritis where the main feature is leucorrhea, we should use electrolysis with silver or the negative pole. The former seems to exercise quite a special action in metritis of gonococcal origin, either at the beginning or in the chronic state. One can almost always obtain very rapid results in these cases. Similar results are obtained after the use of the salts of the same metal in other manifestations of gonococcal origin, such as conjunctivitis, cystitis, etc. Silver electrolysis ceases, however, to be efficacious when the gonococcal metritis becomes very chronic.

In the majority of chronic metrites limited to the cervix, in women who have had whites for a number of years, and particularly in those cases of irritative hypersecretion of the cervix, following infection, negative electrolysis is the procedure of choice. The results obtained under these conditions are, without doubt, due for the most part, to the electrolytic caustic action, penetrating the cervical mucous membrane deeply. These are therefore, in brief, the indications for electrical treatment in cases of chronic metritis.

It is easy to understand by reason of the physiological effects of the current that *uterine subinvolution* may be considered a case for electricity. The specific action of the continuous current on the smooth uterine muscle fiber is sufficient to render this treatment as the best in conditions of involution following on an accouchement or on an abortion uncomplicated by sepsis.

Quite recently a case of partial subinvolution came under our notice which, from the standpoint of our statement above, seems very instructive. The case was a girl who after a procured abortion began to suffer from extremely abundant hemorrhage. The temperature was normal, but the patient became daily weaker. Her medical attendant, an eminent gynecologist, having tried douches, decided to curette her.

This did not give the desired result. The tamponing was

continued, as also the astringent applications and ergotine internally. The hemorrhage continued and I was sent for. Her uterus on palpation gave me an impression of peculiar relaxation and softness, and laterally, in the region of the right cornu, my finger outlined a very depressible sort of ampullary dilatation. After the second application of intrauterine electrolysis the flux diminished by at least one-half and palpation enabled me still to recognize the subinvoluted portion, but very markedly diminished in size.

After the sixth application, about ten days after the electrical treatment, the hemorrhages had completely ceased and the uterus had reassumed its normal shape.

I have reported this case, but all cases of subinvolution treated by electricity react in a similar manner.

All that now remains is to consider the indications of electricity in the treatment of *neoplasms* of the genitourinary tracts. Unfortunately, the services it can render in this field are palliative only and the hopes that two new methods, radiotherapy and fulguration, have engendered in the last few years, have in a great measure declined. Without doubt, it is possible, with special localizing to instruments such as speculums to irradiate a cervical neoplasm through the vagina and we are also enabled with very penetrating rays and by the procedure known as "feu croise" to irradiate a uterine neoplasm. This method, however, which might be efficacious if applied early, when the neoplasm is limited, loses all its curative value if an early diagnosis is not made. The same may be said of fulguration, that is, a surgical curetting followed by a prolonged application of the electric spark to the resulting wound. There is no case of cure of a uterine neoplasm by the electric spark. Its only benefit lies in the possibility of lessening for a time the pain and fetid discharges and of rescuing the poor sufferer temporarily from being an object of repulsion to her entourage. In contradistinction, the vulvar epithelioma, when limited and superficial, is a splendid case for radiotherapy and fulguration.

2. Kinetotherapy.

Kinetotherapy, or the therapy of movements, has been applied as treatment in gynecological affections by Thure Brandt.

Popularized in Germany by Schultze and his pupils, Stapfer[1] has been its main advocate in France, from whose works we will borrow the main portion of that which now follows.

In gynecology, more than for any other class of complaint, the fundamental precept of kinetotherapy is to observe great gentleness in the different manipulations which constitute this method of treatment.

The patient should suffer only in exceptional circumstances during the sitting; she ought never to suffer afterward but should, on the contrary, feel immediately a sense of well-being.

Gynecological kinetotherapy should comprise two kinds of manipulation:

1. Movements of massage in the true sense.
2. The execution of particular movements.

Massage.—The principal manipulations of massage are the following, according to Stapfer:

1. *Circular Friction.*—The left index-finger having been introduced into the vagina[2] in order to support the organs and to guide the movements of the external hand, with the right hand circulatory friction lightly pressing on the viscera which are made to roll under the fingers.

2. *Vibration.*—This consists in a rapid vibratory movement produced by the palm of the left hand placed flat on the lower part of the abdomen.

3. *Pressure.*—Circulatory friction is accompanied by a certain degree of pressure. The corrective pressure is made by introducing four fingers of the right hand between the pubis and the anterior surface of the uterus, so as to exercise pressure at the fundus of the anterior fornix.

4. *Elevation.*—This consists in plunging both hands open into the utero-vesical pouch through the abdominal wall and to depress the peritoneal cul-de-sac and the anterior fornix of the vagina in such a way as *first*, to cause the recession and then the remounting of the cervix into the sacral concavity; *second*, to

[1] Stapfer (H.), Treatise of Kinetotherapy, Paris, 1897, and Gynecological Kinetotherapy, Paris, 1899. Consult also, Jentzer and Bourcart, Gynecological Gymnastics and Manual Treatment of Uterine Maladies and of the Adnexa, Paris, 1891.

[2] Stapfer, in accordance with Brandt, insists that in order to employ the index-finger to its full usefulness, it is unnecessary to flex the other three fingers into the palm. Maintain them extended slightly flexed at the metacarpophalangeal joint, which permits the index to go in as far as the digito-palmar fold which rests against the perineum. Otherwise the same as for vaginal examination.

antevert the fundus; *third*, to lightly raise the whole organ by a gentle vibratory movement.

5. *Stroking.*—This is performed per rectum; on the pelvic walls, the perineum and recto-uterine folds, and the pouch of Douglas. It is done with the pulp of the index-finger which strokes the tissues without more force than would be expended in writing on a window coated with mist.

6. *Malaxation or Kneading.*—This is an external manipulation performed with both hands, which are made to grasp the

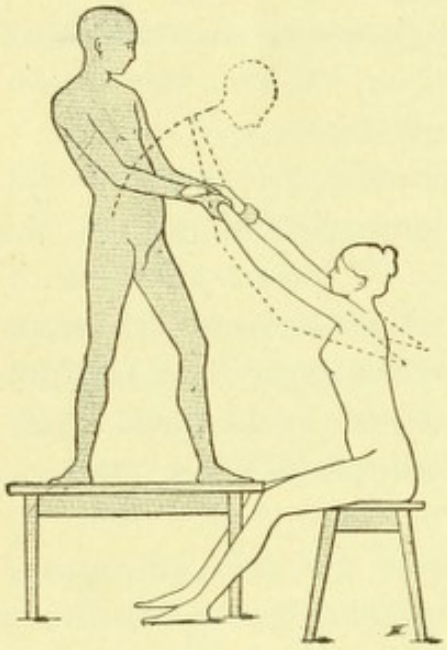


FIG. 79.—The patient is seated and inclined forward. The arms are extended in the line of inclination of the trunk. The elbows are carried backward and outward as far as possible, while the masseur gently endeavors to oppose these movements and then brings the arms without resistance from the patient's part back to the position of extension

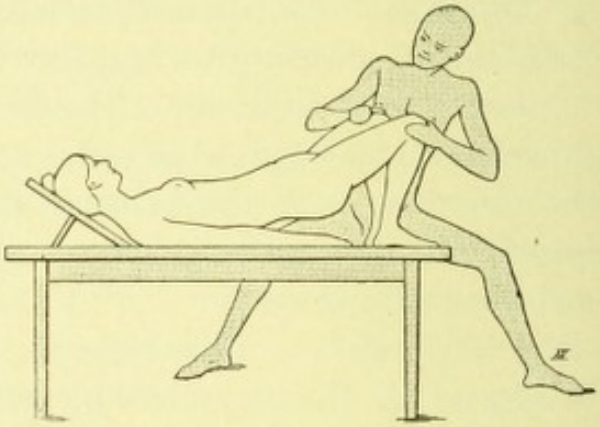


FIG. 80.—The patient lies in the extended position with the pelvis slightly raised and the legs and hips flexed. She separates the thighs while the masseur, with hands on the external surface of the knees resists this movement. Then the masseur gently brings the knees in toward the middle line and the patient endeavors to oppose him.

subcutaneous adipose tissue and convert it into folds, which are then kneaded between the thumbs and the four other fingers, while the skin is stretched.

Movements.—Movements are of three kinds: 1. movements which lessen pelvic congestion; 2. movements which increase pelvic congestion; 3. respiratory movements.

1. *Movements Lessening Congestion.*—These are the movements of flexion and extension of the arms and their action on

the trunk and also movements of abduction of the thighs. These are opposed by the doctor (Figs. 79 and 80).

2. *Movements Increasing Congestion.*—These are passive movements of femoral circumduction and extension and flexion

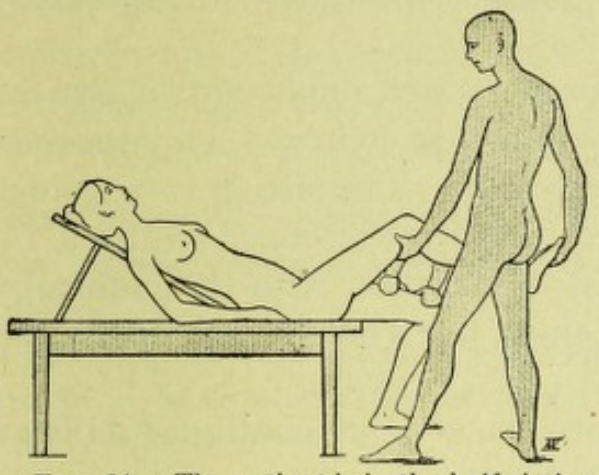


FIG. 81.—The patient is in the half sitting position. The masseur flexes the leg and the thigh and then circumducts from within outward at the hip-joint. The patient remains passive, the other leg being held by an assistant.

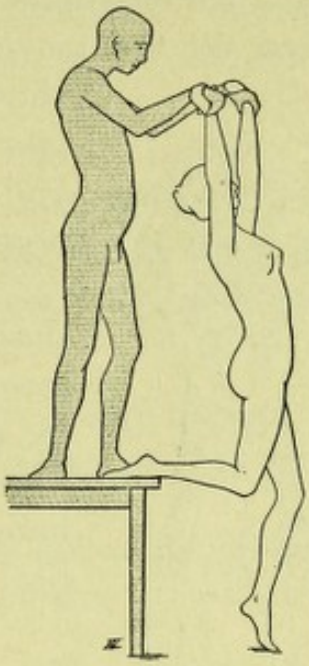


FIG. 82.—Flexion and extension of the knee on each foot alternately. The arms are raised above the head, and the other foot placed posteriorly acts as a support.

of one of the legs which supports the weight of the body. The former give rise to a temporary obstacle to the peripheral circulation and the latter lead to a tension of the abdominal wall which in turn compresses the viscera (Figs. 81 and 82).

3. *Respiratory Movements.*—The doctor, standing behind the patient, raises the shoulders and arms while the patient inspires deeply. Then he allows the shoulders to descend during expiration (Fig. 83). These respiratory movements are important in that they stimulate combustion, increase the respiratory field, and by the action of the diaphragm, cause the elasticity of the suspensory apparatus to come into play and that of the abdominal pelvic vessels.

In practice, at the same sitting, are combined massage and movements.

The patient without disrobing loosens the strings of her skirt and unbuttons her corsets in such a way as to leave nothing

to interfere with respiration, which should always be regular and full during the gymnastic movements and the massage.

If we take as the most common type a case of old exudates, the sitting should commence with movements to lessen congestion. Then if the patient is extended, on a long couch, with the thighs flexed on the pelvis and the legs on the thighs, the masseur should commence with semicircular friction and vibratory movements round about the uterus and adnexa, being careful not to squeeze the organs.

FIG. 83.—The masseur raising the chest by drawing the shoulders upward and backward while the patient inspires deeply.

This massage, which ought not to last more than five minutes, is followed by movements lessening congestion. The sitting is terminated by passive respiratory exercises, followed by a rapidly executed vibration with the palm of the hand passed along the whole length of the vertebral column.

These exercises, etc., are continued daily even during menstruation.

The action of these different manipulations is two-fold. Locally, they increase the elasticity of the agents which fix the uterus and they liberate the organs by relaxing their attachments. They lead to a reabsorption of plastic products, and stimulate the nutrition of the viscera.

They also improve the general state by stimulating the circulation and diminishing constipation. Some authors find that they augment the muscular tone of the cardiac muscle in that they provoke cardio-vascular reflexes.

Indications and Contraindications.—The indications of kinetotherapy seem limited. They would seem to us to be reserved to cases of women suffering from long-standing remnants of peri-uterine inflammation, which has remained long quiescent and above all associated with a certain amount of visceral ptosis (slight uterine prolapse, enteroptosis or movable kidney). In these cases, the slight degree of gravity of the troubles, their multiplicity, and the atony of the tissues contraindicate surgical intervention. Further, such cases are common in women of a neuropathic temperament, where operative benefit is more or

less illusory and where they have much to gain through the kinetotherapeutic measures to which one might be tempted to add hydrotherapy.

Again, in certain women suffering from abdominal trouble, with constipation and insufficient intestinal circulation, massage, combined with gymnastic exercises, is useful, as the abdominal muscles are brought into play.

Massage is contraindicated in inflammatory lesions, not entirely quiescent in which manipulations might lead to their rejuvenescence. In cases of recent hemorrhages or of purulent periuterine collections, disastrous consequences may be induced and in such cases it is rigidly contraindicated.

Sismotherapy.[1]—Sismotherapy, which consists in giving rapid and regular vibrations of small amplitude during a brief period, has been studied by Jayle.

With the aid of an electric motor and a flexible connective rod he imparts to a little apparatus of varied shapes, called a "concuteur," a vibratory movement.

It would appear to be a means of combating gastrointestinal atony and particularly cases of nervous women or neuroarthritics of minor degree, or finally pain where our usual therapeutic means are unsuccessful.

3. Hydrotherapy.

We have already had occasion to study *vaginal injections.* Generally speaking, hot water is most used, but luke-warm for prolonged irrigation and under low pressure may be used for its sedative effect.

Reclus has become the apostle of *hot rectal irrigation* in order to combat the congestion of the pelvic organs.

Douches, general or local, render useful service as also do *hot moist abdominal compresses.* Cold water compresses are also useful. If a sedative effect is desired, we use chlorinated magnesium waters (Salies, Biarritz); if a stimulating effect, waters from Salins-du-Jura or Kreuznach. In very acute phlegmasia, the continuous application of an *ice-bag* to the abdomen is of signal service.

[1] Jayle and De Lacroix de Lavallette, Mechanical Sismotherapy in Gynecology, *Revue de Gynécologie*, Paris, 1899, p. 645. Boucart, Treatment of Uterine Affections and of the Adnexa by Mechanical and Rapid Vibrations, *Ann. de Gynéc.*, Paris, 1895, T. L, p. 476.

It seems unnecessary to dwell more on these points, which are not particularly in our gynecological domain.

Let us add that baths combined with hot vaginal irrigations, general douches, either hot or Scotch, and finally local perigastric douches render great service in helping reabsorption of old exudates and in diminishing those painful complications of which a certain number of women complain, and which we will now describe. Such cases are found to be suffering from dysmenorrhea with abundant menstrual flow, whites, globular uterus, sclero-cystic ovaries and painful chronic metritis, a series of complaints which Richelot, for want of a better term, has described under the name neuro-arthritic uterine sclerosis, a nomenclature undoubtedly erroneous, but enabling us to group practically under one heading those particular cases for whom operative treatment is generally advised and for whom it presents practically no utility.[1]

4. Hydromineral Treatment.

This aspect of gynecological treatment is too much perhaps neglected by a certain number of gynecologists, who only see treatment from the operative point of view. However, hydromineral treatment is an important adjuvant to ordinary therapeutic measures.

While actually this form of treatment does not yet rest on a scientific base, the information acquired by empiric measures permits us to afford very useful indications for its use to patients.

The Principal Waters Used in Gynecology.

A. Robin and Dalche[2] have shown the action of different groups of mineral waters to which the gynecologist has resource. We will borrow from their work the major part of the following text.

Chlorinated Soda Waters.—These waters are divided into those of feeble action (Bourbon-Lancy, Bourbon-l'Archambault, Saint-Nectaire, la Motte-les-Bains, Bourbonne, Santenay, etc., in

[1] Richelot (L. G.), On the Treatment of Pelvic Affections. *La Gynécologie*, Paris, May, 1909, p. 193.

[2] Albert Robin and Paul Dalché, Medical Treatment of Diseases of Women, Paris, 1902.

France; Baden-Baden, Wiesbaden, Kissingen, abroad); moderate action (Balaruc, Salies en Haute-Garonne, Salins-du-Jura, etc., in France; Kreuznach, Hombourg, Nauheim, Bex, etc., abroad); and strong action (Salies-de-Bearn, Briscous-Biarritz, La Mouillere, etc., in France; Rheinfelden abroad).

They produce in the pelvic organs an inflammatory action characterized by a reawakening of pain, an increase in the secretions, and stimulate the vitality of the organs. By stimulating the circulation these waters lead to a reabsorption of old exudates.

By adding the mother waters to baths feebly saline, the local and general reactions are reduced in order to bring about comparatively the properties tending toward resolution of the saline bath on the local state.[1]

Sulphurous Waters.—These waters are generally noted for their excito-motor and hemostatic actions on the uterus. Certain differences exist according to the different origins of the water. While certain ones are purely excito-motor (Cauterets, Luchon, etc.), others have a sedative action on the nervous system (Saint-Sauveur, Saint Honore).

Waters Feebly Mineral.—These waters generally possess sedative properties; Neris would appear to suit the nervous uterine patient who must submit to a treatment of prolonged bathing; Luxeuil, those who suffer from old standing remnants of uterine and peri-uterine inflammations, as also those who complain of a multiple symptomatic complexus, consisting of excessive irritability of the nervous system, whites, anemia and constipation. The treatment here consists in more or less prolonged baths, combined with hot vaginal irrigations, ascending douches, and lumbar and hypogastric douches.

Mud Baths.—Mud baths assist the subinvolution of the uterus and are found at Dax, Saint Amand, Franzensbad, Marienbad, Battaglia, etc.

Other waters, while seemingly having no direct action on the uterus, may be useful in modifying the general condition or

[1] The mother water is the yellowish, syrupy liquid which remains after the evaporation of chlorinated waters, from which has been extracted the ordinary commercial sea salt; it is, in short, intensely concentrated chlorinated water in which the relative proportion of chloride of sodium is very diminished. The sedative action of this mother-water is above all others most evident in the waters and Salies-de-Béarn and of Briscous-Biarritz, which are very rich in chloride of magnesium, while the waters of Nauheim and Kreuznach are noted more for their chloride of calcium elements and those of Rheinfelden which contain hardly any chloride of sodium.

certain neighboring lesions which prevent the cure of the genital trouble. The soda bicarbonate waters (Vichy, Vals, etc.) are useful in women with herpetic or gastrointestinal troubles, bicarbonates mixed with chlorinated bicarbonates (Royat, Ems, St. Nectaire) in anemic cases and in arthritic cases, the waters of the type of Chatel-Guyon for constipated cases with intestinal plethora, the iron waters (Forges, Bussang, Spa, etc.) in chlorotic cases, unless we are dealing with a nervous and erethetical uterus, and arsenical waters (La Bourboule) in lymphatic cases. Baths of carbonic acid (Royat and St. Nectaire) are certainly congestive and may render useful service in amenorrhea.

Therapeutic Indication of Mineral Waters.

Amenorrhea, when associated with chlorosis, is an indication for ferruginous waters; if the temperament is the lymphatic type, saline waters are useful; if leucorrhea also coexists, sulphurous waters are indicated. The amenorrhea of stout subjects would first be treated by an anti-obesity regime (Brides, Chatel-Guyon, Marienbad), that of nervous origin by chlorinated soda waters, tempered by the addition of the afore mentioned mother waters or by sedative waters (Neris, Luxeuil, etc.). In case of subinvolution of the uterus sulphurous waters are suitable (Cauterets, Saint Sauveur) or mud baths.

Dysmenorrhea has the same indications.

Congestive metrorrhagia of puberty will obtain great benefit by a season at a sodium chloride spa; above all, in young girls who are very nervous, great advantages accrue from treatment with baths of feeble concentration mixed with an appropriate quantity of mother waters.

Metrorrhagia occurring at the menopause is well treated by a course of baths at Bourbon-Lancy if there coexists an arterial hypertension; at Chatel-Guyon, at Brides, and at Saint Gervais, if there is also abdominal plethora.

Catarrhal metritis should be treated with sulphurous waters and if this coexists with lymphatic manifestations, strong sodium chloride waters. For chronic and painful genital conditions, and for old inflammatory deposits, waters of indifferent character or slightly mineral are of use.

The action of sodium chloride waters on fibromas is undeniable; their employ is however contraindicated in cases complicated with cardiac troubles or fatty heart.

To combat sterility most varied are the different waters suggested and good results which have been attained have resulted more probably from the hygiene observed than from any special action of the waters.

In a general way, hygiene and regime, well observed, are powerful adjuvants to hydromineral treatment.

PART II.

TECHNIC OF OPERATIONS ON THE VULVA, VAGINA, UTERUS AND ADNEXA.

CHAPTER I.

SURGERY OF THE VULVA.

Summary.—Anatomical elements.—Treatment of traumatic lesions (wounds and contusions).—Treatment of inflammatory lesions (superficial and deep), of kraurosis, leucoplasia, and pruritus vulvæ.—Operations on the vulva, diminishing it (infibulation, episiorrhaphy, nymphorrhaphy), increasing it (treatment of agglutination of the labia, of strictures, and of vulvo-vaginal constriction).—Radical operations, excision of the clitoris, of inflammatory lesions, and of tumors (benign and malignant).—Treatment of vaginismus.

1. Elements of Anatomy.

The vulva presents the form of a median antero-posterior cleft, bordered on the right and left by two projecting pads, the labia majora. When these are separated, two smaller folds are seen, the labia minora, which anteriorly embrace the clitoris and in the space between them is found the vaginal orifice containing the hymen or its remains and the urethral orifice.

Under the name of fourchette is understood the posterior commissure of the vulva. The vestibule is the small triangular area bounded anteriorly by the clitoris, laterally by the labia minora, and behind by the meatus urinarius. Anterior to the fourchette separating it from the vaginal orifice a small depression can be seen which is known as the fossa navicularis.

The vulva is separated from deeply lying structures by the urogenital diaphragm, which is perforated by the urethra and by the vagina, and contains, in its thickness, the deep transversus

muscle and branches of the ischio-pubic vessels and nerves, the internal pudic artery with veins and accompanying nerves.

In the substance of the posterior portion of the labia majora are the vulvo-vaginal glands of Bartholin, whose excretory canals open on the groove which divides the labia minora from

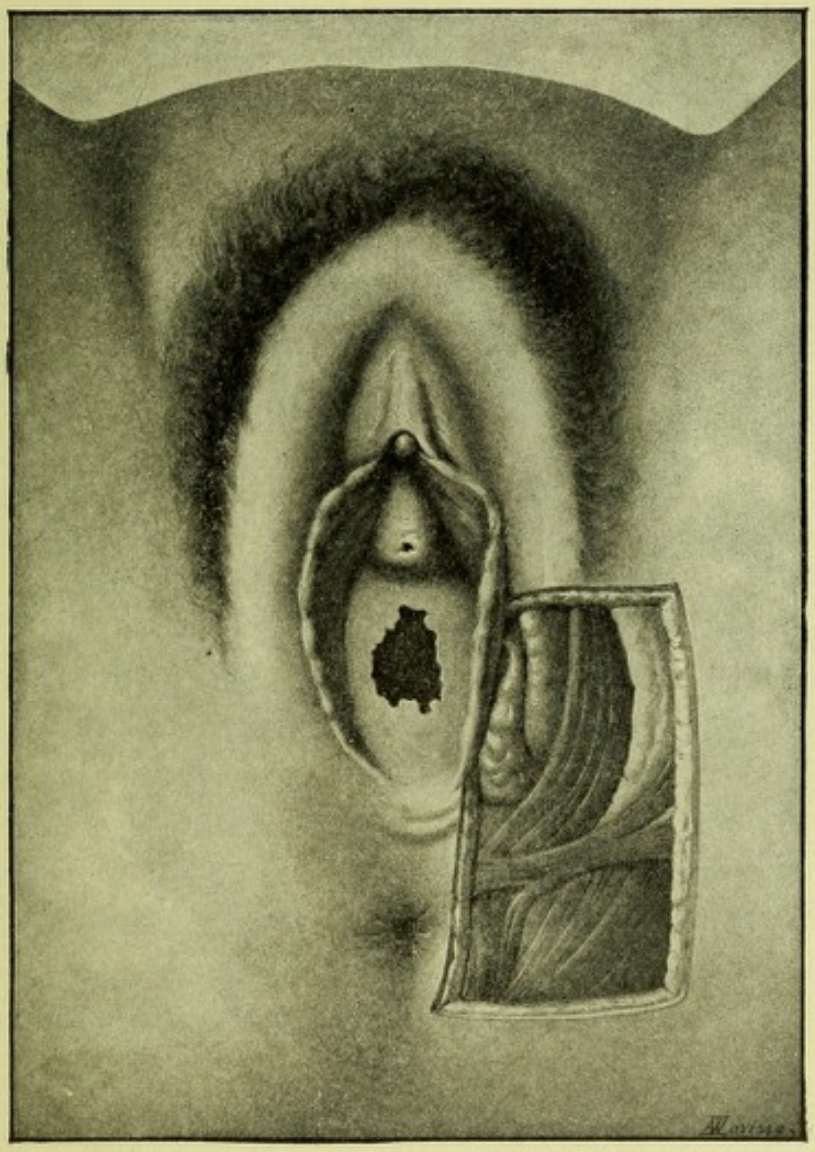


FIG. 84.—Vulva of a virgin. In the dissected area the communications of Bartholin's gland with the bulb and the muscles which cover it externally are well seen.

the hymen at the junction of the posterior third with the anterior two thirds of this groove.

Externally and anteriorly to the vulvo-vaginal glands is the bulb of the vulva, wrongly termed the bulb of the vagina because it is situated below the urogenital diaphragm. This bulb of the vulva, which has the form of a leech gorged

with blood and with its small extremity in front, is covered over by the bulbo-cavernous muscle or constrictor of the vulva.

In the fatty mass which constitutes the greater part of the labia majora are found some fibrous tracts, the termination of the round ligament, and sometimes a prolongation of peritoneum known under the name of the canal of Nuck.

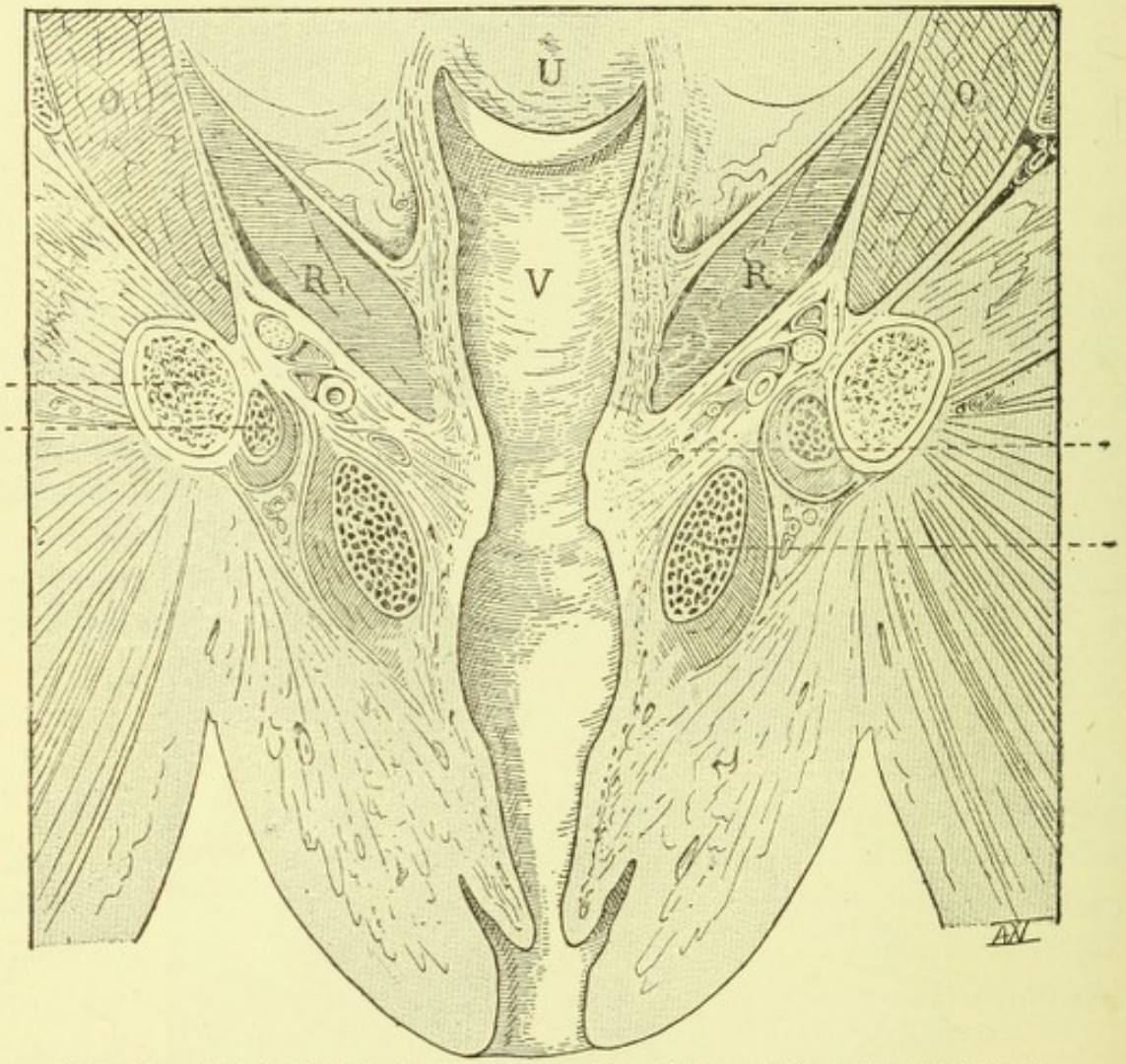


FIG. 85.—Vertical and transverse section of the pelvis (after Farabeuf).
The urogenital diaphragm D with the vessels and nerves it contains is white. Above it are the deeper lying organs: V, vagina; U, uterus; R, levator ani; O, obturator internus. Below it are the vulva: C, corpus cavernosum of the clitoris; B, bulb of the vulva; P, section of pubes.

The vessels of the labia majora, above all the veins, are very numerous. The arteries come from the internal pudic, which gives two collateral branches, the superficial perineal which ramifies in the subcutaneous cellular tissue, the deep perineal or bulbar, which goes to the bulb of the vulva; and two terminal branches, the cavernous artery which goes to the

corpus cavernosum of the clitoris, and the dorsal which goes to the surface of this organ.

The veins correspond more or less to the arteries; they anastomose with the plexus of Santorini and with branches of the internal saphenous. They often dilate during pregnancy.

The lymphatics go to the inguinal glands.

The nerves come from the internal pudic.

2. Treatment of Trauma to the Vulva.

1. Treatment of Wounds of the Vulva.

In principle, every wound of the vulva should be reunited, an immediate union having in this region a threefold object.

1. To produce a condition of hemostasis, because small wounds may give rise to quite dangerous hemorrhages.[1]

2. To prevent secondary infection which may easily occur in a region where permanent asepsis is impossible.

3. To avoid in the future the formation of faulty cicatrices, which may deform or constrict the vulvar orifice.

Union is not always possible in wounds of the vulva. It is contraindicated in infected wounds. It is sometimes impossible by reason of the size of the wound. It is important in such a case to closely examine the cicatrization.

Burns of the vulva and loss of substance following on acute inflammations of the region (noma, confluent pustules of variola, etc.) demand special attention. Very often grafts or secondary autoplastic operations are indicated in order to assist as much as possible the cosmetic and functional processes of the reparation.

2. Treatment of Contusions of the Vulva.

The contusions of the vulva, coming on during the puerperal state or apart from it, are interesting from the therapeutic point of view if they lead to the production of a hematoma.

These vulvar hematomas, often described as thrombi of the

[1] In particular is this the case during pregnancy. Nachmacher has published the history of a woman in whom rupture of a vulvar varix in the last month of pregnancy lead to her death from hemorrhage in an hour (*Berlin. klin. Woch.*, 1890, p. 968). Hyde has even seen death come on in 40 minutes as the result of the rupture of a varix due to a fall (Transactions of the Obstetrical Society, London, T. XL).

vagina, result from tearing of the bulb of the vulva, and the blood collects in the labia majora.[1]

If the hematoma is small, one confines oneself to securing asepsis of the integuments, which is important when these are excoriated, otherwise the infection of the hemorrhagic collection subjacent may occur by microbic invasion.

If the hematoma is large, incise it freely, evacuate the clots, stop the bleeding and finally suture it, being careful that the sutures completely encircle the hematoma cavity, in order to do away with the cavity which may again fill up after fresh bleeding.

If the walls of the cavity are too contused and result of the union is doubtful, tampon it with iodoform gauze.

When the hematoma is infected, whatever its size, make an early and free incision.

In all cases the incision is made on the most prominent part of the tumor and parallel to the axis of the labia majora.

3. Treatment of Inflammatory Lesions.

Inflammatory lesions may be superficial or deep.

1. Superficial Inflammatory Lesions.

Certain of these, such as *inflamed sebaceous cysts* and *furuncles*, are in no way peculiar and should be treated on the same lines as in other regions.

Erythema is not uncommon among diabetic, stout, and also certain patients whose skin is easily irritated by a leucorrheal discharge. Alkaline vaginal injections and local application of inert powders is generally sufficient.

Intertrigo, so often seen in the neighborhood of the vulva in fleshy women, is best treated by local bathing of the parts, using a solution of sublimate 1 to 20,000, and by the application of such powders as oxide of zinc, talc, etc.

Herpes demands no special treatment. Local bathings of the parts with calamine lotion and applications of powder and talc. If ulceration persist, application of nitrate of silver, 1 in 30, is very useful.

[1] The bulb is situated above the median aponeurosis. It is an organ of the vulva, not of the vagina (see Fig. 85).

Eczema is treated by the ordinary means, not forgetting that its origin may be due to a vaginal discharge and the patient may be diabetic.

Erythrasma, which generally attacks the genito-crural fold, is first treated with tincture of iodine, and when desquamation is produced, apply talc powder to which a little salicylic acid has been added, 2 to 100.

Vulvitis requires a special treatment varying according to the case:

In *sebaceous vulvitis* characterized by a hypersecretion of sebaceous material, which forms a sort of membranous lamina on the internal face of the labia majora, the labia minora and around the clitoris, and leaving exposed below this lamina, when rubbed off, a mucous membrane redder than normal. For such a condition we prescribe local bathing of the parts, minute attention to cleanliness and soapy or alkaline lotions.

In *mucous vulvitis*, where there is a hypersecretion of mucus and where the patient complains of wetting herself, order cold lotions and astringents (calamine lotion, solution of alum, and sulphate of zinc) and the application of inert powders.

Vulvitis complicated with vaginitis is treated as vaginitis.

We now pass to the *vulvo-vaginitis of infancy*. It is now recognized to be due, in little girls, to gonococcal inoculation.

Its treatment should first of all be prophylactic. We should treat the discharges from which the mother suffers, and to avoid risks of contagion by towels and sponges, also in hospitals the same thermometer should not be used for taking the temperature in the vagina of a number of children. Epidemics of vulvitis have been traced to this cause.

Curative treatment consists in vulvo-vaginal lavage which should be made by the doctor himself with a little cannula, a red rubber catheter, and a solution of permanganate of potash, 1 to 1000. The mother should be advised to wash the external parts well with a solution of sublimate 1 to 10,000 and in the intervals between the lavages to separate the labia by placing between them a tampon of antiseptic wool (boric acid or salol, etc.).

Combined with the local there should also be a general treatment (iodide of iron and sulphur baths).

Certain of these vulvo-vaginites are accompanied by the development of fungoid growths around the urethral orifice, which may give rise to hemorrhage and may simulate a criminal attack or give rise to a belief in the premature appearance of menstruation. A few applications of silver nitrate (1 to 100) suffice to cause their disappearance.

2. Treatment of Deep Inflammatory Lesions.

The *lymphangitis abscess* of the labia majora should be treated by direct incision as elsewhere, as also abscesses developed around a foreign body or a suppurating hematoma, etc.

The only deep inflammatory lesion of the vulva which need detain us is *inflammation of the vulvo-vaginal gland of Bartholin or Bartholinitis.*

If a purulent collection exist, it may be limited to the gland itself, or extend throughout the labium. In any case the treatment is the same. A more or less extended incision parallel to the main axis of the labium and on its internal surface. As the incision tends to close spontaneously, before the abscess has disappeared, tamponing of the cavity may be required after the excision of an ellipse in order to prevent too rapid cicatrization.

In spite of all precautions, it is not infrequent to see fistulas persist, and an abscess reappear from still affected portions of the gland. Thus, in order to obtain a cure, we practice the complete excision of the gland.

This excision should not take place during the acute stage; it is better to wait eight or ten days after the incision of the abscess. Immediate extirpation should only be advised in chronic cases or in Bartholinitis at the outset of the attack when only a simple indurated nucleus with a softened center exists; in a word, if the inflammation is primarily or secondarily limited to the gland.

Extirpation should be carried out in the same lines, as we will mention further on, for the excision of vulvo-vaginal cysts.

It is indicated during a pregnancy, because the suppurating seat of these chronic inflammations of Bartholin's gland may be the cause of infection during parturition and the dangers of

abortion as a sequel to the operation are not as great as was formerly thought.

If Bartholinitis, has not been methodically treated, a *fistula* may result. For simple fistulas, excision of the tract and glands suffices. For fistulas opening on the internal surface of the vulva and the perineum, more particularly those which tend to burst into the anal canal the little operation we have just described is insufficient. It will be found necessary to completely divide the perineum down to the level of the fistulous tract which is then excised and then proceed to the reconstruction of the perineal body by one of the procedures which we will describe later on.[1] Spontaneous cicatrization always leaves an insufficient perineum.

3. Treatment of Kraurosis and Leucoplasia.

Leucoplasia, characterized by the development of white plaques, requires a very simple treatment. Avoid all causes of irritation and use alkaline injections. Only plaques which are thickened demand excision, because one should always fear in such conditions the secondary development of cancer.

Kraurosis (κραυρωσις, retraction) is characterized by the atrophic retraction of the skin and treated, in the majority of cases, by a purely medical routine (minute cleanliness, treatment of associated vaginal discharges, injections and washing with emollients and alkalines, etc.). Surgical treatment is only required in cases complicated with persistent leucoplasia and dispareunia.[2]

4. Treatment of Vulvar Pruritus.

As in all cases of pruritus, we must look for and *treat the cause.* This is at times quite evident: pediculi, intestinal worms, dirt, or vaginal discharges. These last named may be very copious. To demonstrate the role they play place a tampon in the vagina and the itching disappears so long as the tampon remains in place.

[1] See Perineorrhaphy.

[2] Jayle, Vulvar Kraurosis. *Review of Gynecology and Abdominal Surgery*, Paris, 1906, p. 633.

Diabetes may be the cause, by its hematogenous action or local irritation of the urine.

Pruritus, essentially, can only be admitted after a vigorous search shows no other cause.

Injections with very hot boiled water, or vaginal ovules containing a little chlorhydrate of cocaine (0.02 to 0.03 centigrams—1/3 to 1/2 grain), or applications of silver nitrate 1 to 20, etc., produce a great relief.

As to *real treatment* of pruritus, it has differed according to the idea entertained of the affection. Sanger and Kelly, who believe it to be a dermato-neuritis, advise the excision of the plaques at the seat of the pruritus. Ruge, who thinks it is a parasitic condition, advocates a simpler treatment. He washes and cleans well with soap the cervix, vagina and vulva after which he applies to the last carbolized vaseline (3 to 4 per 100). He recommences his cleaning operation after a few days and soon obtains a complete cure. Hirst and Tavel advise a resection of the nerves involved in inveterate cases.

4. Operations on the Vulva.

Some of the operations on the vulva are of slight importance and won't detain us.

Adhesions of the prepuce of the clitoris are perhaps accompanied by retention of smegma and veritable concretions resulting in consequent irritation and masturbation. These may be separated back by a little blunt sound after the prepuce has been drawn back toward the pubis and a little cocaine applied locally. After freezing is complete, the clitoris, red and denuded, is smeared over with vaseline and the mother is advised to draw back the prepuce of the clitoris daily, vaselining the parts so as to prevent the further formation of adhesions.[1]

Excision of the labia minora is practised by certain people, such as the Maures, following a ritual similar to that of the Israelites' circumcision. Its practice for hypertrophy is rarely called for.

Speaking generally, the operations done on the vulva are divided into three groups:

[1] Bacon, Adhesion of the Female Prepuce. *Americ. Gyn. and Obstet. Journal*, N. Y., 1898, T. VI, p. 278. Kelly, p. 6, *Gyn.*, N. Y., 1898.

1. Operations to constrict or close the vulvar orifice.
2. Operations to increase the orifice.
3. Operations of excision.

1. Operations Constricting or Closing the Vulva.

Operations for the constriction of the vulvar orifice are three: Infibulation, episiorrhaphy, and nymphorrhaphy. Strictly speaking, these three operations belong to the domain of retrospective surgery.

This is above all true of *infibulation* which consists in uniting the labia majora by a metallic ring. Frequently practised in the middle ages, it still exists in Ethiopia, where it appears to be the rule to unite with an amianthus wire the labia majora in little girls of one year to one and one-half years. At the time of marriage the mother of the prospective husband examines the future bride and her consent is not gained until the ring is found to be quite intact. It is afterward incised with considerable pomp.

In episiorrhaphy[1] the labia minora are removed and the internal surfaces of the labia majora are rawed and allowed to unite. *Nymphorrhaphy*[2] is an operation of the same kind, in which the freshening and suturing occur in the labia minora. Employed in cases of rebellious vesico-vaginal fistulæ, these two operations constitute a deplorable necessity, not being able to do better, and are only very exceptionally indicated. The vagina is transformed into a diverticulum of the bladder and becomes most frequently the seat of calculi formation necessitating a secondary opening of that which has been closed.

2. Operations Enlarging the Vulvar Orifice.

Treatment of Adhesion of the Labia.—The simplest of these operations is that in which the labia are separated by a grooved sound. The condition of the adhesion of the labia is brought about by a congenital lesion, or following on an inflammation which has caused a disappearance of the surface epithelium

[1] Of επισειον, lip.
[2] Of nymphs, labia minora.

and consequently union of the lower portion of the labia majora and upper portion of the labia minora.[1]

Treatment of Cicatricial Constrictions.—The cicatricial constrictions may be treated by simple dilatation, but this only gives temporary results. The same may be said of simple section of the cicatricial frenum. Complete cure can only be obtained by an operation of excision of the cicatricial tissue and making good the loss of substance by an immediate autoplastic operation.

Division of the Vulvo-vaginal Tissues.—Introduced into

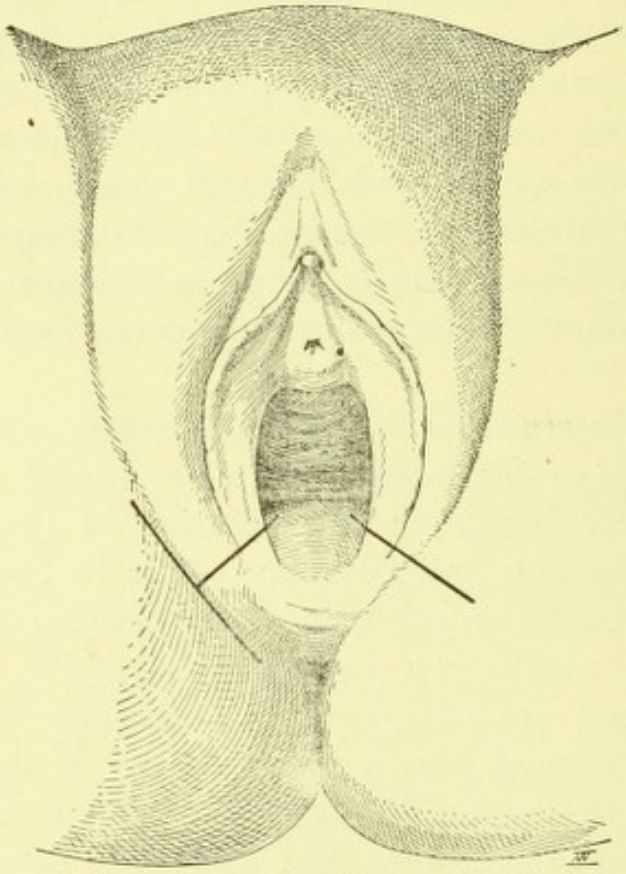


FIG. 86.—Division of the vulvo-vaginal tissues. On the left side simple division; on the right, division with lateral perineotomy.

Germany by Duhrssen and into France by Chaput, it consists of a long posterolateral incision. The incision may be made from without in or by transfixion. Commencing at the skin, it is represented by a line which commences about 2 cm. (1/5 inch) above the fourchette, is directed down and out toward the ischium, and is about 1 1/2 to 2 inches or 4 to 5 cm. long. Deeply, it is continued above into the vagina, about 5 cm. (2

[1] Sanger, Conglutinatio labiorum. *Cent.-Bl. f. Gyn.*, Leipzig, 1891, No. 50. Ross (J. W.), Conglutinatio labiorum. *Cent.-Bl. f. Gyn.*, 1892, p. 284.

inches) from the border of the vulva, and in the same plane as the cutaneous incision.

A few forceps having been applied and hemostasis secured, sufficient access is afforded the surgeon to carry out the operation, which is finished by suturing.

If he wishes to reestablish the parts as before, he commences by uniting the perineal and vaginal segments with a stout thread of silk or silver in the line of the small axis of the diamond-shaped space created by the incision. This suture passes below the bleeding surfaces, so as to obliterate any virtual cavity. He then sutures with catgut the vaginal mucous membrane and the external parts with silkworm gut.

In cases where a vulvo-vaginal stricture exists, as has been observed in certain vesico-vaginal fistulas, it has been found better, after tying the vessels, to allow the wound to cicatrize without intervention, or else suture it in the following way: It may be sutured perpendicularly to the direction of the wound, and we commence by placing the first stitch in the long axis of the lozenge-shaped space and suture the vaginal mucous membrane to the skin and then suturing to the right and to the left the rest of the wound, until the skin and mucous membrane of the vagina are united. In this manner we obtain, as our experience has taught us on many occasions, the healing of the vulvo-vaginal stricture, having first made use of the incision as a preliminary portal of entry.

Side by side with the vulvo-vaginal incision we should mention the procedure employed by Michaux, which is a *lateral perineotomy* combined with a vulvo-vaginal incision. Michaux makes an ischio-rectal incision about 10 cm. (4 inches) long, parallel to the internatal cleft and a good finger's breadth above it. The incision commences posteriorly about the level of the anus and terminates where a line between the ischium and pubis crosses the labia majora anteriorly. It is deepened until it just comes into contact with the external surface of the vagina which is incised. We may continue, if necessary, the incision as far as the vulva and in this manner succeed in making a vulvo-vaginal cleft.

The indications for division of the vulvo-vaginal tissues appear to us to be very restricted. As a preliminary to vaginal

hysterectomy it should be completely rejected. If the size of the tumor or smallness of the vagina render impossible the removal of the uterus by the vaginal route, it is much simpler to have recourse to abdominal hysterectomy or to remove it in fragments. Vulvo-vaginal splitting, however, has its use in certain cases of perineal dystocia and in certain uterine operations in virgins, for the removal of certain vaginal tumors and finally for the treatment of certain vesico-vaginal fistulas which are difficult of access, particularly those that extend high and are complicated by cicatricial contraction of the vagina.

3. Operations for Excision.

We will successively study the excision operations for inflammatory lesions and neoplasms. As a preliminary we will say a word or two about the removal of the clitoris, whether this be normal or simply deformed, because the indications for its removal are quite special.

Removal of the Clitoris.—This has been recommended in cases of hystero-epilepsy (Baker-Brown). It has given no result as has also been the case in treatment of masturbation. Is one authorized to interfere with the clitoris of a child which is abnormally developed? It can happen that an exaggeration in the size of the organ exposes it to friction of clothes, etc., which may lead to masturbation. In short, the only indication for the removal of the clitoris is hypertrophy when it is enlarged to such a degree that it simulates a penis (a variety of pseudo-hermaphrodism known under the name of gynandry). Independent of its inconvenience the hypertrophy may be a cause of annoyance in the accomplishment of the sexual functions.

Another indication for the amputation of the clitoris is carcinomatous degeneration of the organ.

The operative procedure for the amputation of the clitoris is very simple. Dissect up from the base of the clitoris a little collar of mucous membrane and then cut transversely across the erectile cylinder of the organ. This section causes a slight venous hemorrhage which two or three catgut sutures placed around the fibrous envelope of cavernous tissue will suffice to stop. The mucous membrane is afterward brought over the little stump and sutured with silkworm gut.

Excision for Inflammatory Lesions.—Certain inflammatory disorders may require excision.

A *chancre* of the vulva may lead to a *sclerosing nucleus* which may persist indefinitely and become very annoying. In such a

Fig. 87.—Hypertrophy of clitoris necessitating its amputation.

case excise the *sclerous area*, and an immediate union will almost certainly follow.

Lupus, of which the rodent ulcer in Germany constitutes only a variety, should be treated by entire removal followed by autoplasty.[1] Severe forms of *kraurosis*[2] should be treated in

[1] See further the removal of malignant tumors. When total extirpation is impossible the local condition can be improved by touching up with a red cautery or applications of lactic acid, concentrated solutions of chloride of zinc, etc.

[2] Of five cases operated by Martin, four obtained a definite complete cure, and only in one case did he get a recurrence. An extensive extirpation will operate against this complication. See kraurosis: Arnoux, Contribution à l'étude du kraurosis vulvæ. *Th. de Paris*, 1898–1899, No. 621. Jayle, *Revue de Gynécologie*, Paris, 1906, p. 633.

the same way, and *leucoplasia* with thickening of the *tissues.*[1]

Elephantiasis of the vulva is also a case for extirpation. In such cases it is at times very extensive and yet it is exceptional to have trouble in a reunion of the tissues. However, hemostasis will demand close attention, as hematomas may so easily form and yield to suppuration as the preliminary cleansing of the elephantiasis masses is so difficult.[2]

Extirpation of Vulvar Neoplasms.—From the operative point of view these tumors can be divided into two main groups: *Benign tumors* and *malignant tumors.*

I. Treatment of Benign Tumors.

These are *cutaneous* and *subcutaneous.*

1. *Cutaneous Tumors. Vegetations.*—*Vegetations* occur most frequently of cutaneous tumors. Commence their treatment by the attention to their causative agent, the discharge, and using an astringent powder such as alum. These means are generally insufficient and so one is most often obliged to have recourse to surgical intervention.

Excision with scissors is only necessary for extensive vegetations which possess a thick and resistant pedicle. For others the sharp curette suffices.

It is necessary to stretch the skin well during the little operation, so that the vegetations only are removed without undue scraping of the surface of the skin on which they are implanted.

Having finished the curettage, lightly touch up the bleeding points with the thermocautery at a dull red heat. This superficial cauterization prevents bleeding and prevents a return of the vegetations.

A little iodoform powder and the application of a wisp of wool suffice to cure the condition which leaves, in healing, no cicatrix.

This extirpation is so simple that we advise its execution

[1] Pniffe de Magoudeau, Contribution à l'étude de la leucokératose vulvo-vaginale. *Th. de Paris,* 1896–1897, No. 632. Bex, Leucoplasies et cancroïdes de la muqueuse vulvo-vaginale. *Th. de Paris,* 1887–1888.

[2] One must not confound true elephantiasis of the vulva with pseudo-elephantiasis, which is a sort of indurated edema accompanying certain ulcerous lesions, more particularly syphilitic lesions, and which, disappearing with the causal agent, are never justifiable of operative procedure.

even during the course of pregnancy when such vegetations may during labor be a source of complications.[1]

Molluscum.—The name of *molluscum of the vulva* should be limited to the cutaneous fibromata of that region. These tumors are most often pediculated. The simple section of their pedicle with or without preliminary ligature may lead to a cure. It is better perhaps to extirpate their base of implantation and to unite with two sutures. In such a case as Jalaguier had, the *molluscum* was continuous with a subcutaneous fibrous formation which extended to the neighborhood of the ischium and caused a veritable dissection.

2. *Subcutaneous Tumors.*—These tumors are fluid or solid. They may be limited to the vulva or extend to the neighboring region.

The tumors which extend to neighboring regions are *saccular cysts* and *cysts of the peritoneal diverticulum* or canal of Nuck.[2] The extirpation of this category of tumors is comparable to that of a hernial sac. It may be necessary, after incision of the tissues which cover them, to open the cystic cavity, empty it of its contents and extirpate its wall and, taking care to remain in contact with its internal wall in order to avoid losing oneself in the more remote planes of cleavage, not to injure the vessels or neighboring parts.

Among the cystic tumors limited to the vulva, the extirpation presents nothing of importance. They are *simple cysts* and *sebaceous cysts.* Others, such as *cysts of Bartholin's glands*, merit more attention.

In order to expose them, we make an incision along the most prominent part of the tumor, following the axis of the vulva to the limit of the great and small labia. The cyst being thus exposed is dissected out, being careful not to perforate it, and remaining directly in contact with it so as to avoid perforating internally the lining of mucous membrane which is sometimes very thin and doubles the wall of the cyst; externally beware of injuring the bulb of the vulva and transverse perineal artery. Finish the operation by tying all the vessels in order to avoid the formation of a hematoma by inserting some buried catgut sutures and in suturing the integuments.

[1] Lefer (A.), Contribution à l'étude des végétations chez les femmes enceintes. *Th. de Paris*, 1898–1899, No. 492.

[2] Wechselmann, *Archiv f. klin. Chir.*, Berlin, 1890, T. XLIII, p. 578.

In cases where the cyst presents *some difficulty* of extirpation, open it, curette its internal surface, and paint it with a solution of nitrate of silver 1 to 5, chloride of zinc 1 to 10, and tampon with a swab of iodoform gauze, which is left in place until saturated with pus, renewing the tamponing each day in such a way as to keep the wound open until filled up with granulations.

The solid benign tumors limited to the vulva (lipomata) or

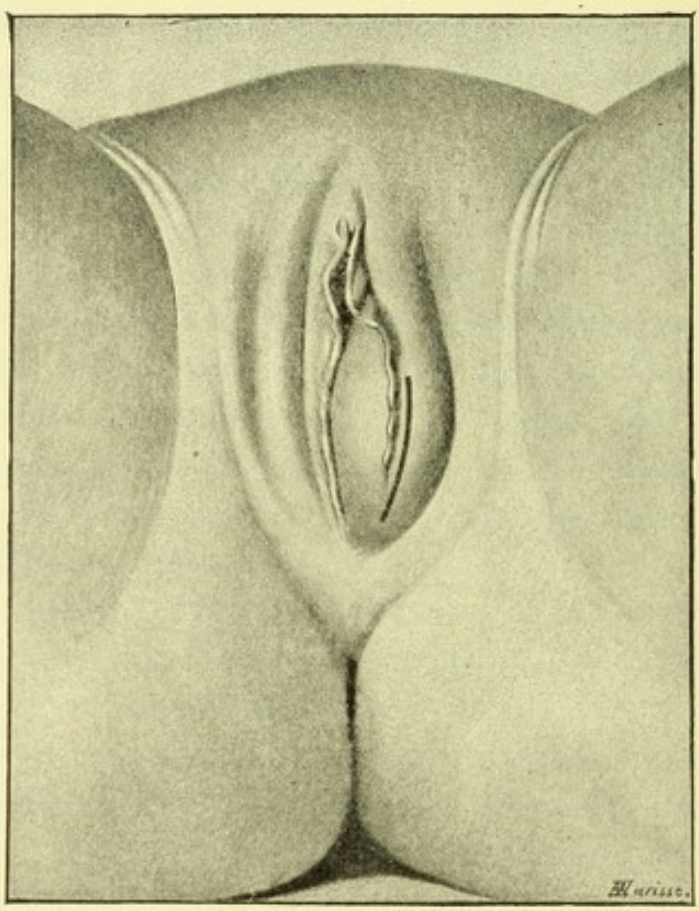


FIG. 88.—Incision to expose the gland of Bartholin.

extending to neighboring parts (fibro-adenomata of the round ligament, perineal myxo-fibromata) present no particular difficulty in their removal.[1]

II. Treatment of Malignant Tumors.

Epitheliomas of the vulva[2] should be removed with the knee "en bloc" together with the ganglionic accompaniments. The

[1] Mauclaire, Molluscum pendulum de la vulve. *Annales de gynécologie*, Paris, 1893, T. II, p. 409.

[2] Teller (Richard), Ueber das Vulvakarzionom. *Zeitsch. f. Geb. u. Gyn.*, Stuttgart, 1907, T. LXI, p. 309.

loss of substance is rectified by autoplastic procedures. The only point of importance is to see carefully to the repair of the urethral orifice when the tumor occupies the region of the meatus in such a manner that the patient will not be exposed to complications allied to secondary stricture of the new urethra (see Figs. 89, 90 and 91).

When the epithelioma is inoperable, a palliative treatment is sufficient, protecting the thighs with an ointment (vaseline and oxide of zinc 25%). The local irritation is produced by the contact of an irritating discharge coming from the ulceration. The ulcerated surface should be washed with antiseptic solutions

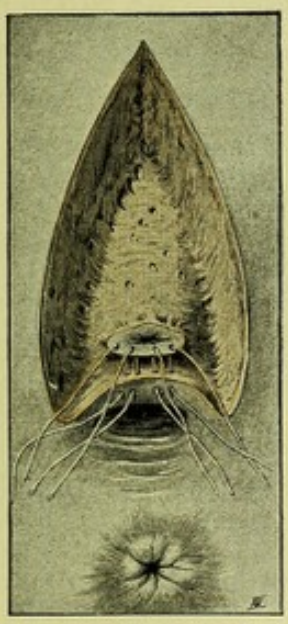


FIG. 89.

FIG. 90.

FIG. 91.

Resection of the meatus and autoplasty after extirpation of the anterior part of the vulva (after Kelly).

afterward powdered with iodoform or even, in case of bleeding, in the event of it being covered with sphacelated granulations, to curette it. Some surgeons, following Kraske, advise the application of a cutaneous flap to the ulcerated surface after scraping.[1]

Very exceptionally one may be called upon to remove a cancer of Bartholin's gland.[2]

5. Treatment of Vaginismus.

Vaginismus is characterized by a painful reflex contraction of the sphincter of the vulvo-vaginal orifice. It involves the sphinc-

1 Kraske, *Münchener med. Woch.*, 1889, p. 1.

2 Giuseppe Trotta, Un caso di carcinoma della glandola del Bartolini. *Archivio di Ostetricia et Ginecologia*, Napoli, 1900, T. VII, No. 4.

ter of the vulva (constrictor of the vulva) and the sphincter of the vagina (anterior fibers of the levator ani) which leads to a distinction between an inferior and superior vaginismus.

The strongest treatments have been suggested for this affection which affection, although of no gravity, is nevertheless very painful.

In order to procure fertilization of the ovum, Gaillard Thomas advises the performance of coitus under anesthesia, which procures a relaxation of the sphincter. Others have suggested section of the nerves to the vulva. To-day these methods are completely abandoned.

The first duty of the gynecologist is to *discover the cause* of the condition. If there be a ureteral caruncle, vaginitis, a fissure, painful excoriations, or a localized increased sensitiveness following on the first coitus, we must absolutely forbid all sexual communication and treat the lesion which may cause the reflex constriction. As it most frequently occurs in nervous women, one might with advantage prescribe tepid irrigations and antispasmodics internally. The first coitus should only be allowed when all local hypersensitiveness has disappeared and after the application of cocainized vaseline.

Lomer has obtained cures by the application of continuous currents.[1]

We have always been able to avoid the operative intervention which we will now describe and which has been some time in vogue.

1. **Brusque Dilatation under Anesthesia.**—This can be very simply carried out with Trelat's speculum.

2. **Excision of the Hymen and of the Vaginal Entrance.**—Marion Sims practised the excision of the hymen, dilated the vulvo-vaginal orifice with two fingers and then made to the right and left of the median posterior column of the vagina two incisions which came together below and posteriorly on the median line of the perineum, thus producing a Y-shaped incision. These incisions partly cut through the constrictor and he then forcibly dilated the orifice. For some days following this operation he left a conical dilator in position for four or five hours daily.

3. **Plastic Operations.**—Numerous procedures have been

[1] Lomer, *Centr.-Bl. f. Gyn.*, 1889, p. 870.

devised. All incise the skin, expose the constrictor, cut a portion of the fibers, and tear across what remains, and finish with a suture of the cutaneous incision.

Pozzi, after excision of the hymen and forcible digital dilatations of the vulvar orifice makes on each side an oblique incision of 3 to 4 cm. antero-posteriorly, which goes much beyond the hymen. He notches the constrictor, dissects up the lips of the incision and unites it at right angles to its original dissection; thus one can obtain at the same time an increase in size of the vulvar orifice and an eversion of the vaginal mucous membrane, thus submitting to the friction of coitus that zone from which reflex actions spring.[1]

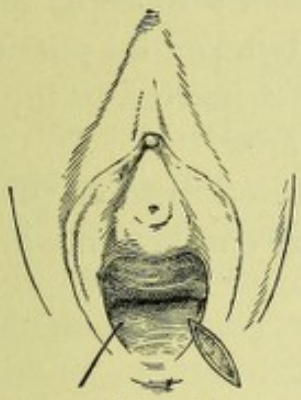


FIG. 92.

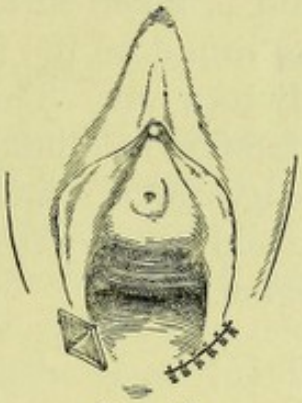


FIG. 93.

Plastic operation for vaginismus.

In Fig. 92 on one side the incision which goes some distance beyond the hymen and on the other side the open wound. In Fig. 93 the lips of the incision are dissected up, the constrictor notched and the operation terminated by suture.

4. **Resection of the Internal Pudic Nerve.**—Tavel advises the following procedure: About the middle of the space which separates the tuberosity of the ischium from the anus he makes an incision about 8 to 10 cm. (3 1/4 inches to 4 inches) long, the direction of which is sagittal and of which the extremity corresponds to a line joining the two ischia.

After having divided the skin and subcutaneous fatty tissue, one proceeds externally and posteriorly toward the internal face of the ischium. In this manner one avoids injuring the inferior hemorrhoidal nerve, which comes out at the level of the sciatic

[1] Veit cuts across the integuments and the constrictor of the vulva by an incision radiating from the vulvar orifice. Then he transforms his vertical incision into a transverse one by reuniting the vaginal mucous membrane to the skin.

Doyen incises the fourchette transversely to the extent of 30 to 40 mm. This incision is made in one cut with a bistoury or by several cuts with a straight scissors. The anterior lip of the wound is then seized in a pair of ring-bladed forceps and separated from the subjacent tissues to a depth of about 30 mm. The sphincter being thus exposed is incised transversely.

spine. Through the fascia which covers the obturator internus, one can feel the palpitations of the internal pudic artery. The aponeurotic sheath which surrounds it is split and one can then isolate the nerve from the artery and accompanying veins.

It is also imperative to distinguish the various branches accurately in order to preserve the anal subdivision of the perineal branch. In order to do this pass a sound under these nervous filaments and this will provoke contractions in the corresponding muscles; the sensitive branches can be recognized by the fact that traction exercised on them causes a depression of the points of skin which they supply.

After having cut the nerves as far back as possible, the peripheral end is taken in a pair of Kocher's forceps, and turned round and round on the forceps, and its terminal portion is thus completely torn out. This withdrawal is limited to the branches which correspond to the hyperesthetic area.

The edges of the incision are reunited without drainage in order to avoid the very frequent secondary infection which occurs in this region.

CHAPTER II.

SURGERY OF THE VAGINA.

Summary.—Treatment of traumatic lesions (wounds, hematomas, foreign bodies).—Treatment of inflammatory lesions.—Treatment of tumors (benign, malignant).—Treatment of strictures and atresia of the vagina; formation of neo-vaginas.

1. Treatment of Traumatic Lesions.

1. Treatment of Wounds.

When one is confronted with a vaginal wound, one must enquire first into the conditions which produced it. With the exception of operative wounds, the causes ordinarily met with are: criminal abortion, coitus,[1] falling astride an object, and finally accouchements,[2] during which tears of the vagina occur especially at the two extremities, injuring at the same time the cervix uteri and the perineum. This is explained by the fact that the vagina is more supple, and more capable of dilatation at any part of its course than at the two extremities.

The *treatment* of these wounds consists of two separate acts: to stop hemorrhage and prevent infection. To fulfil these conditions the best course is to suture the wound.

After evacuation of the clots and cleansing of the vagina by a copious irrigation, one should methodically examine the wound with the aid of specula.

Suture it with catgut and place a tampon of iodoform gauze in the vagina. Tamponing without suture is only used when nothing else can be done.

When the wound is complicated by the presence of a foreign body, the removal of the same is indicated. Generally easy, it may be very painful if the body is engaged in the wound and

[1] Neugebauer (F.), Venus cruenta violans interdum occidens. *Monatschr. f. Geb. u. Gyn.*, Berlin, T. IX, p. 221,

[2] Morel (J.), Rupture et perforation de la paroi postérieure du vagin pendant l'accouchement. *Th. de Paris*, 1897–1898, No. 35.

buried wholly or partly in the vagina. The movements of its abstraction should be very gentle.

If an infection develops secondarily to the wound, involving the paravaginal cellular tissue or an encysted peritonitis, a large incision and drainage are indicated.

2. Treatment of Hematomas.

We have seen that it is imperative to distinguish vaginal from vulvar hematomas.[1] Rarer and yet coming on like the others, during the puerperium, vaginal hematomas often resolve spontaneously. It is only necessary to maintain the asepsis of the vagina in order to avoid infection of the effusion when this is moderate.

The progressive increase of the hematoma by continuation of the hemorrhage or its suppuration would indicate, on the contrary, a free incision with plugging of the cavity in the first instance and drainage in the second. For large intrapelvic hematomas, the vaginal route is the best if the effusion is already somewhat old; on the contrary, if it is a progressively developing hematoma, we should have recourse to the abdominal route.[2]

3. Treatment of Foreign Bodies.

Foreign bodies of the vagina may be divided into avowable (tampons, pessaries) and unavowable (introduced during masturbation), thus presenting a variety which baffles description.

These foreign bodies produce by their presence vaginal inflammation and even ulceration, leading sometimes to strictures and communications with neighboring cavities (bladder and rectum). Sometimes even serious complications arrive, septic troubles, etc., the typhoid state producing death. In these conditions treatment, as one can understand, is not always the simplest.

The first thing to do is *to remove the foreign body*. To do this carefully clean the vagina, vaseline it and then attempt extraction with the aid of forceps introduced on the finger. This extraction is unfortunately not always possible by reason of the nature and

[1] Chaintre, Thrombus intra-vaginaux. *Lyon médical*, 1890, T. LXIII, p. 43.

[2] J. Whitridge Williams, Intrapelvic Hematoma following Labor not Associated with Lesions of the Uterus. *Am. Jof Obstetr.*, New York, 1905, T. II, p. 442.

position of the foreign body, of its bulging into the vaginal wall, or because of the hymen or a cicatricial structure of the vagina. One occasionally has to pick it out piecemeal with a cutting forceps or with a Gigli saw, having first fixed the body with a pair of strong forceps.

Having removed the foreign body, *disinfect the surrounding parts*, and if necessary touch up the ulcerations with a solution of silver nitrate (5 per cent.). As a final act treat the *vaginitis* and repair any *fistula produced*.

2. Treatment of Inflammatory Lesions.

Treatment of Vaginitis.

The first point in the treatment of vaginitis is to inquire into its cause (foreign body, uterine catarrh, cancer, prolapse, masturbation, etc.). As to direct treatment of the vaginitis, that will vary according to its nature. One point of importance is to *interdict all sexual communication* whatever be the nature of the vaginitis, and simple lavage of boiled water will suffice in *vaginitis complicating pregnancy*. For *mycotic vaginitis*, injections of sulphate of copper 2 per cent. is the treatment of choice.

In *acid leucorrhea*, one should prescribe injections of bicarbonate of soda, an ample soupspoonful to a liter of water. In *fetid leucorrhea*, Labarraque's solution is frequently employed in a strength of 1 to 3 soupspoonfuls to a liter of water. In *chronic vaginitis* it is useful to combine feebly antiseptic injections (sublimate 1 in 4000) with the placing in position in the vagina of tampons impregnated with a mixture of glycerin and tannin or alum, which is left in twelve to twenty-four hours and renewed twice a week.

Gonorrheal vaginitis necessitates a more serious treatment. During the acute period, rest, baths, and feeble injections of permanganate of potash (1 in 4000), absolute cleanliness of the external genitals, which should be washed three or four times daily with a solution of boric acid, and often if the discharge is abundant. A little later injections of 1 in 1000 corrosive sublimate solution preceded by a thorough cleansing of the vagina with soap and a thorough lavage with water. It is even better to place

a tampon of glycerin and tannin in the vagina the day previous to the injection. This causes a shedding of the most superficial layers of the epithelium. The sublimate acts better on a mucous membrane thus treated. After washing out the vagina well with sublimate, it is slightly tamponed with iodoform gauze to prevent contact of its walls.

It has also been advised to paint with a 10 per cent. solution of silver nitrate. After having cleaned the vagina well, one paints its walls with a tampon of wool soaked in this solution. Commence at the fundus and leave no spot untouched. Use the speculum to aid this procedure. Then remove the excess of solution with a piece of dry hydrophile wool. Next coat the vagina with vaseline and place two tampons, furnished with silk threads, in such position as to prevent the folds of mucous membrane coming into contact with each other. The tampons are removed in forty-eight hours.

It is quite evident that in this variety of vaginitis, more than in the others, it is necessary to attack the gonococci wherever they may be, whether in the cervix uteri, urethra, or in the peri-urethral passages, as vaginal reinoculations may occur with the greatest ease.

Latterally, Landau has advocated the employment of yeast in the treatment of gonorrhea. He washes the vagina with sterilized water, and then introduces into the vagina two teaspoons of yeast and one teaspoon of grape-sugar. A few minutes after he introduces a tampon saturated with grape-sugar, which is removed by the patient in eight or ten hours. These applications are made each second day.

In a general way, for all varieties of vaginitis one may utilize three methods of treatment which may be sometimes of interest to combine.

1. Painting with somewhat concentrated solutions of active substances.

2. Vaginal injections.

3. Application of tampons of glycerin plus tannin (1 to 2), alum (5 to 100), ichthyol (5 or 10 to 100), thyenol (2 to 100) or protargol (2 to 100), etc. The patients, when left to treat themselves, are allowed to introduce glycerinated ovules, to which some active substance has been added.

3. Treatment of Tumors.

Tumors of the vagina may be removed:

1. Directly *per vias naturales.*

2. After division of the vulvo-vaginal tissues which is carried out on the healthy side (Duhrssen) or on the diseased side (Thorn) or in the median line (Thomson).

3. After transverse perineotomy (Olshausen).

4. By the sacral route.

5. By the abdominal route.

6. By the combination of both these routes.

7. By the paravaginal route.

None of these routes should be regarded exclusive of the others. The nature of the operation depends on the tumor with which one is dealing.

1 **Cysts.**—Cysts of the vagina, small and non-infected, are removed "in toto" *per vias naturales.* It is the operation of choice, but if the cyst is large, with prolongations into the broad ligaments, as in certain congenital cysts, the total extirpation of the sac is impossible. It is therefore necessary to confine oneself to incision of the cyst, excising its prominent position and suturing its base to the sides of the vaginal incision.

After having curetted its epithelium, it is well rubbed over with a piece of wool held in a forceps and soaked with chloride of zinc solution 1 in 10. Afterward the cavity is tamponed with iodoform gauze and healing occurs gradually by healing from below.

Suppurating cysts are treated with incision and drainage.

2. **Fibro-myomata.**—The extirpation of these tumors is usually[1] quite easy. The treatment of choice appears to be:

A. Incision, then enucleation followed by two layers of sutures, a superficial and a deep, in cases of sessile tumors.

B. Ligature of the pedicle in polypoid tumors.

As these tumors frequently spring from the anterior vaginal wall, torsion should not be applied to them, because that may lead to a tearing of the bladder.

In such cases, the volume of the tumor is such that, in order

[1] Jacobée (P.), Des Fibromes sessiles et pédiculés du vagin. *Th. de Paris,* 1908–1909, No. 34.

to disengage it, one frequently has resource to obstetrical forceps and the hand introduced into the rectum. We think it is simpler to take away the tumor in fragments.

If the fibromyoma is gangrenous one can, after extirpation of the tumor, pack the site of enucleation with iodoform gauze and allow it to close gradually up.

3. **Malignant Tumors.**—Malignant tumors have been removed *per vias naturales* or making a larger access by a *vulvo-vaginal* division carried out on the healthy side (Duhrssen), or on the diseased side (Thorn), or in the posterior median line (Thompson).

In order to get better access, Olshausen advised a *transverse perineotomy*, dividing the perineum and then resecting the vagina. A. Martin is accustomed to do a *total colpo-hysterectomy by the lower route.*

The immediate results have generally been good, but time has shown them to be disastrous. In almost all cases, recurrence has taken place in a few months, and death before the end of a year.[1]

The progress realized by the extirpation of cancer of the cervix by the *abdominal route* should fatally lead one to the extension of one's operation to the total concomitant extirpation of the vagina. This is already the case. The uterus and vagina have been extirpated by the abdomen in cases of cancerous degeneration of the latter.[2] It is also possible to operate by another route, and to have recourse, as already stated, to the simultaneous extirpation of the *uterus* and the *vagina* by the *paravaginal incision* of Schuchardt.[3]

We do not yet know how these more recent operations will result, but considering the frequency of recurrence in[4] the rectal

[1] Krönig, *Archiv für Gyn.*, Berlin, 1902, T. LXIII, p. 38. Bonnefous, Contribution à l'étude du cancer primitif du vagin. *Th. de Paris*, 1902–1903, No. 88.

[2] Veit has operated four cases in the following way: He makes a circular incision inferiorly around the vagina, separates the tissues up anteriorly as far as the cervix uteri, and posteriorly as far as the pouch of Douglas. He then closes the vagina by a strong suture and finishes by the abdomen, removing uterus and vagina, following the usual technic employed for cancers of the cervix. He has operated four times with three cures and one death. (*Handb. der Gyn.*, Wiesbaden, 1902, second edition, T. III, Part I, p. 307.)

[3] Hartmann, *Ann. de Gynec.*, 1909, p. 756.

[4] One of the few cases known of cure belongs to Lauenstein. It was a woman operated on July 12, 1888, reoperated in 1892 with occurrence on the cervix uteri. She was seen again, cured in 1895 (Lauenstein, Zur operative Behandlung des primären Scheiden carcinoms. *Deutsch Zeitschr. f. Chir.*, 1895, T. LXI, p. 411.

walls, an occurrence quite inexplicable from the direction of the vaginal lymphatics, which tend toward the hypogastric ganglia, the question naturally arises if the new interventions can give better results.

For this reason many gynecologists have not hesitated to do an excision of the rectum at the same time as a colpohysterectomy. The operation is terminated perhaps with an artificial anus in the iliac region (Himmelfarb),[1] or a perineal anus (Pryor).[2]

In presence of an inoperable cancer, palliative treatment consists in cleansing of the part followed by a thermo-cauterization and tamponing with iodoform gauze. Kronig followed this course of treatment with a pregnant woman, arrived at full term, and she had her accouchement without any trouble. We believe it is better to do a Cesarean section in such a case.

As palliatives, chemical caustics have been employed, particularly that of *chloride of zinc* (50 to 100).

Kustner advises colpocleisis. This remedy appears to us to be worse than the disease, hence we reject it.

4. Treatment of Stricture and Atresia of the Vagina.

Previous to recent times atresia was always supposed to be associated with an error of development. From the work of Nagel,[3] Veit[4] and Pincus,[5] it would seem that atresia is most often acquired, and particularly if the uterus is well developed, atresia may be considered as the result of a pathological process.

This new conception of gynatresia makes us think of the possibility of a *prophylactic treatment.*

In the new-born female children of gonorrheal mothers, we may apply a treatment to the genital organs similar to that of Crede for the eye and make a more or less careful antisepsis of the vulva. One should carefully treat gonorrhea of new-born infants and minutely examine small girls affected with an infectious acute process or grave constitutional tendencies, which may

[1] Himmelfarb, Contrib. au trait opératoire du cancer primitif du vagin. *Rev. de Gynéc.*, Paris, 1907, p. 589.

[2] Pryor, An Operation for Primary Vaginal Carcinoma. American Gynec. Soc., May, 1900, in *Boston Med. and Surg. Journal*, October 11, 1900, p. 373.

[3] Nagel, Zur Lehre von der Atresie der weiblichen Genitalien. *Centr.-Bl. f. Gyn.*, Leipzig, 1896, p. 519.

[4] Veit, Ueber Hämatosalpinx bei Gynatresien. *Ibidem*, p. 560. Pour Veit, L'hématosalpinx, qui complique fréquemment la gynatrésie, est, comme cette dernière, sous la dépendance d'un même processus phlegmasique infectieux.

[5] Pincus, *Sammlung klin. Vortrag.*, 1901.

accompany vulvo-vaginitis. We should also look for and treat complications or secondary troubles, embolism and thrombus of the vagina and vulva. Think of a gonorrheal affection or a hemorrhagic vulvo-vaginitis when one is brought into contact with one of these cases wrongly cited as precocious menstruation. This is particularly the case if it occurs in a new-born child, etc. In this manner one may prevent the later development of gynatresia.

If the lesion is already present, there are two aspects of the case to consider.

1. We have a simple stricture.

2. Or there is a complete occlusion, *i.e.*, atresia (αἴρησις) of the vagina.

1. Strictures of the Vagina.

In limited stenosis, without a surrounding quantity of cicatricial tissue, *simple dilatation* suffices often enough to enable the canal to maintain its accustomed caliber. In such a condition we obtained complete success by the passage of bougies. The case was that of a young girl who had retention of her menstruation due to union of the vaginal walls.[1]

The successive divisions of vaginal tissues, *followed* by the introduction of balls or cylinders, increasing gradually in size, was advocated by Bozeman.

To-day, if we are dealing with the cicatricial tissue, generally we cut through and *follow with immediate suture*, after having stretched the structural with retractors. If we are dealing with a cicatrix of the vaginal vault, draw the cervix to the opposite side and cut through the tense tissues and remove as far as possible the fibrous tissue. Secure bleeding vessels and then suture the mucous membrane.

If there exists above the cicatrix an extensive cicatricial induration, one may injure the uterine artery during the excision of this tissue. This is not of great importance. Of much greater importance, however, is the possible injury to the urethra or the bladder. For this reason, before deciding to intervene in these cases, weigh well in the balance the operative risks and the inconveniences resulting from a cicatrix.

[1]This was published by one of our pupils. Altmann, Contribution à l'étude de la rétention des règles. *Th. de Paris*, 1893–1894, No. 106.

When the cicatricial tissue occupies a certain length of the vagina, incision followed by suture becomes impossible. It becomes necessary, *after resection of the fibrous tissue, to apply* to the raw surface grafts which one takes from parts where the vaginal mucous membrane is profuse. It may be necessary to do this several times and the patients generally get tired of it before the cure is complete.

During pregnancy the same treatment is indicated.

During labor, if the stenosis is slight, we may cut through the strictures that are most marked, and apply forceps. However, the dangers of tears, hemorrhage, and of fistulas communicating between the vagina and neighboring parts is such that we do not hesitate to have recourse to Cesarean section, the advantages of which are to-day so well established.

Even if the stricture is tight, we follow the Cesarean section with a subtotal hysterectomy, in order to avoid the retention of lochia and further pregnancies.

2. Vaginal Atresia.

Operative indications differ according as whether the atresia is complicated by retention of the menses or atresia without retention or any other complication.

1. *Menstrual Retention.*—This condition most frequently draws attention to the malformation which is unnoticed until puberty. Cases have been published of imperforate hymen in a quite young child where accumulation of mucus behind the membrane has produced a grayish tumor which becomes prominent below the urethra when the child cries.

In all cases where retention occurs behind an *imperforate hymen*, the indication is plain: let the fluid out.

The operation is the simplest and consists in a crucial incision of the most protuberant part of the tumor. The great point is to take all precautions against infection, fatal septic complications having frequently been observed and especially in those cases where a hematosalpinx exists. Before opening the retrohymenal effusion, disinfect very carefully the operative field. Then empty the vagina and uterus as completely as possible of clots and tar-like blood collections they contain. Douche thor-

oughly both cavities with sterilized normal saline and tampon with iodoform gauze.

It is as well to see the case during some months to see that there is no reunion.

When the *retention of the menses* is produced *by an atresia occurring high up in the vagina*, the indication is the same. We must make a route from the cavity containing the fluid to the exterior. If it consists of a simple cavity the operation is easy. It is quite sufficient to excise the obstruction and afterward

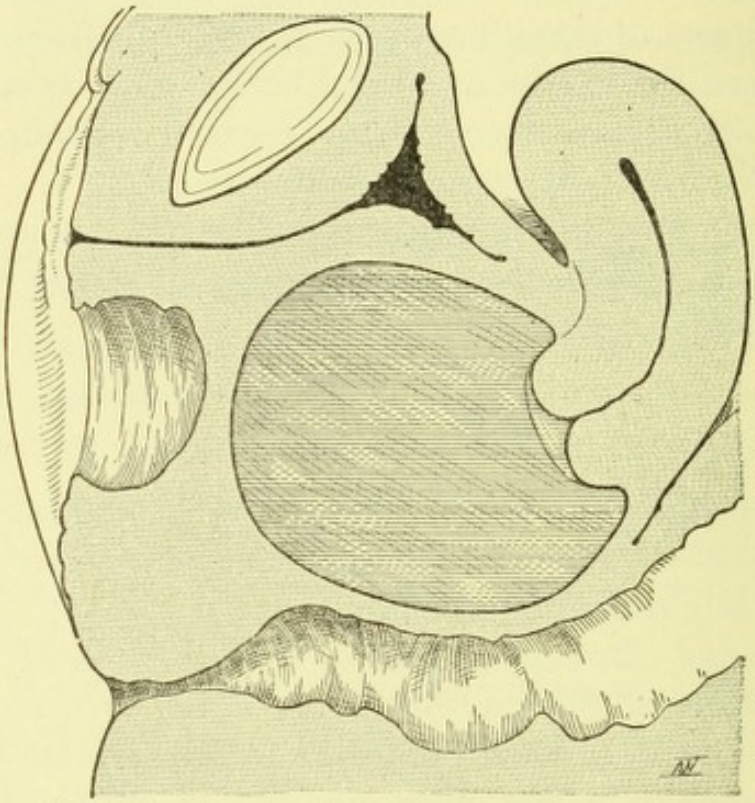


Fig. 94.—Hematocolpos above a vaginal septum.

reunite the walls of the hemorrhagic pocket, so to speak, to the inferior portion of the vagina. If, however, the occlusion is high up, then the operation becomes more complex, and one is forced to make an artificial vagina.

In all these cases of menstrual retention, wherever be the seat of the obstruction, one should examine into the state of the tubes and see if they are the seat of a large dilatation, because rupture of these tubes has occurred after the rapid evacuation of retained fluid. Before operating, even in a simple imperforation of the hymen one should ascertain by a combination of a digital, rectal, and abdominal examination the presence of a median

vagino-uterine tumor of two or more often one laterally placed tumor, which feels like a hematosalpinx. If one ascertains the presence of similar tumors, one should commence, and Veit is very insistent on this point, by opening the abdomen to see the state of the adnexa. The tubes are removed where they are much changed from the normal and if there exists a coincident extended atresia of the vagina. If, however, there is a hope of reestablishing the vaginal canal and if the tubes are not the seat of irreparable lesions, a salpingostomy is the usual procedure.

2. *Molimen without Menstrual Retention.*—If the uterus is developed sufficiently to hope for a reestablishment of the genital functions, then one should attempt to make an artificial vagina;

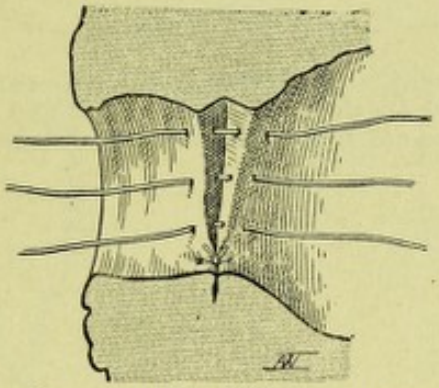


FIG. 95.—The septum is resected and the sutures are inserted for union.

if, on the contrary, the uterus is absent or very atrophied, it is simple to have recourse to castration.

3. *Absence of Vagina without Complications.*—One is in a quandary to know if one is authorized to allow a woman to run operative risks in order to allow her to enjoy non-fecundant coitus. In fact, religious arguments have been used against it. In practice it is certain that if a woman bitterly laments her undeveloped condition, the surgeon is authorized to make a neo-vagina in order to allow her to satisfy her sexual instincts.

3. Formation of a Neo-vagina.[1]

The first attempts at the formation of a vagina have been the result of opening a sac in cases of retained menses. Dupuytren, in 1817, after incision of the perineum, pushed his way through

[1] Consult Dumitrescu, Contribution à l'étude des absences congénitales du vagin considérées au point de vue chirurgical. *Th. de Paris*, 1896. Abram Brothers, The Construction of a New Vagina. *Am. J. of Obstetrics*, New York, 1906, T. II, pp. 289 and 524. (In these publications will be found the majority of published observations.)

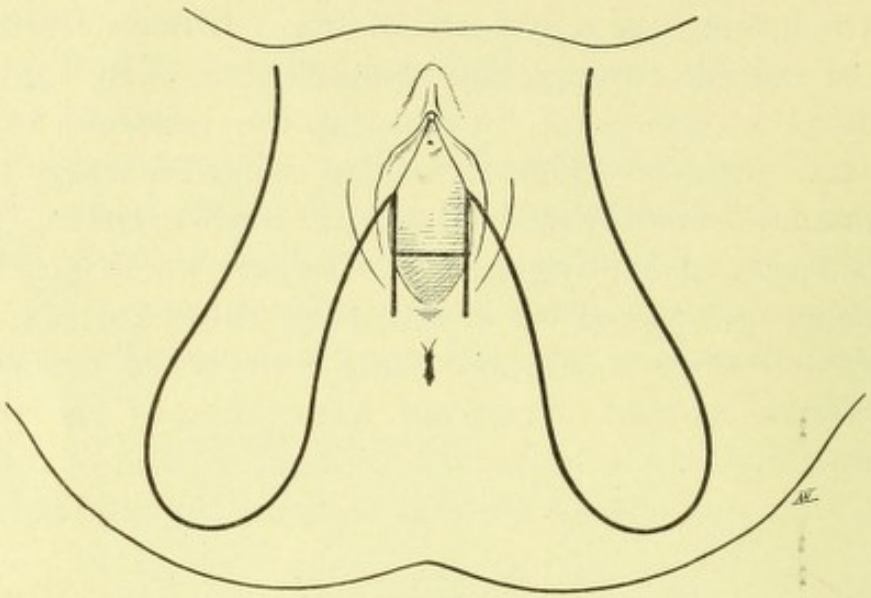


FIG. 96.—Heppner's Operation. An H-shaped incision at the level of the diaphragm permits of tracing two flaps which clothe the anterior and posterior walls of the neo-vagina. The lateral portions are formed of two lateral flaps which are twisted on their pedicle.

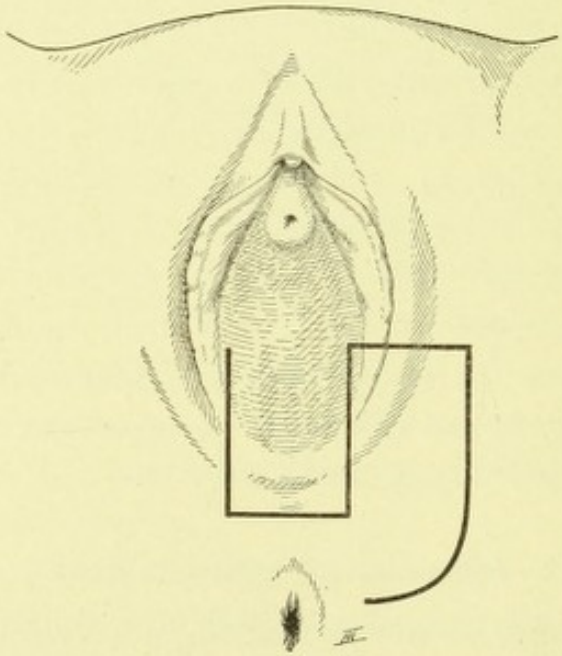


FIG. 97.—Fleming's Operation. The first flap consists of the hymen, the posterior portion of the labia, and part of the integuments of the perineum. Its base lies below the meatus and constitutes the anterior wall of the vagina. A second flap cut at the expense of one of the labia majora, with its base anterior to the anus, forms the posterior portion.

the tissues with a blunt instrument until he came into contact with the collection of blood, which he enabled to escape. In 1823 Vallaume operated in a similar manner. Amussat, in 1832, proceeded slowly to force back the tissues taking fifteen days to reach the menstrual effusion.

These procedures *of separation* and *pressing back* of the tissues certainly produce a cavity, but the difficulty is to maintain its dimensions sufficient for a neo-vagina.

For this purpose one is forced to resort to *continuous dilatation* with tampons, Gariel pessaries and wooden or glass cylin-

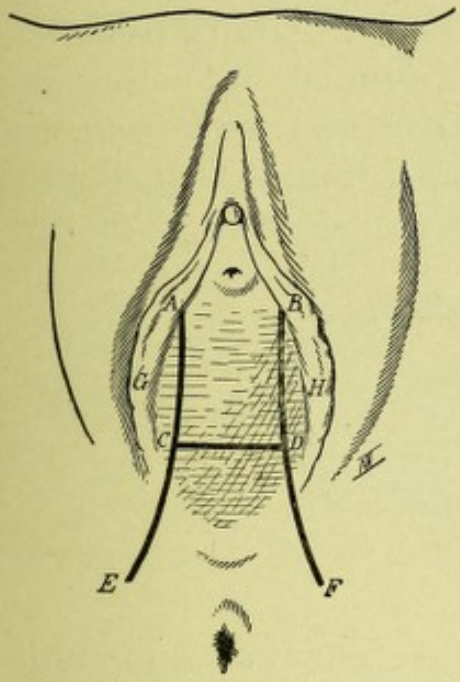


Fig. 98.—Anderson's operation. Two flaps. ABCD and ECDF clothe the anterior and posterior walls of the neo-vagina. The lateral walls are covered with flap ACG and BDH formed in part by the labia minora which have been split.

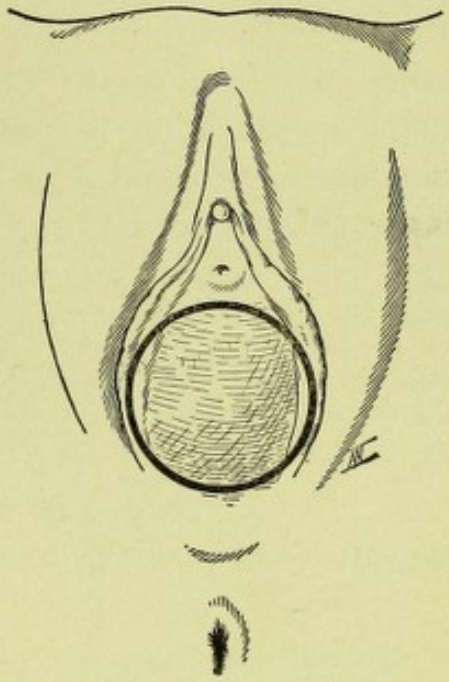


Fig. 99.—Isaac's operation. A circular incision limits a flap, which is gradually pushed back and comes to act as the fundus of the new vagina. Its anterior portion will be clothed with Thiersch's grafts.

ders. The results were mediocre and there was always a tendency toward closing of the cavity.

In addition, in order to obtain the dilatation of the cavity, which has just been formed, resort has been had to clothing it with epithelium grafting.

This has been the practice of the majority of gynecologists. Heppner from 1872 was in the habit of making an H-shaped incision in the middle of the interlabial diaphragm and he makes use of the two flaps above and below the transverse branch of the

H in order to cover the anterior and posterior walls of the neo-vagina. Two elliptical incisions on each side limit the flaps which are twisted on their pedicles in order to clothe sides of the cavity (see Fig. 96).

Since Heppner's first operation, numerous analogous ones have been tried with every variety of flap taken from the neighboring parts, such as the internal face of the labia majora and minora, genito-crural region and buttocks, etc. (Figs. 97 and 98).

Others have simply put Thiersch's grafts, rolled on a large sound, on the raw surface. The sound, covered over with grafts, raw surface external, is introduced into our cavity and fixed by a suture (Czempin, Abbe, Forgues, Tuffier). Grafts from the labia have been used (Schalita) from the intestine of another patient operated on for artificial anus (Kustner), and from the mucous membrane of a rabbit (Sitsinsky), from a vaginal prolapse (Mackenrodt), and from the thigh (Abbe), etc.

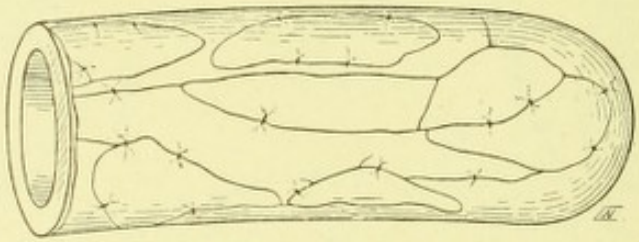


FIG. 100.—Dermo-epidermic grafts fixed, denuded surface external on a glass cylinder covered with rubber.

But if one uses simple grafts or has recourse to autoplastic strips, the cicatrization of the terminal and dihedral angle leads gradually to the effacement of the cavity.

In order to prevent contraction of this dihedral angle, Isaac cuts a circular flap which comprises the imperforate part and the greater part of the labia minora (Fig. 99). He detaches little by little the periphery of this strip from the parts which surround it; then advancing progressively toward the bladder anteriorly and posteriorly toward the rectum he gradually pushes back this flap deeper and deeper until it forms the terminal cul-de-sac of the neo-vagina. This done, he supports it with a glass tube closed at the end. The side of this tube is clothed with a series of Thiersch grafts which will form sides of the artificial vagina (Fig. 100).

This method has not been greatly followed and the successes

have been about the same as in those instances where it has been possible to *fix the flaps to the upper portion of the genital canal, which has been dilated* by blood and is still preserved, or to a denuded cervix uteri.

We believe that in all cases of imperforation where it is impossible to find immediately by examination of the vulvar imperforation any perceptible collection of blood on the uterus itself, an exploratory[1] celiotomy should be resorted to. This permits of finding out the state of the deeper placed organs and of removing the hematosalpinx which may be about to burst, or at least of evacuating its contents and then of deciding if it is necessary to attempt a vagino-uterine reconstitution. It has

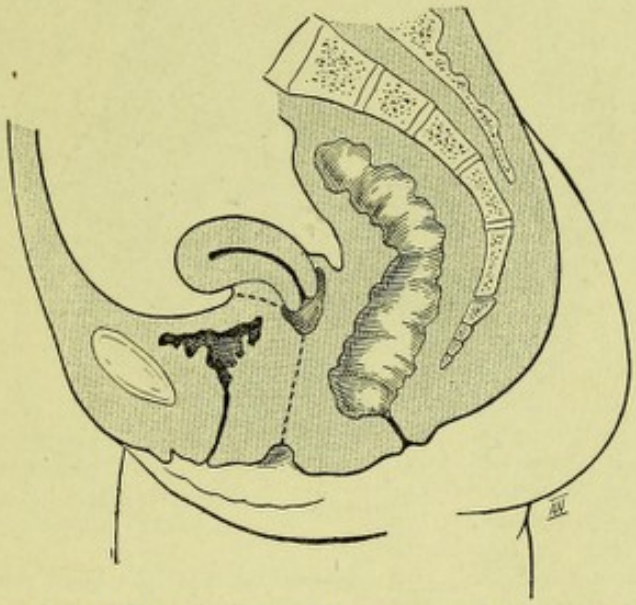


FIG. 101.—The two dotted lines indicate the route to be followed, either by the perineum from one direction or the abdomen from the other in order to reach the vaginal fundus (Vineberg).

also the advantage of facilitating the finding of the cervix uteri which one approaches from above downward. Sometimes it is as well to strip off the peritoneum from the anterior surface of the uterus by the abdominal route. Then separate the uterus from the bladder and open the cervical cavity in the median line. Now join the separation above already commenced at the perineum and suture the lips of the open cervix or the existing vaginal fundus to the autoplastic flaps stripped up from the perineum (Figs. 101 and 102).

[1] Legueu, Hartmann, Tuffier (*Bull. et Mém. de la Société de Chir. de Paris*, 1904, p. 592). Hofmeier, *Zeitsch. f. geb. und Gyn.* Stuttgart, 1904, T. LII, p. 1. Halban, Pfannenstiel, Sänger, Wertheim en Allemagne, Vineberg, Smith et Watermann in America devised the preliminary celiotomy.

In cases where a small vaginal fornix full of mucus was to be found, Schwartz[1] was satisfied to draw gradually the lips of this little cul-de-sac downward and suture them to the vulvar incision.

In the absence of any vaginal fornix, if the uterus is accessible below, it is possible by Polosson's plan to reach the cervix by the lower route and to fix it to what remains of the vaginal or vestibular mucous membrane. The uterus tending to rise, mobilizes this mucous membrane in a slow and progressive fashion, and the result is much better than one could ever have expected.[2]

Reconstitution of a Vagina in Absence of Uterus, by the Supra-symphysial Route.—In absence of the superior portion of the vagina and uterus C. Beck[3]

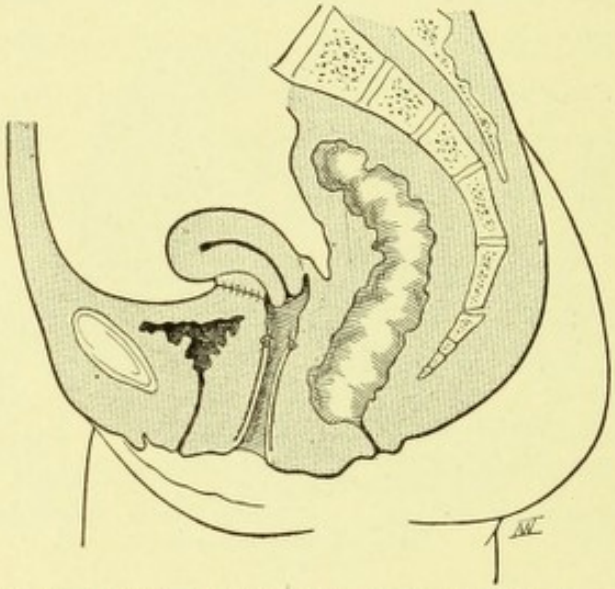


FIG. 102.—Operation terminated, the vaginal fundus has been sutured to some flaps stripped up from the perineum (Vineberg).

has recourse to the high route, but extraperitoneal in order to draw the perineal grafts into the hypogastric region. By a transverse supra-symphysial incision he penetrates the sub-peritoneal space, pushes back the peritoneum above and separates the parts until he is able to make a pair of forceps bulge into the center of the vulva. With the same forceps he draws up above the pubis two flaps from the thighs which he immediately sutures, above the pubis, to the subcutaneous tissues, in such a manner that their cutaneous surfaces oppose and their denuded surfaces correspond to the surfaces prepared.

Transplantation of the Intestine.—Some operators have borrowed from the neighboring intestine a segment sufficient to constitute a vagina. Sneguireff[4]

[1] Schwartz, *Revue de Gynécologie*, Paris, 1907, p. 961.
[2] Violet, *Annales de Gynécologie*, Paris, 1904, second series, T. I, p. 742.
[3] Beck, *Annals of Surgery*, 1900, T. II, p. 572.
[4] Sneguireff, *Zeitsch. f. Gyn.*, 1904, XXVIII, p. 772.

makes an incision along the left border of sacrum and coccyx, resects and then isolates the rectum. He cuts through this and the inferior portion occupies the place of the vagina; the superior portion is fixed to the place left free by the resection of the coccyx. Then splitting the perineum he looks for the upper pocket of the vagina, opens it and makes a communication with the inferior rectal segment.

Gersuny,[1] Fedorow,[2] content themselves with covering the new vagina with a flap denuded from the anterior rectal wall.

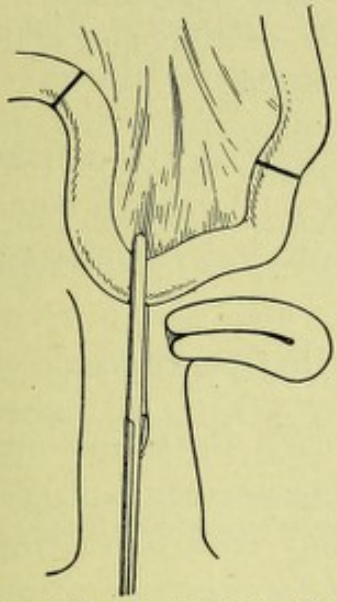


FIG. 103.—A segment of the pelvic colon resected by the abdomen is being drawn into the denuded perineo-uterine portion.

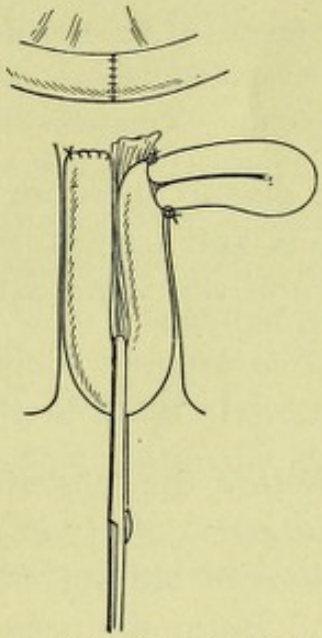


FIG. 104.—The continuity of the colon reestablished. One of the extremities of the resected loop is fixed to the cervix and the other is closed (Baldwin).

Baldwin[3] resects by the abdomen a segment of the pelvic colon, draws it down into the denuded perineo-uterine segment and then at the end of fifteen days destroys, by forcipressure, the septum which separates the two branches of the loop and is destined to constitute the neo-vagina (Figs. 103 and 104).

[1] Gersuny, *Wien. med. Woch.*, 1904, T. XII, p. 486.
[2] Fedorow, *Zent.-Bl. f. Gyn.*, May 19, 1906.
[3] Baldwin, *Ann. of Surgery*, 1904, T. LX, p. 398.

CHAPTER III.

PLASTIC OPERATIONS ON PERINEUM AND VAGINA.

Summary.—General technic of plastic operations.—Treatment of perineal tears.—Colpo-perineorrhaphy.—Anterior colporrhaphy.—Narrowng of the vagina by introducing metallic suture.—Partitioning of the vagina.—Colpectomy.—Treatment of recto-vaginal fistulæ.

The plastic operations practised on vagina and perineum are numerous and procedures innumerable. All have some points in common which we will describe before individualizing.

1. General Technic of Plastic Operations.

1. **Before the Operation.**—Before each operation empty the intestine, particularly in case of inserting perineal sutures, as the evacuation of old scybalous masses may lead to tearing of the sutures. Purge the patient the night before the operation and on the morrow give an evacuant enema. The preliminary evacuation is followed by shaving of the vulva, vaginal injections and a thorough bathing with soap and hot water. This constitutes the habitual pre-operative treatment.

There are cases where this pre-operative treatment should be longer. For example, when there is a complete prolapse of the uterus with much edema and ulceration of the vagina and cervix we find it necessary before operating to touch up the ulcerated areas with silver nitrate to reduce the prolapse, to tampon the vagina with iodoform gauze, and only operate when the cure is completed.

2. **During the Operation.**—The patient is placed in the dorso-sacral position and drawn to the edge of the table, her gown pushed well up, the thighs and knees flexed and enveloped in flannel stockings and the feet fixed as in Fig. 66.

The vagina, vulva and the skin of neighboring regions are disinfected by the usual methods. The operative field is limited

(however large the field prepared), a central space showing for the vulva and perineum surrounded by sterilized compresses which are held together by small forceps.

An assistant looks after the anesthesia; two others, placed to the right and left of the patient, assist the surgeon who is seated between the patient's legs. A table furnished with his instruments is on his right hand. An important point is to keep the parts tense to which the bistoury is applied. To do this, draw on the neighboring parts with Museux's little forceps or may be with tenacula; these serve at the same time to fix the limits of the surface about to be stripped off.

In the course of the operation it is necessary to avoid lowering the vitality of parts which are to be united either mechanically (pulling on, contusion, cutting too thin grafts) or chemically with too strong antiseptics on rawed surfaces. To this end, avoid contact with tampons, and to get rid of blood irrigate with sterile water, saline of 7 to 1000, and at a temperature of about 38° C.

In order to put in sutures, don't wait until the denuded

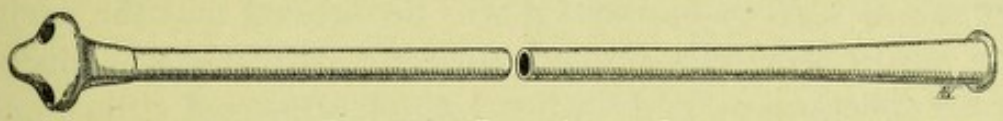


Fig. 105.—Pezzer's sound.

sutures have dried up, but place fine catgut sutures on any vessels of importance.

Operate rapidly covering completely the raw surfaces and leave no virtual cavity where blood serum may collect.

As suture material, use catgut for buried sutures, even for those placed in the interior of the vagina, in order to avoid separating parts recently united in order to search for deep sutures. The non-absorbable sutures, silkworm gut, silver wire, bronze aluminium, do well as perineal sutures and for those placed at the entry of the vulva.

The dressing consists in the introduction of an iodoform plug into the vagina, the external portion being pressed back on the perineum and so leaving the urinary meatus free. An antiseptic dressing is then placed on the vulva externally and maintained with a serviette disposed like a pair of bathing trunks.

3. **After the Operation.**—During the first few days, in the case of operations about the vulvar orifice, it is best not to let the

patients urinate, but to do an aseptic catheterization of the bladder with Pezzer's sound. The food should be reduced during the first few days and a dose of castor-oil and an enema should be given on the morning of the third or fourth day. We do not advise prolonged daily giving of opium. That results in hard accumulations in the rectum very difficult to get rid of. After the third or fourth day, we move the bowels daily.

On the eighth or tenth day we remove the non-absorbable sutures, carefully washing the parts, being careful to avoid pressure on the lines of sutures with the cannula when the dressing is removed.

The patient is confined to bed 15 to 21 days and abstains from sexual congress for ten weeks.

2. Treatment of Perineal Tears.

The treatment of perineal tears should be *preventive* and *curative*.

Preventive Treatment.—If the terminal part of labor is observed, at a given moment it will be noticed that the perineum which up to now only bulged during a pain remains distended after the contraction, and the head which appeared almost entirely enveloped does not go back after the pain. If at this moment the accouchement is allowed to proceed, the head by a brusque deflexion, resting with its forehead on the fourchette and perineum, tears them both. It is the brow which causes the perineum to bulge, because it is the part the furthest removed from the neck and corresponds to the greatest diameter of the head.

Ancient accoucheurs sought to arrest the expulsion of the head in order to give time for the orifice to extend. This is easy with forceps which grasp and firmly retain the head but impossible in the ordinary accouchement, and the perineum will tear under the hand supporting it. Varnier teaches that one should prevent the forehead appearing before the parietal eminences and neck are delivered.

To do this press with the right thumb in the bregma which has just appeared, and thus stop the movement of deflexion. With the thumb and index-finger of the left hand, he makes the right and left labia glide over the corresponding parietal eminences (Fig. 107). It is only when all the parts have appeared externally

that he allows slowly and progressively the deflexion to occur, allowing the forehead, nose, mouth and chin to appear successively.[1] This accomplished, there is no fear of perineal tear.

The little incisions in the vulva are useless and only lead to tears. If a central tear is feared, make an oblique incision backward and outward; a median section increased by the pas-

FIG. 106.—Smellie.
Sagittal section of a labor at the period of expulsion. The fetal head engages in the sub-occipito-frontal circumference. The end of the fifth period is near and if it is sudden, at the moment of deflexion the commissure will bulge forward and the perineum will rupture.

sage of the fetal head risks the rupture of the muscular tissue of the anus.[2]

Curative Treatment.—In spite of all prevention the perineum is torn. The rupture is lateral always, the posterior column of the vagina, fibrous and resistant, remaining intact. The vagina, skin and vulvar constrictor being torn through, on separating them we get a lozenge-shaped wound which, left to itself to cicatrize, results in a perineum which no longer plays its role as a supporting agent.

It is therefore highly necessary that the ruptures are attended to as rapidly as possible, taking care not to limit the suture to the skin, which would create a perineum without any solidity.

Immediate Perineorrhaphy.—This is more or less simple according as the rupture is *incomplete* or *complete* regarding the

[1] Varnier, *La Pratique des accouchement*, Paris, G. Steinheil, 1900, p. 99.
[2] See before, Division of the Vulvo-vaginal Tissues.

anal canal. In these two cases, do not hesitate to proceed without anesthesia, but comfort the patient with encouraging words.

In the *incomplete rupture* the operation is very simple. Having first cleansed the parts, place an iodoform tampon against the cervix to arrest bleeding and hide the wound. Separate the labia and, commencing from above down, place several catgut

FIG. 107.—Means of preventing the perineal rupture (Varnier).
At the moment when the forehead approaches the commissure distended to its maximum, the thumb stops the deflexion. The delivery (end of fifth period) begins, not by progression of the forehead, but by the retreat of the perineum.

sutures in the vaginal tear. This tear often goes higher than one would think after a simple external inspection of it. Then suture the perineal rupture with silkworm gut taking care to include the extremities of the torn vulvar constrictor and getting good continuity along the length of the wound and leave no virtual cavity. One or two superficial sutures complete the operation if the tear is cutaneous. As a dressing, iodoform powder and swab of the hydrophile cotton which should be frequently removed during the first few days. On the eighth or the tenth day, remove sutures, and if no infection, cure is complete.

In the complete rupture the operation is more complex. It

is first necessary to close the rectal side in order to transform the complete tear into an incomplete one. This is done by passing a series of catgut sutures which oppose the lips of the rectal tear and are applied from the side of rectum. These catguts are successively placed from above down, the most inferior comprising the sphincter fibers. Then the vaginal tear as in incomplete ruptures is done with catgut and the cutaneous with silkworm gut, the most inferior stitches taking in the extremities of the sphincter which is approximated as well as possible.

After two days, give a laxative and if necessary an enema, directing the cannula toward the sacrum and injecting the liquid very gently. After this a daily motion is indicated.

With a *central rupture of the perineum*, the best thing to do is to cut across the perineal bridge between the rupture and the fourchette. Then the conditions are those of an ordinary perineal tear which is treated as before described.

These immediate perineorrhaphies are put off for some days if the patient is exhausted with a long labor, an abundant hemorrhage, or with attacks of eclampsia. Again, if there are very extensive local injuries or violent contusions due to prolonged maneuvers, in such cases we do what is called in France the secondary immediate perineorrhaphy[1] which has only one contraindication, viz., puerperal infection.

After subcutaneous injection of cocain, curette the wound and suture as in immediate perineorrhaphy.

Secondary Perineorrhaphy.—After the fifteenth day it is impossible, as the immediate secondary perineorrhaphy as a part of the tear will be already covered with cicatricial tissue. Verneuil advises rawing with a thermo-cautery, suturing the parts after separation of the scars. This is not to be recommended. Better wait some weeks until the tissues assume a definite appearance, then carry out the late perineorrhaphy. Operate six weeks after the accouchement in women who give the breast, and after the first menstruation in others.

Late Perineorrhaphy.—This is practised several months after an accouchement. We will describe it later under head of Colpoperineorrhaphy.

[1] Tellier, De la périnéorraphie immédiate secondaire. *Lyon médical*, 1895, T. LXXVIII.

3. Colpo-perineorrhaphy.

Old procedures, such as Emmet's, which aimed at replacing the perineum, have given place, even in cases of a simple tear without prolapse, to colpo-perineorrhaphies. Truly, in a simple perineal tear there is also a tear of the vagina and enlargement of its orifice and thus an operation to be complete should reconstitute vulva and perineum and constrict the enlarged inferior vaginal portion.

A good reconstitution nearly approaches the operation for prolapse. In both cases a colpo-perineorrhaphy is done. There are in operating great differences according to the case and it is evident that generally speaking one will not operate in the same fashion for the accidental tear of a healthy perineum as for the falling away entirely of all the perineal support with prolapse of the organs.

In tears due to injury, there are complete and incomplete ruptures. We will deal with the treatment of incomplete and then complete prolapse.

The procedures employed are numerous and may be divided into two great categories.

1. Operations by denudation.
2. Operations by splitting.

A. Colpo-perineorrhaphy by Resection.

The posterior column of the vagina being rich in fibrous tissue is very resistant and Martin advises to preserve it to serve as a support for the new posterior vaginal wall and only excising the vaginal mucous membrane laterally. This realizes Emmet's new procedure which is universally employed in America and well described in the works of Baldy and Kelly. The operation presents modifications according to the injury one is treating.

We will describe successively:

1. Treatment of incomplete old tears of the perineum.
2. Treatment of complete old tears of the perineum.
3. Treatment of uterine prolapse.

1. **Old Incomplete Perineal Tears.** *First Stage. Fix the Limits of the Denudation.*—These limits are variable following

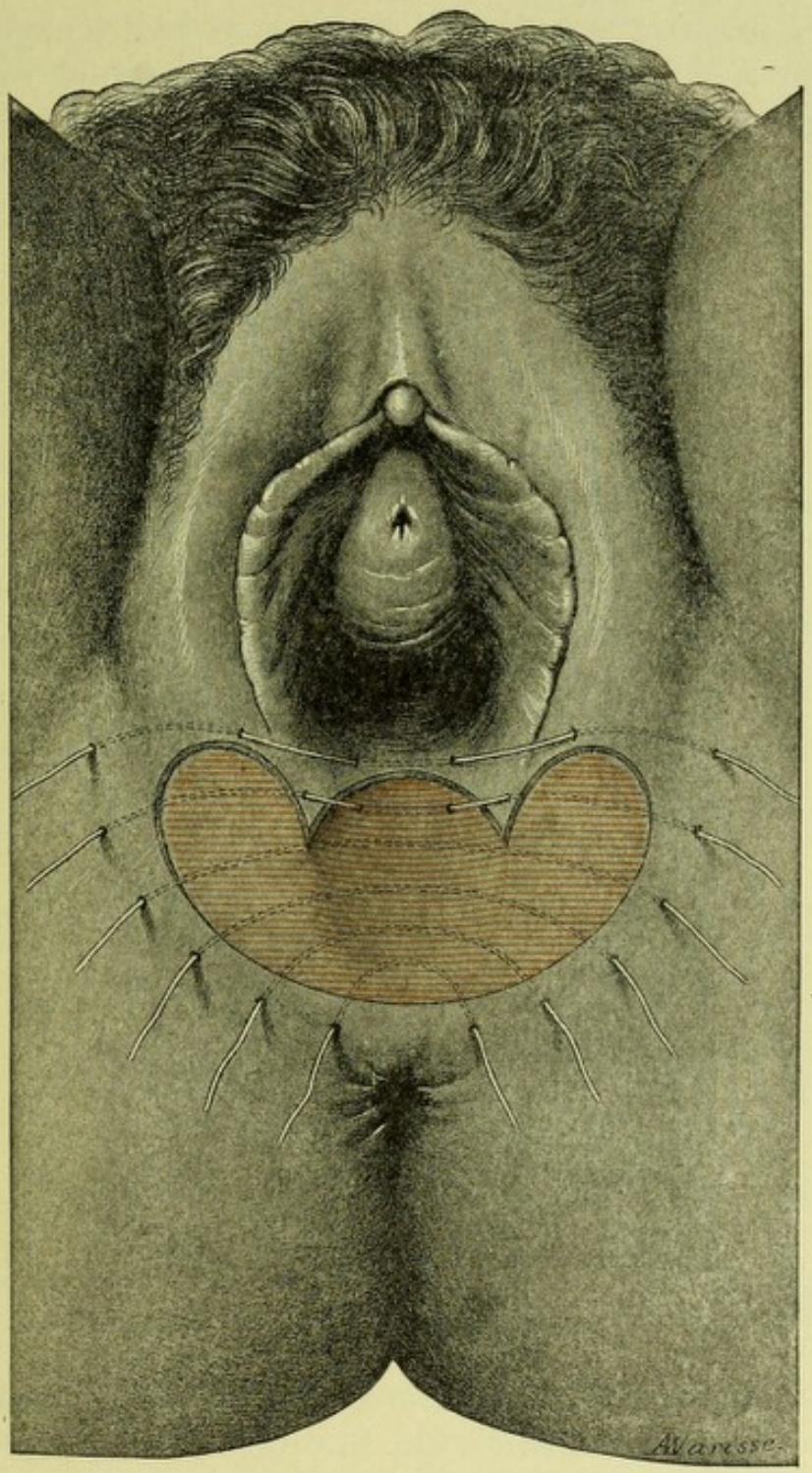


FIG. 108.—First procedure of Emmet. (Denudation in butterfly form with sutures exclusively perineal.)

the degree of relaxation and increased breadth of the vagina following on the perineal tear. To fix them, place on each side at the level of what remains of the hymen two tenacula. Between them leave a portion of the anterior vaginal wall about equal to that of the entry of a vagina in a virgin. A third tenaculum is fixed on the posterior vaginal column.

In drawing on these three tenacula, two grooves are created

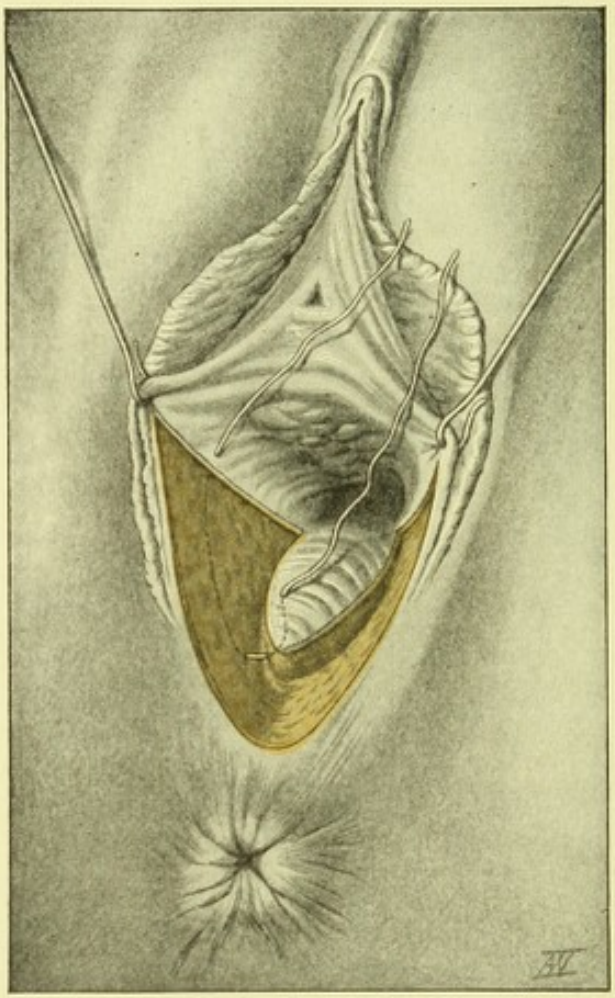


FIG. 109.—Placing the first suture, one time the denudation terminated. (*Kelly.*)

on each side of the middle line posteriorly, which extend more or less deeply into the vagina. On the distal extremity of these, place a tenaculum forceps which may be 2 or 4 cm. (3/4 inch to 1 1/2 inches) from the vaginal entry. It is then sufficient to unite by rectilinear incisions the five points fixed by the tenacula to produce the required denudation.[1]

With a bistoury trace an incision going from each side of the

[1] We use Museux's small forceps instead of tenacula.

column of the vagina to the distal tenaculum and then from this tenaculum to the other which is at the level of the hymen. Finally unite with a V-shaped incision, the two tenacula implanted on the level of caruncules taking care that the incision passes through the mucous membrane and does not impinge on the skin.

Second Stage. Denudation of the Surfaces.—In order to do the

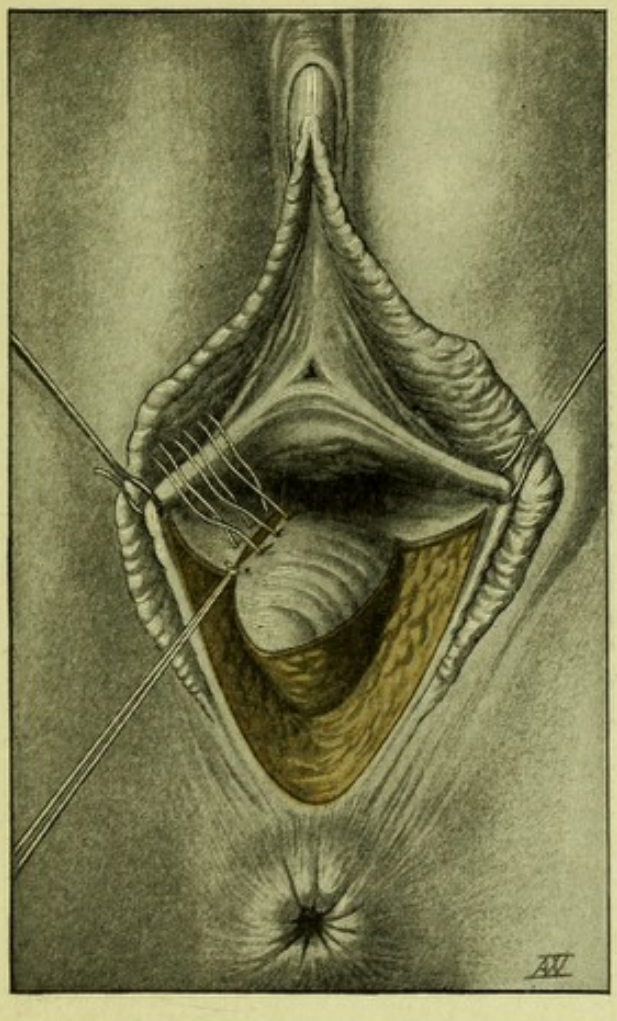


Fig. 110.—Placing the sutures on the triangle rendered accessible by drawing on the first point of suture.

denudation, stretch with the aid of the tenacula, successively, the surfaces from the right side and left side and then excise the vaginal mucous membrane with a bistoury or Emmet's curved scissors. In the latter case, the mucous membrane is raised in the form of little tongues. It is very exceptional to have to tie a bleeding vessel as a temporary forcipressure suffices.

Third Stage.—An assistant separating the right and left labia with tenacula, the surgeon, a little below the middle of the

triangle of denudation, inserts his first silkworm-gut stitch. By drawing downward on this stitch held between the medius and ring-finger, he draws into view the superior portion of the denuded triangle. He brings into apposition its borders with catguts passed on a strongly curved needle. He carries on the same procedure from the other side.

There remains now a wound only moderately deep, formed

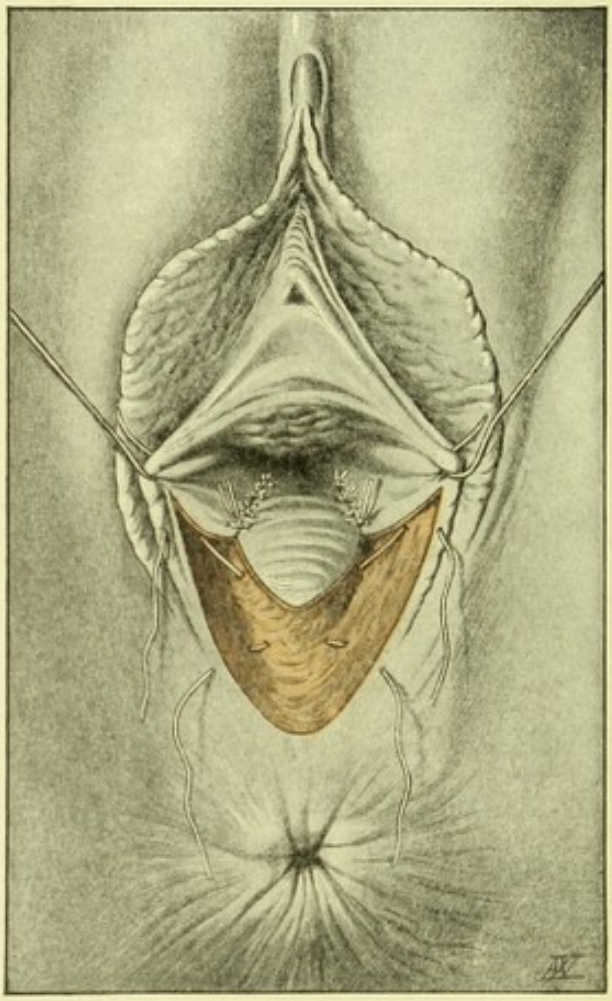


FIG. 111.—The vaginal sutures have been inserted. The perineal ones are inserted but not tied.

by the reunion of the vulvar portion of the lateral triangles and of the central portion of the denudation. Two silkworm guts, one passing by the superior angle of denudation and through the posterior median column and another uniting the skin below, suffice to terminate the suture. One or two extra catguts between the cutaneous and vaginal sutures, and some superficial silkworm-gut sutures unite the skin.

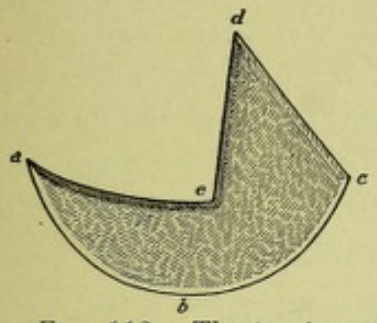


FIG. 112.—The tracing of the denudation.

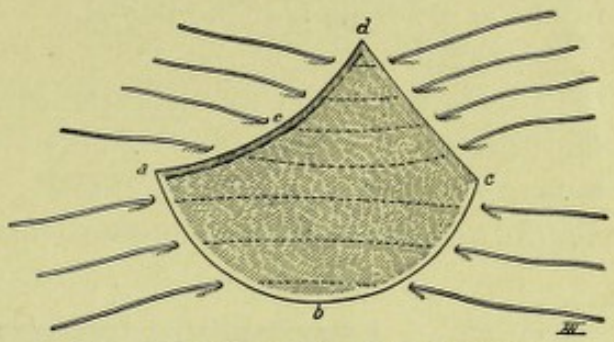


FIG. 113.—Insertion of the sutures.

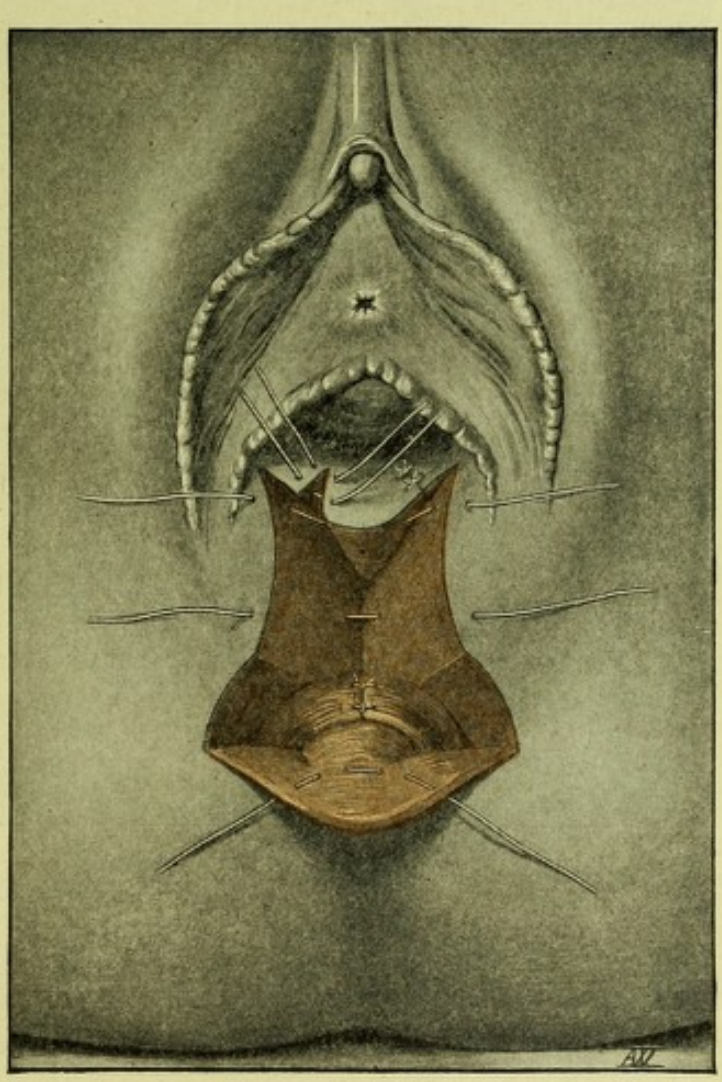


FIG. 114.—Perineorrhaphy by complete denudation of the perineum (denudation and insertion of sutures).

Veit's Procedure.—He operates in rather a special manner. Departing from the principle that the perineal tear is most often unilateral, he makes a circular incision, *abc*, at the junction of mucous membrane and skin. He excises a paramedian triangle, *cde*, dissects up the flap *abd*, and then unites the points *aed* (which points owing to the dissection of the flap no longer indicate an angular line) to *dc*. Then he brings together *ab* and *cd*.

This procedure is asymmetrical like the tear; theoretically it would be

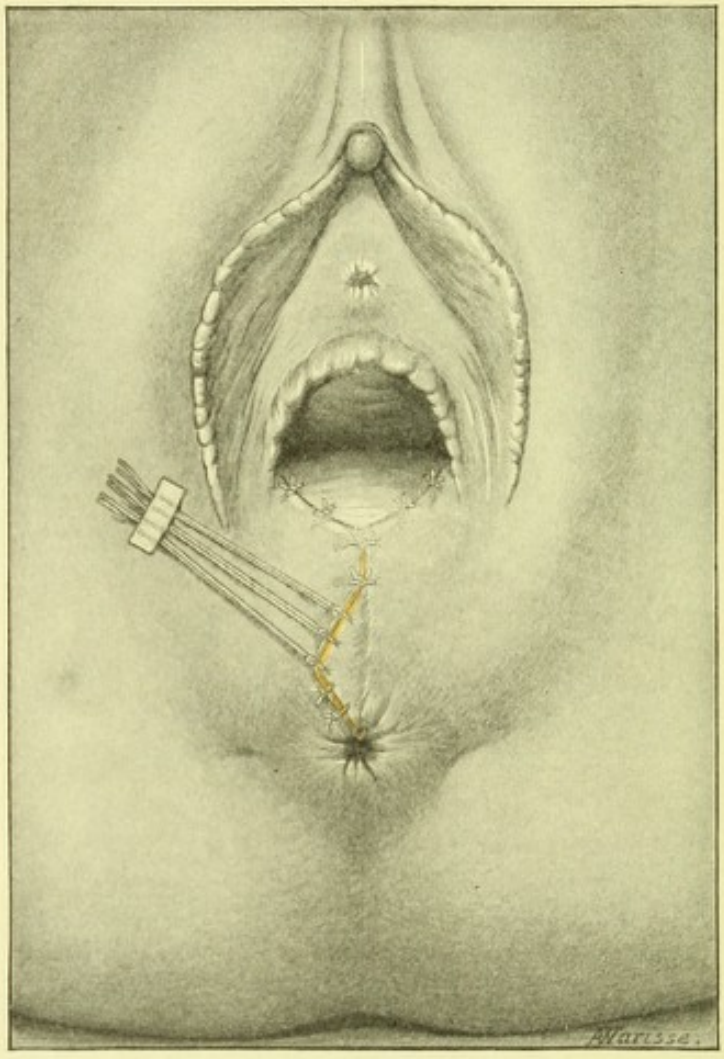


FIG. 115.—Perineorrhaphy in complete rupture of the perineum (operation terminated)

preferable to others, as Veit says, because it is the only one which takes into account the anatomy of the rupture.

2. **Old and Complete Tears of the Perineum.**—Before operating some gynecologists advise the dilatation of the sphincter as much as possible in order to elongate it and prevent spasmodic contractions which may supervene during the first few days following the suture.

An incision is made over the recto-vaginal septum about 1 cm. above the line of junction of the rectal and vaginal mucous membranes. This line curved backward almost to the level of the extremities of the torn sphincter. This incision constitutes the posterior portion of the denudation, the anterior portion of which is identical with that which we have described under the treatment of incomplete ruptures of the perineum.

Inserting the index finger into the rectum, the surgeon dissects the little band of recto-vaginal septum which has remained intact, in such a manner as to free it and to press it down below like an apron over the orifice of the rectum. A close dissection enables us to find without perforating the intestine, the two ends of the torn sphincter and of freeing them to the extent of about 1 1/2 cm. It suffices then to freshen the ends which are covered with cicatricial tissue to bring them in apposition and then unite them with catgut sutures. A few catguts inserted in figure-of-8 form unite the deep parts in the center of the wound in such a manner as to avoid any cavity.

Then do the suture of the perineum and vaginal mucous membrane as in incomplete rupture. The operation is terminated by the suture of the posterior flap which is like an apron and which hangs more or less folded over the anus. In keeping these last sutures long and making a light traction on them, one can draw the whole suture out and fix the ends of the sutures on the buttock with adhesive plaster (Fig. 115).

3. **Old Tears Complicated by Prolapse.**—In prolapse there is as in the incomplete perineal tear, a gaping of the vulva and insufficiency of the perineal body. There is also an excess of vaginal wall. The operation ought to have a triple object: to diminish the posterior vaginal wall and the vulva, and reconstitute the perineum.

This can be done by doing an operation identical to that one which we have described for the treatment of incomplete perineal tear, taking care that we give to the lateral triangles of denudation of the vagina considerable dimensions in length and breadth, so as to resect a large area of vaginal mucous membrane. Dissect up almost entirely the lateral wall of the vagina, the external border of the triangle of denudation being parallel, and immediately subjacent to the angle which separates the

anterior wall from the lateral. The operation becomes then a veritable bilateral colporrhaphy combined with a perineorrhaphy. The laxity of the tissues and the presence of a rounded tumor, prominent anteriorly, in place of the posterior column of the vagina, render this the easiest of operations.

Hegar's Procedure.—The denudation has a triangular form. Dimensions vary according to the degree of prolapse. In slight cases it is sufficient to denude a triangle having 6 to 7 cm. breadth of base and a height of 7 cm. If the prolapse is very extensive, the base may measure 8 cm. and the height may be 9.

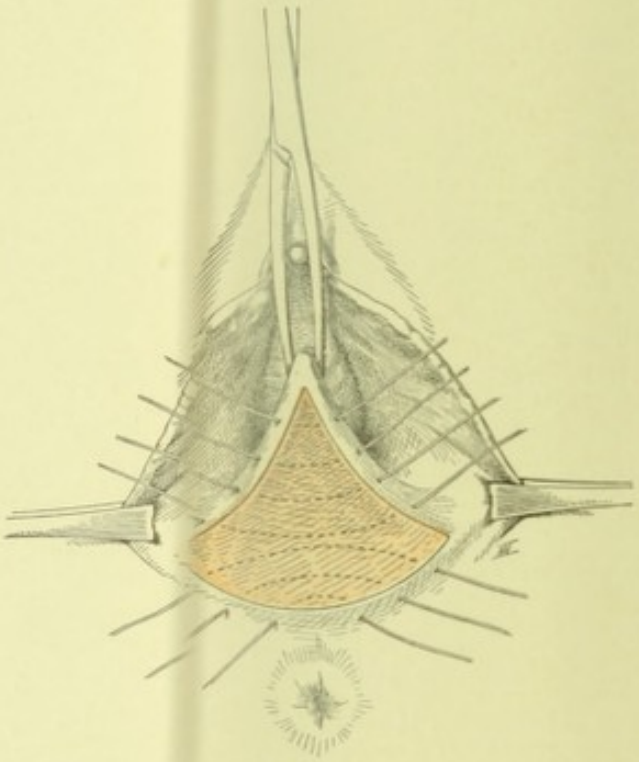


FIG. 116.—Hegar's colpo-peneorrhaphy (denudation and insertion of stitches).

Having fixed the point at the level of which will be situated the superior angle of the wound, it is seized with a small Museux forceps and drawn forward and upward. The posterior wall of the vagina appears directly in the vaginal orifice; two to four other little forceps serve to stretch the flap laterally, of which the base is at the level of the fourchette (Fig. 116). The denudation is then made with the bistoury, the point of which is always directed toward the flap. The thickness of the flap varies according to the state of the tissues. In general a few millimeters thick is enough. But when the wall is hyperplastic, hard and formed of only slightly vascular or cicatricial tissues, one should cut deeper.

When the denudation is complete the operator should make even the surface of the wound and for this purpose he should make the bleeding sur-

face bulge with his finger in the rectum. If there are any little spots not denuded, remove them. The larger vesse are ligatured with catgut.

The vaginal sutures are of catgut and t perineal of silver.

B. Colpo-perineorrhaphy by Division and Splitting.

Langenbeck, Wilms, Staude, Bi hoff were among the first to have recourse to the splitting of t perineum, but these complex methods were not inviting; an Lawson Tait was the first to do a simple and rapid splitting.

The procedure consists essentia in a splitting of the perineum and recto-vaginal septum by a transverse incision and in reunion by following a sagittal lin antero-posteriorly, of the denudation thus created. The wou reunited is perpendicular to the incision and the perineum i reconstituted between the vulvar orifice and anus.

1. **Incomplete Perineal Tears.**—L Tait, with two fingers in the anus, stretched the fourchette t sversely and divided with special scissors, pointed and curve the recto-vaginal septum, stripping the right and left sides over length of 3.5 to 4 cm. with a depth of 2 to 3 cm. From the extre ities of the transverse incision he made two others, which ext ded vertically upward on the labium majora. Drawing up rd the flap thus cut, he transformed the transverse woun into a longitudinal one which he reunited by silver wires pas d from left to right, which took in all the rawed parts but no the skin. This he did in order to avoid the pain which these res cause by pressure.

To this operation we prefer the llowing which in its main lines recalls that of Doleris' colpo-pe neoplasty.

The curved incision, with conca ity above, is made at the union of skin and mucous mem ane. Two fine Museux' forceps mark the limits already deter ined and serve at the sa time to stretch the parts. These are iven to two assistants w draw on them and the operator inc es gently t ddle p in a curve of about 3 cm. The surg on goes de d deep until he gets past the non separable ibrous zon lies i mediately below the skin, keeping clo to the vag der r to risk injuring the rectum. He en presses ith finger the tissues which deeply clo the vagin w

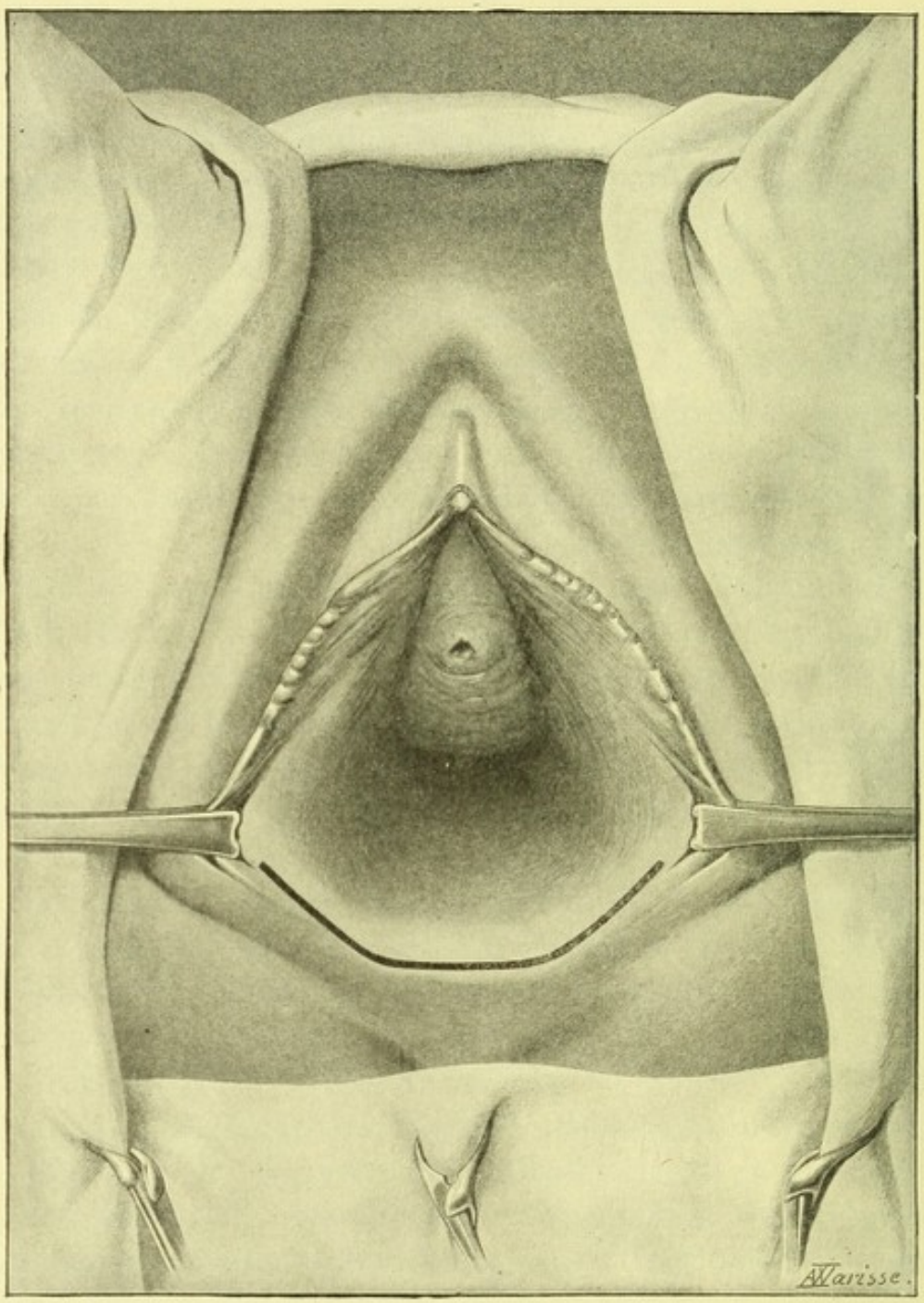


FIG. 117.—Perineorrhaphy incision by splitting in ruptures of the perineum.

external surface of the vagina until the denudation is considered sufficiently deep and extensive. Take a pair of straight scissors and insert one limb as deep as possible in the lateral portion of the separation. Then with one cut go through the skin and parts immediately subjacent to the right and to the left until the incision marked by the forceps is reached. Then with his finger he completes the lateral denudation of the vagina.

The wound has the form of a dihedral angle with base below and limited above by a vaginal valve and below by a rectal valve. Taking off the two forceps which mark the lateral limits of the incision, they are attached to the mid-point of these valves in such a manner as to draw the vaginal valve upward and the rectal downward and to give the wound the appearance of a lozenge with the long axis vertical. Now insert sutures; three metal stitches (silver, bronze, aluminium) suffice generally. The pos-

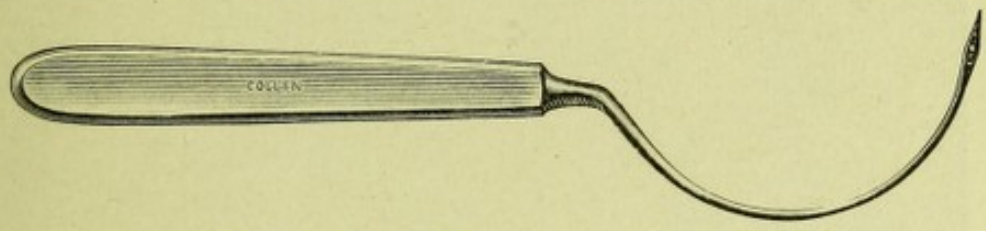


Fig. 118.—Needle for perineorrhaphy.

terior stitch passes through the skin of the perineum in the posterior angle of the lozenge about a centimeter from the edge of the denuded surface; it then traverses the substance of the rectal valve near the upper end, care being taken not to perforate the intestine and comes out opposite the point of entry.

The other two stitches pass anteriorly to the one described, the second at the level of the summit of the cleft and the third in the substance of the vaginal valve.

These wire stitches which pass easily on Emmet's needle draw the soft parts into the median line. It is thus necessary to pass them laterally as deeply as possible in the substance of the perineum, before insertion into the rectal and vaginal valves.

The operation being finished the result is not esthetic. Between the vagina and anus is a perineum sufficiently thick, but anteriorly the exuberant vaginal mucous membrane forms a sort of folded apron which projects over the line of sutures. It is

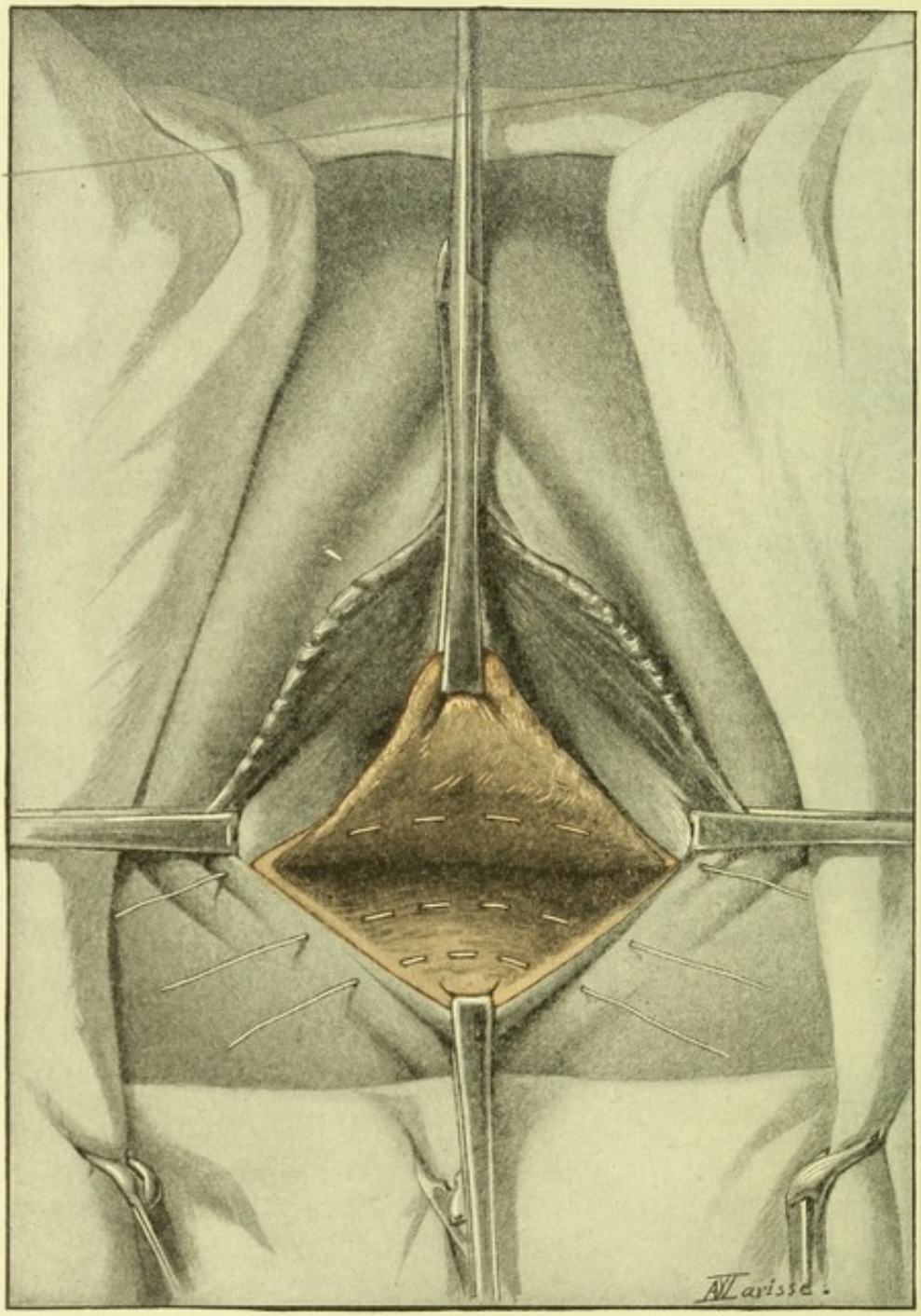


FIG. 119.—Perineorrhaphy by splitting. The splitting has been effected and the stitches inserted but not tied.

unnecessary to worry about this as this mucous membrane will gradually contract.

We consider it useless to shave off close to the redundant mucous membrane perineum of the posterior vaginal wall and to make a careful suture of the vaginal flap to the cutaneous lip.

2. **Complete Tear of the Perineum.**—In complete perineal tear we should draw forward the two extremities of the torn sphincter into the median line. The incision should be modified and take the form of an H.

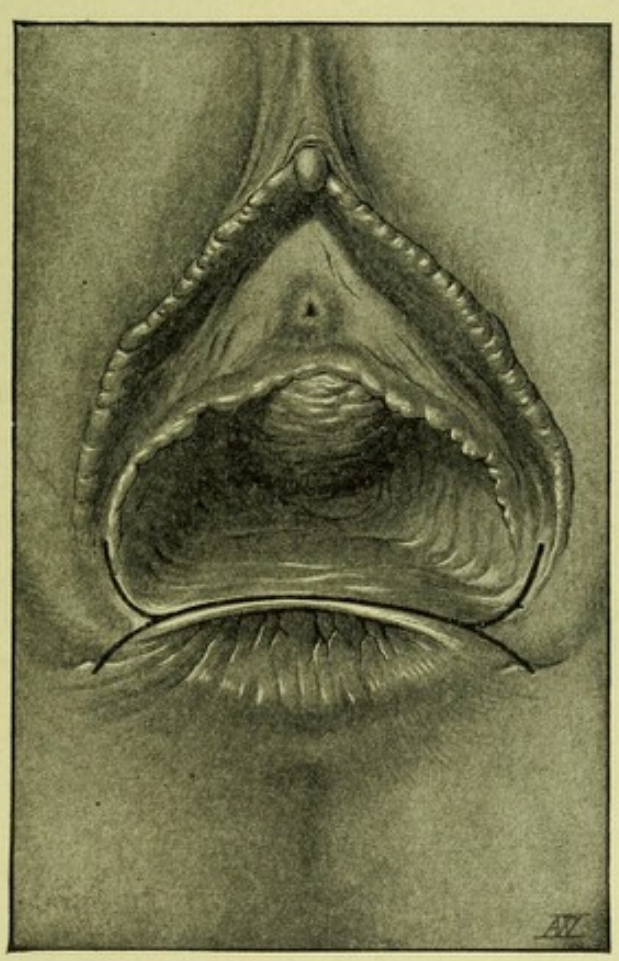


FIG. 120.—Perineorrhaphy incision by splitting in complete ruptures of the perineum. In the skin can be seen the little depressions corresponding to the extremities of the torn sphincter.

To the original incision for incomplete ruptures, add two incisions which run backward to the level of the torn sphincter denoted by a little cutaneous depression.

The splitting and the insertion of stitches presents no peculiarity, as everything is done as in incomplete rupture.

Some gynecologists commence by uniting the two lips of the rectal

tear by points of buried catgut inserted like Lembert's sutures in intraperitoneal wounds of the intestine. They are called after Lauenstein and only differ from Lembert's sutures in that they are placed on intestines denuded of their serous covering. Analogous stitches are inserted in the vaginal tear. Finish the operation by a perineal suture of silver wire.

Watkins[1] has recently advised an operation for complete rupture of the perineum which seems to him to have the following advantages:

1. The sutures are away from the anus, hence infection is diminished.
2. There is no tightening of skin or cicatricial tissue about the anus.
3. The sphincter is sutured apart.

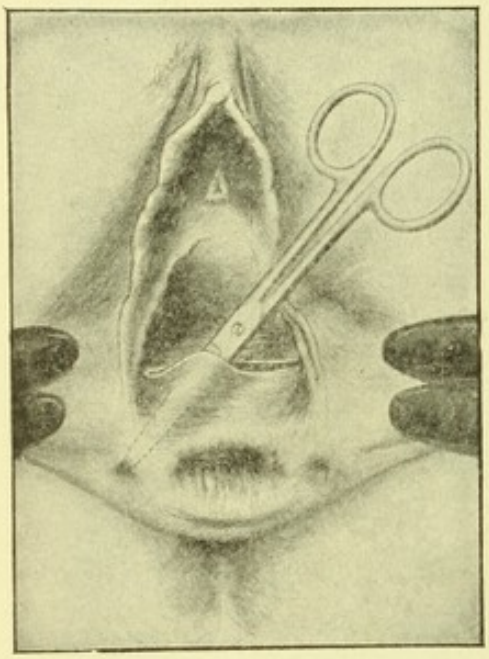


FIG. 121.

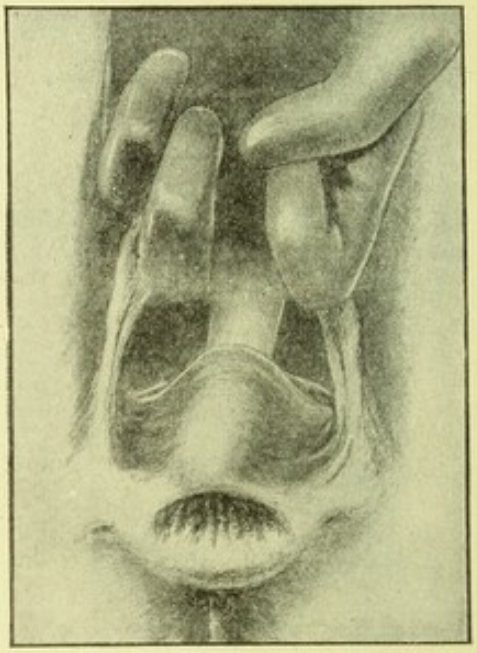


FIG. 122.

4. There is no danger of recto-vaginal fistula.
5. The post-operative pains are minimal.
6. Enemas may be given without fear of infection.

The operation is done in the following manner:

1. A transverse vaginal incision of a thumb's length and a half-thumb's breadth is made above the most elevated portion of the rectal tear. The higher the incision, the greater is the security against infection. When the rectal tear is not extensive, the incision ought to be made at least a thumb's breadth above the edge of the tear.

2. With a pair of pointed scissors denude from each side the vaginal mucous membrane until we reach a point corresponding to the extremity of the torn sphincter indicated by a depression in the skin (Fig. 121). The same

[1] *Surgery, Gynecology and Obstetrics*, July, 1908.

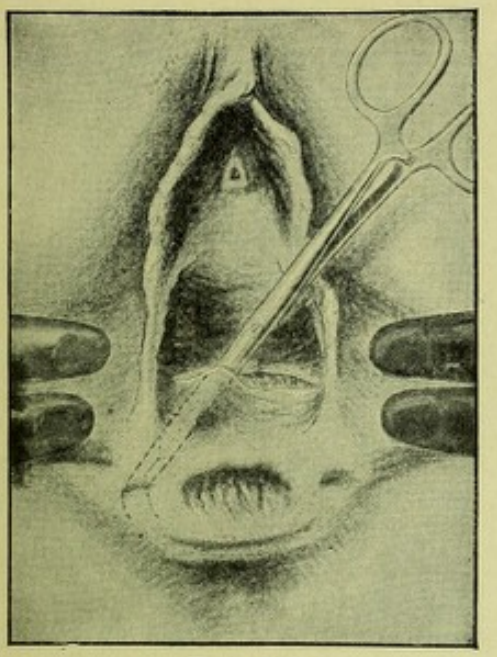


FIG. 123.

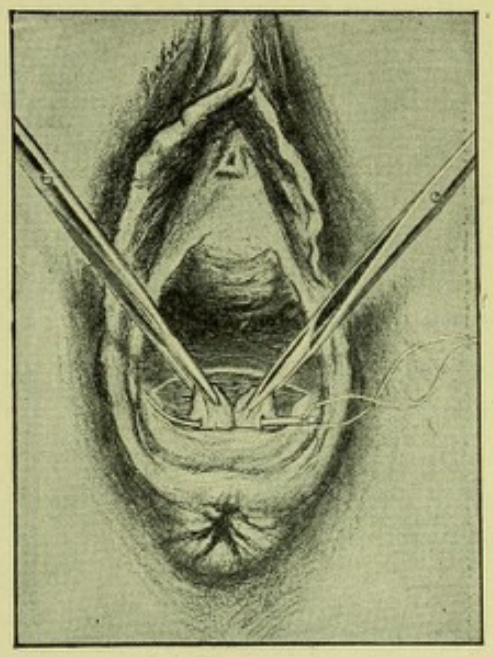


FIG. 124.

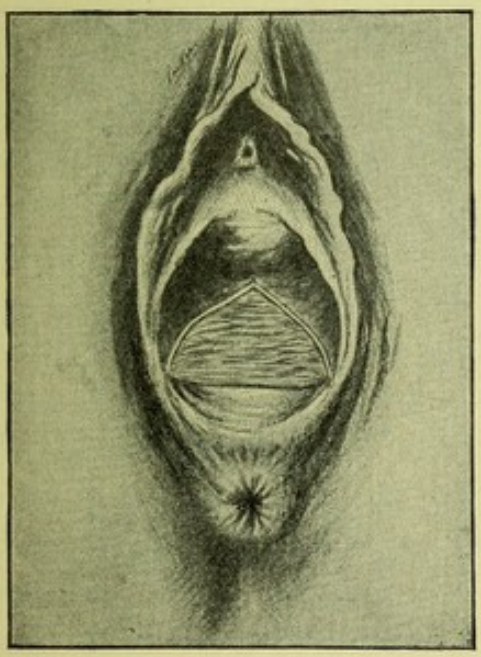


FIG. 125.

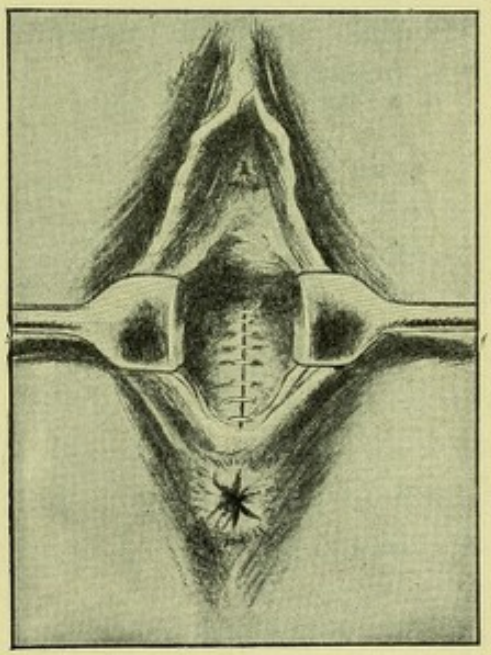


FIG. 126.

maneuver is repeated on each side. The limbs of the scissors are separated in such a manner as to separate the tissues very thoroughly.

3. The tissue lying between the two canals produced by the scissors is gently dissected and the finger explores to see that no uncut bands remain (Fig. 122). It is very important to dissect thoroughly the deep surface of the rectal mucous membrane, so that when the extremities of the anal sphincter are sutured, the sphincter will lie only on this mucous membrane, with the result that tension of the sutures will be greatly diminished.

4. The extremities of the sphincter are then seized on each side with pressure forceps (Fig. 123). Draw out nearly the whole of the muscle. If the first hold is insufficient, make a second with another forceps and, if necessary, a third.

5. The two extremities of the muscle are sutured with chromicized catgut which are passed two or three times through the muscle before tying (Fig. 124). Include surrounding tissue with the muscular to avoid cutting through on contraction of the muscle.

6. Terminate with Hegar's colporrhaphy (Figs. 125 and 126).

In Fig. 126 the sutures are removed from the anal orifice and are all in the vagina. In rectal digital examination it is easy to ascertain a normal muscular resistance and not the least retraction from the skin.

The operation consists, in short, in a transplantation of tissues. The mucous membrane, between the incision and rectal tear, is made to form the external face of the perineal body.

3. **Old Tears Complicated by Prolapse.**—In old tears complicated by prolapse, the operation is little different. The vagina has suffered a considerable increase in size and the perineal support has more or less disappeared. We should therefore resect a portion of the vagina and make a new perineal support.

The increased size of the vagina may be corrected by any of the anterior colporrhaphy procedures which we will describe later. If, however, we find a well-marked rectocele after splitting the tissues in the usual way, it is extremely easy to resect a more or less extensive area on the posterior vaginal wall and then to suture with catgut the two edges of the excised vagina. The operative treatment of vaginal prolapse presents one peculiar point; in place of limiting our splitting to the site of the old tear, we should extend as high as the level of the cervix uteri, and this is the only means of reconstituting a *solid perineal body*.

The suture inserted in the soft parts as formerly described is here insufficient. We must not only go deeply but some dis-

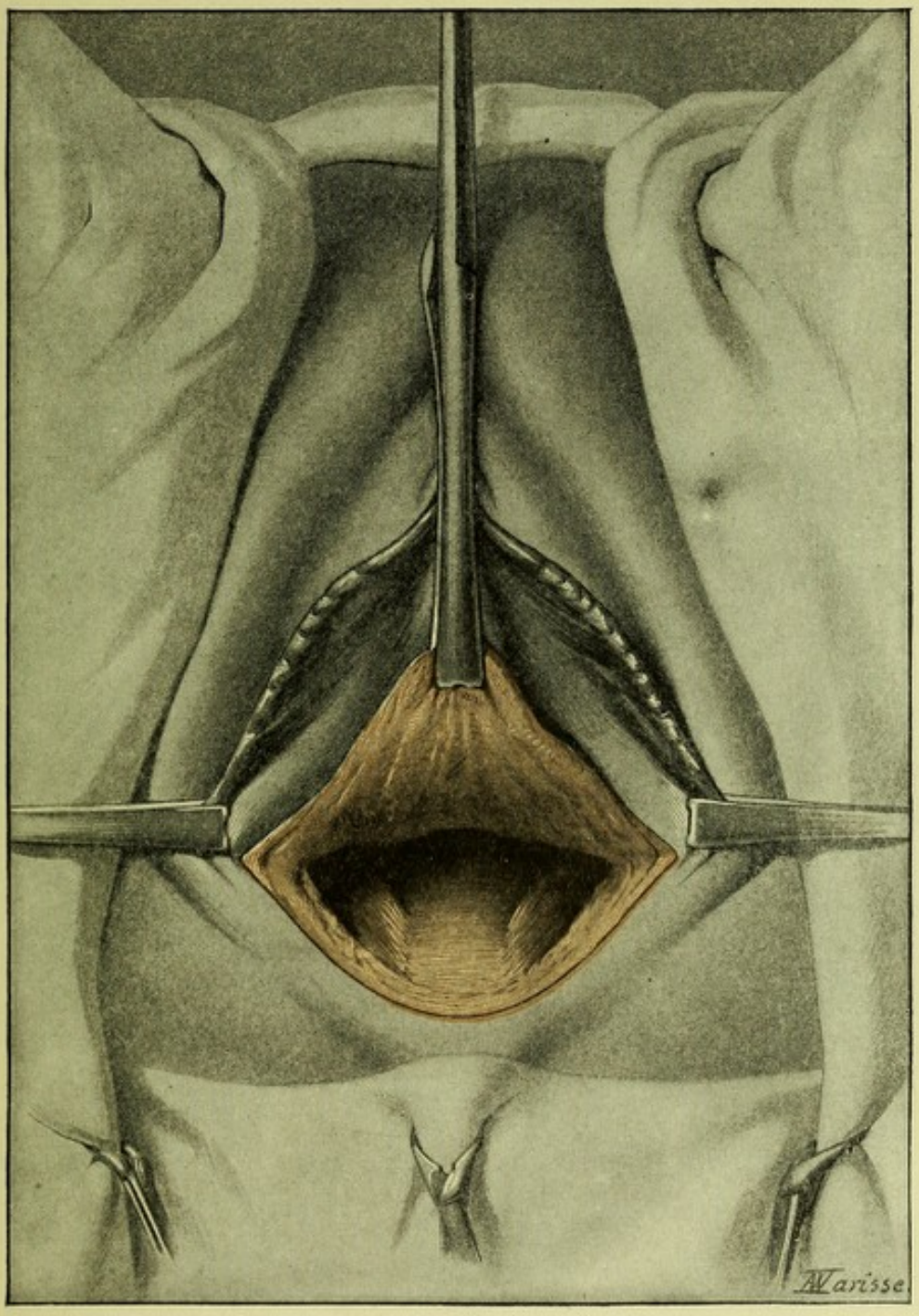


FIG. 127.—On the posterior valve resulting from the splitting are to be seen the edge of the levators.

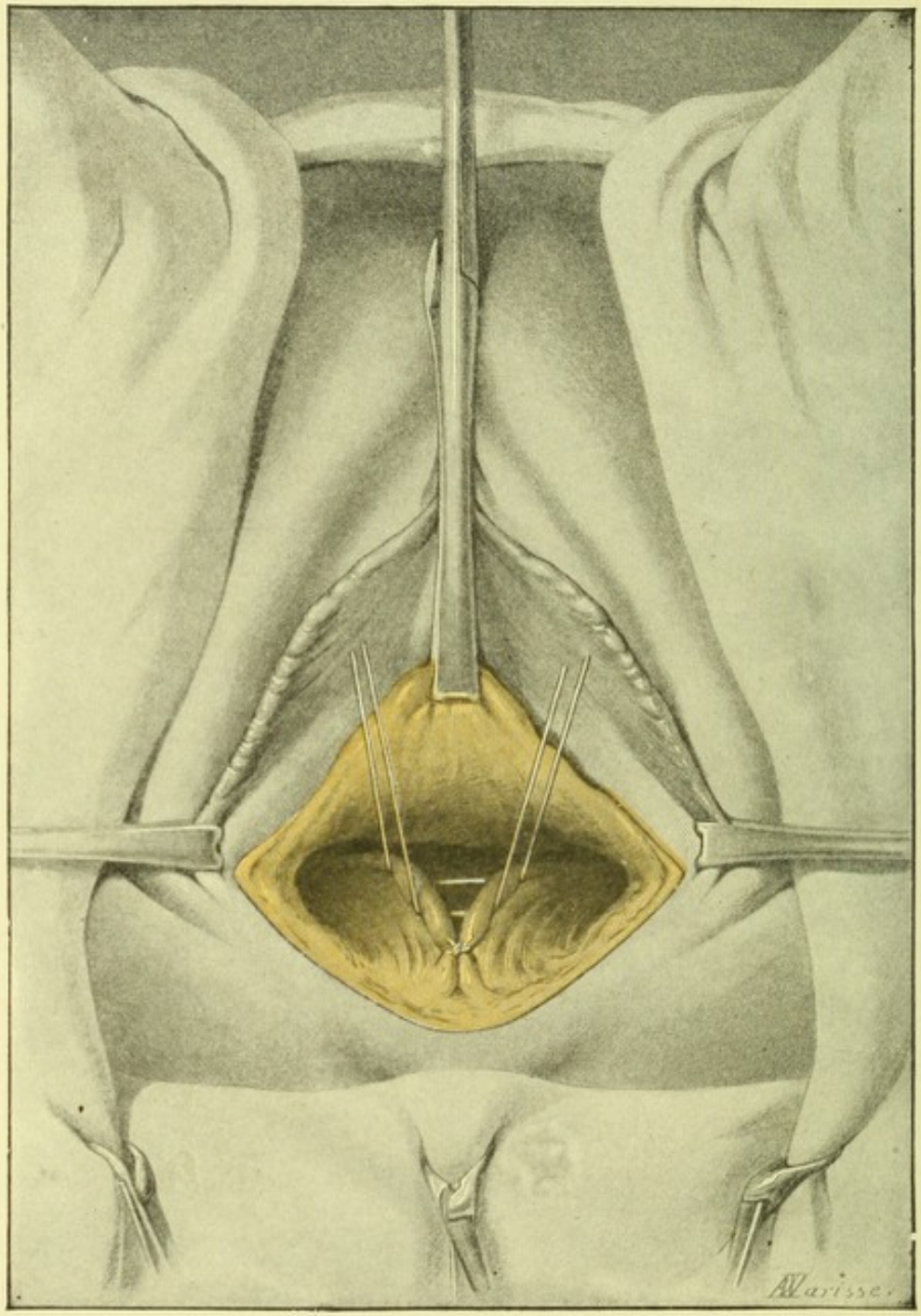


FIG. 128.—Suture of the levators. (The posterior suture is tied but the others are only inserted.)

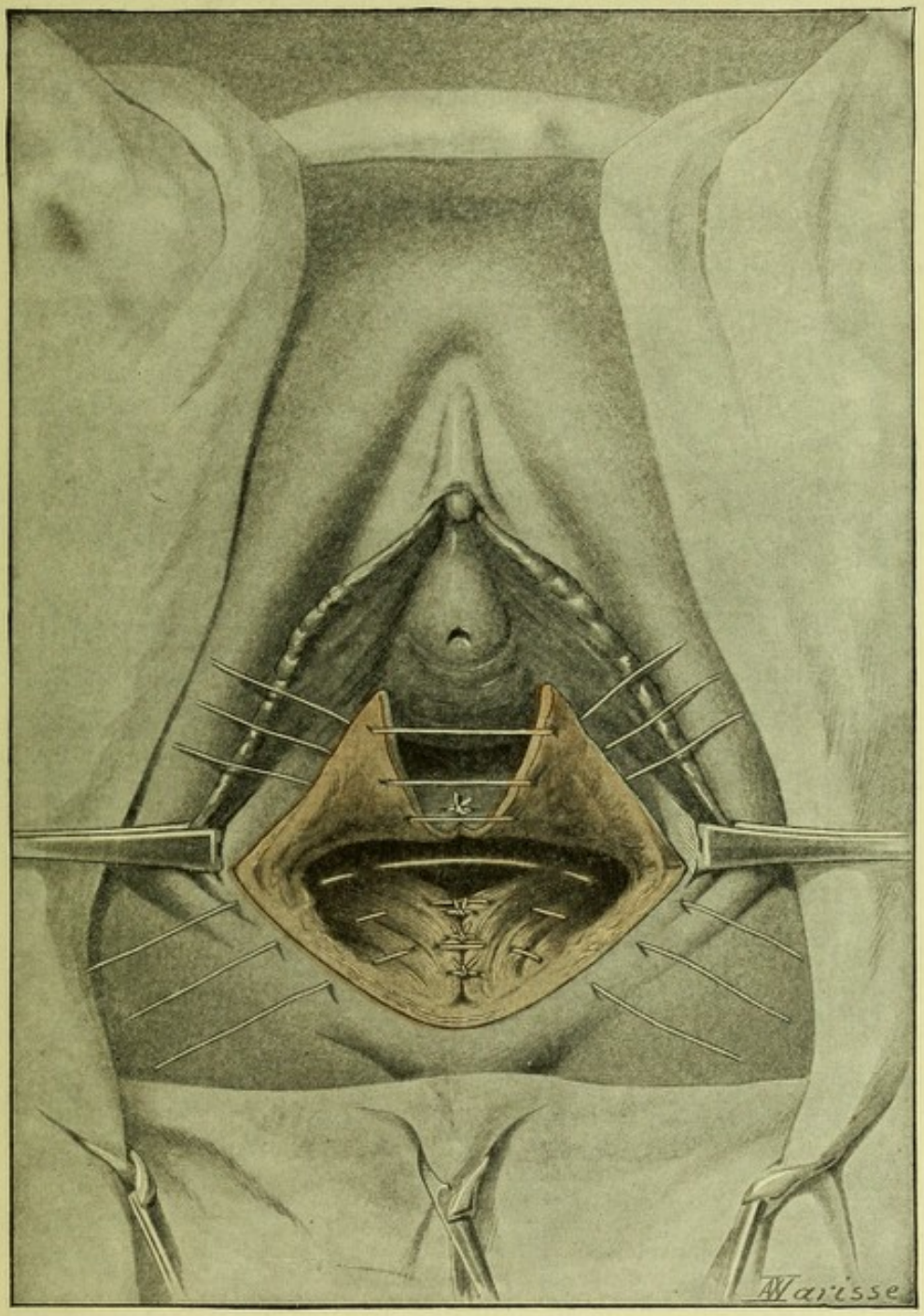


FIG. 129.—Resection of the excessive posterior vaginal wall in colpo-perineorrhaphy by splitting.

tance laterally in order to bring between the vagina and rectum more solid and resistant tissues. These tissues are principally to be found about the level of the levators, and the suture was advised in 1897 by C. Noble[1] in America, by Ziegenspeck[2] in Germany, but strictly was first practised in France by Duval and Proust[3] and my colleague, Pierre Delbet.[4] We have used it for many years.

In the case of prolapse, we must search some distance away for these muscles toward the lateral limits of the denudations. They are often hard to recognize, but on feeling with the fingers the bands which form the edges of the preserved portion of these muscles, descending from the superior portion of the perineum backward from the posterior border of the uro-genital diaphragm to the lateral portion of the rectum. They should be freed and then, guiding one's needle with the finger, they should be freely sutured with chromicized catgut very slightly resorbent. Three or four stitches are placed from behind forward and then tied.

When a muscular perineal body is thus reconstituted, the skin and subjacent parts are sutured with non-resorbent stitches; they pass through muscles already sutured in such a manner as to avoid the persistence of a virtual cavity between the two rows of sutures and thus prevent serum collection.

In proceeding thus, we obtain resistant perinei and durable cures.

In cases where the excess of vaginal wall seems to indicate the resection of a portion of it, it is extremely difficult to do it. It will be found sufficient to remove a corner of this wall and then suture the borders of this vaginal section before proceeding to the perineal reunion (Fig. 129).

4. Anterior Colporrhaphy.

The operative technic of anterior colporrhaphy varies with the object of this operation. In the great majority of cases it is

[1] Charles P. Noble. A Contribution to the Technic for the Cure of Lacerations of the Pelvic Floor in Women. *Amer. Gyn. and Obstet. Journal*, New York, 1897, T. X, p. 413.

[2] Ziegenspeck, *Centr.-Bl. f. Gyn.*, Leipzig, 1899, p. 1251.

[3] P. Duval and R. Proust, Technique de la suture des muscles releveurs de l'anus au cours de la périnéorraphie. *Presse médicale*, Paris, November 22, 1902, p. 1120.

[4] Pierre Delbet, Périnéorraphie par interposition. *Bull. et Mém. de la Soc. de Chir.*, 1902, p. 1092.

done for an anterior colpocele with concomitant cystocele. The following is the operative procedure:

Extensive Anterior Colporrhaphy for Colpo-cystocele.—Commence by exposing and drawing on the anterior vaginal wall by traction forceps. A pair of forceps is placed on the anterior lip

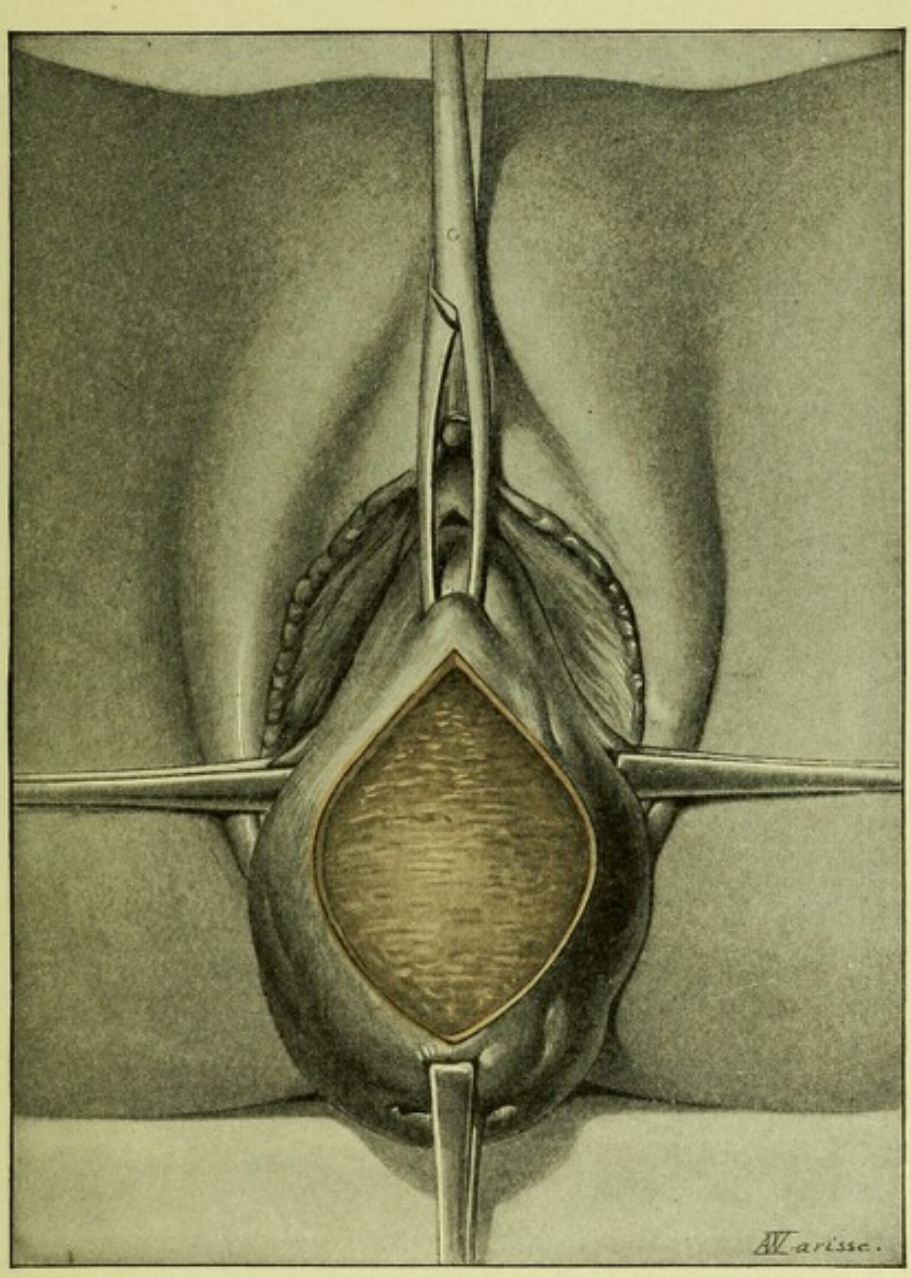


Fig. 130.—Denuded surface in anterior colporrhaphy.

of the cervix, which is drawn down and back toward the fourchette; with a second forceps, median like the first, one seizes the vaginal mucous membrane immediately below the urethral meatus. Finally, two forceps symmetrically placed fix the lateral vaginal wall at equal distance from the upper and lower forceps.

After having *stretched* the anterior *vaginal wall*, trace with a bistoury the elliptical-shaped flap, cutting the whole thickness of the vaginal mucous membrane but not interfering with the vesical wall. Then dissect up the flap, beginning at the anterior angle. The commencement of the dissection at the level of the urethral

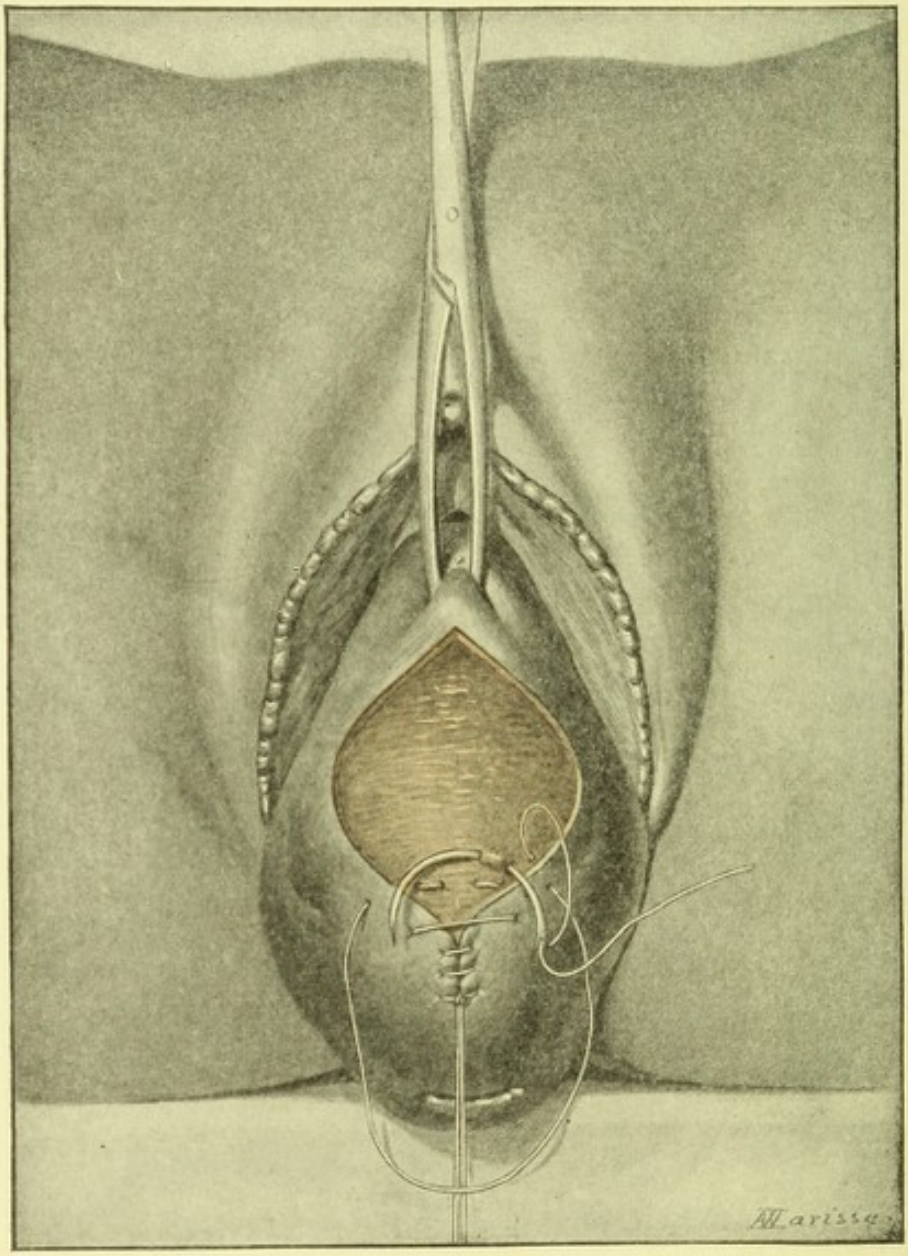


FIG. 131.—The continuous suture commences near the cervix. Hagedorn's needle takes up the denuded surface.

wall is a little delicate because the vaginal mucous membrane is bound to the deeper fibrous tissue. But when one reaches the vesico-vaginal septum, the separation is easy and the bistoury no longer required. It only remains to hook up the free anterior

part of the flap with the index finger and thumb of the left hand and *denude by simply rolling back the parts* which separate easily. The denudation is performed first in the median line and then laterally, until the flap is quite detached. This method is preferable to that of scissors or bistoury. There is less chance of injuring the bladder because one works in a favorable plane of cleavage, and the hemorrhage is less. It is also more rapid which is of importance in anterior colporrhaphy, as generally it is one feature of a more complex operation.

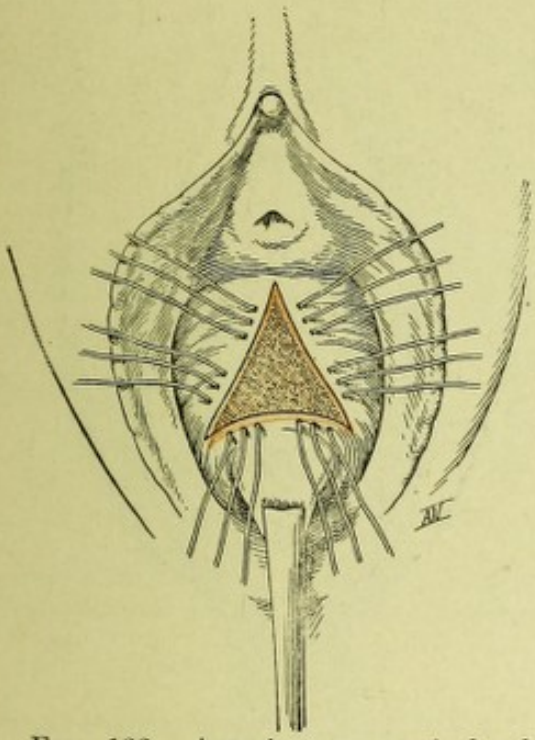


FIG. 132.—Anterior pre-cervical colporrhaphy. Denuded surface, stitches are inserted.

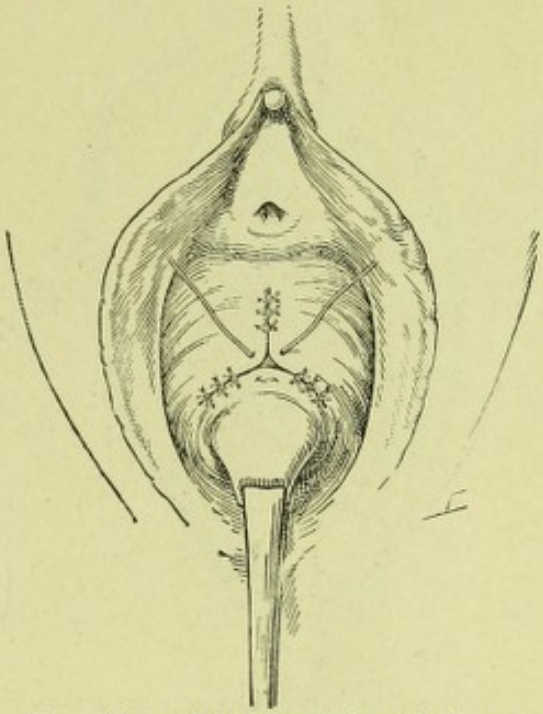


FIG. 133.—Stitches tied with the exception of the last purse-string suture which will close the original center of the three-branched star.

Union is obtained as in all plastic operations. The needle should penetrate below the denuded surface.

We use catgut in place of non-resorbent material such as silkworm gut and silver wire, as removal after contraction is so difficult, seeing that colporrhaphy is so often combined with perineorrhaphy. We prefer the continuous suture which is more rapid. This is done easily with a medium Hagedorn's needle which one can take in the hand. Important to remember is that we commence by the inferior extremity (cervical) and progress to the superior extremity (urethral). The parts are brought together when sutured and the non-sutured portion remains

easily accessible. If, on the contrary, one commences at the urethral extremity, the contraction of the anterior part of the vagina would interfere with the passage of the sutures.

Most often a single suture plane is enough; when the degree of the cystocele has led the operator to do an extensive denudation, the tension of the tissues forces a suture by stages; its execution is easy. Begin with a premier line of stitches which are introduced

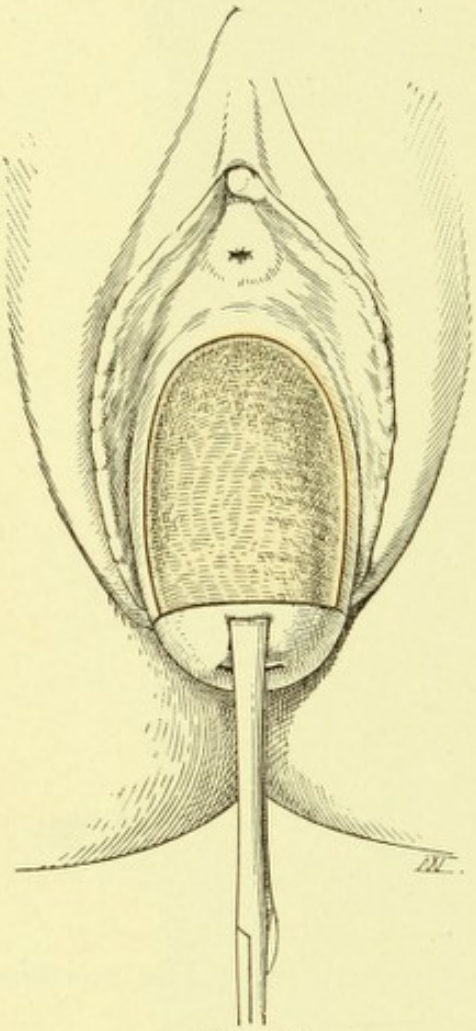


FIG. 134.

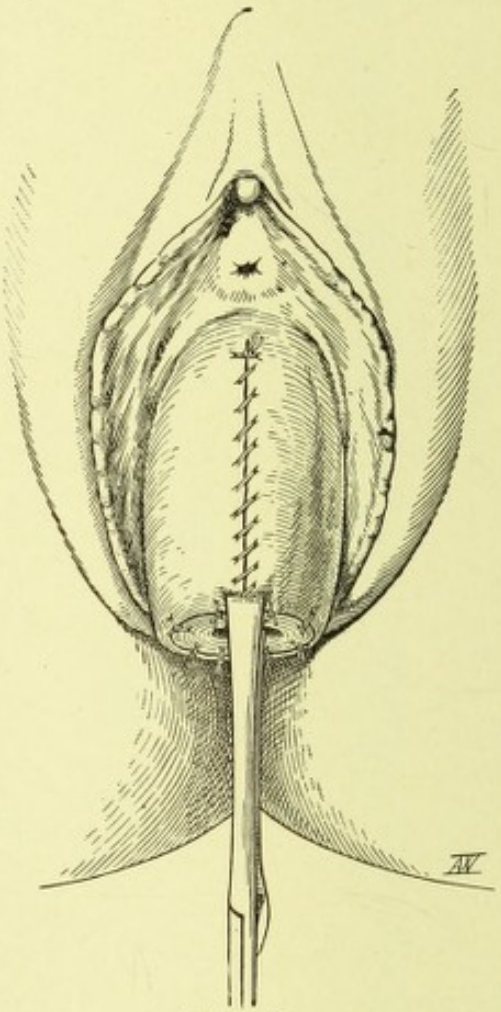


FIG. 135.

and appear in the denuded surface, and thus produce a fold of the vesical wall; then one sutures the non-united parts above this fold, taking up in passage the deep plane to avoid cavities between the two planes.

Various Procedures.—We have described our operation. We ought to add that all sorts[1] of denuded areas have been described and all manner of

[1] See Charles G. Child, in The Review of Cystocele in the Past 100 Years. *Amer. J. Obstet.*, New York, 1906, T. II, p. 514.

sutures. Why go into them? We consider these complicated sutures should give way to the simple continuous suture or that by layers.

Anterior Pre-cervical Colporrhaphy.—In some cases of anteflexion *with collapse of the anterior vaginal wall*, forming at the level of the anterior fornix a prominence, more or less marked, which hides the os. Doléris[1] advises a little anterior pre-cervical colporrhaphy. The denudation is triangular. The base corresponds to the angle of reflexion of the vagina on the cervix and measures 5–6 cm. The sides have the same length and the summit is about the middle of the anterior vaginal column. Unite each of the three angles by two or three separated stitches, thus making a star of

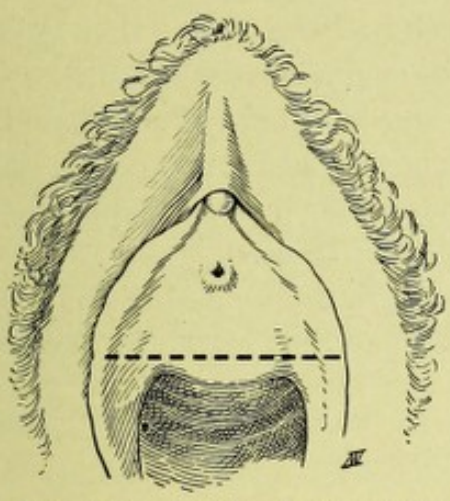


FIG. 136.—Incision for the splitting of the urethro-vaginal septum.

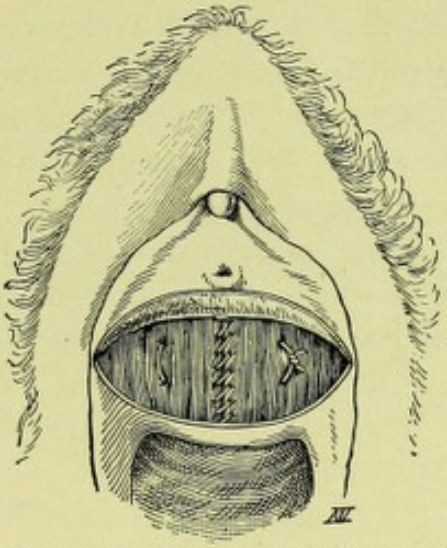


FIG. 137.—Suture of the levators at the level of the splitting of the urethro-vaginal septum.

three branches and the center is closed with a pursestring suture (Figs. 132 and 133).

The vaginal portion of the cervix is thus freed and a solid support is thus made below the bladder and causes it to remain anterior to the uterus, and supports it. It presses the uterus in asense backward and helps to overcome its anterior flexion.

Combination of Anterior Colporrhaphy with Amputation of the Cervix.—Barton Cooke Hirst[2] insists on this fact that the uro-genital diaphragm in prolapse is torn both anterior and posterior to the vaginal orifice. He recommends beginning by *denuding the anterior vaginal grooves* exactly as the posterior are done in colpo-perineorrhaphy. Insert sutures but do not tie them at once. Fix forceps to them and put the forceps on the pubis.

Draw the cervix out of the vulva and make a *large denudation anteriorly*

[1] Doléris, Treatment of Sterility. *Th. de Paris*, 1898–1899.

[2] Barton Cooke Hirst, A Contribution to the Efficiency of Plastic Operations on the Vagina. *Amer. J. of Obstetrics*, New York, 1905, T. II, p. 100.

shaped like a shield with base at the cervix and the top immediately below the urethral orifice. This flap is dissected up and excised (Fig. 134). *The cervix is amputated.* Laterally separate the tissues as far as the uterine ligaments.

A continuous suture in several layers unites the denuded vaginal surface; the stump of the cervix is sutured as in Hegar's operation (Fig. 135), the most lateral sutures taking up the *fibro-muscular tissues of the base of the broad ligaments* in such a manner as to obtain a firm hold of them. The uterus is put back in place and the sutures inserted in the anterior grooves and tied.

Splitting of the Anterior Wall of the Vagina and Suture of the Levators.— The *suture of the levators* commonly practised to-day in colpo-perineorrhaphy was advocated in the treatment of hysterocele by Delanglade,[1] then by Groves[2] and by Chaput.[3] It is done anterior to the vaginal orifice and directly below the bladder. This anterior repair of the muscular pelvic diaphragm has the advantage of placing the bladder on an elastic and normal contractile floor and of pushing back and up the cervix uteri and thus correcting the retro-deviation which accompanies prolapse so often (Figs. 136 and 137).

A finger's breadth behind the meatus make a transverse incision the whole width of the vagina. Separate the bladder and then search for the levators.

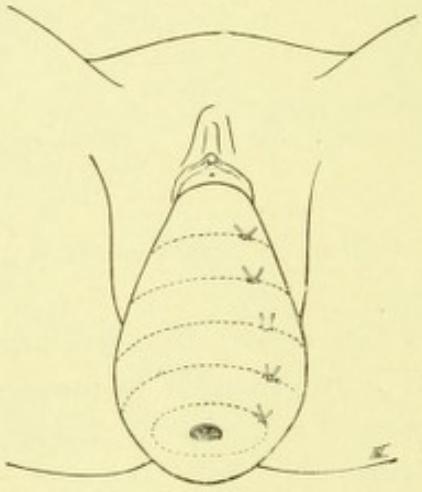


FIG. 138.—Freund's operation.

5. Constriction of the Vagina by Metallic Sutures.

Freund[4] has tried to obtain constriction of the vagina by a series of fibrous rings around wires maintained some time in

[1] Delanglade, *Bull. et Mém. de la Soc. de Chir.*, Paris, 1902, p. 1140, and 1905, p. 361.
[2] Groves (Ernest W. Hey), *Journal of Obstet. and Gyn. of British Empire*, 1905, T. VII, p. 187, et *Ann. de gyn.*, Paris, 1905, p. 367.
[3] Chaput, *Bull. et. Mém. de la Soc. de Chirurg.*, Paris, 1905, p. 337.
[4] Freund, *Centr.-Blatt. f. Gyn.*, Leipzig, 1893, p. 1081.

position. After local anesthesia he inserts his first wire as in the figure near the insertion of vagina on the cervix. In doing this he uses a curved needle which is introduced into the submucous tissue as far as possible. He brings the needle out and enters again in the same point and so continues until the needle comes out in its original point of entry. He now draws upon it until only a narrow vaginal space is left and then ties it. The wire is cut very short. A series of these sutures are placed from the cervix to the perineum.

These sutures have a double action, acting as mechanical irritants and finally a cicatricial ring is formed.

6. Colpectomy.

Conceived by Le Fort[1] and Neugebauer,[2] who excised two little quadrilateral flaps of mucous membrane on the anterior and posterior walls and then the union of the denuded portion with silver wire sutures. This operation results in a band of no great thickness which speedily gives way on pressure of surrounding parts. The procedure of Dubourg[3] who substitutes a transverse instead of antero-posterior septum of the vagina.

We have modified the operation in the following manner:

The prolapse being drawn completely out of the vulva we excise on its anterior and posterior wall two long and broad mucous membrane flaps. Commence at the cervix, and terminate anteriorly near the meatus and posteriorly near the fourchette. We suture the two denuded surfaces with buried resorbent sutures, commencing at the cervix (Fig. 139), advancing to the vulvar orifice, pushing back the united tissues so that when the last stitch is put in, the prolapse is completely reduced. Figs. 140, 141, 142 show this putting back of the prolapsed parts as they are progressively sutured.

We thus create a long cicatricial column which occupies almost the whole length of the vagina and which is much more efficacious than the little mucous membrane band described by Le Fort.

[1] André, Du Traitment du prolapsus utérin par le procédé de Le Fort. *Th. de Paris*, 1889.

[2] Neugebauer, *Centr.-Bl. f. Gyn.*, 1885, p. 6.

[3] Bordier, Supériorité des opérations sur le vagin et d'une nouvelle opération, en particulier dans les prolapsus utérins. *Th. de Bordeaux*, 1893–1894.

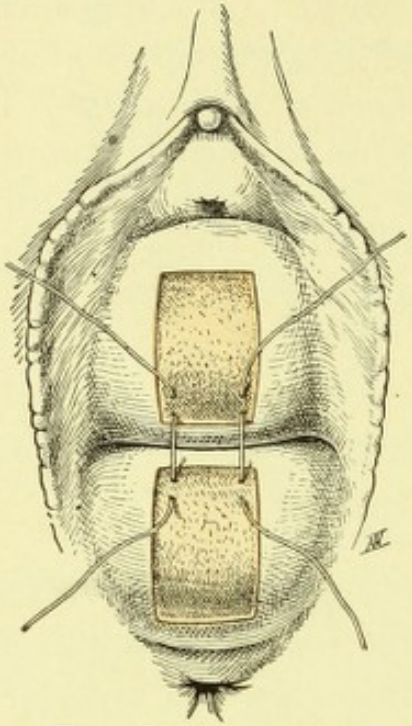


FIG. 139.—Anterior view.

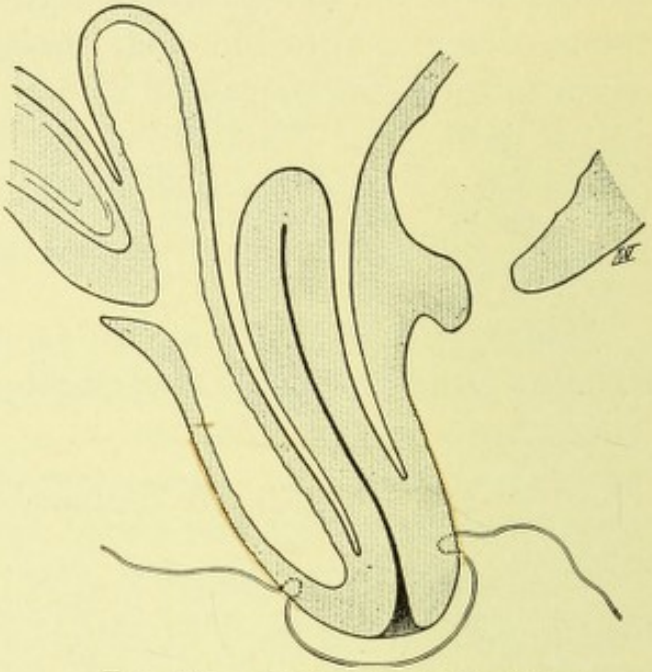


FIG. 140.—Antero-posterior section.

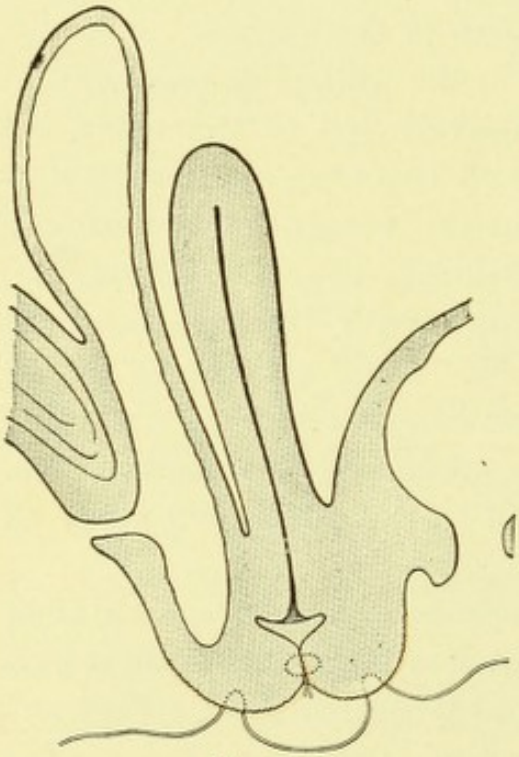


FIG. 141.

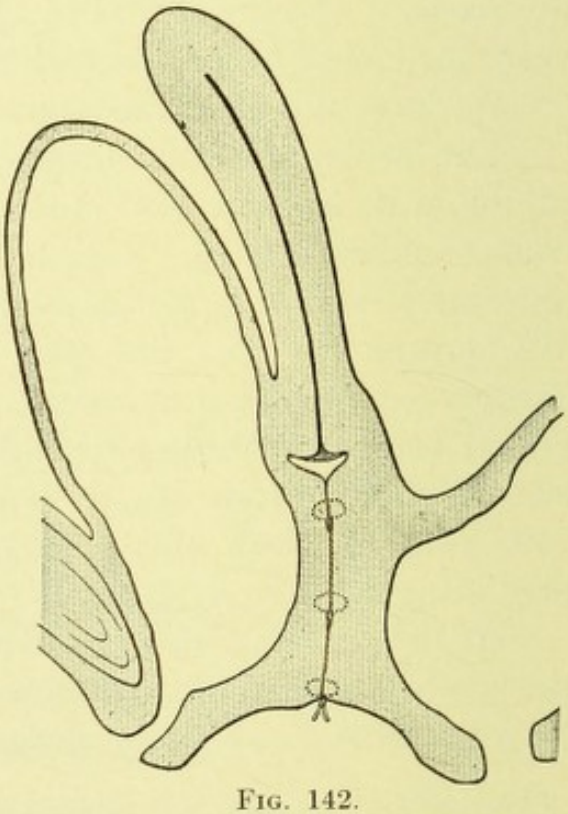


FIG. 142.

Muller[1] advised the *total removal of the vagina*. The prolapse being drawn out to a maximum, he then makes a circular incision of the mucous membrane at its base going above the perineo-vulvar groove posteriorly, and a centimeter from the meatus anteriorly. From this incision he strips the vaginal mucous membrane in its whole extent, amputates the cervix, stops the bleeding and inserts a series of purse-string sutures into the denuded surface, from cervix to perineum, pushing back the tissues as they are sutured.

When the last stitch is inserted, close the vaginal entry with a sagittal suture. When the operation is finished there remains a little cul-de-sac 2 or 3 cm. deep which is tamponed with iodoform gauze.

It seems natural that secretions should form above the cicatricial column. That is nothing if the operation is done on women after the menopause and if the colpectomy is preceded by curettage and a cauterization of the uterine cavity with carbolic acid. Konig[2] had one death in 30 cases, following infection produced by pushing her hands into the wound soon after the operation was done. She was old.

7. Treatment of Recto-vaginal Fistulas.

Recto-vaginal fistulas present very different anatomical conditions. They may be high or low, ostial or canal like. They are easy or difficult of access according as where the vagina is wide or narrow. The operations are also very diverse. Simple *cauterizations* are rarely successful. Their treatment by the rectal route (Demarquay) or by the sacral route (Terrier, Heydenreich) has been abandoned and now there are two routes by the *vagina* and *perineum*.

1. **Operations by the Vaginal Route.**—Simple denudation shaped like a funnel, with its summit at the rectum, followed by reunion of a single line of sutures, being careful not to perforate the intestine, has given success. Schauta prefers a large triangular denudation with sutures at some distance. The fistula in

[1] Wormer, Die Kolpectomie zur Berichtigung des Prolapsus älterer Frauen. *Mon. f. Geb. u. Gyn.*, Berlin, 1898, T. I, p. 367. Savariaud, L'opération de Müller pour prolapsus. *Annales de gynécologie*, Paris, 1906, p. 660.

[2] König, Müller's Method of Colpectomy for Uterine Collapse. *Journal of Obstet. and Gyn. of British Empire*, 1903, p. 295.

the center of this large denuded surface is closed by many sutures which do not perforate the tissues in its immediate vicinity and thus increase the chances of reunion (Fig. 143).

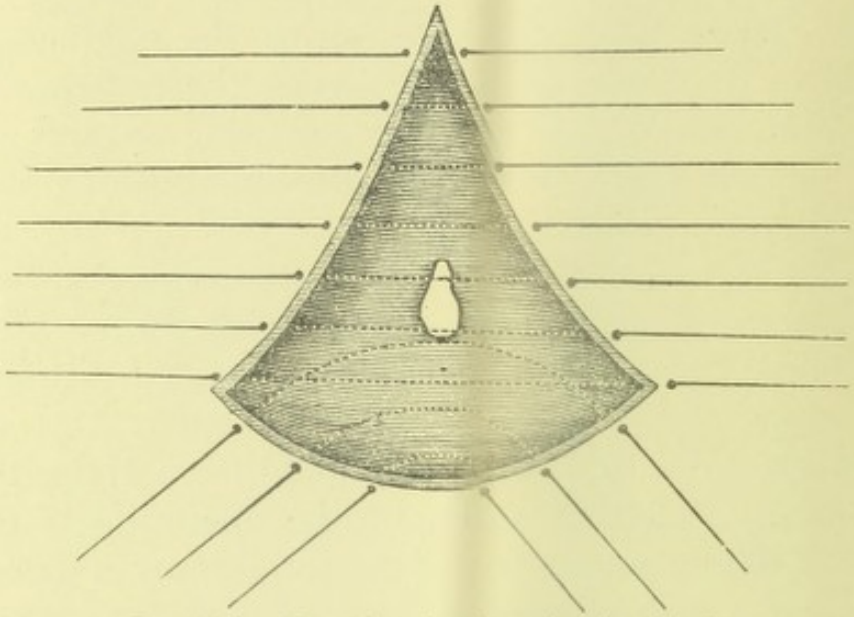


FIG. 143.—Procedure by triangular denudation.

Others have recourse to splitting of the recto-vaginal septum, some proceed from the fistulous orifice (Sanger), others to do the separation at some distance from the fistula (Doyen). In order to prevent fecal matter from getting in between the

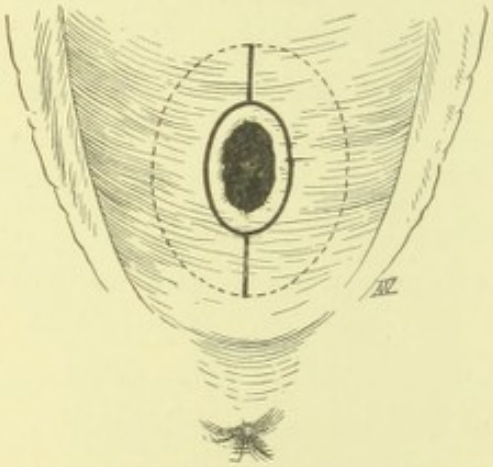


FIG. 144.—Procedure by splitting of the septum. Black lines denote the incision, the dotted the limits of the splitting.

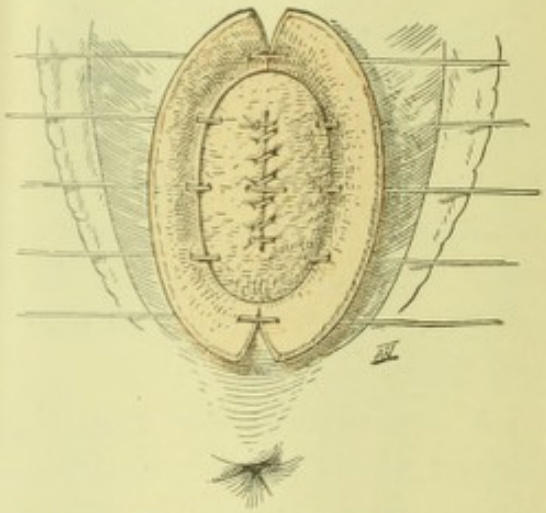


FIG. 145.—Procedure by splitting. The deep continuous suture is tied. The superficial placed but not tied.

opposed surfaces, Sanger makes a complementary rectal suture. After dilatation of the anus he presses back the septum with a finger in the vagina in such a manner as to cause the fistulous

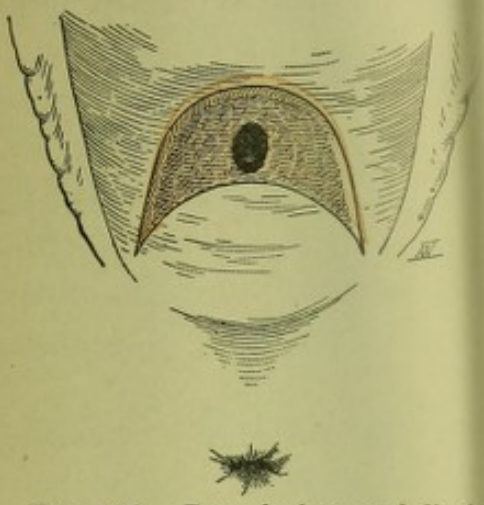


FIG. 146.—Denudation and limit of flap.

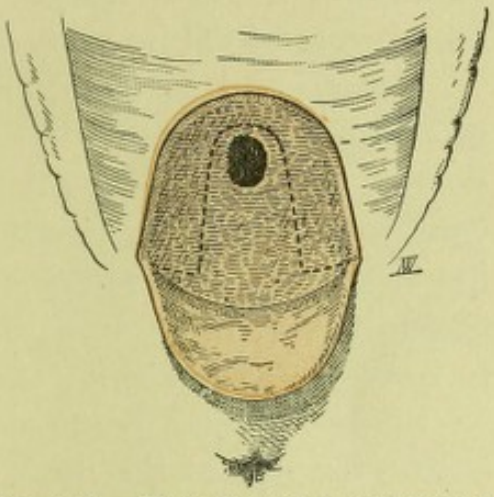


FIG. 147.—Flap dissected and turned back. The dotted line denotes the portions of the ventral wall which will be resected.

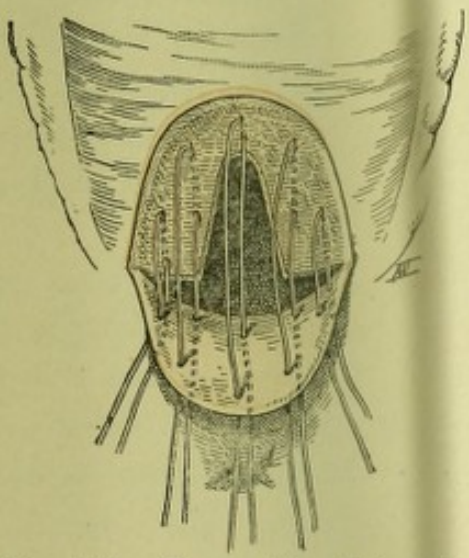


FIG. 148.—The rectal wall is resected. The sutures are placed but not tied. When tied the flap is raised up and loses over the denuded surface and fistula.

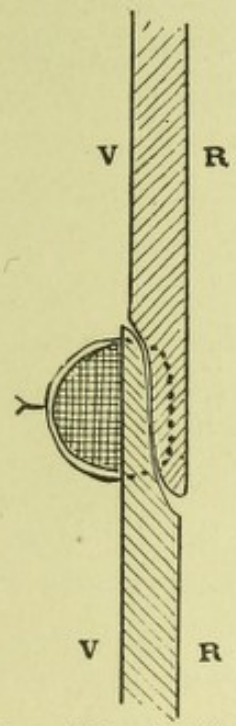


FIG. 149.—Section of the recto-vaginal septum. The suture is tied on a roll of gauze so as not to cut through. V, vagina; R, rectum.

orifice, already sutured vaginally, to appear at the level of the anus, and he then inserts some stitches into the rectal mucous membrane which he folds up above the sutured fistula.

Fritsch and Le Dentu advocate autoplastic operations by use of a vaginal flap, but while Fritsch takes this flap from above the fistula, Le Dentu takes it from below (Fig. 146). In the latter case to avoid the formation of a cul-de-sac we should before inserting the sutures resect a triangular-shaped portion of the rectum, with its summit at the fistula and base corresponding to base of the flap (Fig. 147).

Some stitches, being careful not to perforate the intestine, suture the flap to the denuded surface.

2. **Operation by Perineal Route.**—In this operation we commence by cutting through all parts of the perineum subjacent to the fistula which is either scraped or excised. We find ourselves thus in the position of dealing with a complete perineal rupture and treat it accordingly.

Without cutting through the perineum separate it up to a point just above the fistulous orifice and then after suturing the vaginal and rectal orifices as in perineorrhaphy with flaps, leave in a gauze drain which lies between the perineum and rectal suture.

In cases of extensive and high-placed fistulas, Segond advocates the resection of a portion of rectum subjacent to the fistula, followed by the drawing down of the upper end which descends like a blind behind the vaginal orifice. This latter is denuded and sutured apart (Figs. 150 and 151).

Gerard Marchand's operation might be applied to certain recto-vaginal fistulas. He employs a certain technic for recto-perineal fistulas and this consists in drawing down the rectal mucous membrane alone in front of the fistulous orifice. After dilatation of the anus, G. Marchand[1] everts its mucous membrane and incises it 1 cm. above the ano-cutaneous line. He dissects the mucous membrane by the aid of his finger and the blunt extremity of the scissors. He draws it down until he is able to cut through it above the fistulous orifice and then he attaches this drawn down mucous membrane to the little collarette of mucous membrane preserved in the anal canal.

[1] Gerard Marchand, Perineo- and Recto-vaginal Fistulas. Treatment by Drawing Down of the Mucous Membrane of the Rectum. *Bull. et. Mem. de la Soc de chir.*, Paris, 1902, p. 321.

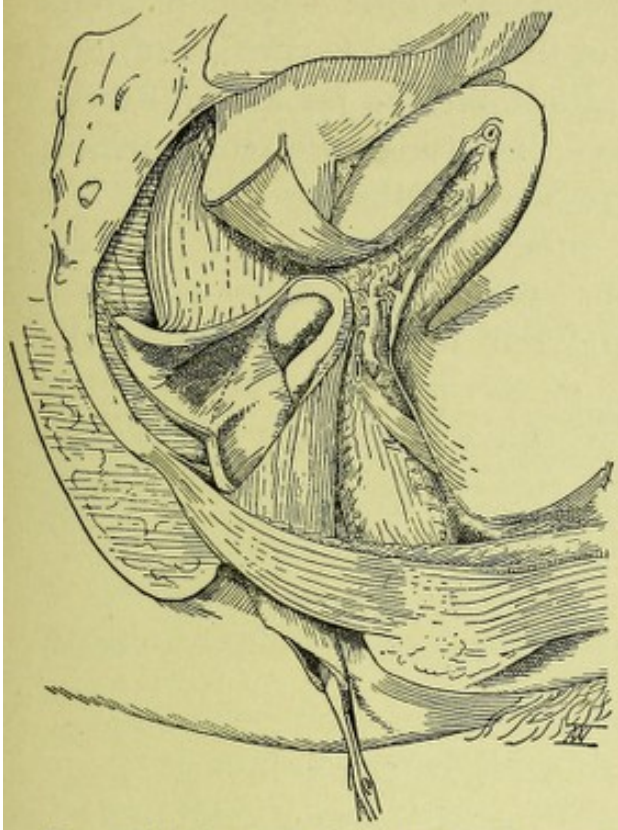


FIG. 150.—Segond's procedure by drawing down the rectum.

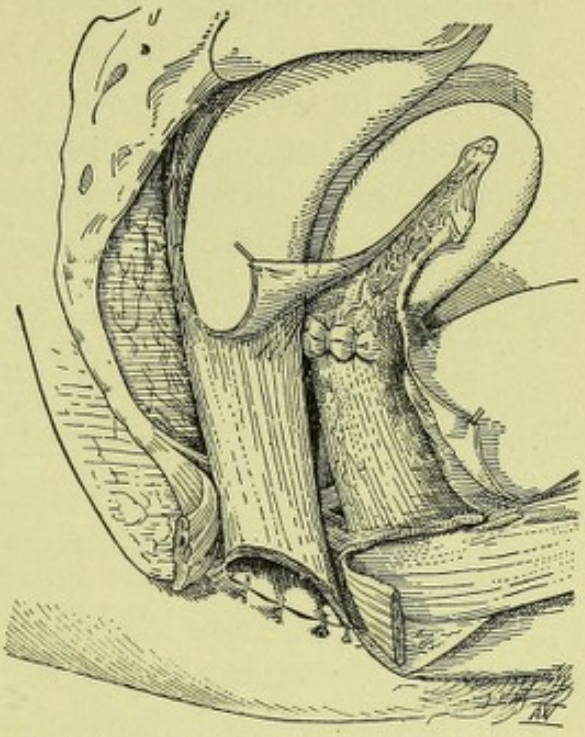


FIG. 151.—Segond's procedure. Operation terminated.

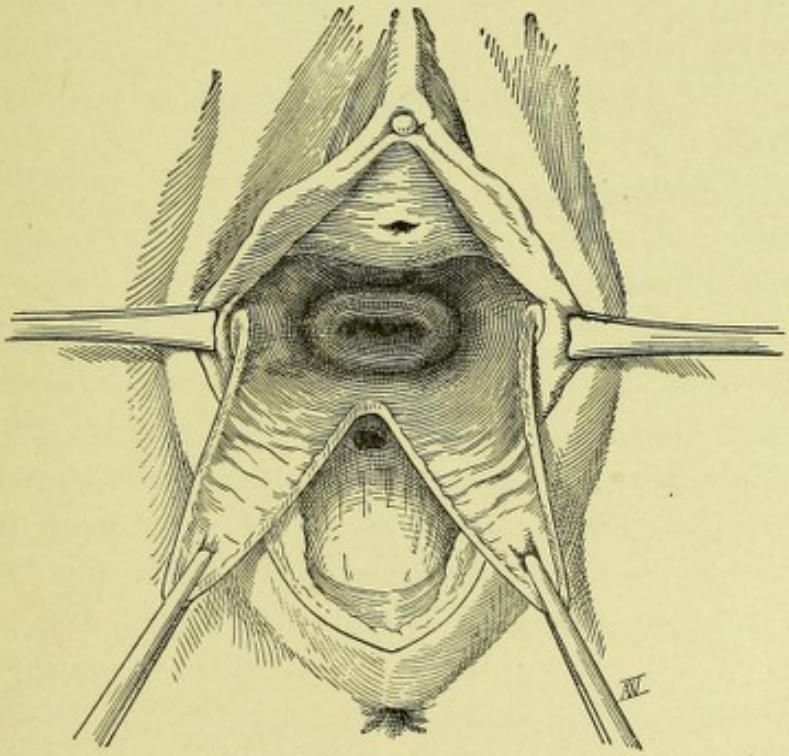


FIG. 152.—Legueu's procedure. The perineum has been divided. The denuded vagina has been split as far as the fistula in such a way as to expose the rectal surface plainly.

3. **Operation by the Vagino-perineal Route.**—Legueu[1] splits the perineum just up to the level of the fistulous orifice, and then divides the denuded vagina longitudinally as far as the fistula. By this wound, which gapes widely, he sutures the rectal orifice, and then he terminates with a colpo-perineorrhaphy (Fig. 152).

Indications.—These various procedures we have just described have different indications; each one corresponds to a particular anatomical disposition. For low-placed fistulas, the best thing to do is the division of the perineum followed by its reconstitution; for high fistulas, the operation by the vaginal route. It is very evident that the state of the perineum has as much value in the choice of the operation as the height of the fistula.

[1] Legueu, The Vagino-perineal Route in the Cure of Highly Situated Recto-vaginal Fistulas. *Presse médicale*, Paris, August 26, 1906.

CHAPTER IV.

OPERATIONS ON THE CERVIX UTERI.

Summary.—Temporary or definite occlusion of the cervix.—Temporary or definite trachelotomy.—Courty's and Pozzi's operations.—Trachelorrhaphy by denudation or flaps.—Amputation of the cervix, infravaginal (with two flaps or one flap), supravaginal.—Various operations (scarification of the cervix).—Bouilly's and Pouey's operation.—Operations for uterine flexions.—Operations on the cervix and pregnancy.

The operations on the cervix are divided into:

1. Operations to produce the occlusion of the cervix.
2. Operations to enlarge the cervical canal (trachelotomy).
3. Operations to repair the torn cervical canal (trachelorrhaphy).
4. Amputation of the cervix.

1. Occlusion of the Cervix.

The occlusion of the cervix may be temporary or definite.

The temporary occlusion may be done with two or three sutures reuniting the two lips of the cervix, perhaps with the aid of two Museux forceps which maintain them in contact.

This *temporary occlusion* of the cervix is done as preliminary to a vaginal or abdominal hysterectomy in order to prevent infection from a septic uterine cavity. It is also done for a uterine hemorrhage or to maintain the provisional reduction of an incompletely reduced uterine inversion.

All these indications are exceptional and in practice the opportunity rarely presents itself.

The *definite occlusion* is done by denuding the lips of the cervix and then uniting them by some sutures. It has been done in case of vesico- or utero-uterine fistulas of a rebellious type. It is a bad operation and has been abandoned.

2. Trachelotomy.

Trachelotomy or incision of the cervix uteri may be, as in occlusion of the cervix, temporary or definite.

Temporary trachelotomy may be carried out on the cervix itself or on cervix and body both. Limited to the cervix it consists generally of a commissural incision which is done with a simple cut of the scissors.

If the trachelotomy includes the body of the uterus, one may have recourse to the incision of the commissures; one must be careful when at the level of the isthmus, not to go beyond it on the external surface of the uterus, and even at the level of the body to be careful not to injure the uterine artery which is so close to the border of the uterus.

Some operators prefer to the bi-commissural incision the antero-median incision of the organ after disinsertion of the vagina and methodical separation of the bladder.

Temporary trachelotomy may be done during an accouchement in certain cases of rigidity of the cervix. It consists in a commissural incision, either simple or bilateral.

Rejected by a number of accoucheurs who reproach this incision as tending to produce extensive tears during the passage of the head, the operation is rarely practised. In any case suture the cervix as well as possible after accouchement.

It is exceptional to do trachelotomy in order to explore the uterus, as simple dilatation replaces it quite well. Again, incision of the cervix is sometimes the indispensable preliminary of a myomectomy *per vias naturales*.[1]

Definitive trachelotomy aims at enlarging in a permanent manner the orifice of the cervix constricted by an acquired or congenital malformation. Whatever means are employed, aim at a new orifice of sufficient dimensions and with no tendency to contract.

That is to say, reject trachelotomies which only consist of simple incisions; also see that the incisions are made with an instrument comparable to the lithotome, or Simpson's metrotome or Kuchelmeister's special scissors.

Fritsch's operation consists of a crucial incision of the cervix,

[1] See Vaginal Myomectomy.

followed by tamponing, and twenty-four hours after destroying the points of the flaps with the thermocautery. This is superior to the aforementioned procedures but is nevertheless unworthy of preservation.

It is quite evident that autoplastic procedures may give a definite enlargement. They are all based on a general principle, *never to leave a rawed surface after section.*

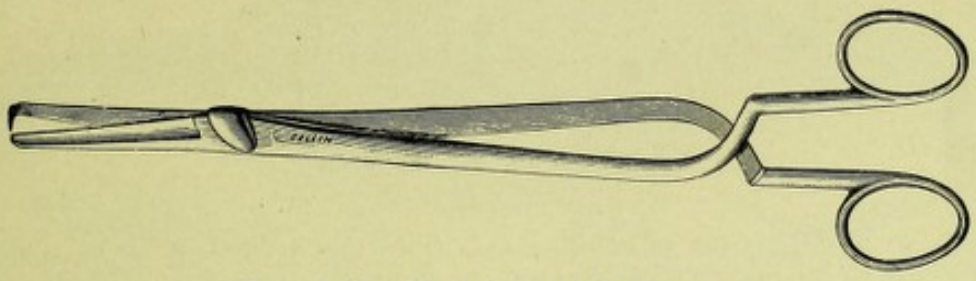


Fig. 153.—Küchelmeister's scissors.

This result is obtained in two ways: Courty's type aims at covering the surface of the section with an autoplastic flap, and Pozzi's followers unite the mucous membrane of the vaginal surface of the cervix to the endo-cervical mucous membrane.

Courty's Operation.—Commence by two triangular and symmetrical flaps on the cervix, summit internally and base externally. Each of these flaps is limited by two incisions which are united at the level of the corresponding commissure of the

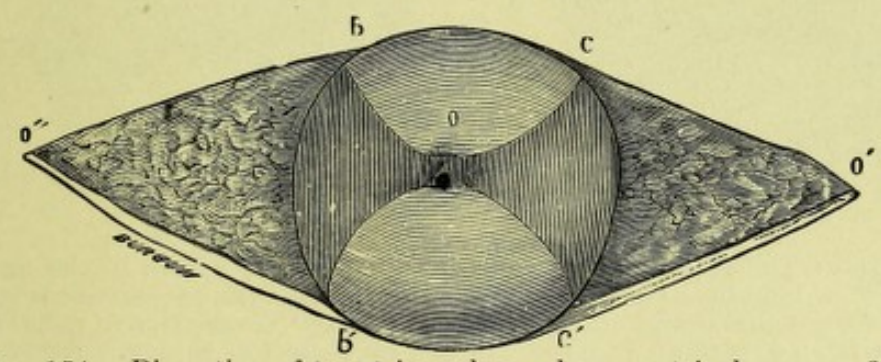


Fig. 154.—Dissection of two triangular and symmetrical mucous flaps, cc'o', bb'o''; o, orifice of the cervia.

cervix. These flaps are dissected down from their summit to their base, which base is left adherent and corresponds to the junction of the cervix and the lateral vaginal fornices. These flaps are raised and their cervix is incised bilaterally at the level of its commissures. The autoplastic flaps are now laid down in the depressions thus created, and with a catgut stitch the summit is fixed to the endo-cervical mucous membrane at the

actual level of the floor of the dihedral angles that represents the incision.

Additional sutures unite the anterior and posterior borders of the flaps to the mucous membrane of the external surface of

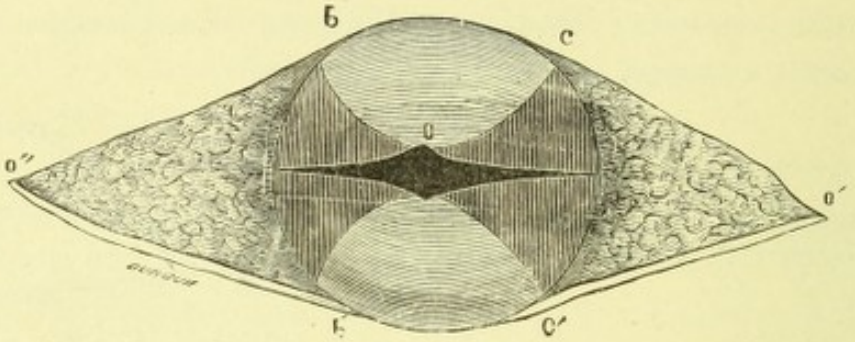


Fig. 155.—A deep bilateral incision extends from the narrow orifice of the cervix, *o*, to the middle of the base of the triangular flaps *cc'o'*, *bb'o''*.

the cervix. The lateral incision of the cervical orifice is thus covered with mucous membrane and no portion rests on the rawed surface.

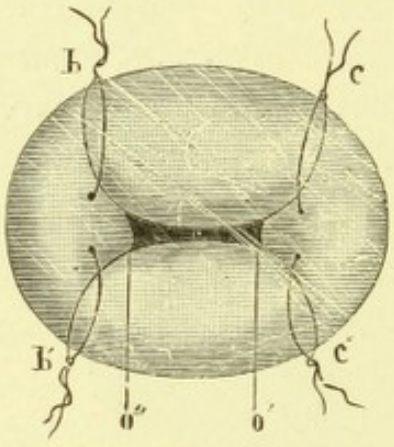


Fig. 156.—The points of the flaps *o'o''* are bent back into the angles of the commissural incision of the cervix; four stitches, two above and two below, fix the flaps in the new commissures resulting from the division.

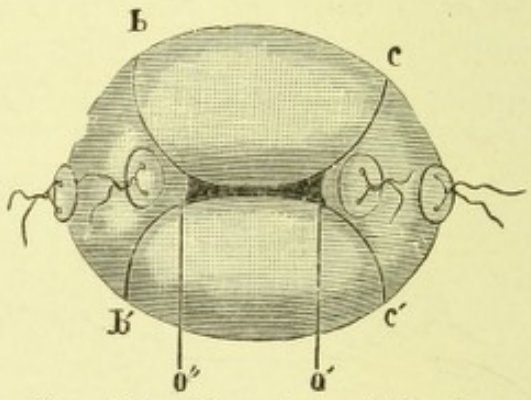


Fig. 157.—The points of the flaps *o' o''*, pressed into the new commissures resulting from division, are maintained there by a button suture on each side. The operation is completed.

The idea of implanting a mucous flap in the wound produced by the division of the stenosed external orifice has been taken up by several other operators, by Rossner,[1] who cuts the flap at a certain distance from the external orifice (Fig. 158) and

[1] Rossner, *Centr.-Bl. f. Gyn.*, Leipzig, 1897, p. 210.

by Mars[1] who takes them like Courty from each side of the orifice (Figs. 159 and 160).

Pozzi's Operation.—This is known often as *stomatoplasty*, and is done as follows:

The cervix being exposed by vaginal specula, place on each lip a pair of bullet forceps and then with a pair of strong scissors

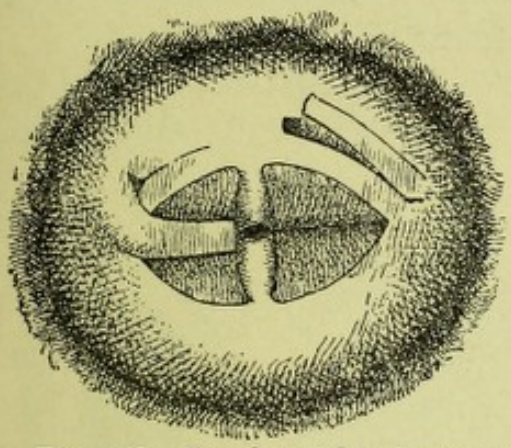


FIG. 158.—To the right is seen the resection of the flap, to the left the flap pressed back into the commissural splitting of the cervix.

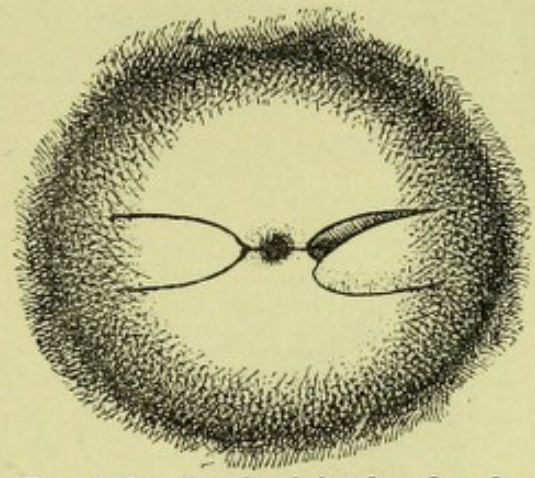


FIG. 159.—To the left the flap has been incised and to the right the flap dissected (Mars).

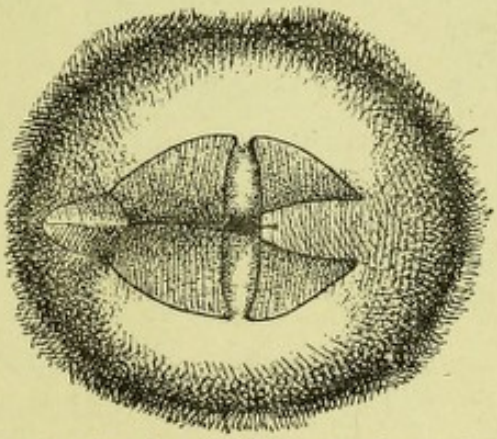


FIG. 160.—To the left the flap is raised up; to the right, pressed down on the denuded area.

make a bilateral dicision of the cervix of 2 or 3 cm. Dilate the cervical canal with Hegar's bougies up to No. 20 or 30. This is easy, owing to the preliminary splitting of the cervix.

The cavity of the cervix being then easily accessible, excise from the lips two triangular prisms, leaving a band of mucous membrane in the median line. Two or three sutures of silver

[1] Mars, *Ibidem*, p. 213.

wire are sufficient to close the grooves thus created in uniting the intracervical mucous membrane to the vaginal (Figs. 161, 162, and 163).

The operation when finished shows the cervix like a duck's beak partly open, but gradually its form changes by retraction, and finally it comes to look like a normal multiparous cervix.

The dressing consists in placing a piece of gauze between the lips and in tamponing of the vagina. This is renewed every two or three days. The stitches are taken out in five days.

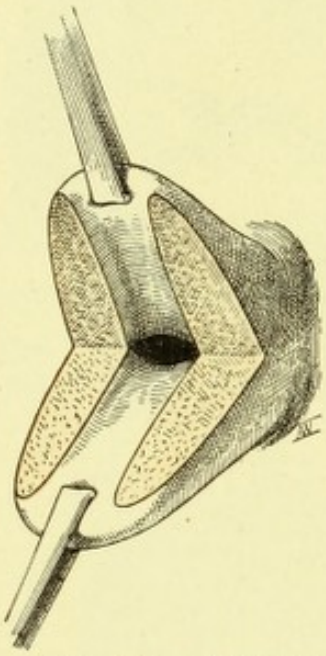


FIG. 161.—Commissural excision of the cervix. First stage. Bilateral division of the cervix.

FIG. 162.—Second stage. Excision of triangular prism from each side of the cervical canal.

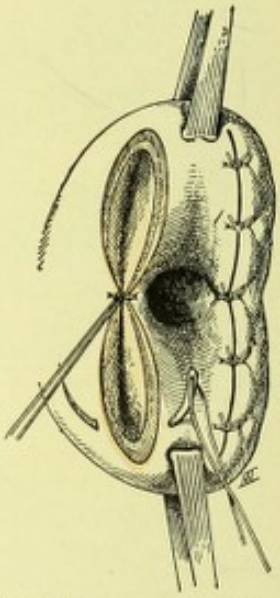


FIG. 163.—Third stage. To the left commencement of the suture. To the right operation completed.

3. Trachelorrhaphy.

Trachelorrhaphy is the name applied to the measures for treatment of tears of the cervix. Every trachelorrhaphy has two principles: the denudation and suture.

Before beginning treat any inflammatory lesions which may exist and never operate before their cure.

If the cervix is infiltrated, everted and rigid, commence with a preliminary treatment, such as hot injections, a scarification of dilated cervical follicles, and glycerine tampons. Only do the trachelorrhaphy when the cervix has become supple.

As for the perineorrhaphy, we find two methods; viz., surface denudation and denudation by splitting.

Trachelorrhaphy with Surface Denudation.—This is the Emmet type of operation. It consists in denudation of the tear with excision of the subjacent scar and then reunion of the rawed surfaces.

The two cervical lips are seized with two Museux's forceps, which draw down the parts and also separate them.

As it is important to excise all the cicatricial tissue, particularly at the level of the superior angle of the tear, where there is often a rigid and fibrous scar, it is well to commence by an incision at the

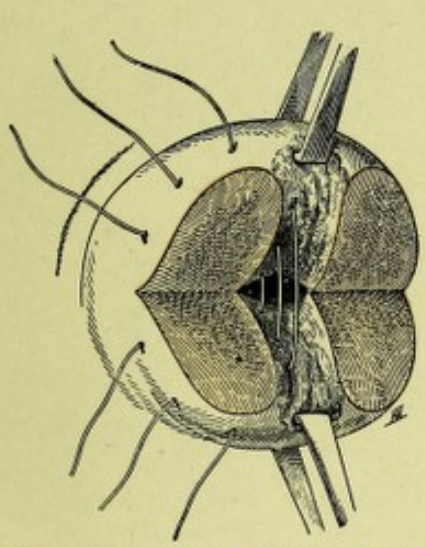


FIG. 164.—Trachelorrhaphy by denudation. To the left is the denudation and to the right the sutures.

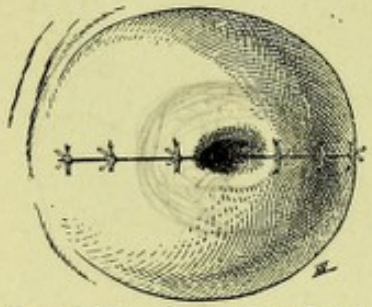


FIG. 165.—Operation finished.

level of each angle, until one finds healthy subjacent tissue. This is done with a pointed bistoury. The denudation is accomplished by the excision of the flap.

After tamponing to stop hemorrhage unite the rawed surface with about four catgut stitches, passing through all the thickness of the cervix and tied externally. The suture is commenced at the superior angle of the wound and finishes at the external orifice of the cervix. All these sutures should be inserted before tying them.

If the tear is bilateral repeat the same operation on the opposing side being careful to preserve in the median line of each lip a band of mucous membrane about 1/2 cm. wide between the lines of incision in order to reconstitute a cervical canal.

Trachelorrhaphy with Flaps.—Trachelorrhaphy with flaps, described by Sanger and practised by Fritsch and Kleinwachter, is much less employed. The triangular flap, with intracervical base, is cut at the expense of the mucous membrane which covers the tear. The resection is carried out toward the cervical canal, and the denuded parts are united (Figs. 166 and 167).

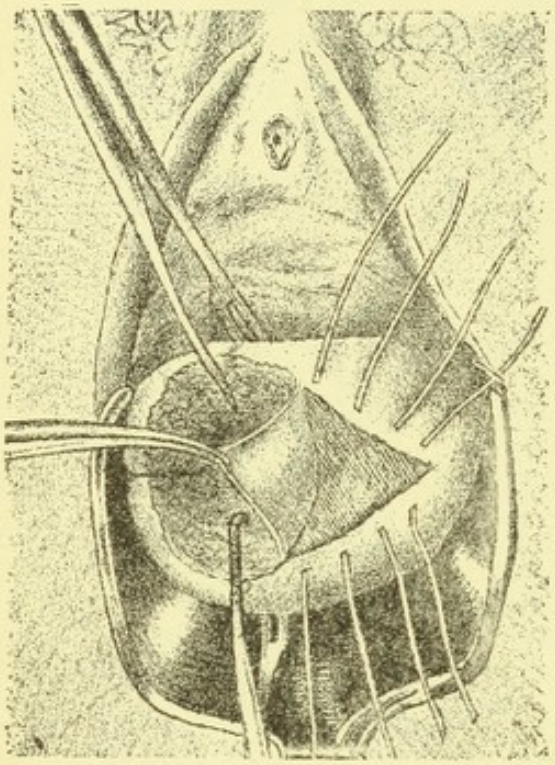


FIG. 166.—Trachelorrhaphy with flaps. Dissection and raising of the flap and insertion of sutures.

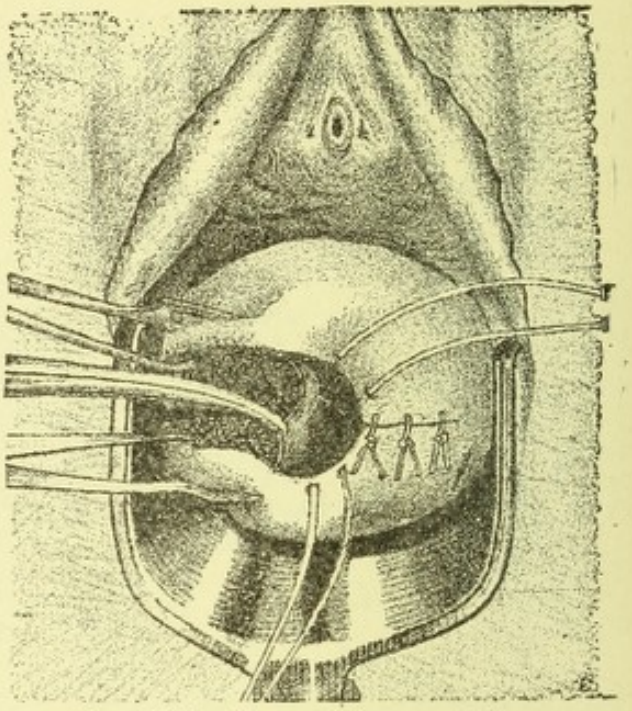


FIG. 167.—The stitches are tide commencing by those furthest away from the orifice of the cervix.

4. Amputation of the Cervix.

The uterine cervix is in part supravaginal and in part intravaginal, and the distinction of infra- and supravaginal depends upon whether the operation is done below or above a point of reflexion of the vaginal mucous membrane on the cervix, which is indicated by the difference of coloration of the mucous membrane as also by the folded aspect of the vagina which contrasts with the smooth cervix.

A Infravaginal Amputations.

This was first done in a very rudimentary manner. At first the protruding portion was cut through transversely in the vagina.

Later the parts were sutured. Simon sutured the vaginal mucous membrane above the rawed surfaces, having between the united mucous membranes and the surface of the section a virtual cavity. This cavity was exposed to consecutive hemorrhages and to an irregular cicatrization.

Hegar made great progress in the operation by suturing the vaginal mucous membrane to the intracervical.

To-day the most frequently practised is two-flap amputation or the one-flap.

The Two-flap Amputation (Simon-Marckwald).—In this operation which is most applicable to large sclerous cervices without any lesion of their lining surfaces, a wedge-shaped excision with the apex above is made from each lip. The operator now cuts through the vaginal surface of the posterior

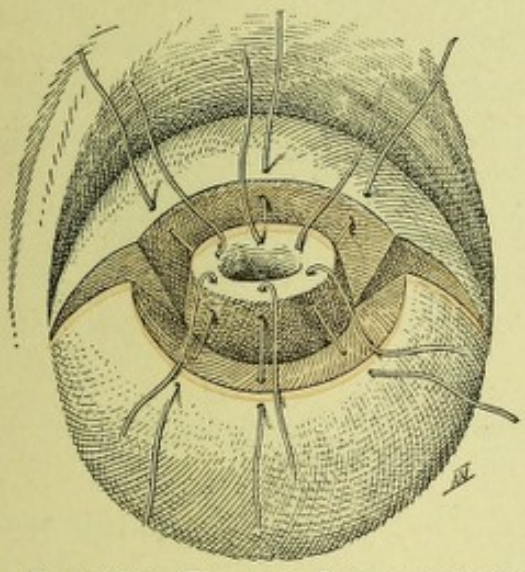


Fig. 168.—The two-flap amputation of the cervix. The commissures are split bilaterally. From each lip is excised a cuneiform segment of the cervix.

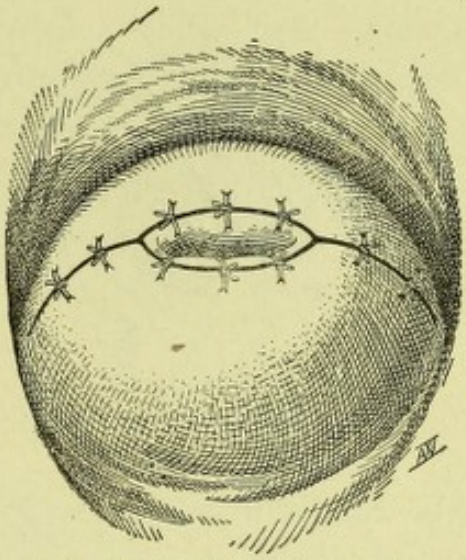


Fig. 169.—Operation finished.

lip from below upward and from behind forward. After this the posterior lip is again incised, commencing on the intracervical surface and directing the knife upward and backward until it meets the first incision. He thus excises a cuneiform segment of the cervix, which leaves two flaps facing each other's denuded surface and covered on their opposing surfaces, the one by intracervical mucous membrane and the other by the vaginal mucous membrane.

Nothing is simpler than to suture the two flaps together

with a non-continuous suture using a strongly curved needle. The only precaution is to pass the suture under the denuded surfaces in order to avoid virtual cavities between the flaps.

When the operation on the posterior lip is finished, the same procedure is carried out on the anterior lip. It only remains to insert a suture in each lateral commissure and to do the dressing which consists in a light tamponing of the vagina with iodoform gauze (Figs. 168 and 169).

The One-flap Amputation (Schroder).—As usual the lesions which demand operation are much more marked on the intracervical mucous membrane than the vaginal surface of the cervix. There is an object in removing the diseased mucous membrane and to cut a flap entirely at the expense of the external surface of the cervix. Thus Schroder's operation realizes

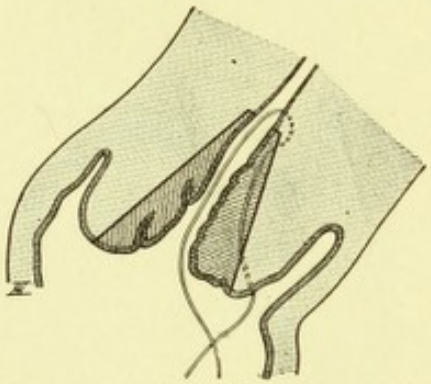


FIG. 170.—One-flap amputation.

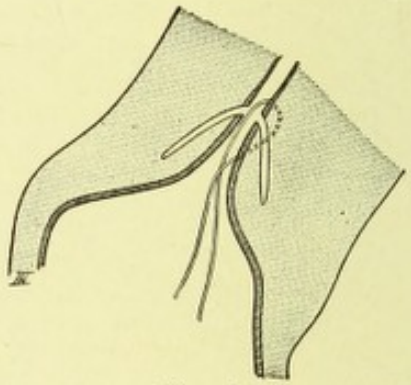


FIG. 171.—The flap is replaced.

this and it is very commonly done. In this operation the resected segment comprises all the intracervical mucous membrane and the greater part of the cervical tissue (Figs. 170 and 171). It has been advocated to make the resected segment thicker in the neighborhood of the internal orifice of the cervix than at the other extremity so as to give more suppleness to the portion of the flap, which ought to fold back on itself, on the surface of the section.

It is simpler we believe to cut off all the muscular tissue from the flap and only preserve the mucous membrane on the vaginal surface. Thus we have quite an elastic flap which applies itself exactly to the rawed surface and which may be fixed without fear of the least traction in the sutures (Figs. 172 and 173). The operation is done as follows:

The cervix having been as a preliminary curetted, so as to facilitate the passage of the suture needles and the insertion of the sutures. Curettage is necessary on account of the cervical metritis which usually exists and of inflammatory lesions of the body.

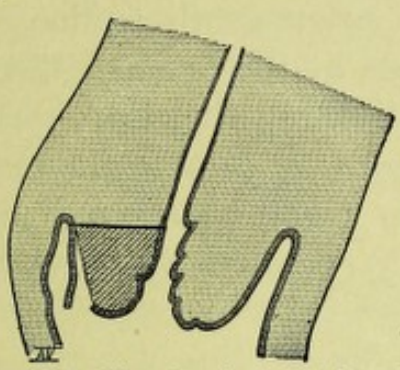


FIG. 172.—The flap is formed exclusively of the vaginal mucous membrane.

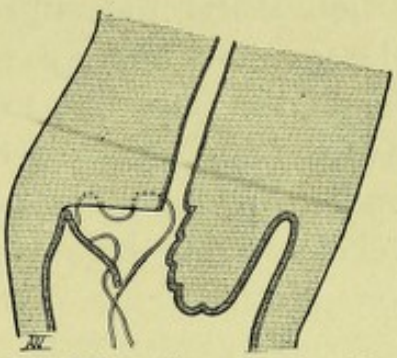


FIG. 173.—When the suture is tight the vaginal mucous membrance will stick to the section of the cervix.

After curettage draw the cervix down with two Museux forceps applied to the anterior and posterior lips. Then incise with single cuts of the scissors the two commissures as far as

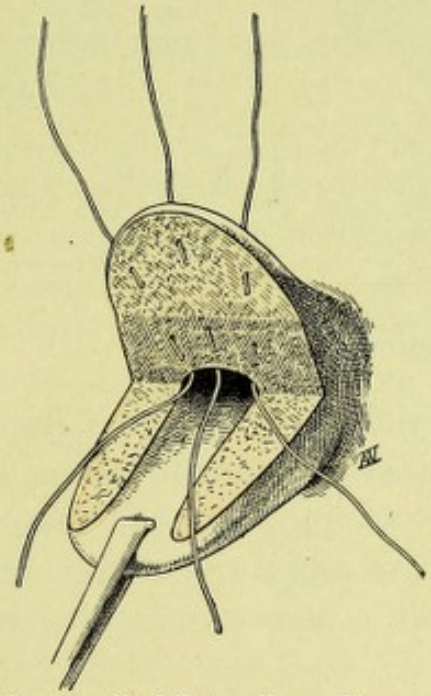


FIG. 174.—The cervix has been split bilaterally. The anterior lip has been excised but the vaginal mucous membrane has been preserved.

the vaginal insertion and thus divide the cervix into two so-called valves.

Still drawing on the posterior lip of the cervix forward and upward, exposed to our view is the vaginal face of the anterior

lip. At the level of the free border or a little more externally if the lesions encroach on the uterine orifice, the mucous membrane is incised with a bistoury and then separates off the muscular tissue of the cervix until we reach the point where we wish to make the section. Now cut this through transversely and then insert the sutures. Three catguts will suffice. Do not be content merely to insert these at the level of the free border of the flap, but to pass right through the deep surface, even to the surface of section of the cervix in such a manner as to avoid a virtual cavity below the flap where oozing may occur (Fig. 174). Pull the sutures tight to assure hemostasis and the

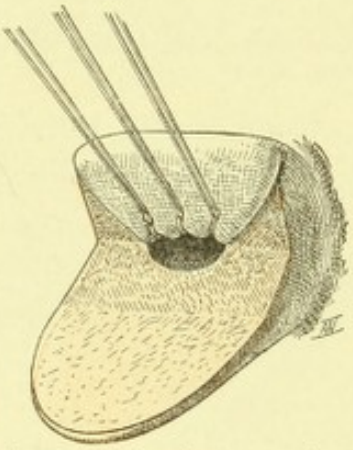


Fig. 175.—Sutures inserted into the anterior lip are cut long and serve to draw on the cervix, of which the posterior lip has been excised. The vaginal mucous membrane is preserved.

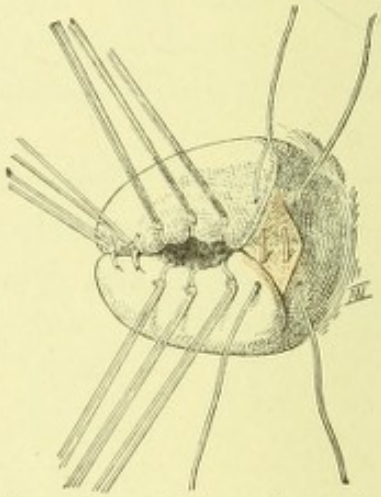


Fig. 176.—On drawing on the stitches which are purposely left long, the right commissure is exposed and in it the sutures are inserted.

knots should be on the outside of the flap so as to avoid the production of little zones of mortification on the line of union.

The three sutures being inserted, keep them long and put on forceps. They serve as means of traction while one operates the posterior lip. The same procedure is carried out on it (Fig. 175).

Now all that remains is suturing of the commissures. The long sutures enable us to pull the sutured lips to the right and thus expose the left commissure. Also we should trim the edges of the flaps so that there is no overlapping and commence with a posterior suture which traverses the muscular tissue. The same procedure is carried through on the other side (Fig. 176).

In operating rapidly and under a current of liquid antiseptic which an assistant directs in order to carry away blood, the different stages can be executed without forceps or ligatures. Only exceptionally has one resort to these.

A drain is placed in the cervical cavity, the stitches cut short, a last irrigation is made and the parts are wiped with sterilized gauze while the vagina is lightly tamponed with iodoform gauze.

The tampon is changed in four or five days; earlier if saturated with oozing blood. After ten days give vaginal injections and as catgut sutures have been used, that finishes our operation.

In some cases it is necessary to modify the operation according to the seat and extent of the lesion. If there are some fibrous nodules, or some deep cysts do not hesitate to remove them. It may even be necessary to groove rather deeply the angles of the lateral incisions when the tissue reaches above the vagina.

These are the minute precautions that one is forced to take which do not complicate the operation and which avoid the production of pain.

The results are excellent and the mortality is nil. We have never seen any complication.

Indications.—Amputation of the cervix is suited to supravaginal hypertrophies, to cystic degenerations, to large inflamed sclerosed cervices. It is also useful in supravaginal hypertrophy, in cases of prolapse; in the last case it is well to separate the bladder high up and then excise the cervix freely. The suture of the vaginal mucous membrane to the anterior lip of the cervix helps toward the lifting up of the bladder.

As in a general way the lesions in these cases are most marked in the intracervical mucous membrane, this must also be resected high up and it is quite comprehensible that one-flap amputation is superior to two-flap amputation which latter does not permit of such a high excision of the intracervical mucous membrane.

B. Supravaginal Amputation.

The conoid amputation of Huguier consisted in grooving the cervix by a circular incision made below the insertion of the vaginal wall and dissected upward and inward toward the cervical

canal. Schroder substituted a more extensive operation which permits of excision of the whole cervix and even a slight extension into the surrounding uterine tissue.

1. **Amputation with Knife.**—After a circular incision of the vaginal mucous membrane, free the cervix anteriorly and posteriorly, and anteriorly detach the vagina by scraping the anterior surface of the cervix with the nail or blunt scissors. This separation is at first difficult but becomes easier when the insertion of the vagina above has been passed. Above this is to be found a cellular stratum, inter-utero-vesical, which separates easily. On reaching the uterine isthmus desist from the separation as the peritoneum may be opened.

Posteriorly the vagina is separated from the posterior surface of the cervix. As the peritoneal cul-de-sac descends just behind the vagina, it is frequently opened during this separation. This accident is of little importance and the breach can be closed with a few catgut sutures.

The cervix is now liberated in front and behind and remains attached only laterally. Here are inserted the broad ligaments and at this level are the numerous branches of the uterine artery, which must be tied in the tissues. To do this, pull the cervix to the left while an assistant separates the right wall of the vagina with a speculum. Isolate with the finger or grooved sound the vascular lamina and with a blunt needle pass a suture 3 or 4 mm. from the uterine border at the height of the isthmus around the base of the broad ligament. When tied the parts are cut off close to the cervix. The same is done on the other side.

The isthmus is cut through with the knife, which is directed from above toward the uterine cavity in such a manner as to groove the stump slightly toward its central part.

All that now remains is to suture the vaginal to the uterine mucous membrane, taking up en route uterine muscle to avoid a virtual cavity. When finished as the wound of the vaginal mucous membrane is much more extended than the opening of the excised cervix, this mucous membrane forms a series of folds which radiate from the cervical canal toward the vaginal fornices.

2. **Amputation with Galvano-cautery.**—In America, in cancer

of the cervix amputation with a galvano-cautery is still practised. Byrne's[1] method is usually followed. A Leith forceps is introduced into the uterine cavity and serves to draw it down. The cervix is cut through with a galvano-cautery and the uterine cavity is curetted and cauterized until the surface is covered with a black eschar.

Later Byrne separates the cervix from the bladder, rectum and lateral attachments and then amputates with a thermo-cautery.

Most important is to cauterize the wound often and deeply as the heat's action in cancer germs seems to extend beyond the

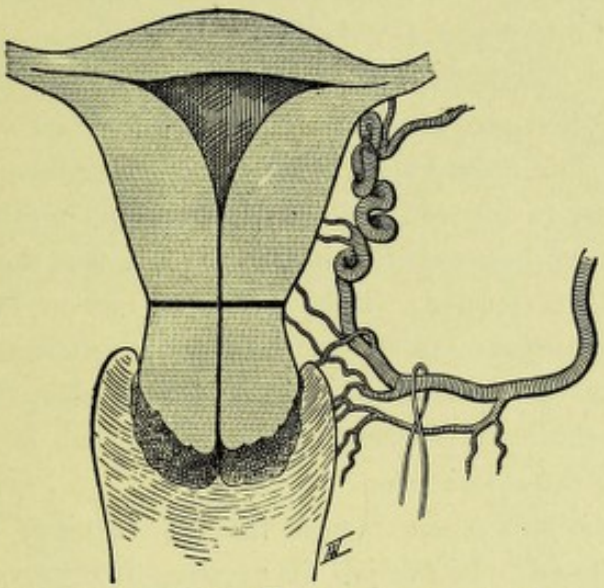


Fig. 177.—Supravaginal amputation. Trace of section of cervix. Point of tying uterine artery.

zone of cauterization. It is the greatest safeguard against a return.

Indications.—Supravaginal amputation of the cervix has been above all employed in cases of cancer. It is to-day generally abandoned for more extensive operations of removal. Certain gynecologists, Spencer in England, advocate the igneous, so to speak, amputation of the cervix, with either a galvano-cautery or a thermo-cautery as being more useful against a return of the cancer than the use of the bistoury.

The great majority of surgeons limit the indications of supravaginal amputation to certain hypertrophic elongations of

[1] J. Byrne, A Digest of Twenty Years' Experience in the Treatment of Uterine Cancer by Galvano-cautery. *Trans. Amer. Gyn. Soc.*, 1889, T. XIV, p. 79. *Ibidem*, 1891, T. XVI, p. 172. Lomer, Zur Frage der Heilbarkeit der Carcinoms. *Zeitsch. f. Geb. u. Gyn.*, Stuttgart, 1903, T. L, p. 319.

the cervix and uterine sclerosis. In the latter case, the weight of the uterus is diminished by a good portion of its length and there is a secondary contraction of the preserved parts.

5. Various Operations.

We will now describe interventions carried out on the cervix and which do not enter in any of the operations we have described.

Scarification of the Cervix.—In cases of endocervicitis, where the finger feels in the dilated cervix little granulations, Doléris advises the scarification of the mucous membrane with a scarifier with multiple and parallel blades, of which the length of 3 to 4 mm. is calculated to penetrate just to the glandular cul-de-sacs without extending beyond the limits of the mucous membrane. This scarifier is applied progressively parallel to the axis of the cervix dilated to its maximum. The most voluminous cystic granulations are thus opened and the smaller cut to pieces. When the mucous membrane is generally incised with no space between the incisions then the mucous membrane is removed with a little curette. This operation when terminated leaves a smooth and united surface instead of the cut up mucous membrane which existed before. Lavage with sublimate and tamponing with iodoform gauze saturated with carbolized glycerine 25 per cent. or 30 per cent. iodized glycerine complete the operation.

Bouilly's Operation.—In recent limited cervical metritis, Bouilly's operation may be tried. It consists in excising from each lip a flap, at the same time preserving the commissures. The lip being seized by its free border with a tooth forceps, the bistoury is inserted into the cervical cavity within the left commissure and the incision directed anteriorly toward the anterior lip penetrates into the tissue of the cervix to the required depth; it is carried toward the right and passes transversely between the mucous membrane of the vaginal surface of the cervix and the tooth forceps and then before reaching the right commissure, it is brought back toward the cervical cavity. With a scissors one cuts from the substance of this cavity the base of the flap thus traced. A similar flap is excised from the posterior lip.

Each lip is thus grooved in the cervical canal. Preserving a band of mucous membrane at the level of each commissure suffices to prevent the consecutive atresia.

As a dressing, Bouilly introduced into the cervical cavity some iodoform gauze, saturated with carbolized glycerine.

Pouey's Operation.[1]—This consists of a circular resection of all the internal part of the cervix. As a preliminary dilate with Hegar's dilators

[1] P. Petit, *Presse médicale*, Paris, 1901, p. 238.

and then make a circular incision at the level of the internal os. Then seize the muco-muscular cylinder thus created and cut it transversely a little below the isthmus. The end of the floating cylinder of uterine mucous membrane

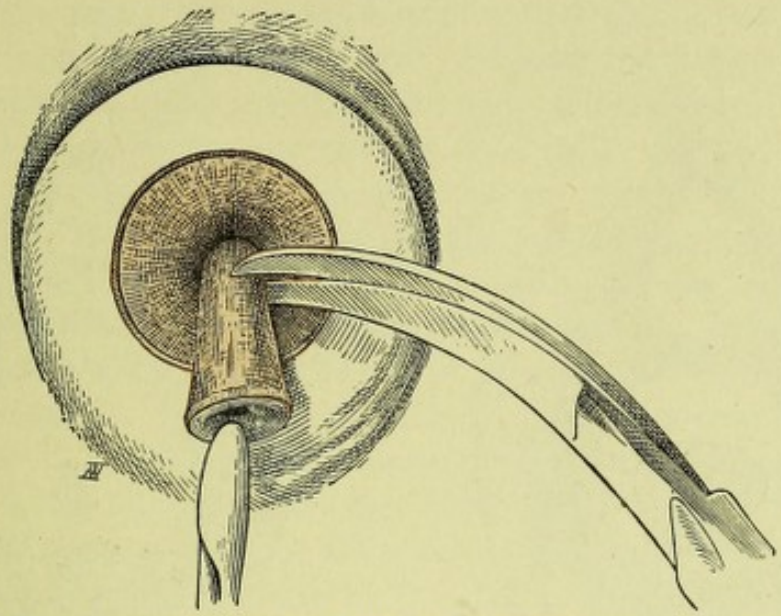


Fig. 178.—Circular resection of the endo-cervical mucous membrane.

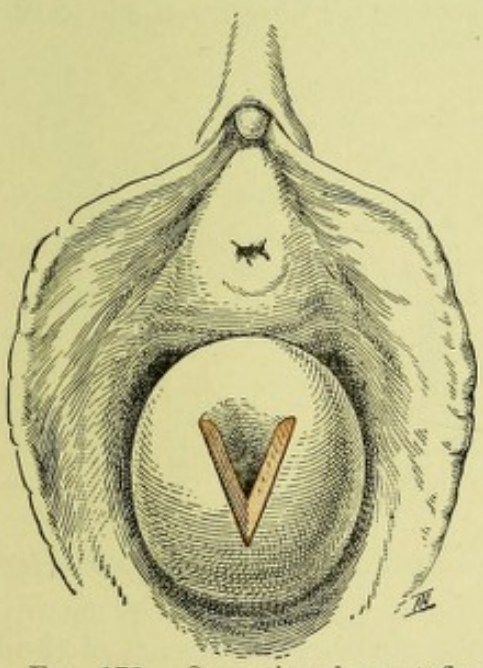


Fig. 179.—Operation for anteflexion. Median splitting of the posterior lip.

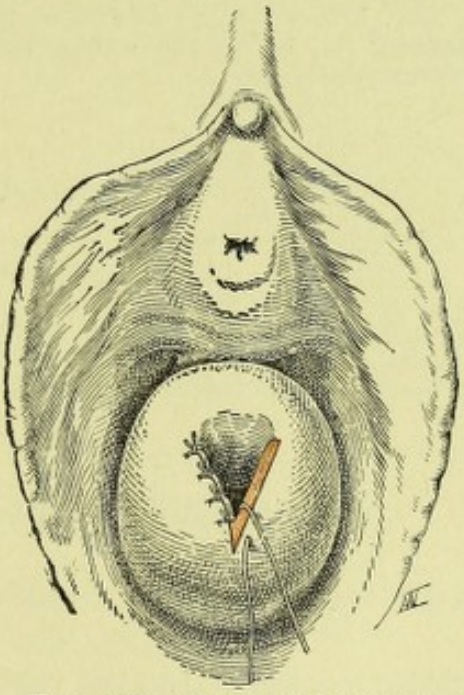


Fig. 180.—On the right one suture is inserted; on the left the sutures are tied.

is united by a continuous suture to the mucous membrane on the external surface of the cervix (Fig. 178).

Operations for Uterine Flexions.—For the simple incisions of the posterior lip of the cervix practised by Sims and Emmet in uterine ante-

flexion, plastic operations have been substituted. In Dudley's[1] operation, which is particularly reserved for anteflexion, the posterior lip of the cervix is split in the median line with scissors, and then the intracervical mucous

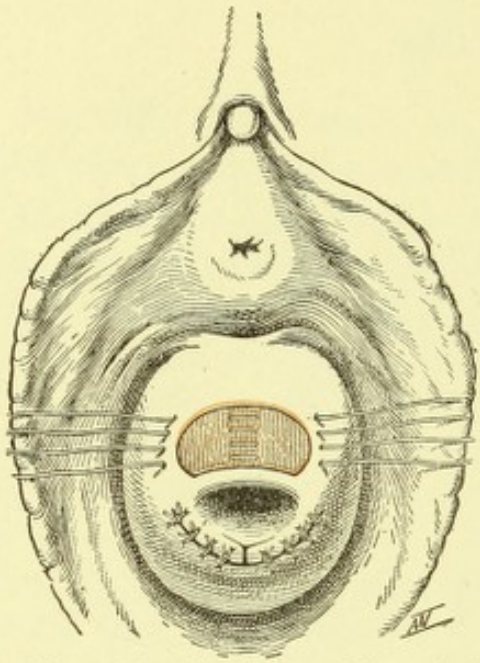


FIG. 181.—Partial excision of the anterior lip, saving the intracervical mucous membrane.

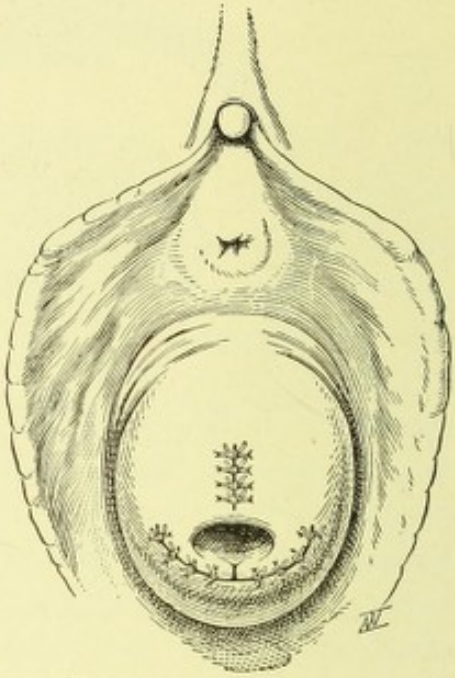


FIG. 182.—Operation finished. The external os is enlarged and carried backward.

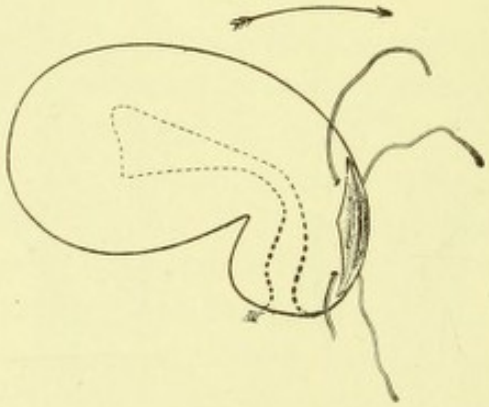


FIG. 183.—Partial excision of posterior lip; when sutures are tied the uterus is corrected.

membrane is sutured to the vaginal mucous membrane on each of the lips of the incision and at the level of its superior angle, and this results in the external os being carried very far back (Figs. 179 and 180). The anterior lip is partially excised while the external os is preserved. This last excision does away with the hypertrophy of the anterior lip so habitual in anteflexion (Figs. 181 and 182).

[1] E. C. Dudley, A Plastic Operation Designed to Straighten the Anteflexed Uterus. *Amer. J. of Obstetr.*, New York, 1891, p. 142.

Reed[1] endeavors to counteract anteflexion by an operation on the cervix. He makes, like Dudley, a vertical median incision in the posterior lip of the cervix and excises from each edge of the incision a crescent-shaped area of tissue. This excision extends the whole length of the incision, but preserves the intracervical mucous membrane. Suturing the superior and inferior parts of the excised areas together, the body of the uterus is drawn up and back and this corrects the cervical canal (Fig. 183).

By his operation Nourse,[2] on the contrary, remedies at will ante- and retroflexions. He splits the cervix laterally just to the angle of flexion in such a manner as to completely separate the anterior lip from the posterior lip of the cervix and to be able to make them glide, so to speak, on each other; then, after hysterectomy, aided by traction on the posterior lip of the cervix, he corrects the flexion. Having done this, he now places forceps on each lip, holding the posterior lip thus corrected lower in the vagina than the anterior. A few sutures unite the edges of the lateral incision of the cervix and fix definitely the lips of the same (Figs. 184 and 185).

In connection with *retroflexion*, it is the anterior lip that is caused to descend lower into the vagina than the posterior.

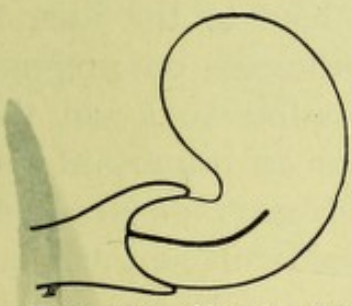


Fig. 184.—Sketch of the lateral splitting of the cervix.

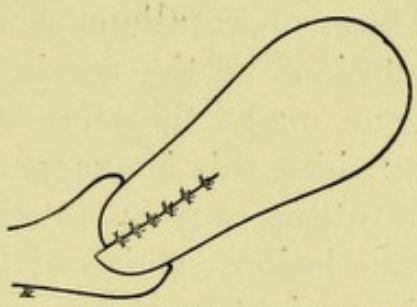


Fig. 185.—The posterior lip has been drawn into the vagina and thus has corrected the uterus and it has then been fixed in its new relations.

6. Operations on the Cervix and Pregnancy.

Do operations on the cervix influence pregnancy favorably or unfavorably? We must solve these questions.

It is certain that some favor conception in doing away with a sterility and enabling a pregnancy to proceed normally. Such operations as enlarging a stenosed cervical orifice or curing a rebellious endometritis. In these operations it is not doubtful.

What is the position in operations in which a more or less

[1] Charles A. Reed, The Surgical Treatment of Anterior Displacements of the Uterus. *Ibidem*, 1892, T. L, p. 12.

[2] F. P. Nourse, An Original Operation for the Radical Cure of Uterine Flexions. *Ibidem*, 1896, T. I, p. 60.

extended excision has occurred? This is a much discussed point.

Observations on abortion and accouchement before term, on rigidities of the os leading to the death of the fetus, necessitating *basiotripsy* or even leading to a uterine rupture, have been published by accoucheurs[1] (Pinard, Champetier, Porak, Lepage, etc.).

Audebert[2] collected observations from sixteen women having had amputation of the cervix. There were twenty-two pregnancies; five accouchements at full term, nine before term (at 6, 7, 7 1/2, 8, 8 1/2 months) and ten abortions (from the first to fifth month); ten times he observed premature rupture of the membranes. These women had had before operation twenty-two pregnancies at term, two at eight months, one at seven months, and two abortions. The duration of the gestation appeared to him to be in inverse relation to the height at which the cervix had been cut through and the extent of substance lost.

These observations would appear to lead to the idea that amputations of the cervix have a bad influence on pregnancy and one ought therefore as much as possible to avoid them. To our idea this is exaggerated. Consider an important point. If the uterus was operated on, it was necessary on account of sclerous lesions, which of themselves, outside all surgical intervention, might be the cause of complications. Moreover, when accoucheurs' observations are studied, it is remarked that the os was surrounded by a zone of cicatricial tissue which was the result of an incomplete union of the line of sutures, or an operative fault. In certain cases the fault was more pronounced and at the moment of accouchement, silkworm-gut sutures have been found in the cervix, forgotten by the surgeon. If in respect of observations made by accoucheurs who have been struck by such accidents one compares the statistics of Doleris, Bouilly and ourselves, the results are quite different. In certain cases sterile women have become pregnant after amputation of the cervix. We can cite the case of a woman who had never had children and after amputation had three children successfully.

[1] Discussion at the Society of Obstetrics, Gynecology and Pediatrics, Paris, 1899.

[2] Audebert, Study of Pregnancy and Accouchement after Amputation of the Cervix. *Annales de Gyn.*, Paris, 1898, T. L. p. 20.

In short, these complications we have considered are more often the result of badly done operations, of a defective operative technic, or an insufficient asepsis.

It is necessary, to avoid trouble, to have the new orifice wide and to remain widely open, and a primary union of sutures, avoiding any virtual cavity in which secondary secretions might collect.

Executed well, amputation of the cervix cures without cicatricial contraction and exercises no bad influence on the course of pregnancy. It is also of benefit in gestation where the vaginal portion of the cervix is excessively long. Operate it before the fifth month and give morphia immediately after the operation to avoid the uterine contractions which might lead to abortion.[1]

[1] Potocki, Amputation of the Cervix during Pregnancy in the Treatment of Hypertrophic Elongation of the Vaginal Portion. *Annales of Gyn.*, Paris, 1906, p. 709.

CHAPTER V.

LIGATURE OF UTERINE ARTERIES BY VAGINAL ROUTE.

Summary.—General anatomy.—Operative technic.—Indications.

1. Anatomical Notions.

The uterine artery[1] is included in the hypogastric sheath, which envelops also some vessels which run to the uterus and to the vagina and also others going to the bladder and ureter.

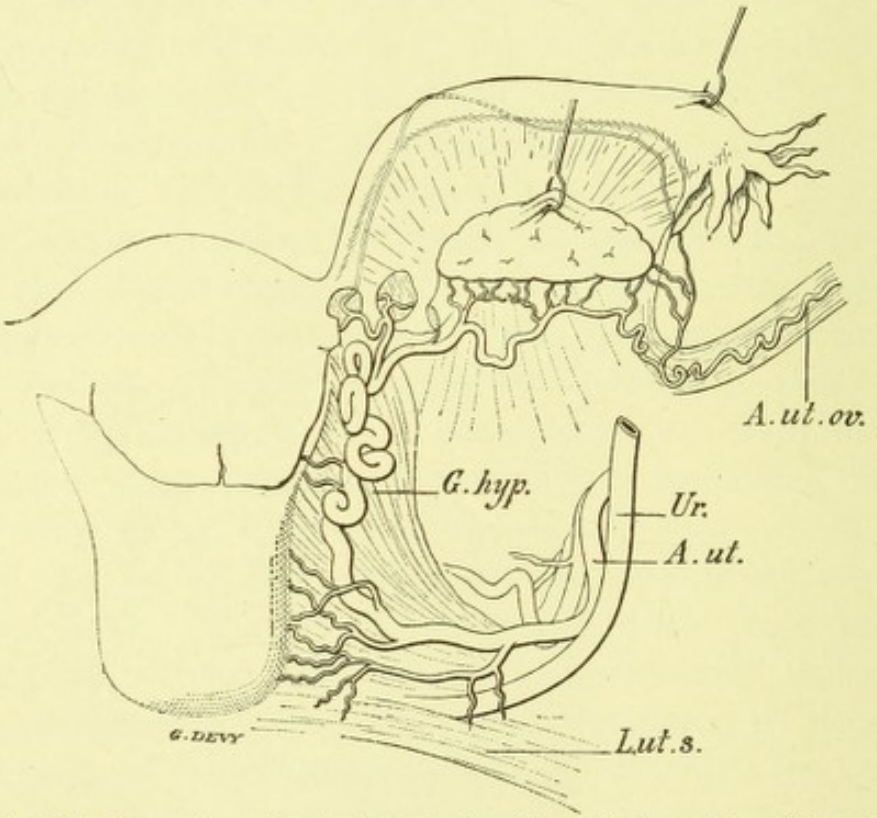


FIG. 186.—Uterine artery (posterior view). The uterine artery (*A. ut.*) gives off ome long cervico-vaginal branches. *A. ut. ov.*, utero-ovarian artery; *Ur.*, ureter; *G. hyp.*, remains of the hypogastric sheath containing the uterine artery and numerous veins; *L. ut.*, utero-sacral ligament.

This fibrous and resistant sheath extends from the wall of the excavation, where it rises between the ilio-pubic line and the spine of the ischium by a narrow root and spreads out along the

[1] Fredet, Vascular Pedicles of the Uterus. *Ann. de Gyn.*, Paris, 1899, T. L, p. 365.

length of the uterus and vagina. It is at the same time a vascular sheath, and a powerful means of fixation described by the Germans under the name of the *cardinal ligament.* At a fair distance from the uterus it splits into two layers, the posterior of which is attached to the lateral parts of the uterus and vagina while the anterior goes to the bladder and terminal part of the ureter. It is in this latter part that the ureter is to be found

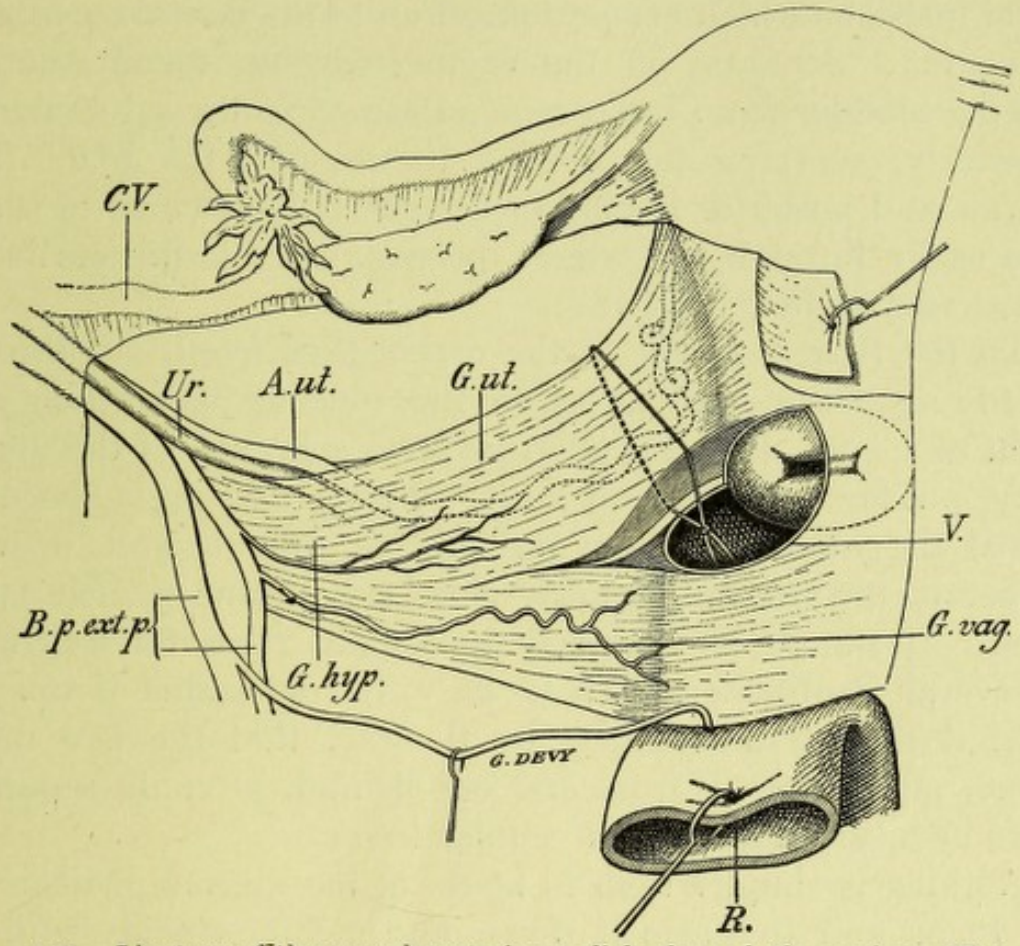


FIG. 187.—Ligature of the vascular uterine pedicle through the vagina. The utero-vaginal pedicle seen from behind envelopes (*G. hyp.*); also the hypogastric vessels and their posterior extra-pelvic branches (*B.p.ext.p.*) which terminate at the border of the uterus and vagina. The uterine artery (*A.ut.*) enters the sheath from its point of origin; (*Ur.*), ureter; (*V*), vagina; (*G.ut.*), vascular uterine sheath; (*G.vag.*), portion of the pedicle which goes to the vagina; (*R.*), rectum separated from the vagina and pressed back; (*Cv.*), vascular.

after passing under the uterine artery. As a result of this arrangement it is possible on opening the anterior and posterior fornices of the vagina to isolate the two sides of the utero-vaginal lamina. On opening the lateral fornix the part of this lamina attached to the vagina has to be separated containing as it does the vaginal vessels from the portion adherent to the uterus in which

are found the uterine vessels. When cut through sagittally the uterine portion of the vascular pedicle has the form of a triangle with apex above and base below (Fredet).

2. Operative Technic.

Commence by a circular incision through the vaginal mucous membrane around the cervix, and then to this incision add two lateral incisions which are prolonged on to the lateral surfaces of the vagina. Separate off the vaginal mucous membrane and then the bladder from the cervix. Proceed in the same manner posteriorly, scraping the uterine tissue with the nail. This anterior and posterior freeing of the cervix enables us to isolate more easily through the lateral incisions the uterine portion of the vascular pedicle (Fig. 187).

To the right and left of the cervix thus freed, cut through the fibrous tissues subjacent to the mucous membrane at a height of 1 cm. If this section involves a branch of the uterine artery, put forceps on it and tie it. Then, inserting a speculum against the vaginal wall on the side we operate and, drawing the cervix toward the opposite side, the uterine pedicle is exposed. It should be denuded upon both faces for a distance of several centimeters. It is easy to determine if one has overshot the uterine pedicle by the fact that the two index-fingers, placed one in front and one behind, are only separated above by a very fine layer of cellular tissue.

Nothing is simpler than to hook up the uterine pedicle with the finger and to draw it down and tie it strongly with silk which is passed on a blunt needle.

The two ligatures having been applied, close the vaginal incision with catgut sutures. The dressing is an iodoform gauze in the vagina.

In operating thus, one does away with the great part of the uterine blood supply, the principal artery being tied and the circular incision in the vagina cuts off the anastomotic connections between the strictly speaking vaginal arteries and collateral branches and the uterine artery (long cervico-vaginal arteries, vesical arteries, etc.).

3. Indications.

These atrophy-producing ligatures were devised in cases of bleeding fibromata of small or medium size. Combined with removal of little polyps during curetting they have given some good results. We have in some cases had recourse to it.[1] To-day, when large operations are much simpler, we believe they may be abandoned. However, we possess a means of resource in hemorrhagic fibromata where, for some reason or other, we do not wish to remove the tumor.

[1] Hartmann and Fredet, Ligatures to Procure Atrophy of the Uterus. *Ann. de Gyn.*, 1898, T. L, pp. 110 and 306.

CHAPTER VI.

REMOVAL OF FIBROMATA BY THE VAGINAL ROUTE.

Summary.—Removal of fibrous polypi and fibromata of the cervix.—Transvagino-uterine myomectomy (creation of a means of access, exploration of the uterine cavity, evacuation of fibroma, treatment of the cavity remaining, after operative treatment, indications).—Transvaginal myomectomy.

The benign nature of uterine fibromata limits often their simple encapsulation, in a certain number of diseases the operation can be limited to the removal of the tumor, which is often enough done by the vaginal route.

1. Removal of Fibrous Polyps.

In cases of simple fibrous polyps situated on the cervix or

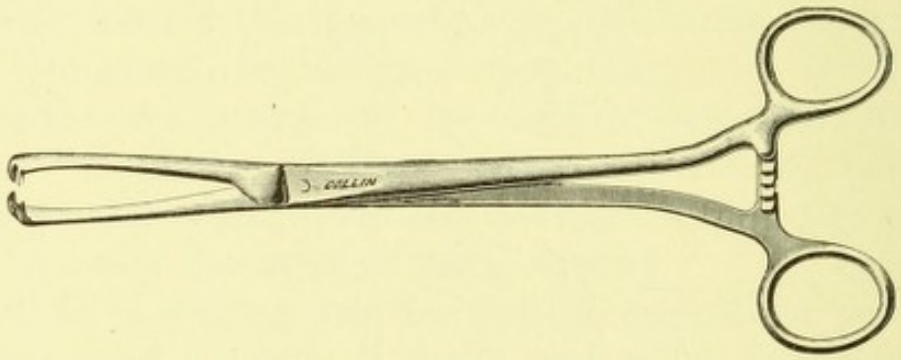


FIG. 188.—Museux's traction forceps.

coming out from the interior of the cervix into the vagina, the operation is very simple.

Anesthesia is unnecessary.

Seize the polyp with a strong traction forceps and make torsion until the pedicle breaks. If the polyp is in the cavity, it is often necessary to dilate the cervix, as a preliminary, with laminaria tents. This is rendered unnecessary generally as the tumor itself has produced the dilatation. Seizing the cervix with a traction forceps in order to drag it down to the vulva, and then make torsion on the polyp and remove it as stated above.

There is no hemorrhage to fear and if some oozing takes place the thermo-cautery or iodoform gauze suffice to stop it.

If the polyp is large so that its pedicle emerges from beyond the os, we must think of a uterine inversion and not attempt to remove it by torsion. It is even imprudent to section across, there and then, that portion which appears to be the fibroma pedicle. One is exposed to the danger of cutting into uterine tissue and opening the peritoneal cavity through the inverted uterus. If a voluntary and methodical opening of the peritoneum is regarded, strictly speaking, as anodyne, one cannot say the same of the involuntary and perhaps ignorant opening of the operator. We must, therefore, avoid this accident.

It is done in the following manner: Apply two traction forceps to the fibroma near its free extremity and at two symmetrical points beginning at its extremity and split it in the median line. The forceps are then removed and fixed on the two lips of the incision in the fibroma, causing it to gape. Then proceed with the section until one comes to the loose capsular tissue which is met with at the base of implantation of the tumor. Nothing is simpler than to raise up separately the two halves of the fibroma without risk of uterine perforation and thus shell them out of their capsule.

For *giant polyps* accompanied by gangrene, removing them in pieces is necessary. Commence at the center and go toward the periphery, advance gradually and terminate by extirpation of the pedicle. The preliminary disinfection by antiseptic injections for several days following is useless. It would be, in any case, illusory, for it is impossible to disinfect the tissue of the tumor.

2. Removal of Cervical Fibromata.

If we find *a fibroma included in the lips of the cervix*, the shell of uterine tissue around is freely incised, including even the fibroma; then with traction forceps seize the tumor between the two lips of the incision which encroach upon it. Draw it out while with the nail or a blunt instrument free it from its capsule.

In rare cases of *diffuse fibromata of the cervix*, we must do a supravaginal amputation.

3. Transvagino-uterine Myomectomy.

Devised by Velpeau and practised by Amussat, enucleation of submucous or interstitial fibromata by the vaginal route only became general since the publication of results by Pean, Segond, and Doyen, who have combined with preliminary hysterectomy the breaking up and enucleation of fibromata.[1]

1. **Preliminary Creation of Means of Access.**—For little tumors, *dilate first with laminaria;* generally one has recourse to *hysterotomy.*

Doyen advised antero-median hysterotomy which is done as follows:

After incision of one-half the vaginal circumference, free the

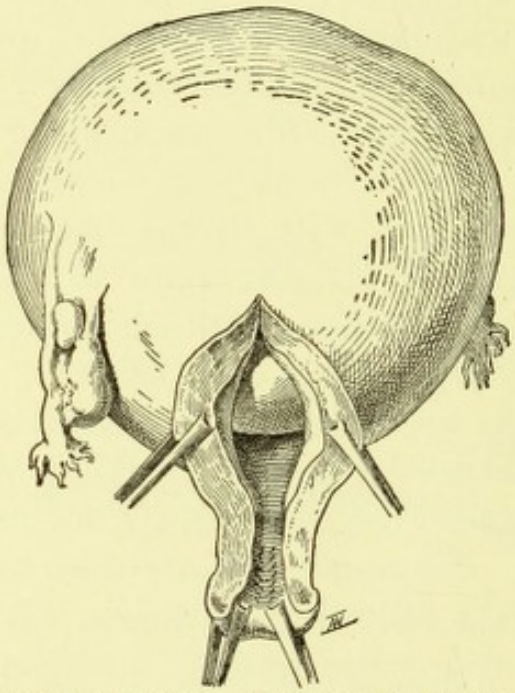


Fig. 189.—Antero-median hysterotomy. Two forceps fix the cervix and two others drag down and separate the lips of the hysterotomy incision. (Doyen.)

anterior surface of the cervix and the inferior part of the uterus. Separate up the vagina at first, which is a little painful, and then the bladder. This is easy owing to a layer of cellular and lamellar tissue between it and the uterus—a layer which permits easy cleavage. If one considers the separation high enough, place a speculum between the parts which so retains them. Then draw down and fix the cervix with two traction forceps in-

[1] See on this question the important monograph of Dartigues, Conservative Surgery of the Uterus and Adnexa in Fibromata. *Th. de Paris,* 1900–1901, No. 385.

serted into the anterior lip. Split in the median line the cervix and uterus, and then seize the lips of the incision with forceps and proceed in the same way as that we have described at greater length under *vaginal hysterectomy*.

Fig. 190.—Segond's S-shaped speculum.

These forceps serve to draw down the uterus and also to separate the lips of the incision. When the uterine cavity is widely open, we can attack the fibroma (Fig. 189).

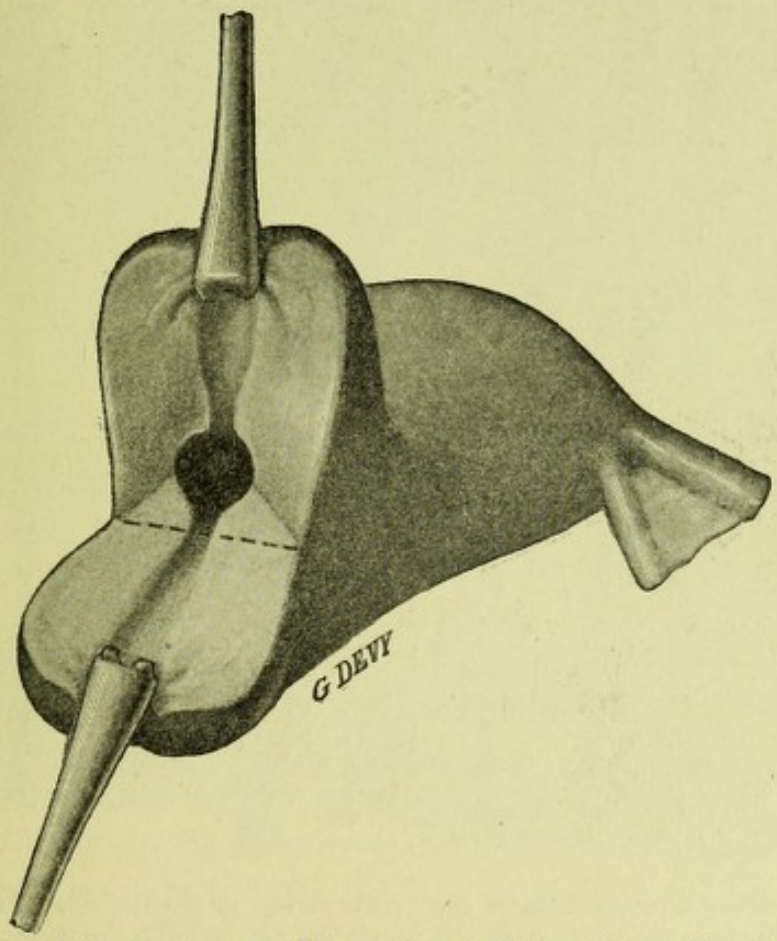


Fig. 191.—Bilateral hysterotomy. The section is higher internally than externally.

Pean and Segond perform a uni- or bilateral splitting of the cervix to the antero-median hysterotomy.

The patient being in the dorso-sacral position, the assistant to the right lifts up the anterior vaginal wall with an S-shaped

speculum. A second assistant, to the left, draws down the posterior wall. The cervix is seized on each lip by one of Museux's forceps and drawn down to the vulva. Armed with

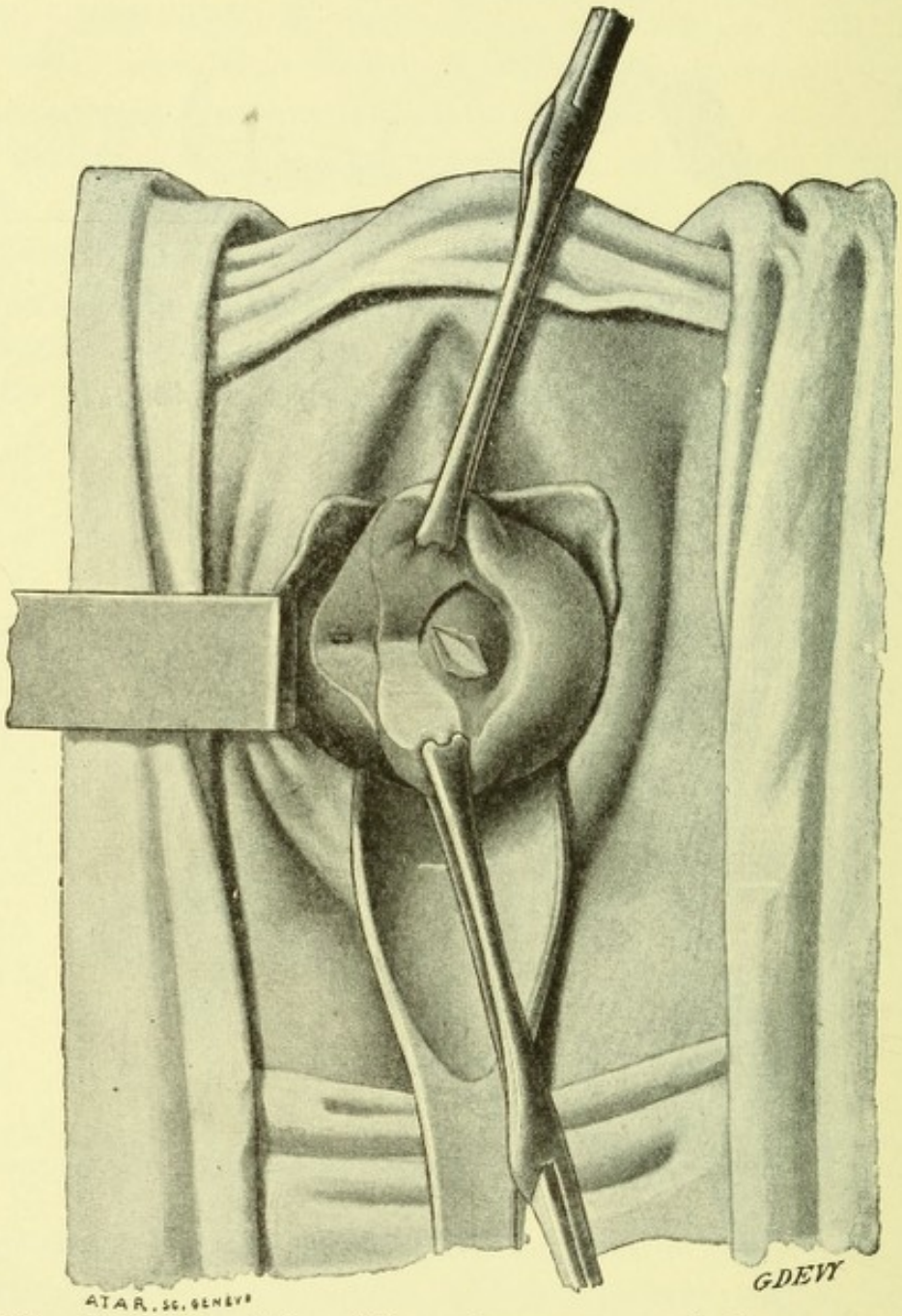


FIG. 192.—Unilateral splitting of the cervix; one can see the fibroma covered over with uterine mucous membrane which has been opened by the nail. (Segond and Dartigues.)

strong blunt scissors, we introduce one blade into the cervico-uterine canal and the other into the corresponding fornix. Cut through each commissure up to the isthmus, encroaching on the lateral fornix of the vagina.

If, after this double cervico-vaginal section, access to the cavity is still difficult, Segond advises to continue the incision higher, taking care not to go through the whole thickness of the uterine border, but carrying the section higher on the internal surface than on the external in order to avoid injuring the uterine artery. The index-finger may complete the enlargement by separation.

Inversely we sometimes only do a unilateral *cervico-vaginal*

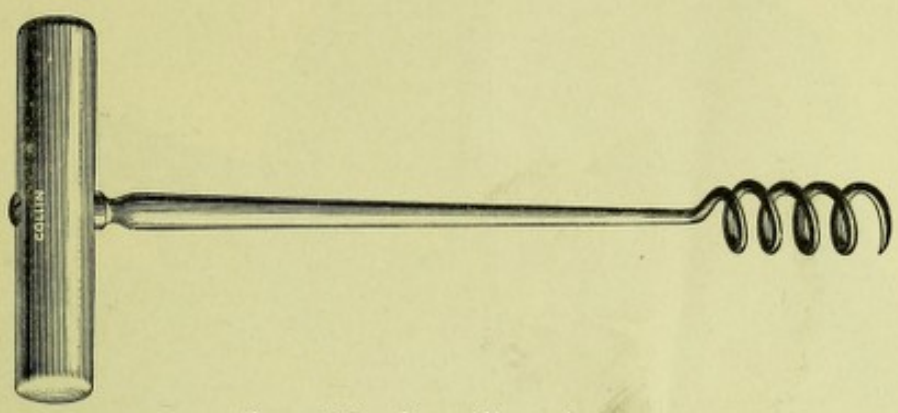


Fig. 193.—Segond's corkscrew.

hysterotomy. We should limit ourselves to what is strictly necessary. It may, however, be necessary to do the bilateral section.

2. **Exploration of the Uterine Cavity.**—It is useless if the fibroma presents after splitting of the cervix; when the tumor is deeper, we may explore the uterine cavity with the index-finger so as to find the exact seat of the fibroma and where it is most

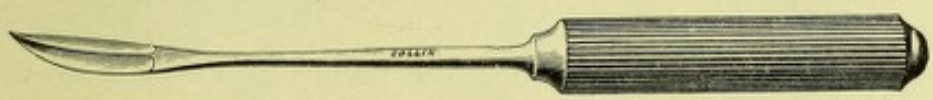


Fig. 194.—Lanceolated knife for morcellement of fibromata.

accessible. To do this remove the specula and draw down the uterus with forceps which fix the lips of the cervix, being aided by the intrauterine palpation of the hypogastric hand which presses on the fundus of the organ.

3. **Breaking up of the Fibroma.**—When the cavity is explored, the index-finger is placed in the most accessible part of the fibroma, and one tries to break through the perifibromatous shell with the finger-nail. Sometimes it is possible to imme-

diately enucleate the fibroma but, recognized by its blanched aspect, protrudes like a hernia between lips of the musculo-mucous membranous wound. In other cases, it suffices to draw down the fibroma, with strong Museux's forceps, or may be by a corkscrew as Segond does. It is well to combine Museux's forceps with the corkscrew. The forceps draws down the fibroma into view. It is easy now to insert the corkscrew without relinquishing the other. If the fibroma is small, enucleate it;

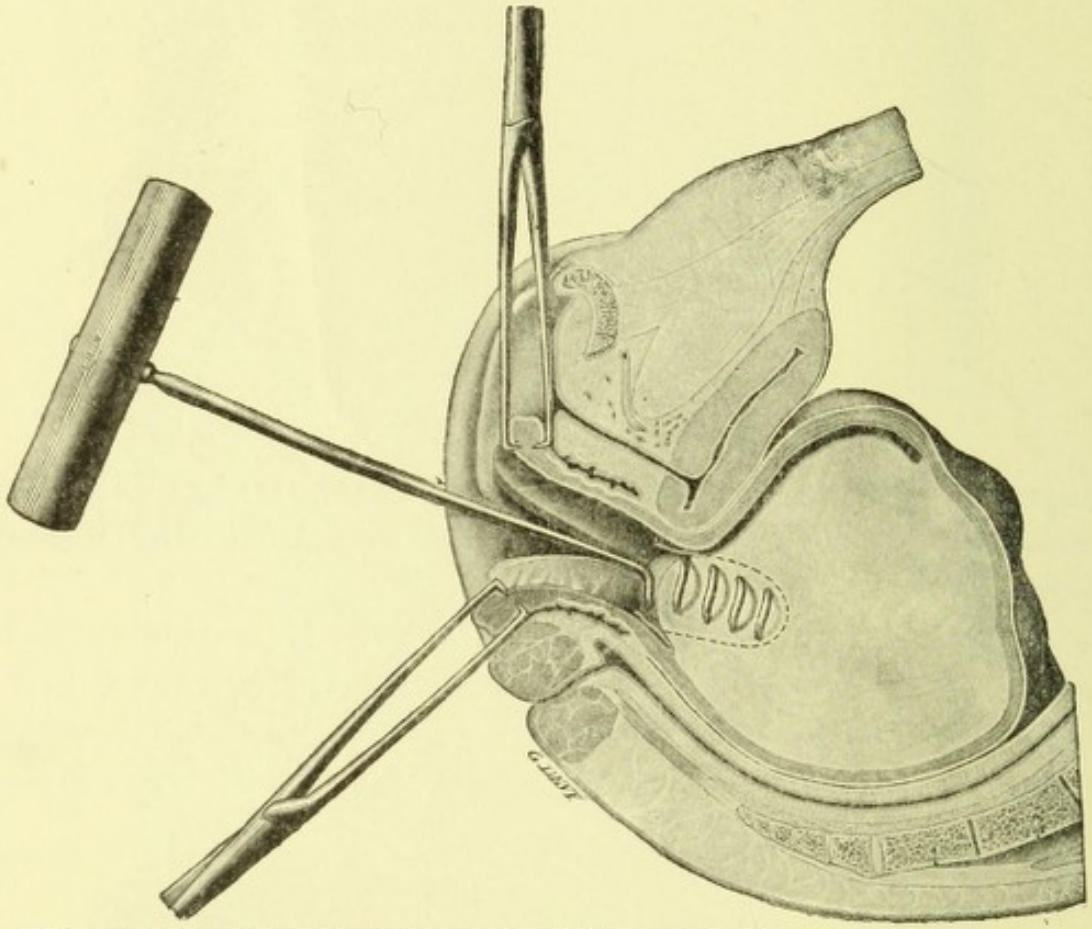


FIG. 195.—The dotted line indicates the incision made by the knife to cut the fibrous zone.

if large, break it up. This latter is carried out with the spirals of the corkscrew as axis and base of support. It should be implanted firmly, but not too well to prevent the movement of the knife. The left hand draws on it gently and the right takes Segond's knife, which we will describe. This instrument has a long handle and a slightly curved double-edged lanceolated blade. It is inserted into the fibroma and directed obliquely toward the extremity of the corkscrew, until its point just lies below it. Then with gentle movements from side to side, make

a circumduction of the corkscrew and bring it back to its point of entry. The corkscrew gives way to a light traction, and brings away with it a conical fragment of the fibroma. It is well before doing this to insert a second corkscrew alongside in

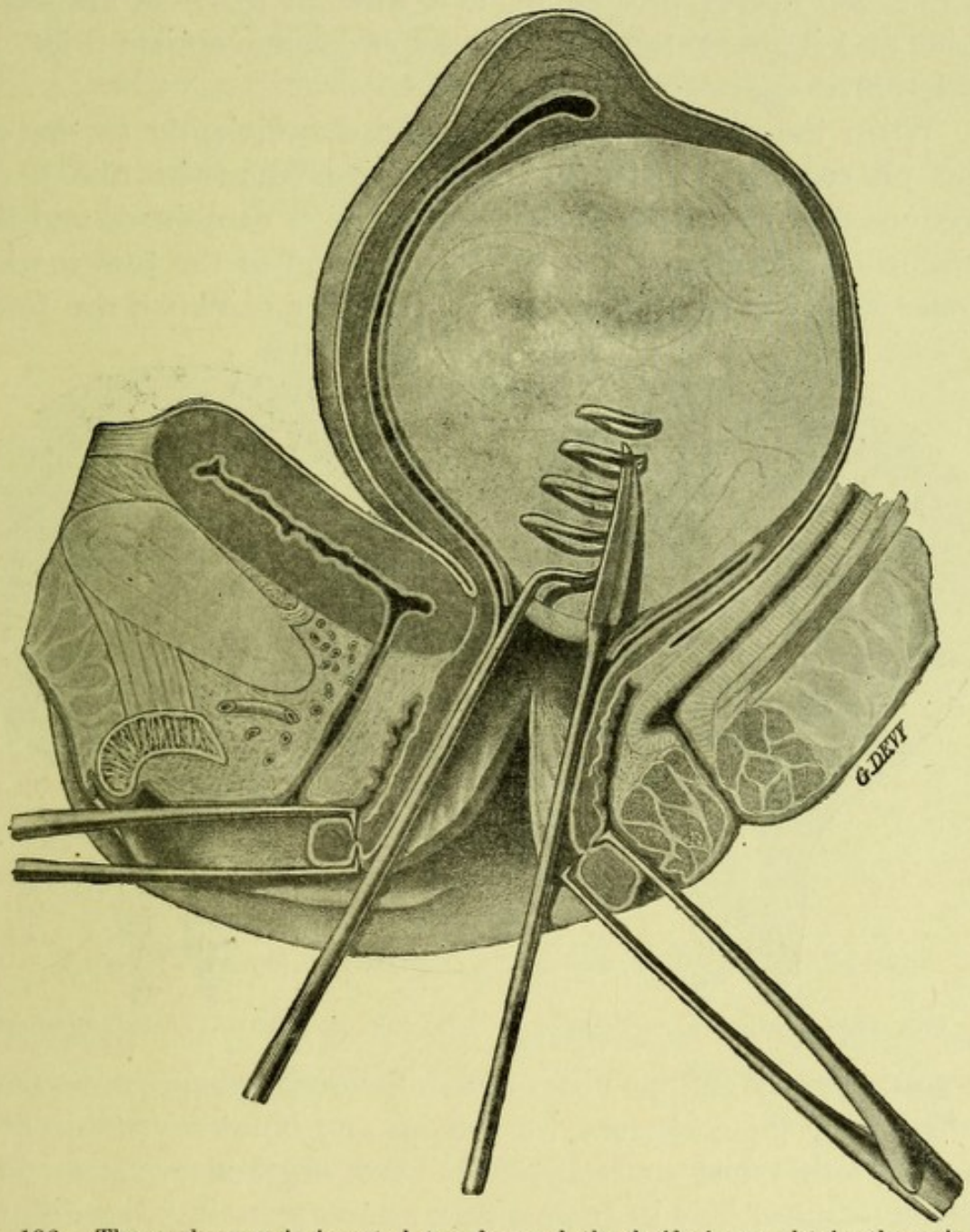


FIG. 196.—The corkscrew is inserted too far and the knife is caught in the spirals. (Segond.)

such a way as to have its hold prepared for the conoid morcellement. This is done several times, as often as necessary to diminish the size of the tumor. While this scooping-out is going on the two lips are separated with Museux's forceps which

act as specula. It is useless to make use of the inferior speculum which serves to lower the perineum.

We have mentioned not to force the corkscrew in too much; this precaution serves to facilitate the movement of the knife. If it is too deeply pressed in, it is difficult to circle around its point and it gets entangled with the corkscrew spirals (Figs. 195 and 196).

When the scooping out is advanced sufficiently so that the line of capsular cleavage is found we can, with the finger, produce movements of torsion and traction combined, and thus produce the freeing of the superior portion of the tumor which comes into the vulva "*en bloc.*" In other cases we are forced

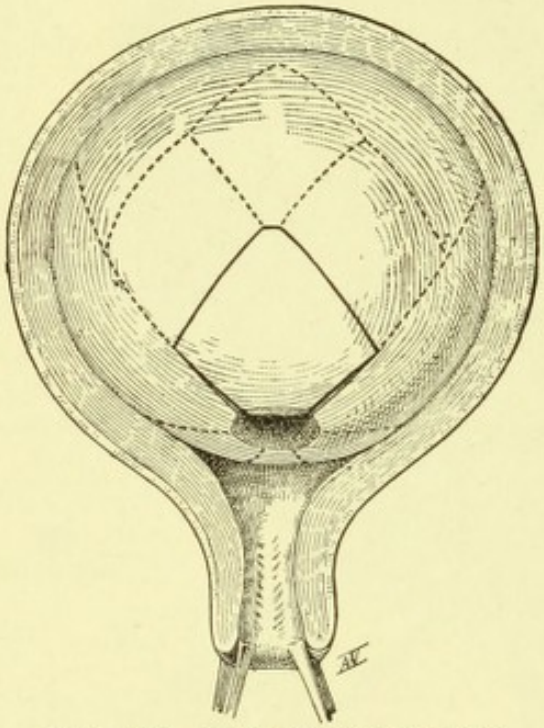


FIG. 197.—Lozenge morcellement.

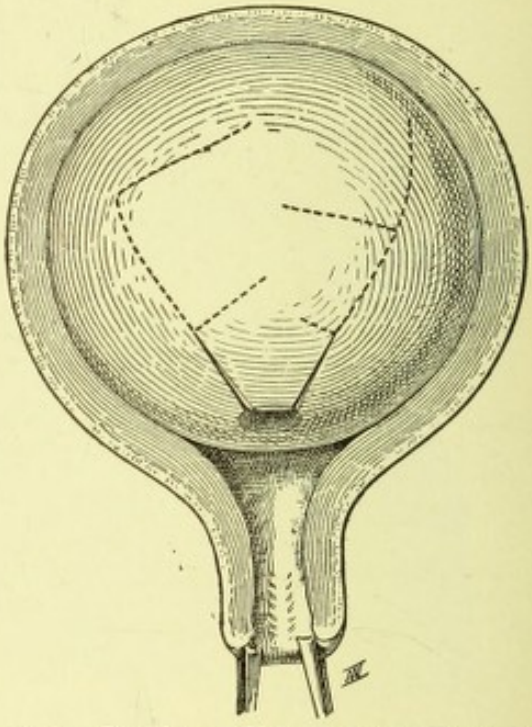


FIG. 198.—Ladder or Echelle morcellement.

to go on slowly till the bitter end. Prudence suggests, however, substituting the corkscrew for forceps and blunt scissors in order to finish this last morcellement. We must also make many digital explorations in such a way as to appreciate the different consistence of the fibroma and uterine muscle and at the same time to learn the thickness of the wall of fibrous tissue capsule.

In absence of special instruments, the morcellement may be done with traction forceps and scissors.

It suffices to seize with forceps a part of the neighboring fibroma, which one desires to remove, in such a manner as

not to lose hold and to bring to the exterior of the wound a part of the fibroma.

The lozenge morcellement and the shell variety, which Doyen has so well described, are useful in the scooping out of the center of the fibroma.

All these manipulations do not bring on a notable hemorrhage. The morcellement is usually dry. The shell having been emptied, the uterus retracts on itself and bleeds very slightly.

4. Treatment of the Sites Occupied by the Tumors and of the Uterine Cavity.—After being assured that the uterus has not been

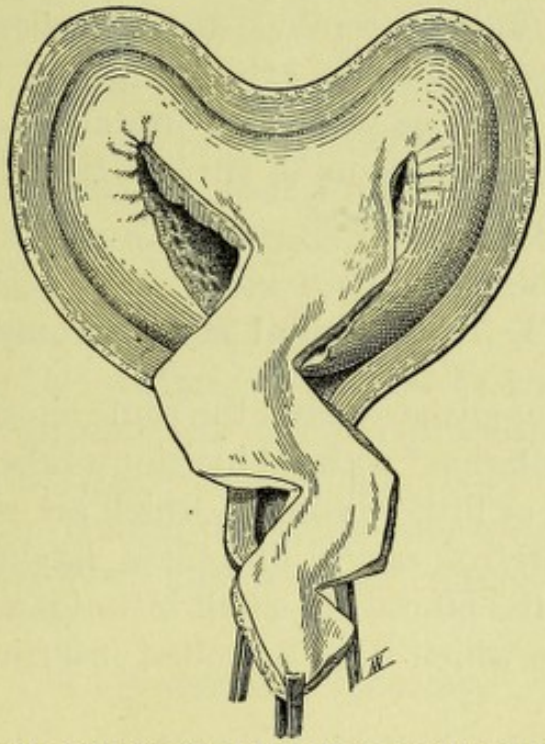


Fig. 199.—Result of "ladder" or Echelle morcellement (after Doyen).

perforated, see if there is any hemorrhage. This may cease spontaneously on retraction of the uterus. If not, apply forceps on bleeding points.

Hemostasis being secured, do the postoperative toilet, excising irregular and floating flaps, removing the clots and doing a hot antiseptic irrigation.

Dry the parts and tamp on the cavity of enucleation, as also the uterus, with gauze wicks, one extremity of which is left in the vagina so as not to be forgotten and left in the uterus.

5. Suture of the Cervix.—This suture is not always indicated. It may be done if the uterus has been largely split or when there

is a hemorrhage at the level of one of the lips of the incision; on the contrary, it is necessary to abstain from making any union when the incision is not deep and does not bleed and, above all, if one has been obliged to leave one or more forceps on the vessels in the interior of the old tumor cavity.

After-treatment.—The first dressing is made from the sixth to tenth day, unless infectious process oblige an early removal of the intrauterine drains.

The drains having been removed, we can make a hot intrauterine irrigation, at 45° C., dry the cavity and tampon afterward lightly.

Indications.—Vaginal removal by morcellement of fibromata is indicated in cases where the external face of the organ has presented a regular form or where the uterus has remained mobile and where nothing causes us to suspect the existence of accompanying lesions of the adnexa.

4. Transvaginal Myomectomy.

In *transvaginal myomectomies* the route chosen is the vaginal.[1]

Colpotomy anterior,[2] without incision of the peritoneum, suits only the removal of little fibromata which are situated low down; the posterior[3] to retro-cervical fibromata having split the recto-vaginal septum; the lateral[4] to small intraligamentous fibromata, above all to those which have a limited insertion into the border of the uterus.

In all cases, after reaching the fibroma enucleate it, with or without morcellement, according to the case, carrying out a procedure analogous to that of intrauterine myomectomy which we have so lengthily described.

[1] We deal here only with operations where there is no opening of the peritoneal cul-de-sacs. We deal later under colpo-celiotomy with the cases where the peritoneum is opened.

[2] D'Herbécourt, The Vaginal Route without Hysterectomy. *Th. de Paris*, 1900–1901.

[3] Ott (D. de), Thirteenth International Congress of Medicine, Paris, 1900. Gynecological Section.

[4] Stratz, Lateral Colpotomy. *Centr.-Bl. f. Gyn.*, Leipzig, 1899, p. 1106.

CHAPTER VII.

COLPOTOMIES.

Summary.—Posterior colpotomy (operation results, indications; fixing the uterus in the vagina with the fundus below; shortening of the utero-sacral ligaments; treatment of uterine inversion).—Anterior colpotomy (operation modifications of technic according to the case; opening of abscess, exploration, removal of tumors, correction of uterus, fixing uterus in vagina with fundus below, results, indications).

Taken in its most comprehensive sense, *colpotomy* signifies incision of the vagina. In practice we limit the word to incisions limited to the vagina, adding to it a qualifying word if any other organ is implicated in the operation; for example, we talk of colpocystotomy when we refer to the opening of the bladder through the vagina.

The fundus of the vagina is occupied by the uterus, with its broad ligaments enclosing the vascular pedicles; an incision into these lateral appendages is never made but colpotomy is either practised in front or behind the uterus and we get the distinction thus of *anterior colpotomy* and *posterior colpotomy*.

1. Posterior Colpotomy.

Generally posterior colpotomy is not limited to the vaginal wall. As the posterior vaginal wall is doubled by the peritoneal recto-uterine cul-de-sac, this is also opened, hence in reality a posterior *colpo-celiotomy* is practised.

Operation.—All preliminary precautions to vaginal operations having been taken, a broad short speculum is placed on the posterior vaginal wall, depressing and drawing down the fourchette with it. Seize the posterior lip of the cervix with traction forceps and draw down the cervix and lift it strongly forward. This manipulation results in stretching the posterior fornix which is well drawn back by the vaginal speculum. The incision is made with the scalpel. In no case is it permitted to

employ the trocar in spite of the arguments of the Lyons school and several German gynecologists in favor of this instrument.[1] We discountenance its employ because it is blunt and may injure the rectum, sometimes united with the posterior fornix. Therefore the scalpel is used to incise the vaginal wall. A trans-

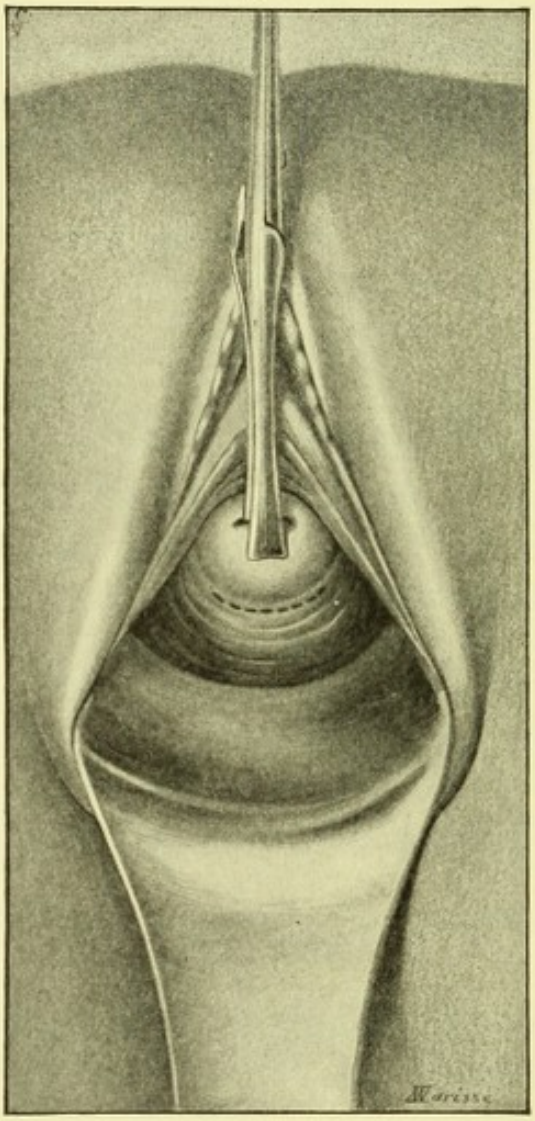


FIG. 200.—Posterior colpotomy. A speculum draws down the posterior wall of the vagina and a pair of forceps draws the cervix forward. The dotted line represents the incision in the mucous membrane of the vagina reflected in the cervix.

verse incision cuts through the vaginal wall and *even encroaches on the cervix* which serves as a sort of executioner's block. However tempted one may be to incise the prominence of the posterior vaginal wall, it must not be done.

[1] Recently Fraenkel advocated puncture because the scalpel causes hemorrhage and also because the pocket automatically cannot be reached from a distance. Fraenkel, Die vaginale Incision. *Arch. f. Gyn.*, Berlin, 1907, T. LXXXIII, p. 171.) None of these objections is valid.

The vagina when incised may present one of three aspects:

1. A collection in the posterior fornix which bulges forward.

2. A collection although situated low down may not press back the dome of the vagina.

3. Or the collection is situated high up, being several centimeters from the posterior fornix of the vagina.

Colpotomy is only a preliminary to a more complex operation (removal of adnexa, of a fibroma from the posterior surface of the uterus, etc.).

In the first case, simple incision of the posterior fornix gives immediate vent to the contents of the recto-uterine pouch.

In the second, we must search for the pouch and to do so must proceed in a methodical manner. *The posterior wall of the uterus as guide*, the index-finger slowly separates off the tissues and remains in contact with the wall until it reaches the level of the collection. It is now best to insinuate the finger into the angle which is formed between the uterus and the retro-uterine pouch. Then having penetrated into this angle, by directing the finger backward we burst the pocket and give vent to its issue.

When the collection is situated high up, some centimeters above the fornix, its localization is more difficult. We must remember that the pockets which are situated high up are more often juxta-median than absolutely median. After, therefore, working in the median line of the posterior surface of the uterus, one should direct the examination toward the affected side. In these cases place one hand on the abdomen and this presses down the tissues. This hand helps to guide the pocket toward the index-finger. In the course of the search for a suppurative collection, situated deeply, it sometimes happens that pockets of serous contents, more or less abundant, are opened. The eruption of this serous fluid into the field of operation should not lead one to think that the operation is finished. Their existence really confirms the existence of a subjacent suppurating pocket and should lead one to go on with the search until it is found. Be careful to always keep in touch with the uterus so as to avoid injuring a loop of intestine.

The pocket having been opened, its contents flow out without any difficulty. There are, however, cases of old hematocele where the blood in solid clots should be evacuated with the finger

or a blunt curette. One might be tempted to irrigate the pocket; we do not advise these irrigations which are more dangerous than useful.

Finally, the operation is finished by the insertion of a drain. We can make a special cross drain by running a small one through a larger and fixing with a suture. This will not then fall out so easily. However, an ordinary drain will do if we fix it to the posterior lip of the cervix with a silkworm gut. Vaginal tamponing with iodoform gauze, frequently renewed if necessary, constitutes all the dressing.

Carried out as a *means of access*, *posterior colpotomy* presents no technical difficulty. When the peritoneal cul-de-sac is opened, we enlarge the incision with the finger but never succeed in obtaining, according to Herbecourt, a circumference of more than 15 cm. (6 inches).

Results.—*Immediate results* of posterior colpotomy are excellent. The *more distant results* vary, on the contrary, according to the case.

When the collection is enveloped in a pocket of recent formation (purulent discharge of the recto-uterine sac, infected hematocele), the cure is the result.

If, on the contrary, pus is formed in a pre-existing cavity (ovarian or tubal) recovery is often incomplete and after the discharge of the pus there is an amelioration of the symptoms, a fall of fever and cessation of pain and a disappearance of compression symptoms. But it is often a temporary amelioration only and we have recourse to a more radical operation later. Even in these cases colpotomy is an excellent operation, if it is regarded as simply palliative, so as to ameliorate their symptoms and place them in more favorable conditions for a radical operation.

Indications.—Posterior colpotomy is principally indicated in *acute and subacute localized infections*, if the examination of the patient permits of determining the seat of infection. It is easy if there are large bulging collections in the posterior fornix. In small and highly situated collections it is more difficult. In these cases the finding of a point of exquisite tenderness is a great help to the surgeon.

Colpotomy has its indications in certain *hematoceles*, but we

must make certain distinctions. In recent hematoceles, in process of evolution, when it is difficult to say if the bleeding is still going on or has recommenced, don't practise this operation. We know of fatal cases of hemorrhage in spite of tamponing on the surgeon's part.

In older hematocele, non-suppurative, many gynecologists make a vaginal incision. Even although the results of evacuating colpotomies are, in a general sense, undoubtedly good, there is an advantage, we consider, in having recourse to the abdominal route, which not only permits of the evacuation of blood, but also of treating the diseased adnexa, and thus leads to less chance of secondary infection of the hemic pocket.

On the contrary, in suppurating hematoceles, posterior colpotomy is indicated.

The posterior vaginal incision has been carried out as *preliminary operation* in order to extirpate diseased adnexa, of small cystic ovarian tumors, of pediculated fibroids on the posterior surface of the uterus, and in order to take out a fetus in extrauterine pregnancies, etc. We prefer abdominal incision, however, to posterovaginal celiotomy.

It is said that *exploratory* posterior colpotomy should be the first stage of a vaginal hysterectomy and should only follow the operation when the examination of the adnexa by the posterior route had established the legitimacy of a radical intervention. In practice, it is often a bad means of exploration which may mislead greatly.

Let us say in conclusion that *posterior colpotomy* may constitute a *means of drainage in tubercular peritonitis.* It was used by Lohein, but we do not approve of it.

Fixing of the Uterus in the Vagina with the Fundus below or "Bascule" of the Uterus.

Posterior colpotomy has been utilized by Freund as first stage of an operation for prolapse. It permits of fixing the uterus in retroflexion in the vagina and of fixing it in its new situation. Thus we create a sort of large vaginal tampon which supports the prolapsed vaginal walls.

After posterior colpotomy, Freund "bascules" the uterus on the vagina, closes up the posterior fornix, then after denudation of the anterior and posterior walls of the vagina, he scrapes the uterine surfaces with a curette and

fixes it then to the denuded vaginal surfaces with catgut sutures. He concludes the operation by perforating the fundus of the uterus projecting into the vagina.

Shortening of the Utero-sacral Ligament.

After posterior colpotomy, pass a suture through the utero-sacral ligament about 4 or 5 cm. from the cervix uteri, and then pass it through the posterior surface of the cervix of the uterus. Then draw the cervix up and back, which will correct the retro-deviation (Gottschalk, Stratz).

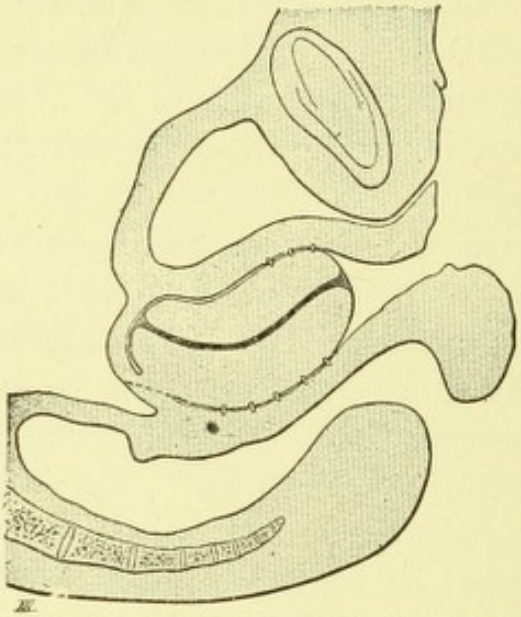


Fig. 201.—Uterus fixed in the vagina after posterior colpotomy and sutured to its denuded anterior and posterior walls, and then perforated at the fundus. Note the fundus lies below.

Treatment of Uterine Inversion.

Küstner, after colpotomy, hooks up with his finger the tunnel constituted by the inverted uterus. He makes a median vertical incision in the posterior surface up to 2 cm. above the external os and reduces the inversion as one does the finger of a glove; then after drawing strongly upon the retroflexed uterus he sutures the incision made in the posterior wall.

This operation has been modified by Italian surgeons, Piccoli, Morisani and Sava, who divide the cervix in its entire thickness and incise the uterine wall in its whole length. The uterus is then formed, as it were, of two shells which are united anteriorly. Placing the thumbs on the anterior wall which is pushed backward, one draws forward with the other fingers the lips of the longitudinal posterior incision and thus returns the posterior wall. All that now remains is to suture the incised posterior wall. Duret advises this method of operation in France.

2. Anterior Colpotomy.

Anterior colpotomy, commonly described in Germany under the name of anterior colpo-celiotomy, consists in opening the vesico-uterine cul-de-sac after incision of the vagina and separation of the bladder and of the uterus.

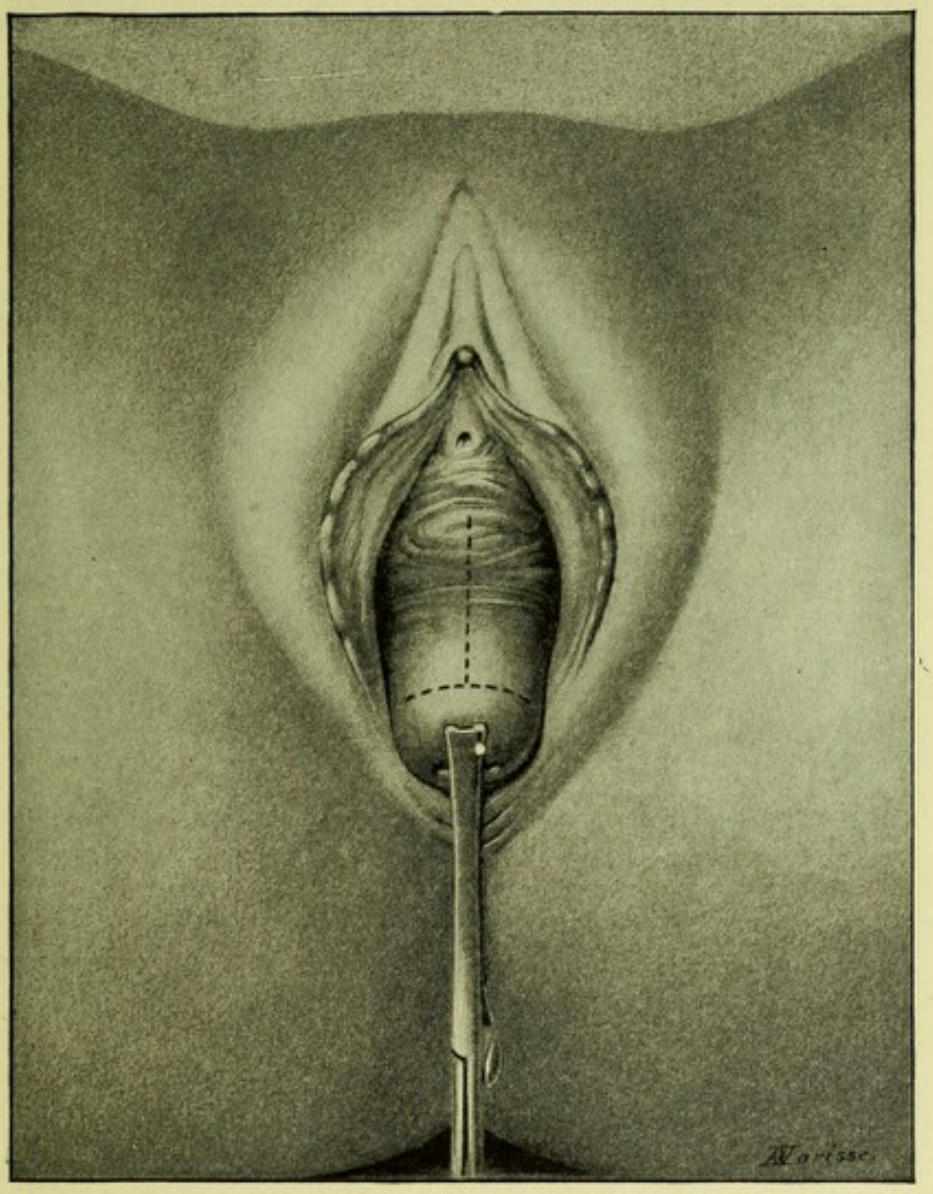


FIG. 202.—Anterior colpoceliotomy. Track of the vaginal incision.

Operative Technic.—The execution of anterior colpotomy is a little more complex than posterior colpotomy. We must strip off the bladder from the anterior face of the uterus in order to reach the peritoneal cul-de-sac which is to be found at the level of the isthmus of the uterus. The operation comprises three

principal stages: incision of the vagina, separation of the bladder, and opening of the peritoneum.

1. *Incision of the Vagina.*—When anterior colpotomy is simply done in order to evacuate a pre-uterine collection, a transverse incision with a slight posterior concave curve is sufficient.

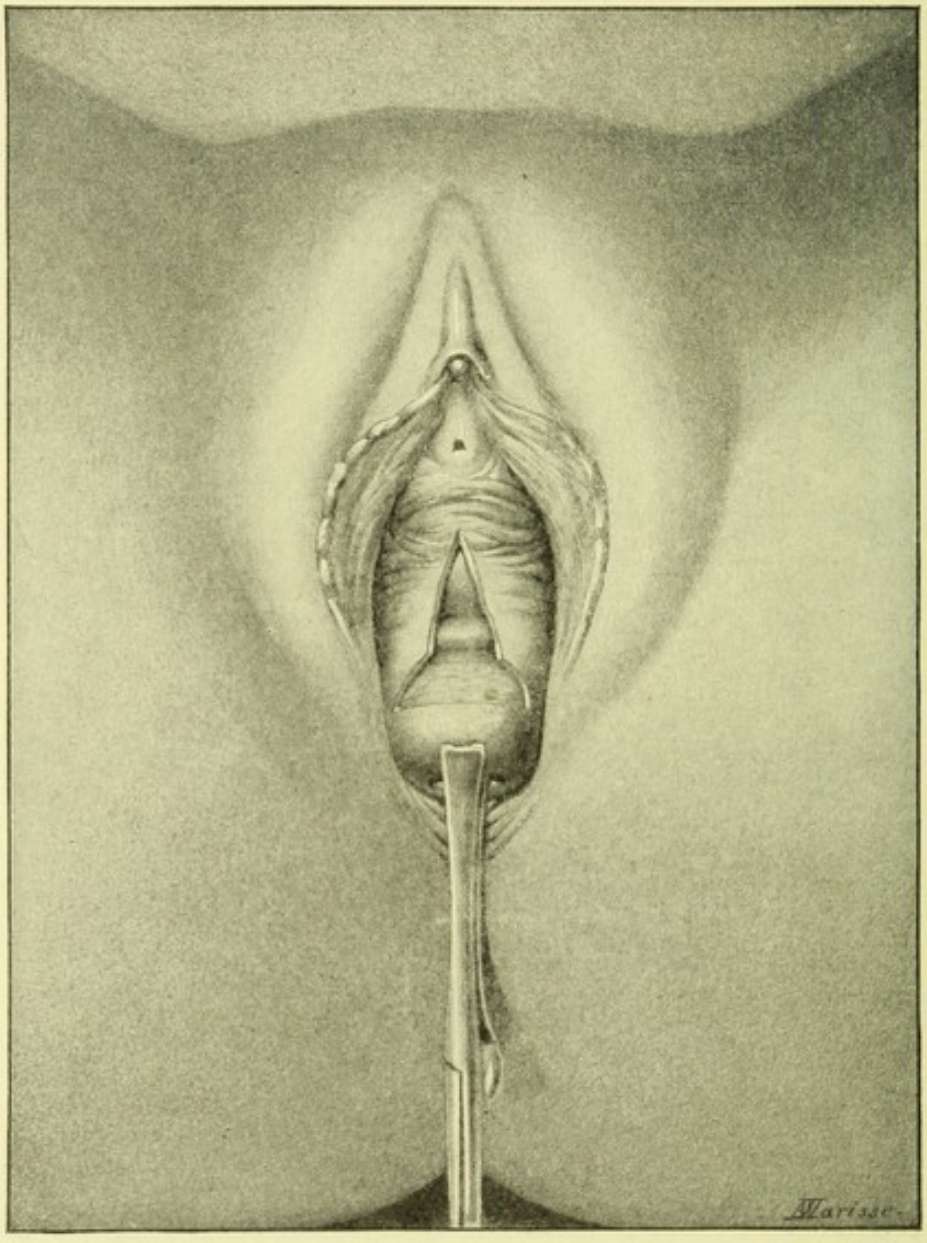


FIG. 203.—Between the bladder and anterior surface of the uterus one may see the projection of the peritoneal cul-de-sac.

It passes through the insertion of the vagina into the uterine cervix. But as the anterior colpotomy is ordinarily destined for a more complex operation and as the surgeon must have as much light on his operation as possible, it is more often the case that he is forced to combine with the transverse incision another

antero-posterior incision 4 or 5 cm. long. This is made on the anterior face of the vagina so that we really have a T-shaped incision (Fig. 202).

The anterior incision may be very extensive, so that some operators confine themselves entirely to it.

2. *Separation of the Bladder.*—This may be done with the

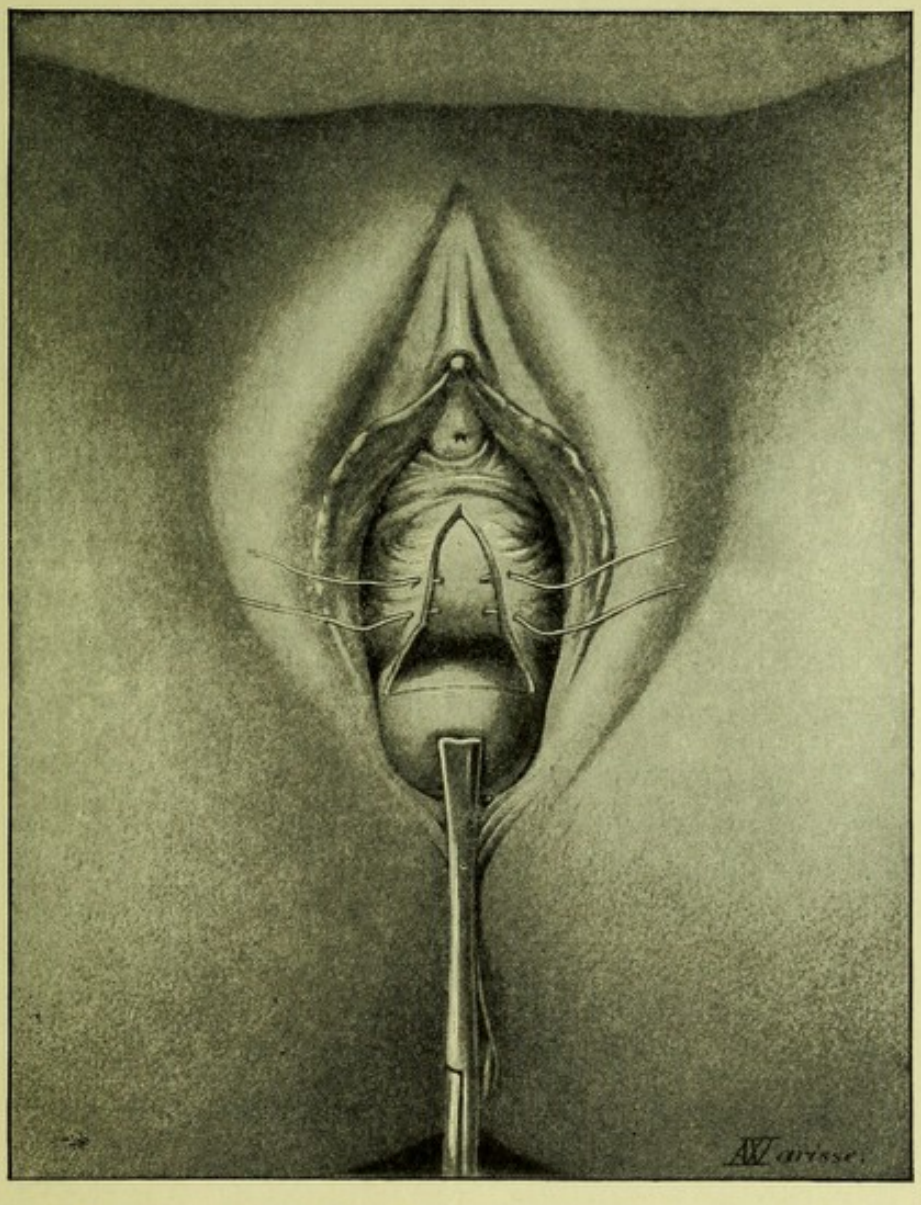


Fig. 204.—Fixation of the uterus directly to the vagina without interposition of the peritoneum.

finger. It ought to be done very thoroughly, particularly in the transverse direction, and carried out until the vesico-uterine cul-de-sac is reached (Fig. 203).

3. *Opening of the Peritoneum.*—Open the peritoneal cul-de-sac with the finger. If the colpotomy is done purely for evacua-

tion, this method presents no inconvenience, but if done as preliminary to a second operation, the opening of the peritoneum should be carried out with more precautions. We should methodically open the serous membrane which appears as a floating fold of grayish color. First take it up with forceps and then incise it with scissors or bistoury. The lips of the incision are immediately taken up with forceps.

Modifications of Technic According to Case.—1. *Opening of a Suppurating Focus.*—When anterior colpotomy is done with the object of emptying an anteuterine collection, the opening of the peritoneum is followed by the evacuation of the contents of the pocket and it suffices in concluding the operation to place a drain in the site.

2. *Means of Exploration.*—When the uterus and adnexa are fixed by adhesions, the finger only can give us the information we require. When there are none seize the uterus with a pair of bullet forceps and drag it into the vaginal wound; the adnexa thus drawn up may be examined directly.

3. *Removal of the Adnexa or a Uterine Tumor; Ligature of the Tubes.*—The removal of the adnexa presents no more particular difficulty than manipulations for their liberation. These difficulties, subordinate to the extent of the adhesions and the skill of the operator, may be great if the incision through which one works is limited. The freeing finished, it only remains to extirpate the diseased adnexa. We now proceed to the hemostasis following principles in so doing which we will study under the heading of removal of organs by the abdominal route.

Anterior colpotomy may also be utilized in *order to remove a fibroma* from the anterior wall of the uterus or an *ovarian cyst.* It also permits of the evacuation of *parauterine fetal cyst.* By the same route *the tubes have been divided between two ligatures.*

4. *Correction of the Retrodeviated Uterus by Vagino-fixation.*—This procedure which has been so often used is of the simplest character: The peritoneum is opened and the uterus and adnexa are explored. These are freed and extirpated if necessary. Then the uterus is pressed down anteriorly into the vaginal incision with the aid of bullet forceps. It is seized near the fundus. Next a series of sutures is passed which penetrates

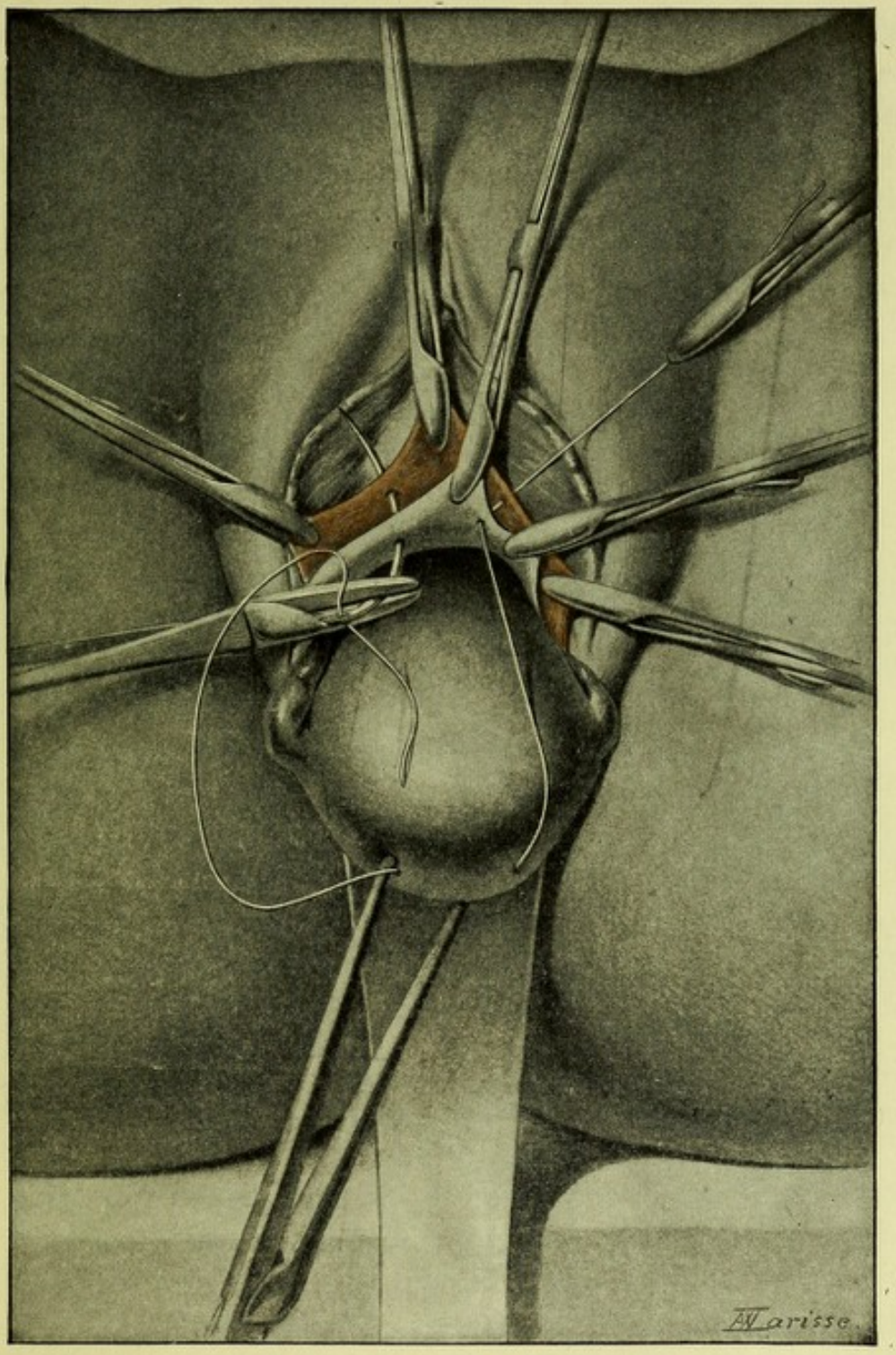


Fig. 205.—The uterus is strongly drawn down into the vagina. Passage of the suture which unites the upper segment of its anterior surface to the peritoneal cul-de-sac, which is well pressed back before tying this fixation suture. The fixation of the uterus will be from this point sero-serous.

one of the lips of the vaginal wall, traversing the anterior wall of the uterus and coming out at a symmetrical point in the lip of the opposite side. We may use either silkworm gut or catgut. The sutures should not be tied at once. Insert them and then attach forceps to them. When they are all in place tie them and thus close the vaginal wound with which the pressed-down body of the uterus is in contact. It is thus fixed in a position of anteflexion (Fig. 206).

In order to avoid the formation of a cicatrix at the site of the uterine fixation and in order to obtain simply a sero-serous

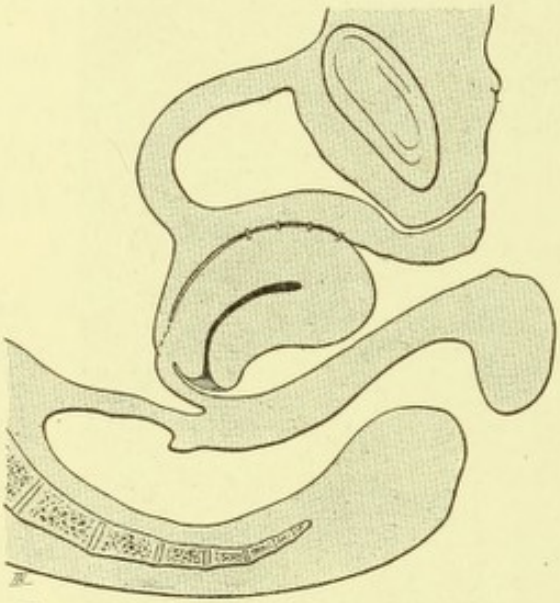


FIG. 206.—Uterus with fundus below attaches in the vagina after anterior colpotomy and fixed to a denuded portion of the vesico-vaginal septum.

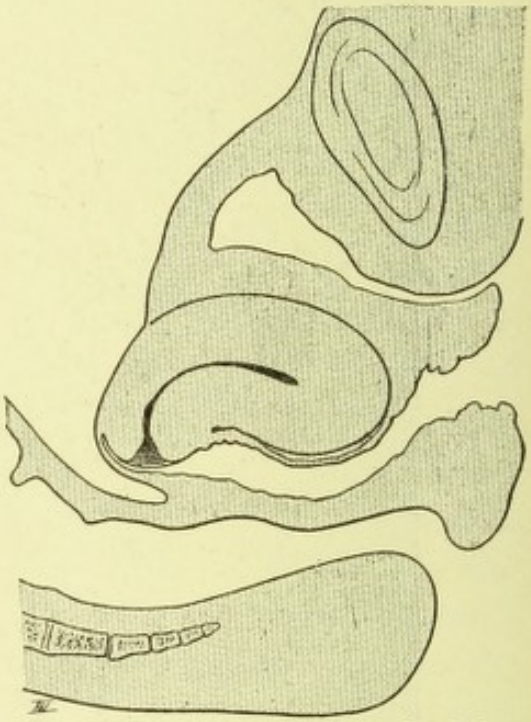


FIG. 207.—Uterus with fundus below fixed in the thickness of the vesico-vaginal septum.

fixation Duhrssen modifies the operation in the following way: He does an ordinary colpotomy, inserts a single fixation suture consisting of a large silkworm-gut suture. This traverses one of the lips of the vertical segment of the vaginal incision near its upper extremity, traverses the vaginal wall, then the corresponding lip of the peritoneal incision, includes the anterior wall of the uterus and comes out through the peritoneal and vaginal lips of the opposite side thus following a symmetrical course (Fig. 203). A pair of forceps seizes the two extremities of the fixation suture, *which is tied at the end of the operation.*

We then proceed to the closing of the peritoneal cul-de-sac by a sagittal continuous suture and then the vaginal incision is closed. The peritoneal suture and the vaginal suture ought to be absolutely independent, one of the other. Nothing more remains to conclude the operation than to tighten and tie the fixation suture.

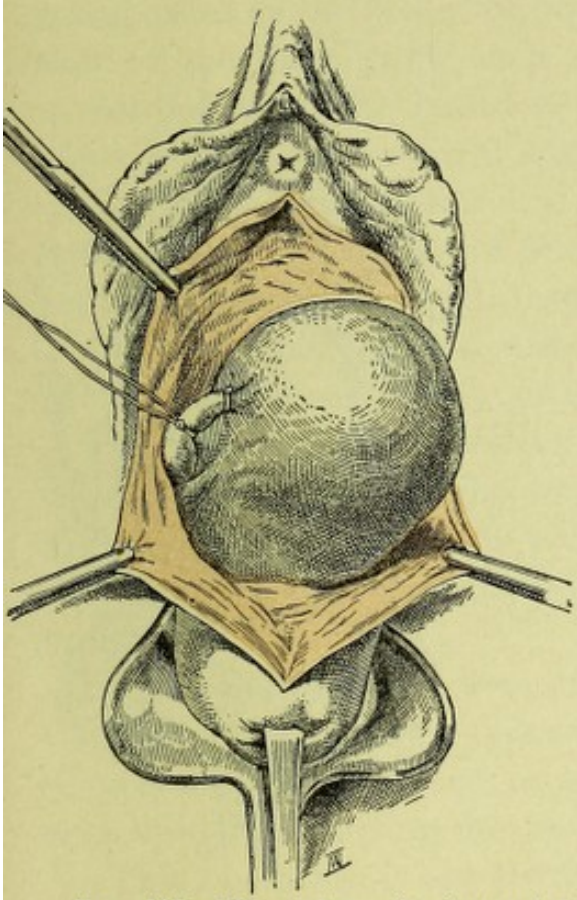


FIG. 208.—The uterus is drawn into the wound of the colpo-celiotomy. The tubes are tied and then cut across to secure sterilization of the patient.

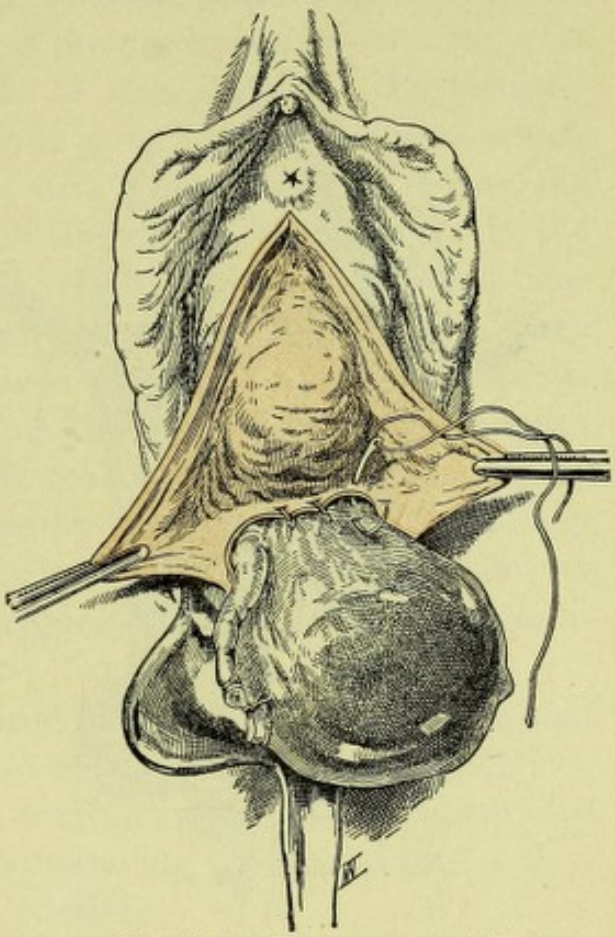


FIG. 209.—The uterus in "bascule" (that is the fundus is drawn down and the organs thus inverted) in the vagina. The abdominal cavity is closed by suturing the retro-vesical peritoneum to the posterior surface of the uterus, which has become anterior owing to the inversion of the organ.

As dressing use a tampon of iodoform gauze. If, like Duhrssen, silkworm guts are used to suture the vagina and fix the uterus, they are removed on the tenth day.

After the operation the anterior surface of the uterus is applied to the serous covering of the new peritoneal cul-de-sac. It is then maintained in its new position by pure peritoneal adhesions

and there is no fibrous nodule in the cellular pre-uterine tissue. By this procedure the uterus is anteflexed and without fixing it tightly to the vaginal wall it is allowed a certain amount of mobility. Vagino-fixation was advocated in France by Le Dentu and Pichevin.

5. *Fixing of the Uterus in the Vagina with the Fundus below or the "inversion" of the Uterus.*—For the "inversion" of the uterus

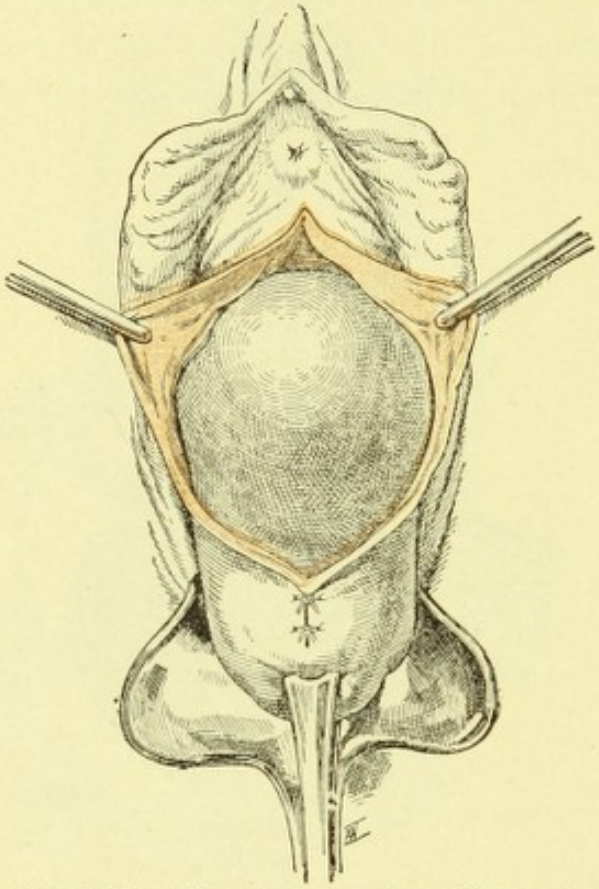


FIG. 210.—The uterus is placed in contact with the bladder. The suture of the vaginal flaps is commenced posteriorly.

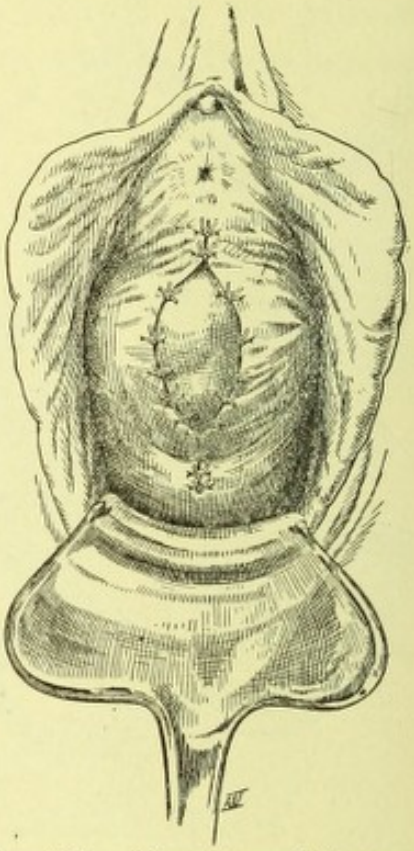


FIG. 211.—The suture of the vaginal wall is concluded, having exposed a slight extent of uterine tissue.

in the vagina after Freund's posterior colpotomy, Fortsch substituted, in the treatment of prolapse, the "inversion" by an incision made in front of the cervix.[1]

The uterus is fixed to the anterior wall of the vagina, from which an oval has been excised; posteriorly it is lodged n a sort of bed formed of two little flaps cut from the right andleft of a T-shaped incision in the posterior vaginal wall.

[1] Fritsch, *Cent. Bl. für Gyn.*, 1900, No. 2. Wertheim is content with fixation to anterior wall of vagina (*Ibid.*, 1899, No. 14) and Buruka (*Zeitsch. für Geb. und Gyn.*, 1901, T. XLV, p. 422).

This operation has the inconvenience of suppressing completely the vaginal cavity. It was soon abandoned for the fixation of the uterus in the substance of the vesico-vaginal septum, thus preserving a vagina useful for copulation (Watkins,[1] Wertheim, Schauta, see Fig. 207).

The operation is done in the following manner: A sagittal incision in the median line on the anterior surface of the vagina, going as far as the posterior part of the urethral meatus. Separation of the flaps from each side of this incision. Posteriorly, in contact with the bladder, make a transverse incision which leads into the retro-vesical space, which is separated. Open the vesico-uterine cul-de-sac and tilt the uterus anteriorly. If the woman is in the period of sexual activity, in order to avoid conception ligature and cut through the tubes (Fig. 208). Then draw the uterus into the anteflexed position and close the peritoneal cavity above it by suturing the retro-vesical peritoneum to that of the posterior wall of the cervix (Fig. 209). The uterus is then lodged in the niche created by the incision and separation of the vagina, its posterior wall being in contact with the bladder and its sides with the dihedral angles resulting from the separation of the incision.

The vaginal flaps are sutured above the uterus of which a small portion remains exposed in the vagina (Figs. 210 and 211). This is of no importance, as the uterine surface becomes covered with epidermis during the weeks following the operation.[2]

This operation is not always possible.

If the uterus is too big to lodge in the space created by the separation of the vaginal flaps, we do a hysterectomy. This is done by Landau. Once the uterus is "inverted" in the vagina, he closes the peritoneum with silkworm-gut sutures, which unite the peritoneum of the pouch of Douglas with the superior angle of the vaginal incision and the vesical peritoneum and which takes up some uterine tissue *en passage*, so that the posterior wall of the cervix is fixed in an elevated position. Liga-

[1] Watkins, *Amer. Gyn. and Obstet. J.*, Nov., 1899; *Surg., Gyn. and Obstet.*, June, 1896, p. 659.

[2] Hastings Tweedy combines an analogous operation by suture of the two broad ligaments in front of the isthmus, which carry the cervix up and back. For that, after inverting the uterus into the vagina, he unites the base of the broad ligaments near their pelvic extremity with strong silk and ties them together. (E. Hastings Tweedy, Curative Operation for Procidentia Uteri. *Journ. of Obstet. and Gynec. of the British Empire*, London, 1905, T. I, p. 349.)

tures inserted into the lateral tissues of the uterus or, if possible, outside the adnexa, suffice to secure hemostasis. Lift out the uterus and fix the pedicles to the corresponding part of the vaginal flaps.

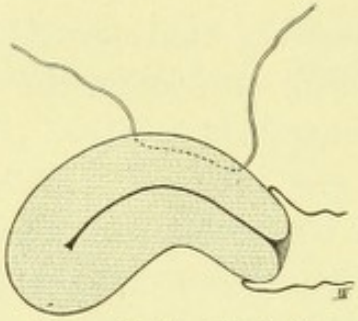


FIG. 212.—Retroflexed uterus. Passage of a suture through its anterior face.

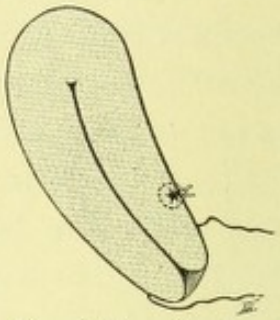


FIG. 213.—The loop of the suture is tightened without the extremities being tied. The uterus is redressed.

6. *Redressing the Retrodeviated Uterus by Uteroplasty.*—Doyen, relying on the fact that in permanent flexion of the uterus the convex wall of the organ distends considerably in its length, proposes to unite by a suture two points

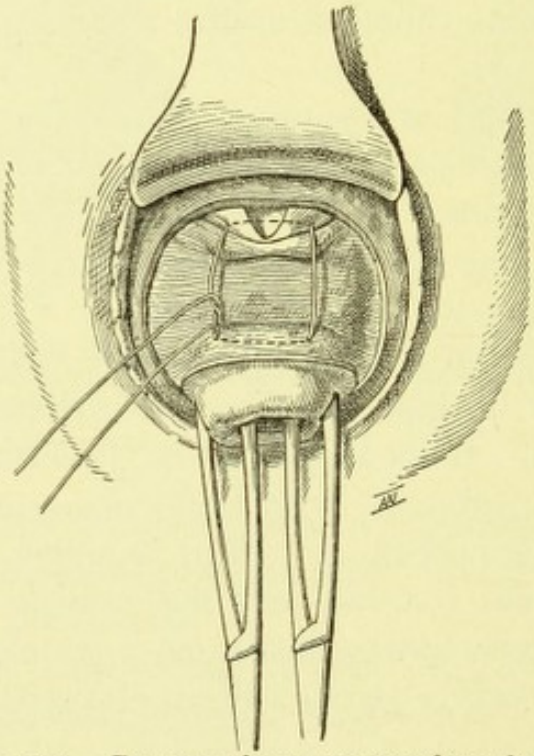


FIG. 214.—Passage of sutures seen from front.

of the anterior wall of the uterus passing exclusively through the superficial strata of the muscle in order to obtain immediate correction of the organ (Figs. 212 and 213).

Anterior colpo-celiotomy, as done by Doyen, consists in passing a loop of sutures 3 mm. deep and 15 mm. broad into the substance of the uterus and then the needle is passed through the superficial layers of the supravaginal portion of the cervix. The extremities of the suture are now tied and thus shorten the anterior wall of the uterus (Fig. 214).

A reinforcing suture, inserted above the first, assures the success of the operation.

Elischer resects from the uterus which has been drawn into the vaginal wound, a U-shaped flap. He denudes the anterior surface of the cervix and then brings the flap and denuded surface into apposition and fixes them.

7. *Shortening of the Uterine Ligaments.*—After anterior colpotomy is done:

a. Shortening of the round ligaments temporarily drawn into the vaginal

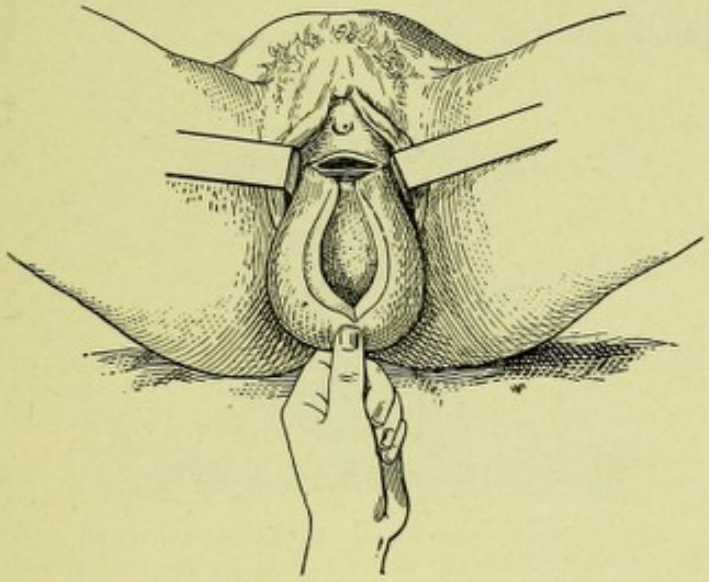


Fig. 215.—Incision of the anterior fornix and anterior wall of the uterus (Oui).

wound (Bode, Godinho), combining sometimes this shortening with vaginal fixation of the ligaments (Wertheim, Vineberg, Hall).

b. Shortening of the large ligaments sutured one to the other in front of the uterus (Kochs).

8. *Reduction of Uterine Inversion.*—Spinelli, after anterior colpotomy, makes an analogous operation to that which Piccoli advocated by the posterior route. On the index introduced into the funnel formed by the inverted uterus, he incises the cervix vertically and the anterior wall of the uterus up to the fundus of that organ. After reduction, he sutures the uterine incision and concludes with a vagino-fixation according to Dührssen's method.

In France, Oui operated in the following manner: After drawing the uterus out of the vulva, he makes just above the external os, which is easily recognized by sight (change in coloration) and by palpation (difference in thickness) a semicircular incision which opens the anterior fornix freely.

This incision should be very extensive so as to enable the operator to easily return the uterus back through it into the abdominal cavity.

Anterior colpo-celiotomy having been done, the infundibulum of the inversion is examined by digital exploration in order to be quite sure it contains no other organ (bladder, intestine) which might be injured by the incision.

With scissors or a blunt bistoury, guided by the finger, the anterior wall of the uterus is incised in the median line in all its thickness from external os to fundus (Fig. 215).

Now the reduction stage arrives. The thumbs are applied to the posterior wall of the uterus; the index-fingers seize the lips of the uterine incision and draw them out and in so doing unfold the uterus (Fig. 216). In continuing this movement we gradually complete the reinversion of the organ. The fundus of the uterus is then directed down and forward, the cervix assuming a position pointing up and back.

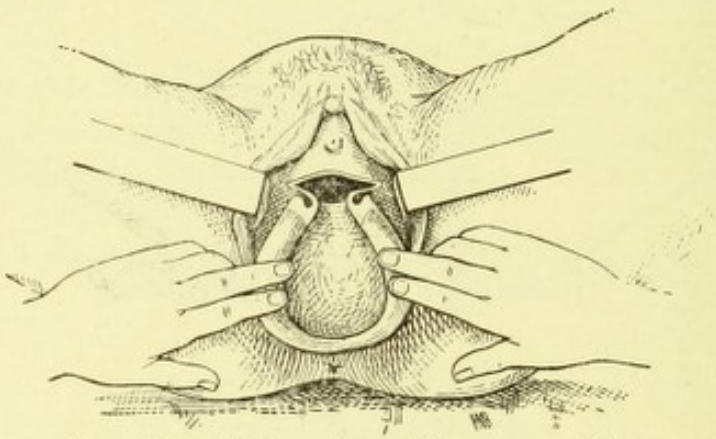


Fig. 216.—Reinversion of the uterus (Oui).

The uterus having been reduced, the wound is united from fundus to isthmus by an interrupted catgut suture. The sutures are about 1 cm. apart and take up the entire thickness of the uterine wall with the exception of its mucous membrane. Between these sutures other catguts are placed, taking up the serous coat and the superficial layers of the muscular in such a manner as to get accurate apposition of the peritoneum.

The fundus of the uterus is then pushed up and back and returned through the vaginal incision into the abdomen.

The cervix is sutured with catgut as also the vaginal fornix.

Results.—*Immediate results* of anterior colpotomy are fairly good. Duhrssen in 503 cases had fifteen deaths; Martin had only four in 471 cases. The bladder is less often injured than one would think *a priori*. Martin has had this occur, however, in five of his interventions.

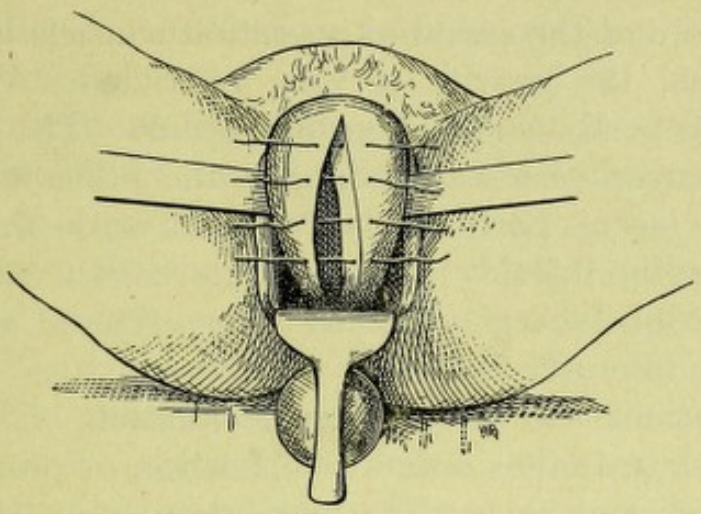


FIG. 217.—Suture of the reinverted uterus (Oui).

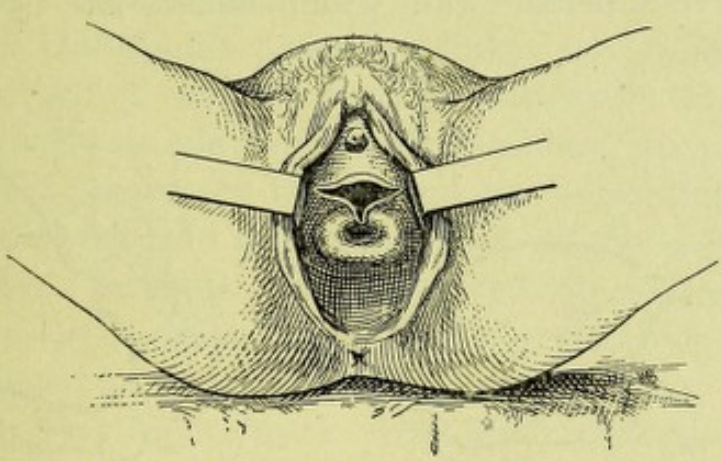


FIG. 218.—The uterus has been replaced by the vaginal incision. There remains now only the suture of the uterine cervix and of the anterior fornix.

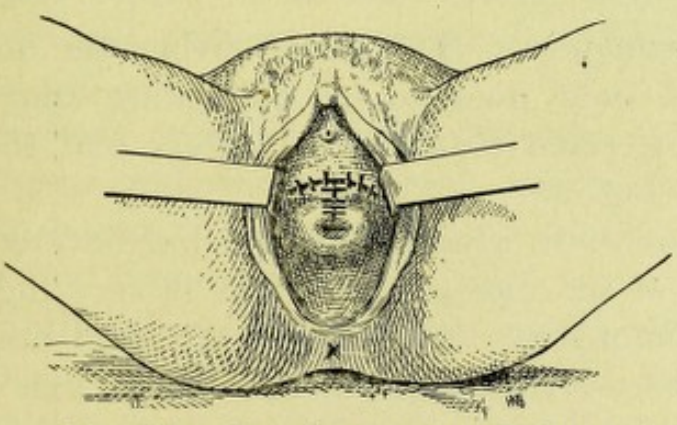


FIG. 219.—Operation terminated (Oui).

In short, in simple cases where the adnexa are healthy or little diseased and the essential operation consists in the fixation of the uterus, the gravity is very restricted. What are the remote results? Retrodeviation may occur. The proportion of these recurrences varies according to the procedure employed. To-day they seem particularly frequent with the procedures in which only the inferior part of the uterus is fixed.

From the obstetrical point of view, remote results are of no particular interest.

Complications are due to uterine fixation. These complications are of two other orders:[1] Abortion or premature labor: 25 to 27 per cent. according to Strassmann. Also dystocia due to the uterus developing unequally during labor. The body of the uterus develops almost exclusively at the expense of the postero-superior wall which causes the os to look up

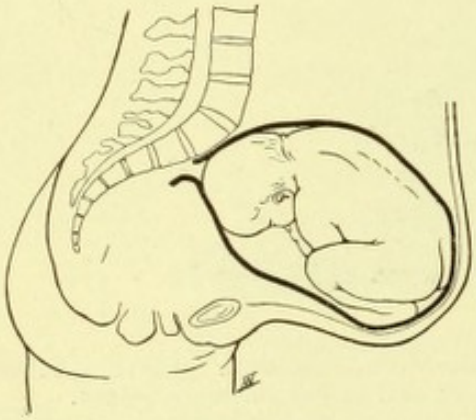


Fig. 220.

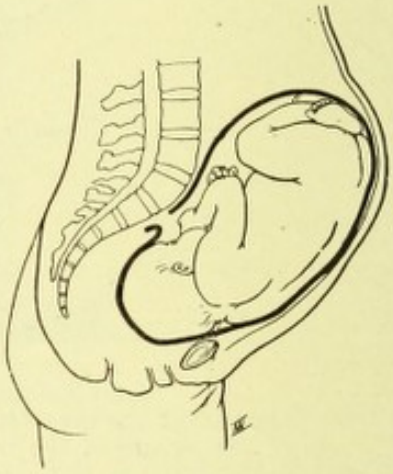


Fig. 221.

Deformities of the pregnant uterus after vaginal fixation (Kleinwachter).

toward the promontory (Fig. 220). When the head enters the true pelvis, it only does so by distending that part of the anterior face situated between the cervix and the fixed point of the uterus (Fig. 221).

We find therefore a head engaged but covered over by the anterior wall of the uterus; the cervix is very high, sometimes above the promontory. The axis of the child may be in these conditions more or less perpendicular to the axis of the pelvis. Ordinarily the uterus, as a result of the pressure of the anterior

[1] Oui, Hysteropexy from the Point of View of its Influence on Pregnancy. *Ann. de gyn.*, Paris, 1904, p. 225.

abdominal wall of the uterus, deviates and a transverse presentation is produced. According to Kleinwachter this occurs in 15.67 per 100 cases.

The complications in different labors have also another cause. The union of the anterior wall of the uterus and of the corresponding wall of the vagina produces at the point of union a fibrous cicatricial area, upon which the development of pregnancy has no influence. Also it is common to observe that during a pain there is a rigidity of the anterior half of the cervix. If this is borne in mind and also the part that the postero-superior wall of the uterus plays during labor, in short, practically the entire role becoming very thinned, one can easily understand ruptures occurring at this level.

Since then defenders of vagino-fixation have endeavored to avoid dystocic complications.

From this Duhrssen's procedure takes its origin. We have already described it and his method endeavors to replace the fibrous cicatrix by simple peritoneal adhesions, susceptible under the influence of pregnancy to undergo the important anatomical modifications which lead to increased size of the uterus.

Indications.—In short, with the exception of the abstraction of pre-uterine suppurative collections where anterior colpotomy may be employed as the operation of necessity, what other cases present themselves for its use? In a general sense when it is a question of the extirpation of uterine *tumors*, such as fibroma of the anterior wall, or para-uterine tumors, such as ovarian cysts, it appears to us as an operation which is inferior to that of the abdominal route. It is even firmly contraindicated in adherent tumors and malignant tumors or solid tumors larger than the closed fist.

In *retrodeviations* complicated by extensive adhesions with neighboring organs, anterior colpotomy, which gives a limited operative field, should be rejected and we would, without hesitation, choose the abdominal route. But, in simple cases of adherent or slightly adherent retroflexion, with healthy or slightly diseased adnexa, anterior colpotomy may give good results. It has the advantage, if it is combined simultaneously with a curettage or colporrhaphy, of fulfilling the different indications by purely vaginal intervention. In such a way one avoids the

loss of time which must occur as a result of the changes of position of the patient.

Personally, we prefer in these cases the abdominal operation. If, at the same time, it is decided to try a vagino-fixation, what proceeding should one employ? All depends on the age of the patient. If she has reached the menopause, if she has undergone a bilateral extirpation of the adnexa, we may have recourse to a direct and extensive vagino-fixation. If it is a young woman, capable of pregnancy, we advise Duhrssen's operation. This operation does not put all recurrence out of the question, especially if pregnancy occurs. But the possibility of a recurrence, otherwise problematic, is nothing compared to the certainty one has of avoiding the redoubtable dystocial complications imparted to the primitive procedure.

In prolapse, the operation of Wertheim-Schauta which consists in fixation of the inverted uterus in anteflexion and the forcing of it into the substance of the vesico-vaginal septum, it counts a certain number of partisans in Germany. The same operation has given us, as also Hofmeier, good results in rebellious cases of incontinence of urine.

CHAPTER VIII.

VAGINAL HYSTERECTOMY.

Summary.—Technic (pre-operative precautions, operation, postoperative precautions).—Operative difficulties.—Complications.—Various procedures (Doyen, Péan, Segond, Müller, Quénu, J. L. Faure).—Operative modifications according to the lesion (cancer, fibromata, inflamed adnexa, puerperal infection, prolapse, uterine inversion, juxta-uterine tumors).

The first surgeon to excise the uterus with success by the vaginal method was Sauter of Constance (1822). He operated without forceps or ligatures and yet his patient was cured. In 1829 Recamier did the same operation, but ligatured the uterine arteries. Unfortunately the high mortality made the operation fall into oblivion, from which it was restored to the light by Czerny, who on the twelfth of August, 1878, did a vaginal hysterectomy for cancer of the cervix. At first, vaginal hysterectomy was reserved for this affection. Its indication, however, soon became more extended.

Thanks to Pean firstly, to Segond, Richelot and latterly to Doyen, vaginal hysterectomy was applied in a systematic fashion to treatment of the adnexa, and then to fibromata.

Its operative technic has been considerably simplified owing to the introduction of forcipressure and to morcellement.

Among numerous operative procedures which were successively utilized, we should give a place apart to that of Doyen to whom is due the merit of introducing a technic so simple and so rapid as to vulgarize vaginal hysterectomy.

In spite of the operative perfection and the excellence of the results, vaginal hysterectomy, having had a very considerable vogue in the treatment of inflammation of the adnexa, fibromata and cancer, has lost much ground and tends more and more to be replaced by abdominal hysterectomy.

1. Operative Technic.

Preparatory Precautions.—Vaginal hysterectomy renders certain pre-operative precautions necessary which it is important not to neglect. Several days before the operation the patient

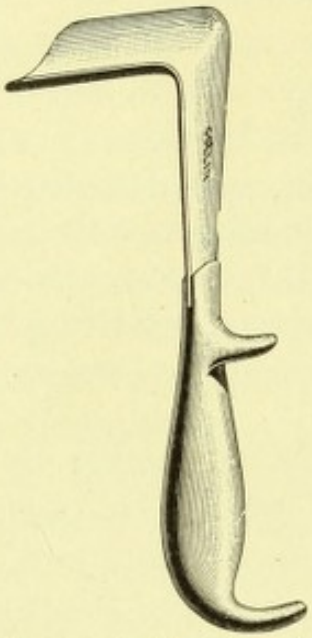


Fig. 222.—Short vaginal speculum.

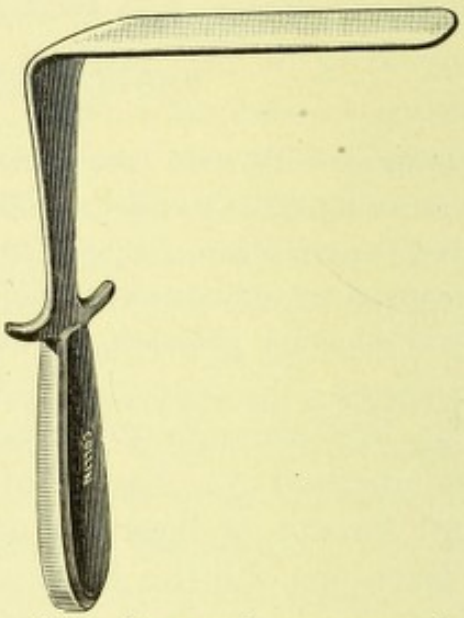


Fig. 223.—Long and narrow speculum.

will take large vaginal injections twice daily. Give a purge the night before the intervention.

Before operating look to the toilet of the vagina and vulva. This is a lengthy and minute operation. The vulva should be

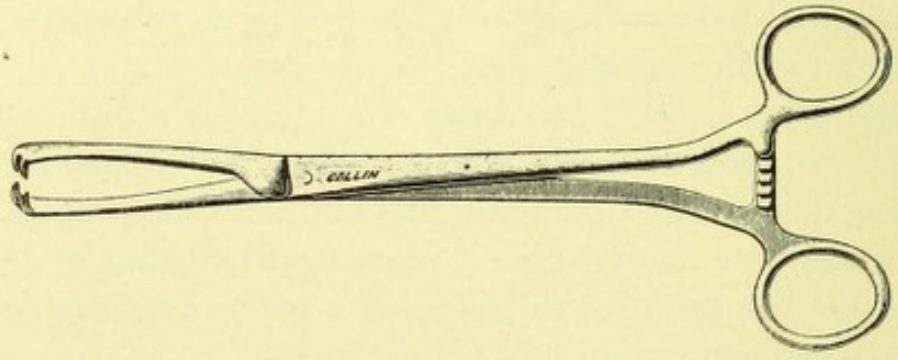


Fig. 224.—Museux's heavy forceps.

completely shaved; wash with soap not only the external parts but also the vagina itself.

The following is a list of instruments required:

Several vaginal specula, one about 5 or 6 cm. long, to

press down the fourchette, two ordinary vaginal specula, two long and narrow specula about 35 mm. long in order to protect the bladder, some tampon holders, six pairs of Museux's strong forceps to draw the uterus down, one hysterometer, one bistoury, some straight and curved scissors, pressure forceps, one pair of tenaculum forceps, some Kocher's forceps, two ring forceps to draw on the adnexa and eight pairs of short and powerful pressure forceps.

The relative position of the operator and his assistants is the same as for all vaginal operations.

Two assistants are indispensable; one is placed to the right and the other to the left.

The instruments are to the right of the operator.

In order to avoid any sepsis the operative field should be extensive. It is important to fix the posterior compress so as to conceal the anus. Three little tenaculum forceps are dis-

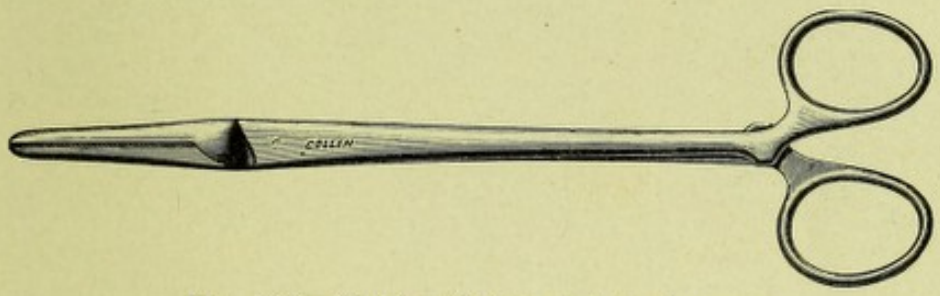


FIG. 225.—Short and strong artery forceps.

posed so that one is on a line with the fourchette, and two others over the buttock; fix this compress and in order to be quite sure of the fixation allow them to take up at the same time a little fold of the subjacent tissues.

The bladder is emptied with a catheter.

Operation.—The operation should then commence.

The fourchette being pressed down by the short speculum, the cervix is seized with two pairs of traction forceps inserted into the anterior lip near the commissures. The hold should be firm; the uterus, by slow and progressive traction, is drawn down to the vulva (Fig. 226). Holding the two forceps in the left hand the operator, with scissors or a knife, held in the right hand, makes a circular incision of the cervix. The majority of surgeons make a circular incision. We believe with Segond,

that it is of benefit to add to this circular incision two small lateral ones.

If the knife is used, the incision is performed in the following manner: Two little retractors are placed in the lateral fornices. The assistant to the right of the patient commences by strongly

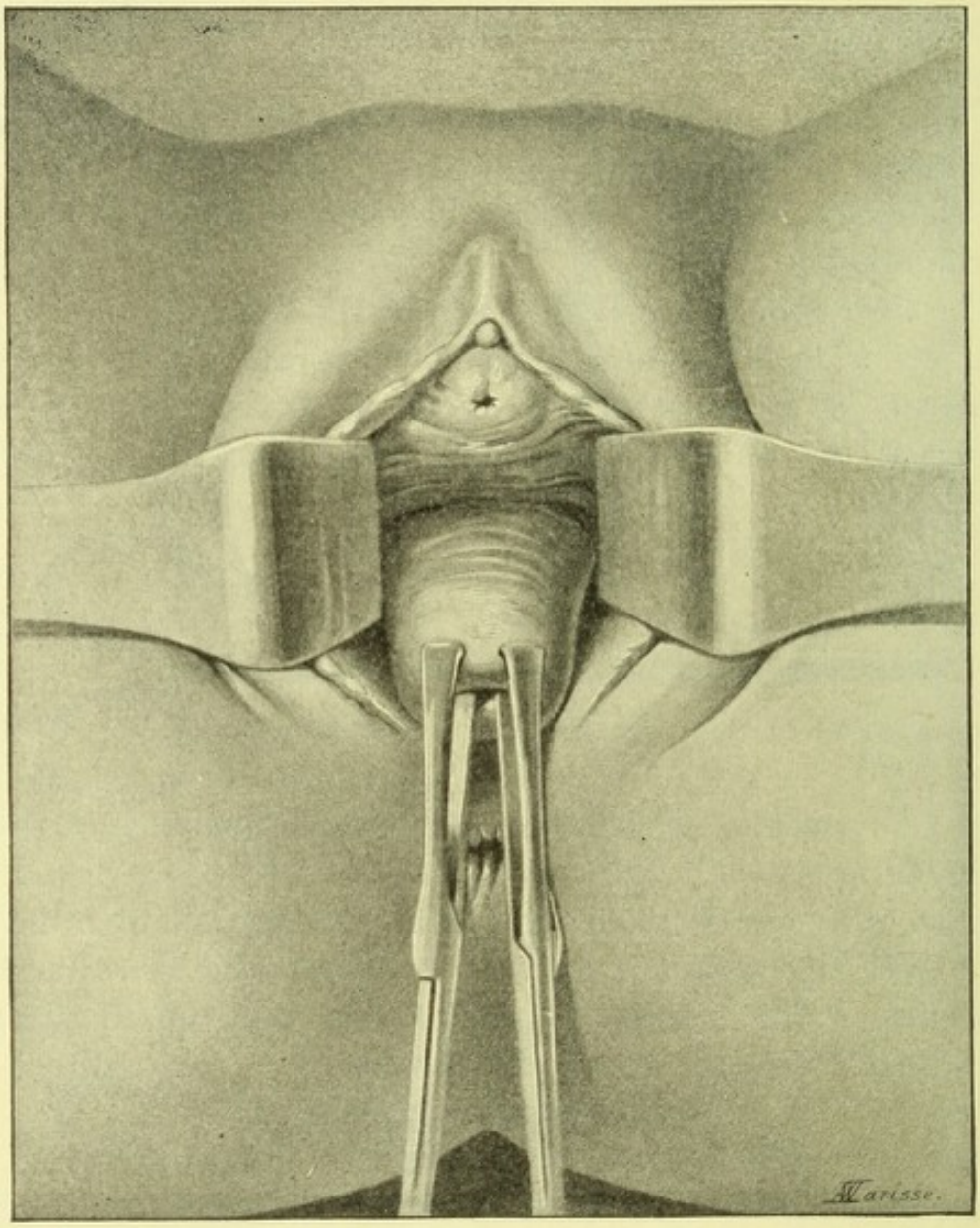


FIG. 226.—The uterus is drawn down with two of Museux's heavy forceps; the vaginal walls are drawn back with retractors.

pressing down with his retractor the corresponding vaginal wall while the surgeon with his left hand draws the cervix strongly toward the left. The fornix is thus well exposed and stretched. Taking the bistoury, the operator commences the incision in

this fornix about 4 cm. from the right commissure. This incision is directed at first transversely toward this commissure but when the bistoury is about 1 1/2 cm. from it the instrument is directed forward and cuts through the anterior fornix on the cervix. During this procedure the cervix is drawn toward the right. The left retractor now plays its role in that it permits of the knife

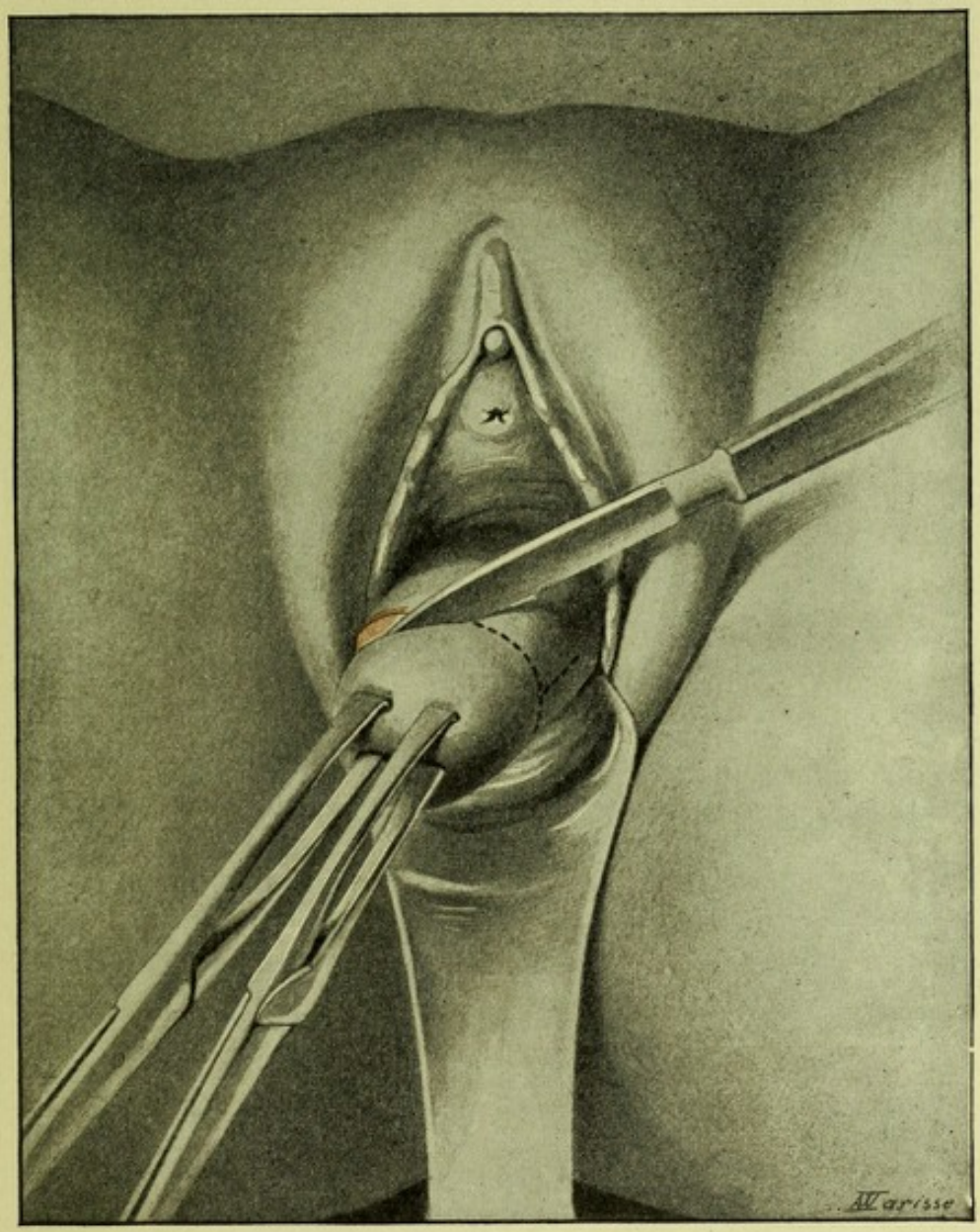


Fig. 227.—Circular incision of the cervix with lateral incisions.

in making a short lateral incision in the left fornix symmetrical with that on the opposite side.

In inserting a posterior speculum and in drawing the cervix forward, one is enabled to circumscribe the cervix by tracing

a curved incision posteriorly, and then proceeding toward the front about 1 1/2 cm. from the external os[1] (Fig. 228).

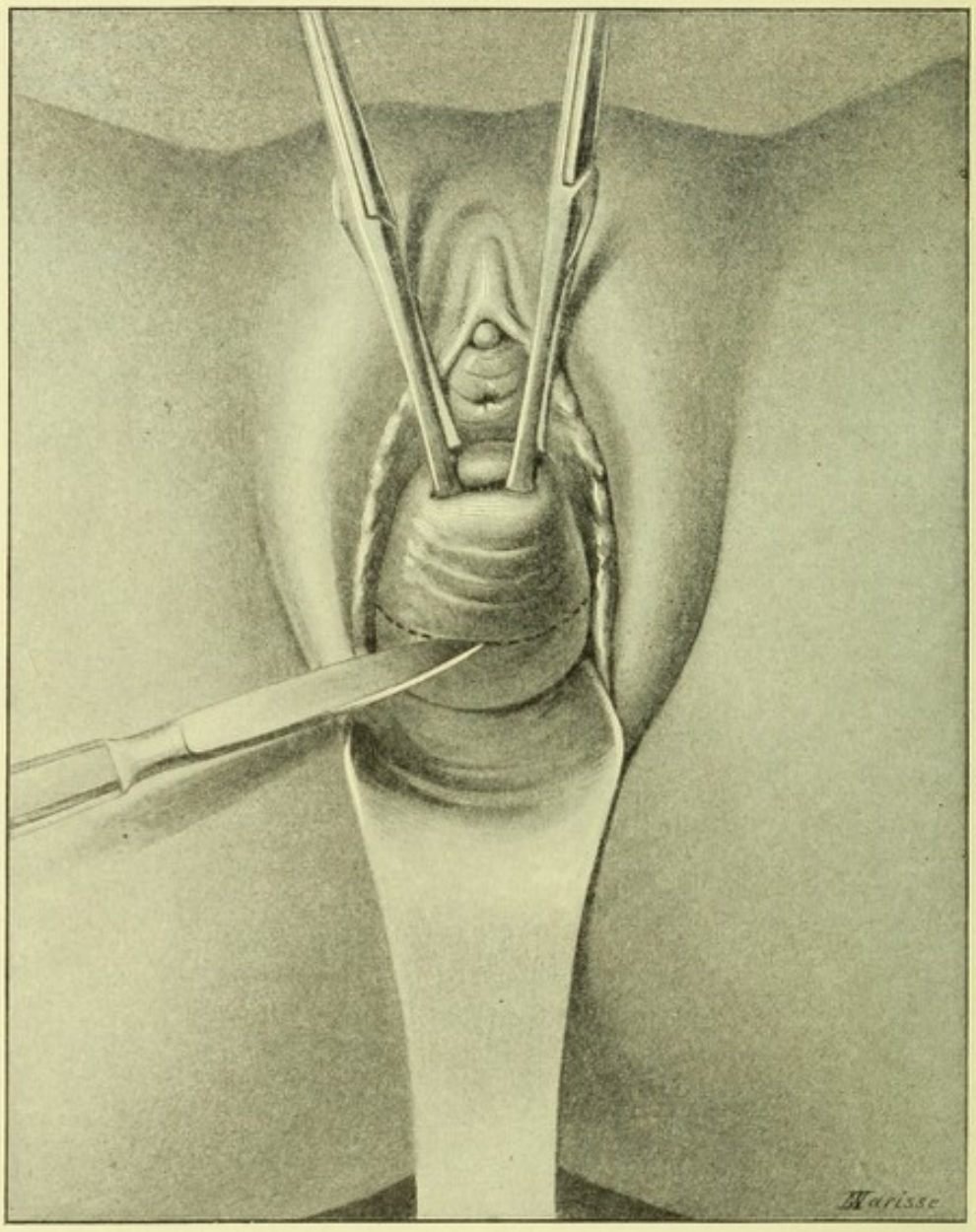


FIG. 228.—Posterior part of the circular incision of the cervix.

The danger is the bladder; by keeping about 15 to 18 mm. from the cervix there is nothing to fear. In case of doubt regard-

[1] Some operators prefer to attack the vagina with strong curved scissors. The cervix should be assailed on its posterior right face. The left hand drawing on the forceps pulls it forward and the scissors cut into the right of the cervix (to left of the operator) about 2 cm. from the external os and with some few cuts sever the posterior vaginal portion; often the pouch of Douglas is opened in this manipulation, but it is of no importance. When the scissors is on the left side of the cervix, the left hand manipulates in such a way as to expose clearly the lateral surface, then the anterior surface of the cervix and the scissors circumscribe the cervix by cutting through the insertion of the vagina; their extremity, applied to the uterus, severs gradually the anterior insertion of the vagina and then goes to the left of the operator to unite with the first incision at its starting point. The disinsertion of the vagina is finished (J. L. Faure).

ing its limits there is nothing simpler than to introduce a sound so as to accurately determine its limits.

The cervix thus circumscribed should be freed. Commence by opening the posterior fornix. To do this, the cervix being carried forward, the index-finger is forced between the lips of the posterior part of the vaginal incision and endeavors to burst through the peritoneal cul-de-sac. If this is free, the action is easy

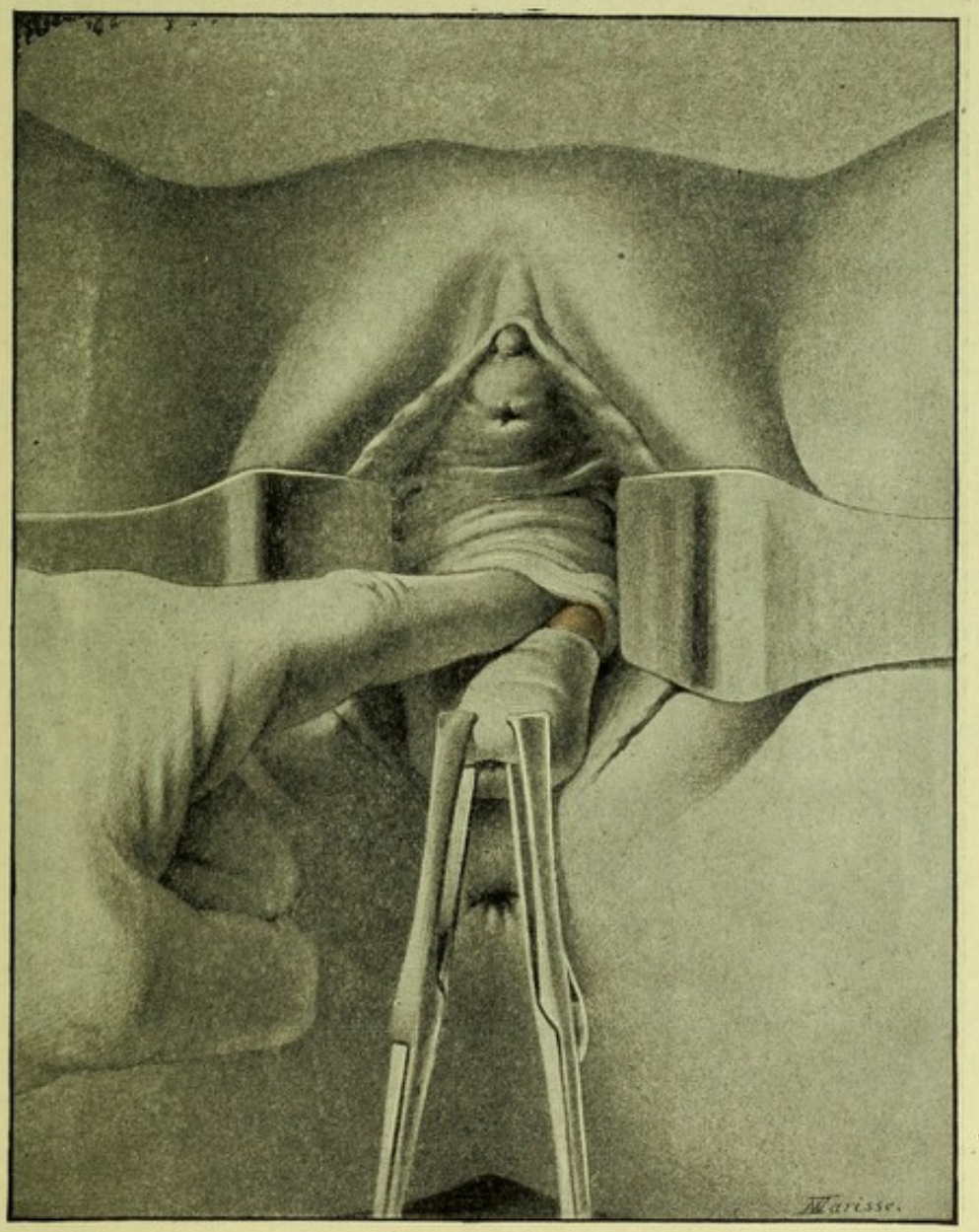


FIG. 229.—Separation of the bladder.

and the finger soon feels as if it were in a cavity, where it feels intestinal loops or even prolapsed adnexa.

If the cul-de-sac is full of adhesions the peritoneal cavity is difficult to find. It is in these cases that we must proceed me-

thodically. The index-finger ought not to lose the contact of the posterior surface of the uterus, which is the best of landmarks. It feels its way along the length of this surface until it reaches the level of the fundus. In complex cases it happens sometimes that in this little manipulation one or more suppurative foci are opened.

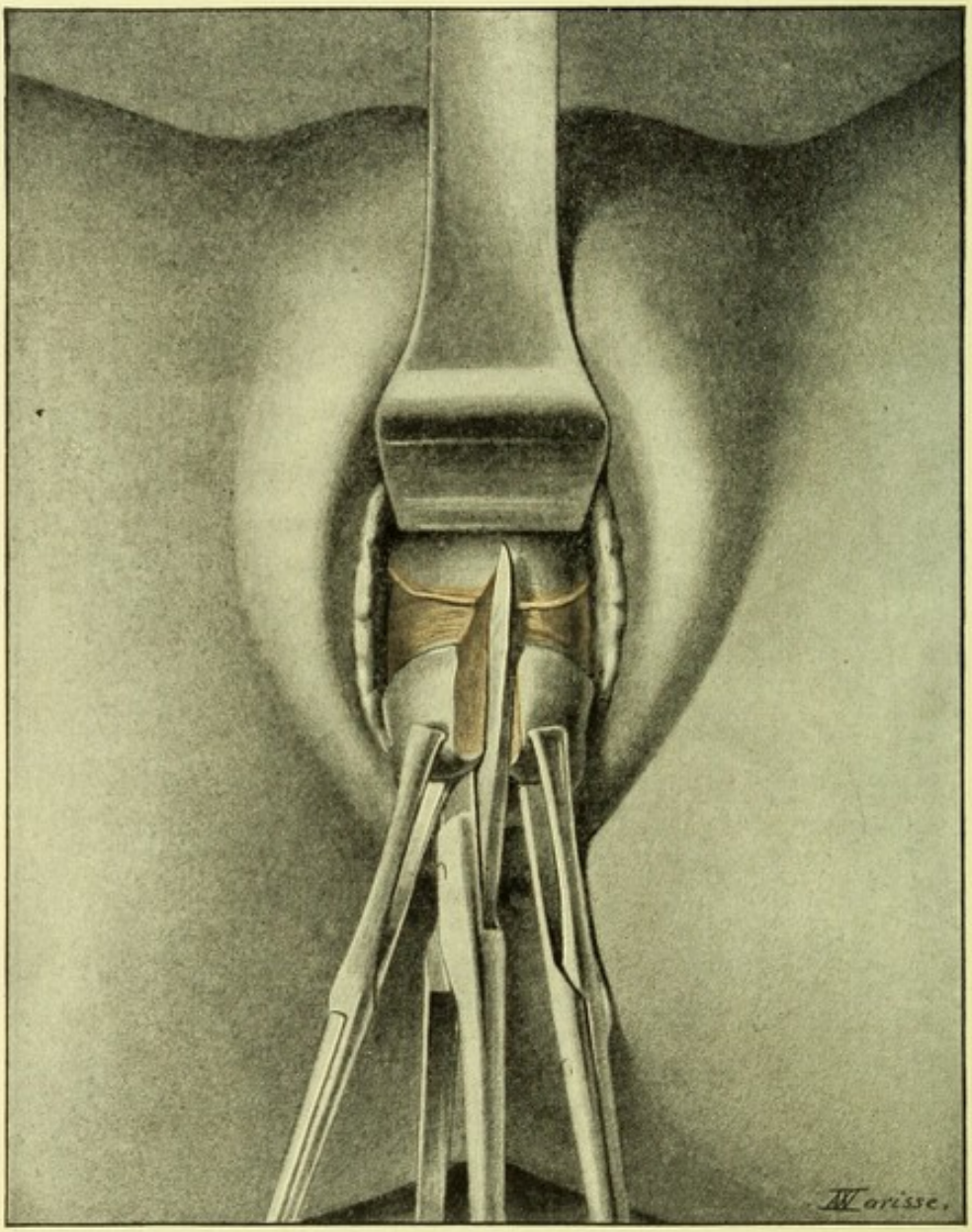


FIG. 230.—Median anterior hemisection of the uterus.

The uterus is freed behind and now it must be freed anteriorly. To do so, carry the cervix down and back toward the fourchette, separate the bladder with the right index-finger (Fig. 229) or with blunt curved scissors which may be used to press

back the tissues and also to cut through the parts which resist the separation.

Above all, at the level of the median line adhesions are most marked, as we have already had occasion to observe when describing anterior colpotomy.

The separation of the bladder should be very complete. It is carried out as extensively as possible laterally in order to separate the ureters from the operative field.

In the course of these manipulations the vesico-uterine cul-de-sac is often opened. If it is not, it may be recognized by its white color, which differentiates from the neighboring cellular tissue and may be opened by a single cut of the scissors.

When the uterus does not descend well and the peritoneal cul-de-sac is not to be seen, we should proceed without waiting to the next stage: *Anterior hemisection of the uterus* or median section of the anterior wall as recommended by Doyen (Fig. 230).

This hemisection is done in the following manner. Two traction forceps are placed at the level of each of the commissures of the cervix. The posterior limb of a pair of straight blunt scissors is introduced into the cervical cavity and the anterior wall is cut through as far as the isthmus, or even a little higher, remembering always to follow exactly the anterior median line. This cut does not bleed. On each lip of the incision, as high as possible, place a pair of traction forceps.

By drawing on these forceps, which hold the uterus very firmly, its anterior face is sensibly depressed and at the same time a slight anterior flexion is imparted to the organ.

A new part of the uterus, not incised, now appears. Taking the scissors again, the surgeon cuts through all the visible portion of the accessible anterior face. A third pair of traction forceps is placed on one of the lips of the incision above the first pair (Fig. 231). This pair may then be taken off and reattached on the most elevated portion of the opposite lip of the same incision.

One ascends thus toward the fundus of the uterus, in a sense making the traction forceps climb the anterior median incision which the operator continues to prolong. This progressive ascension of traction forceps brings about a more and more marked tilting of the body of the uterus. In the meantime the vesico-uterine cul-de-sac has been opened; a long and narrow speculum

is introduced into its cavity, protecting the bladder and pressing back the loops of intestine which tend to descend. When the median anterior incision approaches the fundus of the organ and the traction forceps are inserted very close to this point, tilting of the uterus occurs and the body is turned completely inside out into the vagina (Fig. 232).

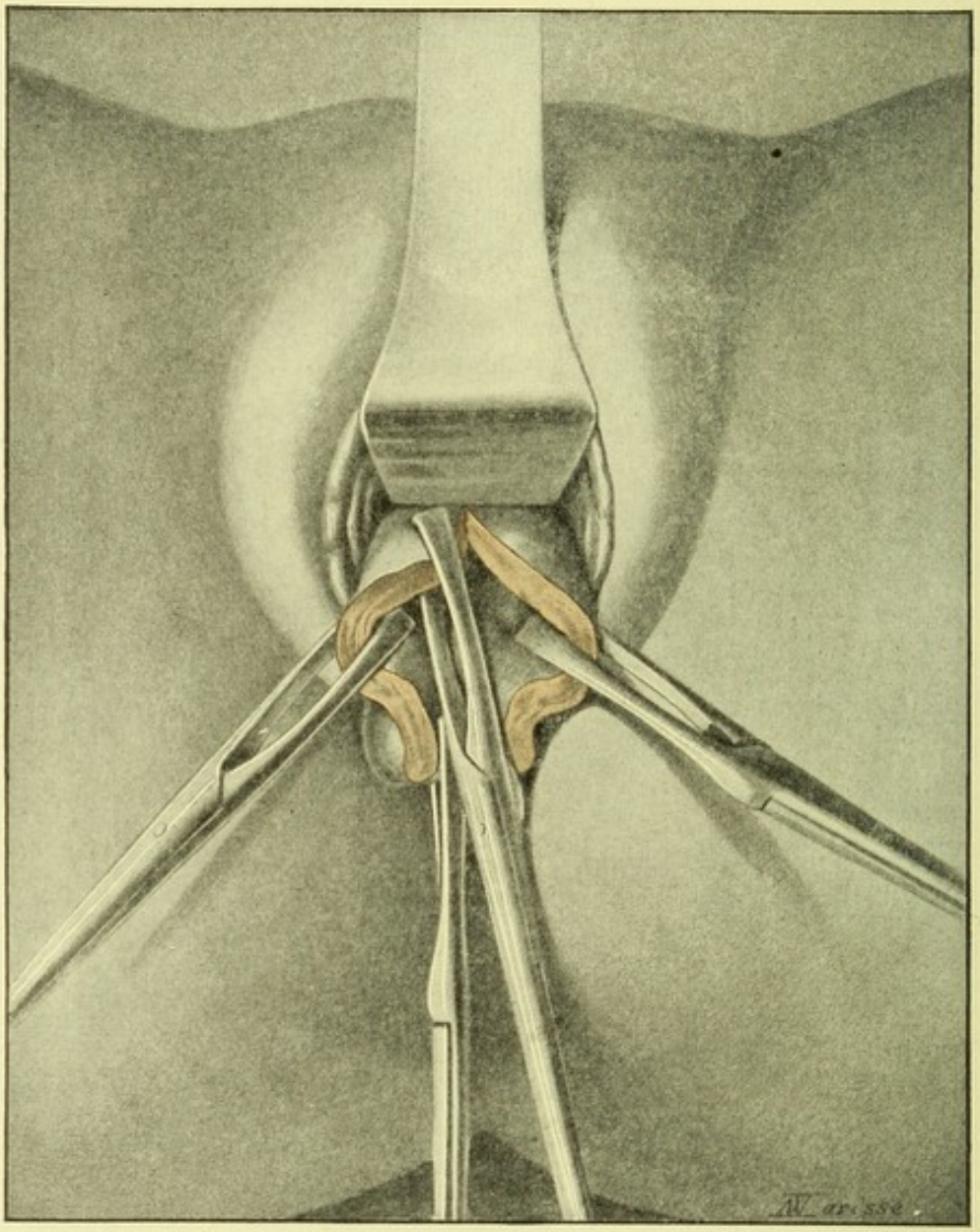


FIG. 231.—Progressive ascension of the forceps as the hemisection proceeds.

We must now free the adnexa. Commence with those on the left side. The index-finger and medius of the left hand are introduced above the fundus of the uterus and are directed toward the posterior aspect of the broad ligament and then they commence

to slowly detach the adherent adnexa. This freeing, which is easy in some cases, may be very difficult, even impossible. We will have to return to this point and the line of action to take in these cases when we study the application of vaginal hysterectomy with reference to the adnexa, and we will not dwell for the moment

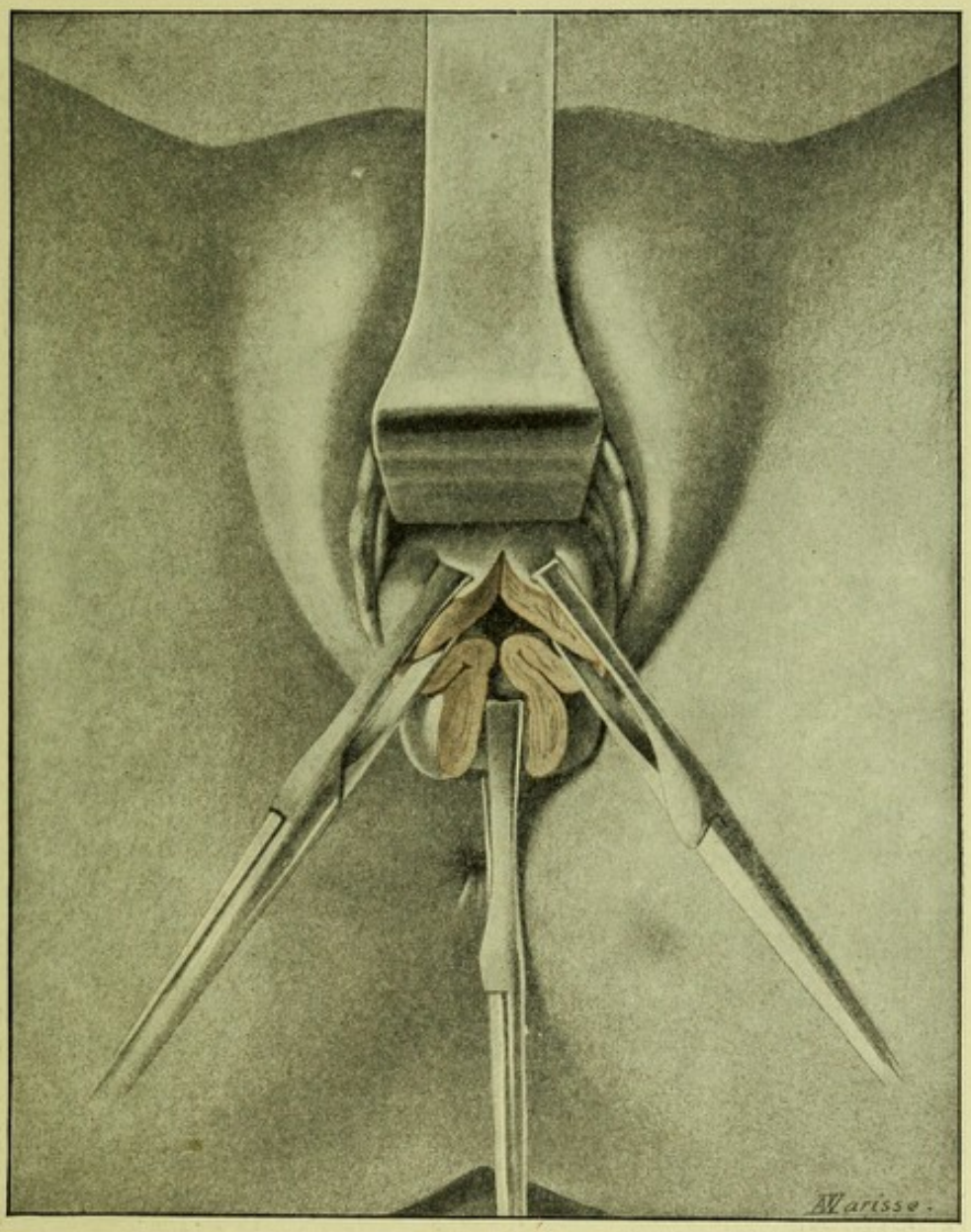


FIG. 232.—The incision has reached the fundus of the organ. The body of the uterus is tilted forward.

on this separation. Having freed the adnexa, these are directed toward the uterus and hemostasis of the broad ligament is carried out. In order to do this, charge the assistant to the right with the care of the uterus, and request him to gently draw it to his side. Then place the clamps in position under the double control of

eye and finger. In no case place forceps on a broad ligament unless under control of the eye. A short and strong pair of artery forceps, the model of which we have indicated, is attached from below up, external to the cervix; it is made to seize the interior half of the broad ligament where the uterine pedicle is situated.

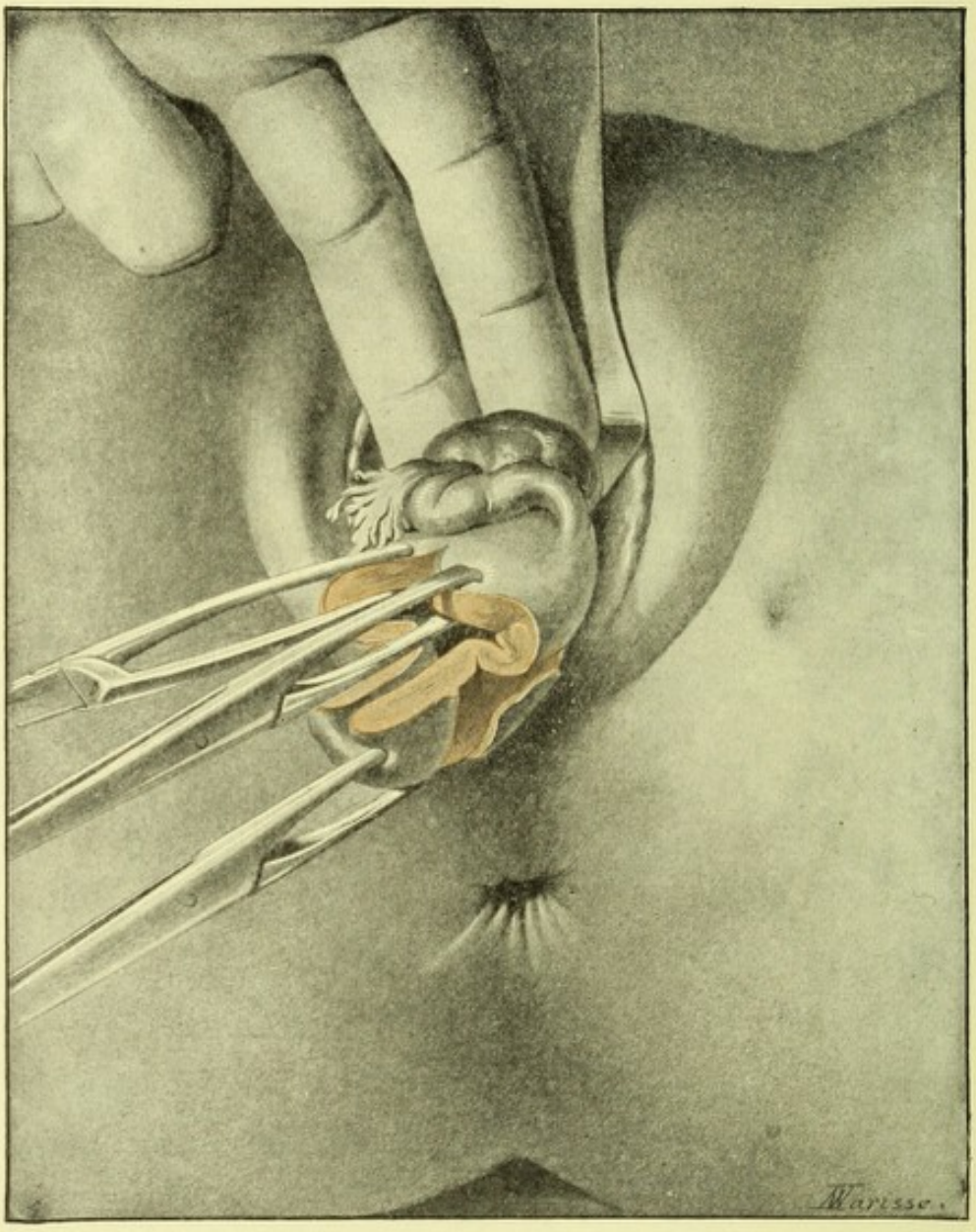


Fig. 233.—Freeing of left adnexa.

At the same time the two fingers of the left hand, introduced into the recto-uterine cul-de-sac, keep away the intestinal loops. A similar pair of forceps is attached in the inverse sense, that is, from above downward, to the upper part of the broad ligament, external to the adnexa and securing the superior pedicle. The

two forceps should be so placed that between them no part of the broad ligament should be exempt from pressure (Fig. 234). With scissors we cut through the broad ligament about 1 cm. external to the clamps.

Then we go on to the freeing of the right adnexa. Having

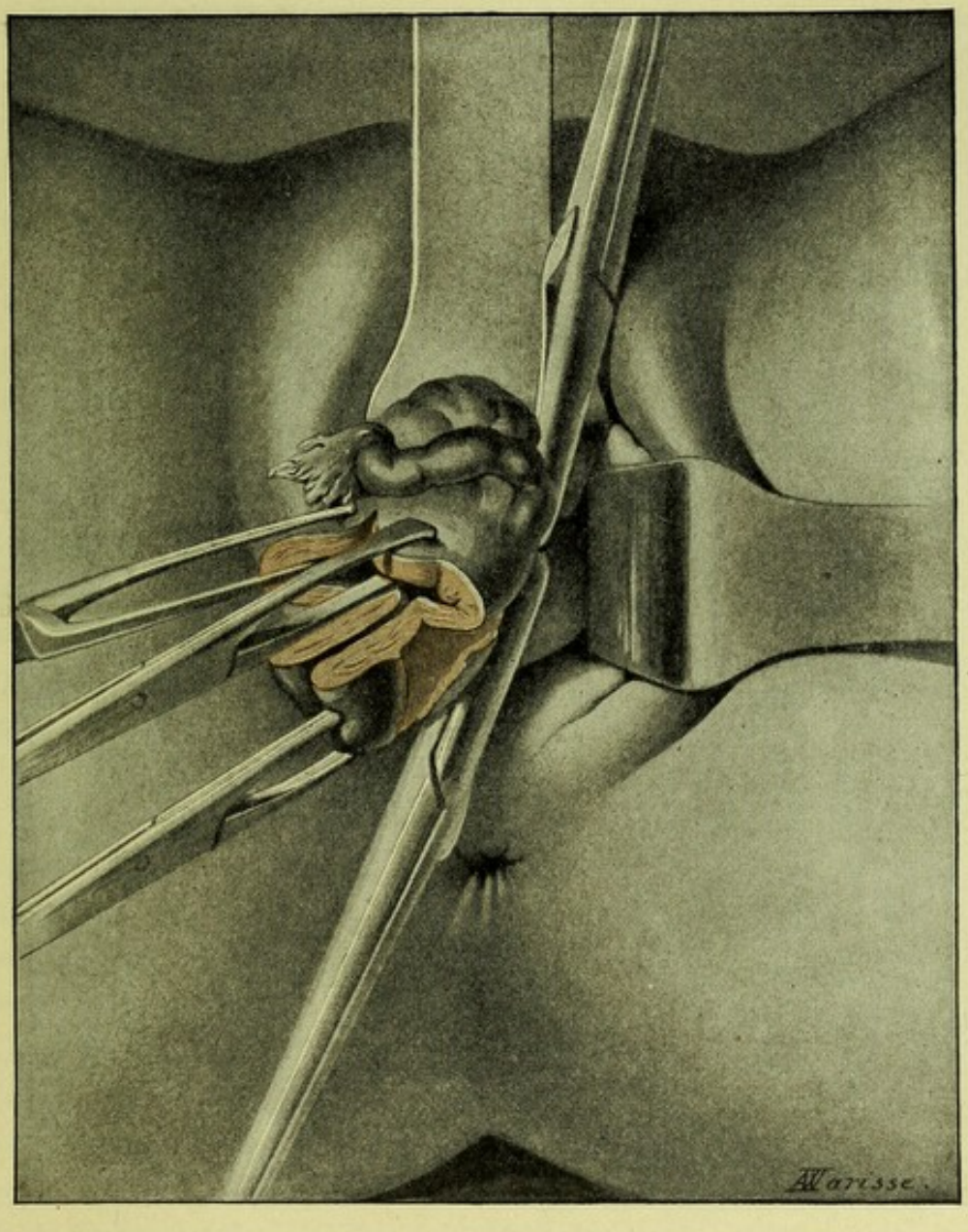


Fig. 234.—Forceps placed on the left broad ligament.

done this, the termination of the operation is very simple. The uterus which is only attached by the broad ligament of the right side should be guided to the vulva and, as on the left side, two pairs of forceps should be placed, one from below up and the

other from above down (Fig. 235). A cut of the scissors internal to these forceps enables us to make the final separation.

The two upper forceps, placed on the utero-ovarian pedicle, fall in front of the two forceps placed on the uterine pedicle; in this movement they drag with them the upper portion of the broad

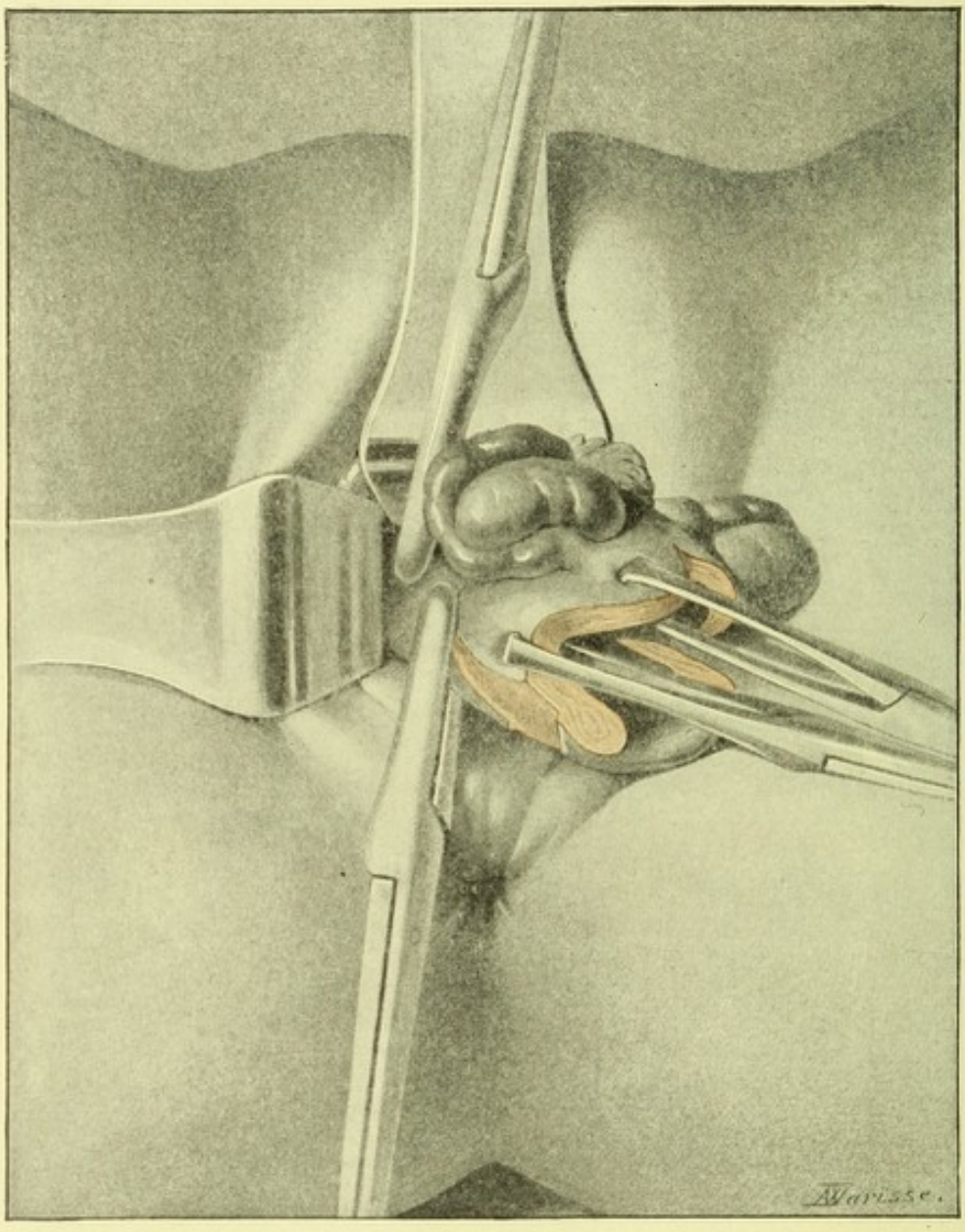


Fig. 235.—Forceps on the right broad ligament.

ligaments and bring about a folding of these ligaments which assumes the form of a dihedral angle, open below, and of which the summit corresponds to the junction of the upper and lower forceps.

If the operation has gone along smoothly and typically, these four forceps are quite sufficient to secure hemostasis.

It is, however, not always thus. In any case, before regarding the operation as terminated and doing the dressing, it is necessary to make a serious examination of the parts. To do so, separate one from the other two groups of forceps, which are doing duty as lateral retractors. Place anteriorly and posteriorly two long and narrow specula and with a tampon of gauze held in a pair of forceps, proceed to the toilet of the parts. One is thus able to see if any oozing is going on. If oozing exists, we must find the bleeding point and arrest it. If we are quite sure that the hold of the four chief forceps is perfect, the bleeding may have many origins. It may come from tears produced during separation of the adnexa; these tears are usually on the posterior aspect of the broad ligaments. It may come from the summit of the dihedral angle formed by the folding of the broad ligament; in these cases the blood comes from the arteriole of the round ligament which has escaped the forcipressure of the upper clamp. Finally, the vaginal incision may be the source of the hemorrhage. In any case, if the source of the hemorrhage has been discovered, it is easy to apply forcipressure to the bleeding vessel. Then we again turn our attention to the bleeding, and if hemostasis is absolute, we go on to the dressing.

This is done with several precautions with the aid of a long pair of vaginal dressing forceps. Two long strips of iodoform gauze are introduced. These gauze wicks should not go beyond the end of the clamps in such a manner as to prevent the contact of these latter with the intestines and finally to separate as widely as possible the intestine from the ligamentous stumps. The exterior extremity of the gauze is folded up in the vagina. A new gauze is interposed between the forceps and the fourchette in order to prevent the direct pressure of forceps on the mucous membrane and to thus avoid the production of little excoriations at this point. These are always painful and present a source of infection. The patient's bladder is catheterized, the vulva very carefully cleaned, and then covered over with a large layer of hydrophile wool, in the center of which is an opening to allow passage for the vaginal forceps. A T-shaped bandage completes it all; finally, be careful to unite the handles of the forceps with a piece of gauze loosely tied.

Postoperative Details.—The patient is kept quietly in bed in order to avoid any movement which may affect the forceps. Raise the patient slightly so that the forceps do not repose on the bed. The two thighs of the patient, united with a broad serviette, are maintained in flexion by a pillow placed under the popliteal spaces.

The *immediate postoperative treatment* is nothing special. It is that of any operation in which the peritoneal cavity is opened. Abstinence from food until evening: then alcoholic fluid (champagne or grog), taken in small quantities at regular intervals. As early as the day following, give liquid alimentation if no inflammatory complication occurs.

The patient's bladder should be catheterized. This should be done at intervals and is of much greater benefit than to leave it in continually, a course we must deprecate. A nurse should remain by the bed, watch the patient's movements and keep her on her back.

Certain surgeons apply an ice-bag continually to the abdomen in order to lessen the pain.

The forceps are taken off forty-eight hours after the operation. This is done very simply. Each clamp is carefully unclamped; then a slight movement of rotation is given to it in order to detach the blades from the tissues with which they were in contact. This being done, the clamp is gently drawn out, without jerks, and above all without force. If in spite of these precautions, one finds difficulty in removing the forceps, do not insist. Unclamp and take away the neighboring ones; that suffices often to render easily removed the recalcitrant pair. Afterward, after removal of the forceps, proceed to a rapid cleaning of the vulva and once more re-apply a layer of sterilized wool.

The gauze wicks are removed on the fourth or fifth day. To remove them, the patient is taken to the operating theater. This permits of washing the vulva with more care and enables the vagina to be thoroughly cleansed before the insertion of new gauze dressing, which will be purely vaginal now.

Commence vaginal injections on the eighth or tenth day. The cannula should be hardly made to enter the vagina, the vulva is maintained open and the pressure reduced to a minimum. The patient may get up on the fifteenth day.

Operative Difficulties.—The vaginal hysterectomy may be very difficult by reason of the tightness of vulva and vagina, by fixation of the uterus, by its friability and adhesions round about.

When the narrowness of vulva and vagina is not too considerable, simple dilatation with specula at the commencement of the operation suffices to give them sufficient dimensions. But if the stricture of the parts, congenital or acquired, presents a very marked degree, it is necessary to change the constricted nature of these tissues before thinking of a vaginal hysterectomy. The different varieties of vaginal incision and separation, which we have had occasion to describe, appear to us to be indicated only exceptionally. It may be sufficient to use repeated tamponing of the vagina or to dilate it with Gariel's pessary. We should not hesitate to employ these means; it is better, however, in these cases to use the abdominal route.

The uterus is usually fixed by peri-uterine inflammatory lesions. It constitutes an operative complication of the most annoying description and renders the drawing down of the uterus so difficult that one has to have recourse to morcellement of the organ.

The difficulties are maximum when to this fixation of the uterus is added friability of tissues. It is then quite impossible to attach a pair of traction forceps without tearing out a piece of the tissue. This friability occurs in hysterectomies soon after a pregnancy or abortion; it may also be seen, apart from pregnancies, in cancer of the uterus and in some special forms of parenchymatous metritis. We must then, according to J. L. Faure, replace traction forceps by forceps with a broad blade, such as are used in ovarian cysts. The large hold prevents the cervix from being torn.

We will not insist on the difficulties due to adhesions of the adnexa, as we will return to this point when we study vaginal hysterectomy in case of salpingo-ovaritis.

In a general way, with patience and method, we can triumph over these difficulties. If, however, they are too considerable, do not continue too long on an operation which is so difficult, but abandon it for the abdominal route.

Complications.—We may come across, during or after a hysterectomy, a certain number of complications which it would be well to go into.

Hemorrhages.—The most important complication is hemorrhage. It may come on during the performance of vaginal hysterectomy and results generally from some operative error. If one takes care to proceed in a methodical manner, clamping the ligaments before cutting them, and to proceed always under direct control of the eye, there is every chance of avoiding hemorrhage during the operation.

If the hemorrhage comes on some little time after the operation, it is due generally to breaking or slackening of the hold of one of the clamps which assures the hemostasis of the broad ligaments. It comes on usually when one uses long-bladed forceps, and when one has applied only a single forceps on each broad ligament. In the procedure we have advised, by using two shorter-bladed forceps, all such accidents may be in that manner avoided.

In presence of a hemorrhage due to this cause, seize the point that bleeds through the vagina. *But most important to remember, do not work in the dark.* The patient should be anesthetized, if necessary, and conveyed to the theater. The specula expose the operative field. Do not forget that these attempts to secure secondary hemostasis have often wounded the ureter; for this reason do not pinch up a part with the forceps until one is quite sure of all freedom from danger. Prepare as for an abdominal celiotomy. If the attempts to arrest hemorrhage by the vaginal route remain fruitless, do not hesitate but search for the bleeding point by operating through the abdomen.

The hemorrhages which succeed the removal of the forceps are justifiable of a similar line of action. It has been recommended that, in order to avoid this complication, one should unclamp the forceps, and leave them in position for about an hour afterward. If hemorrhage recurs, nothing is easier than to reclamp.

This procedure is little practised and it is dangerous also. A loop of intestine may come between the separated blades and be imprisoned at the moment of reclamping. Like all these blind manipulations, they should be avoided.

The hemorrhages which come on about the thirteenth or fourteenth day come from infection as in all secondary hemorrhages. They should be treated with tampons of iodoform gauze.

Lesion of Neighboring Organs.—A certain number of organs may be injured during the operation.

Wound of the ureter is rare in the hands of an experienced surgeon. In 450 vaginal hysterectomies, Segond only had two cases. In the great majority of cases it is the right ureter which is injured and the reason will be seen later.

The ureter may be wounded in the incision of the cervix. This particular section of the ureter is exceptional and it is easy to avoid by incising the vagina on the cervix itself, and at a little distance from the external os.

Much more frequently the ureter is wounded during forcipressure on the interior portion of the broad ligaments. This inclusion of the ureter has two reasons: first, an insufficient liberation of the anterior face of the uterus and broad ligament; second, to a too oblique attachment of the clamp.

It is shown that when the uterus is drawn down toward the vulva, it tends to become enclosed between the two ureters, and that these, normally separated from the cervix for a distance of 12 to 15 mm. come to lie in contact with the uterus at the level of the isthmus. The freeing of the anterior surface of the uterus and of the broad ligaments corrects somewhat this displacement and throws the ureter outward. The lateral incisions, added by Segond to the circular incision which circumscribes the cervix, facilitate greatly this pressing back of the ureter, in permitting the separation of the uretero-vesical and utero-vaginal planes laterally.

If one thinks of the inconvenience of placing clamps in the oblique position, it is enough to make one avoid this operative mistake. If one represents the position of the hands of the operator at the moment of clamping the right broad ligament, it is easy to grasp why one is more exposed to commit the mistake on the right side. This explanation also suffices to explain the great frequency of lesions of the ureter on this side.

Still we do not think it right to blame such and such an operative procedure, and the reproaches directed to the operation by "bascule," or inversion of the uterus without preliminary

amputation of the cervix, such as Doyen does, do not appear to be founded.

Finally, the urethra is above all exposed to be pinched up in the course of atypical manipulations, resulting from an abnormal anatomical disposition of parts or an unforeseen operative complication. In one case it may be due to the commencement of an invasion of the broad ligament by a neoplasm which obliges one to place the clamps laterally; in another case, it is a hemorrhage due to improper application of a pair of forceps or to the slipping off of forceps, which leads us to add a supplementary pair. For these abnormal circumstances, it is impossible to give precise rules of action. It is well to recall that in these atypical cases it is particularly the case to avoid proceeding in a blind manner, and not under control of the eye.

If the ureter is cut across, the urine commences to run into the vagina some hours after the operation. But, as most often the ureter is injured by being pinched up, the discharge is only produced when the scar tissue comes away, from the fifth to the eighth day. If it is a question of an inclusion laterally, renal pains more or less severe may cause a suspicion; if from the beginning of this operative complication, it is, however, not constant.

We will have occasion to return to the treatment of these uretero-vaginal fistulas, following on hysterectomy.

Wounds to the Bladder.—Wound of the bladder is more frequent. Segond observed this five times in 200 cases. The bladder is wounded sometimes at the moment of incision of the anterior fornix or maybe at the moment of liberation of the subperitoneal portion of the anterior face of the uterus.

In contradistinction to utero-vaginal fistulas, the vesico-vaginal one may sometimes heal spontaneously.

Wounds of the Rectum.—The wounds of the rectum are far from rare (nine cases in 200 operations, after Segond). Often prepared by lesions of the rectal wall, they are often produced at the moment when one frees the posterior surface of the uterus. They may heal spontaneously; we have already considered the operative procedures for them.

Wounds of the Small Intestine.—The wounds of the small

intestine, much more exceptional (two cases in 200, Segond), are generally caused by the freeing of the very adherent adnexa and are only met in very complex cases.

Peritonitis.—Septic peritonitis is the most serious of all the complications which come on after vaginal hysterectomy. It is the habitual cause of death after that operation and one can say that the percentage of deaths after vaginal hysterectomy practically denotes the number of cases of peritonitis following on operation.

This complication has become rare and is becoming rarer. The relative benign character of vaginal hysterectomy from the point of view of infection may cause astonishment when one thinks how difficult it is, despite the precautions one takes to artificially unite the operative field from the side of the abdominal cavity. This fact explains precisely that in grave cases where suppurative lesions exist, the pelvic cavity is isolated by adhesions from the large peritoneal cavity; it is explained also by the large open drainage route of the vagina. As we will have occasion to see further, in studying the septic peritonitis following on celiotomy we are almost disarmed, surgically speaking, in the presence of this complication.

Intestinal Occlusion.—This usually results from an adhesion of the intestine at the vaginal cicatrix and appears at a variable epoch after the operation. One may in these cases of precocious occlusion liberate the intestine by manipulations through the vagina. This is most often accomplished by the establishment of an artificial anus, or by a colotomy followed by freeing of the adhesions. We have seen after a simple fistulation of the intestine, all the occlusion troubles disappear and the fistula close spontaneously afterward. The method of action appears to be indicated in certain cases, where the general condition contraindicates a more serious intervention.

Eschars.—Sometimes these appear as sacral eschars in women having undergone a vaginal hysterectomy. These are said to be lesions of the trophic order. We think these bedsores are only macerations of the skin, and since that we have lost fear of moving the patients in order to secure for them the necessary attention and cleanliness this complication has completely disappeared from our wards. With appropriate dressings, these eschars heal rapidly.

2. Various Procedures.

Doyen's Procedure.—We will not insist on the procedure of Doyen. As may be seen, it rests on two fundamental principles: *rejection of all preventive hemostases; median anterior hemisection in order to permit the uterus to be tilted forward.*[1]

We will confine ourselves to remarking that Doyen brings about the hemostasis of the broad ligament with a single pair of very long elastic forceps which he applies from above downward along the extent of the broad ligament. Generally he places a second reinforcing forceps internal to the first part. We prefer the technic we described previously in this book. In cases where the adnexa are difficult to get at it will be well sometimes to continue anterior median hemisection on the posterior face as far as the cervix. Each half of the uterus attached to its broad ligament is more easily drawn out.

Pean's Procedure.—Preventive forcipressure and morcellement are the two principles of Pean. This procedure is done in the following manner: A circular incision disinserts the vagina. Then free by separation the two faces of the uterus and broad ligaments up to a certain height, more or less extensive. Apply forceps to the liberated portion of the ligaments which are cut through internal to the forceps. The fragment of uterus liberated by this partial section of the broad ligaments is then divided with strong scissors into two portions, one anterior and the other posterior. One forceps is placed at the base of each portion and the segment of the uterus placed below the forceps is excised. The same procedure is repeated on the portion of the uterus that lies above. Each stage may thus be divided into four principal parts: 1. The freeing of the anterior surface of the uterus from the posterior. 2. The clamping and section of the broad ligaments. 3. The division into two portions of the portion of the uterus freed by the preceding manipulations. 4. The excision of the two portions thus obtained. We thus obtain, by successive stages, the complete excision of the uterus.

The most important point is never to cut through a segment of the uterus before placing above it another traction forceps in

[1] Döderlein advised a median posterior hemisection of the uterus. (*Arch. f. Gyn.*, 1901, T. LXIII, p. 1.)

order to preserve always a solid hold, without which the fundus of the uterus may sharply disappear into the depths and from whence it could only be recovered with great difficulty.

We must never go away from the median line in the holds we take in order to avoid false holds, tears, hemorrhage and wounds of neighboring organs.

Segond's Operation.—It may be summed up as follows *Segond commences the hysterectomy like Pean and finishes like Doyen.* He commences really by excising the cervix; to do this he clamps and cuts through the lower portion of the broad ligament, isolated at first on each side of the cervix from the peri-

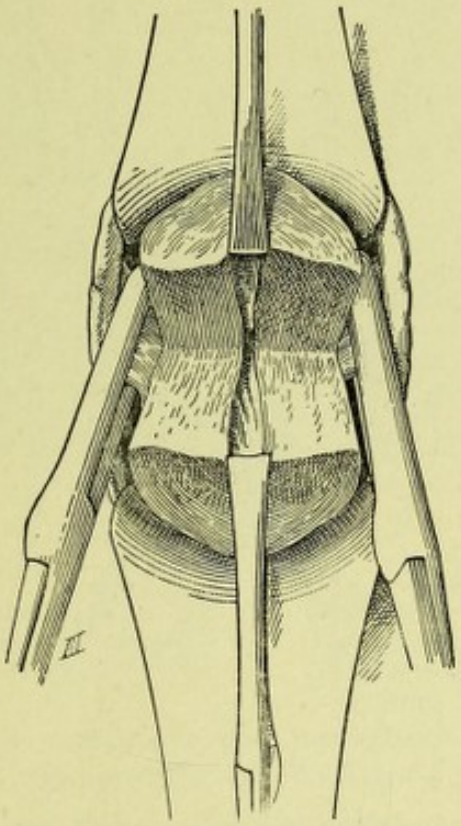


FIG. 236.—Morcellement of the uterus (J. L. Faure).

uterine tissues (interior portion of the broad ligament with the uterine artery, interior portion of the utero-sacral ligament of the same side). A short-bladed forceps seizes the tissues on each side of the cervix and a single cut of the scissors divides them between the forceps and the cervix. As the descent of the uterus is often limited by the utero-sacral ligaments, when these are sectioned across, the uterus descends some centimeters and the operation is facilitated.

The cervix is divided into two portions, one anterior and one

posterior, which are successively excised. This being done, the body of the uterus is extracted by making its fundus descend by virtue of a conoid-shaped scooping out of the anterior wall or simply thanks to a median hemisection of that wall. Segond attaches great importance to the preliminary amputation of the cervix which would constitute, according to him, the best means of putting out of count the possible injury of the ureters.

Procedures of Quenu and Muller.—While these two surgeons have one identical manipulation, *the total median sectioning across of the uterus*, otherwise the procedures of Quenu and Muller cannot be compared.

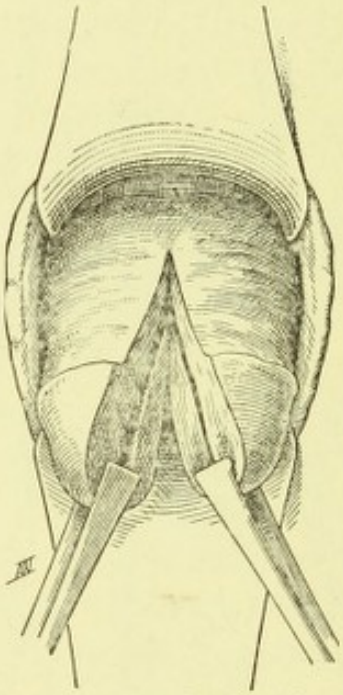


FIG. 237.—Total median hemisection; two forceps draw down and out the two halves of the cervix.

In Muller's procedure, the hemisection is done at the end of the operation if the uterus, which has been liberated, has descended. It is a complementary maneuver, destined to facilitate the ligature of the two broad ligaments. It is based on the observation that ligature of the second broad ligament is always much easier than that of the first.

In Quenu's procedure the hemisection is to enable the organ to be more easily drawn down. This maneuver is carried out at the beginning of the operation as it is done in Doyen's anterior hemisection. The uterus, drawn upon by forceps, does not so much tend to flex forward as in the median anterior section, but

to open itself out, to sink upon itself, so to speak, in the median line, in descending in the axis of the pelvis (Fig. 237). The more the two segments separate in divergence, and the more the fundus descends, the more does one continue the median section toward the fundus (Fig. 238) and eventually by fresh holds and successive sections of the uterus to completely divide it into two. The rest

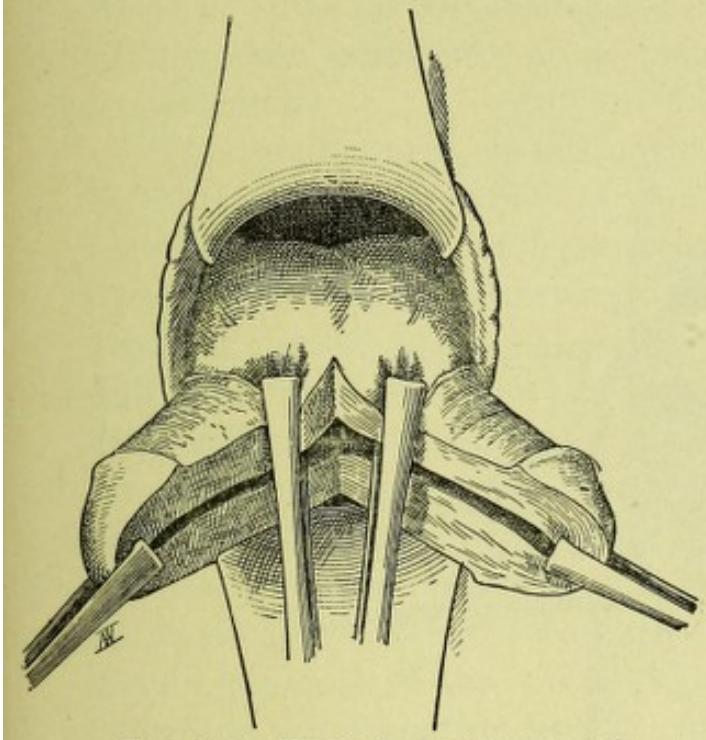


FIG. 238.—While the hemisection advances and the two halves of the uterus separate the fundus descends and comes down to the vulva.

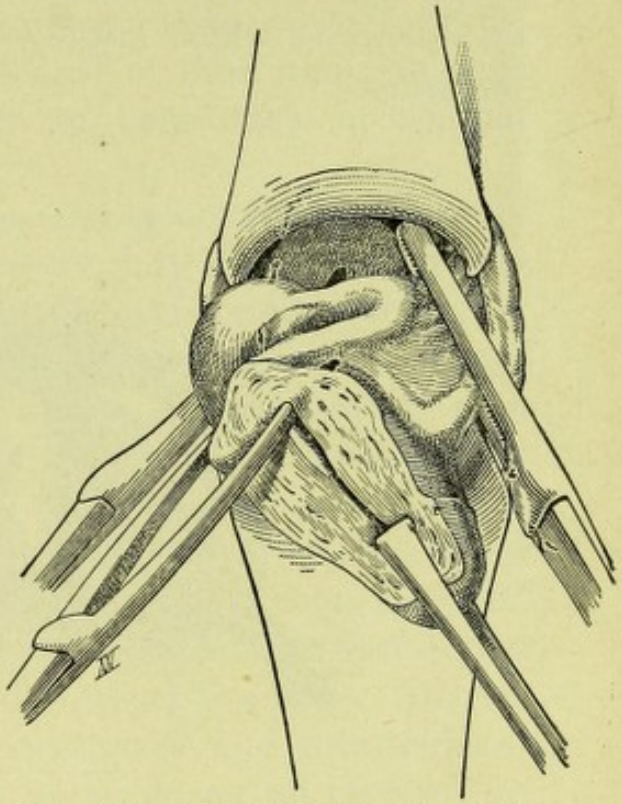


FIG. 239.—One of the halves of the uterus has been pushed back into the pelvis and this permits of the more easy descent of the other.

of the operation with relation to each half is continued as in the procedure of Doyen, the section of the uterus has been carried out through the cervix, posterior wall and cervix. It is at times of advantage when the median section is finished to press back one of the halves into the pelvis and thus render the drawing down of the other easier.

J. L. Faure's Procedure.—If the uterus does not come down, even after total hemisection, the fundus of the uterus remains immobile in the pelvis; then we may sometimes get at the uterine cornua in resorting to Pean's morcellement, and in practising *transverse segmentation of the uterus.* After the median section of a part of the uterus, if one does not gain any more ground, one

should cut across one of the halves of the uterus. The segment, constituted by the segment thus cut across, separates and with a forceps introduced from above upward along the length of the uterine border one is able to seize the upper portion of the broad ligament up to the cornu of the uterus. With a pair of scissors detach this uterine cornu from its insertion into the broad ligament, and the mobilization of the uterus enables us to conclude an operation which appeared at first to possess insurmountable obstacles.

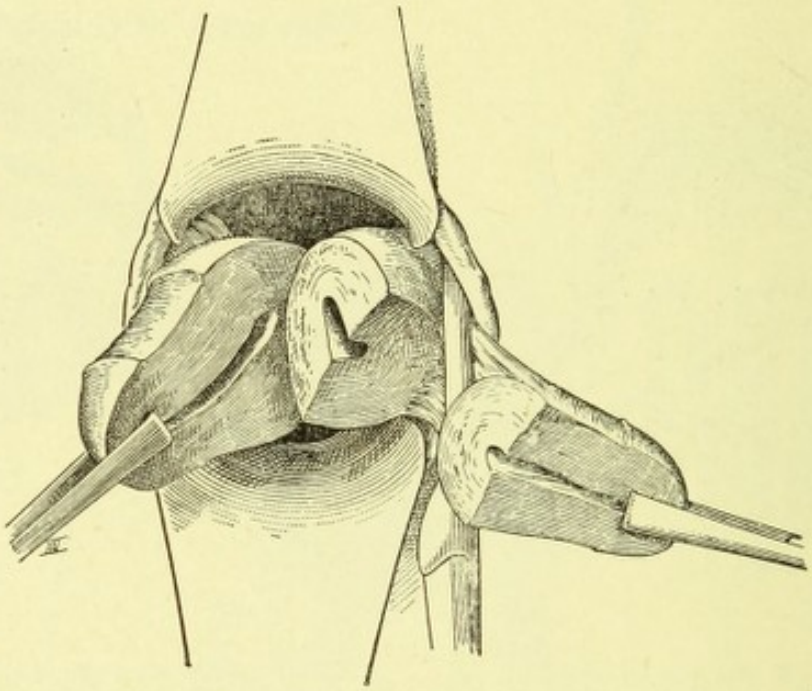


Fig. 240.—Transverse version of the uterus after hemisection.

Ligature of the Broad Ligaments. Angiotripsy. Galvanocautery.—All the procedures we have described have in common the hemostasis of the broad ligaments by means of a forcipressure, which is allowed to persist during a certain period of time. The ligature of the broad ligaments is generally rejected save in certain exceptional cases (hysterectomy for prolapse).

Even in Germany, where for a long time fervent operators opposed it, they have now accepted forcipressure. It is not without drawbacks and the clamps left in for forty-eight hours interfere considerably with the comfort of the patients. This has inspired certain surgeons (Doyen, Tuffier in France, Thumin, Amann in Germany) with the notion of applying *angiotripsy* to vaginal hysterectomy. Although this has been successful, it

is not without danger; there has been persistent oozing, in fact veritable hemorrhages or even peritoneal infection by the falling back into the abdomen of the pedicles which are no longer held in the vaginal wound by ligatures or clamps. It is generally admitted that it is imprudent to apply it without adding "ligatures of safety" and without closing up the peritoneum above the stumps (Doyen). We are precipitated thus into the position of the inconvenience of ligatures and operative complications. Also, in spite of the enthusiasm excited at first, angiotripsy is hardly ever employed as a means of hemostasis in vaginal hysterectomy.

The employment of the *galvano-cautery* advocated formerly by Byrne for amputation of the cervix, has been recently put forward by Werder for hysterectomy in cancer; one avoids, by these means, all local recurrences. The vaginal mucous membrane is incised around the cervix with a galvano-cautery at a dull red heat; the fornices are opened; the uterus is tilted forward; and downward clamps are placed on the broad ligaments which are afterward cut across. The uterus being lifted out, the broad ligaments are drawn on and then external to the forceps, Downes' electro-thermic clamps are applied. These crush the tissues like an angiotribe and then cauterize the crushed parts.[1] All the bleeding points of the wound are cauterized and recauterized. Conclude the operation by suturing the retro-vesical peritoneum to the posterior peritoneum of the pouch of Douglas, leaving on each side a space, in order to insinuate along the stump of the broad ligament a dressing of iodoform gauze, which is taken out at the end of four or five days.

3. Operative Modifications According to the Nature of the Lesion.

1. Vaginal Hysterectomy in Cancer.—Vaginal hysterectomy may be done either for cancers of the cavity of the uterus or for cancers of the cervix. In the latter case, it is better to do a preliminary radical curettage, removing all the cancerous vegetations. The curettage should be done immediately before the hysterectomy, may be several days before, when clinical symptoms lead one to

[1] Cauterization is obtained by the action of a band of platinum which is doubled over one of the blades of the forceps and kept red with an electric current. (Downes, *Ann. de Gynec.*, 1903, T. I, p. 355.)

think that there exists a serious degree of infection of the cancerous vegetations. The preliminary curettage has a double advantage: it permits us, first, to secure a possible disinfection of the operative field to a degree unknown of any antiseptic solutions. It has the advantage of facilitating the clinical exploration and of enabling us to appreciate with more precision than by the bimanual examination the degree of extension of the neoplasm and of seeing if a radical operation is or is not indicated.

Vaginal hysterectomy for cancer would not have the pretension of being a radical operation if it only attacked the primary focus, without being concerned with the lymphatic vessels which are more frequently invaded.

It should be conducted in such a manner as to excise the entire primitive focus and to avoid the grafting of the neoplasm on the raw surfaces. This double desideratum dominates the operative technic in cases of vaginal hysterectomy for cancer.

If it is a question of a cavity cancer, circumscribe the cervix with the ordinary incision. If it is a case of cancer of the cervix, average case, commence by the dissection up of a little vaginal collar, which is prudently detached anteriorly from the bladder and posteriorly from the rectum. Commence the operation by freeing the bladder, because the invasion of this organ should be regarded as an operative contraindication. In order to find out the state of the bladder, commence by a lateral in front of the broad ligaments. Move the hand gently toward the median line; if at this level one finds friable tissue, stop. To pursue the operation would lead to the formation of a vesico-vaginal, in the absence of which one might hope for a relatively durable result.

If the bladder is recognized as healthy, proceed with operation in opening the recto-uterine cul-de-sac and conclude by anterior hemisection procedure, following out the technic we have already indicated. In these particular cases of cancer of the cervix, Segond's procedure has the advantage of removing from the operative field the cancerous mass which may infect the tissues and graft cancer anew.

It is generally conceded that the removal of the adnexa should be carried out because cases have been reported of metastatic deposits in the ovaries.

The immediate results are the following:

In 2156 cases collected by Richot there were 175 deaths or 8 to 10 per cent.

The operation does not therefore present an extreme gravity. Unhappily the later results are more mediocre. In F. Ferrier's work the recurrences have been 70 per cent.; according to Zweifel, 65 per cent., and Olshausen, 61 per cent.

The recurrence is above all in the first year that follows the operation; the frequency diminishes gradually as the interval lengthens, as the following table of recurrences compiled by Segond shows:

The recurrence occurred 14 times in the first year.
The recurrence occurred 9 times in the second year.
The recurrence occurred 5 times in the third year.
The recurrence occurred 0 times in the fourth year.
The recurrence occurred 1 time in the fifth year.

After five years the cure may be regarded as certain. But Segond observed one recurrence after seven years.

The recurrences are almost always seen in the vaginal wall, near the scar in the cicatrix itself or a little above it, probably due to the implanting of cancerous grafts during excision. These local recurrences induced Werder to resort to excision by galvano-cautery.

2. **Vaginal Hysterectomy in Fibromata.**—This is often done for fibromata. We will see that it loses ground more and more and tends to be replaced in the majority of cases by abdominal hysterectomy.

One point dominates all the technic of vaginal hysterectomy for fibromata: it is the great importance of, one might almost say imperative nature of, morcellement.

This morcellement has a double end in view: To diminish the volume of the tumor and to permit it to pass through the vaginal tissues and reduce the uterus to a flexible shell, so to speak, which will tilt forward as in the way a uterus of normal dimensions does after a simple anterior hemisection.

It is evident that the manipulations which give this double result may vary according to each case. Some smaller fibromata, easily accessible, may be torn out with the first pressure

applied to the traction forceps, which seizes them and draws upon them at the same time imparting to them a twist. If the fibromata are larger, more solidly attached, then we would resort to morcellement with the bistoury or scissors, aiding ourselves as required by the corkscrew and evacuating conoid-shaped masses of tissue. If the fibromata are situated high up and inaccessible, we commence by excising a V-shaped area of uterine tissue. (See before, morcellement in vaginal myomectomy.)

The uterus is attacked on its anterior surface. The anterior wall is resected over a more or less extended area; this resection admits of successive enucleation of different fibromatous masses with or without morcellement.

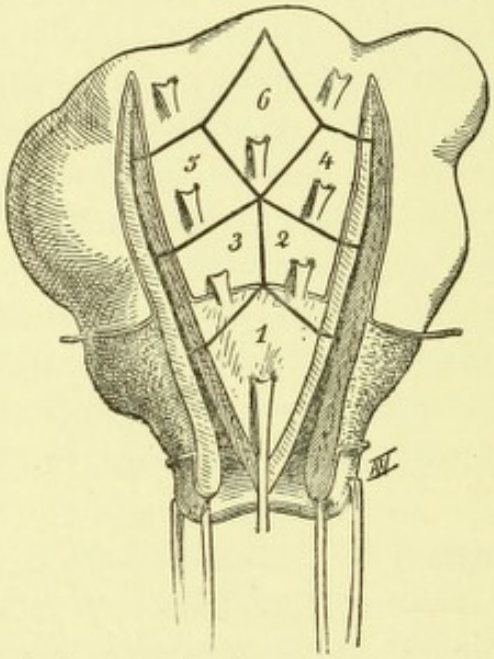


FIG. 241.—Morcellement of the anterior face of the uterus (Doyen). The segments 1, 2, 3, etc., are successively excised.

The general shape of the resected area is a V with the summit below (Fig. 241).

In these manipulations there is never need to excise a fragment of the mass without having as preliminary placed a traction forceps on the part immediately above.

In a general way the commencement of the operation is difficult; beginning by removing very small pieces, one proceeds to greater and greater. At length we have a uterus emptied of all the fibromata it contained and of which the anterior wall has in a great measure disappeared. Nothing is simpler than to

lever up the uterus and then apply forcipressure to the broad ligaments as usual.

This method of procedure appears to be superior to that in which the fibromatous uterus is resected by successive stages, with forcipressure and preliminary section of the corresponding portion of the broad ligaments, as in Pean's operation.

In 1369 vaginal hysterectomies for fibroma, Richelot had 63 deaths, giving 4.6 per cent.

Segond, whose experience and skill in vaginal surgery is so well known, gives results of 15 per cent. of deaths in vaginal hysterectomy for fibroma.

These differences may be explained by the fact that Segond pushes to excess the vaginal operative route and thus in attempting very difficult cases acquires a higher mortality.

3. **Vaginal Hysterectomy in Inflammation of the Adnexa.**— It is known that Pean regarded the excision of the uterus as the essential stage in the treatment of inflammations of the adnexa by the vaginal route. We excise, to use his expression, "la bonde," the bung literally which closes the suppurating peri-uterine pockets; these being freely drained by the preliminary excision of the uterus, heal perfectly without any call for their individual extirpation. This is a mistake; we have on many occasions excised the entire uterus without opening any peri-uterine suppurative foci. For this reason, modern surgeons prefer to excise the diseased adnexa with the uterus.

It is certain that this excision is difficult and often even impossible. But systematic attempts at excision, even when they fail, have the advantage of preventing a suppurating focus, remaining unopened in spite of the excision of the uterus.

In excision of the adnexa during vaginal hysterectomy, free these by the hand. They are separated behind the posterior surface of the broad ligaments, and we then endeavor to draw them toward the fundus of the uterus. Surgeons with knowledge of the vaginal route generally succeed in the extirpation in the majority of cases (Segond, 55 times in 77 cases; Bouilly, 45 times in 52 cases; Jacobs, 372 times in 421 cases).

The immediate results of vaginal hysterectomy for diseased adnexa are the following: In 1113 cases collected by Bardenheuer,

he had 39 deaths, giving about 3.5 per cent. Particular statistics give an average mortality slightly higher.

Richelot,	307 operations,	15 deaths;	4.87 per cent.
Segond,	200 operations,	14 deaths;	7 per cent.
Reynier,	52 operations,	6 deaths;	11 per cent.
Bouilly,	51 operations,	3 deaths;	5.8 per cent.

4. **Hysterectomy in Puerperal Infection.**—The puerperal uterus is very friable; its cervix tears under traction of toothed forceps, which are usually employed for the drawing down of

FIG. 242.—Puerperal hysterectomy. The friable uterus is seized with cyst forceps (J. L. Faure).

the uterus. After successive holds the cervix is lacerated, becomes unrecognizable and unfit as a hold in order to do the operation. All these inconveniences disappear if, as J. L. Faure advises, one uses broad-bladed cyst forceps instead of the toothed variety. The large hold prevents the cervix from tearing. In women recently "accouchees" with a large vagina and a supple uterus the operation is of the easiest if one draws gently on the uterus without force. The uterus flexes forward with the greatest facility and the operation is terminated very rapidly.

5. **Vaginal Hysterectomy for Prolapse.**—Vaginal hysterec-

tomy is rarely practised for prolapse; it is only exceptionally indicated in the treatment of this affection.

The technic of hysterectomy in these cases presents some peculiarities by reason of the special anatomical conditions we find.

1. The replacing of continuous forcipressure by ligatures, the broad ligaments being, as the result of the drawing out of the uterus, very accessible.

2. The necessity of making at the same time as an excision of the uterus a large excision of the vagina, since this canal undergoes a considerable increase in size as the result of the prolapse.

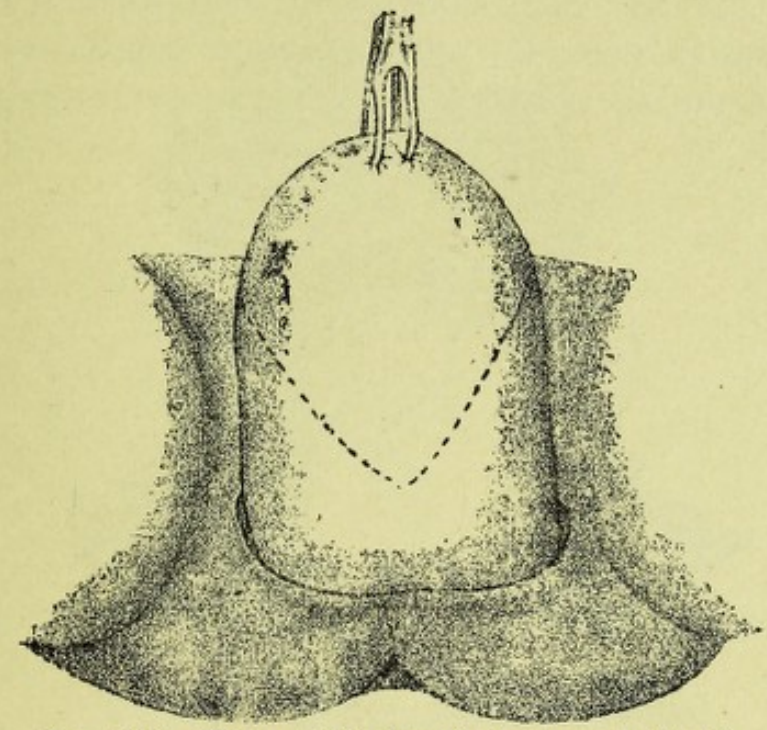


FIG. 243.—The posterior denudation traced (Asch).

Fritsch's Procedure.—To do this operation draw strongly on the cervix upward and forward. A V-shaped incision is then made with the summit pointing posteriorly at the level of junction of the posterior third with the anterior two-thirds of the posterior vaginal wall (Fig. 243). The pouch of Douglas is opened and the peritoneum is sutured to the posterior lip of the incision. It is then easy to draw the fundus of the uterus into the wound. The broad ligaments are tied off in stages commencing from above, and removing if possible the adnexa. It only remains to separate off the bladder and to resect the anterior vaginal wall.

The cervix is now strongly drawn downward, and a U-shaped incision is made in the vagina with the convexity corresponding to the ureter (Fig. 244), and the mucous membrane is separated up from this almost to the cervix. This is done partly with a scalpel and partly by the finger. This stage of the operation is difficult, especially when anterior colporrhaphies force us to work in cicatricial tissue.

Once the cervix is reached, we may operate from above downward by the vesico-uterine cul-de-sac. If the adhesion to

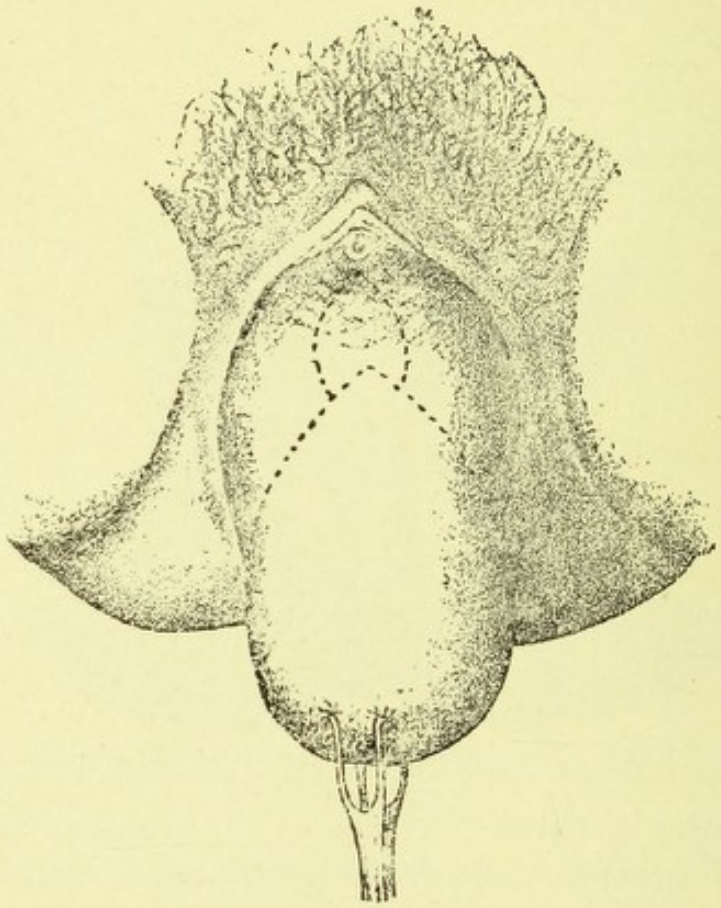


FIG. 244.—The anterior denudation traced (Asch).

the bladder is too firm separate off a thin layer of uterine tissue.

The uterus having been excised with the two large anterior and posterior flaps of vaginal mucous membrane attached to it, the two lips resulting from the resection of the mucous membrane of the anterior wall of the vagina are united transversely; then, after having reduced the bladder, it is covered over again with vesico-uterine peritoneum which is sutured to the mucous membrane of the vagina. Further, the pedicles of the broad

ligaments are sutured to the vagina on each side and thus keeping it in suspension.

The non-obliterated peritoneal cavity is tamponed with iodoform gauze. The operation is concluded with a reconstruction of the perineum.

Doyen's Procedure.—Acting on the observation that the pouch of Douglas is always easily accessible when the inferior border of the bladder is sometimes difficult to make out amidst the hypertrophied and indurated tissues that surround it, Doyen commences by opening the peritoneum posteriorly. He cuts across the mucous membrane transversely at the level of the old posterior fornix of the vagina. As soon as the lips of the mucous membrane open out, he makes in the median line pos-

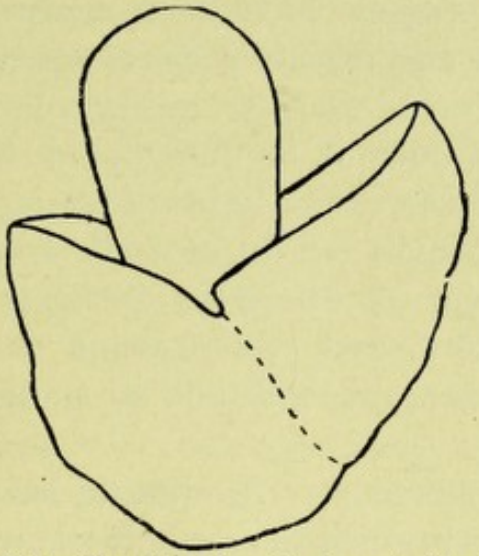


FIG. 245.—Totality of excised parts (Asch).

teriorly a longitudinal incision which opens the inferior portion of the pouch of Douglas. After enlarging the peritoneal opening with the fingers, he hooks up the fundus of the uterus and, making it tilt forward, he draws it outside.

A longitudinal hemisection carried out on the posterior aspect of the uterus is continued on to the fundus and then on to the anterior aspect. The uterus and bladder are separated with the finger or a blunt instrument and then after completing the hemisection the anterior fornix is opened. The circumference of the cervix is freed by the dissection of a collarette of the vagina. The two halves of the uterus are now only held by the broad ligaments.

After giving each of these halves a torsion of 180 degrees,

imparting to each broad ligament the appearance of a spiral cord, these cords are crushed, ligatured, and cut below the ligaments. Then he closes by a purse-string suture, which in passing through the broad ligaments, takes up the peritoneal collarette. He excises the largest part of the anterior wall of the vagina and does an anterior colporrhaphy and concludes with a colpo-perineorrhaphy.

Results.—Considering the weakness generally found among patients operated on for prolapse, the hysterectomy gives a fairly elevated mortality of five deaths in 57 cases we have collected,[1] which number is a little higher than that given personally by Kirchgessner, who in 40 cases had three deaths.[2]

The later results, if one is confined to the excision of the uterus and of the vagina, have been mediocre; it has also been found necessary to add drastic perineal operations to the excision of the uterus.

In these conditions it is understood that we reserve this operation to the cases where a lesion of the organ exists (gangrene, fibroma, cancer), which suffices in itself to render excision necessary, and to those cases where the uterus is constantly external, extensively ulcerated, and is the origin of various discharges, mucopurulent or sanguineous, and in women, either at or past the menopause.

6. **Vaginal Hysterectomy in Uterine Inversion.**—The operative technic differs according as whether inversion is incomplete or complete.

In incomplete inversion seize the cervix with two traction forceps attached at the level of the commissures. Circumscribe the cervix with a circular incision, penetrate the posterior cul-de-sac, then explore the pelvic cavity and determine the anatomical disposition of the uterus. Then pass to the liberation of the anterior part.

Split the cervix in the median line anteriorly. Then see if that incision is not sufficient to secure the reduction of the inversion of the uterus. If the reduction is impossible, continue the operation by opening the anterior cul-de-sac. Nothing is

[1] Hartmann and du Bouchet, Vaginal Hysterectomy in Treatment of Uterine Prolapse. *Annales de gyn.*, Paris, 1894, T. I, p. 45.

[2] Ph. Kirchgessner, Complete Vaginal Extirpation in Complete Uterine Prolapse. *Zeitschr. f. Geb. u. Gyn.*, Stuttgart, 1906, T. LVIII, p. 230.

simpler than tying or seizing the broad ligaments in a pair of forceps and of separating off the uterus.

If the inversion is complete, the commencement of the hysterectomy may be delicate. Do a circular incision at the level of the cervix, which may be determined by palpation.

Open the posterior fornix as soon as the peritoneum is opened, introduce the finger into the peritoneal cavity and draw it in front of the cervix. Then with the finger open the anterior fornix cautiously. When the uterus is freed anteriorly, the operation may be pursued without difficulty as in incomplete inversion.

7. **Vaginal Hysterectomy for Juxta-uterine Tumors.**—Vaginal hysterectomy may be done during the course of an operation for excision of a juxta-uterine tumor.[1]

Two cases present themselves: Either the tumor is supra-uterine and the hysterectomy is done in order to create a way of access; the *hysterectomy* is then spoken of as *preliminary* or the tumor is rather more intrauterine and its excision may be carried out without a preliminary hysterectomy. But this removal leaves a denuded uterus, badly fixed, and the *complementary hysterectomy* is required. In the latter case hysterectomy has the advantage of creating an extensive drainage canal.

In spite of some successes obtained with this manner of operating, relative successes really, since Segond had two deaths in twenty-five cases, making a mortality of 8 per cent., we believe that the abdominal route is less grave and should be done whenever we are in the presence of tumors, manifestly of the adnexa, however small they may be. We must apologize for the long dissertation on vaginal hysterectomy.

The great place it has occupied in the history of gynecology justifies the developments we have consecrated to it. While convinced partisans of the abdominal route in the immense majority of cases, we believe that vaginal hysterectomy may still be of great service in particular cases.

In inveterate uterine prolapse with extensive lesions on the cervix, in certain cases of irreducible uterine inversions, in rare acute or virulent pelvic suppurations, where colpotomy is insuf-

[1] Segond, Bilateral Tumors of the Adnexa that are Suited for Excision by the Vaginal Route after Hysterectomy. *Revue de gynecologie*, Paris, 1897, p. 205.

ficient to arrest the march of invasion of the disease, and in puerperal infection, vaginal hysterectomy preserves its superiority. It is even indicated in certain cases, ordinarily justifying the abdominal route, when, for example, the patient is very stout and the uterus is small, mobile and may be so easily extirpated from below.

The annoyance to the operator of adipose excess of the abdominal wall, and the difficulty of obtaining a quiet anesthesia with regular breathing are strong arguments in favor of vaginal hysterectomy.

We will not insist on the choice of procedure as it depends on the case; that which we have already said in reference to each enables one to decide what to do without our returning to the question.

CHAPTER IX.

HYSTERECTOMY BY THE PARAVAGINAL ROUTE.

Summary.—History.—Operation.—Results and indications.

History.—The paravaginal route, advised by Karl Schuchardt,[1] has for its purpose the creation of a free path of access

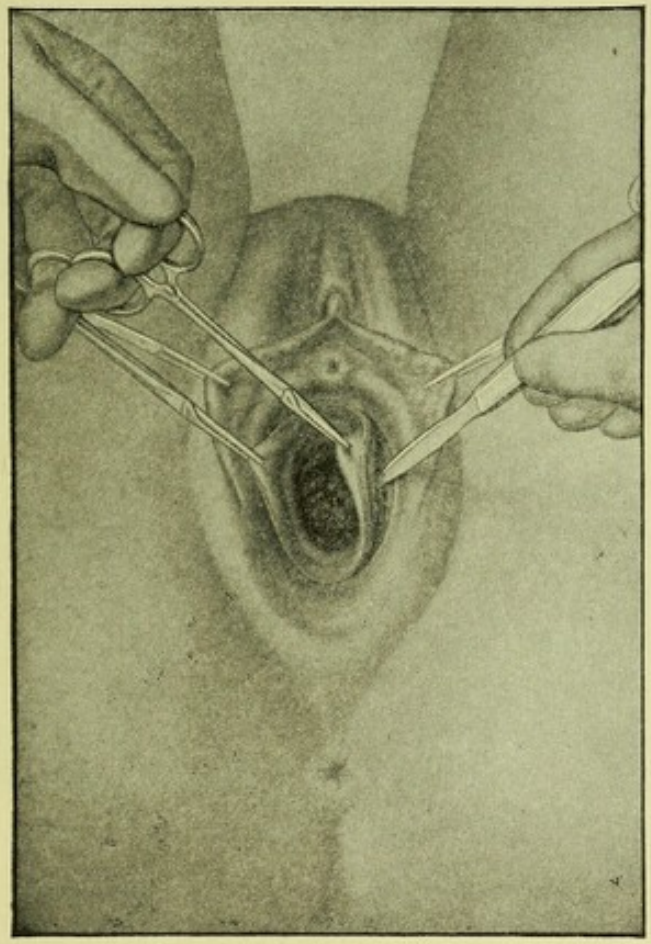


Fig. 246.—Dissection of a vaginal collarette (Proust).

toward the vagina and in exposing to the light of day the whole vagina and its fornices. Before Schuchardt vaginal incisions and splitting were adopted, but these had no connection with the big paravaginal incision, of about 18 to 20 cm. length, which

[1] Karl Schuchardt, Concerning the Paravaginal Method of Extirpating the Uterus and Its Results in Cancer of the Uterus. *Arch. für klin. Chir.*, Berlin, 1901, T. LXIV, p. 289.

runs along all the whole level of the perineum and exposes very largely the broad ligament.

By this route it is possible to freely resect the vagina and the parametrium after dissection of the ureters. Adopted by Schauta,[1] this incision has been eulogized in America by Gellhorn,[2] in France by Proust,[3] and in England by Sinclair.[4]

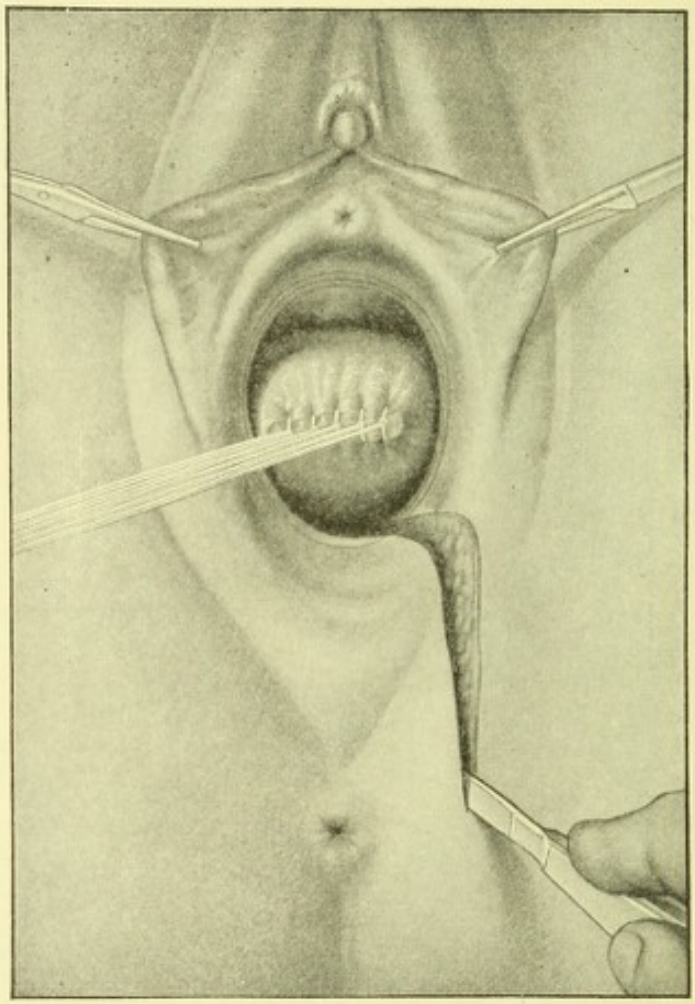


FIG. 247.—The circular vaginal cuff has been dissected up, then closed, and the sutures kept long. Also the paravaginal incision is outlined (Proust).

Operation.—Schauchardt makes an incision commencing at the left labium major and going through the left part of the vaginal canal. From there the incision tends to approach the median line, while avoiding the rectum and sphincter region.

[1] Schauta, *Monatschrift für Geb. und Gyn.*, 1902, T. XV, p. 133, et *Ibidem*, 1904, T. XIX, p. 475. See also *Lehrbuch der gesammt. Gynäkologie*, Vienne, 1907, third edition, T. II, p. 444.

[2] George Gellhorn, Paravaginal Abdominal Operation in Carcinoma of the Uterus. *Amer. Jour. of Obstetrics*, New York, July, 1905, p. 1.

[3] Proust, Total Colpohysterectomy by the Vulvo-perineal Route. *Presse médicale*, Paris, March 16, 1907.

[4] Sinclair, On Paravaginal Section. *Journal of Obst. and Gyn. of British Empire*, London, April, 1906.

Schauta added to it the closing of the vagina in such a manner as to remove the cancer without any fear of infection of the operative grafts. Proust, who has published a very good technic of this operation, describes it as follows:

Circular Separation and Closing of the Vagina.—After cau-

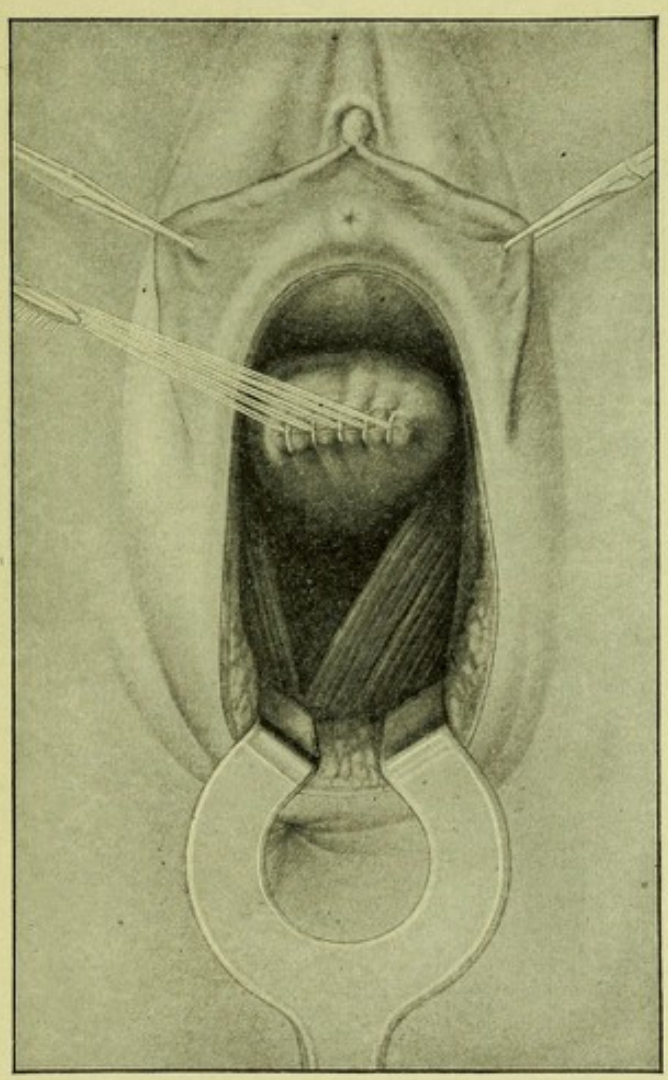


Fig. 248.—The paravaginal incision having been made, a speculum is inserted posteriorly. On comparing this figure with 247, one may see the enlarged operative field given by Schauta's incision (Proust).

terization of the neoplasm and disinfection of the vagina, a circular incision circumscribing either the middle portion or the inferior portion of the canal is done (Fig. 246). A circular cuff of about 5 cm. long having been dissected up, the vagina is hermetically closed with sutures, which are kept long so as to serve as agents of traction.

When the suture area has stopped bleeding, the surgeon

changes his gloves and instruments in order to carry out the antiseptic stages of the operation.

Paravaginal Incision.—The paravaginal incision commences more or less high at the level of the inferior lip of the circular incision of the vagina and at the junction of the posterior and left lateral quadrants and from these it is directed toward the vulva, which is also cut through at the junction of its posterior and left lateral parts. Then it is prolonged directly backward

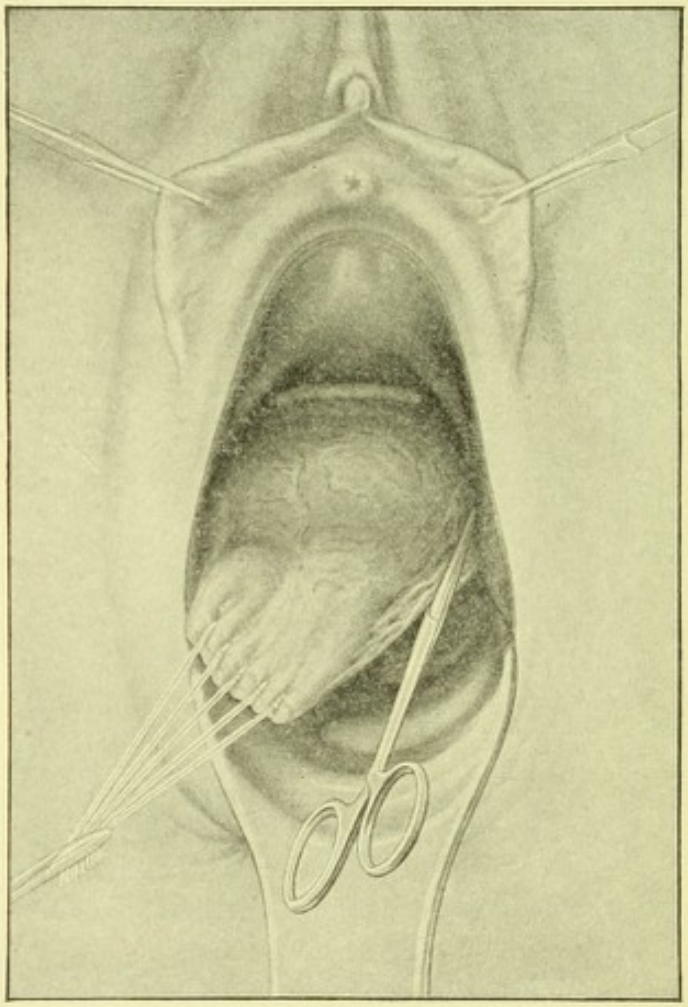


Fig. 249.—Liberation of the lateral borders of the vagina, attached by vascular pedicles (Proust).

and laterally, but parallel to the axis of the perineum and terminates external to the anus. It may be carried on to the sacrum, and become consequently pararectal (Fig. 247).

The incision passes through all the thickness of the soft parts of the perineum; it cuts through the tunnel of the levator ani near the rectum, but spares the sphincter and the intestine.

The rectum is isolated and inclined toward the right. The vessels are tied and the wound tamponed with sterilized gauze.

In cases particularly difficult we may, after Staude, make a double paravaginal incision.[1]

Dissection of the Bladder and Ureters.—The separation of the bladder is done as in anterior colporrhaphy and in tilting the uterus backward.

The separation becomes very simple when one arrives at the

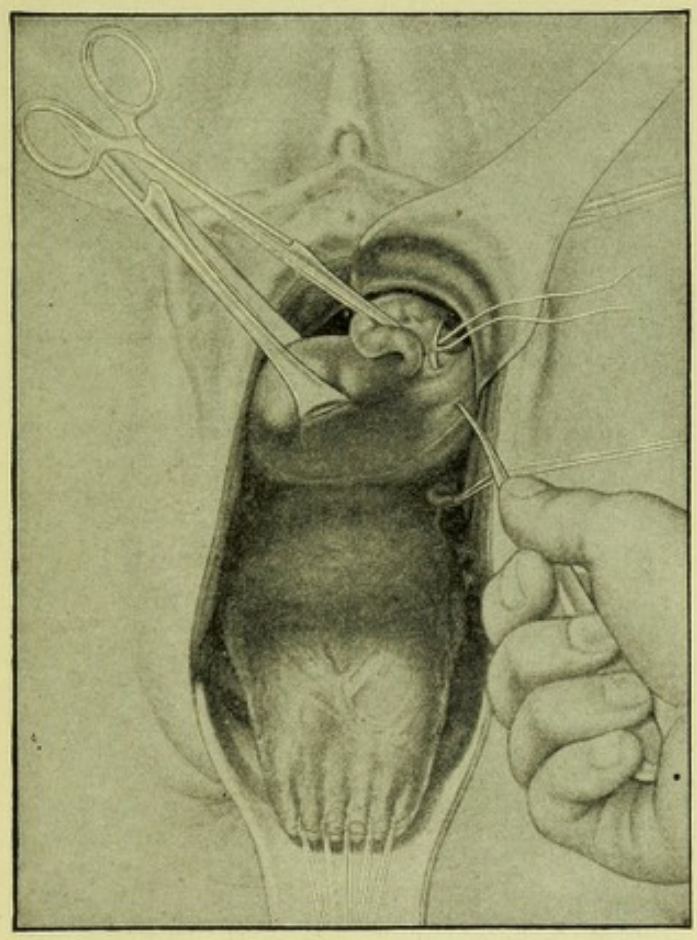


FIG. 250.—The anterior peritoneal cul-de-sac is opened and the uterus tilted anteriorly: the operator passes a suture in order to tie the round ligament (Proust).

height of the cervix, in front of which is a lamellar, cellular tissue. Of course if there are neoplasmic adhesions at this level, it is a different question and one may be obliged in such circumstances to do a partial resection of the bladder.

Once the bladder is separated in the median line, we pass on to the isolation of its lateral angles "veritable cornua which continue with the uterus." Recognizable by their reddish color,

[1] Staude, Ueber totalexstirpation der carcinomatosen Uterus mittels doppelseitiger Scheidenspaltung. *Mon. f. Geb. und Gyn.*, Berlin, 1902, T. XV, p. 863.

they run toward parametrium and their isolation leads to the ureter, which runs obliquely backward and outward, like a cord running into the base of the broad ligament. In some cases one has had occasion to dissect out the ureter lying in a groove in cancerous tissue. In order to follow the dissection of the ureters sufficiently far back, it becomes necessary, when their situation is recognized and their isolation commenced, to free the vagina.

Freeing of the Lateral Borders of the Vagina and Dissection of the Base of the Parametrium.—One commences the freeing of the vagina on its posterior face, proceeding in the avascular separable zone which results from the coalescence of two fine layers of the embryonic peritoneal cul-de-sac and which leads almost as far as the recto-uterine cul-de-sac of the adult. The isolation of the vagina only presents difficulties at its lateral borders, where one finds the following vessels: the long vaginal branches coming from the curve of the uterine artery, vaginal arteries,

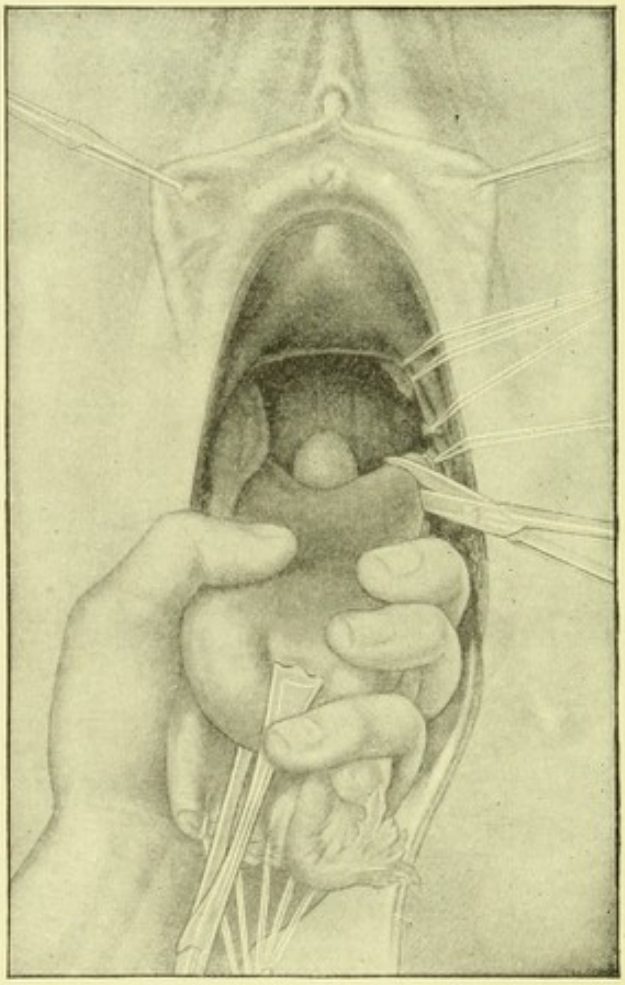


FIG. 251.—Section across the utero-sacral ligament after tying it off (Proust).

branches of the hypogastric artery and ramifications of the middle hemorrhoidal and collateral vesico-vaginal veins. Accompanied by fibrous tissue strands, these various vascular ramifications constitute the principal means of fixation of the vagina, the levators only contracting with this canal during simple contact. We must cut across these and tie them together, taking care to do so below the ureteral zone and not to open the vagina (Fig. 249).

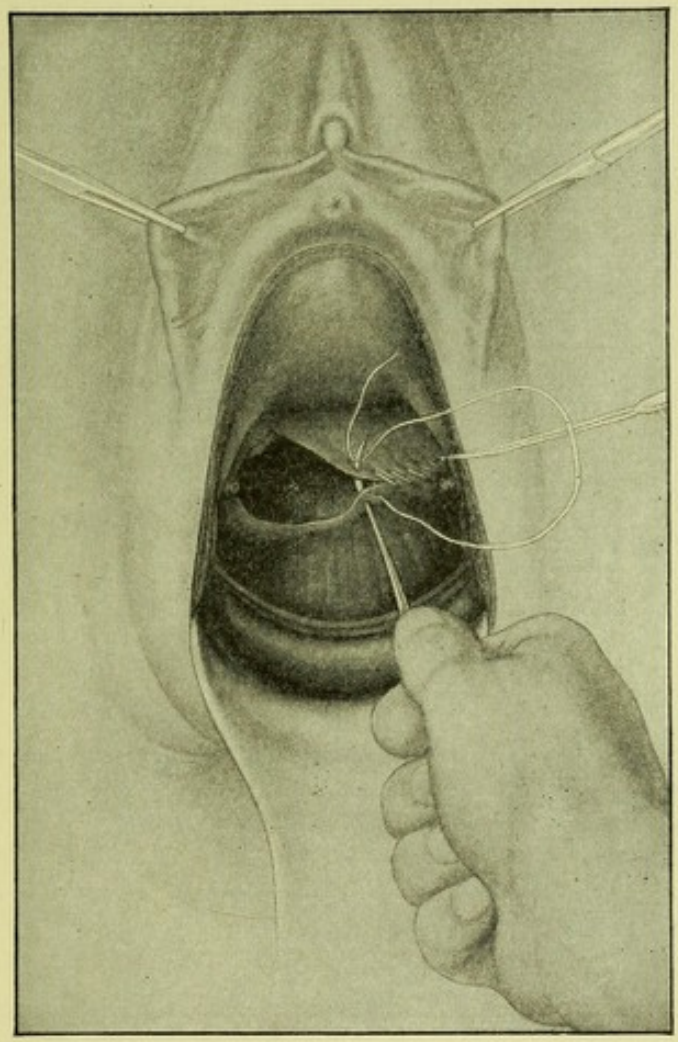


Fig. 252.—Continuous suture of the peritoneal cul-de-sac (Proust).

This freeing of the lateral borders of the vagina permits of it being drawn down and facilitates the access to the parametrium, the methodical extirpation of which constitutes one of the principal stages of the operation. Under visual control, dissect the ureter in its latero-cervical course; then tie the uterine artery or wait until the end of the operation.

Opening of the Peritoneum, Removal of Uterus and Vagina.—

Once the ureters are well liberated proceed to the opening respectively of the anterior and posterior peritoneal cul-de-sacs. This opening is made with scissors, the fundus of the uterus is tilted down and forward. Cut through and successively tie the round ligament and then the utero-ovarian ligament of the same side external to the adnexa (Fig. 250). The broad ligament is cut through in its turn and the uterine artery is tied, if it has

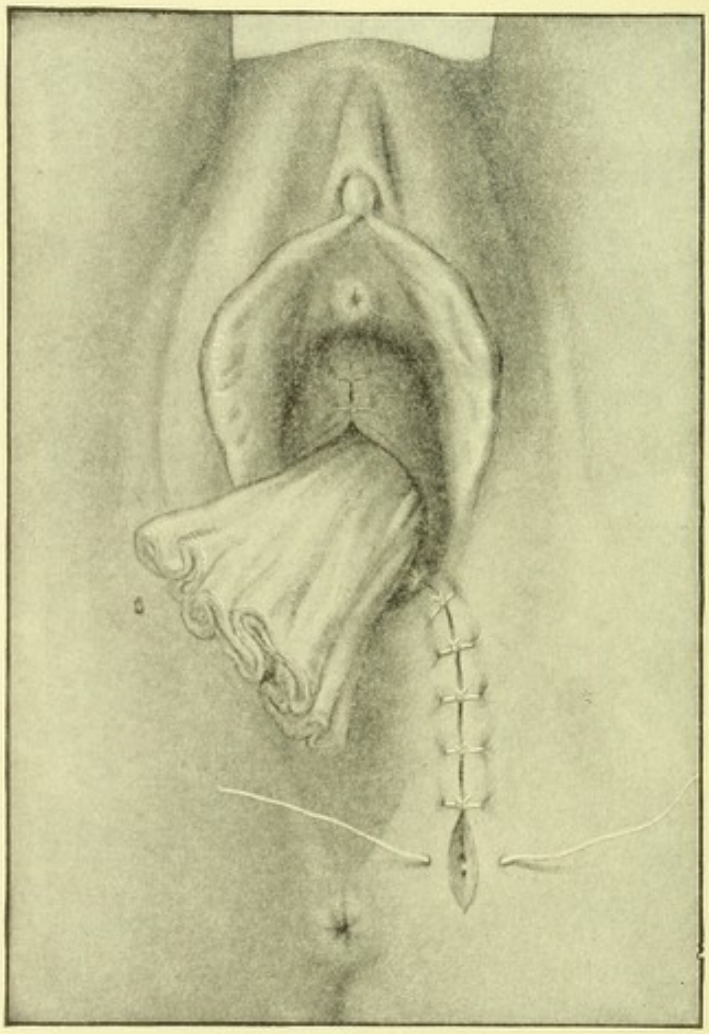


Fig. 253.—Aspect of parts at the conclusion of the operation (Proust).

not already been done. Conclude with ligature and section of the utero-sacral ligament (Fig. 251).

The same manipulation is repeated on the opposite side. Thus we excise the adnexa *en bloc* with the uterus and vagina closed and containing the cancer.

Closing of the Peritoneum. Reconstruction of the Vulvar Ring.—The peritoneum is closed again (Fig. 252). The two anterior placed sutures unite the lateral borders of the remaining

vaginal cuff in such a way as to create a support to the bladder, then the vulvo-vaginal incision is closed up by means of deep sutures, taking up "en masse" all the tissues. By the vulvar orifice thus reconstituted the gauze drains protrude from the operative cavity (Fig. 253).

Results and Indications.—The results may be viewed from the standpoint of immediate and more remote results.

Immediate Results.—Schuchardt in 87 cases had 8 deaths, or 9.6 per cent. Twice he has had injury to the bladder, twice injury to the ureter, and twice injury to the rectum. Schauta[1] in 336 cases had 36 deaths from the operation, giving about 10.7 per cent. In reality, the *mortality* is actually much less frequent. In 1907–1908, it was 5 in 28 or 17.8 per cent.; in 1908–1909, it was not more than 2 in 50, or 4 per cent.

The operative complications have been diminishing.

In 1901–1902, 4 injuries to the ureter in 47 operations=8.7 per cent.

In 1902–1903, 2 lesions to the ureter in 29 operations=6.7 per cent.

In 1904–1905–1906, only 1 lesion to the ureter in 49 operations =2 per cent.

In 1907–1908–1909, 0 lesion in 336 operations, the rectum 4 times.

Remote Results.—In 42 cases which he followed Schuchardt found 15 patients cured two years after operation, which is about 35.7 per cent.; Schauta found 36 patients well after five years, 19 after four years, 21 after three years, and 20 after two years.

[1] Schauta, The Extended Results of Extirpation of the Cancer of the Cervix of the Uterus by the Enlarged Vaginal Route. *Annales de gynécologie,* Paris, 1909, p. 642.

CHAPTER X.

PERINEAL AND SACRAL ROUTES.

Summary.—Transverse and sagittal perineotomy.—Operations by the sacral route, parasacral incision, resection of the rectum.

The perineal and sacral routes have been employed on rare occasions by a certain number of gynecologists.

1. Perineotomy.

Perineotomy has been practised by a transverse incision or an antero-posterior incision.

Transverse Perineotomy.—In transverse perineotomy, advised and described by Otto Zuckerkandl, a flap in the form of /‾\, the figure is traced on the perineum. The transverse portion of the incision measures 7 cm. and lies about 3 cm. in front of the anal orifice; the two divergent sides are directed toward the ischia; in deepening this incision one arrived to penetrate the recto-vaginal space almost to the recto-uterine cul-de-sac.

Operation.—After incising the skin and superficial fascia, separate up the flap, and cut through the fibers of the external sphincter which go toward the fourchette and then separate the rectum from the vagina up the whole length of the sphincter. Then cut across the fibers of the recto-vaginal muscle, some fibers of the levator, and one finds oneself in the easily separable space intermediate between the vagina and rectum, from whence one may easily make way as far as the peritoneal cul-de-sac. It is sufficient to press the rectum backward in order to have a fully exposed, widely opened wound, whose base reaches to the peritoneal cul-de-sac. This wound is limited behind by the rectum, in front by the posterior face of the vagina and laterally by the ischia, which are covered by the fatty tissue of the ischiorectal fossa.

The peritoneum being opened transversely, introduce the hand, tilt into the wound, the uterus and adnexa, ligature and cut across the broad ligaments, open through the vesico-uterine peritoneum anteriorly, separate off the bladder and excise the uterus.

This operation has been used in opening certain pelvic abscesses in order to remove vaginal neoplasms and to excise advanced uterine cancers.

Sagittal Perineotomy.—In sagittal perineotomy, more often called vertical perineotomy, the incision is usually anteroposterior. Sänger,[1] who has had most frequent recourse to it, makes an incision to the side of the median line—commencing at the level of the posterior third of the labium major and terminating 2 cm. external to the anal orifice between this orifice and the ischial tuberosity. He cuts across the levators.

2. Sacral Route.

The incision may be simply parallel to the sacrum when it is called the *parasacral route;* it may accompany a more or less extensive resection of the sacrum; it is then properly speaking the *sacral route.*[2]

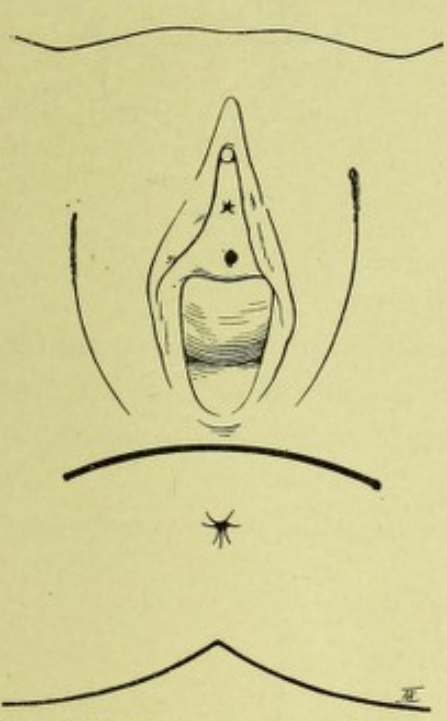


FIG. 254.—Transverse perineotomy.

FIG. 255.—Sagittal perineotomy.

Parasacral Route.—This may be various.

E. Zuckerkandl makes an incision parallel to the border of the sacrum, extending from the postero-inferior iliac spine to the ischiorectal fossa at equal distance from the tuberosity and the rectum; he cuts through the muscles and the ligaments without fear of injuring the vessels and nerves of the sciatic foramen, which lie externally.

Wölffer makes an incision which commences about 1 or 2 cm. external to the incision of the coccyx and sacrum; this incision, like an arc of a circle, passes near the rectum and terminates in the perineum about 2 or 3 cm. from the inferior commissure of the vulva. He incises the gluteus maximus, the

[1] Sänger, *Archiv f. Gyn.*, Berlin, 1890, T. XXXVII, p. 100.
[2] Terrier and Hartmann, *Annales de gyn.*, Paris, 1891, T. II, p. 81.

sciatic ligaments, large and small, near their insertion, and then the levator ani, after which he separates the rectum from the vagina.

Sacral Route.—In the sacral route the osseous resection may be more or less extensive; Kraske resects the coccyx and the left portion of the sacrum, following a line the horizontal part of which passes below the third sacral

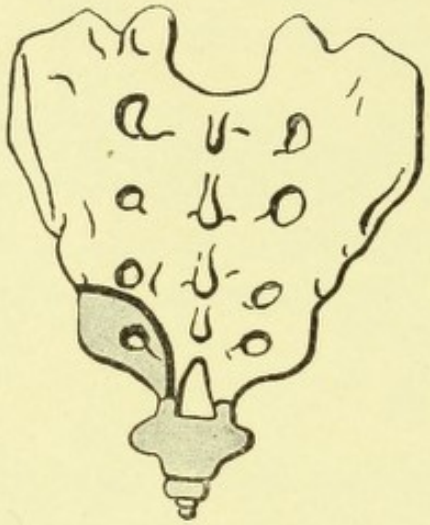


Fig. 256.—Kraske.

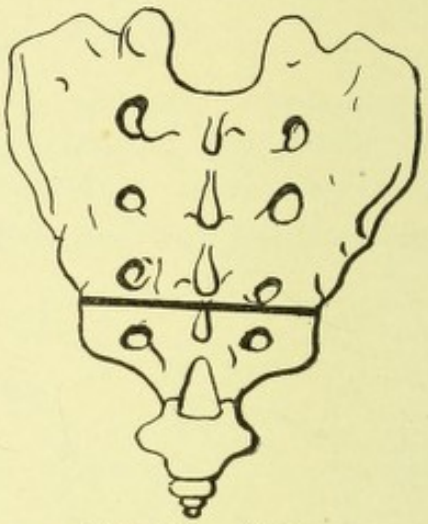


Fig. 257.—Roux.

foramen; Roux makes a transverse incision below the third sacral foramen; Hochenegg makes a resection intermediate in some respects to the other two, taking care to include the nerves proceeding from the right fourth sacral foramen and the right sacrosciatic ligaments.

Others have done temporary resections, cutting transversely across the

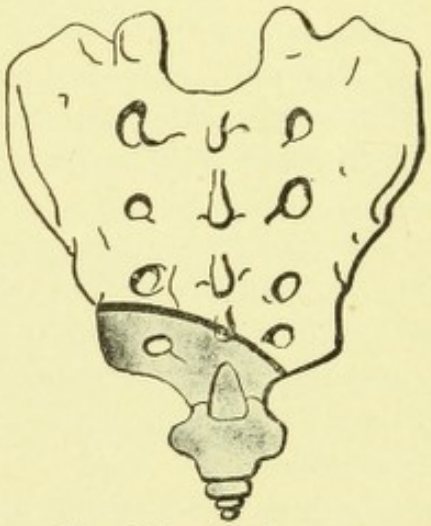


Fig. 258.—Hochenegg.

sacrum below the third sacral foramen, after following its right border (Roux), or making an oblique section which passes to the right between the third and fourth sacral foramen, to the left, through the lateral portion of the cornu (Hegar and Wiedow).

The important point is to get good exposure of the parts; the opening of the sacral canal is of no importance because the dura mater is not diseased, and it eventually forms a fibrous and resistant cicatrix.

These operations by the sacral route have to-day been almost abandoned; they present certain difficulties and are exposed to complications. Sometimes there is trouble to recognize and open the peritoneum; the intestine, bladder and ureter have all been injured. An interesting point to note is that the injured ureter is always on the operated side, which is explained by the fact that it separates easily from its cellular connections with the pelvic wall and that, being very mobile, it is easily drawn upon and injured.

PART III.

OPERATIONS BY THE ABDOMINAL ROUTE.

CHAPTER I.

SHORTENING OF THE ROUND LIGAMENTS IN THE INGUINAL REGION.

Summary.—Anatomical Survey.—Operative Technic.—Results and Indications.

The shortening in the inguinal region of the round ligaments was advocated by Alquie in 1840, but his work had fallen into oblivion when Alexander in 1881 did it and Adams in 1882 helped to familiarize it.

Commonly described as Alexander's operation, the shortening of the round ligaments is sometimes known under the name of the Alquie-Alexander-Adams operation.

Anatomical Recapitulation.—The round ligament, commencing at the cornu of the uterus, lifts up the anterior fold of the broad ligament and runs down the inguinal canal, where the cord breaks up into a series of fibers which separate to become inserted into the connective tissue and skin of the mons veneris, the pillars of the inguinal canal, to the periosteum and spine of the pubis.

In its inguinal course, the round ligament is a veritable cord which is sometimes accompanied by a diverticulum of the peritoneum (canal of Nuck) situated internal to it.

The round ligament, the peritoneal diverticulum when it exists, and numerous veins are united by cellular tissue into a cord, which crosses posteriorly, superiorly and external to the epigastric vessels. Above it lies the inferior abdomino-genital nerve.

At the level of the external inguinal ring the terminal fibrils of the round ligament are in a great measure included in the

pad of fat, Imlach's pad, which enters the canal as a fatty cord.

Operative Technic.—The round ligament ramifies at the level of the pad of fat, which covers the external inguinal ring and we must therefore search for it in the inguinal canal, where it is still a round cord.

The first stage of the operation consists in *exposing the inguinal canal.* To do that make an incision of 7 to 8 cm.

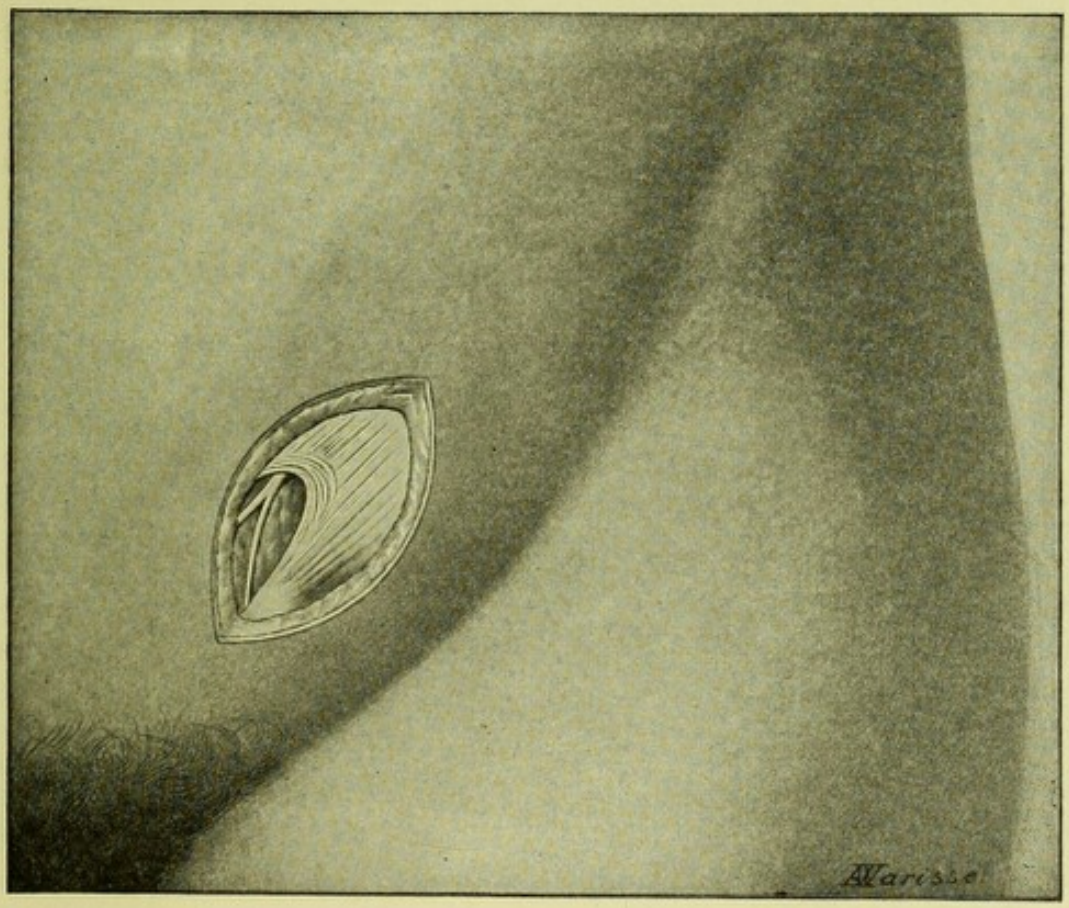


FIG. 259.—External orifice of the inguinal canal.

long, commencing at the spine of the pubis, parallel to the crural arch, an incision which generally is concealed by the pubic hair.

In order to be sure of not mistaking the fascia transversalis for the aponeurosis of the external oblique, which may be the case with fat women, it is advisable to deepen the incision externally to a point where one is certain to meet with the solid and resistant plane of the pearly external oblique. Where this is fully exposed run a grooved director along it from above downward and

from without in, which necessarily leads us to the external rings, always easily recognized in this way. We can see the internal and external pillars, the round ligament and nerves issuing from the ring.

The canal is opened on the grooved director for a length of about 4 cm.; then drawing back, if necessary, the interior border of the internal oblique with a retractor, *one exposes the round ligament.* Even when it is atrophied in its superficial layers, it

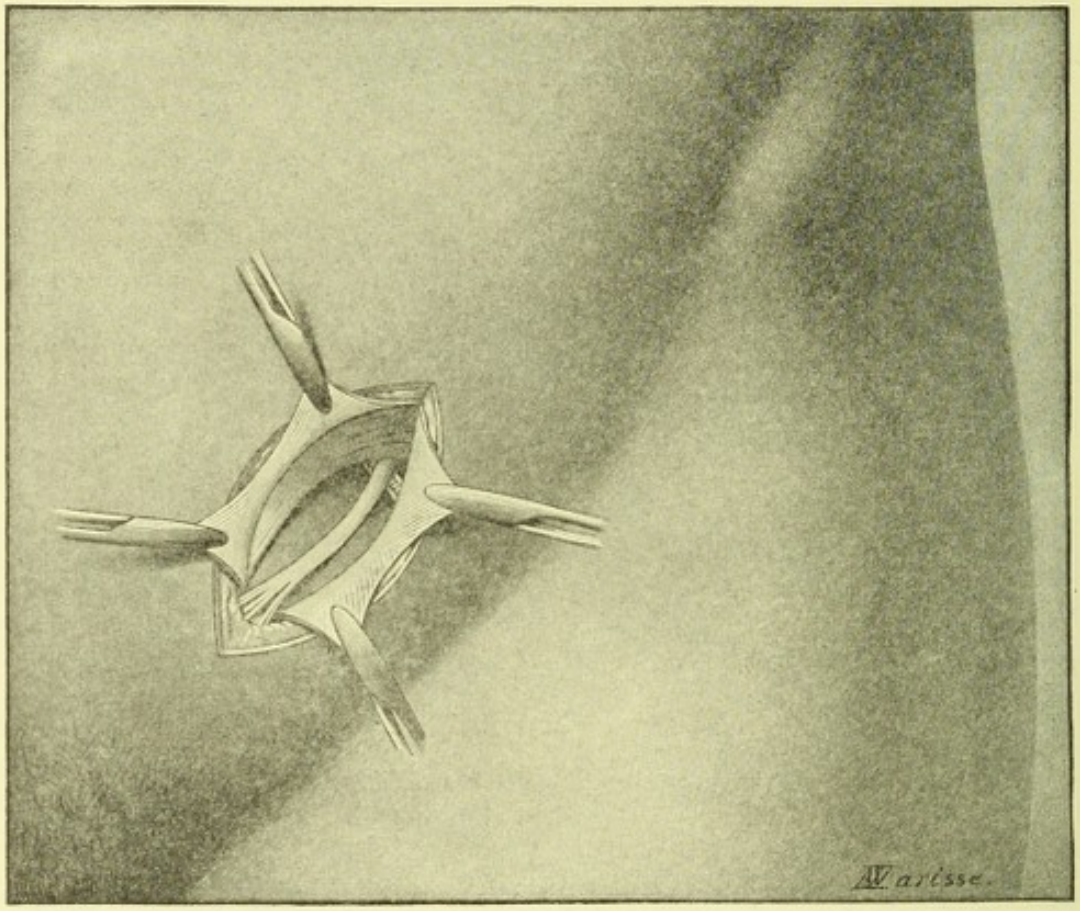


Fig. 260.—External ring of inguinal canal.

always appears on looking deeper as a bluish colored cord, reddened in part by the vessels. When recognized it is isolated, and with the director we tear through the fibrous tracts which unite it to the walls of the canal. Press back with gauze the peritoneum which envelops it. By gentle and continuous traction it may be gradually brought out, until it may be freed for about 10 or 12 cm. Now the separation of the peritoneum becomes more difficult, as the uterine cornu rests against the deep

face of the wall and opposes resistance to the traction. It happens often during these manipulations that the abdomen is opened, not that this is of such importance, but it is even of advantage to systematically open the peritoneum in such a way as to be able to explore with the finger the corresponding adnexa and to liberate, if necessary, any adhesions that exist. The important point is always to act with gentleness in such a manner as to avoid rupturing the ligament.

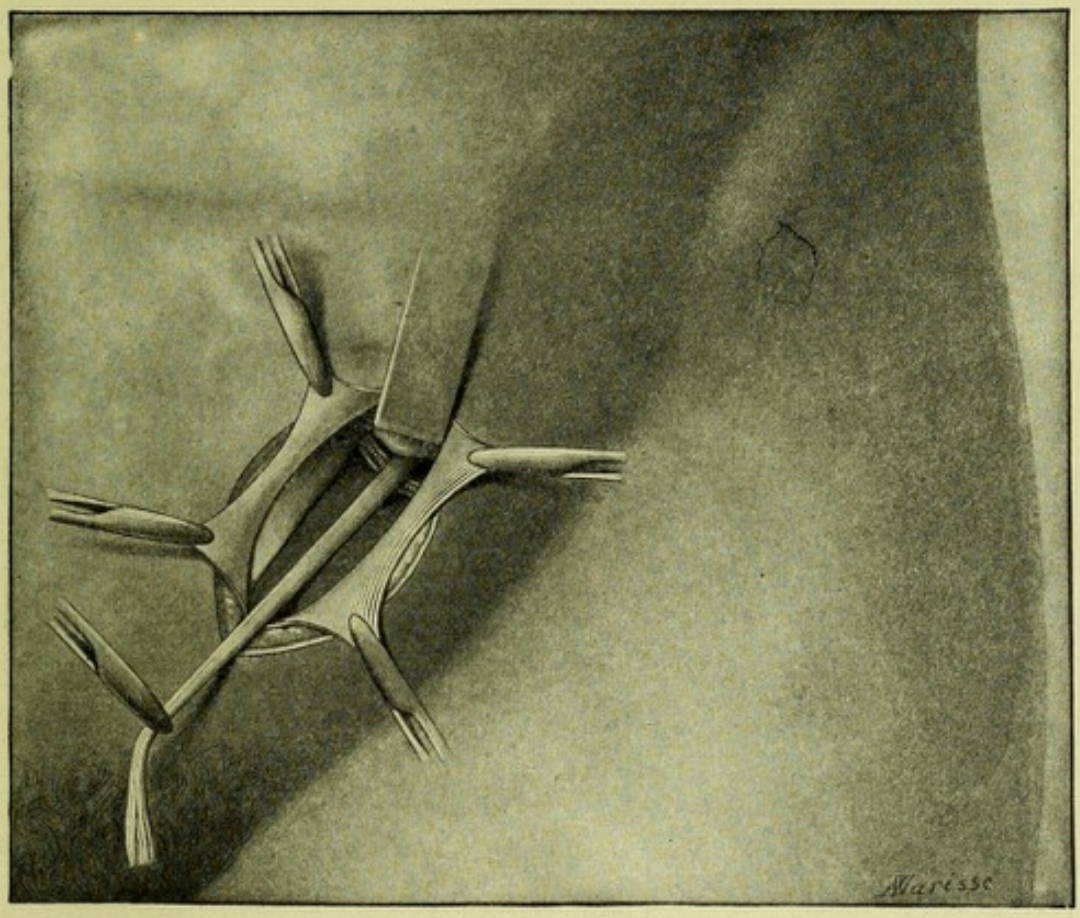


FIG. 261.—The round ligament is freed from the peritoneum, the cul-de-sac of which may be seen immediately below the retractor.

The canal is closed as in Bassini's operation, suturing the peritoneum, uniting the internal oblique and the transversalis to Poupart's ligament, taking care to include the round ligament in the two or three inferior sutures (Fig. 262). Conclude the fixation by uniting the ligament to the superficial portion of the aponeurosis. The terminal part of the round ligament is then resected.

The aponeurosis of the external oblique and then the skin are sutured without drainage.

The same manipulations are carried out on the opposite side; the operation is concluded by the application of a vaginal tampon or by that of a pessary, which is destined to prevent the uterus from exercising the traction of its weight on the fixation sutures of the ligament for the first few days.

Various modifications have been added to the type of operation we have just described. In place of making two symmetrical incisions some operators

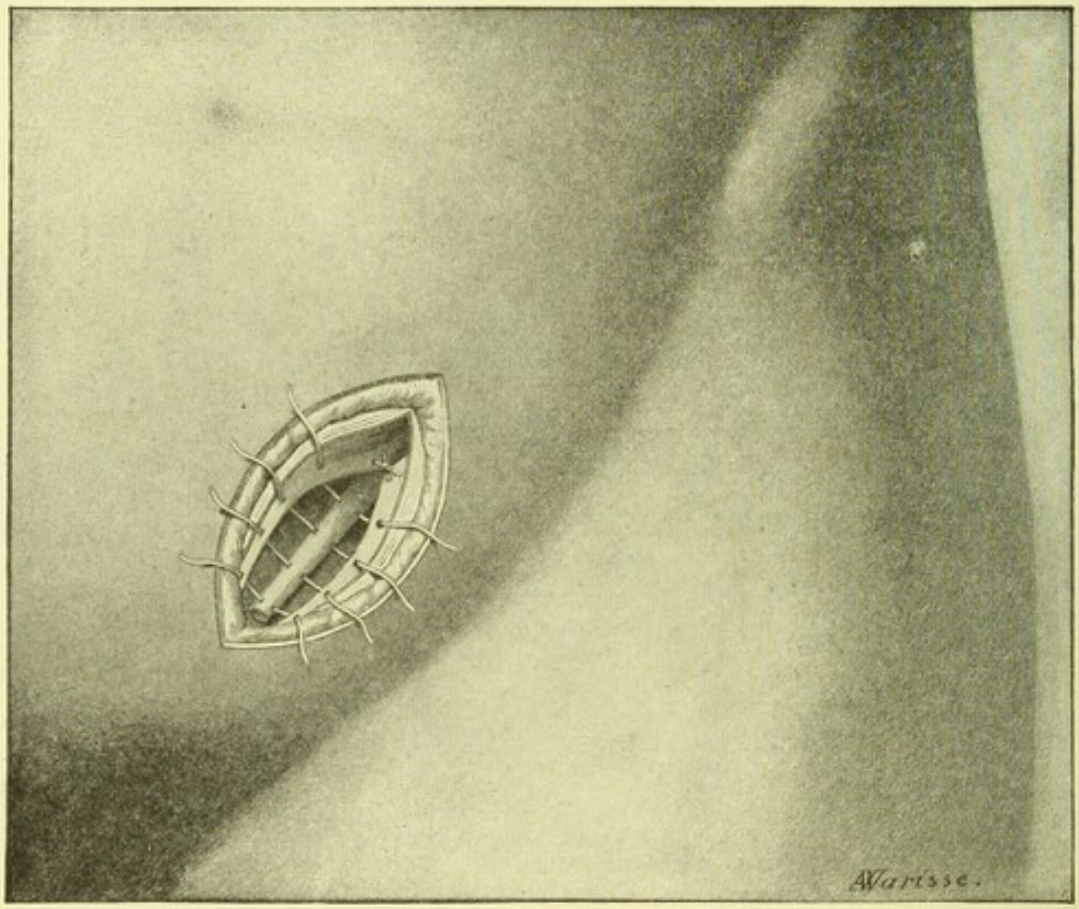


Fig. 262.

make a single curved incision to it, the convexity on a level with the pubis (Bumm,[1] Flaischlen[2]) and others close the canal by making use of the round ligament through which the sutures pass in a spiral form in traversing from one wall to the other (Abbe[3]), in splitting it and threading each of its halves through one of the lips of the incised canal and then tying them together

[1] Bumm, in N. Staedler, *Arch. für Gyn.*, Berlin, 1899, T. LVIII, p. 492.
[2] Flaischen, *Monatschr. f. Geb. und Gyn.*, Berlin, 1899, T. IX, p. 26, and T. XI, p. 309.
[3] Robert Abbe, Fixation of the Round Ligament in Alexander's Operation. *Annals of Surg.*, Philad., December, 1896, p. 699.

(Juvara[1]). Others bend the round ligament upward and outward and fix it to the external face of the aponeurosis of the external oblique in the direction of the anterior superior spine (Kocher[2]), while others unite the extremities of the resected round ligaments together (Doleris[3]). Bourcart, after drawing strongly on the round ligament, incises the peritoneum immediately external to it: the traction on the round ligaments draws the uterus forward; those on the cone of peritoneum act on the adnexa. In this way we can graduate the action on the uterus and ovary as we wish, fixing the round ligament to the aponeurosis and then closing the peritoneum in suturing the external cone to the round ligament more or less distant from the uterus as there is necessity for drawing the adnexa forward.[4]

Results and Indications.—*The immediate results* are good. There is no trouble in connection with the bladder. The remote results should be viewed from a triple standpoint, viz., orthopedic, therapeutic and obstetric. From the orthopedic point of view, if one has been careful to secure a forced antedeviation the cornua are in contact with the abdominal walls and the results are generally good; it is rare to find recurrences in cases of retro-uterine adhesions or when the operation has been used for prolapse.

From the therapeutic aspect, pains only occur when coincident with the deviation that are inflammatory lesions, in particular those of the adnexa. It has been demonstrated that a consecutive hernia is rare if the walls have been well sutured.

From succeeding pregnancies, inguinal shortening of the ligaments seems to exert no bad influence.

The examination of immediate and remote effects leads us to the conclusion that the operation is indicated in simple retrodeviations and prolapse; if in the latter case, it is combined with a plastic vagino-perineal repair. It ought only to be done, however, during active sexual life when the ligaments are well developed and capable of supporting the weight of the uterus.

In practice we do not perform this operation much:

1. Because, while it gives good results, it is necessary that there be no retro-uterine adhesions nor inflammatory lesions of

[1] Juvara, *Presse médicale*, Paris, 1901, p. 178.
[2] Kocher, Chir. Operationslehre et in Lanz, *Arch. für Gyn.*, Berlin, 1893, T. XLIV, p. 348.
[3] Doléris, *Nouvelles Archiv d'obstétrique et de gyn.*, February, 1889, p. 49.
[4] Bourcart, *Ann. de gyn.*, Paris, 1907, p. 705.

the uterus or adnexa; that in all such cases, retrodeviations which present no painful symptom may most often be left to themselves.

2. Because we possess to-day, as will be seen later, most excellent means of fixing the uterus in good position.

CHAPTER II.

ABDOMINAL CELIOTOMY.

Summary.—General technic.—Operative precautions (operator, surroundings, operated).—Median celiotomy (incision, limitation of operative field, treatment of adhesions, hemostasis, peritonization, examination of the appendix, closing of the wall, drainage).—Transverse celiotomy.—Postoperative precautions.—Complications (shock, hemorrhage, peritonitis, intestinal occlusion, pulmonary complications, parietal suppuration, fistula, phlebitis eventration).

Under the name of celiotomy is meant the opening of the peritoneal cavity or celom. The means of access to the cavity are multiple. We have already described its opening under the name of vaginal celiotomy or, more correctly, *colpo-celiotomy*. Most often the entrance into the abdomen is through the abdominal walls; it is *abdominal celiotomy*.

This term, abdominal celiotomy, tends to replace the incorrect form *laparotomy* which means, literally, lateral incision. The word laparotomy should be rejected as also that of gastrotomy which was generally employed at one time and is now reserved to the opening of the stomach.

1. General Technic of Abdominal Celiotomy.

It was once regarded as a very serious operation. The patients died of hemorrhage or suppuration and the rare cures were considered as happy chances. Actually, the opening of the peritoneal cavity, executed according to rules and by a surgeon knowing his work, presents no longer any danger. This is due to the introduction into surgical technic of antisepsis and asepsis.

It is important to draw attention to the employ of purely aseptic methods in abdominal surgery. *From the time that the peritoneum is opened, leave all antiseptics on one side and only employ asepsis.*

The action of antiseptics on pathogenic organisms is largely counterbalanced by injurious effects to peritoneal endothelium. This destruction of peritoneal endothelium, as the laboratory experiments of our colleague Delbet proved, confirm our clinical results and leave no doubt of the disastrous consequences that may be occasioned.

Certainly absolute asepsis is never realized whatever precautions are taken. It is not indispensable; one should endeavor to obtain it as completely as possible, but happily one finds in the body elements capable of resisting a microbic invasion of the operative field. The peritoneum possesses a considerable resistance as our clinical observation has established. It is not rare to observe patients get better without the least peritoneal reaction although they present a parietal suppuration some days or weeks after the operation. But, in order that the struggle may be efficacious, it is necessary that the tissues preserve all the phagocytic action which a strong antiseptic may impair.

The employ of antiseptics has other drawbacks which, although not immediate, are none the less important. We refer to extensive adhesions, produced by the irritation of the serous membrane. The production of these adhesions has so many drawbacks that it is sufficient alone to withhold their use in abdominal surgery.

In another sense, *the more recent technical improvements* have contributed to reduce the risks of celiotomy.

These chief improvements are three in number: limitation of the operative field, the suppression of large pedicles and the doing away with intraperitoneal surfaces.

The limitation of the operative field, as far as one is able, results in the reduction in size of a possible infected zone and renders the operation extraperitoneal as it possibly can be. The following result is thus obtained:

1. By the use of the inclined plane.

2. By the methodical isolation of the pelvic cavity with sterilized compresses.

While Scultet used the elevated pelvis position, with an inclined plane, it is to Trendelenburg that the merit is due of using the inclined plane in order to favor descent of the intestine in all operations on the pelvic cavity.

Since 1890 I have, in Paris, constantly used the inclined plane, and at the same time my friend Delageniere used it at Mans; at present its employ is general.

In this elevated pelvis position, with the body at an angle of 45 degrees, the intestines fall toward the diaphragm and leave the operative field free. This intervention renders the operation easier and safer. It has been said that it may lead to pulmonary or cephalic congestion. In some stout women, with fatigued hearts, there is at first some facial cyanosis, but it is very exceptional to find that this extends to a degree involving the return to the horizontal position.

The employ of aseptic cloths which our master Ferrier made common is the natural complement of the inclined plane. By placing them methodically, one may completely isolate the pelvic from the rest of the abdominal cavity and thus the risk of infecting the general peritoneal cavity is reduced to a minimum. For this purpose a *good anesthesia* with calm and regular respiration permits of the constant and regular maintenance of the compresses below the intestines and constitutes a considerable operative adjuvant. Personally, I consider that a good anesthesia is more important than a good assistant.

The suppression of large pedicles constitutes an improvement none the less important. The ligature *en masse* of pedicles, formerly the custom, presents numerous drawbacks. It is complicated, dangerous and generally useless. To show how complicated it is, one has only to think of the numerous ligatures devised to accomplish it (chain ligature, Tait's knot, Bantock's knot, etc.). Its danger is emphasized by the way it slips when most carefully applied; most dangerous hemorrhages of course result from this when the abdomen is closed; useless also because these large pedicles are often avascular along the greater course of their length. Thus when one proceeds to the removal of the adnexa, two small ligatures, one placed externally on the utero-ovarian artery and the other internally on the uterine artery suffice to secure the hemostasis. In these conditions why is it necessary to tie an enormous ligature around the upper part of the broad ligament? That is not all. In addition to these immediate drawbacks the large pedicles have even more remote results. They present a large raw surface ready to contract

adhesions. Every surgeon has seen those sad cases where a bilateral excision of the adnexa left two large more or less infected pedicles, as painful as the organs removed.

The *suppression of the rawed intraperitoneal surface* constitutes another improvement. The reconstitution of the peritoneum over the raw surface and ligatures, commonly known in France as "peritonization," has the advantage of preventing these raw surfaces from exuding their products into the peritoneal cavity. It is also sufficient to prevent the secondary formation of adhesions, a source of pain and such grave complications as intestinal occlusion.

2. Preparatory Measures.

We will consider this under three heads: the operator, the patient, and the surroundings.[1]

Operator.—The surgeon who undertakes a celiotomy should be quite well; a good physical state assures the operator that moral condition which enables him to form and execute decisions rapidly and well. He, his assistants, and his material should be aseptic.

We will not go into the means of securing this state of affairs. Rubber gloves should always be employed. They should be used in all abdominal operations. Masks, however, if the operator does not speak, appear to us to be useless. Personally we only use them when we have coryza or sore throat.

Surroundings.—The surroundings are not of such great importance as one would be led to believe *a priori*. It is, however, prudent to avoid operating septic cases in the same theater as one does celiotomies. It is advisable to give any spectators aseptic blouses, to caution them not to touch anything, not to crane over the operative field and not to breathe on the wound.

Patient.—It is the patient who is above all the object of the preparatory attentions. It is essential, when there is no absolute urgency, to prepare her at the operation.

1. To increase her resistance as much as possible to infection and to stimulate the function of her in such a manner as to

[1] See the discussion, French Congress of Surgery, 1909, and Holybach, Einige Bemerk. über Vor und Nachbehand. gynec. Op., *Samml. klin. Vortr.*, 1910.

obtain an easy elimination of toxic substances in cases where an infection may be brought about.

2. To render her skin aseptic.

1. *Preparation of the Patient.*—In order to place her in the best possible conditions of resistance, we should insist before the operation a moral and physical repose of some days, giving hypnotics if necessary to the neurotic subjects. We think it is as well not to state beforehand the day of the operation in order to avoid apprehension, sleepless nights, and the state of terror which sometimes gives rise to complications at the commencement of anesthesia. If the patient is a little agitated, we give a sedative before the day of operation in order to secure a good calm night.

The regime is nothing special. Avoid objects difficult of digestion. In patients with glycosuria, albuminuria and sometimes stout subjects, a special regime is to be recommended.

In a general manner of speaking avoid all operation in diabetic subjects, above all in those with polyuria and flabby skin; on the contrary, the simple presence of a moderate quantity of sugar, combined with a good general state, does not contraindicate an operation. However, it is advisable before operating to give a regime of milk and alkalies to reduce the sugar.[1]

Albuminuria, which many gynecologists think is a contraindication to any operation, certainly is an unfavorable symptom. It is none the less true that in certain conditions, such as uterine fibroids where it results from the interference of the sexual function by the pelvic tumor, the operation is absolutely indicated. In such cases we operate after giving them a course of fifteen days on milk. We are doubtful of cases where in addition to albuminuria there are also epithelial cylinders in the urine.

In stout subjects the celiotomies are more difficult, longer, and more dangerous. It is a question when there is nothing urgent whether a course should not be suggested enabling the patient to become thinner. Pauchet advises a regime in which the essentials are vegetable soups, green vegetables, fruits, oranges, with water as beverage. Others recommend a milk diet, consisting of 2 1/2 liters per diem.

[1] Some authors have blamed chloroform as the cause of diabetic coma; in reality the question of anesthesia is secondary. Coma has come on after simple spinal anesthesia (Füth, Holzbach).

When the patients are *run down* and *enfeebled*, among those who have worked up to the last minute and arrive at the hospital quite exhausted, it is advisable to recommend some days of rest, to give baths, a fortifying diet, tonics to stimulate the excretions, and even if the heart is feeble to give a little digitalis or strychnine.

We attach a great *importance to the careful cleaning of the mouth.* We may thus diminish the occurrence of pulmonary complications of postoperative parotitis, etc. Remove the tartar and then brush the teeth well, etc.

The evacuation of the intestine by purgatives, besides being the best of disinfectants, has the advantage of cleaning the digestive tube of its contents, liquid or gaseous, which reduces the volume of the intestine and facilitates the intraabdominal manipulations. It is advisable not to give too much purgation and to avoid drastic purgatives. We give an oily or saline laxative two days before the operation and an enema or laxative the day before the operation if the primary result has been unsatisfactory. We may thus be certain of avoiding the disadvantages consequent upon the continuation of purgation on the morning of the operation. Never give violent purgatives as the fatigue of the muscular intestinal wall helps to augment the postoperative bowel paresis at times when it is necessary to induce contractions of the bowel for the discharge of pus.

2. *Disinfection of the Operative Region.*—The day before the operation the skin is shaved. The patient is then cleaned up with soap and water in such a manner as to stimulate the skin functions. Be particular to remove epidermic debris.

The vagina is disinfected with repeated antiseptic irrigations and even most carefully bathed with soap and water on the morning of the operation and then packed with iodoform gauze.

Latterly surgeons have endeavored by ante-operative measures to combat the hemorrhages, intravenous coagulations, and infections, secondary to intervention.

They set to work by ascertaining the coagulability of the blood, and if it is not normal, endeavoring to obtain that state by the administration of calcium salts, subcutaneous injections of gelatine 5 to 100, animal serum and milk diet, or anti-coagulants (citric acid, potassium citrate, vegetarian diet, Prussian

blue injected intravenously) and to thus prevent the occurrence of hemorrhages or that of thrombosis or embolus (Wright).

Others propose to immunize the patient against surgical infection by a streptococcal, staphylococcal or colibacillary vaccination. Unhappily, there is yet no serum which prevents the development of infection in man. It has been suggested to increase the resistance to infection by making a pre-operative leucocytosis. The subcutaneous injection of 20 c.c. of a solution of 1 per cent. nucleinate of soda has been recently declared as valueless (Aschner and Von Graff).

Personally we have never used any of these plans, and their efficaciousness appears to us to be incompletely established. On the contrary, when the patient is feeble, we do not hesitate to give her, the day before and the morning of the operation, a subcutaneous injection of 3 to 500 c.c. of physiological serum.

Urgency Operation.—In case of urgency it is evident that preparatory treatment should be reduced to a minimum. Be content to stimulate the patient with subcutaneous injections of normal saline or in extreme anæmia with intravenous ones. Also, give injections of strychnine and disinfect the skin with two applications of tincture of iodine at some minutes interval (Grossich).

3. Operation.

The opening of the abdomen is generally carried out in the median line; some operators prefer the median vertical incision to the transverse suprapubic one and differentiate them by the names of median and transverse celiotomies.

A. Median Celiotomy.

Preliminaries of the Operation.—The surgeon and his assistants after having disinfected their hands in the usual way and put on rubber gloves, and then placed in large receptacles the necessary armament for the operation: large cloth dressings, sterilized gauze with which to sponge, simple or chromicized catgut, silkworm-gut sutures, the usual abdominal instruments and very few special ones, wire metal retractors, a large valvular

retractor the fixed point of which lies between the legs, a blunt needle to tie vessels, some tampon holders, and some large and small Museux's forceps. The needles to be used for the sutures are sharpened before and kept between sterilized compresses.

During these preparations, the patient is anesthetized in her bed or in an adjoining room. The bladder is emptied. We use chloroform usually because the respiration is calmer than that induced by ether and in not producing any cephalic congestion proves its superiority in this respect for operations in the inclined plane, as is so constantly done to-day.

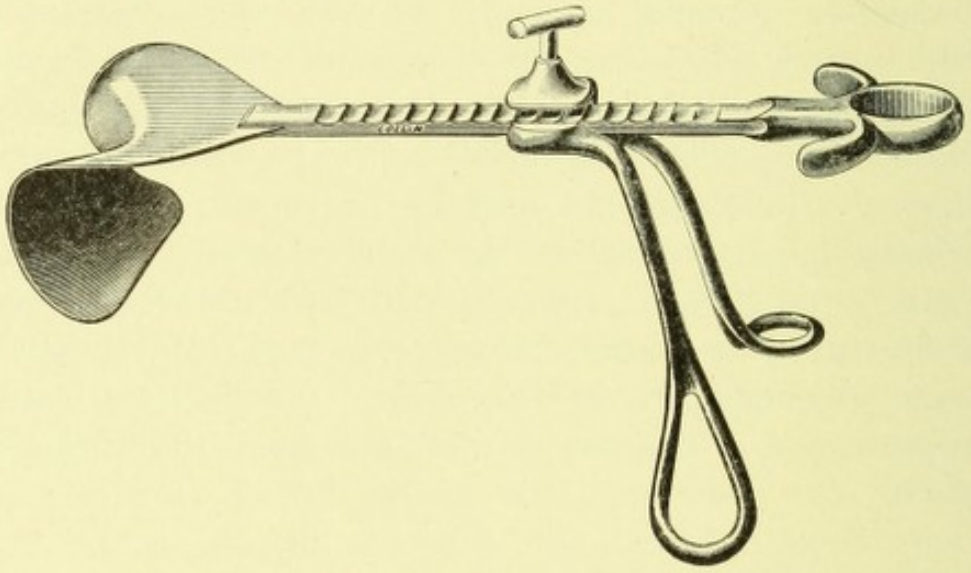


Fig. 263.—Large valvular retractor with its fixed point placed between the legs (Doyen).

When the anesthesia is sufficiently complete to enable the patient to be transported, she is brought into the operation theater and placed on the table which is provided with shoulder pieces so that when her legs are fixed in the elevated position and table head lowered, she will not be suspended by the knees. The arms lie alongside the body and are tied with a serviette or bandage. Never place them as one often sees in forced abduction as this exposes them to paralysis of the roots of the brachial plexus, which, although spontaneously capable of cure, nevertheless causes the patient much worry.

A warm application is applied over the chest, a second is insinuated under the kidneys.

A fresh abdominal toilet is made by an assistant. Brush

well with soap and water,[1] ether, alcohol and 1 to 1000 sublimate. Be careful to disinfect the umbilicus which should be drawn out with a pair of Kocher's forceps.

When the skin disinfection is finished circumscribe the operative area with sterilized cloth compresses, slightly moist, and thus limit our operative field. The inclined plane is now put at 45 degrees, the minimum to get a satisfactory result.[2] The operation then commences.

The surgeon is on the patient's right, and behind him is a table on which are the flat trays containing instruments, a box of gauze compresses, two boxes of cloth compresses (small and large), and facing him is the principal assistant with his table on which are gauze compresses, sutures and ligatures. To the surgeon's right is the second assistant, who will hold during the operation a valvular or ordinary retractor. He may not be required if automatic retractors are used.

During the whole course of the operation, the surgeon and his assistants should avoid craning their hands over the wound and they should not speak or breathe into the abdomen, as their breath is infective.

Abdominal Incision.—The ost generally employed incision is the median vertical subumbilical. It should be long enough to permit doing the intraabdominal manipulations with ease and yet not too long so that loops of intestine keep appearing in the wound. It varies from 4 to 12 cm. and more; an incision to permit of the extraction of large fibroids may attain great dimensions.

Generally one commences with a small incision a little below the mid point of a line between the umbilicus and pubis.[3] Cut through the skin, the subcutaneous cellular tissue and the aponeurosis in a line with the white line. In fact, the incision

[1] In order to get the best results with the brush we use a tampon of wood shavings; as this tampon is of no value, it is used once and thrown away. We use liquid soap and a little water (white soap 1, black soap 1, oil 1, water 5, naphtol, 0.025, essence of citron, q. s., in order to perfume it). Be careful not to rub the skin too hard as it may be broken.

[2] In exceptional cases this elevated pelvis po ition is badly supported. In certain short subjects the diaphragm cannot support the weight of the viscera which compresses it and the respiration becomes rapid and stertorous and the pulse irregular, the face cyanosed and pupils dilated. It is necessary to assume the horizontal position.

[3] In extremely fat women, Kelly advises an exploratory incision at the level of the umbilicus, a point where the abdominal wall is thinned by reason of the absence of fatty tissue and of muscular tissue between skin and peritoneum.

is rarely median and generally opens the sheath of one of the right muscles. It is easy to recognize the internal border of the muscle thus discovered and it is liberated by a cut of the bistoury along the whole length of the internal border. We must go prudently in order not to injure the intestines in immediate contact with the deep surface of the peritoneum. In order to avoid injuring them, pinch up a fold of the deep layers of the wall and then seize the other side of the fold with a pair of

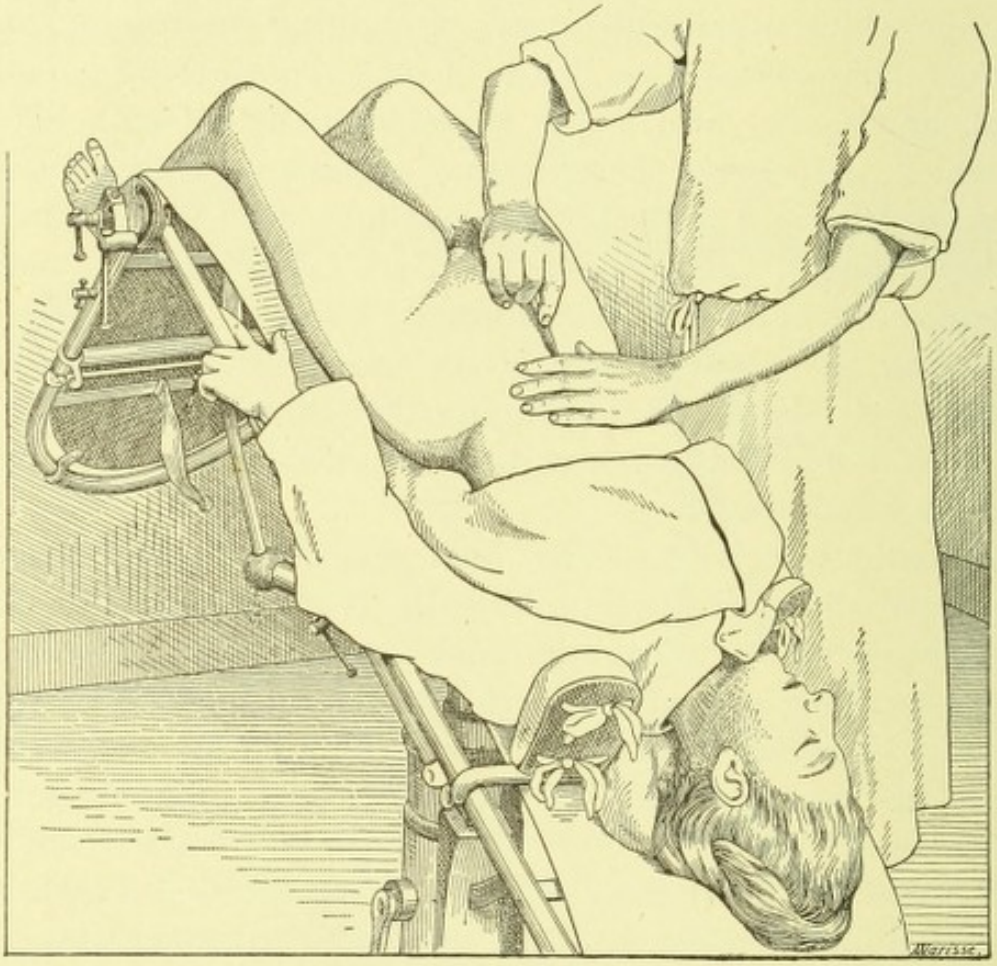


Fig. 264.—Incision of the abdominal wall.

artery forceps and cut between them with the knife (Fig. 265). Often the peritoneum is immediately opened; sometimes the same manipulation must be repeated several times in order to cut through the fibers, fatty tissue and the peritoneum before opening the abdominal cavity; as soon as this is opened, enlarge it at each end with blunt scissors.

Insinuate two fingers into the incision thus made and lift up the whole thickness of the wall and then enlarge the pubic

extremity of the wound, being careful not to injure the bladder, and then the umbilical end.

When the dimensions of a tumor force us to go beyond the umbilicus we prolong the incision to the left in such a manner as to avoid the suspensory ligament and thus give it sufficient dimensions.

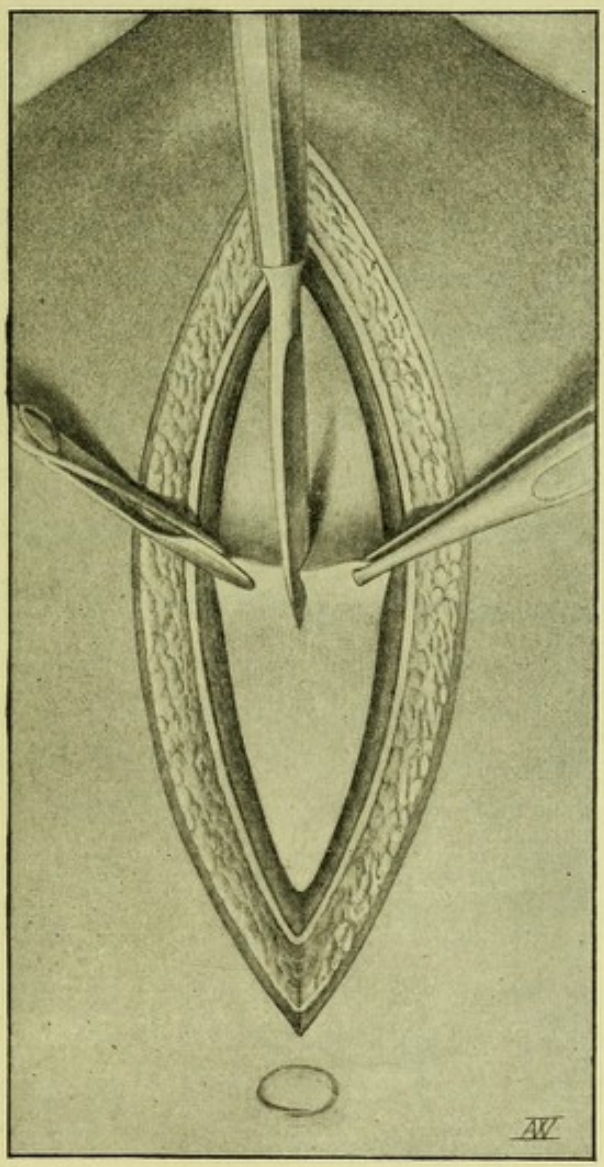


FIG. 265.—Incision of the peritoneum between two forceps.

This incision usually cuts no vessels of importance and it is useless to place forceps on all the bleeding points. The application of two sterilized cloth compresses on the lips of the wound suffice to arrest in a moment all oozing. One or two arterioles at the pubic angle of the incision require to be clamped.

Limitation of the Operative Field.—The peritoneum being

open, its edges are seized with four forceps, and two wire retractors are inserted, and the contents of the abdomen are examined. This done, the intestines are pressed back toward the diaphragm and kept there. In order to prevent a loop coming out during the operation, we commence by inserting into the umbilical angle of the wound between the deep face of the wall and the mass of intestines, one extremity of a compress which we place on the abdominal wall toward the xiphi sternum. This compress assures for us the impossibility of an intestinal loop, appearing in the upper angle of the wound, and we then proceed to place other compresses to limit the operative field. The mass of intestines should be maintained by warm compresses, slightly moist, outside the operative field and thus avoiding cold and traumatism.

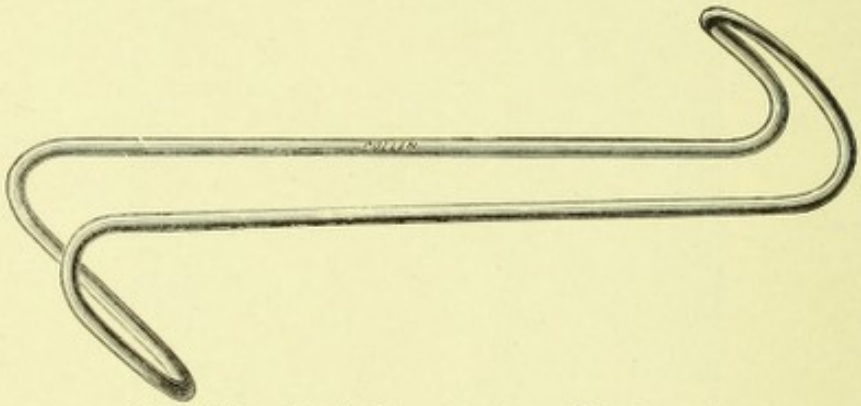


FIG. 266.—Steel wire retractors (Hartmann).

A first compress is placed in the superior angle of the wound, which literally covers and holds back the mass of intestines and it extends from the incision almost to the promontory. The two lateral retractors are then successively lifted out and two lateral compresses are insinuated under the abdominal walls in order to tampon the iliac fossas. It is often useful to double and triple these means of protection of the intestine when the examination of the lesions would lead one to think of the possible rupture of a focus of suppurations in the course of the operative manipulations. In no case should a compress be entirely introduced into the abdominal cavity; one extremity should always remain externally. We thus avoid the risk of forgetting one of them in the abdomen, and there is no trouble of having to count them previous to the operation and after. The pelvic cavity thus

exposed, we proceed to the operation we have in view. This is more or less easy according to the purpose in view and the state of the lesions. In all cases, the presence of adhesions may complicate the manipulations.

Treatment of Adhesions.—We may distinguish two great groups: inflammatory and natural adhesions.

Inflammatory Adhesions.—Adhesions to the wall are usually easy to liberate. In some cases, however, they complicate the opening of the abdominal cavity and one is often puzzled to know whether one is within or out of the peritoneum. The simplest thing to do in such a case is to prolong the incision toward the umbilicus in order to penetrate into a cavity free of adhesions and thus enable one to obtain an orientation of one's surroundings.

The *most frequent adhesions* found are those of the epiploon. When recent, separate them. It is well to clamp pieces of separated epiploon because they may be the seat of oozing, more or less abundant, and for which it is most often necessary to do a resection. When we are dealing with old adhesions, they are too firm to permit separation. It is better in such cases not to waste time with useless manipulations, but to cut through the epiploon above the adherent parts. When it is necessary to do extensive resections, the crushing forceps render great services in reducing to a minimum the volume of the epiploic pedicles.

Periuterine adhesions are very troublesome when they mask the body of the uterus. It is difficult to ascertain one's position. In such cases look for the body of the uterus methodically as follows:

Commence by the liberation of adhesions immediately behind the pubis, at the level of the bladder, and work from in front backward, being careful to work always in the median line. We come upon vesico-uterine cul-de-sac and then on the anterior surface of the uterus. Continuing the separation in this manner, we at length come into contact with the body of the uterus.

We liberate successively its fundus and posterior face. After this we are in the position of a full uterus with only the adnexa adherent.

The liberation of the *adnexa adhesions* is generally easy enough when they are adherent only to the parietal peritoneum

or to the posterior surface of the broad ligaments. It is always carried out in the median line, working toward the sides and proceeding from below upward. Use the extremities of the fingers from the commencement of operation to hook up the adnexa from the floor of the pouch of Douglas. This liberation is only difficult when there are adhesions with the intestine.

Intestinal adhesions ought to be detached with more care because at all costs we must not open the digestive tract, the wall of which, often altered by inflammation, becomes infiltrated, friable and like a paste board; also, if a cleavage is not found enabling separation to go on, it is best to use the knife and incise the adherent adnexa than seek to separate afresh. In no case should one act with force, and sometimes it may be deemed necessary or better to leave a piece of tube or pocket adherent to the intestine. However much care is taken, the intestinal wall may be wounded at the level of these adherent points. If the lesions occur only in the musculo-serous tissues, some Lembert sutures suffice. If the mucous membrane is opened, a double suture, one total and the other sero-serous, is absolutely necessary.

Very exceptionally in cases of extensive and firm adhesions, one may be led to do a resection of the intestine.

Vesical adhesions much rarer are treated like adhesions of the intestine.

Natural Adhesions.—Under this misnomer is meant the inclusion of tumors under a peritoneal fold. This inclusion is seen particularly in fibromas which appear on the antero-lateral portion of the inferior segment of the uterus and, developing below the serous layers of the broad ligament which they separate, eventually they come to lie under the peritoneum in contact with the iliac colon to the left and the cecum to the right. The anatomical disposition of the parts dictates the line of conduct in such cases. Make a circular incision of the peritoneum near the base of the tumor and attach to the inferior lip of the incision a small hemostatic forceps, then separate off the serous layer and be careful to remain in direct contact with the tumor. We thus avoid wound of the intestine and above all of the ureter which is more particularly exposed in these cases of tumors included in the broad ligament.

Hemostasis.—When the tumor is freed, practise the hemostasis. Remember that it is illogical and dangerous to leave large pedicles. It is necessary to tie off the different vascular pedicles. To do so use a silk or better still a catgut ligature.

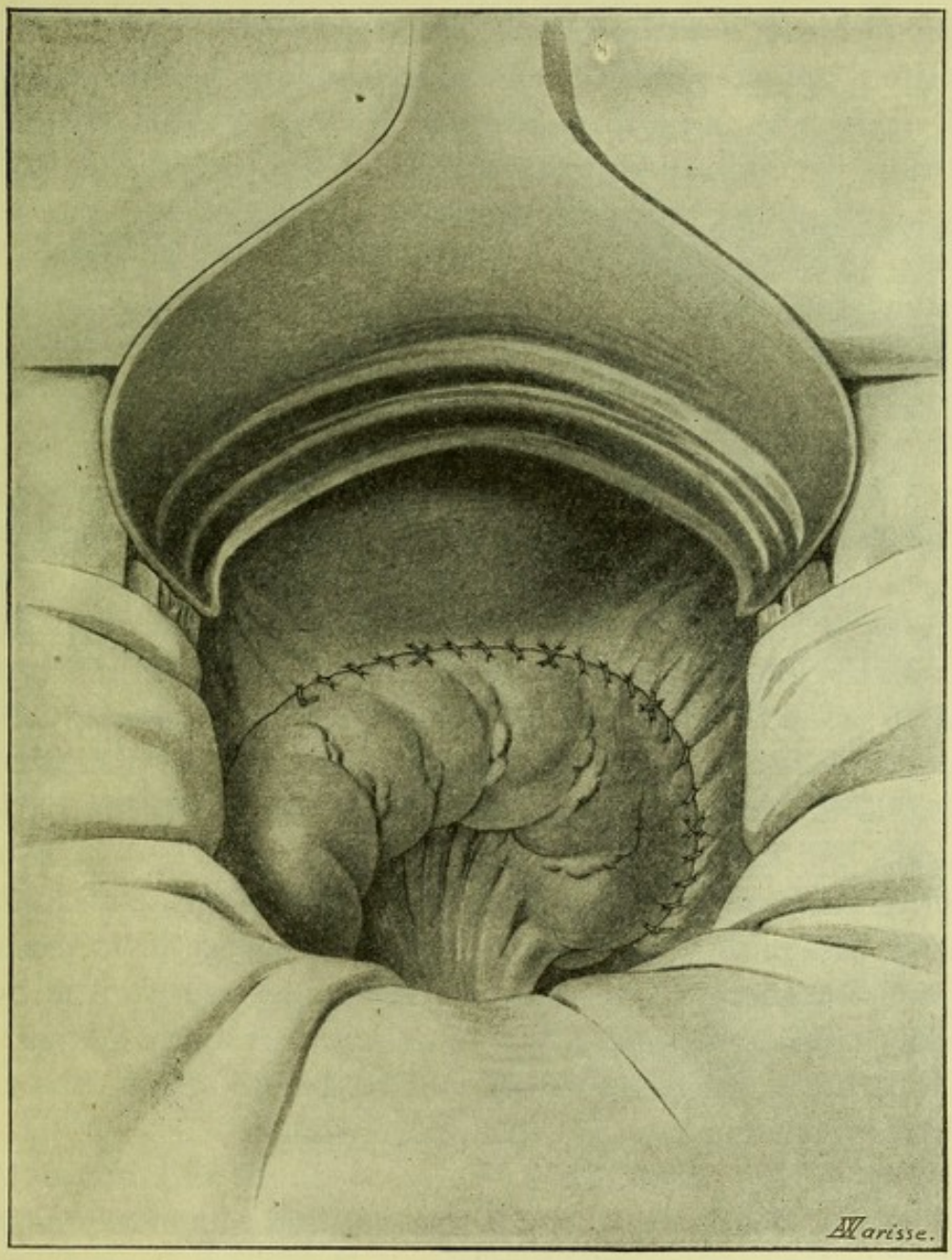


Fig. 267.—Partitioning of the pelvis by suture of the pelvic colon to the peritoneum of the anterior wall above a vaginal drain.

In short, the ligature should be of fine caliber as small threads have the double advantage of tying tightly and of being better tolerated than the enormous threads of silk which some surgeons still wrongly use. As the pedicles have a constant position,

corresponding to known anatomical data, it is easy to know at what points one should place the ligatures. With the exception of the uterine, utero-ovarian and some funicular arteries one has only to place a few ligatures on bleeding points corresponding to secondary vessels; the only important point is never to place forceps on blindly and always to see what one does.

Peritonization.—Excision accomplished and hemostasis secured, it is necessary to peritonize the rawer surfaces of the true pelvis by making an exact suture of the peritoneum including in a continuous suture the ligatures and rawed surface. This is done by a curved needle in a needle holder. When the surfaces to be covered are very extensive or where the peritoneum is inflamed, thickened, friable, and is easily torn with the tightening of the suture, to use the expression of Chaput, we have a veritable transverse partitioning of the pelvis. Suture the recto-vesical peritoneum to that which covers the pelvic colon and the superior part of the rectum, isolating large peritoneal cavity, the operative field which is left in communication with the vagina (Fig. 267). This partitioning off, as in all peritonization of the pelvis, is carried out very rapidly with a curved needle in a needle holder and threaded with fine catgut; this method appears very superior to us, as regards facility and rapidity, to the suture with Reverdin's needle which my Parisian colleagues still employ greatly.

Examination of the Appendix.—Before closing the abdominal wall it is always of advantage to draw in the cecum, to examine the appendix, and if it presents any lesions to remove it at once. The systematic removal of the appendix has been advised by many operators in all cases in which the abdomen has been opened for a lesion of the gynecological order.[1]

Closing of the Abdominal Wall.—A final abdominal toilet having been done, the closing of the abdominal wall alone remains. It is well to lower the inclined plane and see if there is bleeding in the pelvic cavity when the patient is horizontal. This may occur whereas it did not exist in the Trendelenburg position.

[1] Kelly uses the abdominal opening to explore other regions. He has been able not only to discover appendicular lesions but also a movable kidney, biliary calculi, ureteral lesions and even a pyloric tumor. (Kelly, Exploration as an adjunct to every celiotomy. *Medical News*, 1899, p. 784.) We believe that this systematic abdominal exploration is inferior to a precise examination associated with a methodical interrogation of the patient before the operation.

Now remove the compresses that protect the intestines. The intestines are allowed to come back into the pelvis and then the epiploon is sought and it is spread out in front of the intestines; in order to isolate the peri-intestinal serous membrane from the operative field and prevent any secondary intestinal occlusion due to a kink of the transverse colon which has fallen, at the moment of the pelvis being raised, into the diaphragmatic concavity, and remained in that abnormal situation till the

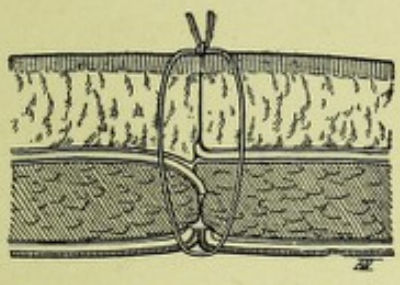


FIG. 268.—Suture *en masse*. The parts are badly apposed and the aponeurosis is folded up between the muscles.

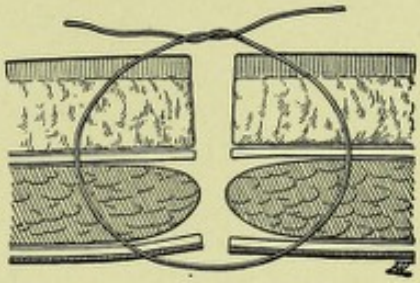


FIG. 269.—Suture *en masse*. The parts have been well apposed, peritoneum to peritoneum, muscle to muscle, and aponeurosis to aponeurosis.

patient is in the horizontal position. Each surgeon has his own way of closing the abdominal wall; to be honest, the manner is of little importance, provided that the *suture remains aseptic and retains similar parts in connection.*

The suture may be employed either in *one plane* or *several planes.*

The one plane suture may be done with the aid of large silk-

FIG. 270.—Needle with handle (Doyen).

worm-gut sutures, of large silks or even better metallic sutures (silver wire, or sutures of aluminium bronze).

The suturing excites nothing special. It is important, however, to see that the needle does not escape the muscle and aponeurosis, and that it is inserted as near as possible.

Better than all descriptions, Figs. 268 and 269 show the points where the needle should traverse the different planes. This method of suturing has for its object the prevention of the perit-

oneum being drawn between the two lips of the wound and that the skin may be cut through by silver wires which would embrace the extended area. The sutures are placed 2 cm. apart, and passed with the aid of a solid needle provided with a handle. Place all the sutures first and tie them later and take care that

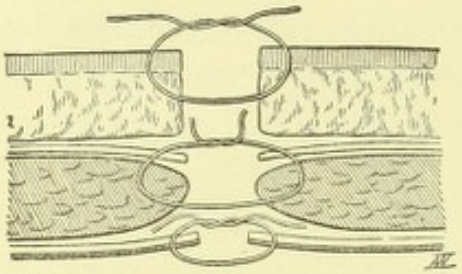


Fig. 271.—Suture in three layers.

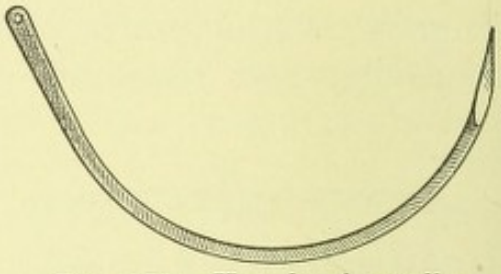


Fig. 272.—Hagedorn's needles.

at the moment of tension there is neither intestine nor epiploon in the suture loop.

The deep sutures having been inserted, some superficial

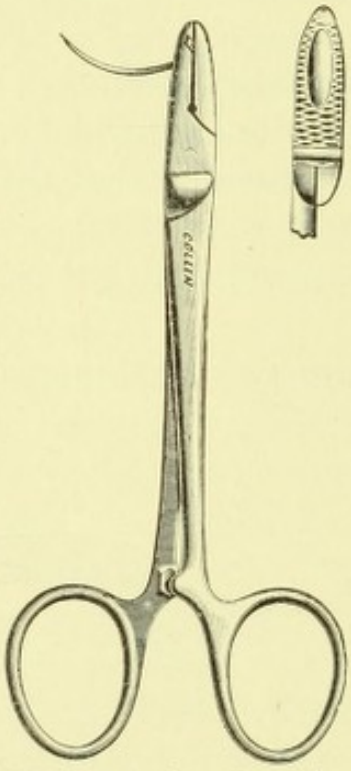


Fig. 273.—Needle mounted on Doyen's needle holder.

silkworms or Michel's agrafes are placed between them in order to get an accurate apposition of the skin.

If one uses the *many suture plan*, unite first the peritoneum, then the musculo-aponeurotic layer and lastly the integuments (Fig. 271). Use either silk, cotton or catgut.

We use catgut sterilized in alcohol under pressure for the suture of the peritoneum and lightly chromicized catgut for *the musculo-aponeurotic* layer[1] and silkworm gut for the skin. We do a continuous suture of the peritoneum with one of Hagedorn's needles held in the hand interrupting the suture after

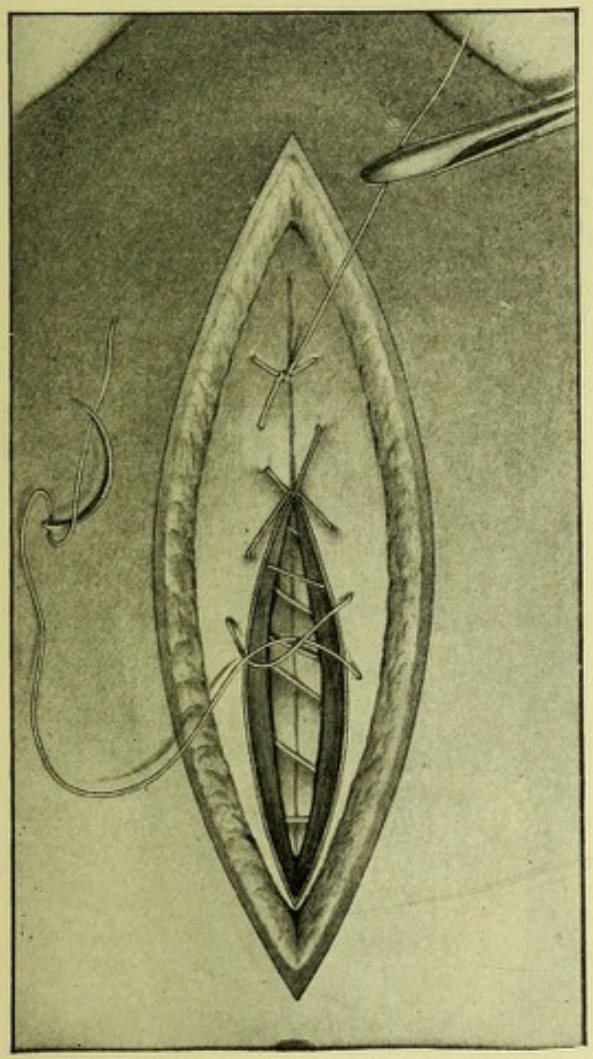


Fig. 274.—The continuous peritoneal suture is finished. Suture of the musculo-aponeurotic wall.

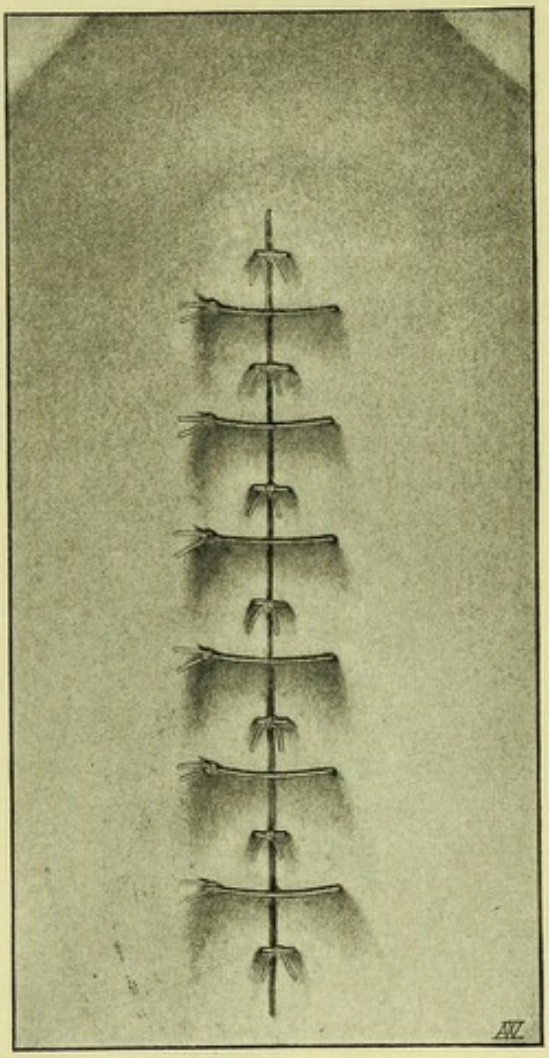


Fig. 275.—Cutaneous suture (deep and superficial sutures).

every four or five insertions. For the suture of the more difficult musculo-aponeurotic layers we use a so-called fistula needle held with a needle holder. We do a continuous suture taking up all the thickness of the musculo-aponeurotic layer, being careful to interrupt the suture after every second insertion (Fig. 274).

[1] The catgut sterilized in alcohol under pressure is absorbed very quickly in 5 or 6 days, while chromicized catgut takes about 25 to 26 days to resorb. It is particularly useful for suture of the resistant part of the wall, the muscles and aponeuroses.

The suture of the skin is an interrupted one and is made with Reverdin's needle (Fig. 275).

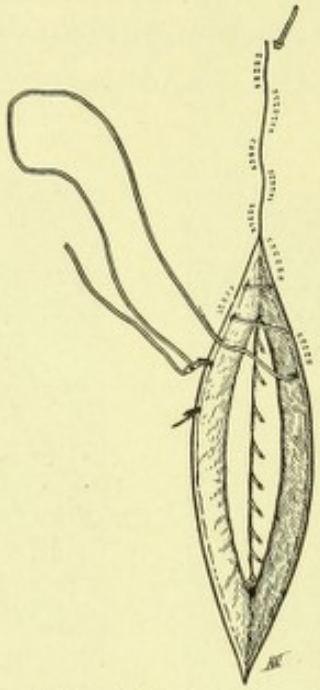


Fig. 276.—Intradermic suture.

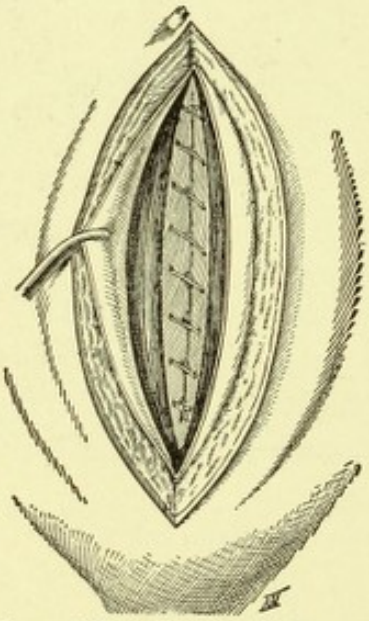


Fig. 277.—The peritoneum is sutured on the left side, the fatty tissue which covered the anterior surface of the aponeurosis has been removed. The aponeurosis will be doubled by the superposition of that of the right side.

Fig. 278.—The recti muscles are sutured. The aponeurosis is doubled and maintained in position by a continuous suture (Noble).

Different Methods of Suture.—Numerous have been the methods described. We cannot give all, but will give the principal.

A suture often employed for the skin is the *intradermic suture* described

a long time ago by Chassaignac, taken up by the American surgeons and recommended by Pozzi. It is done with a very fine suture and a Hagedorn's needle, short and curved. The superior angle of the wound is fixed. Each edge of the wound is seized with dissecting forceps slightly put on tension, and retroverted. One forceps is held by the surgeon and the other by his assistant. The needle penetrates at first about a centimeter above the wound

FIG. 279.—Lace suture left loose (Roggers).

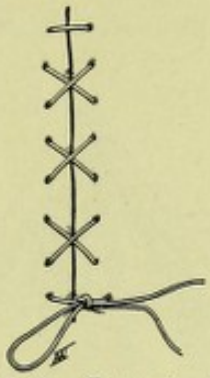


FIG. 280.—Lace suture drawn tight and tied (Roggers).

or at the side, near the angle, and then completely traverses the skin and comes out on the wound bringing with it the suture which is drawn up until stopped by the knot. The needle is then engaged in the skin of the opposite lip which it traverses, comes out, etc. (Fig. 276). At the extremity of the wound it perforates completely the skin and is finally knotted.

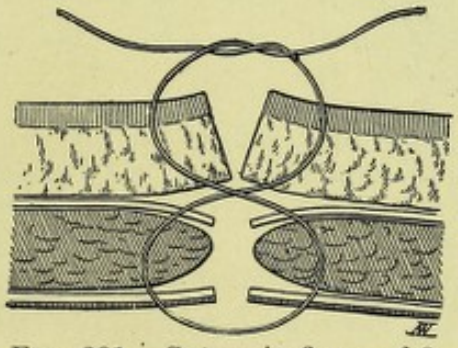


FIG. 281.—Suture in figure-of-8.

The suture by doubling of the aponeurosis which we used for a long time in curing eventrations with extensive separation of the recti muscles, is correctly practised by Noble. After uniting the peritoneum by an absorbable catgut in continuous suture, he takes some chromicized catgut and unites the aponeurosis of the transversalis and rectus with a continuous suture. Then, having arrived at the extremity of the wound, he passes the same suture

through the anterior layer of the aponeurosis which he sutures to that of the opposite side, thus superimposing one of the sides on that of the other.

The lace suture as carried out by Roggers, if it comprises the three planes of the wall, brings the parts into accurate apposition, and may be in some cases of repeated celiotomy untied and unlaced like a corset. One has only to cut the suture below the knot at the pubic extremity of the wound.

The figure-of-8 suture gives a good apposition. It is usually made to comprise the three planes (Fig. 281); personally, when we have recourse to it, we do a continuous catgut in the perineum and only place the figure-of-8 in the musculo-aponeurotic sheath and skin, using silkworm gut.

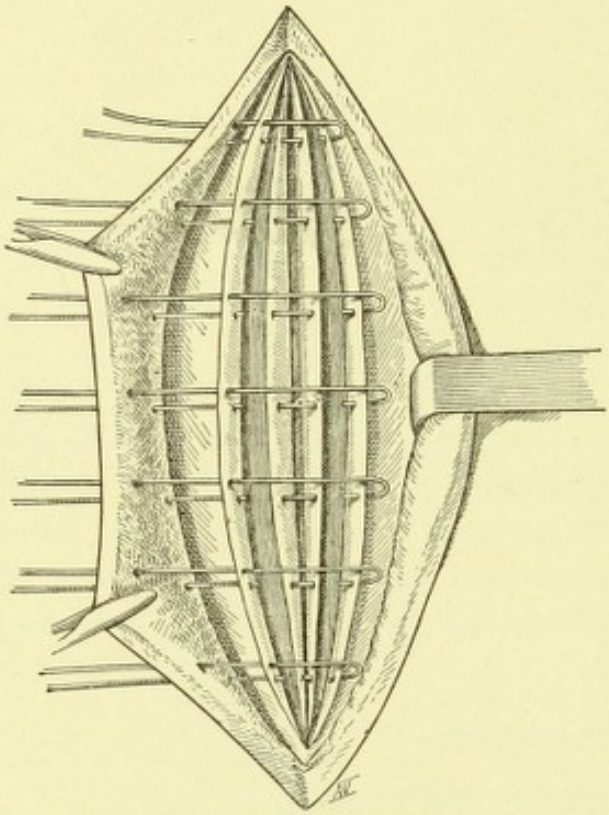


Fig. 282.—Suture of the abdominal wall without buried sutures (insertion of sutures).

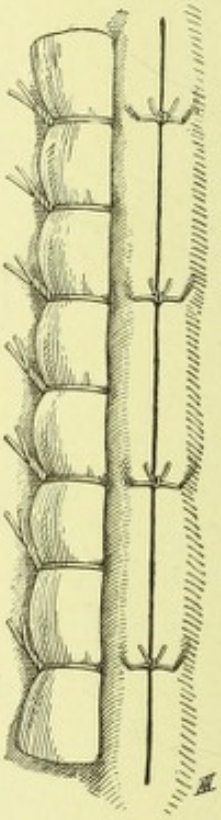


Fig. 283.—Suture of the abdominal wall without buried sutures (operation terminated).

Jonesco *inserts a single row of metal sutures of a U-shape* whose extremities come out through the skin, the loops comprise the two deep aponeuroses, the recti muscles, the two anterior aponeurotic sheaths without touching the skin of the opposite side. These are tied on a roll of gauze. Some complementary silkworm-gut sutures complete the cutaneous apposition (Figs. 282 and 283). Gauthier employs *the sewing machine* suture.

Amann's suture is a little special and is easily understood by a glance at Figs. 285 and 286. It is to be noted that Amann, instead of making an exactly median incision, splits the anterior aponeurosis of the right rectus laterally; presses back the internal lip of the aponeurotic incision and then

separates the muscles and opens the peritoneum in the median line. In this way the aponeurotic incision is opposite intact muscles which diminishes the risk of eventration.

Drainage.—During the last fifteen years there has been an effort to restrict the domain of drainage; we believe this to be wrong. Certainly the peritoneum has great powers of absorption and very real properties of defense. The improvements in

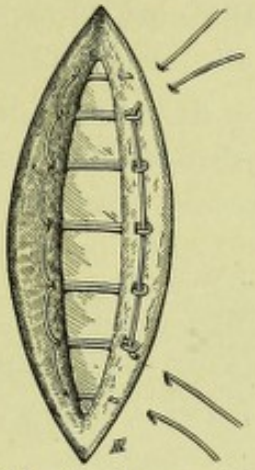


FIG. 284.—Sewing machine suture.

technic, notably that of peritonization of the pedicles, have placed the peritoneum in a favored position to engage the struggle with an infective process. We wish to show that drainage not only presents no inconvenience but notably ameliorates the operative results in a certain number of cases as we have had occasion to show in an analysis of ours on 1000 cases of consecutive celiotomy.[1]

FIG. 285.—Amann's suture untied.

FIG. 286.—Amann's suture tied.

In every operation conducted aseptically and concluded with perfect hemostasis, drainage is of no use. But it is indispen-

[1] Hartmann and Metzger, Abdominal Drainage in Gynecology in 997 Consecutive Celiotomies. *Ann. de Gyn.*, Paris, 1910, p. 329.

sable when for some reason or other there is a fear that there may have been infection of the pelvic cavity or if one fears the production of either a serous or hemorrhagic oozing.

That is to say that drainage is indicated in the course of an operation where a suppurating pocket has been ruptured or where a diseased intestine is found or when one is forced to leave in the abdomen a fragment of the inflamed pocket.

It is even necessary when hemostasis is not perfect and the peritonization is not complete and where surfaces remain capable of oozing.

From where should one drain? Some drain by the vagina and others by the lower part of the abdominal wound. These

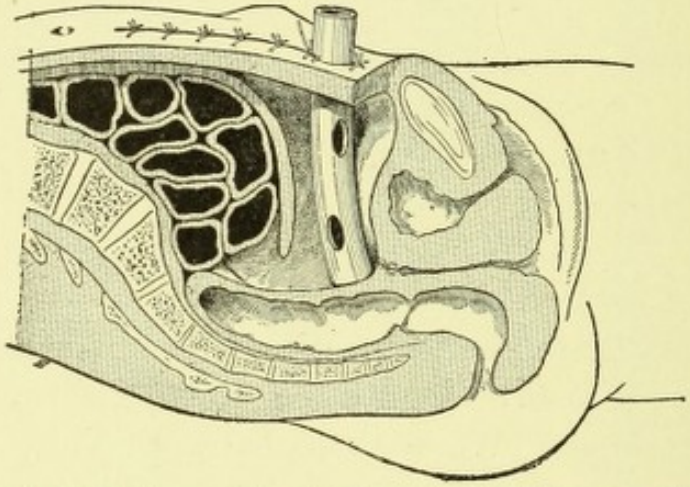


FIG. 287.—Abdominal drainage after total castration; the omentum falls like an apron in front of the mass of intestines and thus isolates the drainage area.

two methods have their advantages and their defenders and both appear to give good results. The *important point is to drain a limited cavity.* Also at the moment of insertion of the drain bring all the altered intestinal surface into contact with it. Isolate the pelvic colon and the great omentum, folded down like an apron, and the large peri-intestinal peritoneum from the drainage area in the pelvis.

The rapidity with which adhesions form suffices to isolate our infective area almost immediately and there is no fear of infective complications developing elsewhere in the abdomen (Fig. 287).

Each of these methods has its indications. Where the uterus has not been completely removed, we drain by the ab-

domen. The reproach levelled at this method, to the effect that the exudates on the pelvic floor are not drained off, is not founded because there is always an intraabdominal pressure opposed to the force of gravity. A large rubber drain in the inferior angle of the wound and fixed by a silkworm gut assures the perfect evacuation of fluid without aspiration. We prefer this to the glass drains which may break or exercise dangerous pressure on neighboring organs, and to gauze drains, because the removal of these last is so painful; and if the drain is not in contact with the part that oozes, it may act like a cork and imprison the exudates.

During the first 24 or 48 hours the oozing, sometimes abundant, obliges us to renew fairly frequently the dressing. The

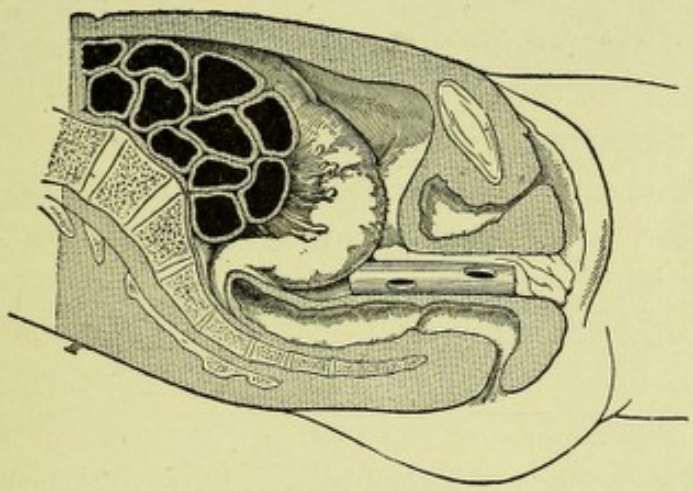


Fig. 288.—Vaginal drainage. Alongside the drain in the vagina is a gauze wick. The drainage area is isolated from the large peri-intestinal serous membrane by a suture uniting the pelvic colon to the retro-vesical peritoneum.

drain may be drawn out in aseptic operations as early as the second day. To avoid the entry of omentum into the lateral orifices of the tube, it is well to rotate it before drawing it out.

If the uterus has been entirely removed and an exact peritonization has not been carried out and one has had recourse to the partitioning of the pelvis we drain by the vagina. We fix the extremity of the drain to the edges of the incision with a non-chromicized catgut (Fig. 288).

Drainage by Gauze.—This has been particularly recommended by Mikulicz, who operated in the following manner: He took a piece of steril-

ized gauze, square in shape, as large as a pocket handkerchief, in the center of which is fixed a long and strong silk. Fold the gauze like a cone, and seize the end with a pair of forceps and push it to the limit of the operative area. Introduce into its interior a series of wicks in order to fill it and to tampon the pelvis. Take out the wicks in 48 hours and the sac itself on the fourth or fifth day.

Some surgeons combine the gauze wicks and drainage tubes, using one of Mickulicz's sacs in which they place a drain and at the same time some gauze wicks; others simply introduce a drain and place around it some gauze wicks, which tampon the raw surfaces. All the procedures were good when a hemostatic packing was as necessary as a drain, but now hemostasis must be perfect before the wound is closed.

In America a cigarette drain is used consisting of a rubber tube containing a gauze wick.

Lavage of the Peritoneum.—Some gynecologists still recommend *lavage of the peritoneum* in cases where the operation has been prolonged, in those where it was necessary to drain off debris, cystic fluid, etc. The introduction of a certain quantity of normal saline, at a temperature a little higher than that of the body, would have the advantage, according to them, of washing out foreign bodies, of acting as a general stimulant in shock, of diluting toxic substances and favoring leucocytosis. Personally, we have never had recourse to it, seeking, on the contrary, to perform the operation in a limited cavity and greatly preferring, in cases where it is indicated, to combine drainage with large subcutaneous injections of serum.

Dressing.—The dressing is in no way out of the ordinary. Apply compresses of sterilized gauze to the wound, placing, if there is a drain, a certain number of folded compresses about it. Above the gauze place sterilized hydrophile wool, then ordinary wool and bandage with flannel so applied as to exercise an elastic compression on the abdomen, to immobilize the wound and to protect it from external shocks and to maintain a constant temperature about the wound.

If the operation has been a little long and if the patient has lost a considerable quantity of blood, it is distinctly indicated before her removal to her bed to inject with a can and a fairly long rubber tube, 3 to 500 c.c. of saline solution in proportion of up to 1000.

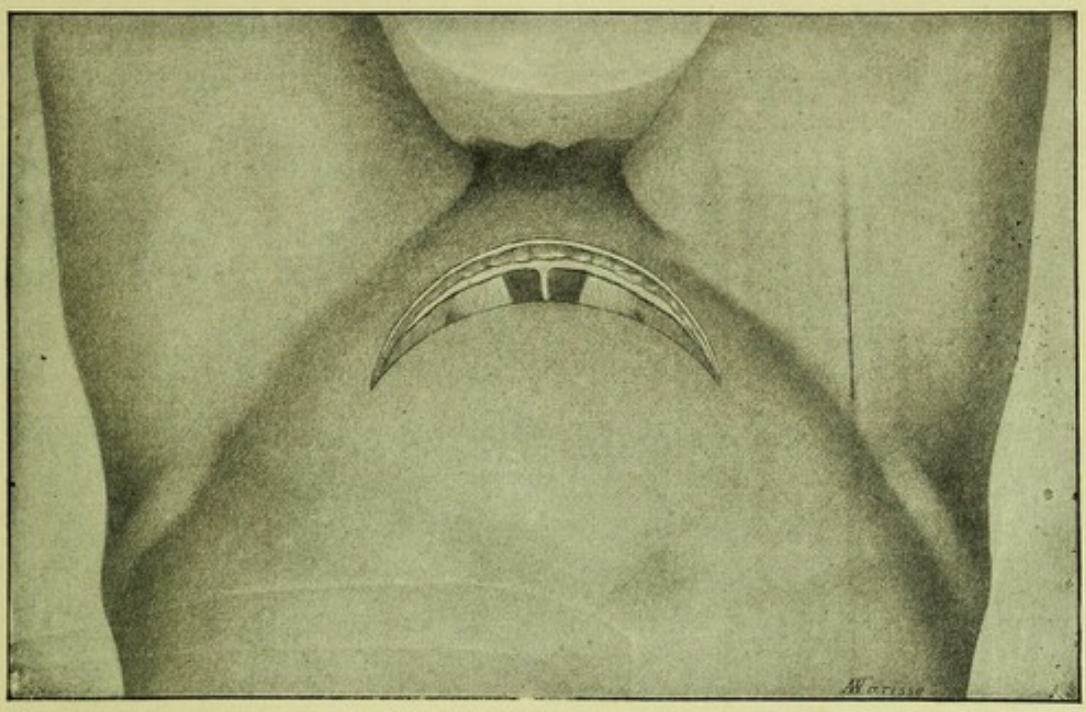


FIG. 289.—Incision in transverse celiotomy.

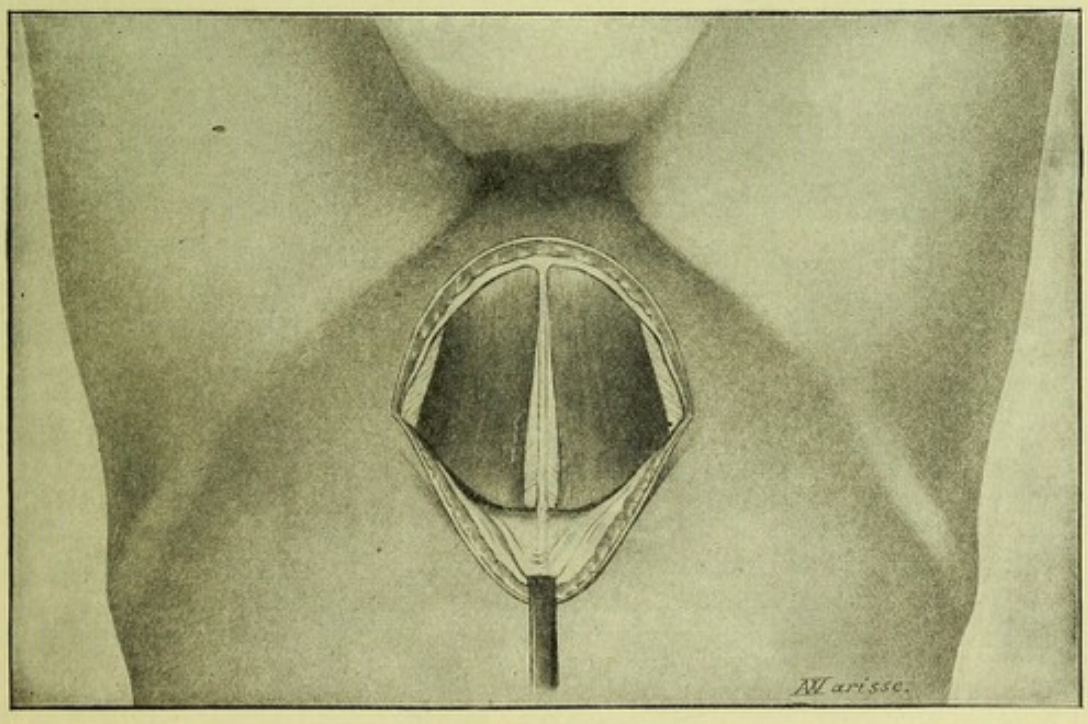


FIG. 290.—The cutaneo-aponeurotic flap is raised.

B. Transverse Celiotomy.

If there is not a large tumor, no suppurative lesions, no special operative difficulties, we may substitute for the median vertical and median incision, the transverse incision. To the suprapubic transverse incision, generally adopted by the German gynecologists, we prefer a curved incision with its summit just approaching the pelvis and the extremities mounting laterally to the limit of the region of the pubic hair.

After incising the anterior abdominal aponeurosis, we raise

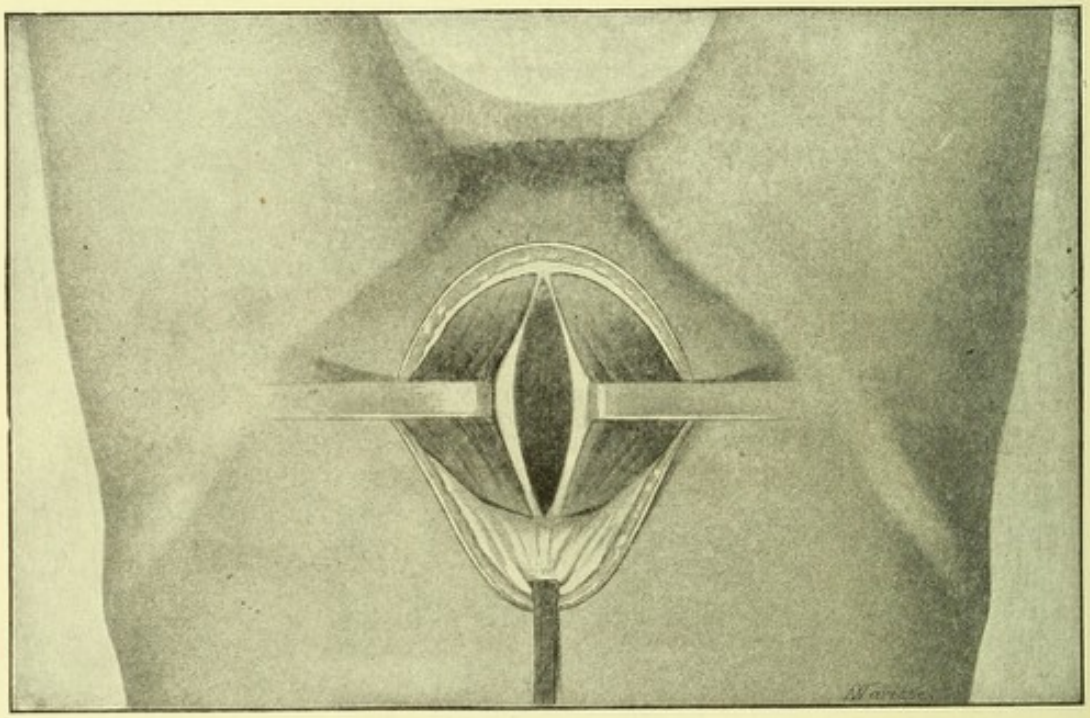


Fig. 291.—The peritoneum is incised vertically after retraction of the recti.

the flap formed of skin, subcutaneous fatty tissue and anterior abdominal aponeurosis, placing forceps on the numerous bleeding points. From this point the operation proceeds as usual. The recti muscles are separated in the median line and the fascia transversalis and peritoneum are opened vertically.[1]

When the intraabdominal operation is finished close the abdomen by suturing the peritoneum vertically, then the recti, then the aponeurosis transversely and finally the skin. The

[1] Küstner suggested, with a purpose purely cosmetic, the transverse cutaneous incision. He raised the skin and then the subcutaneous fatty tissue, and incised the musculo-aponeurotic wall vertically. Pfannenstiel modified this operation by cutting the aponeurosis transversely and separating the muscles vertically so as to obtain a more solid wall. (J. Pfannenstiel, Ueber die Vortheile des suprasymphysären Fascienquerschnitts für die gynäkologischen Kœliotomien. *Samml. klin. Vortr.*, 1900.)

advantage of this operation is that the cicatrix is hidden by the pubic hair and also that it leaves a solid wall as the lines of sutures are in two planes reciprocally perpendicular.

The inconvenience of the operation is that it lasts longer, requires a more perfect antisepsis, and that it gives only a limited sphere of action. The last consideration is improved by the curved incision we advise in preference to that employed by the Germans. If one requires a larger sphere of action, prolong the extremities upward and outward, so as to have a flap with a broader base which may be raised higher and thus enlarge the space between the two recti.

Bardenheuer employs often a *large incision* convex below, extending from one *iliac spine to the other*, and cuts through the large recti muscles above their insertion into the symphysis pubis. This incision, which gives a fine working space, diminishes the solidarity of the wall.

4. After-treatment.

When the dressing is finished the patient should be immediately taken to her bed, which has been warmed. Use hot water bottles. Do not leave them in contact with the skin as the anesthetized part may be very badly burnt.

It is essential that either the chloroformist or experienced nurse remain at her side until she emerges from the anesthetic. Before even the awakening is completed, inject into the intestine with a long cannula a certain quantity of artificial serum or even inject it subcutaneously.

The patient is maintained for some hours following the operation with lowered head, and knees semiflexed over a pillow. This horizontal position is useful to combat the effects of acute anemia, collapse, shock and also, in a certain measure, chloroform vomiting. But it must not be too prolonged. As soon as she comes out of the anesthetic sleep replace the pillow and cause her to breathe deeply and in a word produce a series of gymnastic respiratory exercises. The most complete calm should reign about the patient, leaving her at first in semiobscurity, while assuring oneself of the ventilation of the room in order not to have an atmosphere full of chloroform vapor exhaled by the lungs.

If pains still persist give a little morphine or heroin subcutaneously (1/4 or 1/2 cm. repeated as required). In the evening, if the chloroform vomiting has ceased, commence to give lightly alcoholized drinks (champagne or grog); on the following day give milk and on the day following a light soup, returning in short to a normal dietary very quickly.

On the day following the operation without waiting, as before for the patient to complain of colic or meteorism, insert a sound into the rectum. The presence of this sound leads to an emission of gas and is a great relief to the patient. Even on the following day or at latest the second day give a *laxative*[1] or enema. If some intestinal adhesions with difficulty liberated and sutured make us fear for the state of the intestine the purgative should be preferred to the enema.

To the liquids given in the beginning, it is necessary to advance progressively after the intestinal evacuation to solid food.

The stitches are taken out from the seventh to the tenth day; on the seventh, if it is a case with stitches in several layers, and on the tenth or eleventh if the sutures have embraced the tissues *en masse;* often the stitches are not all taken out at once. We commence with those that are surrounded by an areola of red and slightly red and cut the skin.

If a drain has been used, *when should it be removed?* This may be done in twenty-four or forty-eight hours, if the operation results are normal. But it is often necessary to prolong the drainage several days. In a general way, the matter is decided by the temperature chart and the amount of fluid passed by the drain.

If the convalescence goes on without incident, the patient is now allowed to sit up in bed and she is given several pillows to support her. She is allowed to get up on the fifteenth day.

There is no fixed rule to guide us; it is certain that a patient having undergone a slight operation and whose abdominal wall is accurately sutured may get up soon, but it is of advantage to keep in bed those patients who were much run down before the

[1] The stimulation of the intestinal peristalsis is useful. Vogel and R. v. Hippel insist on it and inject immediately after the operation a milligram of physostigmine, which is repeated every 3 hours until the bowels move. (R. v. Hippel, *Centr.-Blatt. f. Chir.*, 1907, p. 1345.) Lucas Championnière in France has for years insisted on the advantage of early movement of the intestines.

operation and who have lost very much blood or been drained, or have feeble, relaxed and badly united abdominal walls.

We are not of the opinion, contrary to many Germans, that early rising from bed lessens the danger of thrombi and emboli; these are septic complications and we cannot understand how early movements of the operated patients should protect from these complications. Some recently published works, however, show that we insist on a too lengthy immobilization of the patients and that without going so far as to insist on patients getting up in 48 hours or three days after the operation, it is well to remove them from bed earlier than we do. The respiration and circulation are thus stimulated and they are placed in better circumstances in order to reassume a normal existence.

It is habitual to advise the patient to *wear a belt;* this is probably of no great service for thin patients with solid abdominal walls. It is indispensable in fat patients with flabby abdominal walls and those who have been drained.

5. Complications of Celiotomy.

We may have a number of complications after celiotomy.

Shock.—Under the heading of shock is comprised a complex symptomatology characterized by elevated temperature, pallor of face and cardio-vascular collapse; the extremities are cold, respiration short, frequent and irregular; pulse small, fast; there is cerebral torpor, an indifferent facial expression, while at the same time the intelligence is preserved.

It is necessary to get the patient warm by all means in our power (hot bottles, extra blankets, etc.), to stimulate the heart by injections of strychnine, sparteine, caffeine, camphorated oil, and the respiration by inhalations of oxygen. Lightly tap the face and if necessary do rhythmic traction of the tongue and combat the lack of vascular tension by injections of normal saline.

Most frequently the patient gradually recovers; sometimes, however, complications ensue and lead more or less rapidly to fatal termination.

Internal Hemorrhages.—If the complications of shock continue to increase instead of diminish, we are forced to think of

internal hemorrhage. This manifests itself in a certain number of hours; the patient is awakened; she seems as if she were getting well when she experiences abdominal pain and the pulse becomes small and thready; the face and mucous membranes blanche, and there is a tendency to syncope, etc. The ultra-rapid evolution of these complications which come on some few hours after the operation should not be confounded with signs of peritoneal infection which appear later, and whose course is less rapid.

In presence of an internal hemorrhage don't wait for therapeutic anodynes such as ice applied to the abdomen. Precious time is thus lost and the life of the patient may depend on a few minutes saved at the beginning. We must immediately open the abdomen, find the bleeding point, and secure it. Intravenous injections of serum render signal service.

Septic Peritonitis.—Septic peritonitis commences toward the middle of the second day. Vomiting or more often hiccough, rise of temperature, coldness of the extremities, acceleration of respiration, an abdominal facies, a small and cracked voice and above all the small and rapid pulse are the cardinal symptoms that announce the apparition of this complication. The local signs are more variable. In grave and rapid forms the abdomen remains supple, painless and sometimes not ballooned. In slower forms the peritoneal reaction is evidenced by a more or less acute pain and a ballooning of the abdomen more or less marked. This complication is generally fatal. The attempts made up to the present to combat post-operative peritonitis (secondary drainage, continuous irrigation of the peritoneum, etc.) do not appear to have given much result and the therapeutic treatment remains purely medical (massive injections of normal saline, collargol, electrargol, caffeine, etc.).

In less severe forms after infection, if there is no drainage, remove some of the sutures and place a large drain in the floor of the pelvis, reducing the intervention to a minimum. Place the patient in the half-sitting position and give at the same time subcutaneous and intravenous injections of saline, injecting slowly, using a long sound into the rectum, beginning eight hours after the intervention to give calomel in fractional doses; in short, doing the Murphy's treatment for acute peritonitis.

Slight Peritonitis.—In the slight infections characterized

principally by tympanites, elevation of pulse and temperature, vomiting, complete arrest of fecal matter and gas, the indication is to give a purgative in fractional doses every twenty minutes a soup spoon of a solution of 60 grams (*e. g.*, 1½ ounces) of sulphate of soda in 200 c.c. of Vichy water, stopping as soon as there is emission of gas or fecal matters by the anus, and continuing if not successful to give the whole of the mixture irrespective of vomiting.

At the same time inject three hourly under the skin 1 c.c. (20 minims) of 10 per cent. camphorated oil in order to support the heart. By these simple means we often obtain a cessation of these complications.

Intestinal Occlusion.—Intestinal occlusion is much rarer than the foregoing. It is characterized by vomiting, a complete arrest of fecal matters and gas, ballooning with peristaltic undulations of the intestine, the preservation of a good facies, good pulse and without elevation of temperature.

Reopen the intestine and explore the seat of the primary intervention; generally there is an adherent intestinal loop to be found. If nothing of this nature be found, look for a kink of the colon; if this does not exist, we must make an artificial anus.

Acute Dilatation of the Stomach.—Acute dilatation of the stomach is characterized by vomiting, an alteration of the features, an accelerated and small pulse and an epigastric ballooning which gradually extends. Treatment is directed to the washing out of the stomach. Then place the patient in the ventral position. These symptoms seem to correspond to a strangulation of the third part of the duodenum by the mesenteric pedicle.

Parotitis.—Parotitis results from an infection from the mouth, and extending into the gland whose secretion is diminished by reason of the dehydration of the patient and absence of mastication. This may be prevented by a rigid antisepsis of the mouth and early ingestion of liquids. If the parotitis is developed, resolution may be easily obtained by the expression of the gland, combined with external applications of hot moist compresses and cleansing of the mouth. When an abscess is imminent, open the gland by a small incision directed parallel to the branches of the facial nerve.

Pulmonary Complications.—These are often seen associated with one of the preceding complications, occlusion or infection.

They may nevertheless come on independently of these last and constitute of themselves a grave complication. We fear it greatly in aged subjects already suffering from a chronic pulmonary infection, or with cardiac or renal lesions. Fat subjects are specially liable to this complication. It may be avoided by strict attention to the cleansing of the mouth in preventing, during anesthesia, vomited matters entering the respiratory passages and in avoiding carefully exposure to cold during and after the operation, in keeping the patients sitting up in bed after the operation and preserving the trunk vertical during the greater part of the day. We advise also as soon as there is the least trouble to commence veritable respiratory gymnastics and forcing the patient to execute from time to time a series of large and deep inspirations. If the pulmonary congestion already exists, treat it with repeated applications of dry cups, cardiac tonics (camphorated oil, caffeine, etc.,) and by all known means of stimulating the general condition.

Late Intoxication by Anesthesia.—This has been particularly studied in France by Tuffier. If slight, question is evidenced by a very small and transient albuminuria and sometimes by a transitory jaundice; if serious, by a diminution of the quantity of urine, which contains albumen, urobilin, bile, some acetone, an excess of nitrogenous matter by nervous phenomena (delirium, trembling), respiratory (irregular dyspnea), by vomiting which may assume the aspect of vomito negro. Generally these symptoms go on to coma, and death may follow on the third to seventh day.

It has been recommended to give glucose and alkalies and inhalation of oxygen to this condition.

Retention of Urine.—This is frequent and may be treated by catheterization which should be done with a perfect aseptic technic so as to avoid secondary infection and following cystitis.

Abscess of the Wall.—Abscesses of the wall are due to an infection of sutures which may be due to any insufficient sterilization or more often to contamination during the operation. It is important to warn the assistant to keep a sterilized compress above the tray which contains the suture material and not to touch the sutures more than is absolutely necessary.

These parietal abscesses may come on more or less rapidly after operation. In cases where non-absorbent sutures have been used it has come on months or even years after, while the wound had long healed by first intention and so perfectly that the question has arisen of a possible blood infection.

When the abscess is opened, it leaves a fistula which only heals after the elimination of the suture, the primary cause of the trouble. This elimination of the suture is often spontaneous. It may be hastened by the curetting of the fistulous tract with a very fine curette which brings out the contaminated stitch.

In other cases, it is necessary to produce a separation of the tissues in order to remove the cause of trouble. Cocaine anesthesia is usually sufficient for this little search which may be more painful than at first thought. With the catgut we employ usually we are able to avoid all late fistulas of abscesses, and in case of infection, we obtain after opening of the abscess a rapid cure.

Pyo-stercoral Fistulas.—Pyo-stercoral fistulas are produced in cases where one has been obliged to liberate adherent intestine. The suture of the altered parts does not always suffice to prevent the fistula. This often heals spontaneously. In certain cases the fistula persists and it is necessary to have recourse to intervention to close it.

Urinary Fistulas.—These are usually due to operative faults. They may occur in bladder or urethra. When due to sectioning of these organs, which has passed unperceived, a discharge of pathognomonic urine takes place immediately after the operation. If the fistula is due to stricture of the bladder or urethra by a stitch or clamp, the discharge occurs some days after the operation.

Urinary fistulas, with the exception perhaps of some little vesical fistulas, have little tendency to spontaneous cure. They demand an intervention which is often complex; we will have occasion to refer again to this point.

Phlebitis.—Phlebitis with the embolus which follows it sometimes constitutes a serious complication of abdominal operations. It results from a slight infection in patients with a defective venous system (varicose veins, venous enlargements following on large abdominal tumors), blood the coagulability of which is increased (in patients with fibromata, chronic affections, anemia,

etc.), and an insufficient circulation (fatty and feeble heart, and an atonic digestive canal).

It has been advised, as prophylactic means, to relieve the blood pressure to disinfect this digestive tube and to give citric acid. If thrombosis comes on, envelop the limb in wool, immobilize it and place the foot in good position.

In case of embolus, Trendelenburg advises the opening of the pulmonary artery and the removal of the clot, a practice which one has not often the opportunity to follow, and the efficacy of which has not yet been proved.

Eventration.—This may be immediate or late. *Immediate*, when it comes on in the day following the removal of the stitches. It is accompanied by the issue under the dressing of loops of the intestines. A curious point is that this complication, in appearance very serious, is not, generally speaking, the point of departure of any other complication. We introduce the intestines and close the wound and the patient is generally cured. This complication may be avoided by using a material which slowly absorbs (chromicized catgut), and in cases of suture *en masse*, only removing the stitches late if the general defective state of the patient makes us fear a delay in the establishment of solid union.

Late eventration is justifiable in an operation where we wish to reconstitute a firm abdominal wall.

CHAPTER III.

ABDOMINAL HYSTERECTOMY.

Summary.—Abdominal hysterectomy.—Type of procedure.—Various procedures (H. by separation, H. by primary removal of the uterus, H. by continuous transverse section, H. by uterine hemisection, H. total by sub-peritoneal decortication with primary opening of the posterior vaginal fornix). —Indications and modifications of technic according to the nature of the lesions (inflammation of adnexa, fibromata, cancer, prolapse, puerperal infection, uterine rupture).

Fifteen years ago abdominal hysterectomy was the object of numerous discussions; of controversies on the treatment of the pedicle or stump after the removal of the organ. Some advised the fixation of the pedicle to the wound externally while others reduce it into the abdomen; others finally fixed it to the deep portion of the anterior abdominal wall. The relative value of these measures was largely discussed without any decision being eventually arrived at.

To-day abdominal hysterectomy has benefited by the general progress of the technic of abdominal operations, doing away with pedicles, isolated ligatures of vessels, peritonization of intraabdominal raw surfaces. The operation has become simplified and excellent in its immediate and remote results.

1. Type of Procedure.

The patient having been placed in the Trendelenburg position, the surgeon makes a median incision sufficient to allow him to see well.

Having inserted lateral retractors, or a large sub-pubic valvular retractor, he frees the pelvic cavity by turning back the intestines toward the diaphragm and maintaining them there by hot sterilized cloth compresses.

A rapid palpation determines the connections of the pelvic organs and adhesions which they present, etc.

After making these observations the operator brings the uterus into the wound, drawing upon it with the hand and using, in case of necessity, toothed forceps or even in fibromata, a corkscrew, and as soon as the uterus is drawn to the outside, a large

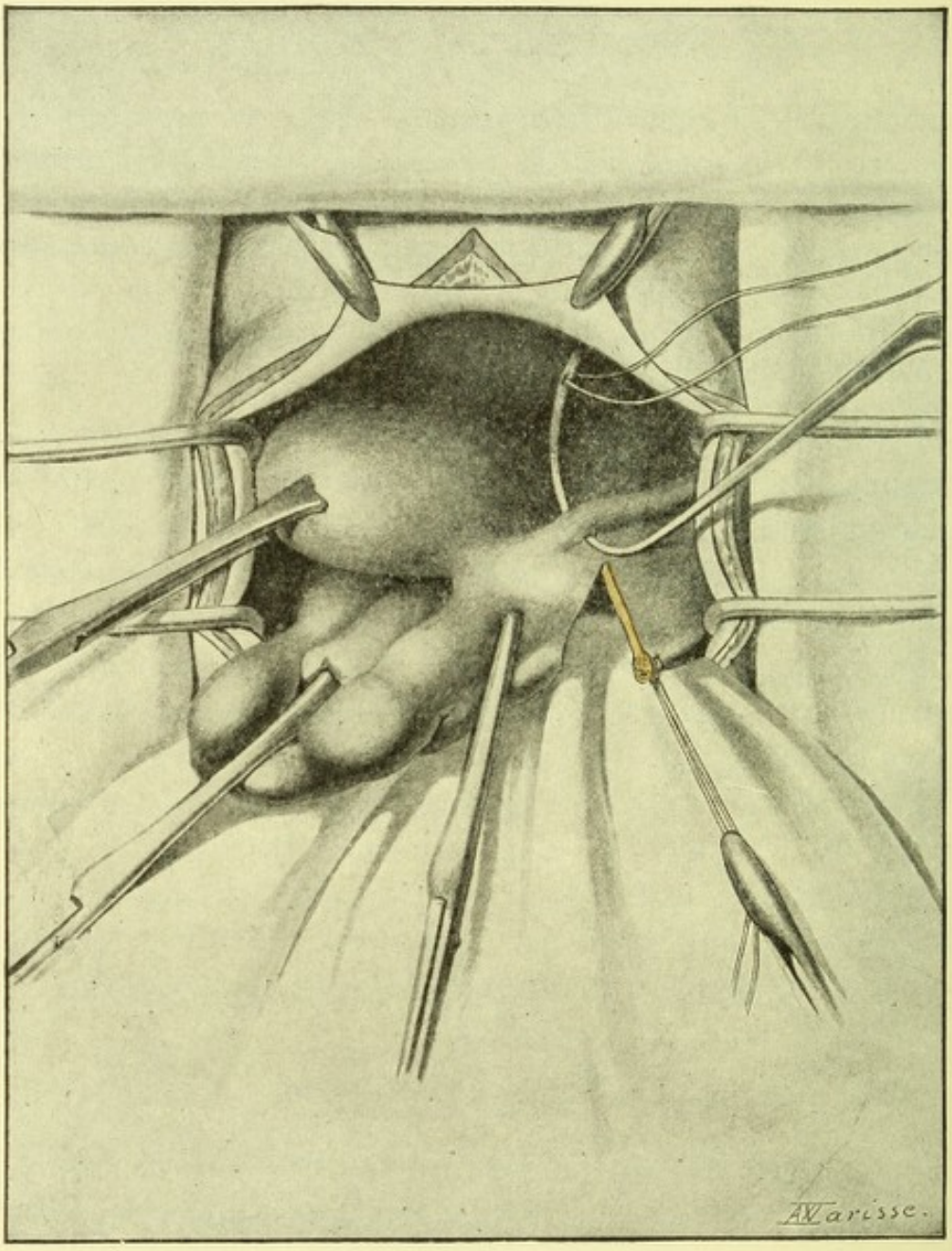


Fig. 292.—Abdominal hysterectomy. The utero-ovarian vessels have been cut across between a ligature and pair of forceps. The blunt needle, threaded with a stitch, takes up the round ligament which will be cut and tied.

compress is inserted behind it in order to protect the intestine; this has in all probability been done at the beginning of the operation. The field of operation is then circumscribed with many other cloth compresses, maintaining the intestines well confined

beneath them and preventing them entering the pelvis, which accident may arise in spite of the elevated position of the pelvis as the result of a fit of coughing or effort of vomiting, etc.

We now proceed to the ligature of the right utero-ovarian pedicle. To do this, the uterus is drawn forward to the left. The operator seizes between his left thumb and index-finger the utero-ovarian pedicle, raises it and passes below it a blunt needle (Fig. 293) threaded with No. 1 or No. 2 catgut. Tightly tie this catgut around the infundibulo-pelvic ligament just outside the adnexa.

A pair of forceps having been placed a little outside this ligature, the pedicle is cut through very close to the forceps. With the scissors the broad ligament is severed almost at the level of the round ligament. This segment of the broad ligament is muscular, and preliminary forcipressure is useless if applied to it. However, note that before cutting through the round ligament it is of advantage to enclose it in a ligature, because it generally con-

FIG. 293.—Blunt needle (Hartmann). This needle enables us to take up the vessel on the floor of the excavation and on its wall by reason of the acute angle of the needle.

tains a little arteriole (Fig. 292). It is cut through after having first fixed a pair of forceps a little internal to the ligature that surrounds it. The same procedure is carried out on the opposite side.

Of the six arterial pedicles of the uterus, four are already tied. There now remains only the two uterine arterial pedicles. They are, it is true, the most important.

To expose them, we unite with a transverse incision the two sections of the broad ligament; this incision passes along the anterior face of the uterus a little above the floor of the vesico-uterine cul-de-sac. We then separate the bladder in the middle line and on each side the anterior fold of the broad ligaments, pressing the whole forward. The separation of the bladder is generally easy but it is sometimes necessary to use scissors in order to sever some rather firmer adhesions along the median line, as to the anterior fold of the broad ligament, it is very

easily separated. This separation exposes the uterine pedicles, which are isolated with a grooved sound; this isolation should be done gently, in order to avoid tearing the peri-arterial venous plexus, a tear of little importance but which may become very

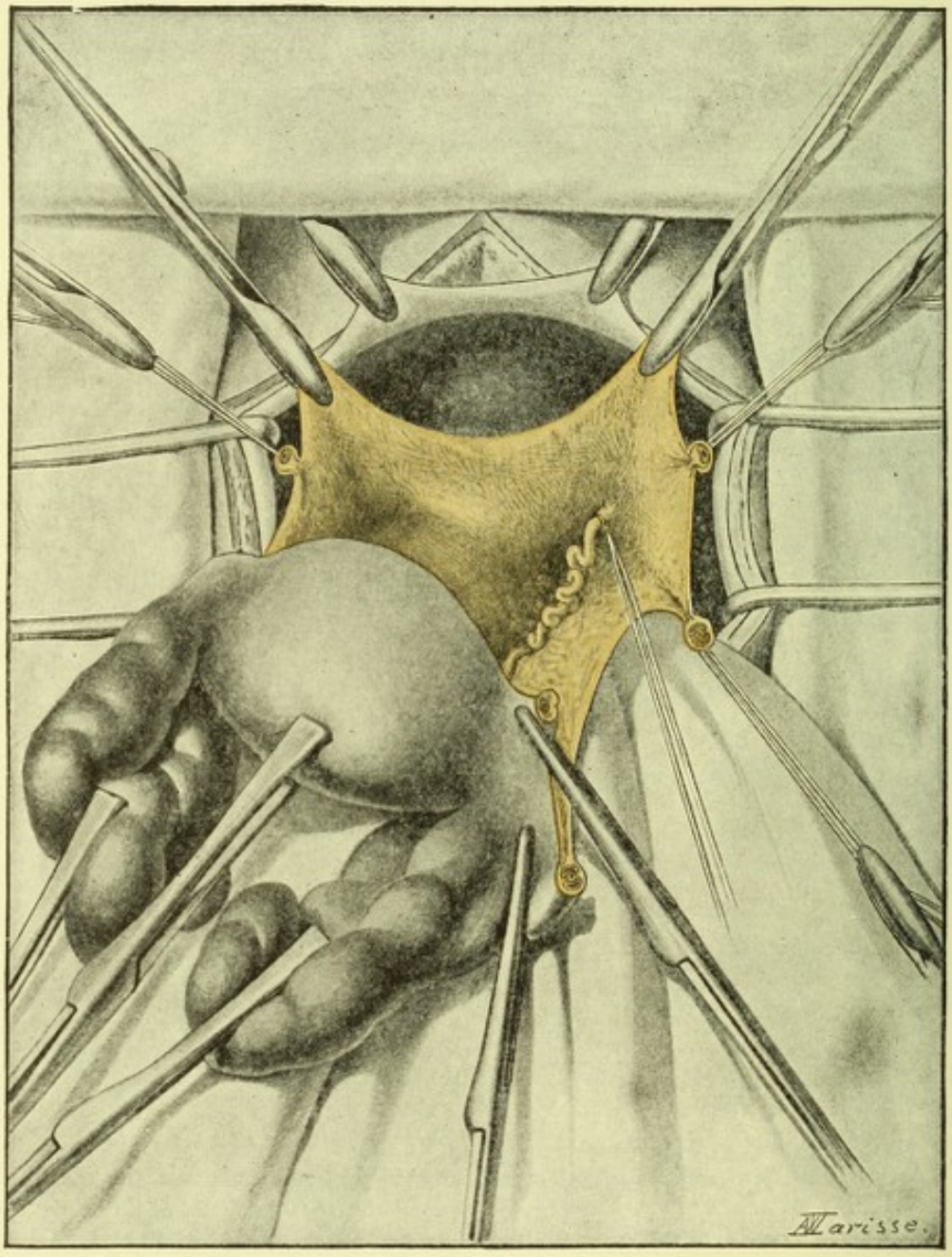


Fig. 294.—Abdominal hysterectomy. The utero-ovarian pedicles and round ligaments have been tied and severed; the vesico-uterine peritoneum already cut through has been separated by ligature of the right uterine artery.

troublesome and which it is better to avoid. The isolated pedicles are then taken up with a blunt needle. One blunt needle is of advantage in this (Fig 293), being more handy than the other forms used, as will be found in all cases where a ligature

has to be passed around a pedicle lying deep in a cavity. The catgut passed by this needle is immediately tied, a pair of forceps is placed a little above the ligature and the two uterine pedicles are cut through between forceps and ligature.

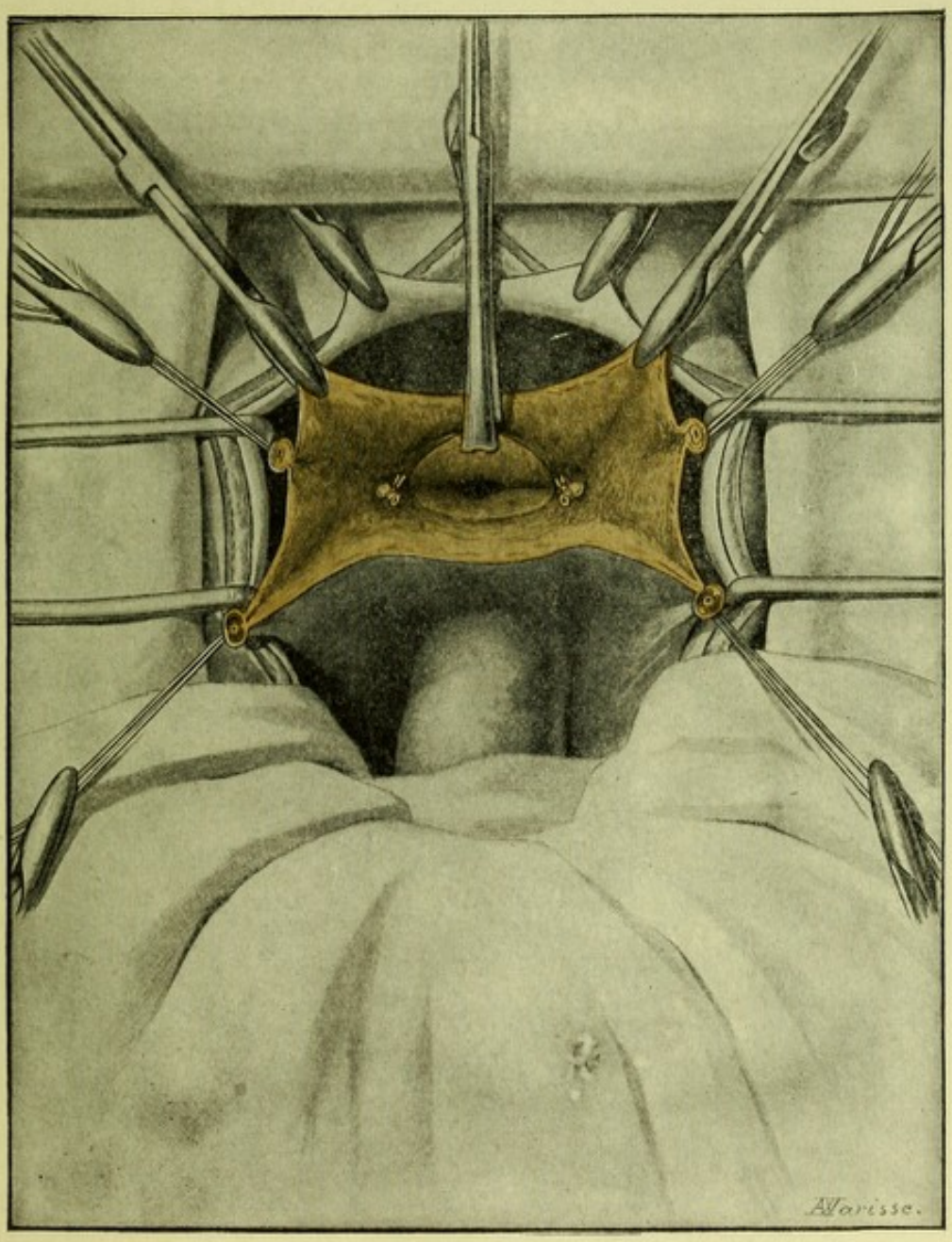


FIG. 295.—Subtotal abdominal hysterectomy. After removing a wedge-shaped piece of tissue, the cervix is now sutured.

The detachment of the uterus now alone remains.

The stages of the operation vary according as it is desired to do a *total hysterectomy* or to cut across the uterus immediately above the vagina, and leaving behind the vaginal portion of the cervix. This is generally known as *subtotal hysterectomy*.

In subtotal hysterectomy, the uterus is sectioned across immediately above the insertion of the vagina. This section is made with the knife from before backward; then the cervix is

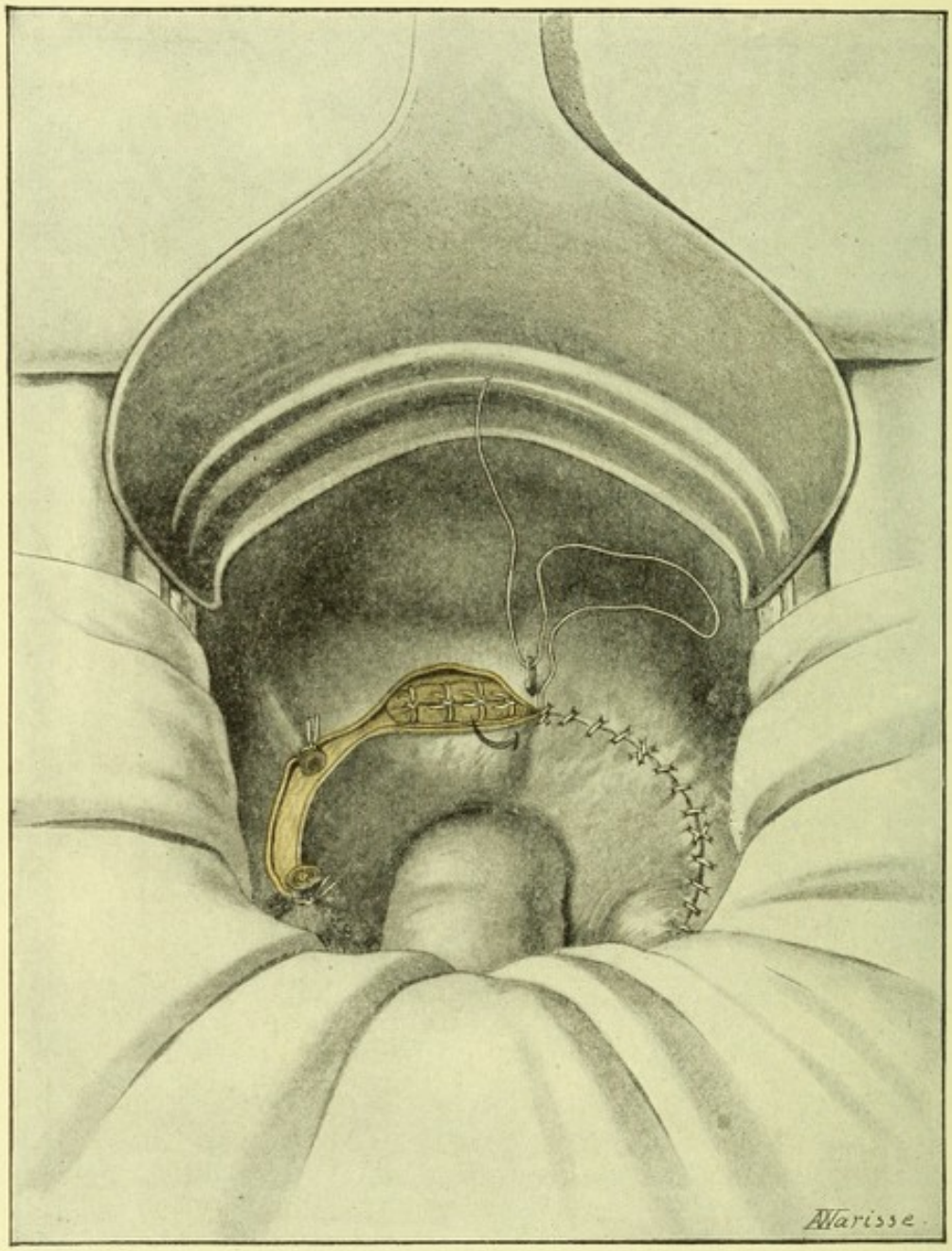


Fig. 296.—Subtotal abdominal hysterectomy. After removal of a wedge-shaped piece of muscular tissue, the cervix is sutured; a continuous peritoneal suture, interrupted at every fourth or fifth stitch, buries the ligatured pedicles and the cervix, thus securing a complete peritonization of the parts.

hollowed out; all these cut surfaces bleed; if it is only a slight oozing, traction forceps suffice to secure temporary hemostasis. This operative procedure is carried out in the following manner:

The uterus having been drawn upward and a little backward the anterior face of the uterus is incised with the scalpel and then the anterior portion of the cervix seized with a pair of

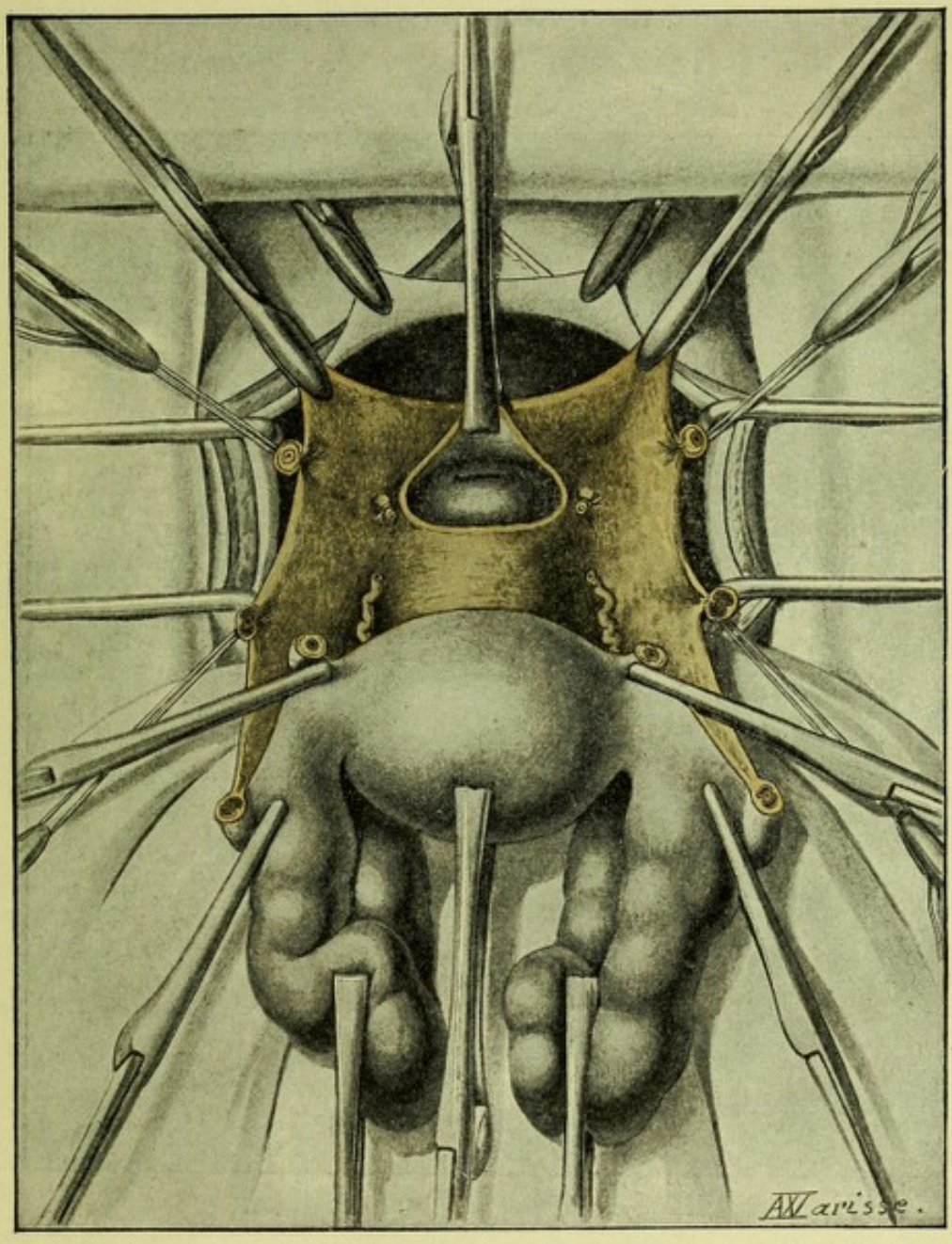
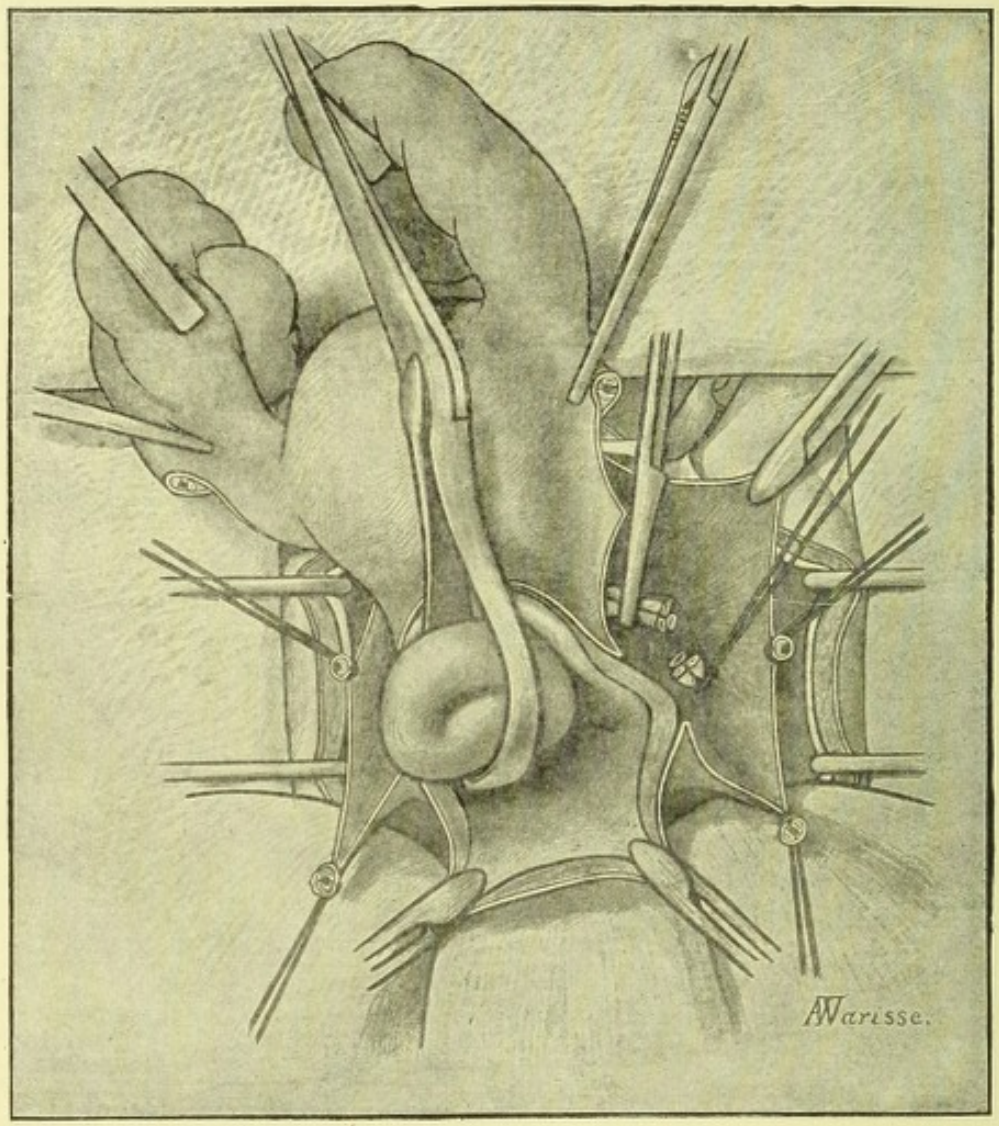


FIG. 297.—Total hysterectomy. The separation of the bladder having proceeded far enough, the vagina is opened anteriorly; a pair of Museux's forceps seizes the anterior lip of the so-called buttonhole. All that now remains is to separate the vagina from around the cervix.

forceps and the incision is continued posteriorly until the organ is completely severed. As the cervix is fixed by the forceps, it does not fall back. Nothing is simpler, once the amputation

is concluded, than to place a second pair of Museux's forceps on the posterior face, and then, exposing with these two pairs of forceps the upper portion of the cervix, to excise a wedge-shaped piece of muscular tissue and to remove in its entirety the intracervical mucous membrane. All that remains finally is two flaps of the cervix in front and behind. This method has the



Fig, 298.—Total hysterectomy. The cervix is drawn through a buttonhole made in the posterior vaginal wall.

advantage of creating two supple flaps, which adapt themselves easily, the one to the other, for the suture and of doing away with the sometimes diseased endocervical mucous membrane. Three catguts unite the anterior and posterior lips of the surface left after the section and assure hemostasis at the same time.

If it is desired to do *total hysterectomy*, the separation of the

bladder is carried on anteriorly until the anterior vaginal wall is reached. It is opened, and then with a pair of Museux's forceps seize the vaginal lip of the incision and complete the disinsertion of this canal by a circular incision with scissors, which work obliquely, while the uterus is drawn up and away from the side where one is working (Fig. 297).

If there are doubts as to the situation of the vagina, we may, as Doyen does, open in the median line posteriorly, on the end of a pair of forceps introduced through the vulva.

It is then easy to seize the cervix with a special pair of forceps (Fig. 309) through the buttonhole made in the posterior wall of the vagina, to draw upon it, and to disinsert the vagina around its whole circumference (Fig. 298).

The uterus having been removed, a wick of iodoform gauze is introduced through the gaping opening of the superior portion of the vagina and which latter is closed by a series of catgut sutures which serve at the same time to stop the numerous bleeding points.

If it is desired to do vaginal drainage close the lateral bleeding parts and leave open the middle part of the vagina, and whatever the operation performed, whether it be subtotal or total hysterectomy, from that point the end of the operation is the same. It is necessary to cover the raw surfaces with peritoneum, which may be done with a continuous suture of fine catgut, which buries laterally the vascular pedicles, in the middle the vaginal suture or the uterine pedicle according as whether the cervix has been removed in its entirety or not.

When the operation is concluded, the floor of the pelvis presents an absolutely smooth surface; if one has the opportunity to study the pelvic cavity of a woman thus operated on several weeks afterward, one is struck by the complete absence of the adhesions, by the regularity of the floor of the pelvis; if it were not for the absence of uterus and adnexa, no abnormality would suggest an operation.

We will not return to the subject of drainage by abdomen or vagina or the transverse partitioning of the pelvis by suture of the pelvic colon to the retro-vesical peritoneum, as we have already dealt with these questions in the chapter of celiotomy in general.

2. Various Procedures.

Hysterectomy by Separation.

With recognition of the fact that the principal means of fixation of the uterus is its continuity with the vagina, J. L. Faure recommends commencing by the separation of the uterus from the vagina by incising it across above its vaginal insertions. This division of the cervix uteri, *this uterine separation*, is carried

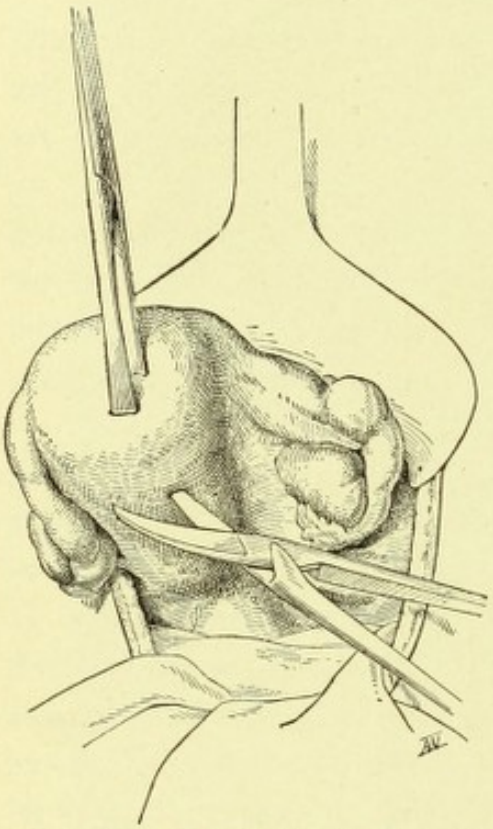


FIG. 299.—Hysterectomy by separation. The uterus having been drawn upward and forward, the scissors cut across the isthmus of the uterus.

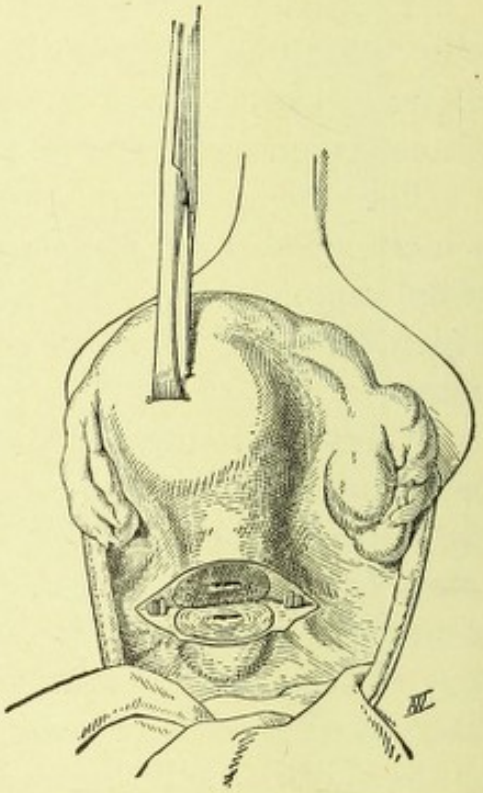


FIG. 300.—Hysterectomy by separation. The isthmus has been divided. The body is only attached to the cervix by an anterior strip of uterine tissue.

out before any other manipulation, and is the capital act of the operation.

The uterus is drawn out and turned over as much as possible on to the pubis. We are then enabled to see the pouch of Douglas and the isthmus of the uterus, which is recognized, in general, quite easily by the presence of a constriction corresponding to the upper edge of the utero-sacral ligaments below the body of the uterus which commences to widen out above the smooth and slightly "bombe" cervix.

If the uterus is deformed by fibromatous bases, the isthmus is less plainly seen, but it may be recognized on palpation. The index-finger, introduced so as to lie on the floor of the pouch of Douglas, between the two utero-sacral ligaments, depresses anteriorly the supple and depressible wall of the vagina. If it is carried upward toward the uterus, the finger soon feels the projection of the cervix; about 2 or 3 cm. below this lies the isthmus.

When this is recognized, cut it across with strong curved, blunt scissors. Traction on the body of the uterus makes the incision

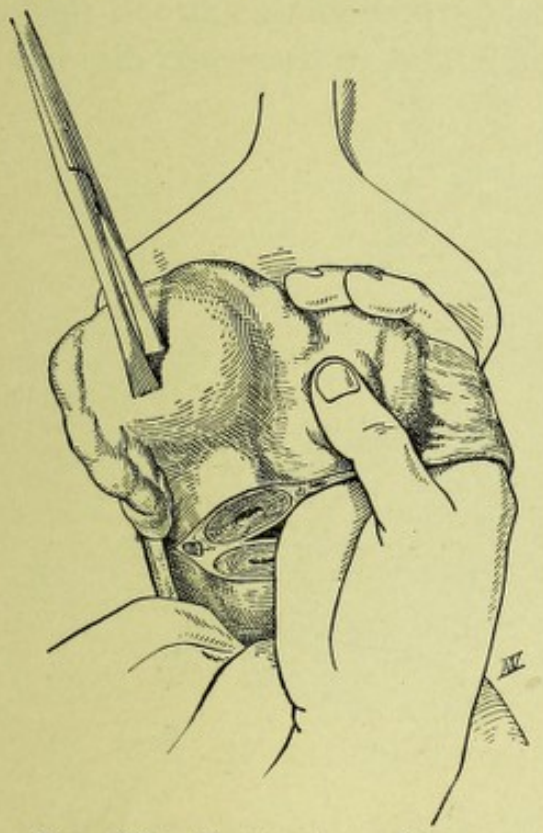


FIG. 301.—Hysterectomy by separation. The right hand having pressed in the anterior peritoneal covering, lifts up and makes a pedicle of the broad ligament.

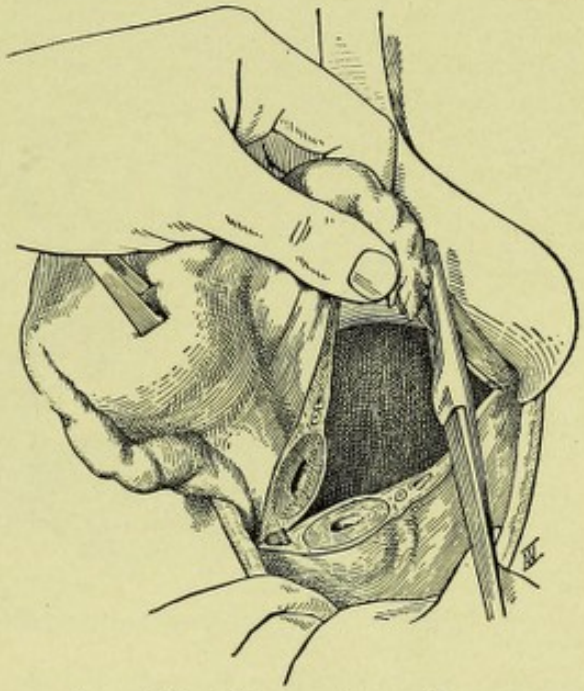


FIG. 302.—Hysterectomy by separation. The left hand seizes the broad ligament while the right hand attaches a pair of forceps to it external to the adnexa.

gape and one is enabled to see the central cavity which serves as a guide and the division may be continued without fear of injuring the bladder (Figs. 299 and 300).

For the rest, if one goes beyond the uterus, in the great majority of cases, one finds oneself in the vesico-uterine cul-de-sac or above it.

As soon as the separation is completed between the body and cervix, draw the former upward; then insert two or three fingers of the right hand into the space which separates the two segments

of the divided uterus, pushing them from behind forward with the palmar surface of the hand upward. The extremities of the fingers come into contact with vesico-uterine cul-de-sac which it pushes in. The fingers lie in front of the uterus and broad ligaments, while the thumb is behind. In carrying the hand toward the right, the broad ligament is picked up between the thumb and index-finger and a pedicle is thus prepared. Nothing is simpler than to isolate it by lifting it from below upward as far as its pelvic insertion external to the adnexa (Fig. 301).

With the left hand seize the already pediculated broad ligament while the right clamps the pedicle that is afterward divided with scissors (Fig. 302).

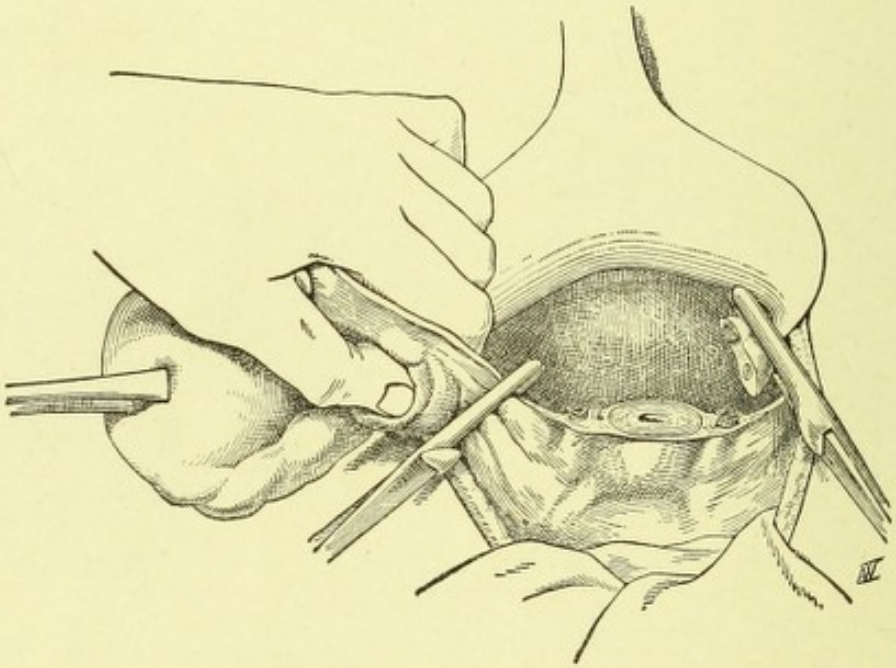


Fig. 303.—Hysterectomy by separation. The right broad ligament has been divided. The uterus is tilted to the left and a forceps holds the left broad ligament (Faure).

The uterus is tilted toward the left and the left broad ligament exposed. This is pediculated as before and divided with scissors (Fig. 303), and the uterine arteries are tied as also other bleeding points, and the operation terminated as usual.

When the uterus cannot be drawn forward, the *cervix is divided in front*, on a level with the vesico-uterine cul-de-sac. A pair of Museux's forceps is fixed to the inferior portion of the body of the uterus, and then with curved scissors the isthmus is denuded from in front backward. It is then quite a simple affair to bring the interior portion of the body of the uterus for-

ward and to introduce the fingers behind it, and separate from above upward the adhesions which fix it behind.

Hysterectomy by Primary Excision of the Uterus.

This procedure was initiated by Villar and generalized mainly by Terrier. The fundus of the uterus is seized with traction forceps and a long pair of Kocher's forceps is placed from above downward along the border of the uterus as far as the level of the

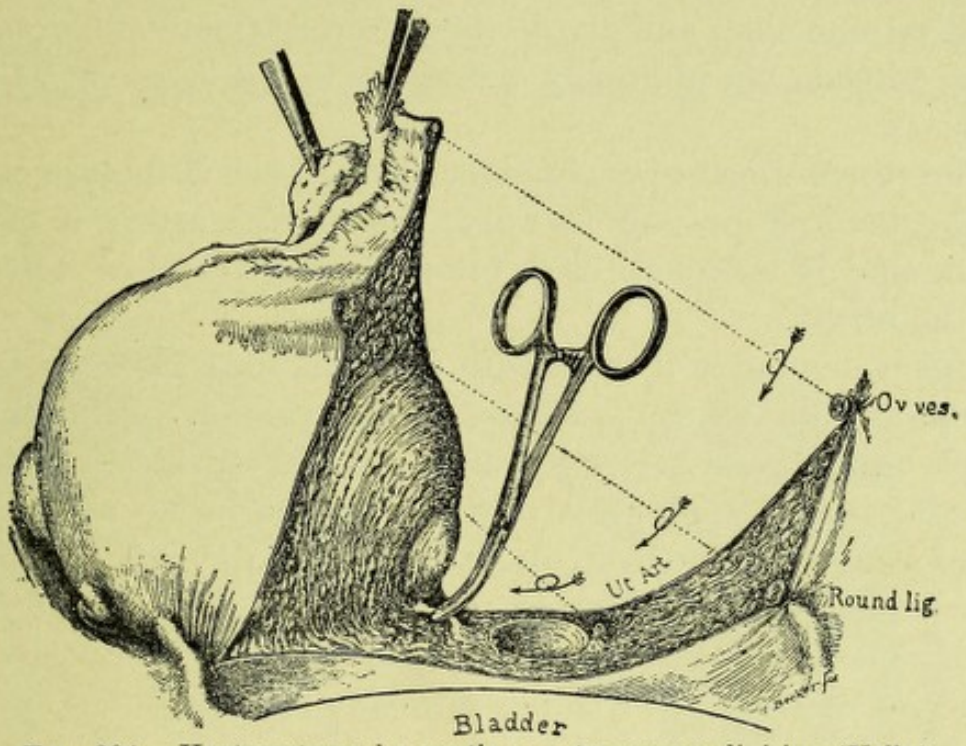


FIG. 304.—Hysterectomy by continuous transverse division (Kelly).

isthmus; a second identical forceps is placed a little more external, along the whole depth of the broad ligament, which is divided between the two forceps. A similar manipulation is carried out on the opposite side. The uterus is only attached now to the cervix which is divided at the isthmus after clamping and tying the uterine arteries.

In place of the excised uterus is an empty space where the hand may move with ease in an endeavor to attack the adhesions on each side.

Hysterectomy by Continuous Transverse Section.

Hysterectomy by continuous transverse section, carried out and first described by Pean, is best known under the name of

H. A. Kelly's operation. It consists in cutting successively the tissues from one side to the other, commencing with the utero-ovarian pedicle, broad ligament of the same side, uterus, broad ligament of the other side and finishing with ligature and division of the second utero-ovarian pedicle.

The operation may be commenced to the right or the left, choosing the side where the operation seems simple owing to the parts being more accessible.

Draw the uterus to the opposite side, tie the utero-ovarian vessels on one side, and divide the round ligament; then, turning up the adnexa, cut obliquely across the broad ligament as far as the cervix.

The vesico-uterine peritoneum, having been in its turn incised, and the bladder pressed forward, the uterine artery is exposed to view and is taken up on a blunt needle, very low down and near the cervix.

This is divided in its turn with strong blunt scissors or scalpel, immediately above the insertion of the vagina. With traction forceps, seize the superior lip of the incision which is made to gape and then cut progressively the uterine tissue under visual control until cut through in almost all its substance. Continuing to draw gently on the forceps, one observes that the uterus, in tilting, separates from the broad ligament of the opposite side; the second uterine artery comes into view; it is tied and cut in its turn (Fig. 304).

Continuing the tilting movement, the second broad ligament unfolds to our view, the utero-adnexal mass only holds together by the round ligament and the utero-ovarian pedicle, which is clamped and divided without the least difficulty.

If in this operation it is decided to do a *total hysterectomy*, in place of dividing the cervix, after having tied the first uterine artery, one proceeds to the separation of the soft tissues, close up to the uterus, between this organ and the tied uterine artery, and continues until the lateral vaginal fornix is reached. It is recognized by the difference in consistence of the tissues. It is opened laterally with the scissors.

Seize the incision thus made with a pair of forceps, in order that it may not fall back; then, attaching strong toothed forceps to the cervix, it is drawn upward, while the vagina is divided

completely around it with strong scissors which should not deviate from uterine tissue.

This disinsertion having been completed, the uterine artery on the opposite side is tied and divided, and the operation is concluded as in subtotal hysterectomy.

Hysterectomy by Uterine Hemisection.

This procedure has been described and carried out by J. L. Faure who operates as follows: The fundus of the uterus having been seized with two strong forceps, both of which are attached a little outside of the median line, it is divided as far as the isthmus,

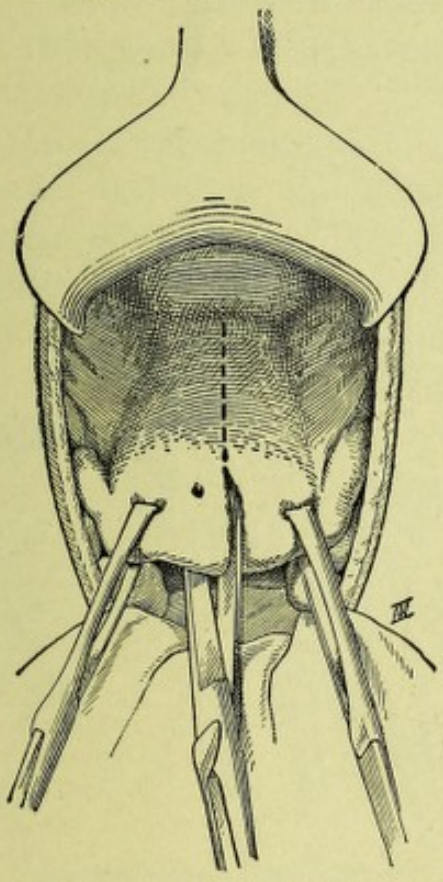


FIG. 305. — Hysterectomy by hemisection. The uterus is drawn upward by two forceps and the hemisection is commenced.

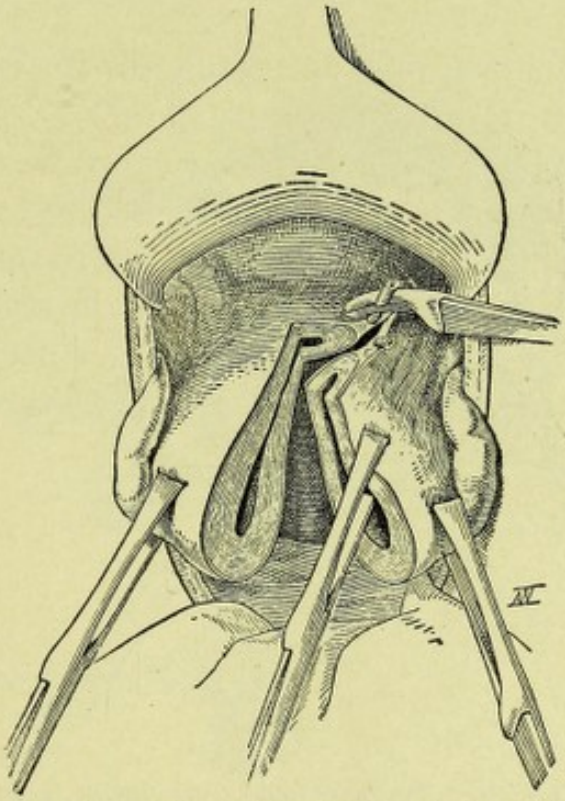


FIG. 306.—Hysterectomy by hemisection. The right half of the uterus detached at the level of the isthmus is drawn upward. Clamping of the left half of the uterus (J. L. Faure).

at the level of the vesico-uterine cul-de-sac. It is very easy to avoid all uterine hemorrhage, to cut exactly in the middle line when traversing the uterine cavity. As soon as the uterine cavity is opened, it is sterilized by the application of a thermocautery.

The uterus is thus divided into two halves as far as the isthmus.

One of the halves is taken up with a traction forceps near the isthmus and then with large curved scissors, it is divided at this level (Figs. 305 and 306). Drawing on this half of the uterus it is made to pivot around the insertion of the adnexa. The uterine vessels are approached internally and are divided after having been clamped. Continuing to draw on the laterally inclined half of the uterus, the adnexa are then drawn upon and separated below. The operation is concluded by the clamping and section across of the round ligament, and then of the utero-ovarian vessels.

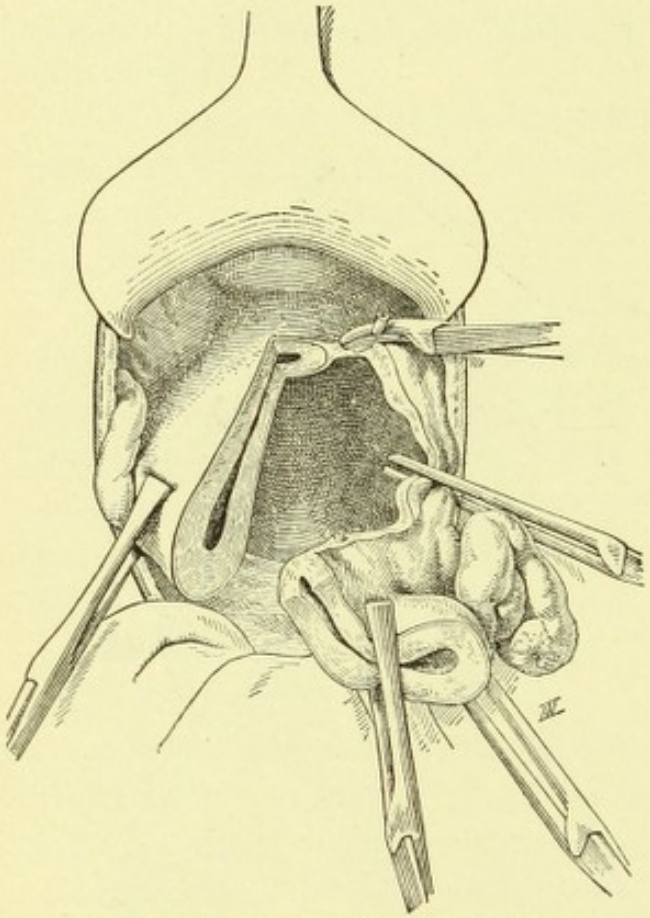


FIG. 307.—Hysterectomy by hemisection. Turning down of the right half of the uterus. Clamping of the corresponding broad ligament which will now be divided.

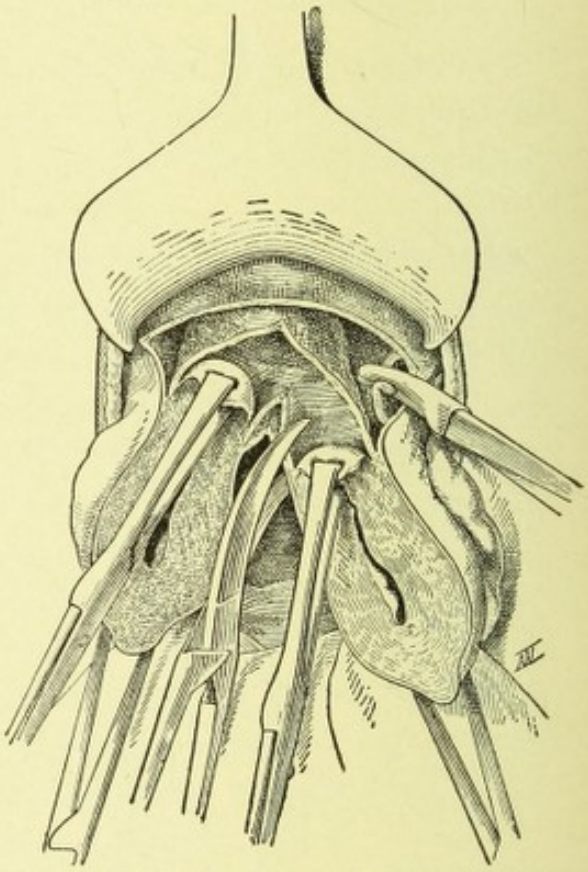


FIG. 308.—Total hysterectomy by hemisection. Disinsertion of the vagina in a line with the divided cervix on the right side.

The same manipulations are carried out on the other side. In short, each half of the uterus is dealt with as in the second half of the operation for hysterectomy with the continuous transverse section.

If it is desired to do *total hysterectomy* by this method, the vesico-uterine cul-de-sac is incised, and the bladder pushed back,

thus freeing completely the anterior face of the cervix and the superior portion of the vagina. Then instead of stopping the median section on a level with the isthmus, the incision is continued right into the vaginal cavity. Seizing one of the halves of the cervix with a traction forceps, it is drawn upward and outward, the vagina is cut, stretched, and divided close against the uterine tissues and one continues as before (Figs. 307 and 308).

Total Hysterectomy by Subperitoneal Decortication with Primary Opening of the Posterior Fornix and with Preliminary Hemostasis.

This procedure owes its introduction to Doyen and reposes on the rejection of all preventive hemostasis; it is carried out in the following manner:

The surgeon stands to the left of the patient. The uterus is thrown down on the symphysis. The posterior fornix of the vagina is opened. This fornix is rendered prominent by the preliminary introduction of a curved pair of forceps into the vaginal cavity. The finger is introduced into the vaginal buttonhole, the cervix is recognized and taken up with a special hook. We prefer forceps (Fig. 309) to Doyen's instrument. The cervix is drawn upward and appears between the edges of the button-

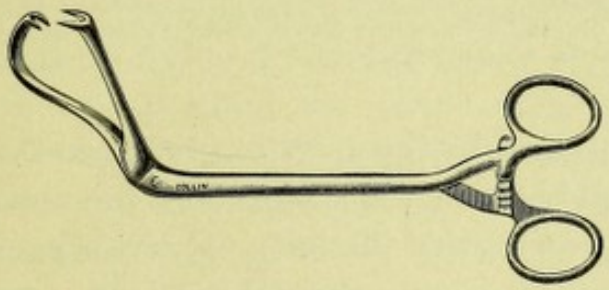


FIG. 309.—Forceps to seize the cervix through the buttonhole in the posterior wall of the vagina.

hole incision in the vagina. It is easy to recognize its lateral attachments with the index-finger of the left hand. A scalpel or scissors is employed to make a division on each side in contact with the uterine tissue. Free the lower end of the cervix from its lateral attachments to the interior portion of the broad ligament. It is raised up immediately by traction of the forceps in an upward direction.

The anterior fornix, then exposed, is cut across with scissors in contact with the cervix. By drawing strongly on the forceps, the bladder may be detached with the right index-finger.

The uterus is now only retained by its lateral vascular connections. It suffices in order to free it, to introduce the left index-finger toward the right, above the broad ligament, and then to perforate the vesico-uterine peritoneum and to proceed to the separation of the right broad ligament with the finger bent like a hook.

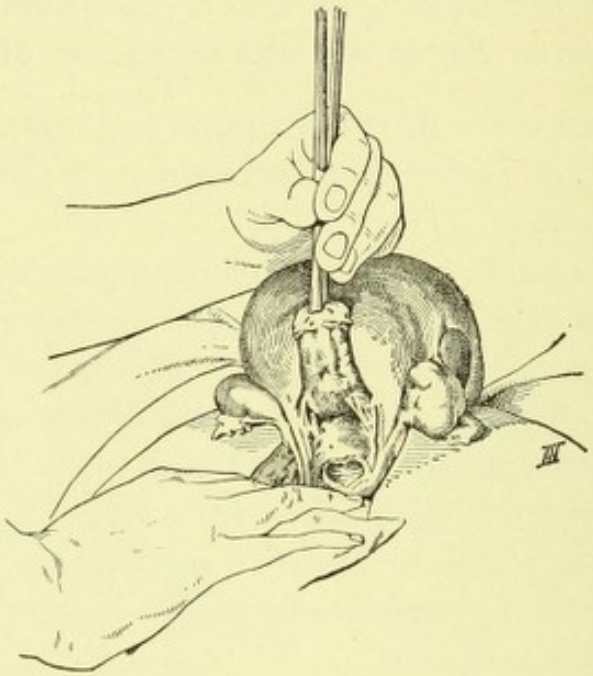


FIG. 310.—Hysterectomy by subperitoneal decortication. The vagina having been opened posteriorly, is divided around the cervix which is then drawn upward, detaching it in this manner from the bladder (Doyen).

This ligament is seized by the assistant between thumb and index-finger and divided between the adnexa and the uterus. The tumor is then rapidly tilted toward the left. It strips itself of its anterior serous envelope which is cut across if it offers any resistance, then of its connections with the left broad ligament, and finally only adheres by the superior border of this latter. A final cut with the scissors frees the uterus which is caught by an assistant. The surgeon then seizes the broad ligament of the left side and finally proceeds to the hemostasis of the broad ligaments. Two ligatures on each side secure this in the simple cases.

The utero-ovarian pedicles are drawn into the vagina and the peritoneal-vaginal opening is closed with a purse-string suture, and where this is impossible by a continuous one.

3. Indications for Abdominal Hysterectomy and Modifications of Technic According to the Nature of the Lesions.

Abdominal Hysterectomy for Inflammatory Adnexa.

Technic in abdominal hysterectomy presents no specialty in the case of inflammation of the adnexa. It is important to limit the operative field when one is dealing with suppurative lesions of the adnexa. It is in such cases necessary to double and triple the rampart of compresses which protect the area of operation from the general peritoneal cavity. The superficial already soiled compresses should be changed in order to prevent infection going through to the deeper compresses and then to the intestines.

The existence of adhesions, although it does not interfere with the course of the operation, may complicate its execution. The freeing of these adhesions is more or less easy according to the case. Commence with the least resistant. Generally the finger may detach these; one should be careful to tear them from the organ about to be removed; this is the best means of avoiding lesions of the adherent intestine. When the adhesions are too tight, dissect them with a scalpel or scissors, taking care to cut always from the side of the organ to be removed. We have seen how the intestine may be injured in these manipulations and have indicated the course to follow in such cases.

With patience and method we arrive at a successful issue even in those cases which seemed impossible at first.

If the adhesions are so numerous that they render the pelvic organs unrecognizable, concealed by adherent great omentum and intestine, in order to find our whereabouts we must first look for the body of the uterus. To do this, commence by separating the parts in the median line behind the pubis; one then comes across the posterior face of the bladder; in liberating it little by little, one infallibly finds oneself in the vesico-uterine cul-de-sac, and then to the anterior face of the uterus. Little by little we free the fundus and then the posterior face of that organ. This having been done, we are masters of the situation, and it is easy to free the adnexa. All that now remains is the hysterectomy, following the method we have related.

The special procedure we have described may sometimes be of service, in particular that of continuous transverse section, which is specially indicated in those cases of inflammation of the adnexa where the parts are easily accessible on one side but not on the other. Commence the operation on the easily accessible side and one finds oneself admirably situated to attack the very adherent adnexa from below upward and from within outward on the opposite side.

If the cervix is almost normal, it suffices to hollow it out and do a subtotal hysterectomy; if on the contrary it is very diseased, it is illogical to leave it, and we should do a total hysterectomy. This is even indicated when the raw surfaces of the pelvis cannot be clothed with peritoneum and if possible to terminate the operation by a partitioning of the pelvis above the area drained by the vagina.

Recently Beuttner, after removing the diseased tubes, seeks a more conservative operation.[1] He cuts a wedge from the fundus, preserving the round ligaments with care. These incisions are prolonged on to the anterior and posterior surfaces of the broad ligaments. After having made in the median line a hemisection of the wedge already cut, he seizes one of the halves of the fundus of the uterus with a pair of Museux's forceps and detaches it with scissors.

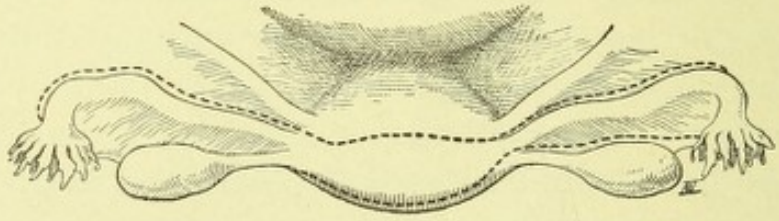


FIG. 311.—Removal of the tubes with partial preservation of the uterus and ovaries (the dotted line indicates the incision).

Having reached the cornua of the uterus, he cuts and clamps the uterine artery and its branches, excises the diseased tube and if necessary on one side, the tube and ovary. He concludes the excision by ligature of the infundibulo-pelvic ligament. Similar manipulations are carried out on the opposite side.

The uterine wound is closed by a deep musculo-mucous-membrane catgut suture and then a second sero-serous suture and if need be a third one.

[1] Aubert, Concerning the Extirpation of Bilateral Adnexa with Transverse Excision of the Uterus by Beuttner's Procedure. *Revue médicale de la Suisse romande*, 1909, p. 78.

The operation being terminated, the surgeon finds himself in presence of a little uterus accompanied by an ovary and some fragments of the one or both ovaries which have been preserved; the round ligaments still remain, the relationship of the bladder and uterus have not been in any way changed, and the broad ligaments have only been sacrificed along a very limited extent. The menstrual function can go on and the patient may not regard herself as deformed.

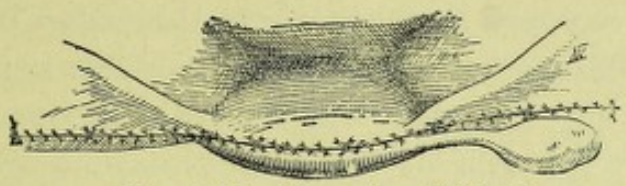


FIG. 312.—Operation finished.

As far as possible the uterine suture is covered with peritoneum and if need be it may be covered over with the loop of the sigmoid or even one may be forced to do an anterior abdominal hysteropexy on the posterior face of the uterus.

Results.—The mortality from abdominal hysterectomy is at present very low and is always becoming less.

Our first results show four deaths for 104 operations or 3.35 per cent.; our second results showed two deaths in 139 cases or 1.43 per cent. If the lesions present degress different of seriousness on each side, we reestablish one of the broad ligaments following our general method and confine ourselves to partitioning off the opposite side of the pelvis. It suffices after having closed the broad ligament on the less diseased side with a continuous catgut suture, to place a drain in the vagina, the extremity of which lies in contact with the raw surfaces on the opposite side, then, taking up the needle again, we continue the suture by uniting the recto-vesical peritoneum to the anterior face of the rectum, and then to the pelvic colon until all the raw surfaces have disappeared from view under the suture.

The *immediate results* are excellent. The *remote results* are none the less satisfactory. We will return to this question when we deal with treatment of inflammation of the adnexa.

Abdominal Hysterectomy for Fibroma.

In the instance of fibroma, the execution of abdominal hysterectomy presents a certain number of peculiarities.

Opening of the Abdomen.—The abdominal wall should be opened with caution. Its too rapid division may injure the fibroma and opens one of the great venous sinuses which spread about its surface; it is a complication of no great importance, but which nevertheless may give rise to a very troublesome but non-dangerous oozing.

A prudent incision enables us to escape wounding the bladder, to which one is exposed in cases where the organ has been drawn toward the umbilicus by a fibroma developed below the vesico-uterine cul-de-sac. We must fear a similar ascension of the bladder, when, after incision of the musculo-aponeurotic layer, one comes into contact with a thick fatty layer, which leads one to think of that which lines the bladder in front. In such a case, it is recommended to work toward the umbilicus in order to open the peritoneum above the dangerous zone.

Extraction of the Fibroma.—When the abdomen is open, rapidly explore the tumor in order to ascertain its connections and mobility, increasing, if necessary, the incision made in the wall. Then draw the fibroma to the exterior with the hand or with a large pair of Museux's forceps, a proceeding of no difficulty.

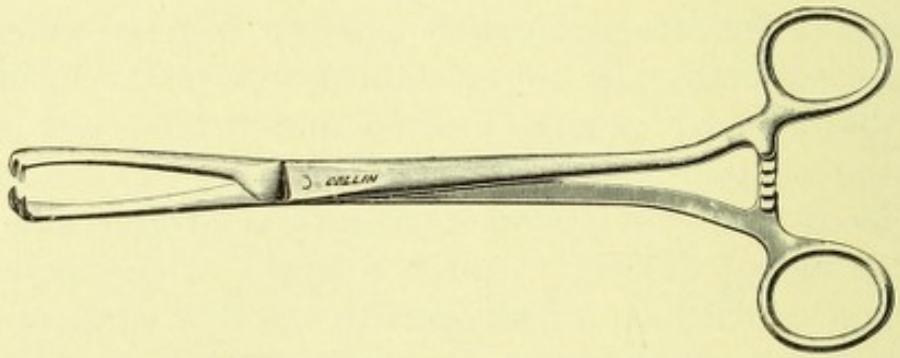


Fig. 313.—Large pair of Museux's forceps.

In certain cases the extraction of the fibroma may be very difficult. We should then use a corkscrew (Fig. 314) which is solidly implanted into the tumor, taking care not to enter the neighboring parts of the pubis, but of forcing it into the parts as high as possible, in such a way as to be able to easily draw the superior pole of the fibroma out of the wound, and to tilt it out of the abdomen without running the risk of struggling against the opposition of the symphysis. Strong traction on this corkscrew suffices to bring the fibroma out of the pelvis at first, and

the abdomen afterward. If it resists all our efforts, we may have recourse to morcellement, enucleating from their site one or two fibromatous masses. Traction forceps close the lips of these cavities emptied of their contents and the uterus thus reduced in size is extracted with ease.

For enormous tumors, A. Reverdin's suspension apparatus may be useful (Fig. 315); having raised the tumor, it permits of manipulations round about it and the successive stages of the operation being easily carried out. It is useless to use the special

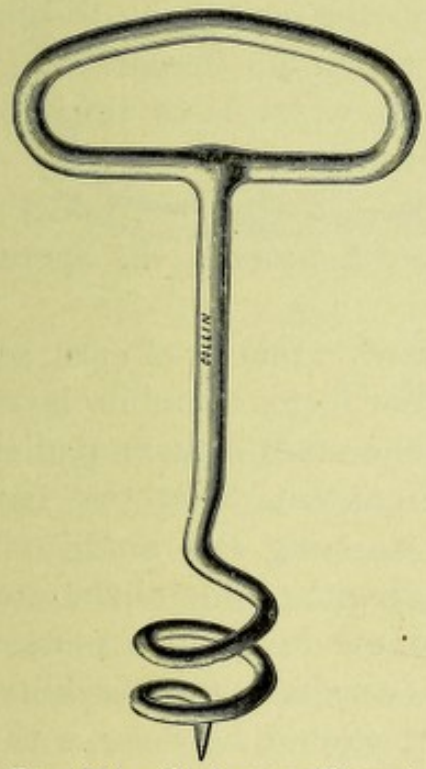


Fig. 314.—Corkscrew (Doyen).

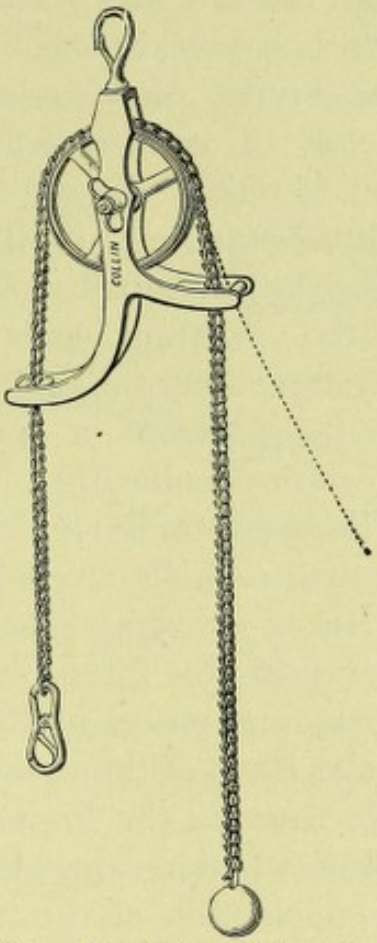


Fig. 315.—Reverdin's pulley.

forceps devised by this surgeon; it suffices to hook the suspension apparatus to the corkscrew firmly fixed in the fibroma.

The ligature of the different vascular pedicles presents no special difficulty.

Total or Subtotal Hysterectomy.—Should we do *total* or *subtotal hysterectomy?* Richelot has insisted on the removal of the organ in its entirety, body and cervix, in order to entirely avoid the secondary cancerous degenerations which may occur

in the preserved cervical stump. It is quite certain that this argument has its value, as quite a number of such observations have been published. It loses much of its importance, if one takes care, as we advise, to hollow out the cervical stump as far as its extremity and of extirpating the whole of the intracervical mucous membrane. It is certain that one thus avoids degenerations of the vaginal face of the cervix; but the total removal of the cervix does not prevent the development of a secondary carcinoma with vaginal cicatrix, as the observations of Pierre Duval, Temoin, and Bazy and others prove.

We believe that the line of conduct is dictated by the state of the cervix. If it contains fibromatous nodules, if there is a suspicion of intracervical carcinoma, total hysterectomy is the course to take. If, on the contrary, the cervix is absolutely healthy, we prefer to do the subtotal, which has the advantage of being a little simpler and more rapid, which is of importance when the operation has lasted a certain time.

Hysterectomy for Included Fibroids.—If we have to deal with an *included fibroid* in one of the broad ligaments, the operation has certain peculiarities.

The inclusion having been recognized, a matter of ease, as the peritoneum which covers over the tumor forms a mobile layer on its surface, we commence by cutting the utero-ovarian pedicle at the level of the infundibulo-pelvic ligament; then two curved incisions are made in this pedicle, crossing the anterior and posterior faces of the tumor and attaining the body of the uterus.

We thus fix the limits on the fibroma itself, of a peritoneal collarette which is separated with care in order to free the fibroma. This enucleation of the included part should be done with the greatest care and extra care should be taken on arriving at the base of the ligament.

At this level one is exposed to the danger of wounding the ureter; this may be avoided *if one keeps constantly in immediate contact with the tumor.* This method of procedure has also the advantage of not exposing the operator to the risk of losing himself in bad planes of cleavage and of avoiding wounds of the other organs in the neighborhood of the tumor, of large vessels or even of the pelvic colon or cecum, when the fibroma, lifting up the peritoneum and unfolding the mesenteries, comes into the neigh-

borhood of the large intestine. The included masses having been enucleated, the operation is concluded with an ordinary hysterectomy.

Hysterectomy for Gangrenous Fibromata.—Technic is in such cases a little special.

Commence by removing as much as possible of the tumor by the vagina and fill the uterine cavity afterward with iodoform gauze. Then suture the cervix, and do a total hysterectomy by the abdomen without incision of the uterus, and without morcellation, cutting across the vagina between two curved forceps; Kronig in fourteen operated cases had thirteen cures.

Rochard[1] advises a similar technic; he does a colpo-hysterec-

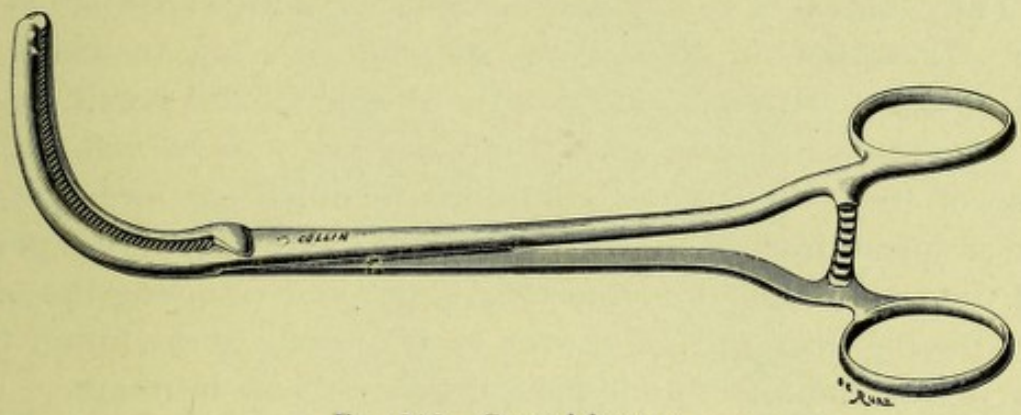


FIG. 316.—Curved forceps.

tomy and divides the vagina after having attached to it some curved forceps, thus doing the hysterectomy in an isolated space as Goullioud has done since 1896. The important point is to avoid all discharge of hemorrhagic fluids in the neighborhood of the wound.

Conservative Operations.—Latterly gynecologists have carried out conservative operations.

They first preserved one or two ovaries, when they were healthy. It was found sufficient instead of tying the utero-ovarian artery at the level of the infundibulo-pelvic ligament to tie internal to the ovary, simply excising the tube with the uterus.

Zweifel goes further.[2] He amputates as high as the tumor permits and reestablishes the cavity of the uterus preserving the ovaries at the same time so as to obtain a persistence of menstrua-

[1] Rochard, Removal of the Uterus in an Isolated Area in Certain Cases of Gangrenous Fibromata. *Bull. et Mem. de la Soc. de Chir.*, Paris, 1904, p. 778.

[2] Frankenstein, Ueber die Bedeutung der Resectio Uteri bei Myoma zur Erhaltung der Menstruation nach der Operation. *Arch. für Gyn.*, Berlin, 1907, T. 83, p. 477.

tion. To preserve a sufficient arterial supply for the ovary, we must take care of the important branch it receives from the uterine artery, and leave a layer of uterine tissue around it. Remove the portion of the uterus containing the fibroids, and tie the vessels that bleed; then suture the pedicle in two layers, burying the first row of sutures under a sero-serous suture, which at the same time draws the pedicles of the adnexa in contact with that which remains of the uterus.

In more than one-half of the cases menstruation is preserved.

The conservative operation, par excellence, is myomectomy[1] which may be carried out in two different conditions, viz., for pediculated myomata or interstitial myomata.

The removal of *pediculated myomata* is of the simplest description. It consists in division of the pedicle, tying vessels if any, and suturing with catgut the little uterine wound resulting from the intervention. The only difficulties likely to be met with are those of frequent enough adhesions to omentum and intestine. The simplest thing to do is to commence by division of the pedicle, and then attacking the adhesions, tying and resecting the omentum, freeing the intestine or even leaving some of the tumor tissue attached to the intestine if the adhesion is very intimate.

When we have to deal with *interstitial myomata* we incise the cortex of the uterus at the level of the myoma and just as far as the capsule that surrounds the latter. With a blunt instrument such as a pair of curved scissors or a special spatula, the tumor is liberated from the cortex that surrounds it. If there are several myomata close together, they may be removed by the same incision.

It has been advised in cases of large tumors to make an elliptical incision; if one has recourse to this incision we must take care as Kelly and Cullen advise not to remove too great an extent of the uterine cortex as this retracts after the removal of the tumor and union may then be difficult. It is better to be satisfied with the simple incision; free if necessary to resect the exuberant portion of the uterine flaps.

As much as possible during enucleation one should avoid the opening of the cavity of the uterus and to do so one must be

[1] Loubet, Enucleation of Uterine Fibromata by Abdominal Route, *Th. de Paris*, 1901–1902, No. 319. Kelly and Cullen, Myomata of the Uterus, Phila., 1909.

careful to remain in close contact with the tumor. If by mischance it is opened, dilate the cervix and leave a drain for several days in its interior.

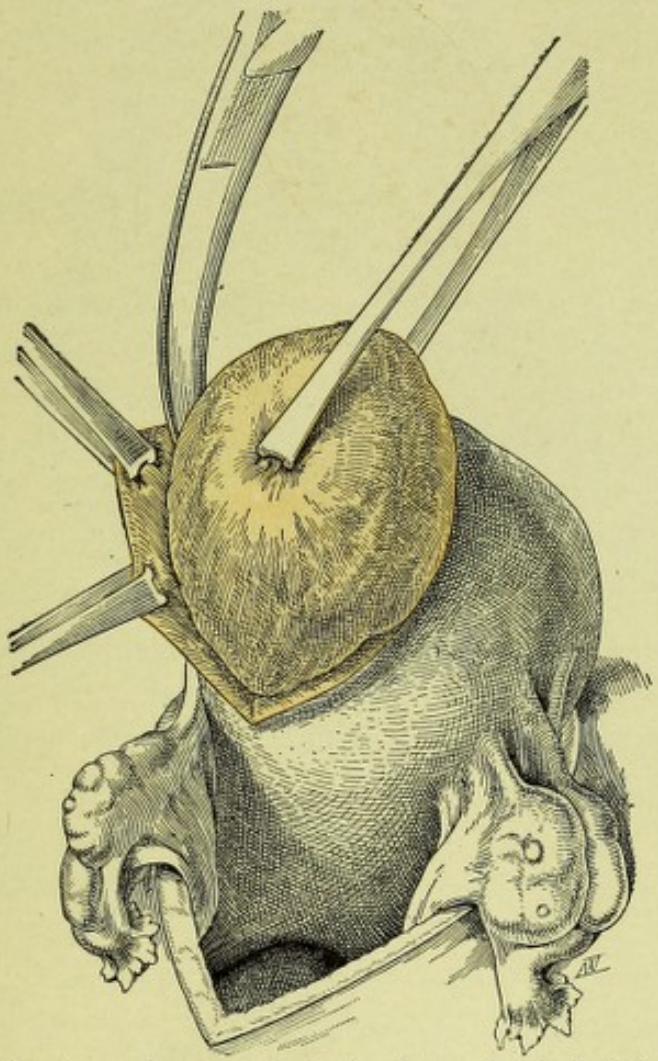


Fig. 317.—The uterine tissue has been incised as far as the shell of the fibroma; a forceps draws upon the latter and it is isolated with curved scissors.

Once the enucleation is finished, suture the wound in layers with some catguts which pass right into the substance of the uterine tissue, taking care to get good apposition of the parts, in such a manner as to leave no virtual cavity where fluids may collect.

If there are several myomas, multiple uterine incisions may be required and proceed if possible from the cavity of the principal myoma into those of less importance so as to have merely one uterine wound to suture.

We cannot yet appreciate the value of these conservative operations and if we face the usually excellent results of hyster-

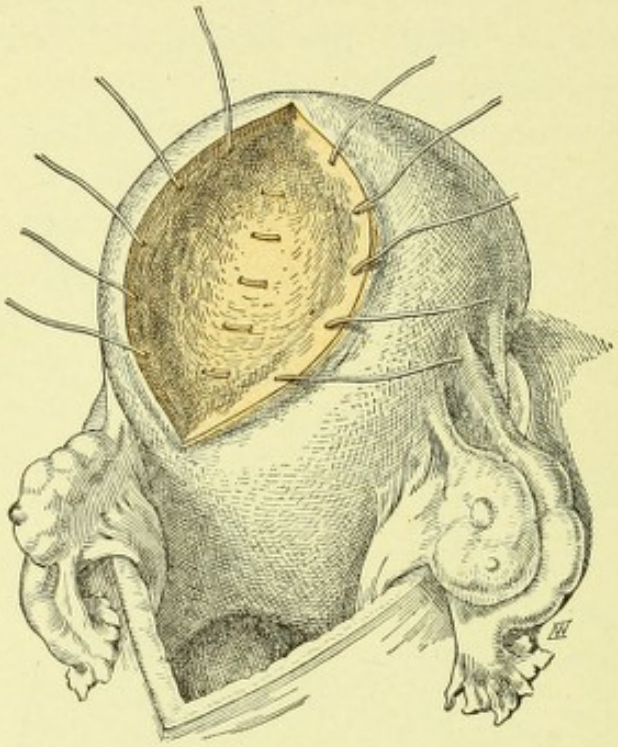


FIG. 318.—Passage of buried catgut suture uniting the walls of the capsule.

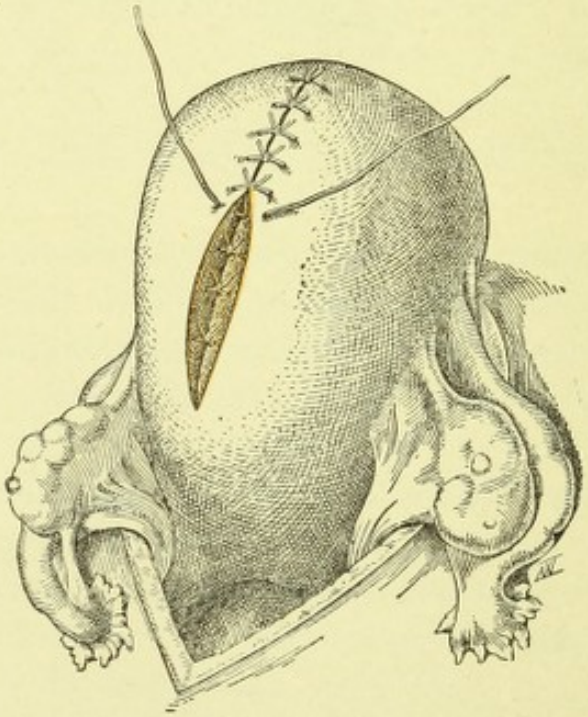


FIG. 319.—Second layer of sutures.

ectomy, we are a little tempted to recede from this position and we certainly prefer the complete operation which places the patient in a position of having to fear no recurrence and no more pain from a possible lesion of the adnexa. Our average mortality for abdominal operations on fibromas is 4.1 to 100, *i.e.*, 11 deaths in 268 cases.

Abdominal Hysterectomy for Cancer of the Uterus.

The first surgeon to deliberately practice *the excision of the uterus for cancer* by the abdominal route was Freund on January 30, 1878. This intervention was rapidly followed by a series of others, but its mortality[1] was so great that Freund's operation was abandoned for vaginal hysterectomy which was advocated by Czerny in 1880. The immediate results of this operation were incontestably better but the remote more mediocre.

As the technic of celiotomy became better return to the abdominal route became rapid, and as a result the immediate prognosis became better and permitted a much more extended removal than by the vaginal route. By the abdomen it was possible to do *an extensive excision of the cancer.* With this new technic are associated the names of Mackenrodt, Riess, Rumpf, Clark, Werder and Wertheim, etc. More and more extensive operations were advised, with the purpose of removing at one and the same time the periuterine cellular tissue and the glands receiving the efferent lymphatics from the uterus. The congress in Rome in 1902 marked the apogee of these attempts. It was at this meeting that Jonesco advised preliminary ligature of the hypogastric artery and the "lumbar-ilio-pelvic hollowing out" extirpating all the cellulo-fatty tissue of the pelvis, iliac fossæ, and interior lumbar regions with the vessels and lymphatics they contain. About the same time Franklin H. Martin in America advised the partial excision of the bladder with implantation of the ureters in the rectum; Sampson advised the systematic excision of the ureters with reimplantation of their upper end into a higher point on the bladder wall.

[1] Ahlfed in 1881 found 72 deaths in 100 cases done by Freund; Gusserow found 106 deaths in 148 cases, 71.6, per 100.

These operations are often excessive and have to a certain extent been abandoned. In particular the systematic search for all the invaded glands has been abandoned, as anatomo-pathological researches show that this removal was most often useless or impossible.

In order to establish it it suffices to recall what researches have established in the last few years. We will study from this point of view the cancers of the body and the cervix separately, because from the points of view of extension to glands there is a great distinction between the two.

In thirty-four cases of *cancers of the body* of the uterus, Kronig found only five cases of glandular enlargement; in one case the inguinal glands, two cases the iliac glands, and two cases the lumbar glands. In four of these cases the uterine cancer had gone beyond the limits of operation and in the fifth a cancer of the ovary had previously been removed.

In consequence in all cases of cancer of the uterus which are capable of extirpation there was no glandular enlargement. The *conclusion to draw from these observations is that it is not necessary to search for the glands in cancer of the body of the uterus.*

In *cancer of the cervix* the invasion of the glands is, on the contrary, much more important. Schauta in fifty postmortem examinations of women, who died from cancer of the cervix, found thirty-two cases of infected glands, being 64 per cent. of the cases. The search for glands seems *a priori* to be indicated. But if we look for the situation of these glands we will see that in the greatest number of cases of infected glands we find aortic as well as pelvic glands may be in a state of isolated enlargement or degenerated. In 13 per cent. of cases only the cancerous degeneration is limited to the pelvic glands, the only ones that the surgeon is able to attack and then not always.

It may be objected that these statistics have been made of cases where the patients died of their cancer, thus being in a different condition to those for whom the operation is a matter of discussion. Let us then proceed to the examination of those who succumbed to surgical intervention. Schauta in ten women examined found only two with cancerous glands; Oehlecker in seven cases found two. It is true that Kronig in eighteen

operative cases found nine cases of glands; but it must be added that Kronig attempted the operation on many cases that by others would be regarded as inoperable by reason of the obvious extension beyond the uterus.

Kundrat, who studied conscientiously the question of glandular propagation in Wertheim's clinic, found in 80 cases 54 with ganglionic invasion, about 59 per cent. In 26 cases there were infected glands but these glands were only capable of extirpation in 13 per cent. of cases. We therefore find a figure about the same as that of Schauta.

Does this figure of 13 per cent. of *glandular degenerations, capable of being operated on*, authorize the systematic removal of glands and to expose the patients to a research which incontestably aggravate the immediate operative prognosis? We do not believe it. We are supported in our nonbelief by the results of the anatomo-pathological researches of Oehlecker, Rosthorn, Kromer, Cullen and Sampson, who show that the size of the tumors, the only factor revealed during a celiotomy, is not a certain index of a cancerous degeneration. Large glands may be noticed in women and they are merely inflamed, while quite small ones may be degenerated. If one wished to be sure of removing all the infected glands, one should remove the whole glandular chain, which is of course impossible.

Is failure the result of the abdominal operation? Not in the least. The study of recurrences after old operations shows us that the mischief reappears at the level of the cicatrix in the immense majority of cases. This agrees with the facts determined by Kundrat who, in 160 cases operated by Wertheim, found the *parametrium invaded in 55 per cent.*; with those of Brunet who, *in 72 per cent. of cases* where the parametrium was clinically and macroscopically free, nevertheless found in 72 per cent. of these cases cancerous infiltrations; the researches of Pankow, who, in 60 cases operated by Kronig, found the *parametrium affected* in 68.2 per cent., and finally Sampson in a study of Kelly's cases found the parametrium invaded in 20 out of 27 cases.[1]

Another interesting anatomo-pathological point, well exposed

[1] Sampson, A Careful Study of the Parametrium in 27 Cases of Carcinoma Cervicis Uteri and Its Clinical Significance. *Am. Jour. of Obst.*, New York, Oct., 1906, p. 433.

by Brunet's[1] examinations on Mackenrodt's cases and by Assereto[2] on Doderlein's, is that in a certain number of cases there exists *an invasion of the vaginal wall by the cancer, and yet there is no change in the corresponding mucous membrane.* We have had occasion to make the same observations.

The abdominal operation by permitting the extensive excision of the vagina and parametrium exhibits even in the absence of a glandular extirpation, an incontestable superiority over vaginal hysterectomy and as such merits substitution for the latter.

Indications.—All cases of cancer of the uterus do not justify an abdominal operation and one is obliged to limit oneself to a purely palliative line of treatment. In order to present the indication of so-called radical operation, it is necessary to do a certain number of exploratory examinations by digital vaginal examination, digital rectal examination, and the cystoscope.

One should not operate when the *vaginal examination* shows an extensive invasion of the vagina, in particular if its anterior wall is in contact with the bladder, or perhaps an infiltration *en masse* of the broad ligaments extending to their external third. We confine ourselves to a palliative treatment when the *rectal examination* shows a beaded induration in the utero-sacral folds or the presence of enlarged presacral glands. *The cystoscopic examination* of the bladder should always be carried out. It is evident that direct invasion of the bladder should arrest the surgeon. The same may be said of certain lesions which, according to Hannes, would indicate the partial invasion of the vesical coats. A prominence of the trigone which could not be explained otherwise than by a mechanical cause (forcing back of the bladder by a large intravaginal mushroom growth or by a strongly anteflexed uterus) or by folds or bullous edema of the mucous membrane.[3] According to Clark, the obliteration of a ureter would have great diagnostic value, as purely inflammatory infiltrations of the broad ligaments never lead to the arrest of the passage of urine.

[1] Ergbnisse der abdominalen Radikaloperatien des Gebarmutter-scheidegkrebies mittels Laparotomia hypogastrica. *Zeitschr. f. Geb.*, Stuttgart, 1905, T. LVI, p. 1.

[2] Assereto (L.), La propagazione del carcinoma del collo uterino al tessuto paravaginale. *Annali di obstetricia e ginecologia*, Milano, 1907.

[3] A bulging like a bowel of the vescial mucous membrane with production of papillomatous nodules has a great importance (Scheib); on the contrary, a bullous edema, according to unpublished researches of our interne, is without value.

The Operative Treatment.—Is there any preoperative treatment? Some gynecologists have advised a curettage of the cancer 8 to 10 days before the hysterectomy.

This practice has been in the main abandoned. It is well to do a curettage followed by cauterization before removing the uterus, but it is done at the same sitting. The preliminary curettage has, however, its uses in certain cases.

If a woman is very anemic as the result of continuous hemorrhages, curette and cauterize her cancer, under anesthesia or after a short anesthesia of ethyl-chloride. This curettage followed by tamponing with iodoform gauze arrests the hemorrhage and enables us to tone up the patients in about 12 days or so before the operation of hysterectomy.

Operation.—Before opening the abdmen, commence with a careful curettage of the cancer, followed by cauterization. This method has been objected to on the score that it disseminates infectious germs or cancerous cells. We believe that this fear is chimerical and we never hesitate to do a preliminary curettage and cauterization.

Again in destroying the ulcerated cancerous vegetations, habitat of an aerobic and anaerobic bacterial flora, we diminish the risk of septic contamination during the course of the operation and it often happens that in so doing we have discovered evidence of other propagation until then unknown and which contraindicates a more serious intervention.

If the curettage reveals that a hysterectomy may follow on, the rubber gloves are changed and a new operative material is produced for the abdominal intervention. The patient is placed in the Trendelenburg position and the surgeon makes a long incision so as to get a good exposure of the diseased parts. He inserts a large retractor in the pubic angle of the wound and some compresses against the intestines and before commencing the hysterectomy, he makes with great care an intraabdominal examination in order to find out the *operative conditions* of the case.

At this stage he should examine, first, the vesico-uterine fold and see if it is invaded by a cancerous nodule; in presence of such nodules, we should take into account the presence of simple cicatricial contraction of this fold. The examination should now

be extended to the broad ligaments and extensive infiltrations may be found in the aortic and presacral glands. As a result of this examination we decide whether a radical operation is necessary or a palliative intervention. This latter may include a hysterectomy and the excision of the uterus constitutes in certain cases the best of palliatives. It is certain that no extensive extirpations should be made in the cellular tissue, and in order to reduce the immediate operative risks to a minimum, the surgeon should confine himself to a simple operation and not carry out the complex manipulations of the cleaning out of the pelvis.

If a radical operation is decided upon, do it as follows: The uterus, having been seized with care, is drawn upward and a little to one side. All violence must be avoided in taking hold of it on account of the friability of the degenerated muscle fiber; it is advisable in cancers of the body, to employ forceps provided with teeth which penetrate as far as the neoplasm, and after ligature and division of the utero-ovarian pedicles, the upper portion of the broad ligament is incised between the middle broad ligament fold where the tube lies and the anterior which contains the round ligament. This latter is tied at a little distance from the uterus and divided; then the preuterine peritoneum is incised below the vesico-uterine fold. Separate the bladder from the anterior surface of the cervix, which is generally easy and may be done by pressing back the parts with a strip of gauze; if there are adhesions cut through them with small nips of a blunt-pointed scissors. When the separator has proceeded far enough on the vagina, we return to the broad ligaments in order to discover the ureters and to tie the uterine arteries; generally the anterior and posterior folds of the broad ligament, if there is no marked infiltration of the parametrium, are separated with ease like the pages of a book. The ureter, in which, by the way, it is useless to insert beforehand a catheter, follows, in its displacement backward the postero-internal fold of the broad ligament. To expose the field better, split the peritoneum externally toward the iliac fossa, as far as the cecum to the right and the iliac colon to the left, passing anteriorly to the utero-ovarian vessels.

If there are some enlarged glands found at this level, separate

them from the outside and remove them with the cellular tissue around them in drawing them toward the uterus.

In separating the parts of the lateral wall of the pelvis, the

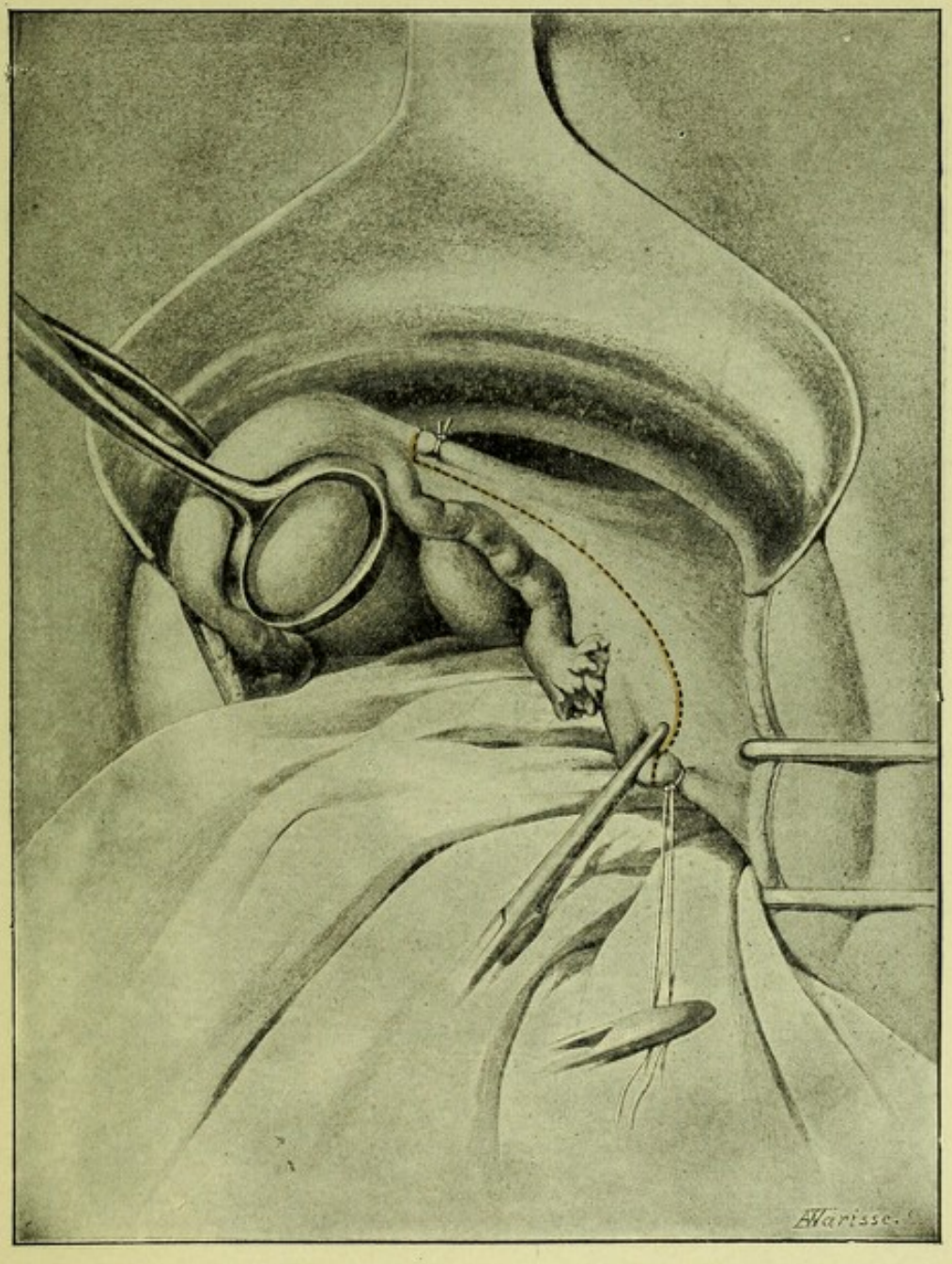


FIG. 320.—The uterus is drawn upward and to the left. The red dotted line shows the incision in the broad ligament. The utero-ovarian vessels and round ligament are tied.

large vessels, the lymphatic and the ureter are clearly exposed. The ureter follows, as we have already mentioned, the postero-internal fold of the broad ligament, which is held tense by the uterus being drawn to the opposite side. The uterine vessels

which are easy of access are then tied external to the point where they cross the ureter, without, however, going too far outside in such a way as to preserve the vesical arteries which spring

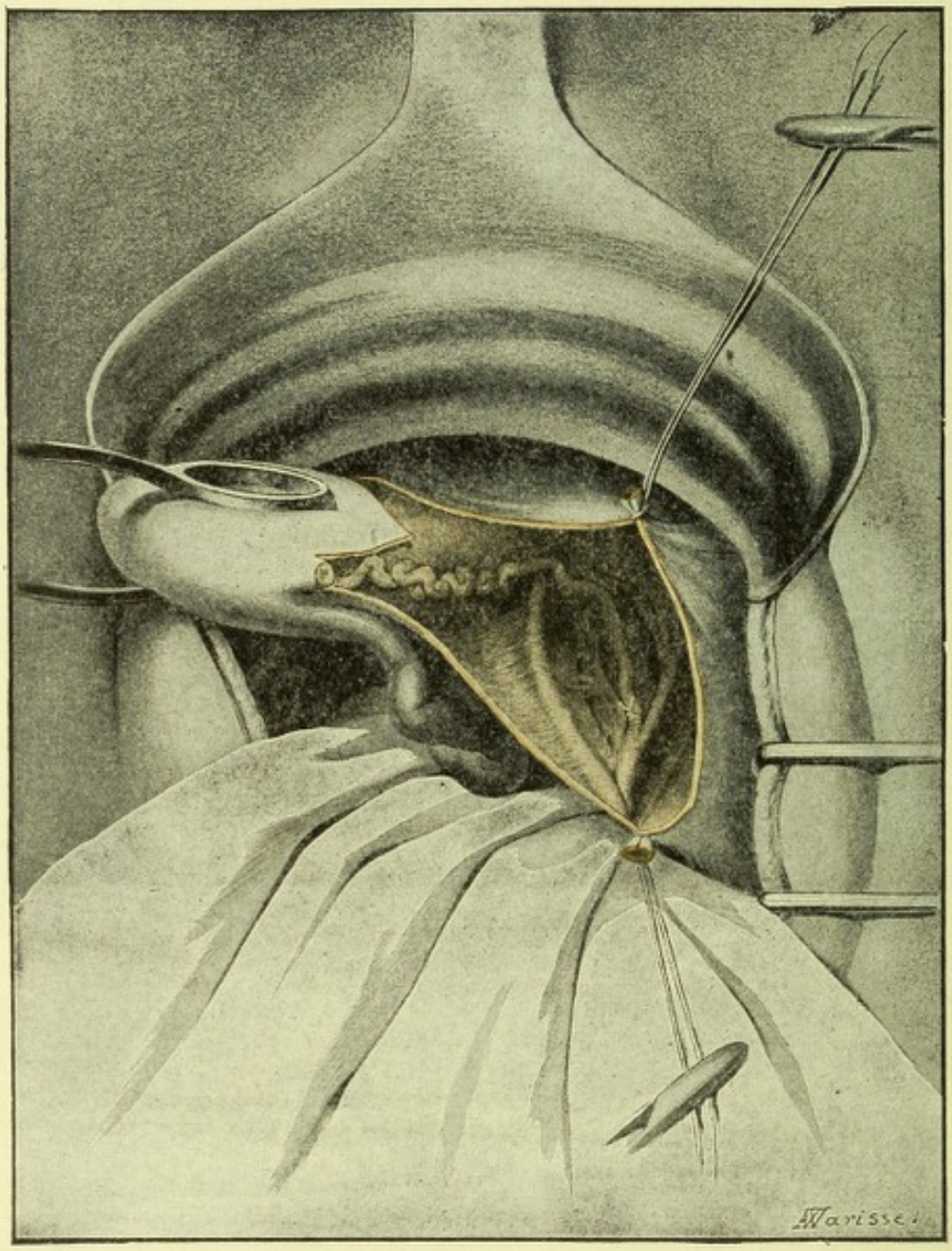


FIG. 321.—The broad ligament has been split. The ureter may be seen following the displaced postero-internal fold.

sometimes from the hypogastric by a common trunk with the uterine artery. Then place a pair of Kocher's forceps on this vascular pedicle nearly level with the uterus in such a manner as to prevent all hemorrhagic reflux by the veins, and then the

uterine veins and arteries are divided immediately inside the ligature.

Raising the pedicle of uterine vessels with the cellular tissue that surrounds them, it is carried toward the median line and

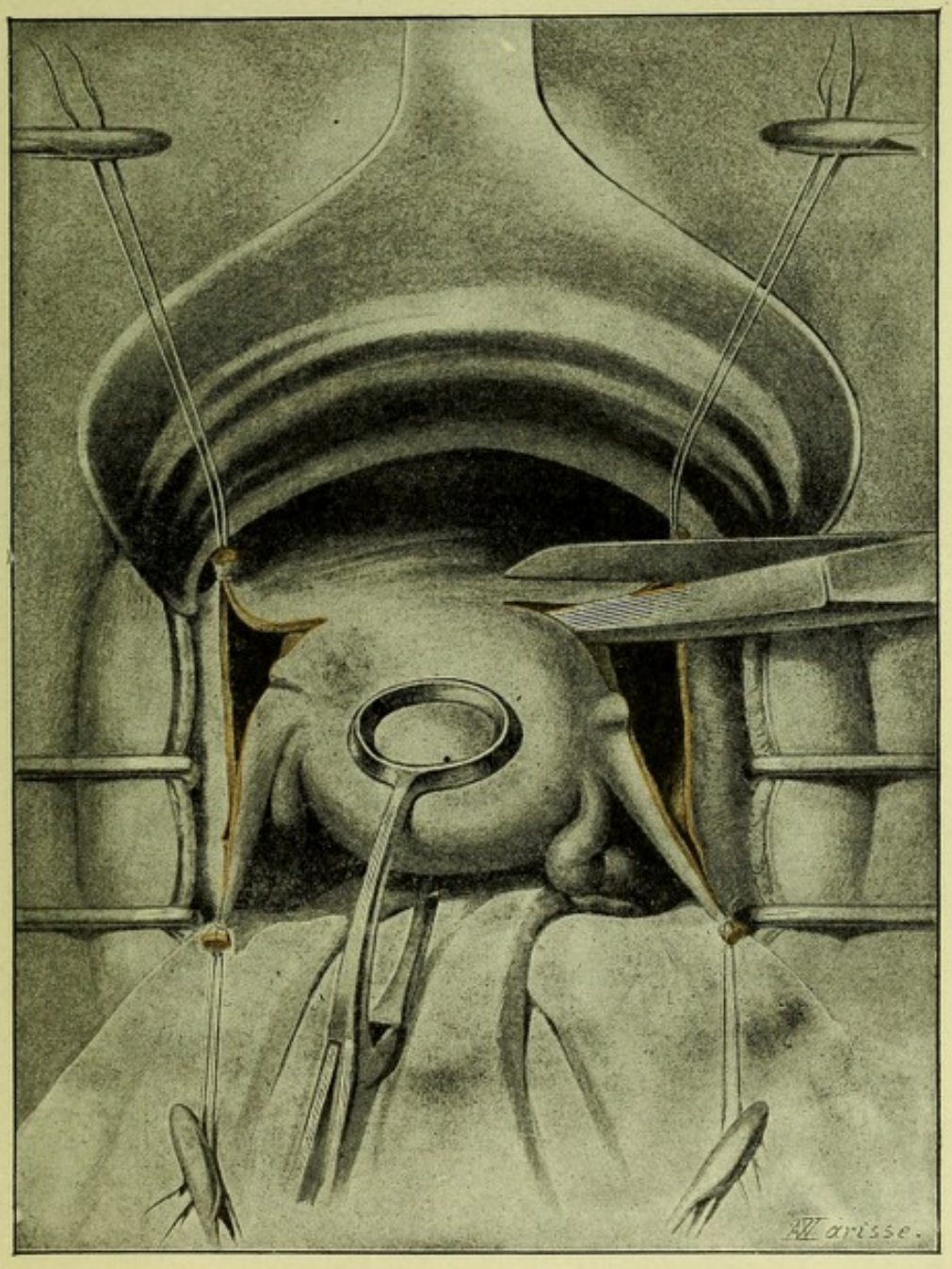


FIG. 322.—Division of the vesico-uterine peritoneum which is followed by separation and the pressing of the bladder forward.

the ureter is freed with a blunt instrument as far as the bladder, preserving, however, its conjunctival-vascular sheath and as much as possible of its posterior connections so as to best preserve its

nutrition. In the neighborhood of the bladder it is impossible, however, to isolate completely this canal (Fig. 323).

Drawing the uterus strongly forward and upward we cut through the utero-sacral ligaments, after tying them behind and

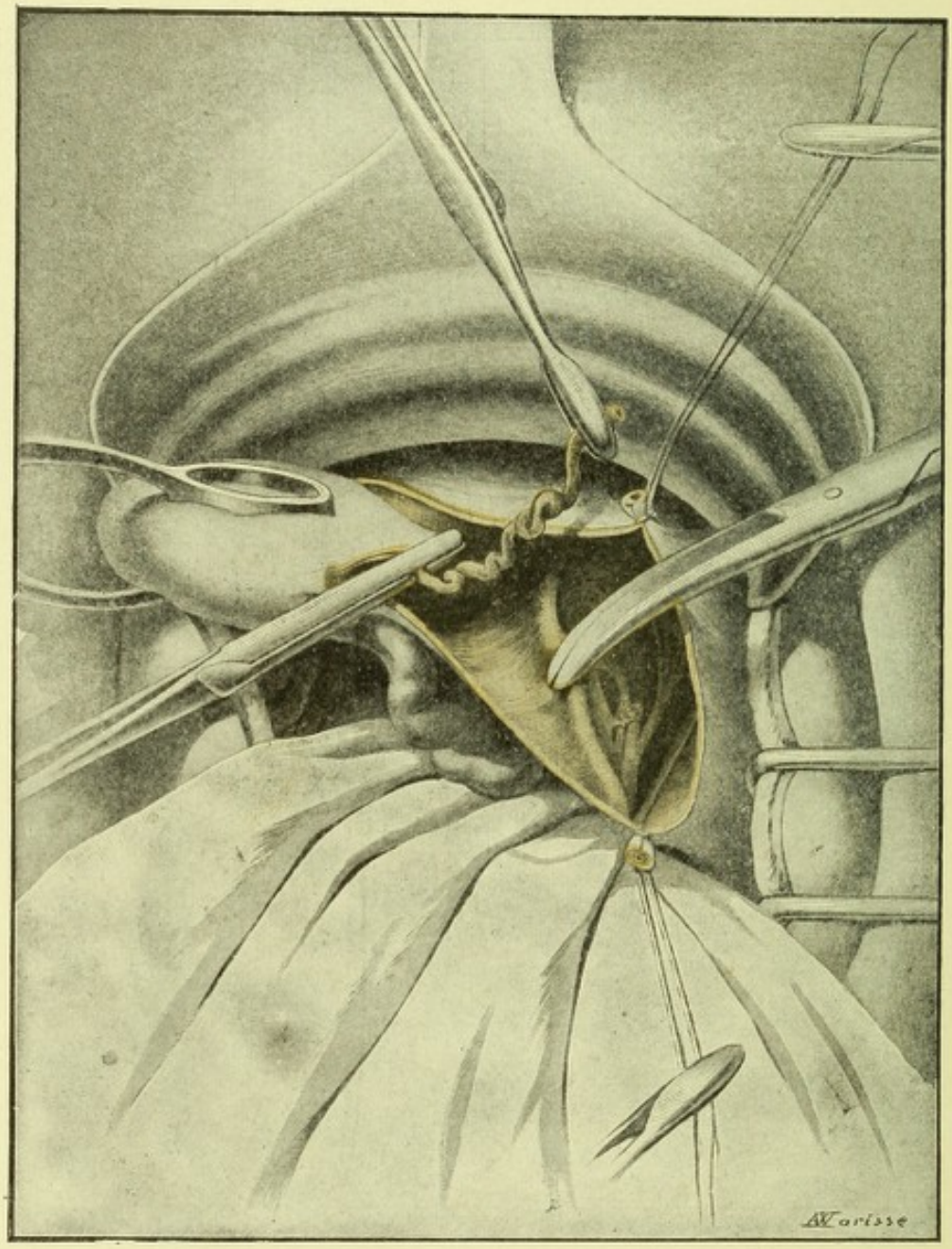


Fig. 323.—The uterine artery has been tied and divided. With the curved and blunt scissors the ureter is isolated and at the same time its own cellular sheath is preserved.

below the ureter, as near as possible to the wall of the excavation. As a rule we insert several successive stitches and as many ligatures in order to take up the arteries, veins and lymphatics that are contained in these ligaments.

As soon as they have been cut across above, using stitches already inserted, the recto-uterine peritoneum is made tense and is divided and it is separated by pressing back with a gauze compress the anterior face of the rectum. As one divides the

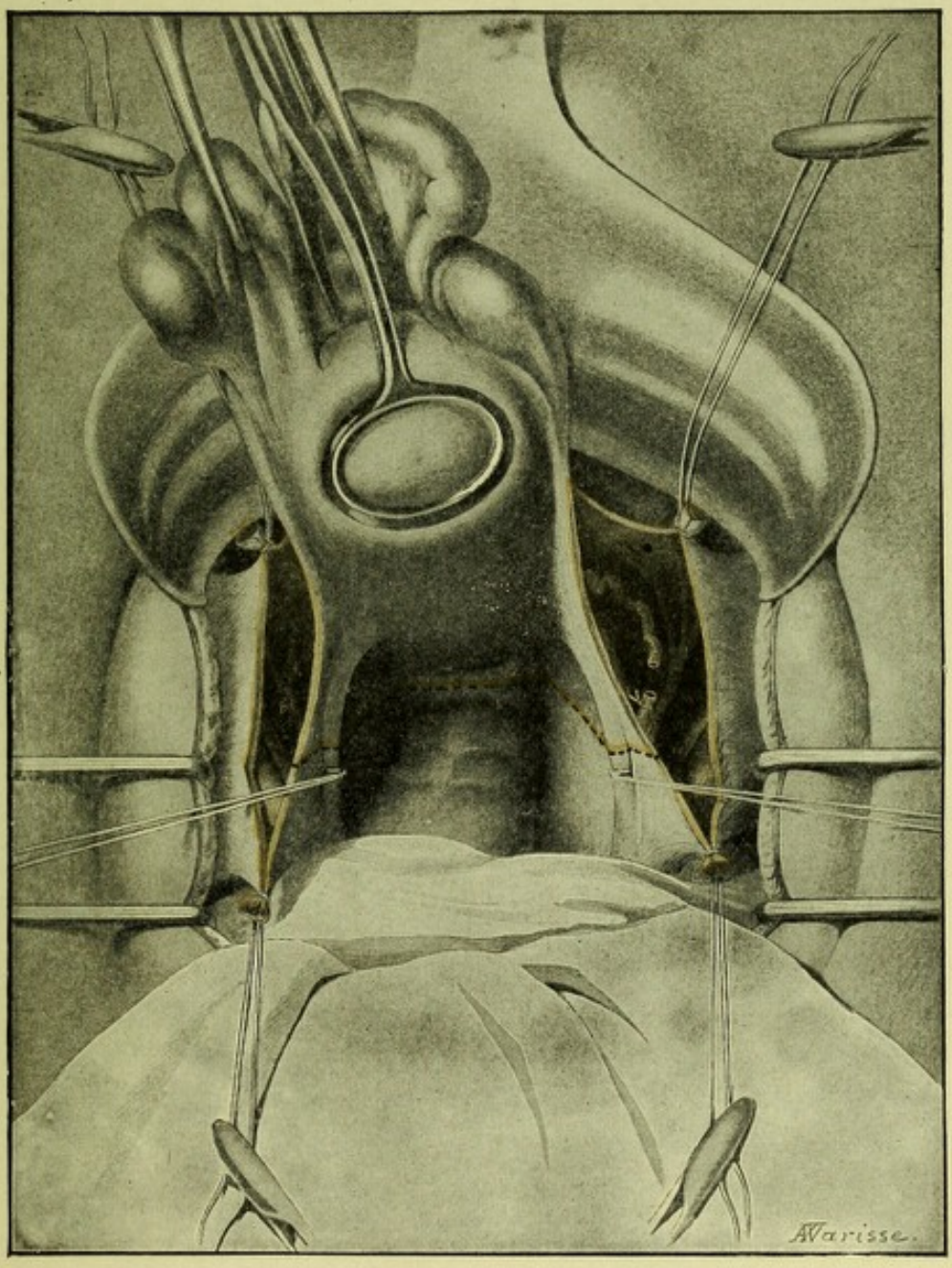


FIG. 324.—The uterus has been drawn upward and forward and the peritoneum posteriorly and the utero-sacral ligaments will next be divided along the red dotted line.

utero-sacral ligaments, it is observed that the uterus and vagina mount toward the wound, and this facilitates the cleavage between the vagina and rectum. Finally the superior one-third

or even the one-half of the vagina is seen to emerge from the excavation (Fig. 324).

Curved forceps may be placed on the last named (Fig. 316), following the practice of Wertheim, taking care that the two

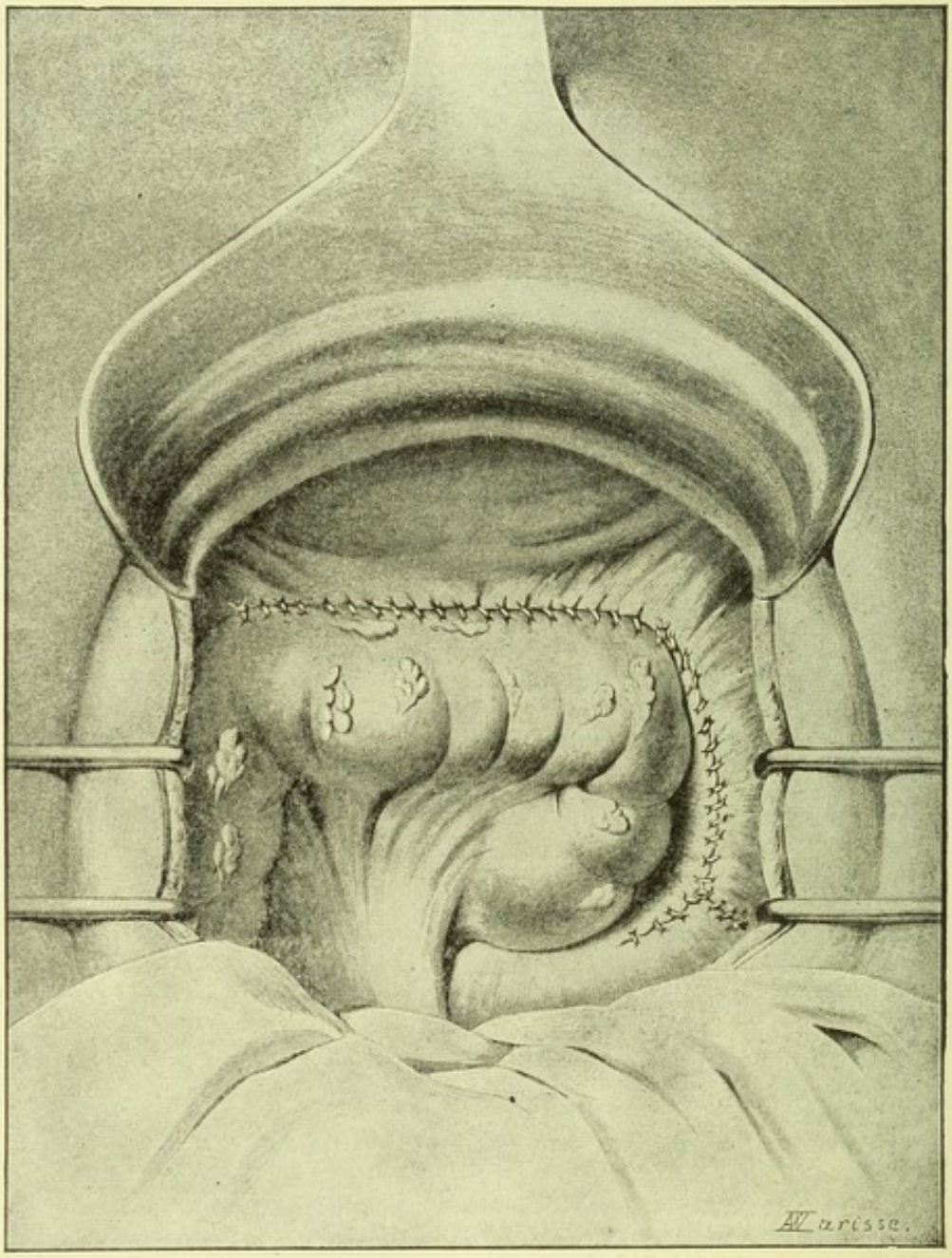


FIG. 325.—The operation is finished, the true pelvis is clothed with peritoneum, the pre-rectal peritoneum is sutured in the middle to the retro-vesical peritoneum.

forceps cross so as to close the whole width of the vagina; this is then divided with a scalpel below the forceps in such a manner as to remove the cancer in an isolated space. Bumm, whose practice we have often followed, does not use curved forceps,

which to a certain extent hamper the extensive removal of the parts.

He opens the vagina as far away as possible, commencing his incision on the least affected side of the tumor and then finally attacking the most affected tissues. He makes a sort of pedicle of the cancer in order to procure at its site the maximum of extirpation.

Pollosson recommends that once the uterus and vagina have been removed with the parametrium and enlarged glands included, to look for glands which may exist in the pelvic wall about the level of the bifurcation of the iliac vessels, extending along the length of the common iliac vessels and into the obturator fossa. They are recognized by sight and touch. Having located them, their dissection should be made with care, without crushing them, and endeavoring to remove with them the cellular tissue in which they are surrounded.

Having removed them, glance over the operative field, tying bleeding points and suture the peritoneum laterally as after an ordinary hysterectomy, uniting the retro-vesical to the pre-rectal peritoneum. As a preliminary to this, insert some iodoform gauze into the vagina (Fig. 325).

To produce drainage, Amann advises incising the posterior wall of the vagina with a thermocautery as far as the inferior limit of the lateral separation.

Modifications of the Operation.

Preliminary Freeing of the Vagina.—Some surgeons[1] have advised commencing the operation by a freeing of the vagina. After a circumferential incision of the vulvar orifice, they dissect up a mucous membranous cuff over an extent of about 4 cm., and they then close this cuff with a purse-string suture. The rawed surfaces, resulting from this separation, are brought together by sutures and the vulva is closed with the exception of a small space reserved for the introduction of a drain.

The perineal stage of the operation being finished, the surgeon goes on to the abdominal stage and removes the uterus "en bloc" with the vagina as a closed cavity.

We are enabled thus to avoid the contamination of the wound with the

[1] Imbert and Pieri. *Bull. de la Soc. de Chir.*, 1905, p. 925, *et Annales de gynécologie*, T. LXIII, p. 655; P. Duval, *Bull. de la Soc. de Chir.*, June, 1906, Report by J. L. Faure, p. 573.

septic products of cancer at the same time to avoid the cancerous grafts during the operation. In addition, the primary division of the vagina by leaving the uterus free to mount upward, permits us, according to J. L. Faure, to remove in the abdominal stage of the operation both the uterus and the peri-cervical region almost on a level with the abdominal wound, which greatly facilitates the delicate dissection of the ureter and parametrium.

Transverse Incision of the Wall and Partitioning of the Abdomen.—In cases of extensive cancers, Mackenrodt and Amann advise making a transverse incision in the abdominal wall and of cutting through the recti and thus give a full exposure of the parts. Having opened the abdomen they separate the peritoneum from the deep aspect of the anterior abdominal wall and suture it to the posterior aspect of the pouch of Douglas, thus shutting off the large peritoneal cavity and isolating by this septum the operative field.

In order to have a more enduring partition, Kronig takes the fascia transversalis with the peritoneum and thus avoids necrosis of the flap and the later bursting through of the intestine into the suppurative operative field, a state of affairs noted in some cases.

In this procedure make a curved incision which passes one finger breadth above the pubis and extends to within three finger breadths of the antero-superior spine of the ilium on both sides; cut through the skin and aponeurosis and then the recti about one-half a finger's breadth above the pubis. Tie the epigastric vessels which are to be seen on the external surface of the peritoneum.

Drawing the musculo-cutaneous flap upward, we put on tension, the peritoneum forming the floor of the wound and we can ascertain the limits of the bladder. We must not draw too strongly so as to separate the bladder from the symphysis; if its limits are not to be seen plainly, we may recognize them by palpation. We then open the peritoneum above the bladder.

Lower the head a little more at this stage so that the intestines fall toward the diaphragm and suture the peritoneal-transversalis fascia flap to the peritoneum of the posterior wall of the pelvis, beginning by a stitch which unites the utero-ovarian pedicles to the flap and then attaching this in front of the rectum. Laterally isolate the peritoneal cavity by suturing the anterior lip of the broad ligament, previously split, to the peritoneum of the lateral wall of the abdomen. We thus gain a splendid view of our field of operation, and at the same time an occlusion of the peritoneal cavity which prevents any irruption of the intestine. The uterus, upper part of the vagina, and the parametrium are extirpated in the usual manner.

Mackenrodt recommends detaching the parametrium from the pelvic wall in order to remove it in its entirety with juxta-rectal and pre sacral glands. We then see the glands along the length of the iliac and obturator vessels which are removed secondarily. Finally insert a vaginal wick. The uterus

must not be in contact with the gauze; to this end, bury it by suturing the lateral portion of the extremity of the vagina either to the bladder or to the vesical peritoneum. Close the operative field above by uniting the vesical peritoneum to the rectal peritoneum and carrying the sutures as far laterally as the utero-ovarian pedicles.

On the fifth day remove the gauze wick and make the patient sit up in order that the intraabdominal pressure may diminish as much as possible the existing cavity.

Complications.—The most important complication is either infection of the *peritoneum*, or of the *cellular tissue*, and according to Bumm[1] in cases of cancer, infection extends much further than the tumor, even to the extent that the tissues in the neighborhood of the uterus are almost constantly found to contain streptococci. In operating on these infected tissues, that infection of the peritoneum and the wound should take place is not to be wondered at. Patients who had fever before their operation are particularly dangerous subjects.

Curettage followed by thermo-cauterization is insufficient as the thermo-cautery hardly extends its action 1 cm. deep.

In order to have a more complete disinfection, Mackenrodt, after a curettage carried out on the day before the operation, tampons the vagina and the cancerous cavity with a long strip of gauze steeped in a solution of 10 per cent. commercial formol, which is then gently expressed. The vulva, the anus and internal surface of the thighs are greased with vaseline so as to avoid the irritating action of any drops which may overflow, and Bumm tries also antistreptococcal vaccination but, up to now, has obtained no results.

Fresh research appears essential to us in order to establish the cause of postoperative infections which are frequent enough after abdominal hysterectomy. We think, however, that it is useless to always call into question the preliminary infection of the cellular tissue of the broad ligaments and hold that the length of the operation and the contusive manipulations suffice to explain certain cases of cellulitis or peritonitis.

The same reasons cause *shock* to be dreaded particularly in fat patients with cardio-pulmonary affections.

[1] Bumm, Zur technik der abdominalen Extirpation de Karzinomatösen Uterus. *Zeitsch. für Geb. und Gyn.*, Stuttgart, 1905, T. LV, p. 173.

With the exception of infection and shock, the other most frequent complications are those connected with the urinary system.

Albuminuria with nephritis is not exceptional and may lead to a fatal termination.

Cystitis is very frequent and ought to be treated by catheterization and washing out of the bladder. *The traumatic lesions of the bladder* may be produced during its separation; *late necrosis* is rarer. It may be in connection with a too extensive denudation of the bladder and an insufficient re-clothing of it.

According to Mackenrodt the principal cause of this *late necrosis* is the participation of the bladder in the peri-cancerous inflammatory process. He advises in case of adhesions to freely resect the bladder, preserving the mucous membrane if possible and doing an immediate suture.

The lesions of the ureter[1] are much more important: this canal may be wounded during the operation; it has been wounded thus eight times in a primary series of 200 cases by Wertheim; three times in a second series equally of 200 cases. Secondary necrosis, followed by urinary fistula, coming on about the seventeenth or eighteenth day has been observed in 24 out of 400 cases or about 6 per cent. of cases.

It is the consequence of too extensive denudation of the ureter which floats like a telegraphic wire in the field or perhaps the ureter fixed by the cancer in the neighborhood of the cervix has been so injured that its wall has lost its resistance.

In order to avoid this, during the course of the operation, we should never lose the ureter from sight nor pinch it up, nor draw upon it, and finally not to isolate it from its surrounding cellular tissue.[2]

In traumatic lesions, it is necessary to do a uretero-cysto-

[1] Wilhelm Weibel, Das Verhalten der Ureteren nach der erweiterten abdominalen Operation der Uteruskarzinoms. *Zeitsch. f. Geb. und Gyn.*, Stuttgart, 1908,T. LXII, p. 184. Kronig resected the ureter voluntarily twelve times in order to increase the operability of the case, and once only for fear of second necrosis.

[2] Amann advises including the terminal part of the ureter in the thickness of the vesical wall by inserting some sutures which take up the most dependent portion of the posterior aspect of the bladder and unite it to the vesical peritoneum; he maintains the first portion applied to the lateral wall of the pelvis by uniting the pedicle of the uterine artery to the lateral peritoneum which is drawn a little downward. The ureter is thus maintained, so to speak, "on horseback," on a fork formed by the uterine artery and the hypogastric artery which lifts it up and applies it to the lateral wall of the pelvis (Amann, Ureterdeckung und Drainage bei ausgedehnter Beckenausraümung wegen Uterus karzinom. *Zeitsch. für Geb. und Gyn.*, Stuttgart, 1907, T. LXI, p. 2).

neostomy immediately; on the contrary, however, in fistulas following on necrosis of the canal, there is no need to be in hurry to do an intervention. These fistulas heal spontaneously in 70 per cent. of cases, from two weeks to four months after the operation and with conservation of the permeability of the ureter. We should not hasten to a too early nephrectomy until there are marked signs of ascending infection; the uretero-cysto-neostomy should be done in persistent fistula, when the corresponding kidney is healthy or even when diseased unless a disease of the opposite kidney contraindicates nephrectomy.

Results.—Abdominal hysterectomy with resection of the vagina and parametrium should be considered from a triple point of view: 1. Operability; 2. Immediate results; 3. Remote results.

1. *Operability.*—The abdominal operation, such as has been done for the last ten years, has enabled us to extend the domain of radical operations.

Pollosson managed to operate 56 per cent. of cancers that came to hospital; Wertheim, 60 per cent. to 65 per cent.; Doderlein, 69 per cent.; Bumm, 80 per cent.; Kronig, 87 per cent.

That is to say, a great number of surgeons do not hesitate to have recourse to a radical operation in those cases which would certainly never have been done before.

2. *Immediate Results.*—In spite of the great extension of the operation, the mortality is hardly more elevated than it was formerly in the days of vaginal hysterectomy. Leaving on one side *cancers of the body*, the mortality from which is almost nil, and considering only the *cancers of the cervix* we arrive at the following results.

Mackenrodt[1] in 69 cases had 16 deaths=20 per cent. In reality, the mortality is much less, because at the commencement Mackenrodt reserved the abdominal operation to cases which were unable to be extirpated by the vagina. Since he operated all cancers by the abdomen his mortality fell to about 11 per cent.

Doderlein,[2] 47 cases, 7 deaths = 14.8 per cent.

[1] Mackenrodt, Ergebnisse der abdominalen Radikaloperation der Gebärmutterscheidenkrebses mittels Laparotomia hypogastrica. *Zeitschr. für Geb. und Gyn.*, Stuttgart, T. LIV, p. 514.

[2] Döderlein and Krönig, Operative Gynäkologie, Second Edition, Leipzig, 1907.

Bumm,[1] 82 cases, 17 deaths = 22 per cent.
Pollosson,[2] 133 cases, 17 deaths = 12 per cent.
Scheib,[3] 149 cases, 30 deaths = 20.1 per cent.
Franque,[4] 51 cases, 8 deaths = 15.7 per cent.
Schindler,[5] 117 cases, 16 deaths = 13.67 per cent.
Wertheim,[6] first series of 200 cases, 49 deaths = 24.5 per cent.
Later series of 200 cases, 20 deaths = 10 per cent.

As the second series of Wertheim's work appears we see how the mortality tends to diminish. It is the same with Pollosson's cases; while the first series gave a mortality of 18.5 per cent. the third series gave only 8.5 per cent. and the 36 last patients operated are all cured.

This amelioration in the immediate results is general. If only recent cases were cited we should, as Scheib says, find that Wertheim has a mortality of only 7.5 per cent. and Doderlein, 5 per cent., figures which agree with those of Koblank, who had 5.4 per cent. of deaths according to his latest report.

In fact there is a diminution in the mortality in the abdominal operation identical with that which occurred in the vaginal operation when the mortality fell from 20 per cent. to 4–8 per cent.

3. *Remote Results.*—For *cancers of the body of the uterus* remote results are excellent; in 13 cases of cancers operated by Doderlein, two died of intercurrent diseases, two died of metastasis in existence before the operation, eight are without any recurrence after more than three and one-half years have fled. According to Scheib 75 per cent. of cancers of the body of the uterus are definitely cured.[7]

For *cancers of the cervix* the remote results are very superior to those formerly the case in vaginal hysterectomy; above all when it is considered that cancers regarded as inoperable at the time

[1] Bumm, Zur Technik der abdominalen Exstirpation der karzinomatösen Uterus. *Zeitschr. für Geb. und Gyn.*, Stuttgart, 1904, T. LV, p. 173.
[2] Pollosson, Hysterectomy with Hollowing Out of the Pelvis. *Lyon chirurg.*, 1909, T. I, p. 333.
[3] Scheib, Klin. und Anat. Beitr. z. operativ. Behandl. des Uteruscarcinom. *Arch. für Gyn.*, Berlin, 1909, T. LXXXVII, pp. 1–233.
[4] Franque (Otto v.), Zur Statistik der operativen Behand. bei Uteruskarzinoms. *Mon. für Geb. und Gyn.*, Berlin, 1909, T. XXX, p. 29.
[5] Schindler, Statist. und anat. Ergebnisse bei der Freund-Wertheimtchen Radikaloperation der Uteruskarzinom. *Monat. für Geb. und Gyn.*, Berlin, 1906, p. 78.
[6] Wertheim, *Soc. internat. de chir.*, Bruxelles, 1908, T. I, p. 541.
[7] Scheib, Klinische und anatomische, Beitrage zur operativen Behandlung des Uteruskarzinoms. *Archiv für Gyn.*, Berlin, 1909, T. LXXXVII, pp. 1 and 233.

when only the vaginal route was practised, are removed by the abdomen. Bumm in 46 cases notes 17 recurrences, 6 patients were lost to view and 23, of whom 20 had been done over two years before, gave a result of 57 per cent.

Wertheim in 151 cases after operation had four deaths from intercurrent disease, 59 recurrences and 88 cures found after five years' interval, giving 59 per cent. of lasting cure.

Mackenrodt in 144 cases found 74 per cent. of the patients living after a variable period of eighteen months to six and one-half years after operation.

Scheib in the clinic at Prague finds 62.5 per cent. of his cases living after two years, after three years 58.8, after five years 28.5, and after six years 27.2.

Pollosson, in 1909, found 35 per cent. of cases operated before June, 1905, quite well; 61 per cent. were operated in 1905 and 1906; 69 per cent. were operated in 1907.

It is still difficult to come to a definite conclusion with regard to the radical cure of uterine cancers, as operations are not always made in identical conditions. It appears according to results published that certain gynecologists, Bumm, Mackenrodt and Kronig for example, intervene in cancers with extensive invasions and that they do a very extensive extirpation, searching for glands and carrying out their excavation as far as the levator and this explains the considerably higher early mortality in their results. Others, and particularly French surgeons, are not favorably disposed to the radical operation in cases of cancer which have manifestly spread beyond the uterus. These differences in the extension granted to the operability of cases and in the extent of the incisions explains the differences found in the statistics.

However, it is established to-day that the abdominal operation is superior to vaginal hysterectomy from the point of view of early and remote results.

Hysterectomy for Prolapse.

Abdominal hysterectomy is only exceptionally practised in cases of uterine prolapse.

Its technic presents no peculiarity with the exception of

fixing firmly the stump of the cervix or the dome of the vagina either to the aponeurosis or to the muscles[1] or to the pedicles of the broad ligaments (Ligamentary Trachelopexy, Jacobs).

The technic of abdominal hysterectomy in puerperal infection has no peculiarity. Here total hysterectomy is absolutely indicated. The minute protection of the peritoneal cavity will be the principal care of the operator on account of the extreme virulence of the uterine contents. It will be found of advantage as in hysterectomy for epithelioma of the uterine cavity to close the cervix by some sutures before commencing the excision of the uterus.

Abdominal hysterectomy for puerperal infection gives a high mortality, 6 deaths in 12 cases (Mouchotte).[2]

Hysterectomy in Uterine Ruptures.

Hysterectomy is indicated in complete ruptures of the uterus. In 23 non-operated ruptures Pinard observed 20 deaths, in nine operated cases, five deaths only; it may also be added that in two of these last cases the operation was done "in extremis."[3]

The operative technic should, we think, vary according to the seat of rupture either in front or behind the vascular uterine pedicle.

If the rupture is situated behind the uterine pedicle, hysterectomy is done as usual, that is, the uterus is divided at the level of the most inferior part of the tear.

If the rupture lies in front of the uterine pedicle, as is generally the case in extensive lesions of the cellular tissue, a rather irregular supravaginal hysterectomy is done, dividing, as in the preceding case, the uterus at the level of the inferior part of the rupture, but terminating by fixing the sutured uterine pedicle to the deep surface of the abdominal wall, marsupializing and draining the seat of contusion of the broad ligament. If there are symptoms

[1] A. Pollosson, Total Abdominal Hysterectomy with Colpopexy in the Treatment of Certain Prolapses. *Bull. de la Soc. de chir. de Lyon*, April, 1906, T. IX, p. 137.

[2] Mouchotte, Documents to Help toward the Study of Hysterectomy in Puerperal Infection Postabortion. *Th. de Paris*, 1902–1903, p. 412.

[3] Sauvage, Pathological Anatomy and Treatment of Uterine Ruptures During Labor. *Th. de Paris*, G. Steinheil, 1901—1902, No. 305. The Statistics of the Munich Clinic show the superiority of intervention. All non-operated cases died, while the operation saved 40 per cent. (F. Weber, Die kompletten Uterusrupturen der letzten 50 Jahre an den Münchner Frauenklinik, *Beitr. z. Geb. und Gyn.*, 1909, T. XV, p. 53.)

of infection or if the tear extends to the vagina it is of advantage, as Dragiescu and Cristeanu advise, to do a total hysterectomy with vaginal drainage.[1]

[1] Dragiescu and Cristeanu, On the Treatment of Ruptures of the Uterus. *Ann. de Gyn.*, Paris, Feb., 1902.

CHAPTER IV.

OPERATIONS ON THE TUBES AND OVARIES.

Summary.—Removal of the adnexa (healthy, inflamed, neoplasmic); conservative operations on the tube and ovary.

1. Removal of the Adnexa.

The technic of the operation varies according as we have to deal with healthy adnexa, diseased adnexa either from inflammatory or neoplasmic lesions.

I. Healthy Adnexa.

The removal of healthy adnexa is one of the simplest of operations.

Operation.—A small vertical incision or better still a crucial incision of the wall will suffice.

The abdomen having been opened, the intestine pressed back, thanks to the Trendelenburg position, and protected by compresses, one proceeds to look for the tube and ovary. The hand being introduced behind the broad ligament finds the adnexa with ease and draws them up to the wound. Then divide the utero-ovarian pedicle at the level of the infundibulo-pelvic ligament. Cut across the tube right up against the uterus without a preliminary ligature; having done this, put a ligature around the uterine artery at the level of the angle of the uterus and cut it external to the ligature. Then detach the adnexa from the superior border of the broad ligament without the least bleeding.

The important point is to remove the ovary *in toto*, cutting through the ligament at some distance in such a manner as to avoid a frequently committed fault which is to leave a sort of tail on the organ at this level.

Hemostasis is very easily realized by isolated ligature of the vessels; nothing remains but to unite the two lips of the broad

ligament, burying the ligatures of the arterial pedicles and the uterine insertion of the tube.

This method of removal is as rapid as the too lengthy classical procedure which consists in taking up with two large interlocked ligatures all the upper part of the broad ligament. It has

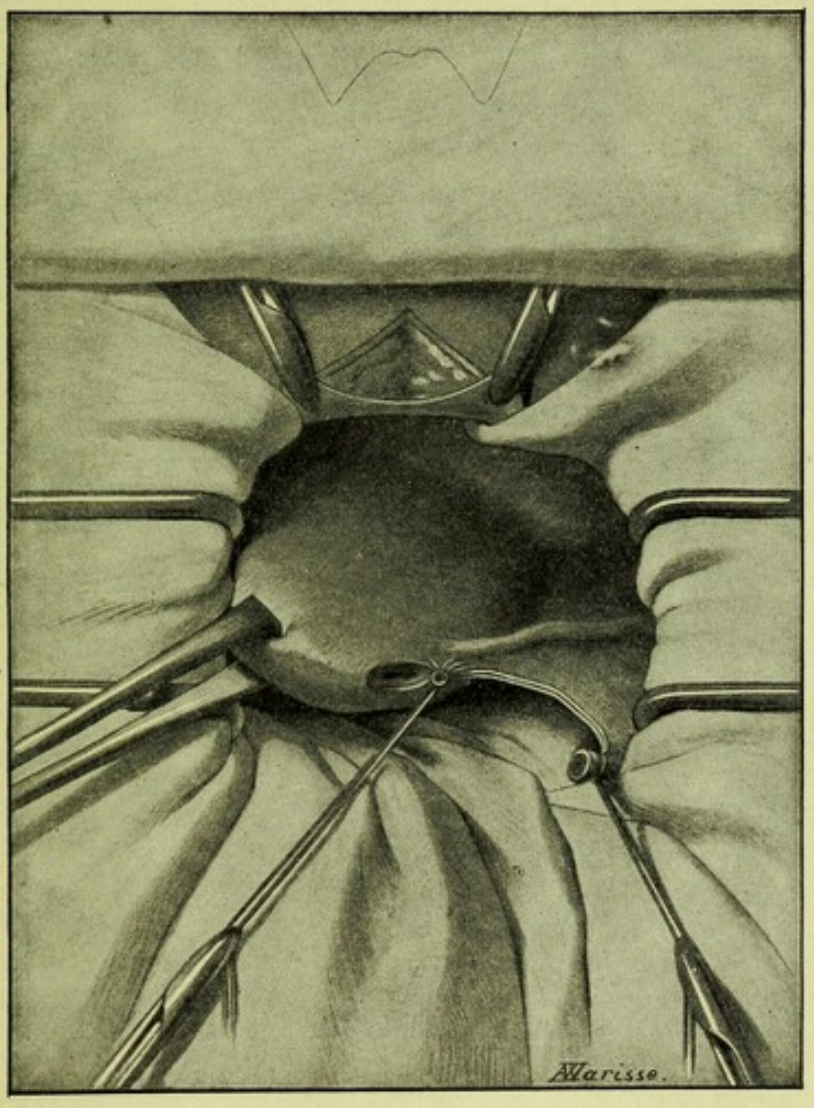


Fig. 326.—Unilateral removal of the adnexa. Two ligatures are applied, one close against the uterus on the termination of the uterine artery, the other external to the utero-ovarian vessels.

the advantage of filling the three desiderata that we have already on several occasions formulated, doing away with large pedicles, isolated ligature of vessels, and reconstitution of the pelvic peritoneum.

Indications.—The removal of healthy adnexa has been advised in a certain number of cases. On the advice of Bailey,

it was done formerly for *nervous troubles* (hysteria, insanity, epilepsy, mania, melancholy, nymphomania, etc.). It gave no satisfactory result. The only case where it was authorized to be done, and still is, is that condition where nervous troubles are in relation to menstruation and where after failure of medicinal therapeutics, they are sufficient to make life miserable.

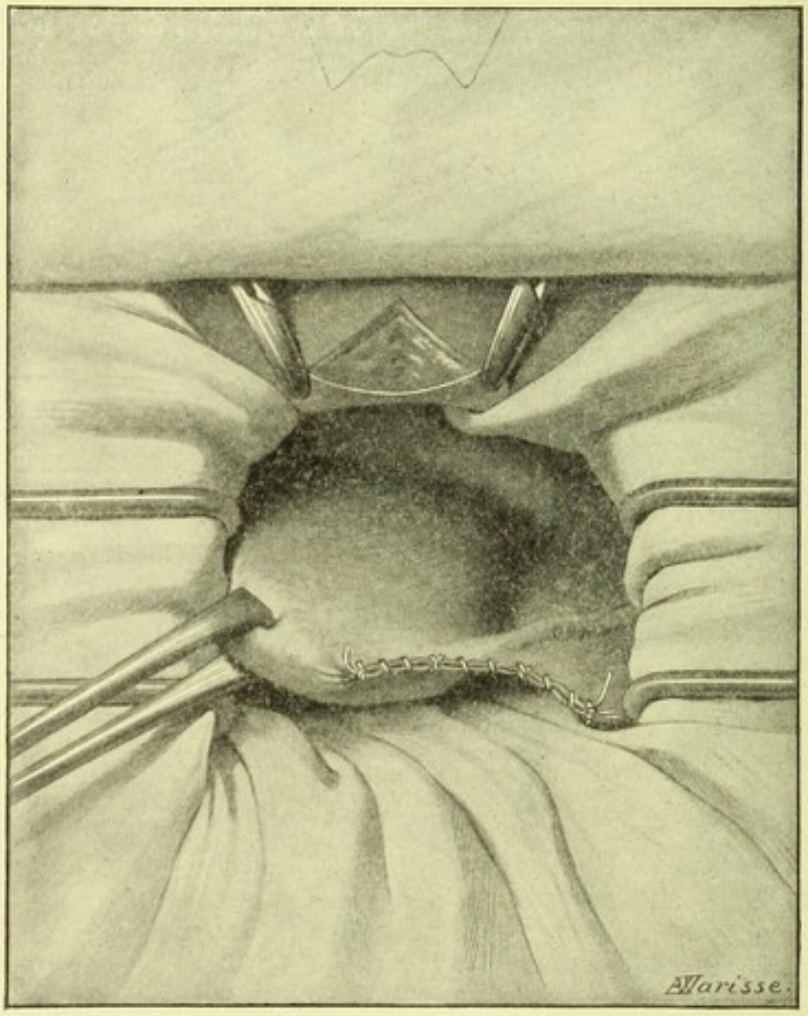


Fig. 327.—Unilateral removal of the adnexa. A catgut continuous suture unites the layers of the broad ligament, burying the vascular ligatures.

Hegar proposed it as a *palliative treatment of uterine fibroids.* To-day with a simplified technic of hysterectomy, it has been abandoned for operations which attack the fibroids directly.

Oophorectomy is still practised in *dysmenorrhea* called ovarian and attributed to a difficult ovulation. The examination of ovaries removed reveals no lesion; it appears that one is confronted by a simple neurosis and which hardly ever calls for operation.

Prolapse of ovaries, which frequently accompanies radiating pains, and pains in coitus and defecation, etc., has been regarded as an indication for oophorectomy; to-day we prefer ovariopexy.

Fehling advised the removal of the ovaries in osteomalacia, Beatson in *inoperable cancer of the breast.* It is certain that amelioration was obtained in osteomalacia, but in inoperable tumors of the breast the results announced had been contested.

Finally, some accoucheurs have practised it when a narrowing of the pelvis necessitated a Cesarean section in order to prevent another pregnancy. It is more logical to remove only the tubes or to simply remove a segment between the two ligatures. The patient cannot conceive again while she preserves the internal secretion of the ovary and a normal menstruation.

II. Inflammations of the Adnexa.

Operation.—When the adnexa show inflammatory lesions the course of the operation proceeds as in that for healthy adnexa. But in the former we have superadded a special condition, which comprises the most delicate part of the operation—the freeing of the adhesions. In studying abdominal hysterectomy we have insisted on the different characters of the adhesions and on the manner of detaching them and the treatment of the complications following on their liberation. We will not return to this subject.

Indications.—The bilateral removal of the adnexa has been considered for some time as the treatment of choice in inflammation of the adnexa. To-day it is the rule to always do a hysterectomy at the same time. To preserve the uterus when the adnexa from both sides have been removed is, to us, ridiculous.

If one wishes to do a conservative operation it is above all the ovary that one should keep. The uterus, after removal of the adnexa, has no purpose. Generally inflamed, it constitutes a useless heavy organ, which is the origin of pain and various discharges. Its removal, far from complicating the operation, simplifies the operative procedures by doing away with the cul-de-sac of the pelvis, in making its cavity smooth and in assuming a better drainage, where this is wanted.

The limited removal of the adnexa has only one indication, that of irreparable lesions on one side and a possible conservatism of the uterus and adnexa on the other side.

III. Neoplasms of the Adnexa.

The neoplasms of the adnexa are so various that it is impossible to describe an operative technic for their removal which even in its broadest lines would be applicable to all cases.

Operation.—From the point of view of operation, neoplasms may be divided into two groups: 1. Small, solid, or fluid neoplasms; 2. large cysts (ovarian or parovarian).

1. Extirpation *of small neoplasms* (papillomas, sarcomas, carcinomas of the tubes, solid tumors of the ovary, etc.) resembles greatly the operation employed for removal of healthy or inflamed adnexa. The abdominal incision should be long enough to permit of an easy execution of intraabdominal manipulations.

Soft tumors and papillomas bleed when they are drawn externally. It is useless to arrest the hemorrhage in their friable tissues and it is necessary to search for their vascular trunks as rapidly as possible along the length of the pelvis and near the uterus and then to clamp and tie them. When the hemorrhage is menacing we are forced to remove as soon as possible the mass of the tumor. Stop the hemorrhage and immediately do a minute toilet of the pelvis in order to find and remove, if necessary, the abdominal pieces of the neoplasm.

As in inflammatory lesions the concomitant removal of the uterus is necessary in bilateral lesions.

2. The removal of large *cystic tumors* presents a certain number of peculiarities.

In the usual form of the ovarian cyst, the question of preliminary puncture presents itself. It is not so much a question of puncture as means of diagnosis, and justly an exploratory celiotomy is to be preferred as being less blind and less dangerous. It is no longer a question of puncture as a therapeutic agent; it is only done in patients whose condition is almost despaired of or where too advanced age contraindicates any serious intervention. We allude to the enormous ovarian cysts, with respiratory trouble, edematous infiltration of the wall, cases

in which the abdominal tension is such that when the tumor is removed, more or less grave troubles are apt to supervene.

In these cases, preliminary puncture may render service. If carried out two or three days before the operation, it presents no inconvenience and prepares the patient to withstand the removal of the enormous mass which she is accustomed to.

The operation is conducted in the following manner: The table on which the patient lies is almost horizontal and the first stages of the operation are done in this position. Whatever be the volume of the cyst, commence by making an incision of medium length, and the evacuation of the intracystic fluid permits most often of reducing the tumor by a large proportion. The peritoneum should be opened with caution in order to avoid the wounding of the venous sinuses which twist about in the substance of the cystic wall and, above all, do not prematurely open the pocket. This opening would have as a consequence the effusion of the cystic contents into the abdominal cavity; and although the contents are generally aseptic, its effusion into the peritoneum would help the conflagration of infectious complications; moreover, it helps to graft epithelial elements and the development of secondary tumors.[1] It should thus be avoided.

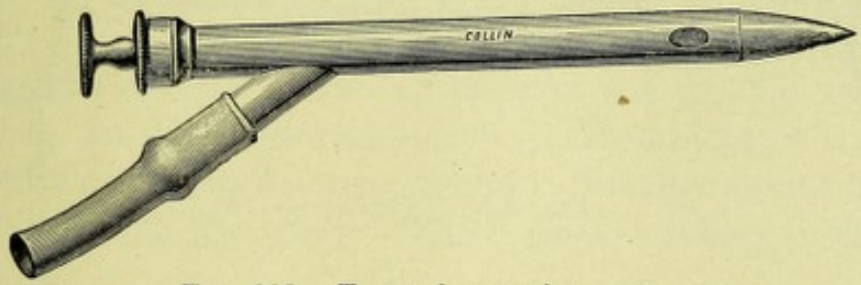


FIG. 328.—Trocar for ovarian cysts.

The abdomen having been opened, the operative field is limited with aseptic compresses, which are insinuated between the cyst and the wall and which completely tampon the peritoneal cavity and cover over the lips of the abdominal incision. Puncture the cystic mass at a point where there are no large vessels and with a stout trocar, to which is attached a rubber tube and an aspirator, or else the extremity of the tube rests in a

[1] Hartmann and Lecène, Neoplasmic Grafts. *Ann. de Gyn.*, Paris, 1907, p. 65.

vessel alongside the operator. As soon as the cyst commences to empty, the assistant increases the pressure slowly on the abdominal wall with his hands.

Continue until the wall follows the retreat of the cystic pouch. When this latter becomes folded, the operator seizes it with forceps so as to draw it gently externally. Do not draw roughly on the forceps as the cystic wall often is very friable. If the cyst is unilocular, as is the case in parovarian cysts, the sac empties itself completely and may with great facility be drawn outside through a very little incision in the wall. If there are several loculi, empty the largest by perforating them with the trocar point which is left in the primary puncture point, and consecutively perforates the walls of the various loculi.

Once the volume of the cyst is sufficiently reduced, draw out the trocar and obliterate the orifice of the fracture with the aid of a special forceps called cyst forceps and draw the cyst with the semi-solid portion it contains out of the abdomen. At this stage elevate the pelvis, isolating the intestine carefully with compresses and then we treat the pedicle.

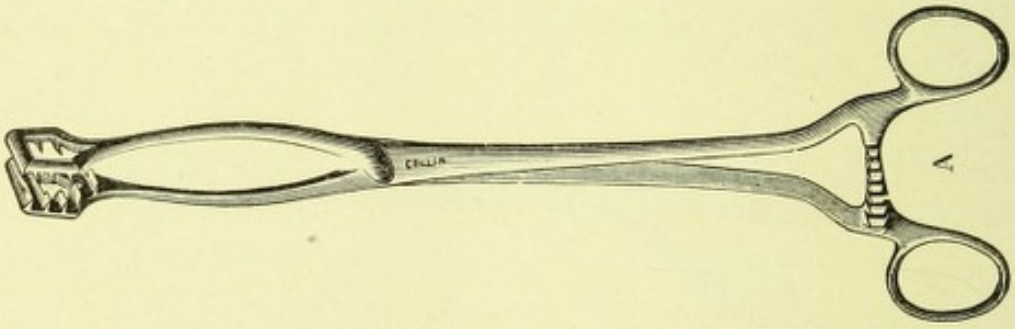


Fig. 329.—Cyst forceps.

The length and thickness of the pedicle vary greatly. Formed by the superior part of the stretched broad ligament, it contains the uterine and utero-ovarian vessels which are apt to be mingled in a single group as in the removal of healthy or inflamed adnexa, one is forced to tie the internal vascular pedicle and the external vascular pedicle separately without interlocking the two ligatures. The central part intermediate between the two ligatures does not generally bleed, and if a vessel has escaped the two principal ligatures, nothing is simpler than to enclose it in an extra ligature; conclude by uniting with a continuous

suture the two folds of the broad ligament at the level of the space intermediate between the two vascular pedicles, which one is careful to bury under the line of sutures.

Operative Complications.—The operation presents sometimes a certain number of difficulties.

Adhesions.—Extensive parietal adhesions may lead to two complications when the incision is made in the wall, depending upon where the peritoneal is incised; one may go too far and incise the cyst without knowing it or on the contrary taking the modified peritoneum for the external wall of the cyst one separates it from the other layers of the wall, in the idea that pericystic adhesions are being liberated.

There is a very simple means of avoiding these two operative faults; it is, when in doubt to increase upward the abdominal incision; in prolonging it sufficiently, we arrive eventually at a point where the peritoneum is free. It is easy then to find one's whereabouts and to continue the operation.

There is an advantage in liberating the parietal adhesions before puncturing the cyst.

The stretched tumor gives to the operator's hand a resistant base on which it glides, insinuating itself between the tumor and the wall, thus facilitating the detaching of the adhesions.

The *visceral adhesions* are treated as usual; we will not return to this point.

Included Cysts.—Inclusive cysts may be in the ovary or parovarium. In the former inclusion is incomplete; it is, on the contrary, always complete in certain intraligamentous cysts whose origin is still discussed. The course to follow is the same in both cases.

In presence of an included ovarian cyst, commence by looking for the two vascular pedicles which are no longer united in a single cord, as in the usual case, where the cyst by its development, has stretched into a pedicle the superior portion of the broad ligament. These vascular pedicles do not always appear immediately above all the internal pedicle, whose disassociated elements twist over the external surface of the cyst; in these cases, one is obliged to successively tie the isolated vessels. The ligatures having been inserted, the two pedicles

are divided internal and external to the cystic mass; they are united by a circular incision which circumscribes a large peritoneal collarette around the portion of the included cyst. Apply forcipressure forceps to this collarette as landmarks and then commence the separation of the cyst. We must take care in this freeing of the intraligamentous portion of the cyst not to lose it so as to avoid wounding of the ureter, uterine vessels or even the large intestine.[1]

In the cystic productions of the broad ligament the enucleation of one or many loculi is done with the same principles; follow the cyst wall without being separated from it more than a millimeter and that without preliminary ligature of the vascular pedicles. It happens often that one removes *in toto* the cystic pouch without having to use a single ligature.

When the cyst is removed, which is no other than the broad ligament unfolded, secure the bleeding points with care in this cavity, which is then isolated from the general peritoneal cavity by suturing the two serous layers together. If oozing still persists in this cavity, marsupialize it to the wall and drain it.

Accompanying Hysterectomy.—In the case of bilateral cysts, it is indicated to remove the uterus with the adnexa; we may include hysterectomy also in the course of the extirpation of an included cyst. In cases of bilateral included cysts, Olshausen and Fritsch advise the systematic preliminary removal of the uterus; the extirpation is thus simplified.

2. Conservative Operations.

In the presence of inflammatory lesions of the adnexa, we may do a certain number of conservative operations[2] which may be carried out on the tubes or ovaries.

Conservative Operations on the Tubes.—The simplest of these interventions consists in the *freeing of adhesions.* If one finds a tube whose size and consistence are not at all changed, and whose infundibulum still remains permeable, but which has

[1] See Treatment of Tumors.

[2] Montana, Contribution to the Study of Remote Results of Conservative Operations on the Adnexa. *Th. de Paris,* 1898–1899, No. 620. F. N. Boyd, Conservative Surgery of the Tubes and Ovaries, *Journal of Obst. and Gyn. of the British Empire,* London, 1903, T. III, p. 241 (Bib.).

prolapsed into the pouch of Douglas and is more or less adherent to the pelvic peritoneum, it is sufficient to break down the adhesions and return the organ into its normal situation. The

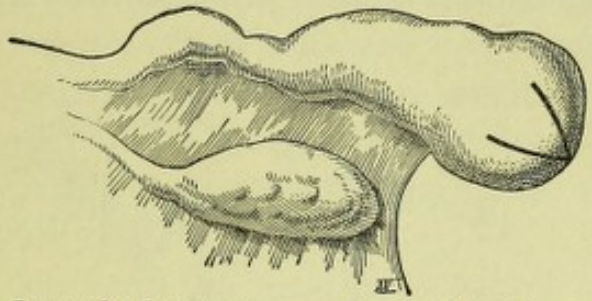


FIG. 330.—Lateral salpingostomy. Trace of incision on the tube.

tube will require to be fixed with one or two sutures in its new position and is attached to a fixed portion of the peritoneum, as for example the infundibulo-pelvic ligament. In other words,

FIG. 331.—The flap is turned back, serous surface fixed to serous surface.

the freeing of the tube is followed by a *salpingopexy*. After partial resection of the ovary, the fimbriæ ovaricæ have sometimes been fixed to the pedicle of the ovary, in order to prevent

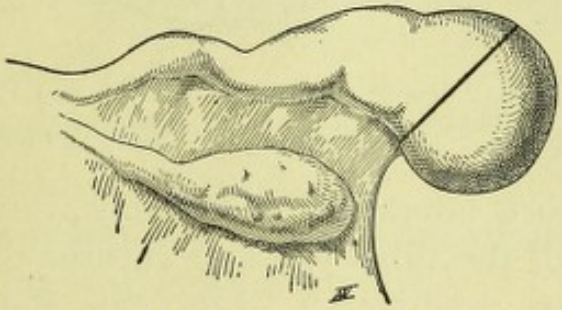


FIG. 332.—Terminal salpingostomy. Trace of the excision.

separation of the two organs by formation of later adhesions (Fig. 334, Pozzi).

Polk has endeavored to preserve tubes with catarrhal lesions of the mucous membrane by *expression*. After having isolated

the diseased tube with care by sterilized compresses, it is gently expressed from its insertion outward so that its contents are expelled. The mucous membrane may then be cleansed with an appropriate solution which is injected into the pavillon with a syringe.

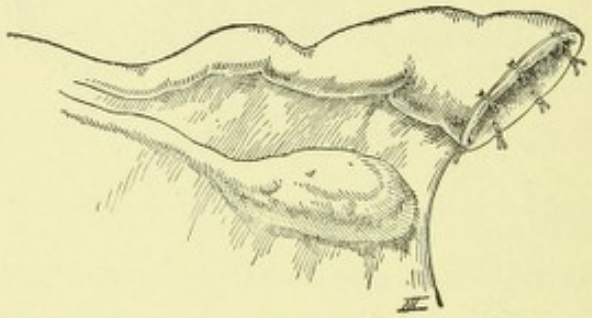


Fig. 333.—The tubal mucous membrane is sutured to the peritoneum.

A conservative operation more frequently practised is *salpingostomy*, a plastic operation having for its aim the remedying of the occlusion at the peritoneal orifice of the tube. Carried out for the first time by Skutsch, this salpingostomy may be lateral or terminal.[1]

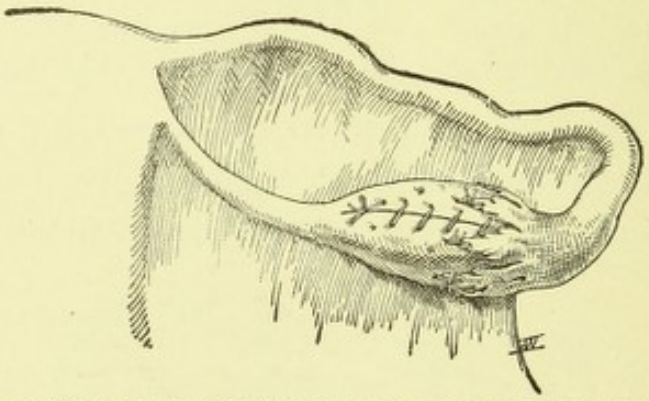


Fig. 334.—Fixation of the tubular fimbriæ to the ovary after partial excision of it.

In order to do a lateral salpingostomy (Skutsch), one does an oval excision of the tubal sac and sutures the tubal mucous membrane to the peritoneum. One can then, as we have already done, press back a flap of the tube and its serous surface is fixed to the serous surface of the tube (Figs. 330 and 331). In terminal salpingostomy (Martin) the obliterated

[1] Skutsch, *Ver d. deutsch. Ges. f. Geb. und Gyn.*, 1889, T. III, p. 376. Jarsaillon, De la salpingostomie et autres operations conservatrices des trompes utérines. *Th. de Lyon*, 1899–1900, No. 19. Kahn, Some conservative operations de la trompe. *Th. de Paris*, 1901.

extremity of the infundibulum is shaved off and then the tubal mucous membrane is sutured to the peritoneum (Figs. 332 and 333). Clado[1] after having reformed a tubal infundibulum fixed it to the ovary (salpingo-ovaro-syndesis).

These conservative operations are only applicable to those cases where the contents of the tube are aseptic. Are they really useful? The pregnancies as ascertained by Gersung, Delbet, Martin, etc., prove that at least in a certain number of cases conception may follow.

In order to conclude the plastic operation on the tubes, we will mention a salpingoplasty made by Vidal, who performed on the stenosed tube an operation in all points comparable to pyloroplasty.[2]

Conservative Operations on the Ovary.—Contrary to operations on the tubes, conservative operations on the ovaries have been frequently done in France following on Pozzi's results since 1893.[3] These operations are indicated when the tube is healthy

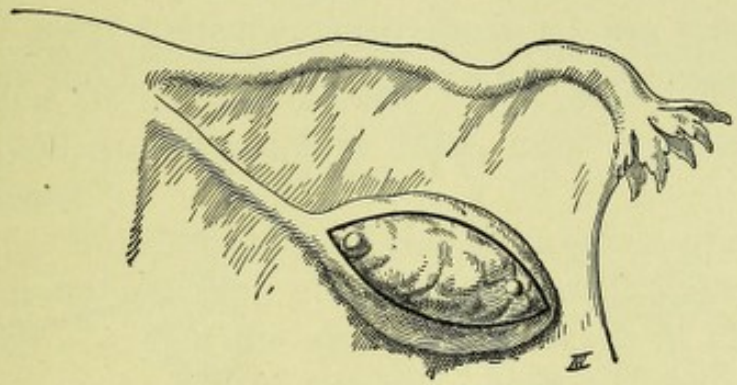


Fig. 335.—Line of the incision for partial resection of a cystic ovary.

and when a portion of the ovary rests intact (dermoid cysts, isolated cysts, microcystic degeneration leaving the region of the hilum untouched).

One may do a *resection* or *ignipuncture* of inflammatory cysts with the point of the thermocautery.

If a partial resection of the ovary is desired, it is seized at its base between thumb and index-finger, which assures its fixation and a temporary hemostasis. Two incisions which join and go

[1] Clado, *Semaine Gynécologique*, Paris, 24 Jan., 1894. Ayroles, Salpingo-ovaro-Syndesis. *Th. de Paris*, 1898–1899, No. 256.

[2] Vidal, *Rev. de gyn. et de chir. abdomen*, Paris, 1900, T. IV, p. 81.

[3] Consult in particular the work of Pozzi, Resection and Ignipuncture of the Ovary. *Rev. de. gyn. et de chir. abdomen*, Paris, 1897, p. 1.

as far as healthy tissue circumscribe the diseased portion and permit of its excision. This done, the wound is sutured with fine catguts, which take up the ovarian tissue and bring into apposition the whole length of the wound (Figs. 335 and 336).

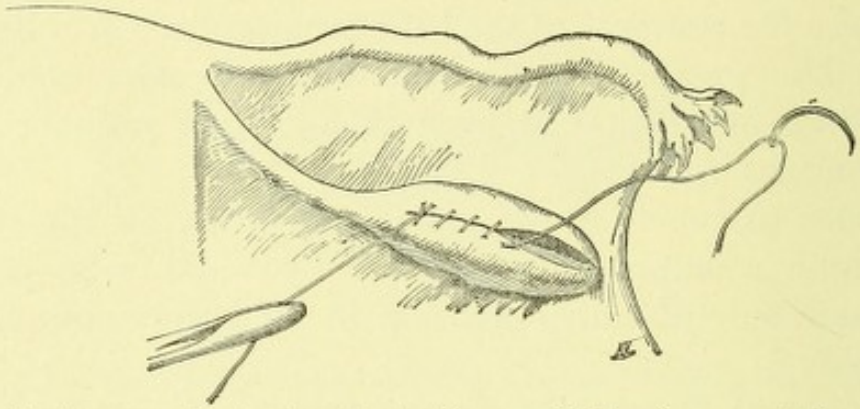


FIG. 336.—Continuous catgut suture closing the wound following on partial excision of the ovary.

This partial resection of the ovary has been combined with extirpation of the tube by Polk, Lejars, Jayle.[1]

The results are far from being constant from the point of view of disappearance of the pains, but the functions are preserved.

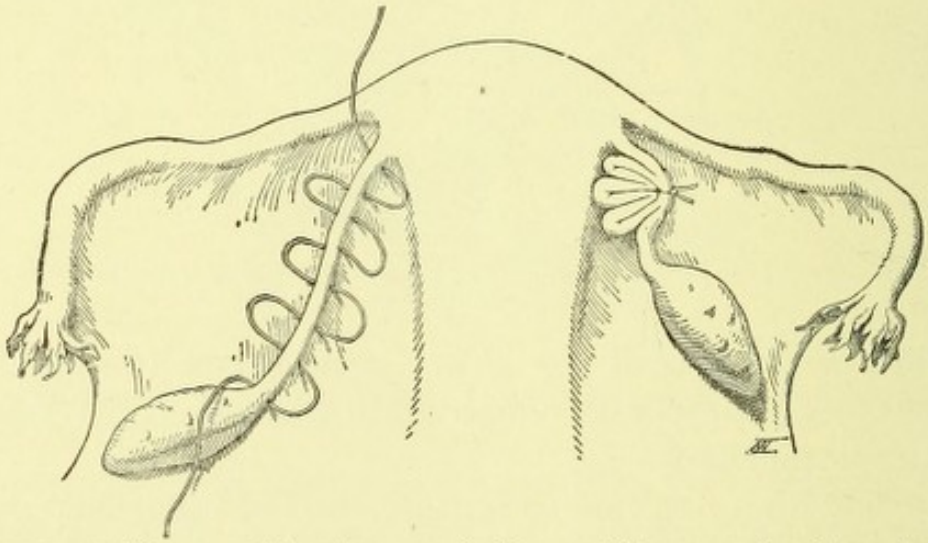


FIG. 337.—Folding up of the utero-ovarian ligament in a case of prolapsed ovary.

Martin who has done a great number of the operations notes 19 per cent. who became pregnant after the operations.

Ovariopexy has been done in cases of healthy ovaries which have prolapsed into the recto-uterine cul-de-sac and become

[1] Blagny, Salpingectomy with Partial Ovariectomy. *Th. de Paris,* 1899. Jayle. *Presse médicale,* Dec. 30, 1899.

painful. Imlach merely did a shortening of the infundibulo-pelvic ligament; Bonney,[1] did a zigzag fold of the utero-ovarian ligament (Fig. 337); Mauclaire[2] and Barrows[3] transposed the ovary in front of the broad ligament, making it pass from behind forward through a split in the broad ligament, which once in position in front is shortened.

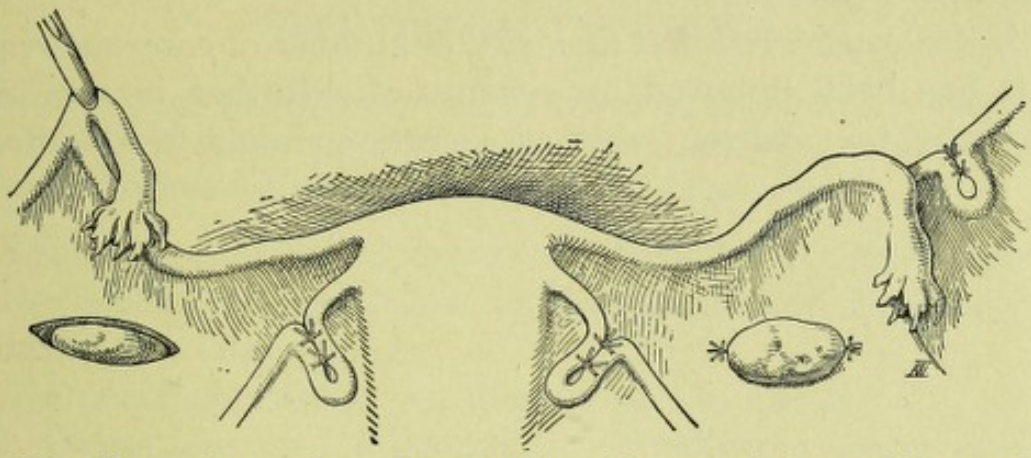


FIG. 338.—Barrows' operation. Transposition of the ovary in front of the broad ligament. Shortening of the round and the infundibulo-pelvic ligaments.

Among conservative operations we should mention "ovarian grafts," which in the last fifteen years, after publications of Morris in 1895 and Knauer in 1896, have been the object of numerous works.[4]

It is to-day quite established that an ovarian graft may take place without complicating procedures, notably without vascular anastomosis, but that if the autograft succeeds in more than 50 per cent. of cases, the heterograft succeeds only exceptionally. These grafts are made in the peritoneum or in the subcutaneous tissue. There is less pain associated with the ovary if placed in the peritoneum than if left in the subcutaneous tissue.

As indications of the ovarian graft may be mentioned the complications of an early menopause, general and genital infantilism. These indications are a little theoretical; it is not yet certain that these grafts persist without modifications, as the

[1] Bonney, The Treatment of Ovarian Prolapse by Shortening the Round Ligament. *Trans. of Obst. Soc.*, London, 1906. T. XLVIII, p. 339.

[2] Mauclaire, *Sem. Gyn.*, Paris, 1903, p. 273, 1905, p. 41.

[3] Barrows, *Med. Rec.*, N. Y., 1904, LVI, p. 601. At the same time as he transposes the ovary in front of the broad ligament, Barrows shortens the round and infundibulo-pelvic ligaments.

[4] Sauvé, Ovarian Grafts from the Surgical Point of View. *Th. de Paris*, Steinheil, 1909; *Ann. de gyn.*, Paris, 1910, p. 155.

persistence of a tumefaction is not the certain index of a persistence of the graft, as all the secreting tissue may disappear from the organ and be replaced by fibrous material; the fact that pregnancy may occur in a woman after a graft, where both ovaries have been removed proves nothing, as the removal may have been incomplete and a third ovary exists in 4 per cent. of women.

If it is considered that in a certain number of cases an ovarian graft has been removed on account of pain then in spite of its simplicity the ovarian graft as operation should be abandoned.

CHAPTER V.

ABDOMINAL OPERATIONS FOR DISPLACEMENTS AND DEVIATIONS OF THE UTERUS.

Summary.—Anterior abdominal hysteropexy.—Indirect hysteropexy.—Intra-abdominal shortening of the round ligaments.—Cuneo-hysterectomy.—Intra-abdominal shortening of the utero-sacral ligaments.

Numerous abdominal operations have been carried out for displacements and deviations of the uterus and they may be classed in two large groups.

1. Operations carried out directly on the uterus.

2. Operations on the ligaments. Finally the uterus may be redressed by partial excisions of the uterine muscle.

1. Anterior Abdominal Hysteropexy.

Anterior abdominal hysteropexy is described under the names of hysterorraphy, ventral fixation, suspension of the uterus, and consists in the formation, between the uterus and the abdominal wall, of adhesions constituting a sort of suspensory ligament for the uterus.

At first extraperitoneal fixation was done by pushing up the uterus with two fingers in the vagina against the deep surface of the anterior abdominal wall and then taking it up with a large curved needle, passing through the whole thickness of the non-excised wall.

This led to numerous complications and fell into disuse and was succeeded by an intra-abdominal operation which permits of the exploration of the pelvis, the breaking down of adhesions and the passage of sutures through any given part of the uterus.

Operation.—The patient being in the Trendelenburg position an incision 4 or 5 cm. long is made, stopping at about 2 cm. from the pubis; we may also use a transverse incision of the abdominal wall.

Nothing more remains except to fix the uterus to the wall. The most various procedures have been devised, from the point of view of the segment of the uterus to fix, and the number of layers of the wall through which the suspensory suture should pass.

From the anterior surface of the portion immediately above the isthmus to the upper portion of the posterior face, every inter-

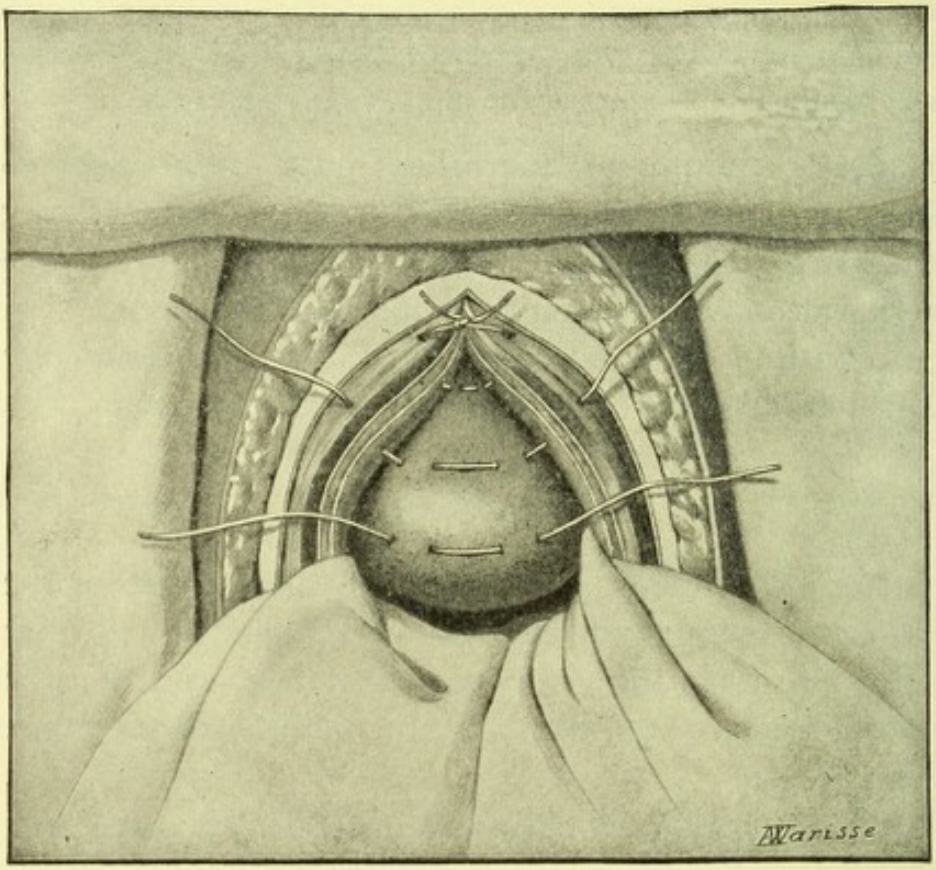


FIG. 339.—Abdominal hysteropexy.

mediate portion has been fixed. The two extremes already mentioned are chosen by Pierre, Delbet and Kelly respectively. One of the most frequently employed procedures is that of Terrier.

It consists in the passage of several stitches, passed through the anterior wall of the uterus, the highest up being placed below the insertion of the tubes, the three or four sutures being distant about 1 cm. apart.

All the sutures are successively placed, their ends being held with forceps before being tied; they traverse the entire thickness

of the abdominal wall with the exception of the skin and fatty subcutaneous tissue. Before tying them one must be quite certain that no loop of intestine or piece of epiploon lies between the uterus and the abdominal wall (Fig. 339).

In order to get a firmer attachment of the uterine wall to that of the abdomen Leopold has advised the scraping of the uterine surface; Thiriar advises the denudation of its surface with the same object; absorbable or partly absorbable sutures are to be used and the whole or most of the abdominal wall has been taken up in their loop.

On the contrary, other operators only take up a limited portion of the uterus and the cellular tissue immediately subjacent. This is Kelly's practice, who says that he gets adhesions which gradually stretch and finally form more or less long frenums which maintain the uterus in light anteversion, but at the same time allow it a certain mobility.

The method of disposition of the sutures varies infinitely; the majority of operators place them transversely, while others make non-penetrating sutures for a short distance in the uterine tissue (Terrier), while others only make up one suture (Czerny, Kelly); Legueu places his stitches as Guyon in nephropexy, doing a sort of hammock suspension of the uterus.[1]

Pozzi fixes the uterus with a continuous suture.

Others pass their sutures vertically, inserting two sutures, one to the right and the other to the left of the median line (Zinsmeister), or three, one in the middle, on line with the inferior angle of the abdominal incision, and two lateral (Faucon).

It has been advised to insert a pessary or do vaginal tamponing after the operation in order to support the uterus for some days. This appears to us to be useless.

In women after the menopause, Harris has advised fixing the body of the uterus in the substance of the uterine muscle. He sutures the edge of the incision of the parietal peritoneum right around the uterus at the junction of body and cervix. Then he draws the fundus of the uterus down toward the umbilicus, denudes the anterior face and fixes it to the fibrous layers of the wall.[2]

[1] Voir Hartmann, *Chirurgie des organes génito-urinaires de l' homme*, Paris, G. Steinheil, 1904

[2] Philander A. Harris, Intramural Sequestration and Fixation of the Corpus and Fundus Uteri. *Am. J. of Obst.*, N. Y., 1910, T. II, p. 36.

Results.—The *early* results are good. The operation is one of the safest in abdominal surgery. The remote results should be viewed from the triple point of view, orthopedics, therapeutics and obstetrics.

From the *orthopedic* point of view, the results are poor in cases where the operation has been done to remedy a simple retrodeviation of the uterus; they are, however, of no use when the hysteropexy has been done for a retrodeviation complicating a prolapse, if one does not at the same time do a reconstruction of a solid pelvic floor.

From the *therapeutic* point of view, they are equally good if the deviation constitutes the whole trouble; unfortunately, it is rare to have to operate for simple non-complicated deviations as these deviations most often give rise to no functional trouble. The therapeutic result of the hysteropexy will depend to a great extent on the treatment applied to the troubles which complicate the deviation. If the adhesion is not very tight, it will elongate and constitute a band which may cause an intestinal obstruction.[1]

The operations of uterine fixations are most often done in women who have not yet arrived at the menopause and hence it is useful to follow the remote results on the obstetrical future.

Andrews has had 395 cases of pregnancies after hysteropexy.[2]

In these 395 pregnancies there have been 36 abortions, or 9 per cent.; it is certain that many of these abortions have been of criminal intent; note one fact that in some cases after one abortion there have been several pregnancies at term (Negri, Olshausen, Sanger); nine of these pregnancies terminated in premature labor.

In the 189 cases published with details, Andrews found 10 transverse presentations, three breech, three uterine ruptures, and 16 Cesarean sections.

The combined results of Noble, Milaender, Kustner and

[1] Wallace, in order to prevent this complication sutures the peritoneum of the utero-vesical cul-de-sac below the point of the hysteropexied uterus. Arthur Wallace, A Modification in the Performance of Ventral Fixation of the Uterus. *Journal of Obst. and Gyn. of British Empire,* Aug., 1907.

[2] Henry R. Andrews, On the Effect of Ventral Fixation of the Uterus on Subsequent Pregnancy and Labor Based on Analyses of 395 Cases. *Journal of Obst. and Gyn. of British Empire,* 1905, T. II, p. 97. Consult also: Hysteropexy and its Effect on Pregnancies Following. *Ann. de Gyn.,* 1904, p. 225; Seigert, *Zeitschr. für Geb. und Gyn.,* 1905, T. LV, p. 383.

Montandon show a total of 386 pregnancies with 44 abortions, nine premature labors, and 87 pathological labors.[1]

It appears that the operation leads to a fair number of normal pregnancies. One point is established and that is that these complications are in relation with the manner in which the operation has been executed and that *they are more pronounced in proportion as the fixation of the organ is more solidly fixed and the nearer it is fixed to its fundus or posterior face.*

In a general way, one finds the cervix situated high up above the promontory; during labor, uterine contractions are directed toward the sacrum instead of following the axis of the pelvis. By reason of the fixation of the fundus of the uterus, the expansion of the anterior wall is prevented; the anterior wall is hypertrophied, but it is folded back on itself and forms a hard mass above the symphysis (Fig. 340); the uterus only dilates at the

FIG. 340.—Pregnancy in a uterus fixed to the anterior abdominal wall.

expense of its posterior wall and takes on an irregular shape. The dystocia observed are the consequence of these uterine deformities; the extreme thinning of the undisturbed posterior wall is perhaps also the cause of inertia uteri which has followed Cesarean section in a certain number of cases.

In consideration of these complications, it will be understood why the pregnancies of patients who have had hysteropexy done should be carefully watched. If from the commencement

[1] Montandon, Abdominal Hysteropexy or Intraperitoneal Shortening of the Round Ligaments. *Thèse de Genève*, 1907, No. 160.

there are violent pains, if the uterus dilates asymmetrically, its cervix being displaced upward and backward, there should be no hesitation; as soon as the seventh month is reached open the abdomen and break down the adhesions in order to permit the uterus to develop regularly. If the seventh month is passed wait until term. At this period endeavor to break down adhesions, which will permit of the immediate elevation of the fundus, the replacing of the cervix and the accouchement *per vias naturales;* if this breaking down of adhesions is impossible do a Cesarean section. Elizabeth Hurden[1] has published five cases of the breaking down of adhesions at term, with no maternal mortality and a fetal mortality of two.

Indications have been, above all, applied to retrodeviations if they appear to be the cause of varied troubles when there are no accompanying lesions of the adnexa, of the cervix, or of the uterine mucous membrane or when the congestive phenomena appear to be caused or at least kept up by the circulatory disturbance resulting from the retrodeviation. It has been practised as a *complementary operation* after a vagino-perineal plastic operation in order to remedy a retroflexion complicating a prolapse; after a unilateral removal of the diseased adnexa in order to maintain the uterus in a good position and to prevent it adhering behind to the raw surfaces of the pelvic floor; after curettage or an amputation of the cervix in a patient with metritis and retroflexion.

Condamin has applied it to the treatment of *uterine anteflexion*; the fixation of the uterine body in a fairly high position redresses the flexion and causes the painful symptoms to cease.[2]

2. Indirect Hysteropexy.

H. A. Kelly fixes the uterus by means of the tubo-ovarian ligaments, Olshausen by the internal portion of the round ligaments, Winiwarter by the anterior face of the broad ligaments, etc. All these procedures should be abandoned to-day for that procedure with some modifications which has been adopted by

[1] Elizabeth Hurden, Dystocia Following Ventral Fixation of the Uterus. *Amer. J. of Obst.*, 1907, T. II, p. 24.

[2] Condamin, Anterior Abdominal Hysteropexy in the Treatment of Anteflexion of the Uterus. *Arch. provinc. de Chir.*, 1896, p. 233.

Doleris, Richelot, Gilliam, Mayo and ourselves.[1] The operation consists essentially in a shortening of the round ligaments, after median incision of the abdomen, with inclusion in the substance of the abdominal wall of a part of their length. It is

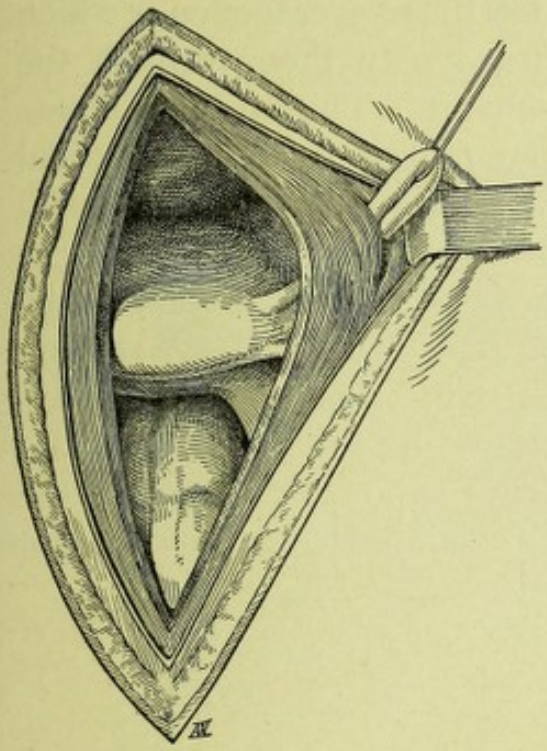


Fig. 341.—The round ligament is drawn through a buttonhole made in the rectus muscle.

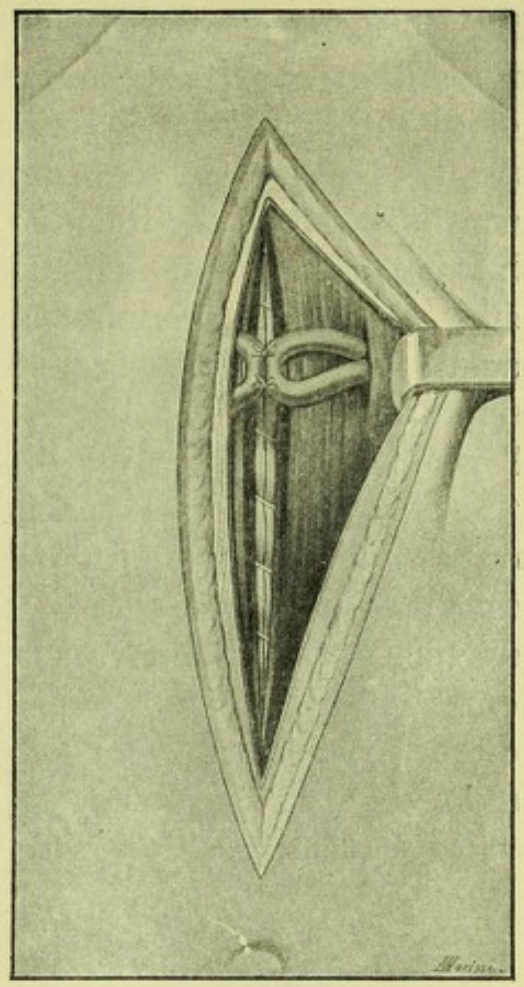


Fig. 342.—Suture of the round ligaments in front of the internal portion of the recti muscles.

the procedure that removes them the least from their natural state that has become known as physiological hysteropexy (Doleris).

[1] Doléris, *La Gynécologie*, Paris, 1898, p. 494. Fumey, Treatment of Retrodeviations by Doléris Method. *Th. de Paris*, 1900. Gouin, Advantages of Hysterectomy from the Point of View of Obstetrics. *Th. de Paris*, 1904–1905, No. 25 et *la Gynécologie*, Paris, Aug., 1905, p. 289. Gilliam, Round Ligament Ventrosuspension of the Uterus. *Am. J. of Obst.*, N. Y., 1900, T. XLI, p. 299. Ferry, Valeur comparée de hysteropexy médiate. *Th. de Paris*, 1905–1906, No. 202. Harold Barker, Results of Mayo's Modification of Gilliam's Operation for Shortening the Round Ligaments. *Boston Med. and Surg. Jour.*, Sept. 2, 1909, p. 322. Chevrier. *Ann. de Gyn.*, Paris, 1910, p. 257. Poullet, Tendinous Hysteropexy. *Congrès français de Chirurgie*, 1908, p. 293, passes through a hole made in the anterior fold at the broad ligament, a band detached from the tendon of the rectus abdominis. He unites it to the round ligament and then sutures the tendinous band to the pubis.

Operation.—The commencement of the operation, freeing of adhesions, and redressing of the uterus is as usual, only the mode of fixation differs from that we described in the technic of direct hysteropexy.

Each round ligament is seized 3 or 4 cm. from the cornu, a point, where even in cases that it is little developed, it is a firm and resistant cord; a chromicized catgut is passed around it. Strongly retracting the anterior lip of the incision made in the anterior aponeurosis, the surgeon inserts a pair of Kocher's forceps in between the fibers of the rectus muscle and perforates with it the peritoneum. He then takes the long catgut ends which encircle the round ligament and draws with them through the muscular buttonhole the round ligament. The two ligaments are sutured together in front of the muscle. The abdominal wall is reestablished in its different planes, and we are careful to take the round ligaments with the suture that unites the anterior aponeuroses so as to obtain a complete fixation of parts.

Indications and Results.—Indications are those already given for direct abdominal hysteropexy. The results are excellent from the orthopedic point of view, and are as good as those of direct hysteropexy. They are very superior to it from the point of view of pregnancy, as this means of fixation does not interfere with the progress of the gravid uterus.

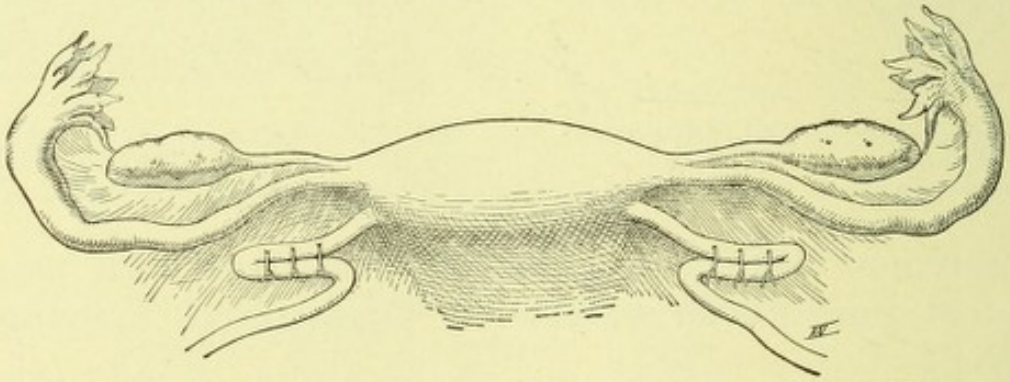


FIG. 343.—Shortening of the round ligaments by transverse folding.

3. Intra-abdominal Shortening of the Round Ligaments.

The procedures concerned in intra-abdominal shortening of the round ligaments are very numerous; they may be classed in three groups.

1. Simple Folding of the Round Ligament.—Wylie makes a transverse fold and fixes it, after having denuded its concave surface (Fig. 343); Ruggi does it vertically with the convexity

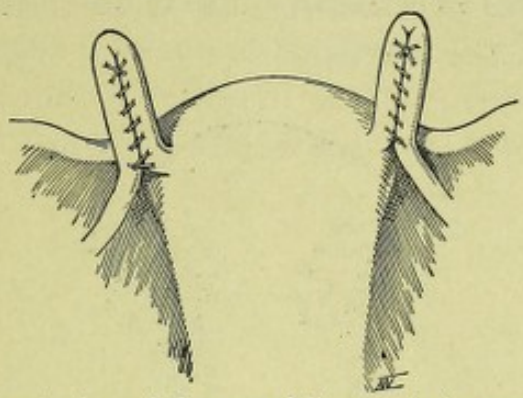


FIG. 344.—Shortening of the round ligaments by vertical folding.

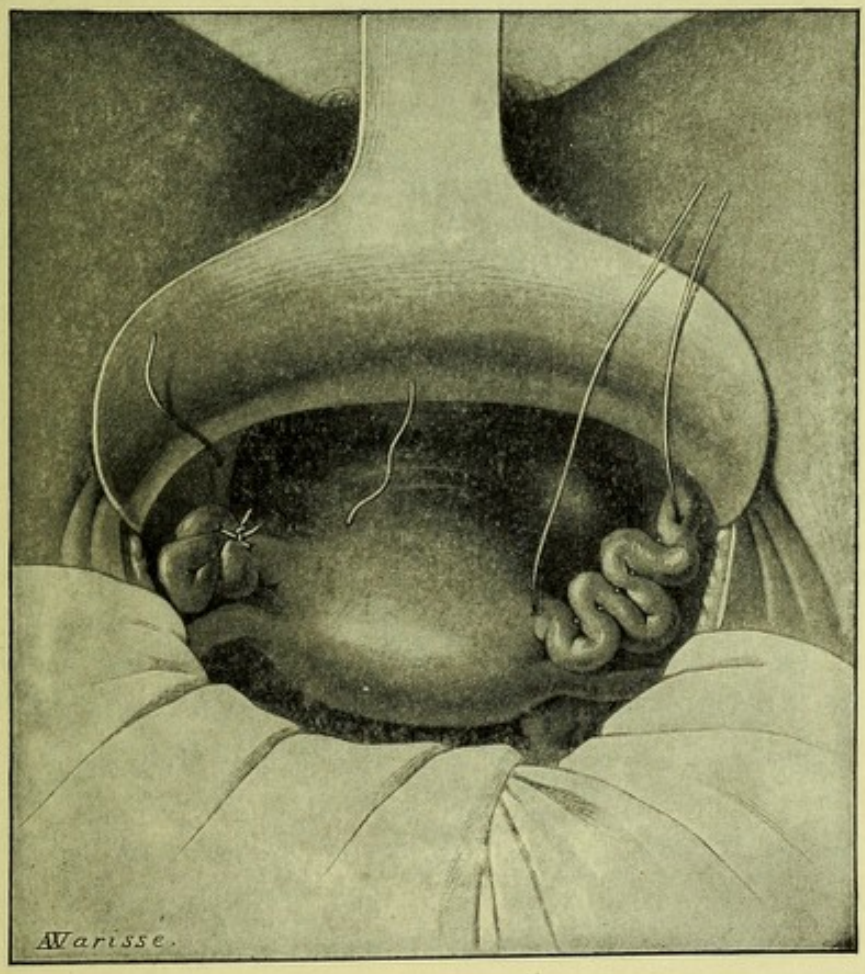


FIG. 345.—Shortening of the round ligaments by folding up.

upward (Fig. 344). Formerly we gathered up the round ligament into one mass, like an accordeon with a tacked stitch (Fig. 345).

2. **Folding up and Fixation to the Anterior Wall of the Uterus.**—Polk denudes the internal surface of the round ligaments about 20 or 25 cm. from their uterine end. He brings them together in front of the uterus and sutures one to the other and then to the anterior surface of the uterus.

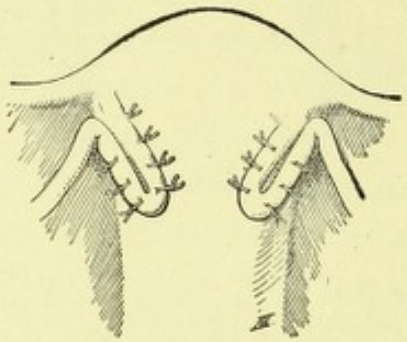


Fig. 346.—Folding up and fixation of the round ligaments to the anterior surface of the uterus.

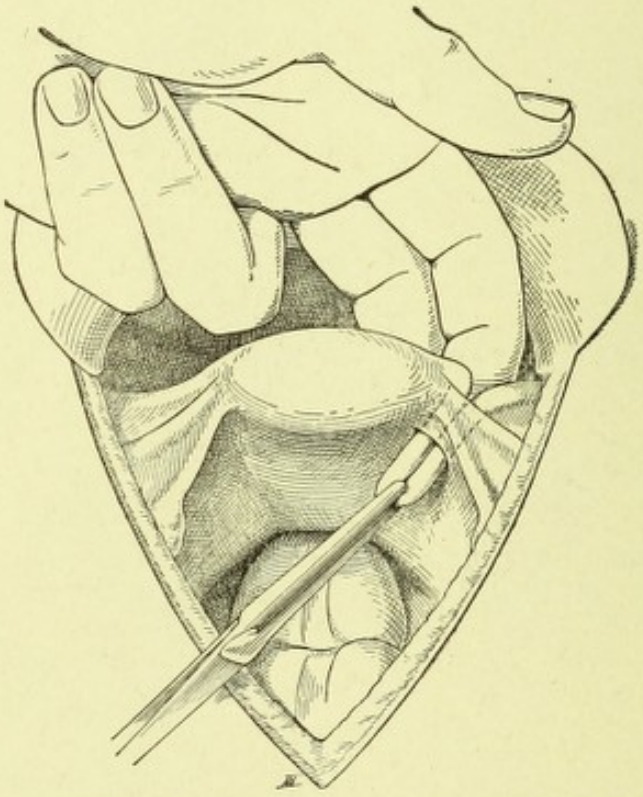


Fig. 347.—The round ligament is drawn backward through a hole in the broad ligament.

Palmer Dudley denudes an ovale with its large axis vertical, in the middle part of the anterior face of the uterus; the round ligaments are sutured together and to this surface.

Menge draws out a loop of the round ligament and inserts it at the level of the orifice of the inguinal canal, which brings

the uterine cornu in contact with it. He sutures the two sides of the loop of the ligament together and then to the anterior surface of the uterus.

3. **Folding up of the Round Ligaments and Fixation of the Fold to the Posterior Surface of the Uterus.**—This fixation backward has been done in different ways. When one has passed the folded round ligament above the upper border of the broad

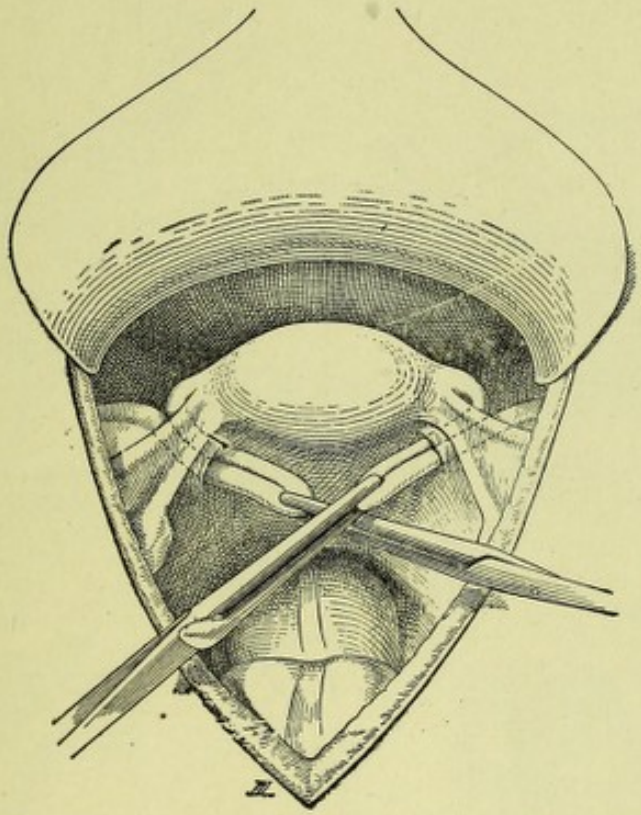


Fig. 348.—The two round ligaments are drawn together behind the uterus.

ligament, it is passed through a buttonhole in the latter and fixed to the middle or lateral part of the posterior surface of the uterus and in the former case the two ligaments may be sutured together.

Baldy's[1] procedure is the most universally employed. It was described for the first time in 1892 and it has at last been taken up again. In France Dartigues and Caraven[2] practised it with success.

Raising the upper border of the broad ligament with two fingers of the left hand, take a pair of forceps and perforate the

[1] J. M. Baldy, Treatment of Retro-uterine Displacements. *Surg., gyn. and obstet.*, Chicago, 1909, T. VIII, p. 421.

[2] Dartigues and Caraven.

ligament from behind forward, in the avascular portion, near the border of the uterus, and below the utero-ovarian ligament. Then seize the round ligament about 3 cm. from the uterine cornu (Fig. 347). The forceps draws through the hole in the broad ligament the loop formed by the round ligament. The operation is concluded by suturing the two round ligaments together and then to the posterior surface of the uterus.

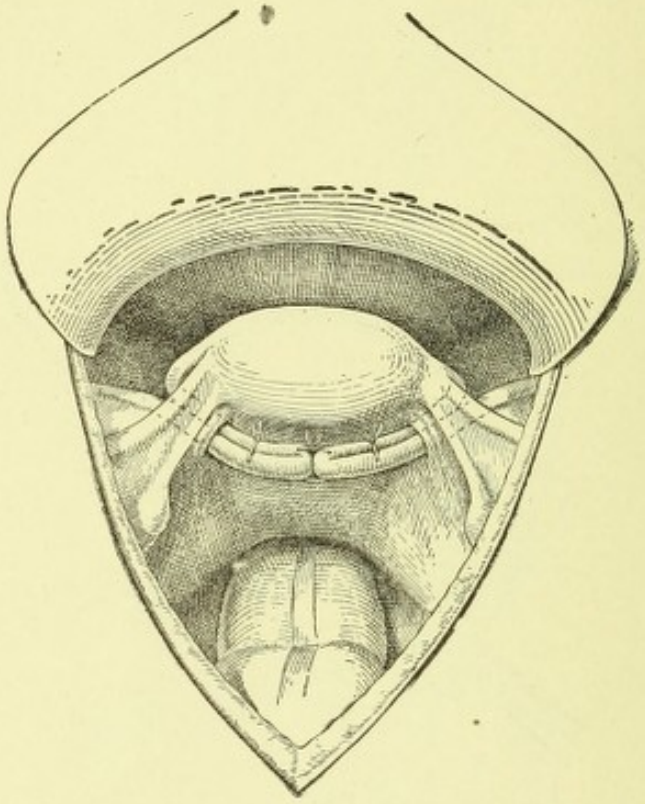


Fig. 349.—Suture of the two round ligaments together and to the posterior aspect of the uterus.

4. Cuneohysterectomy.

Thiriar and Jonnesco have carried out the procedure known as *anterior cuneohysterectomy*[1] for retroflexion.

The operation consists in diminishing the length of the anterior wall of the uterus. After incision of the peritoneum, 2 or 3 cm. of this wall are denuded retracting the bladder with the inferior part of the incised serous membrane. Two curved transverse incisions circumscribe an ellipse on the denuded area whose small axis measures 1 1/2 to 2 cm. and the large transverse axis is about the width of the organ, without, however, reaching its borders so that the vessels there are not injured. A cuneiform segment is resected at this

[1] International Congress of Gynecology and Obstetrics, Brussels, 1892, p. 512. Jonnesco, Surgical Works, 1899, p. 11.

level and comprises the whole thickness of the muscular wall without taking up the mucous membrane. Three or four catgut sutures unite the lips of the incision; a second layer of sutures brings together the lips of the peritoneal incision.

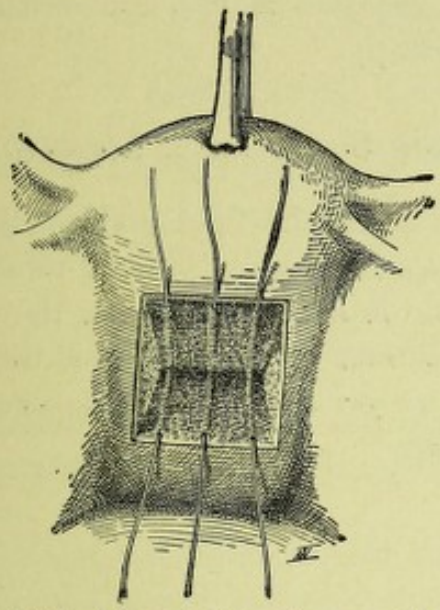


FIG. 350.—Cuneohysterectomy. Denudation and passage of stitches.

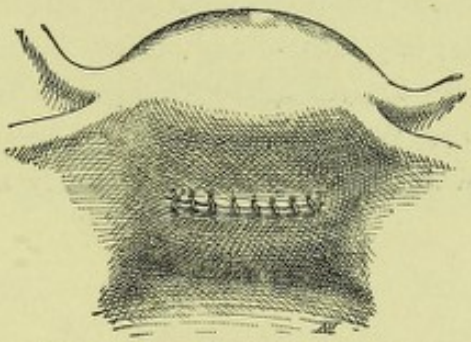


FIG. 351.—Cuneohysterectomy. Operation terminated.

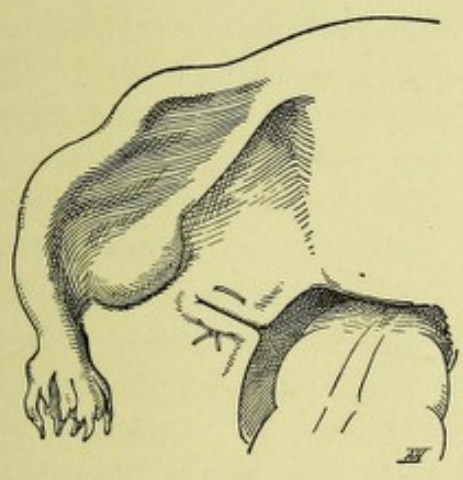


FIG. 352.

FIG. 353.

Shortening of the Utero-sacral ligaments.

We may compare Pestalozza's[1] operation with this one. At the upper limit of the inferior segment of the uterus, Pestalozza incises on the anterior surface the serous membrane and the subjacent muscular layer. He separates the flap with his finger as far as the level of the vesical dome and then passing a suture through the anterior surface of the anteflexed uterus, he

[1] Pestalozza, Per la cura Operativa della Retroflessione Uterina. *Atti della Soc. ital. d'obst. e. gin.*, T. XII, and Montuoro, *Zentr.-Bl. f. Gyn.*, 1910, p. 497.

traverses the middle of the flap. A series of secondary sutures are inserted laterally as far as the broad ligaments so as to completely close up the denuded surface.

By passing the sutures more or less high up on the anterior surface of the uterus, we obtain a more or less extensive area with the flap and we can thus determine the degree of anteflexion accordingly.

5. Intraabdominal Shortening of the Utero-sacral Ligaments.

The uterus having been drawn forward and upward the utero-sacral ligaments are rendered tense and one or more sutures are placed on these ligaments; the sutures are passed from without in about 2 cm. from the uterus in order to pass again through the ligament from within outward at the same distance from the rectum. When tied, we get a folding of the ligament, which is thus shortened (Figs. 352 and 353).

CHAPTER VI.

SOME RARE ABDOMINAL OPERATIONS.

Summary.—Obliteration of the pouch of Douglas.—Ligature of the uterine artery.—Ligature of the hypogastric veins.—Reduction of uterine inversion.—Cystopexy.

1. Obliteration of the Pouch of Douglas.

Marion, who invented this operation for certain cases of prolapse with exaggerated deepening of the pouch of Douglas, advises it to be done as follows:[1]

The abdomen being opened, the pelvis emptied of its intestines, he draws the uterus forward and then proceeds to the obliteration of the pouch of Douglas by means of four purse-string sutures of increasing diameter in the peritoneal cul-de-sac.

In order to insert these sutures he begins by seizing the floor of the cul-de-sac with forceps which draw it upward, and then places completely around it a subperitoneal suture which he ties after having taken off the forceps. The first suture is drawn upward in its turn, which permits of placing a second, and one can then successively dispose of a series of four or five sutures according to the depth of the cul-de-sac.

These sutures should take hold not only of the peritoneum on the posterior surface of the vagina or the uterus, but equally on the sides, the serous membrane that clothes the pelvis below the white line.

The insertion of the deepest stitches is quite a delicate undertaking; to do it best, the operator should take hold of the peritoneum with a long pair of forceps for holding tampons and then insert into the fold thus produced the suture needle. The inserted sutures should go as high as the posterior face of the uterus. The only precaution is to guard against completely perforating the coats of the rectum.

Thus the pouch of Douglas is obliterated. The cervix is drawn backward and adhesions between it and the rectum and peritoneum of the postero-lateral portions of the excavations are produced (Figs. 354 and 355).

This procedure, to us, seems above all applicable to "false prolapse,"

[1] Rousseau, Treatment of Certain Cases of Prolapse by Obliteration of the Pouch of Douglas. *Th. de Paris*, 1908–1909, No. 7.

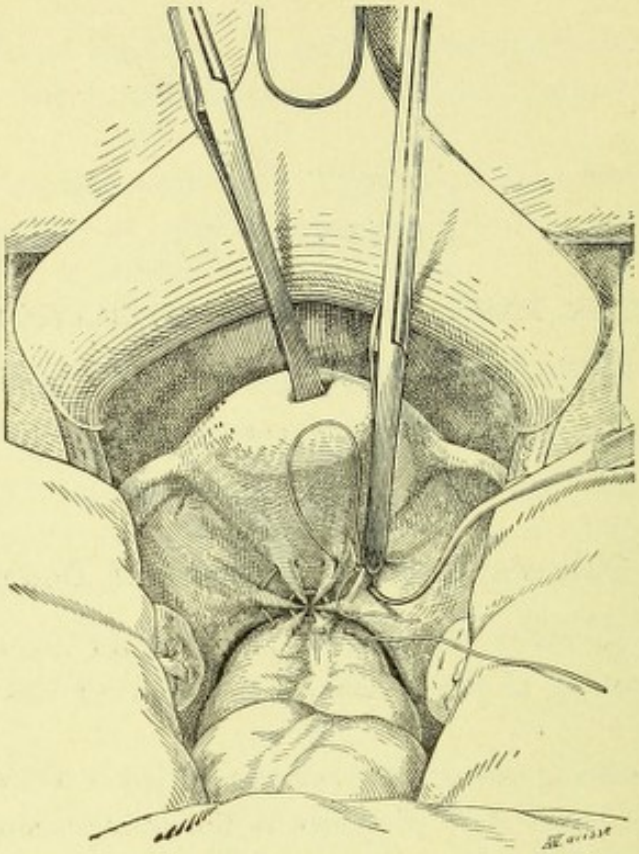


FIG. 354.—Obliteration of the pouch of Douglas.

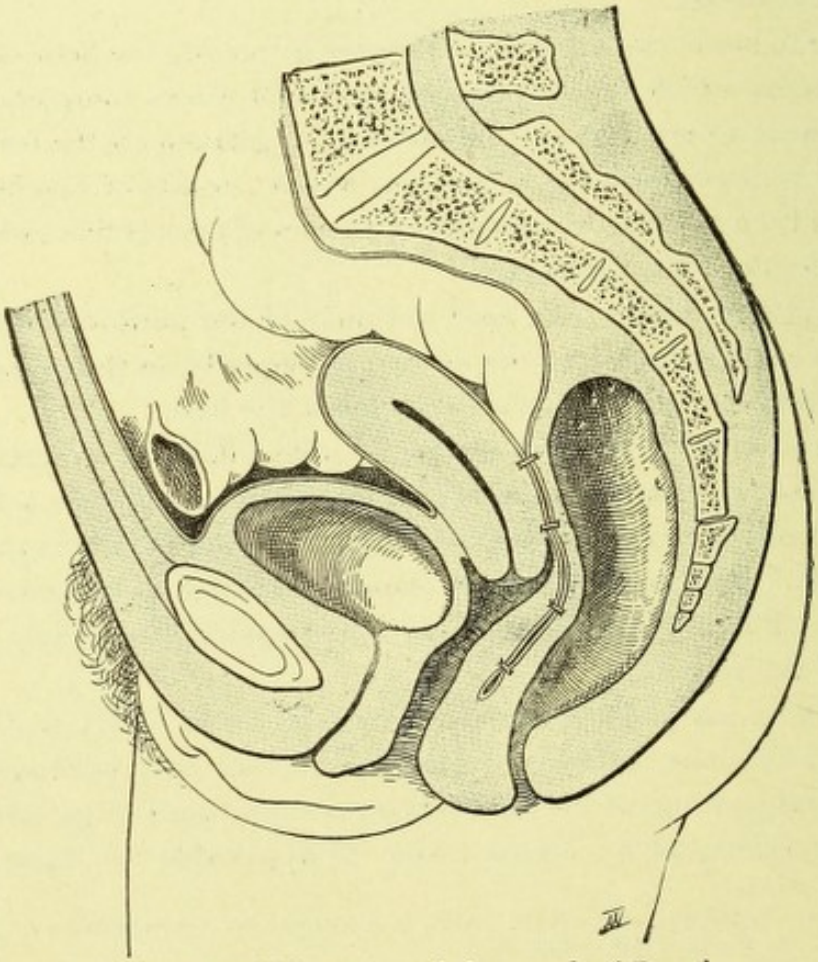


FIG. 355.—Obliteration of the pouch of Douglas.

those cases in which there is a real hernia of the pouch of Douglas, sometimes confused with true prolapse. It is good, we believe, to combine it with a posterior colporrhaphy.

2. Ligature of the Uterine Artery by the Abdominal Route.

The uterine artery, the ligature of which has been advised in certain cases where atrophy of tumors[1] is desired, may be done in two ways:

1. *At the Level of the Ovarian Fossa* (Hartmann and Fredet).—The landmark in this operation is the constant relationship of the uterine artery to the ureter at the level of the little fossa of the ovary.

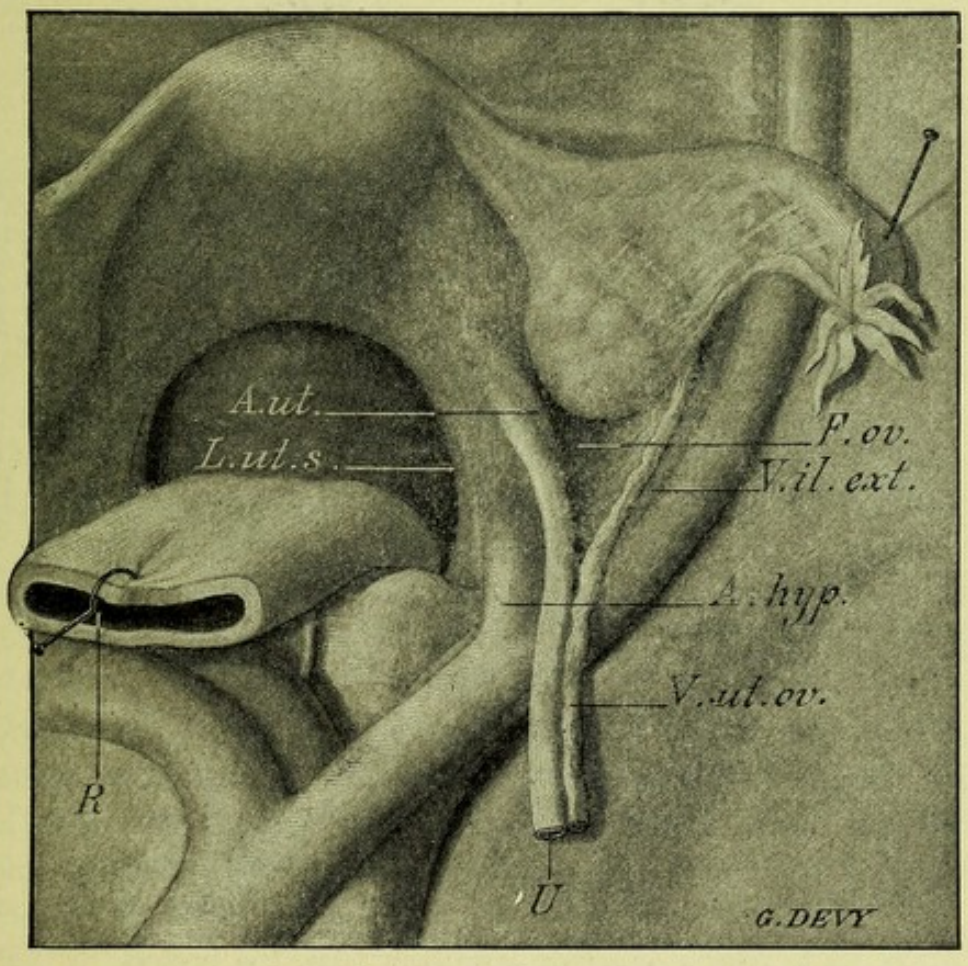


FIG. 356.—The patient is placed in the Trendelenburg position at an angle of 45 degrees. The figure shows the relation of the uterine artery to the ureter in the ovarian fossa.

The hypogastric artery, up against the osseous wall of the pelvis, behind the ureter or in part covered over by it, gives off three anterior branches, the obturator, the umbilical and the uterine, which separate in front of the ureter under the peritoneum which clothes the floor of the ovarian fossa.

[1] Hartmann and Fredet, The Atrophying Ligatures in the Treatment of Uterine Tumors." *Ann. de Gyn.*, Paris, 1898, T. I, pp. 110–306.

The uterine artery which comes off either high or low, or in common with the umbilical artery, always appears in front of the urinary canal. This constitutes an excellent landmark for the finding of the artery and its origin (Fig. 356). If there is some doubt in the event of our finding two vessels, both are tied or the common utero-umbilical trunk is tied. Never risk by an incision in the ovarian fossa the injury of the obturator, which lies higher and more parietal than the two arteries we have mentioned.

We will now describe how the operation is done:

The patient having been placed in the Trendelenburg position, the ovary is lifted up with a pair of Museux's forceps and the ovarian fossa is

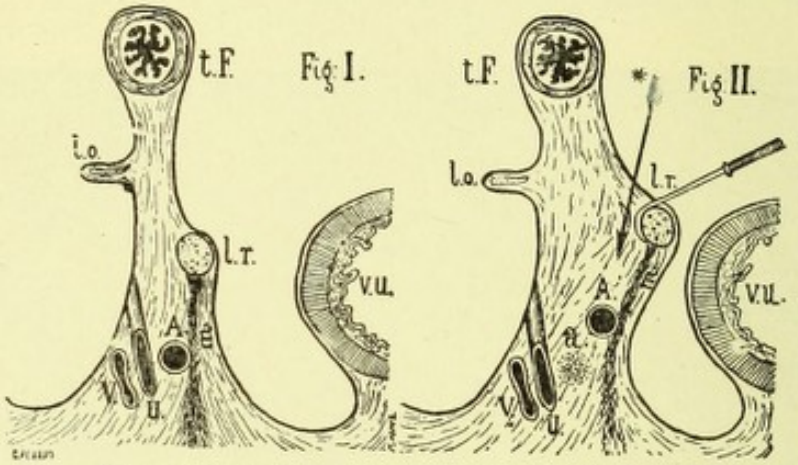


FIG. 357.—This figure is the exact reproduction of that of Altuchoff.

The two drawings represent a vertical antero-posterior section of the broad ligament about the mid point of the length of the tube. (*l. o.*, ovarian ligament; *t. F.*, Fallopian tube; *l. r.*, round ligament; *m*, partition forming a sort of mesentery to the round ligament; *V.*, uterine vein; *U.*, ureter; *A.*, uterine artery; *v. u.*, bladder. To the left, the Fig. I shows the parts in partition; to the right, Fig. II, shows that on drawing forward the round ligament, the mesentery is drawn with it and the uterine artery which normally in *A.* comes after traction to lie in front of the round ligament at *A*. In order to catch the artery follow the course of the arrow.

exposed. At this level, below the psoas, may be seen the ureter by transference. Parallel to it and a little in front an incision is made in the peritoneum of the ovarian fossa. Seizing between forceps the lips of the incision, separate the peritoneum backward a little with a grooved director and about 3 cm. below the brim of the pelvis, the uterine and umbilical arteries at the point where these vessels separate anteriorly from the ureter.

Nothing is simpler once the artery is recognized than to pass a blunt needle and suture below it and tie it. Some fine silks unite the peritoneum, loose enough to avoid compressing the subjacent ureter; then the abdomen is closed in the usual way.

2. *Across the Broad Ligament* (Altuchoff).—This procedure is based on the following anatomical data:

There exists in the substance of the broad ligament a sort of partition which mounts from its base toward the round ligament, doubling the anterior

layer of the broad ligament. The uterine artery is adherent to this sort of partition and follows it when it is drawn forward (Fig. 357).

In order to ligature the uterine artery by this procedure, lifting up the tube, the round ligament is drawn forward; parallel to this and immediately behind it, we make an incision of about 3 cm., the external end of which terminates about 1 cm. from the innominate line.

The grooved director is made to enter the substance of the broad ligament, following its anterior layer, which reinforced by the "cellular mesentery of the round ligament," gives a fairly resistant point of support. At a depth of 12 to 16 mm. one comes across the uterine artery; when recognized, nothing is simpler than to tie it fairly high up. The ureter lies below and behind the artery; it will not be injured.

3. Ligature of the Hypogastric Veins.

This ligature has been advised and carried out with success since 1902 by Trendelenburg in a case of puerperal pyemia. Freund and Bumm had already tried[1] without success to stop the puerperal processes from going beyond the uterus by tying the utero-ovarian veins. Their course being checked is explained by the fact that phlebitis of the hypogastric veins is three time more frequent than that of the utero-ovarian ones, 21 as opposed to 7 (Trendelenburg), which was confirmed by Lenhartz.

1. **Extraperitoneal Route.**—By an iliac incision the peritoneum is separated and then the hypogastric vessels are looked for.

Transperitoneal Route.—The transperitoneal route, which is easier and which permits furthermore of tying if necessary the utero-ovarian veins, is preferred by Vineberg.[2] After opening of the abdomen in the median line, the operation will depend upon whether it is necessary to tie or not the utero-ovarian veins at the same time as the hypogastric veins. In the former case, cut the utero-ovarian veins between two ligatures and prolong the peritoneal incision downward along the length of the hypogastric vessels. Enlarge this incision with the fingers and we have the large pelvic vessels exposed to view. Nothing is simpler than to tie the internal iliac vein, which is to be found on the right behind and to the outside of the artery and on the left to the inside of the artery. If the utero-ovarian veins are healthy, make an oblique incision on the posterior surface of the broad ligaments like that of Wertheim in his radical operation for cancer. Then separate the edges of the peritoneal incision and we find that we have a liberal access to the base of the ligament and to the large pelvic vessels contained in it.

[1] Trendelenburg, *Münch. med. Woch.*, 1902, T. XIII.

[2] Vineberg, Ligation of Pelvic Veins for Puerperal Pyemia, *Amer. J. of Obst.*, N. Y., 1909, T. I, p. 412.

4. Reduction of Uterine Inversion by the Abdominal Route.

Gaillard Thomas, after he has opened the abdomen, introduces his index-finger into the inverted uterus, and then guides along it a dilating forceps which enlarges the cervix and renders taxis easy.

This method, which enables us by sight and palpation to find out the state of contraction of the cervix and of the form and extent of the adhesions, appears *a priori* to be the operation of choice.

In reality it has given few good results by reason of the difficulty in dilating the cervical ring and because of the necessity of often splitting it. It is simpler to operate by the vaginal route.

In 1898 Everk proposed a mixed procedure by *abdomino-vaginal route*. He opens the abdomen, splits the anterior wall of the uterus as far as the bladder, and if the reduction is impossible he splits the posterior wall as far as the insertion of the vagina and then reduces it with the vaginal hand on the fundus of the uterus. He concludes by suturing the anterior and posterior uterine incisions, then fixes the organ to the anterior abdominal wall.

5. Abdominal Cystopexy.

Abdominal cystopexy has been done by a certain number of operators. Tuffier fixes the bladder by its extraperitoneal part above the pubis. Byford fixes it on a line with the inguinal rings; Laroyenne commences by doing an abdominal hysteropexy and then sutures the postero-inferior wall of the bladder to the anterior face of the uterus, and its anterior wall to the abdominal wall below the zone of fixation of the uterus.[1]

De Vlaccos, Dumoret[2] and Chiaventone do an intraperitoneal fixation. Chiaventone, after incision of the vesico-uterine fold, separates the bladder from the uterus and from the vagina up to a point where the dense connective tissue takes the place of the loose tissue. He finds that he is at the level of the interureteral ligament which he takes up and stitches to the anterior surface of the uterus about 1 cm. above the anterior vaginal fornix. He closes the incision of the vesico-uterine cul-de-sac and finishes by doing an anterior abdominal hysteropexy.[3]

All these procedures are abandoned to-day.

[1] Laroyenne, Treatment of Prolapse by Suspension of the Uterus and Bladder from the Abdominal Wall. *Ann. de Gyn.*, Paris, 1900, T. II, p. 366.

[2] Terrier, Anterior Abdominal Cystopexy. Report on Observations of Vlaccos, Dumoret and Tuffier. *Bull. et Mem. de la Soc. de Chir.*, Paris, 1890, p. 454.

[3] Chiaventone, Cystopexy in Gynecology. *Ann. de Gyn.*, Paris, 1902, T. I, pp. 282 and 385.

PART IV.

THERAPEUTIC INDICATIONS IN DISEASES OF THE GENITAL SYSTEM OF WOMAN.

CHAPTER I.

TREATMENT OF INFLAMMATORY LESIONS OF THE UTERUS AND ADNEXA.

Summary.—Metritis. Evolution of pathogenic conception and treatment.—T. prophylactic, T. curative of acute metritis, of chronic metritis (general and local treatment).—Indications of treatment in acute and chronic inflammation of the adnexa.

1. Treatment of Metritis.

The treatment of metritis is far from being definitely established; divergence of surgeons in their opinions on this special point of gynecological therapeutics points to the obscurity of the nature of this affection.

Here, as everywhere, therapeutics have always been closely allied to the pathogenic conception and different modes of treatment, gradually abandoned, reflect faithfully the different theories that inspired them.

Forty years ago, in a case of metritis one saw only the local expression of a general state: herpetic eruptions of cervix, scrofulous[1] and rheumatic metritis, etc., were described.

With metritis was ranged congestion and uterine subinvolution, without exact knowledge of the lesions one was treating. Therapeutics participated in the uncertainty. It consisted mainly in a line of general treatment in keeping with the supposed diathesis of the patient, and of applying various local applications to the cervix.

Modern bacteriological work and the idea of infection abruptly simplified the conception and treatment of the inflammation of

[1] Martineau, Clinical Treatise on the Uterine Affections, Paris, 1879.

the uterus. The term metritis became synonymous with infectious lesion of the uterus and the treatment once clearly grasped, had as its simple object, the disinfection of the endometrium. Various and varied means have been tried to this end, varying from simple antiseptic treatment to curettage, which represents the most energetic expression of antiseptic treatment.

Latterly gynecologists have come to the conclusion that the role of infection has been exaggerated and we have a division into metritis and infective metritis, and then a variety of pathological conditions known as false metritis (Doleris), simple chronic metritis, non-infective, hypoplastic metritis (Doderlein), uterine sclerosis (Richelot),[1] etc.

These non-infective metrites or pseudo-metrites spring from a variety of causes. Generally, it is a local cause (tears of the cervix, prolapse, uterine deviations, tumors of the uterus, etc.).

Infection may have been the original cause; the primary microbe disappears, but the lesion continues to evolve and finally forms the disease without it.

At other times it comes from a general cause such as neuro-arthritis, eventually leading to a sclerosis of the uterus. Finally more recently, our attention has been drawn to lesions of the mesometrium,[2] either an insufficiency of muscular tissue combined with chlorosis or such affections as tuberculosis or typhoid fever, or a congestion or stasis brought about by sexual excesses, onanism, defective hygiene, or circulatory troubles due to arterio-sclerosis.[3]

The existence of these non-infective metrites is to-day sufficiently demonstrated, but it is often difficult to distinguish them from chronic infective metrites. From the clinical point of view, the differences are often minimal and at times do not exist. An etiological research from an interrogation of the patient is often very uncertain; there only remains the bacteriological examination which may also be uncertain.

It is certain that we should diminish in one's mind the role

[1] Richelot, Surgery of the Uterus.

[2] Theilhaber and Meier, Zur Anatomie, Pathologie und Terapie der chronischen Endometritis. *Arch. f. Gyn.*, Berlin, 1908, T. LXXXVI, p. 628. Hirsch, *Arch. f. path. Anat.*, Berlin, 1909, T. CXCVI, fasc. 3.

[3] Palmer Findley, Arteriosclerosis of the Uterus as a Casual Fact in Uterine Hemorrhage (*Am. J. of Obst.*, July, 1905, p. 71). Brooke M. Anspach, Metrorragia myopathica. *Univ. of Penn. Med. Bull.*, Feb., 1906, p. 322. R. L. Dickinson, Intractable Menorrhagia of Arteriosclerosis of the Uterus, *Brook. Med. J.*, 1906, T. XX, p. 45.

of infection and not at the same time to exaggerate the number and importance of those pseudo-metrites. Nevertheless it is certain that from the point of view of practice there exist a certain number of cases where antiseptic medication, with the object of destroying infective agents, is quite useless as these do not exist.

Finally, from the therapeutic point of view, we should take account of *concomitant lesions*, tears of the cervix, elevations, prolapse, etc., which if they do not cause metritis, favor, more or less, its development and contribute toward its support.

I. Prophylactic Treatment.

For *infective metritis* the indications for treatment are quite distinct. We must cure the vulvo-vaginal infections, which may ascend toward the uterus. We should do every gynecological exploration under cover of strictest asepsis. Aseptic precautions in pregnant women have a great importance; the majority of post-puerperal metrites result from some infraction of asepsis during an exploration or intervention during labor.

The retained placental remains may be perhaps the direct cause of infection as they favor at least the invasion of pathogenic agents.

Again from another point of view, we should take note of the state of the husband's urethra. A number of metrites are not only caused by, but kept up by, gleet and the treatment of this gleet is one of the most important prophylactic means we possess. Young men should be warned of the danger to their wives from a neglected and very small discharge.

In *non-infective metritis*, in which the pathogenic is still unknown, prophylaxis has not advanced much. The general hygiene as adopted by the woman is the capital point. The advantage of sufficient rest in bed after an accouchement abortion, of abstention from exaggerated or abnormal sexual stimulation, after menstrual troubles, etc., is generally admitted. There is nothing, however, definitely established in the foregoing.

II. Curative Treatment.

Curative treatment differs according as we have to deal with an acute or chronic metritis.

Acute Metritis.—We will only deal here with two types of

acute metritis, gonorrheal and septic, of which the latter is exemplified generally in puerperal metritis.

Gonorrheal Metritis.—The treatment is not extensive. The patient is put to bed and given complete repose. Give vaginal injection of permanganate of potash (1 in 5,000 to 1 in 20,000).

Secure a daily evacuation of the intestine. If there is acute pain, put ice on the abdomen, and prescribe morphia suppositories. In every case abstain from the least intrauterine intervention by reason of the possible invasion of tubes and peritoneum.

Septic Metritis.—In septic metritis, where puerperal infection is the most frequent, repose, diet, light laxatives, application of ice to the abdomen, antipyretics, general antiseptics as collargol or electrargol, and vaginal injections have been advised. But, contrary to the rules of treatment in acute gonorrhea, the local action on the uterus is our first thought. The means proposed to act on this organ are three: Intrauterine irrigations, curettage and hysterectomy.

Intrauterine irrigations which may be repeated one to three times in twenty-four hours constitute the simplest of the means we possess. In slight cases, they give excellent results, above all if one is careful not to combine with them any tamponing of the uterus which generally blocks it, but to do drainage of the cavity with a simple rubber drain instead.

In acting thus we do not pretend to destroy the microorganisms of the uterine cavity, but we avoid stagnation and diminish the phenomena of absorption. If the intrauterine irrigations are inefficacious, we should not wait, but go on to *curetting of the uterus* which is often indicated by another cause such as the existence of a retained product of the placenta.

There has been much discussion over the indications of curetting in cases of puerperal metritis.

A certain number of gynecologists particularly in Germany are opposed to it.

Its utility in cases of partial or complete retention of the placenta seems to us to be indisputable. In all cases of septic lochia with fever, we may always have recourse to it. The fear of

destroying the protective membrane of defense or of not evacuating all the intrauterine germs should not arrest the surgeon.

The somewhat rare complications we have observed are nothing in proportion to the considerable number of patients whose fever ceases on curettage, free irrigation and drainage of the uterine cavity.

When the intrauterine injections and curettage are powerless, the question of *hysterectomy* occurs to us. Theoretically it is indicated after failure of simple treatment when the uterus is the sole starting-point of the complications. When there are no infective foci outside it, neither peritonitis nor more remote lesions, caused by the transportation of septic emboli to some distance, in a word, when life is in immediate danger by reason of the existence of an infection in the uterus.

Unfortunately, in practice it is often difficult to be sure that life is actually in danger; a patient who seems lost is better the next day, others who seem to be doing very well suddenly show signs of being much worse. The secondary metastatic deposits are not easy to discover. Hesitation is, therefore, necessary before intervention. The results of the operation are, however, not very brilliant. Christeanu,[1] who has collected 137 cases, finds a mortality of 63 per cent., larger than for hysterectomy after confinement at full term, 64 per cent., and also larger than that after abortion, 42.2 per cent. It must also be understood that few surgeons are in favor of the radical operation. If resorted to, total hysterectomy is preferable to subtotal, as the infective lesions often spread to the cervix. As to the route to follow, it varies greatly; the vaginal route has been objected to because the uterus, soft and friable, is easily torn by traction of the teethed forceps; this objection fails, if in place of using teethed forceps we use large forceps with flat extremities of the same variety as cyst forceps. The abdominal route, however, most merits our preference because it permits, in cases where it appears necessary, of our operating on the veins of the pelvis, tying and excising those that are affected with suppurative phlebitis, an important point, as juxta-uterine venous suppuration, is far from rare in the cases that we are dealing with.

[1] Cristeanu, Hysterectomy and Acute Puerperal Infection. *Revue de Gynéc. et de Chir. Abd.*, Paris, 1904, p. 617.

Chronic Metritis.—The treatment of chronic metritis should be general and local at the same time.

General Treatment.—The importance varies according to the case. Even when we are dealing with a *chronic infectious metritis* we should not leave it completely on one side.

We should avoid all cases of congestions in the lower pelvis, and constipation in particular; this latter may be treated by use of enemas and laxatives. Repose is one of the first indications, and rest in bed, if the symptoms still show a certain character of acuteness or if there are any hemorrhages, or rest on a sofa if the patient is a chronic; we thus avoid fatigue, walking or standing for any period of time. Sexual congress should be absolutely forbidden.

Wearing a belt or appropriate corset, lifting up the lower abdomen and preventing the intestinal mass from pressing on the uterus is also of use.

To this hygienic treatment add an internal medication, which is, according to the case, simply tonic, antiarthritic or antilymphatic. Mineral water treatment may be of great use, if it is thought necessary to act on the general condition. The choice of a resort depends above all on the nature of general symptoms, which are superadded to the genital troubles.[1]

Local Treatment.—Local treatment of chronic metritis consists of a series of agents, which we will simply enumerate, and we have mentioned the technic of their execution earlier in this work. We will see later which agent is to be preferred according to the type of metritis we are dealing with.

The *vaginal injections* are currently employed. Remember the importance of the position of the patient and temperature of the injection. The nature of the fluid employed is only of a relative interest.

As *vaginal dressings* we use tampons of iodoform or salicylic gauze steeped in neutral or slightly iodized glycerine. We may also use ovules with a glycerine base. This last named merits, as a local application to the cervix and vagina, a reputation due to its hydragogic properties.

Cauterizations of the cervix with thermocautery or chemical

[1] See Mineral Water Treatment.

agents (tincture of iodine, chloride of zinc, nitrate of silver, etc.) may be of use. We should also use *intrauterine therapeutic* agents which are applied in various forms: intrauterine pencils, tamponings, uterine lavage, chemical cauterization and disinfection with touching up of the parts with formol in a solution of 30–50 per cent.[1] Remember the importance of preliminary dilatation which may besides constitute the principal stage of the treatment in rendering the uterine muscle supple and securing easy drainage of the uterine cavity.

Curettage, formerly regarded as the last resort in treatment of metrites, has now restricted indications for its use, also better determined ones.

Let us mention in conclusion that the different varieties of *amputation of the cervix* and more particularly amputation by Schroder's procedure or a modified form of the same, and finally *hysterectomy*, vaginal or abdominal, which may be indicated in some exceptional cases.

Such are the local means at the disposal of the surgeon in the treatment of metritis. We must make a choice from these, according to the form of metritis we are dealing with.

In a general way, metrites in their primary phase, in particular those which follow on the puerperal state, are accompanied by notable lesions of the cavity of the body; later, when the disease is characterized above all by abundant leucorrheal discharges, it appears to be entrenched above all in the region of the cervix. The treatment should be directed to the body or cervix according to the case.

In *gonorrheal metritis* of still recent growth, if gonococci are found in the uterine discharge, dilate the uterus and follow with liberal washing out with lukewarm solution of permanganate of potash, in strength varying from 1 in 4000 parts to 1 in 1000 parts.

At a more advanced period, if the gonococci are rare or disappeared, we should have recourse to cauterization with silver

[1] Menge recommends this agent very warmly. He rolls a thin layer of wool around the sound, steeps it in formol and applies both ends successively to the mucous membrane; the first to drain the mucous membrane, the second to change it. A piece of iodoform gauze is afterward inserted into the vagina to obtain a cauterization of its mucous membrane. The application should be renewed at the end of eight days and then at longer intervals. (C. Menge, Die Therapie der chronischen. Endometritis in der allgemeinen Praxis. *Arch. für Gyn.*, Berlin, 1901, T. LXIII, p. 291.)

nitrate (1 per cent. to 5 per cent.), chloride of zinc (10 per cent.), tincture of iodine, etc.

Always do a preliminary dilatation before these cauterizations. Between these cauterizations we may apply medicated pencils.

In *non-specific infective processes* at their onset or having become secondary, the treatment varies according to the anatomo-clinical conditions we are brought face to face with.

Hemorrhagic metritis justifies curettage of which it constitutes the triumph. Instillations of chloride of zinc give also excellent results in these hemorrhagic forms and may even cure these cases where curettage has failed, while uterine atmokausis has equally given numerous successes in infective hemorrhagic metritis, but the difficulty of its application and above all of regulating this very energetic therapeutic agent, determined us to reject its employ. One should choose then between cases for curettage or for instillations of chloride of zinc, after a preliminary dilatation.

In *leucorrheal forms*, intrauterine treatment has, for a time, been abused, such as the scraping, injecting or uselessly cauterizing of the uterine cavities. As Richelot very wisely remarks, the majority of cases of purulent leucorrhea is connected with lesions of the cervix, so they must be treated.

In *slight cases*, with enlarged cervix or with slight ectropion, a cure may often be very simply obtained by the combination of light cauterizations with nitrate of silver or applications of iodine, etc., and dressings to the vagina.

In *grave cases* we should have recourse to a more energetic treatment and make use of cauterizations with Filhos' caustic. If the cervix shows characteristic lesions of sclero-cystic degenerations, we should, without hesitating, amputate it by one of the anaplastic procedures we have described.

In the lesions which are manifestly not infective and are sometimes described under the names of *congestion* and *uterine sclerosis*, curettage and intrauterine treatment is not often of great use.

For uterine congestion in virgins rest in bed, during menstruation and abstention in the intervals from violent exercise (horse riding, bicycle and abuse of dancing) constitute the base of the treatment (Siredey). The uterine medication (hydrastis

canadensis, viburnum prunifolium, piscidia erythrina and above all quinine sulphate in doses of 16 to 24 grains) render signal services (Richelot).

In a young woman, hot vaginal injections at 50° C., of from 5 to 10 liters, given gently under low pressure, diminish greatly the pains and hemorrhage. Glycerine applications, electricity and massage render service. Intrauterine therapeutic agents have hardly any use in the hemorrhagic forms.

In all cases general treatment has a great importance. One should avoid all cause of pelvic congestion, such as constipation, by giving enemas and laxatives so as to get a good motion daily, but no true purgation. Alcoholic drinks, meat in excess, iron preparations are useless and often harmful. Baths, in particular alkaline ones, friction with horse hair gloves and general massage, in short, anything that stimulates the circulation is indicated. A point which should never be rejected is to endeavor to diminish the pressure on the uterus and consequently it is necessary to proscribe corsets which constrict the waist and force the abdominal contents toward the pelvis. On the contrary advise the use of a belt or corset which strongly elevates the lower pelvis. A thermal cure will certainly do much good. Neris and Luxeuil are useful for nervous patients; the former of these is specially good for those patients in whom nervous erethismus is excessive and the latter for those in whom a nervous condition is combined with gastrointestinal troubles such as entero-colitis; on the contrary, if the general troubles of nutrition are marked, recommend Vichy, Royat, Chatel-Guyon, Vittel.

All these agents are very suited to cases that are plainly sclerosis of the uterus. One can in the hemorrhagic forms add to it local treatment and in particular dilatation of the uterus. The operations to produce atrophy, subvaginal amputation and above all supravaginal amputation of the cervix, render useful service in advanced cases. In more particularly rebellious cases, with great uterine enlargement as also in cases of alteration of the mesometrium united with arteriosclerosis, this treatment may be able to check it, and the necessity of a more serious intervention may be necessary to prevent complication and particularly hemorrhage. It is for such cases that complete destruction of the mucous membrane by intrauterine vaporization has been recom-

mended; hysterectomy with a better technic and more certain results appears to us to be preferable; we have recourse to it in the circumstances.

Let us add in conclusion that in whatever form of metritis we are dealing with, it is always essential to treat the *accompanying lesions.* To do this, operations, sometimes complex, such as curetting, amputation of the cervix, colporrhaphy perineorrhaphy and hysteropexy, may be carried out at the same operation, and is the only means of procuring a definite cure, as a treatment which is directed solely against the inflammatory would only give a temporary amelioration.

2. Treatment of Inflammation of the Adnexa.

The treatment of inflammation of the adnexa has passed through very varied stages. Up to the appearance of antisepsis lesions of the adnexa, the pathology of which was little known, belonged to the domain of medicine. Gradually intervention was carried out in certain periuterine collections appearing during the course of the puerperium.

The fact that one could antiseptically open the peritoneal cavity without danger, changed the face of the situation and almost all lesions of the adnexa appeared to justify extirpation. Tait was one of the protagonists of this radical surgery; he did not hesitate in a unilateral adnexitis to remove the tube and ovary of the healthy side, believing that later its infection was almost inevitable.

It is useless to recall the discussions which arose in extra-medical circles over the incontestable abuse of removal of the adnexa. These discussions have lost to-day their primary bitterness, while time shows that more and more, by a sort of reaction, the tendency of surgeons is to practice in the most extensive measure possible, conservative operations. In the last few years there has been a movement in Germany against all operative treatment, even against conservative operations. Amann, who, in 1899, operated 24 per cent. of women with inflammation of the adnexa, in 1901 did only 4.5 per cent. and considers the operation as indicated in lesions of a tuberculous nature. A certain number of gynecologists have rallied to this

view, to a certain extent. Treub had already expressed the same opinion.

In America and in France, on the contrary, the operation is still the order of the day.

We will study the treatment of inflammation of the adnexa in the acute and chronic state.

I. Acute Adnexitis.

The treatment of acute inflammation of the adnexa, putting aside suppuration, is of the simplest. The alarming manifestations at the commencement are in relation to the peritoneal retention which accompanies acute salpingitis. Again these inflammatory peri-adnexal foci have generally a natural tendency to spontaneous cure. It suffices to aid nature in her cure. In slight cases, rest in bed combined with hot vaginal injections and daily evacuations of the bowels by enemas or mild laxatives, a low diet is sufficient treatment. If there is acute pain, the constant application of ice to the abdomen, and sometimes analgesics, are indicated.

Generally the trouble slowly disappears, the patient gets well or is left with a chronic inflammation of the adnexa. Exceptionally general troubles become worse, the fever and pain increase, and a purulent collection forms in the neighborhood of the uterus. The surgeon should then intervene and incise the collection on the most accessible, either by colpotomy, which is generally employed, or sometimes by an iliac incision. The choice between the vaginal route and the iliac route is subordinated to the results obtained by the physical examination.

II. Chronic Adnexitis.

In the treatment of chronic adnexitis, the first question which occurs to us is: when should we adopt medical treatment, and when, on the contrary, should the surgeon intervene?

If the clinical history of the disease (former brief attacks of pelvic peritonitis, pains, fever, etc.) and the physical examination (large fixed mass) makes one suspect the existence of suppurating lesion there should be no possible hesitation; we must operate.

If there is absolutely no suppurative lesion, we should wait and try medical treatment. A certain number of objections have been made to the *conservative treatment:* the long duration, the danger of after attacks, and the number of failures. These criticisms have been a little exaggerated. Every time, practically, that we do not think that we are dealing with a suppurative lesion, we advise medical treatment.

The base of this treatment is the combination of rest in bed and hot vaginal injections. Rest is the fundamental principle. It does not consist of half resting, but of complete, absolute rest in bed or on a sofa. The employment of half measures, as for example in allowing the patient non-fatiguing occupation,

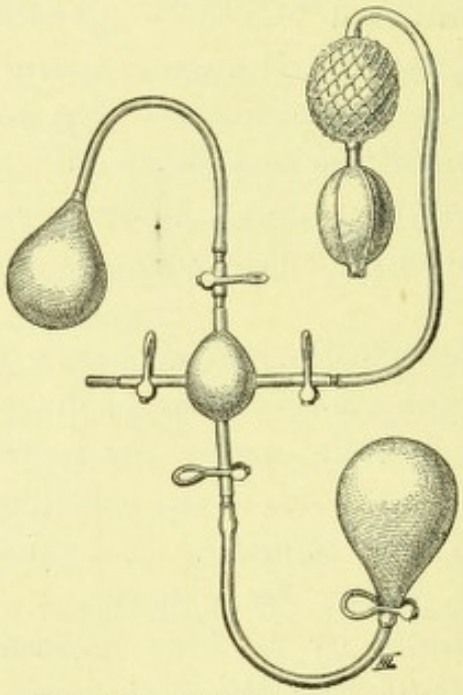


Fig. 358.—Pincus' apparatus.

should be absolutely condemned. The question is, can the patient carry out this treatment? Hot injections of say 48 to 50° C. and the application of moist heat to the abdomen and warm baths, either salt or alkaline, constitutes the treatment in addition to rest. It has also been advised to use very hot enemas, which act like vaginal injections and give as good results. One should pay attention naturally to the regularity of the digestive functions and to treat the general state by appropriate means.

A certain number of German gynecologists state they get good results by vaginal packing, and passing hot air into it.

Treatment by this packing is derived from the old columnization of the vagina and the methodical tamponing by which one tries to secure a sustained pressure on the diseased parts. One of the best means of doing this is with Pincus[1] apparatus. The patient is placed on the table with the pelvis and lower limbs raised (see Fig. 359). Then insert into the vagina an india-rubber bulb resembling the Gariel pessary. This bulb is united by a rubber tube to an elliptical glass receptacle, which has three tubes and three corresponding balls. One communicates directly with the air, the second with an insufflator, and the third with a second india-rubber ball full of mercury (Fig. 358). By elevating this last, one gently squeezes 500 grams of mercury into the vaginal bulb, gradually increasing the weight, but never going beyond 1200 to 1500 grams.

This compression is left for one, two or three hours or longer.

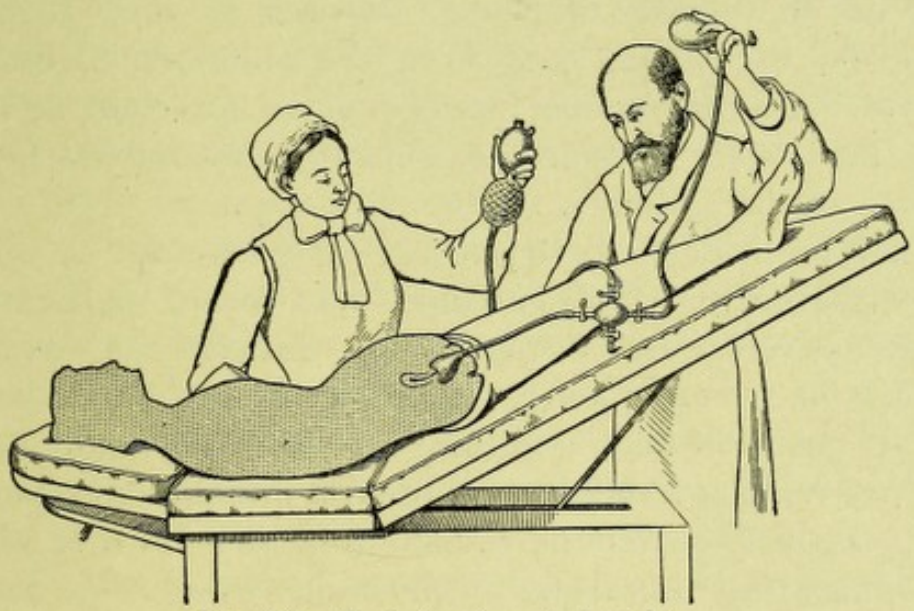


Fig. 359.—Technic of vaginal packing.

We should never abruptly bring the compression to an end, so as to avoid pelvic congestion "in vacuo." Now we employ the insufflator. As the vaginal bulb of mercury is emptied by lowering the whole apparatus, air is injected, and finally the tap is opened to allow the air to escape gradually in its turn (Fig. 359).

At the same time an external compression is made on the abdomen with a weight of 2500 grams of shot.

The heating of the abdomen helps the absorption of exudates. This is carried out with a kind of hot-air apparatus which

[1] Pincus (L.), *Belastungslagerung*, Wiesbaden, 1905.

encloses the whole of the abdomen, and the heat is generated by electric lamps,[1] gas heaters or alcohol lamps. In order to permit the hot air to act not only externally on the abdomen, but also by the vagina, a tubular speculum is inserted which consists of practically a non-conductor of heat (wood or hardened rubber).

The air enters the apparatus at a temperature of 100° or 120°. The sittings which last 15 minutes at the beginning are progressively prolonged to three-quarters of an hour. The skin is dripping; the parts of the body in the apparatus resemble a boiled crayfish, and an abundant discharge occurs by the cervix. It is advantageous during the sitting to place a compress soaked in fresh water on the forehead.

The patient should only have a sensation of pricking; if she complain of burns, we must immediately lower the temperature by turning off the source of heat. As soon as the "seance" is finished, dry the patient and wrap the abdomen in hot wool, and cover her with woollen blankets so as to retain as long as possible the heat. In short, we substitute an intense heat and congestion of the abdomen for the old cataplasm.

Should we in adnexitis try to act on the lesions by an intrauterine treatment? This method has warm partisans and obstinate adversaries. Generally, it consists of dilatations followed later by tamponing, curettage, or by catheterizing the tubes. It has even been said that a pyosalpinx might be evacuated "per vias naturales." Anatomical and anatomo-pathological data scarcely permit us to believe in this and it is held that only suppurating intratubal collections should be removed. There are cases where intrauterine treatment causes improvement; the endometritis reacts indirectly on the adnexal lesions. There are those cases in which the tumefaction is not properly speaking formed by the inflamed adnexa, but consists of peritoneal or periuterine exudates which proclaim themselves clinically by a diffuse puffiness of the fornices without one being able to discern a well defined, limited tumor. For patients with

[1] Polano, Eine neue Methode der Behandlung chronischen Beckenexsudate. *Centr.-Bl. f. Gyn.*, Leipzig, 1901, p. 857, et Zur Anwending der Heissluftherapie in der Gynakologie. *Ibidem*, 1902, p. 961. Kehrer, Beitr. zur Behandlung chronischen Beckenexsudate. *Ibidem*, 1901, p. 1409. Jung, Beitr. z. Heissluftherapie bei Beckeneiterungen. *Münch. med. Woch.*, 1905, p. 2521.

lesions of this kind, uterine dilatation followed by prolonged drainage of the cavity is indicated; following on this drainage, one may see the uterus gradually lose its congestion, return to its former state and the periuterine lesions gradually retrogress.

Quite recently, Aulhorn stated he got good results even in pyosalpinx. With a syringe holding 2 1/2 c.c., and a flat, slightly curved cannula provided with several lateral orifices, he injects with moderate pressure into the uterine cavity. The liquid used should be bactericidal, specially antigonococcic, and at the same time should not come into contact with the peritoneum, as nitrate of silver would cause a severe irritation. The liquid used should be argentamine (a solution of phosphate of silver in some ethylic diamine) in a 2 per cent. solution.

At first one should inject only 1 1/2 c.c. of the solution as the injection causes cramp-like pains; after several injections the patient suffers much less and the whole contents of the syringe may be injected with sufficient force to make the liquid penetrate into the tubes. The results were excellent. Eighty-two per cent. of the patients were completely relieved of their troubles in 4 to 5 weeks.[1]

Whatever the treatment employed, even if the tuberculous cases are left on one side and where operation is always required, surgical intervention is nevertheless indicated when a grave condition threatens life, or when acute attacks follow on a chronic lesion, or when conservative methods have failed, and there is no change in objective or subjective symptoms. We should also take into account the social condition of the patient and the life she leads. Also in spite of numerous attempts, carried out latterly, to enlarge the domain of non-operative treatment, we believe that in a great number of cases one will be obliged to have recourse to the removal of diseased organs. When the necessity of a bilateral removal is indicated, we should remove the uterus at the same time as it is useless to preserve it and it may lead to various discharges.

The operation is not, however, necessarily destructive and the surgeon should endeavor to preserve all or part of the diseased adnexa in a certain number of cases. We have seen how

[1] Aulhorn, Die Behandlung entzündlicher Adnexerkrankungen mit intra-uterinen Injectionen. *Arch. f. Gyn.*, Berlin, 1910, T. XC, p. 213.

a certain number of conservative operations is at our disposition (simple freeing of adhesions, followed or not followed by salpingopexy, expression of the tubes, salpingostomy, ignipuncture, and partial resection of the ovary).

These different conservative operations may give success, and pregnancies may develop later; but the number of these is not as great as one would think *a priori*. If they are frequent after freeing of the adnexa, ignipunctures and partial restrictions of the ovary, they are exceptional after salpingostomy.

Also in obliterations of the infundibulum we are tempted to systematically remove the diseased organ and remove, at the same time, the uterus if there are bilateral lesions. The preservation of the uterus has no object and has only drawbacks; it leaves in the abdomen a bleeding surface, a cornu often infected, and a deviated organ; the enlarged uterus is diseased and the origin of various discharges, of a sensation of bearing down, and of pelvic uneasiness; its preservation is only a cause of complications and trouble.

Latterly following Beuttner's example, we have combined the removal of the pyosalpinx with a wedge from the uterus and conservation of one or two ovaries. The early results have been very good; but our observations are still too recent in order to allow us to formulate a definite opinion on the value of the procedure.

CHAPTER II.

TREATMENT OF NEOPLASMS OF THE UTERUS AND ADNEXA.

Summary.—Uterine fibromata (general indications of treatment; Treat. palliative, medical, surgical; Treat. radical, vaginal and abdominal myomectomy, hysterectomy, vaginal and abdominal).—Fibromata and pregnancies.—Malignant tumors of the uterus (sarcoma cancer, Treat. radical and palliative).—Cancer of cervix and pregnancy.—Tumors of the ovary.

1. Treatment of Uterine Fibromata.

Uterine fibromata (fibrous bodies, myomas, fibromyomas, etc.) are tumors whose structure resembles that of uterine tissue. They are benign neoplasms, in this sense that in contradistinction to cancer, they do not become generalized and are not propagated to the glands. They are, however, tumors for which an operation is often enough indicated on account of the complications they produce, even in the absence of any secondary degeneration. The complications are various: some are, so to speak, directly in connection with the fibroma, such as hemorrhages, which so frequently accompany them, and which are almost constant, when the tumor projects into the uterine cavity. Others are the consequence of secondary inflammatory lesions, and particularly those of the adnexa; finally others result simply from the progressive growth of the tumor, its enormous size and the interference it causes to the intra-abdominal organs.

These considerations explain to us why certain fibromas should be operated and why others should be abandoned to themselves. Some partisans of intervention in all cases invoke to aid their ideas the benign character of early operation, the possible sarcomatous transformation of the tumor, and the extreme gravity of a late hysterectomy. It is certain that hesitation formerly was carried to an extreme, and that it is a mistake to await the menopause at any price, reckoning with retrogressive influence on the myomas. The operation is often necessary, even when menstruation has ceased.

But between these exaggerated opinions there is a happy medium. To-day the majority of surgeons, while regarding operation as indicated in the majority of cases, think that stationary fibromata unaccompanied by hemorrhages, pain, compression phenomena, may be submitted to a purely palliative treatment while being carefully watched so as to be always ready to intervene in any case where a change in the evolution of the tumor occurs.

I. Palliative Treatment.

Palliative Medical Treatment.—A series of agents have been advocated for the purpose of avoiding operation. Rest in bed during hemorrhage, leaving off a too tight corset, use of a hypogastric belt and hot vaginal injections of 48° to 50° C. have in turn been recommended to lessen congestion of the pelvis and all have their use.

There are also certain drugs. Fluid extract of hydrastis canadensis, 25 drops two or three times a day; viburnum prunifolium, piscidia erythrina, hamamelis, virginica, stypticine, iodipine, salypirine, and above all ergot, the systematic employ of which was suggested by Hildebrandt.

Ergotine may be given by mouth or rectum. Generally it is prescribed as a hypodermic injection.

Pozzi advises the following prescription:

℞.	Ergotine,	grams v
	Chloral hydrat.,	grams j
	Aqua destill.,	grams c.

Inject daily 12 drops of this solution. The injections should be done with all the indispensable aseptic precautions, either into the muscles of the buttock or shoulder. We can thus obtain an action on the hemorrhage, and no complications of intoxication are observed, but pains and abscesses are frequent enough. Treatment is long and painful, and gives hardly any cures.

Chloride of soda mineral waters (Salies-de-Bearn, Briscous-Biarritz, Salins du Jura, Kreuznach, etc.) have an action which is sometimes real on hemorrhages, and they have the advantage of stimulating the general nutrition.

Electricity has played for some twenty years an exaggerated role, as a result of Apostoli's work. It appears to act in interstitial fibromas, which still participate in the life of the uterus. It acts essentially on hemorrhages, and also on the pain; its influence on the size of tumors is less certain. If we add that its action is not always harmless, as one would at first be led to believe, and that patients have died as result from peritonitis, perforation of the rectum and bladder, it will be understood why we have reserved its application and that we have had recourse to it only in those women who were rebellious to all operative treatment, toward the approach of the menopause and afflicted with interstitial fibromata of fair volume which are mainly troublesome owing to the hemorrhages and pain they cause.

Latterly we have had recourse to X-rays to destroy the ovaries and thus bring about an artificial menopause. Kronig obtained amenorrhea in 60 per cent. of cases and oligomenorrhea in 30 per cent. The indications for intervention for hemorrhagic myomas may be thus limited, as we may have recourse to X-ray treatment in patients who are blanched with loss of blood, or in any fat patients or in those with bronchial catarrh. In a word, in all those where operation indicates a particular gravity. We certainly, by these means, secure a reduction in the results of the mortality of radical intervention, as we exclude the gravest cases from operation.[1]

Palliative Surgical Treatment.—A number of surgical means have been brought forward to avoid the radical operation and have been successively advised: hemostatic dilatation of the cervix, intrauterine curettage and cauterization, atmocausis atrophying ligatures, ovarian castration, and pressing back into the abdomen a tumor enclosed in the pelvis, and producing compression complications. All these means were tried when surgical intervention in fibromas was a serious affair. They have no reason for existence to-day. If recourse to operation is

[1] Krönig et Gauss, Wie weit wird durch Röntgenbehandlung unsere operative Therapie bei Uterus blutungen und Myomen beeinflust? *Münch. med. Woch.*, 1910, p. 1529.

imperative, do the radical operation, which is hardly more serious than operation of minimal appearance, and in addition it is a curative operation.

II. Radical Treatment.

As uterine fibroids are so various the operations are also.

For polyps which project into the vaginal cavity, *vaginal polypectomy* is the operation of choice.

If the fibroid simply projects into the uterine cavity, we should do a *transvagino-uterine myomectomy* after first doing a preliminary hysterotomy.

In all these cases there is no discussion on the choice of procedure. For other varieties of fibromas, however, opinions differ; some desire the conservative *intraperitoneal myomectomy*, while others of the radical school cannot agree and either do *vaginal hysterectomy or abdominal hysterectomy.*

Abdominal Myomectomy.—After opening of the abdomen, if we find a single tumor pediculated, myomectomy is the operation of choice. It is even advised to do this in single tumors which are sessile, but projecting markedly from the external surface of the uterus.

If it is necessary to have recourse to it for interstitial fibroids, and above all for multiple fibroids, Martin, in Germany, Kelly, in America, and Tuffier, in France, advocate this operation. It is very tempting to confine the operation to incision of the capsule of the fibromas and to their enucleation; it is the conservative treatment, par excellence. The patient continues her menstruation and may have children. Of 109 operations Temoin[1] has observed five pregnancies come to a favorable conclusion; Engstrom in 180 cases had nine pregnancies. But these are particularly fortunate results. Winter[2] collected 129 remote cases of myomectomy, and found only three pregnancies and of these three one ended in an abortion at the third month. Schauta only had one single pregnancy in 39 cases. Graf in 30 myomectomies only had

[1] Cited by Tuffier and de Rouville, Report to the XV. Congrès international de médecine, Lisbonne, 1906.

[2] Winter, Die wissenschaftlichen Geundlagen für conservativen Myomoperation. *Zeitschr. f. Geb. u. Gyn.*, Stuttgart, 1904, T. LI, p. 105.

one pregnancy and which terminated in an abortion at the third month.[1]

The argument thus shown of the possibility of consecutive pregnancies while it still has a certain value, has less than one would *a priori* suppose.

On the other hand, while the mortality has diminished since 1890, when Martin had 18 deaths in 96 operations, the average mortality of abdominal myomectomy is considerably higher than that of other operations for myomas. According to Winter, it is about 44 for 451 operations or 9.8 per cent. It is true that we find more favorable statistics, as Temoin had only five deaths in 109 operations or 4.1 per cent.

It seems to us that as practically established that myomectomy which is only applicable to fibroids that are easily removed having no adhesions, and without lesions of the adnexa has an incontestably more serious prognosis than hysterectomy.

If we add that many women complain after this operation of persistent trouble, of inability to work, and seeing that one cannot be sure of removing all the nodules, also that sometimes we have recurrences necessitating a second operation, it will be understood that its indications are relatively limited; *e.g.*, a young woman desirous of having children, and having only one or at least a small number of myomas and without any inflammatory lesions of the adnexa.

Vaginal Hysterectomy.—Vaginal hysterectomy, which has been applied by Segond to large tumors reaching up as high as the umbilicus, has gradually had its domain restricted by abdominal hysterectomy. Personally we have hardly ever used it. In its favor its lessened gravity has been advocated; that is wrong, the mortality of the abdominal operation in small or medium-sized fibroids is to-day almost nil. That which raises the mortality of the abdominal operation is that the operation is the only one applicable to the enormous tumors often accompanied by renal lesions or cardiac degeneration tumors which even the most ardent partisans of the vaginal route are forced to remove by the abdomen. Even burdened with these bad

[1] Raoul Graf, Zur Frage der konservativen Myomoperationen. *Zeitschr. f. Geb. u. Gyn.*, Stuttgart, 1906, T. LVI, p. 103.

cases it is certain that abdominal hysterectomy is preferable to vaginal.

We will prove this by taking the statistics of the most ardent advocates of vaginal hysterectomy in France:

Segond, 66 cases, 7 deaths.

Bouilly, 109 cases, 8 deaths.

Richelot, 139 cases, 5 deaths.

Total, 314 cases, 20 deaths, or a mortality of 6.36 per cent. and our abdominal operations give a mean mortality of 4.1 per cent., that is, 11 deaths in 268 cases.

Vaginal hysterectomy is still indicated for medium-sized or small tumors, situated low down in women with an excess of adipose tissue on the abdominal wall and having at the same time a large vagina and a dilated or easily dilatable vulva.

Abdominal Hysterectomy.—Abdominal hysterectomy is indicated in the immense majority of myomas. The only question which presents itself is, if it is better to have recourse to a total or subtotal operation. One of the arguments in favor of total is the possibility of a cancer developing secondarily in the cervix left behind. Botzony has gathered together 27 cases; it is fair to add that after total hysterectomy secondary cancers of the vagina have already been published.

Again, total hysterectomy is certainly more serious than subtotal; it is about 6.6 per cent. in 499 cases for the total and 2.61 per cent. in 724 cases of subtotal, according to the statistics of Botzony. The subtotal removal we consider is the operation of choice and we only do the total in those cases where the cervix is chronically inflamed. In a general way, it is admitted that the preservation of one or both ovaries is useful as preventing the complications of the artificially induced menopause.

2. Fibroids and Pregnancy.

It is difficult to give precisely the indications for treatment in cases of myomas complicating pregnancy, as there is little agreement on the subject of the reciprocal influence of myomas and pregnancy.

There is still a subject of discussion, the influence of myomas on conception, on the evolution of pregnancy and its termination.

While Hofmeier, Pinard and others do not regard myomas as being a cause of sterility, Olshausen finds that 30 per cent. of women with fibroids are sterile, and Winckel finds 41.6 per cent. The coincidence of fibroids and sterility appears undeniable but we are not tempted to accept Pinard's opinion that a woman has a myoma because the uterus has not fulfilled its function of gestation.

Opinions differ even on the action of fibroids on the evolution of pregnancy. Jamain, in his thesis, inspired by Pinard, writes that fibroids in the great majority of cases do not hinder pregnancy in any way.[1]

And while Pinard found 20 abortions or miscarriages in 84 pregnancies in fibromatous uteri, Anton Garkisch found 86 abortions in 232 pregnancies.[2]

The same lack of agreement from the point of view of presentation when the pregnancy arrives at term.

P. C. =90 per cent. (Pinard); 54 (Olshausen); 51 (Lefour);
P. S. =7.8 per cent. (Pinard); 24 (Olshausen); 32 (Lefour).
P. Tr. =0.9 per cent. (Pinard); 19 (Olshausen); 17 (Lefour);

On a single point the opinions agree: the relative frequency of the faulty insertion of the placenta.

In presence of the divergences of opinion, it can be understood that the indications of operative intervention have been very variously regarded. It appears that accord tends to limit the domain of the operation and in a general way the operation should be rejected.

While when there are serious complications, such as hemorrhage, torsion of the pedicle, etc., or when the tumor develops rapidly, or if there is acute pain, the surgeon is authorized to intervene.

If it is possible to do a myomectomy without opening the uterine cavity, it would be done in the hope of seeing the pregnancy continue its evolution. But, if the myomas are big and developed in the inferior segment of the uterus or projecting into the uterine cavity, a radical operation is necessary. If the

[1] Jamain, Uterine Fibroids and Puerperality. *Th. de Paris*, G. Steinheil, 1906–1907, No. 37. See discussions of the Société d'obstétrique de gynécologie et de pédiatrie, Paris, 1900, and of the American Gynecological Society of 1903.

[2] Anton Garkisch, *Klin. und anatom. Beitr. z. Lehre v. Uterusmyom*, Berlin, 1910.

fetus has not reached the age of viability we should have recourse to hysterectomy.

If the fetus is viable, the operation of choice appears to us to be Cesarean section, followed immediately by hysterectomy.

Leaving out complications, should one in all cases await labor and proceed to the accouchement *per vias naturales?* In order to give an idea of that which this line of conduct leads to we have Pinard's statistics published by Jamain in 158 cases:

In 158 women, we find 23 infants dead before, or during, or immediately after confinement, one confinement at five months, two at seven months, five at eight months, three at eight and one-half months, 41 during the ninth month and 15 near term; 68 only reached full term. Fibroids have therefore an unfortunate influence on the normal development of the fetus; it would be still greater if only the really grave cases were taken into consideration, because in these statistics figure a large number of cases where there was only a medium-sized or small fibroid, developed in the body of the uterus and not appearing to interfere with the development of the uterus and labor. Also we believe that distinctions should be made between cases. For the non-encapsulated we should await term and seek to obtain expulsion *per vias naturales;* in the presence of fibroids developed in the inferior segment, above all in cases of multiple tumors, we do not hesitate to operate before labor, doing first a Cesarean section followed by hysterectomy. In the hands of an experienced surgeon the operation seems hardly more risky than the total of immediate risks and those resulting from a secondary removal of fibroids, and the chances of having a living child are perhaps greater.

After accouchement, a rapid intervention is only indicated if there are complications of gangrene, suppuration, or septicemia. With the exception of these cases, one should always wait until the end of the period of involution of the uterus before making a decision, reflecting well on the operative indications as in ordinary cases quite apart from any modification due to pregnancy.

3. Malignant Tumors of the Uterus.

The recognized existence of *a sarcoma of the uterus* constitutes an indication of immediate total removal of the organ. This

operation should give real cures. Gessner in his statistics of 61 cases gives the following results:

Twenty-six sarcomas of the mucous membrane, ten recurrences, five at the end of two, three, five, six and seven months, four after one year, one after two years; 16 have been under observation and are well, four after one to two years, five after two to three years, one after three years, one after five years, two after six years, three after four years, one after five years, two after seven years and two after eleven years.

Thirty-five sarcomas of the wall, 14 recurrences between one month and four years, 21 patients have been seen again without recurrence; 11 after two years, two after three years, three after four years, one after five years, two after seven years and two after nine years.

The radical operation of *cancer of the uterus* gives even more lengthy cures, as we have already mentioned in dealing with abdominal colpohysterectomy.

We may therefore conclude that the treatment of malignant tumors of the uterus is essentially operative and that if a total removal of invaded parts could be carried out it should always be done. We will not return to the indications of the so-called radical operation as we have gone into them very thoroughly under the heading of *abdominal hysterectomy* and we will deal only *here with cases that justify a palliatve treatment.*

Some gynecologists[1] advised *vaginal hysterectomy* for cancers which having gone beyond the limit of indications for the radical operation are not nevertheless too advanced (D. de Ott, Bouilly). The removal of the uterus would suppress hemorrhages and discharges; the recurrence taking place above the dome of the vagina would result in a long interval of time elapsing before ulceration occurred. Formerly we followed this practice; the results we obtained did not appear to us to be superior to those of simple curettage. We have also rapidly abandoned this operation, which gives an early and serious prognosis.

The best of palliatives is *curettage*, which is followed by igneous cauterization. It is the treatment "par excellence" for hemorrhages and ichorous discharges, which are so annoying to the patient. Curettage is also done as completely as possible and

[1] See J. Récamier, Treatment of Inoperable Cancer. Paris, G. Steinheil, 1905.

followed by an energetic cauterization with the thermocautery. This is successively passed over the whole extent of the cavity; the floating debris of the cervix are excised and the cavity made smooth. Finally we finish the opération by making an extensive lavage with sublimate solution, drying the part and tamponing with simple or iodoform gauze.

The results are excellent and the mortality nil. It is astonishing to see how the parts heal and curettage may in certain cases be repeated several times with advantage during the course of the disease.

Its use is well established in cancer with consecutive pyometra following, combined oftenest with cancers of the isthmus, where the intrauterine secretions do not discharge well on account of the blocking up of the inferior portion due to the intracervical tumor which obliterates the canal of the cervix. This complication only disappears when a large opening permits of regular evacuation and lavage of the uterine cavity. Fever and expulsive-like pains, intermittent discharges of pus, and sometimes of gas cease when a tunnel has been made bringing freely into communication the interior of the uterus and the vagina.

Chemical cauterization with chloride of zinc, carbide of calcium, etc., appear to us to be inferior to curettage; their application is often very painful and it is impossible to limit their action.

For nodular epitheliomas of the cervix quite inoperable and with bleeding cancerous vegetation sometimes non-ulcerated, methylene blue, 2 to 1000 (Mosetig-Moorhoff) has been recommended. It is given as an injection. Absolute alcohol injections (Schultz) are also recommended. These injections appear to act by bringing about a necrosis of certain points of the tumor and in bringing about a formation of fibrous tissue at its periphery, which retards the growth of the neoplasm. We have no experience of these forms of treatment, as we always prefer conoidal amputation of the cervix with a thermocautery.

Atrophying ligatures with which we have experimented have only given a very temporary arrest of the secretions and we cannot recommend them. The application of X-rays and above all radium therapy often bring about a superficial cicatrix, but

below the lesions progress and the very small amelioration is in short less than that which follows curettage.

With the exception of curettage, followed by igneous cauterizations, we can only recommend as local treatment the employment of antiseptic injections (potass. permang., hydrogen peroxide, and Labarraque's liqueur) and vaginal dressings. The latter are particularly useful if we have to deal with repeated hemorrhages; simple iodoform tampons suffice to stop them.

If the neoplasm has invaded the rectum, if a large fistula exists with an incessant discharge of matter from the vagina or if the cancerous vegetations in the intestine interfere with its evacuation we may relieve the patient by doing an *iliac colostomy*. Pauchet did successfully a bilateral shutting off of the intestine in a woman whose ileum had a fistula at a point where a recurrence had occurred secondary to a vaginal hysterectomy. In all these cases of secondary invasion of the intestine it is the intestinal lesion which demands intervention, and treatment should be carried out as if no uterine cancer existed.

When the bladder is invaded and a vesico-vaginal fistula is formed the continuous discharge of urine leads rapidly to very painful erythema, and if one is not careful to a slough of the sacrum. There is no operative treatment to advocate; it is better to make the patient lie on a rubber mattress which is perforated and to wash out the vagina repeatedly with a solution of bicarbonate of soda in 1 to 1000 or 1 to 5000 so as to diminish the irritation caused by the passage of urine and to pacify the painful erythema. The free application of 25 per cent. zinc oxide ointment to the skin in order to protect it is of service and cystitis and sloughs are treated in the usual way.

Toward the end the treatment will be limited to supporting the patient's strength, *easing her pain* and sometimes to intervene for anuria which follows on compression of the ureters. Section of the posterior nerve roots has also been advised to quell intolerable pain. This is carried out at the level of the lumbar enlargement so as to anesthetize the lower limbs, buttocks and pelvis (J. L. Faure), separation of the rectum with section of the presacral sympathetic branches (Jaboulay), distention of the filaments of this sacral plexus by injection of artificial serum between the posterior surface of the rectum and the anterior surface of

the sacrum, and finally ano-rectal dilatation which acts indirectly on the uterine pain (Poncet).

To this operative treatment of pain we prefer the simple use of narcotics, in particular subcutaneous injections of morphin or of heroin, which we must not hesitate to give in sufficient doses to produce sleep. Suppositories of extract of thebaine and antipyrin cachets also render service. Epidural injections, the technic of which is much more complicated, do not appear superior from the point of view of results.

The slow uremia characterized by oliguria, gastric troubles, changes in the temperament improve after giving saline purgatives, oily enemas, subcutaneous injections of artificial serum, caffeine, pilocarpine and milk diet.

To combat early anuria due to compression of the ureters, various operations have been done such as lumbar ureteroneostomy (Le Dentu), nephrostomy (Legeu, Chavannaz, Poncet, Jayle). It must be understood that this anuria is often remittent and that after several days, under the influence of diuretics and injections of serum, the secretion has reappeared and the state of the patient improved. We hardly ever advise these operations, which are often useless and which in case of success only lead to a prolongation of a miserable life.

4. Uterine Cancer and Pregnancy.

In presence of a uterine cancer complicated by pregnancy[1] the therapeutic indications are governed by the *degree of operability* of the mother and the state of *viability of the fetus.*

The first question that appears is: Is the cancer operable or non-operable?

Operable Cancer.—The evolution of cancer, during pregnancy, is extremely rapid and we should not hesitate about a decision; it would result probably in sacrificing the life of the mother, while conserving limited chances of saving the infant.

During the first four months the operation is that of vaginal hysterectomy. The uterus is drawn down to the vulva very easily because of the relaxation of its suspensory apparatus

[1] Cullen, Cancer of the Uterus, N. Y., 1900. Oui, *Ann. de gyn.*, Paris, 1907, p. 193. Sarvey, *Handb. d. Gyn. de Veit*, Wiesbaden, 1899, T. III, second part, p. 489.

following on pregnancy. The uterus, generally, may be taken out en bloc with its contents. At the fifth or seventh month total abdominal hysterectomy has been done, supravaginal amputation being followed by extirpation of the cervix by the vagina (Zweifel), and the abortion having been excited is followed by vaginal hysterectomy once the involution is effected. To-day the general tendency is in this case, to do a vaginal hysterectomy, splitting the uterus once the cervix is liberated from the vagina and the parametrium, and afterward proceeding to the extraction of the fetus and finishing as usual. It is about the eighth month that the question of the child occurs. We must bring forth a living child and do a radical operation for the mother. We do then a Cesarean operation followed by a total hysterectomy in the usual way.

At the time of accouchement we cannot hope for a sufficient dilatation of the cervix if the cancer is limited as the invaded parts are incapable of extension.

If, on the contrary, the cancer is extensive we may do a Cesarean section and then hysterectomy.

Immediately *after the accouchement* and without awaiting the involution of the uterus we do a vaginal hysterectomy, the dilatation of the vagina renders the operation very easy and the uterus may be drawn down as far as one likes.

In spite of the rapidity of evolution of the cancer in the gravid uterus, these operations have shown some survivals. Olshausen, who did 25 vaginal hysterectomies with 25 successes, had up to the time of publication of his article, followed nine patients during a fairly long interval and of these one died after six months; four of them had recurrences after five, six and one-half, seven months and three and one-half years, respectively; four were well after two and one-half years, five and three-fourths years, six and one-half years, and seven and one-half years respectively.

Inoperable Cancer.—If the cancer is inoperable, the child is the first consideration. We confine ourselves to a symptomatic treatment. If the mother dies and the child is viable, we may do an immediate Cesarean section. At term, as soon as labor has commenced, do a curettage of the cancerous vegetations, make a star-shaped incision in the cervix and extract the child either

with forceps or by version. The fetal mortality is seven deaths in 29 cases or about 25 per cent. In reality it is considerably higher, since to these 29 cases we should in reality add 10 in which perforation was carried out, so that we see that extraction *per vias naturales* gives in reality a mortality of 43.57 per cent. It appears preferable to do Cesarean section, which is followed by Porro's operation, being careful not to cut the uterus too near the cancer, because of the inflammatory infiltration of uterine tissue which exists in its neighborhood. This procedure is less grave than the conservative Cesarean operation, which in cases of cancer is often followed by septic complications. The fetal mortality is considerable, about 27 per cent.; it is, however, less than that of extraction *per vias naturales;* the results would be still better if the operation had not been often practiced too late, when the child had already succumbed during the course of a prolonged labor (Oui).

5. Tumors of the Ovary.

During the opening period of abdominal surgery operations were limited to the removal of cysts of the ovary when by their large size they seemed likely to injure the general health. In 1883 Spencer Wells declared that it would be better to remove ovarian tumors as soon as they were diagnosed. To-day the rule is fixed: *every ovarian tumor when diagnosed should be removed immediately.*

The operation when done at the commencement is less grave and places the patient in a position of acquiring numerous complications such as inflammation and rupture of the cyst and torsion of its pedicle. Finally malignant degeneration may occur, as in 658 cases of cysts removed by Schroder, 100 were degenerated.

Malignancy of tumors does not constitute contraindication to intervention.

While speaking of this, we should make special mention of papillary cysts, the removal of which when they are accompanied by ascites and peritoneal grafts, may be followed by a recurrence so late, 5, 10 and 20 years after, as almost to constitute a cure (Pozzi).[1]

[1] Pozzi, *Rev. de gyn. et de Chir. abd.*, Paris, 1904, p. 407.

Age is no contraindication; cures have been brought about in infants of one year and old people past 80.

The only question discussed is that of knowing if in the case of finding a unilateral ovarian tumor, one should remove the ovary of the opposite side.[1] This opinion is supported by a certain number of gynecologists. Personally we remove the healthy ovary whenever this organ has ceased its functions; on the contrary, in young women we always keep the healthy organs, these that in a certain number of cases we have seen pregnancies develop to the great joy of our former operated patients.

6. Tumors of the Ovary and Pregnancy.

Audebert has collected 241 ovariotomies done during pregnancy and finds five deaths or 2.1 per cent; in 79 per cent. of cases the pregnancy went on to full development.[2] It is clearly seen that any ovarian tumor diagnosed during pregnancy should be operated on. Is there any object in waiting until the sixth or seventh month so as to increase the chances of viability of the fetus? We do not agree with this and think with Pozzi that all a tardy intervention causes is a new risk to both mother and infant. The indication is to operate as soon as the diagnosis is made.

We take certain precautions during the course of the intervention. We make an incision long enough to easily extract the cyst, the volume of which has been already reduced by puncture, gently draw the tumor outward and avoid traction on its pedicle. After the operation, as Pinard does, we give systematic injections of morphia in order to prevent the production of uterine contractions.

During labor we should only intervene if the tumor by reason of its pelvic site prevents the engaging and expulsion of the fetus. We should try to press it back with our fingers which are introduced into the rectum, avoiding the while too violent pressure which may rupture a cystic loculus. In case of failure open the abdomen and remove the tumor, and if this is impossible do Cesarean section.

[1] D. v. Velitz, Ueber die Dauererfolge der Ovariotomie, *Arch. für Gyn.*, Berlin, 1906, T. LXXIX, p. 533.

[2] Audebert, *Soc. d'obst., gyn. et péd.*, Paris, Oct. 10, 1904.

CHAPTER III.

DISPLACEMENT OF THE UTERUS.

Summary.—Treatment of genital prolapse.—Means of fixation of the uterus.—Anatomo-pathological lesions of prolapse.—Prophylactic treatment; medical treatment (massage, pessaries, injections of paraffin and quinine). —Operative treatment.—Treatment of vaginal enterocele.—Treatment of uterine deviations (exaggerated mobility, anteflexion, retrodeviation, retroflexion of the gravid uterus).—Uterine inversion (puerperal and polypoid).

In this chapter we will successively study the treatment of prolapse and that of deviations.

1. Treatment of Genital Prolapse.

Before beginning the study of the therapeutics of genital prolapse it appears to us to be of advantage to recall in two words the disposition of the means of fixation of the uterus and vagina. This short anatomical glance will enable us to better grasp the pathogeny of prolapse and of exposing in a rational manner the indications of their treatment.

The pelvic organs in a woman are maintained in their normal position by various agents, those of suspension and others of support.

Principal among the *suspension* agents we find the *peritoneal folds* which run from the uterus to the walls of the pelvic cavity, broad ligaments, round ligaments, and utero-sacral ligaments. If these ligaments were only formed of peritoneal folds they would count for very little. Reinforced as they are by *fibrous* or *muscular tissue* derived from the uterus (round ligaments, utero-sacral ligaments, and ligaments which run from the border of the uterine cervix to the pubis, taking their course external to the vesico-pubic ligaments which they reinforce), they constitute but feeble means of fixation and are practically only small cords of moderate tension. Below is the sheath of the uterine artery and the sacro-recto-genital aponeurosis. It is agreed to-day, as

Farabeuf stated, that both are only appendages of a perivascular fibrous formation which is very unequal in its development, and included with the intra-pelvic branches of the internal iliac is called the *hypogastric sheath.* Its role is more manifestly seen along the borders of the vagina, where it is a resistant sheath accompanying the vessels and constituting the most efficacious means of fixation of this canal.

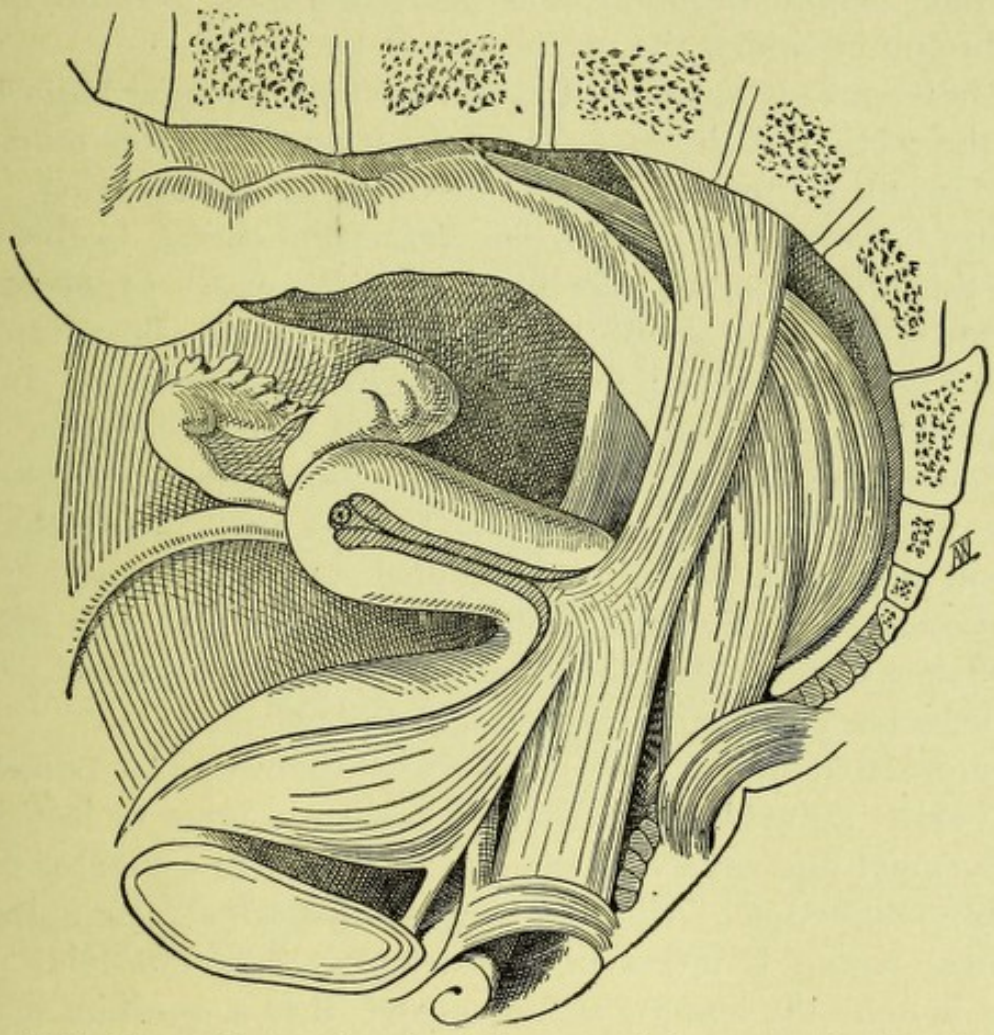


FIG. 360.—Means of suspension of and ligaments of the uterus (after Farabeuf.)

The means of *support* are disposed about several planes arising from the perineum.

We first notice the perineal body, which is constituted essentially by the anterior segment of the anal sphincter, the transversalis superficialis and the constrictor of the vulva.

Immediately below is a sort of diaphragm, partly fibrous and partly muscular, which springs from the pubic arch behind the ischio-cavernous muscles and is inserted into the vagina behind

and laterally into a point corresponding to the hymen. Anteriorly this diaphragm is less well developed and is easily perforated by the finger on the line with the urethra.

Deeper anteriorly we find the pubo-vesical ligaments coming off from the internal face of the pubis, laterally and posteriorly the fibers of the levators which gird the vagina laterally and proceed toward the preanal fold, then to the sides of the anus and then behind the anus, thus constituting an infundibuliform diaphragm on which the pelvic viscera lie.

These various means of fixation have an unequal importance and the section of the means of suspension facilitates much less the descent of the uterus than vulvo-vaginal splitting. The facility, however, with which one draws the cervix to the vulva after this operation is a current observation of all gynecologists.

One is forced to admit that in genital prolapse the primordial lesion is represented by the insufficiency of the perineum. In fact, this perineal insufficiency is never at fault without being in direct relation with a tear of the perineum. Torn perineums are seen quite often, where the tear extends to the anus without the least descent of the genital organs. The tear favors prolapse but does not produce it; it is necessary at the same time that there exist an insufficiency of the supporting power of the levators and general degeneration of the fibrous tissues of the pelvis.

In practice several cases may present themselves. Sometimes there exists an evident tear dating back to a more or less recent confinement and involving the perineal body to a greater or less extent. Sometimes insufficiency is of obstetrical origin, but the perineal region is intact in appearance. The muscular apparatus is none the less gravely damaged; it is a question in these cases of subcutaneous tears of the muscles and the palpation of the perineum shows it to be relaxed, thinned and reduced to a plane of integument. This atrophy of the muscles of the perineum is independent of all traumatism; we have to deal with patients whose muscular system is degenerated and whose abdominal wall is enfeebled and who besides their genital prolapse, suffer from ptoses, renal and intestinal, and hernias, etc.

Whatever else may be the cause the insufficiency of the perineum opens the door to prolapse. The vagina shows a progressive eversion through the gaping vulva. Generally there

is at first prolapse of the anterior vaginal wall, an anterior colpocele, then of the posterior vaginal wall, posterior colpocele. Anterior colpocele is always accompanied by cystocele, by reason of the anatomical solidarity of the vesical and vaginal walls. On the contrary, the posterior colpocele generally exists without an accompanying rectocele. The vagina in unfolding becomes larger and assumes manifestly exaggerated dimensions. At the

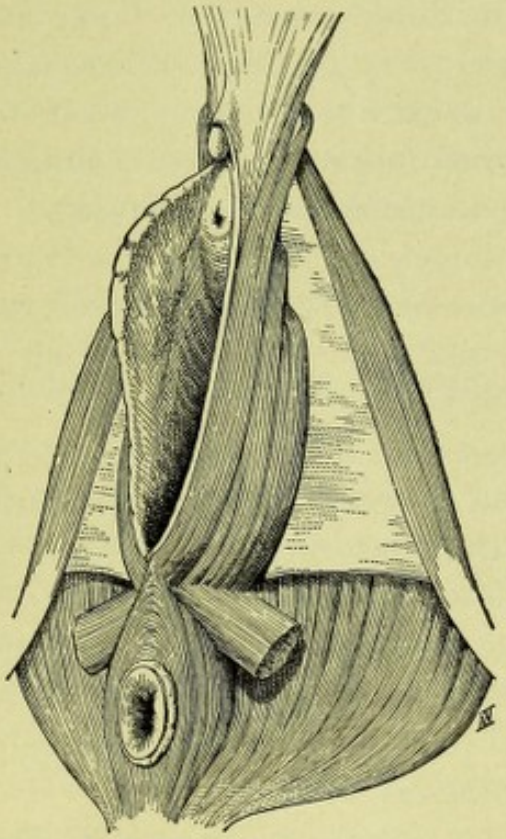


FIG. 361.—Means of support of the uterus. Below the middle aponeurosis are the muscles which by their convergence go to form the perineal body; posteriorly the fibers of the levator are seen to emerge from its posterior face.

same time the uterus becomes progressively lower and appears at the vulva and in extreme cases may issue in its entirety externally, dragging with it the vagina. It goes without saying that such an extreme relaxation of all the ligaments enters into these cases.

The falling down of the uterus does not form the only lesion of this organ. Excepting metritis and particularly cervical metritis, which is rarely absent, there exists a much more characteristic lesion: hypertrophy of the cervix, especially of the supravaginal portion, which was described by Huguier a long

time ago, but which he was wrong in attributing as the primary cause of prolapse.

The more the uterus falls down the more it is tilted down and backward, by reason of the cervix being drawn anteriorly and inferiorly under the traction of the anterior vaginal wall.

Latterly, Marion and his pupil Rousseaux have insisted on the importance of the abdominal depth, primary, congenital or secondary to a prolapse of the uterus or of the pouch of Douglas.[1]

As may be seen, the lesions of prolapse are multiple and are most often combined; it is illogical to disassociate them from the therapeutic aspect even when they appear to be differentiated. This isolation is only apparent and a clinical examination will always show the complexity of the lesions.

These few pathogenic ideas permit us to approach the study of the different modes of treatment proposed for genital prolapse.[2]

Prophylactic and Medical Treatment.

Prophylactic treatment does not appear to have a great importance. It has been pointed out how important it is to repair perineal tears and to favor uterine involution, so that the parts reassume their volume and tonicity. It is well to recommend to young women after labor to remain in bed three weeks so as to avoid premature fatigue, household efforts and to wear an abdominal belt. But we repeat we must not have any illusions about these prophylactic means.

Medical treatment relieves in a certain degree, but does not cure. It is evident that in cases of prolapse which have remained a long time exposed, and become ulcerated, methodical reduction, commencing with the parts nearest the vulva, following by antiseptic dressings, renders great service.

It is a necessary treatment before commencing operative intervention.

The genu-pectoral position, the columning of the vagina, and the use of astringent injections have been advocated. Their efficaciousness is doubtful.

[1] Rousseaux, Treatment of Certain Cases of Uterine Prolapse by the Obliteration of the pouch of Douglas. *Th. de Paris*, 1908–1909, No. 7.

[2] We will leave on one side the treatment of prolapse symptomatic of a tumor of the uterus and its adnexa; the prolapse, being only a secondary lesion, is cured on removal of the primary cause. (Ch. de Pierrepont, Les prolapsus génitaux symptomatiques. *Th. de Paris*, 1903–04, No. 511.)

Massage, consisting principally in movements of elevation of the uterus, combined with Swedish gymnastics, have given success.

Pessaries may for a time relieve the patient, but they do not hinder the progress of the disease; their size continually augments and finally the pessary cannot be borne any longer, which condition is produced by ulcerations or pains or what is most frequent, it will no longer remain in place and becomes useless. The pessary is in truth only useful where there is a resistant floor. In other cases the simple pessary is insufficient and if for special reasons, one is induced to have recourse to this instrument of contention, use pessaries with a stem which protrudes between the legs and is supported by a sort of T-bandage (hysterophore).

We should also mention as intermediate in the medical treatment and the operations, the injections of paraffin the whole length of the vaginal walls, much praised by Pankow, Douglas and W. Stone,[1] and the injections of quinine as Inglis Parsons[2] does. He injects into the base of the broad ligaments in the hope of provoking a curative sclerosis of the parametrium.

In short, we cannot count much on medical treatment. It is important to leave it on one side in the immense majority of cases. It may be employed when the patient formally refuses intervention and for any reason whatever when the operation is contraindicated. We would then have recourse to pessaries or hysterophores if the pessaries are found to be insufficient.

Operative Treatment.

Operative treatment should always be preceded by a careful examination of the patient; this will enable him to immediately distinguish a *vaginal hernia* from prolapse which may have a pedicle or not and has special operative indications.

The operations for genital prolapse are very numerous.

Some are done by the abdomen and their object is to render firmer the suspensory ligaments, etc., of the various parts constituting the prolapse. Some surgeons devote their attention to

[1] Douglas and Stone, *Brit. Med. Journal*, 1903, T. II, p. 79.
[2] Inglis Parsons, *Congrès intern. des sc. médic.*, Paris, 1900.

the bladder, the displacement of which is generally very marked in genital prolapse, and have carried out cystopexy. Others fix the vagina above. The majority seek to act on the uterus either by drawing on it indirectly by the shortened round ligaments already done in the inguinal operation, or by shortening the utero-sacral ligaments, by directly fixing them to the anterior abdominal wall according to any one of the procedures of hysteropexy. Some have gone further: they have commenced by a hysterectomy and then fixed the stump either to the anterior abdominal wall or to the stumps of the broad ligaments (Jacobs, Ligamentary trachelopexy).

In another series of cases gynecologists have operated exclusively from below, confining themselves to supporting the uterus by constricting the vagina. This is done by putting in a series of metallic rings under the mucous membrane or by making a more or less thick belt, by doing an episorraphy, a partitioning of the vagina, or even a total colpectomy without removal of the uterus.

The remote results of these various operations have in general been mediocre. As we have seen *the lesions of genital prolapse are multiple and the treatment should therefore be complex.*

First, we must diminish the hypertrophy (cervix and vagina); second, reconstitute the insufficient perineal support, not forgetting the important role of the muscular floor formed by the levators; third, to redress the retrodeviated uterus.

These various indications are carried out as follows:

An amputation of the cervix, a resection, more or less extensive, of the vaginal walls will reduce the hypertrophied parts; then the perineum is reconstituted by any of the procedures usually employed, particularly that of splitting with suture of the levators;[1] the operation is terminated if there is any retrodeviation by an indirect hysteropexy. This gives to the uterus an inclination almost perpendicular to that of the vagina, suppresses the tendency of the uterus to invaginate and thus increases the chances of a definite cure.

Hysterectomy is indicated only if there exists a concomitant

[1] It has been advised in cases of hernia of the pouch of Douglas during the splitting operation to open the peritoneal cul-de-sac and of partially suppressing it. (Frank, Freund, Stratz).

grave lesion of the uterus; it is then necessary not to confine oneself to the removal of the organ and to combine with it a plastic perineo-vaginal operation.

Outside inveterate prolapse when the vagina is entirely invaginated, hypertrophied, and ulcerated, we must do a preliminary treatment to reduce the prolapse and to apply antiseptic applications and keep the patient in bed. Hyperemia, edema and pseudo-hypertrophies disappear so well that the operation becomes simpler.

In rebellious cases with a complete tear of the tissues we are sometimes obliged to do a simple palliative treatment of a medical nature.

Treatment of Vaginal Enterocele.

Vaginal enterocele forms in the space between the uterus and rectum; stopped below by the perineum it presses against the vagina and pushes its posterior wall anteriorly (A. Cooper). Sometimes it is a simple exaggeration of the pouch of Douglas, which may project into the vagina and even out of the vulva; sometimes it is a pediculated tumor of the posterior wall of the vagina; in fact, a real hernia.[1]

When we are dealing with a pediculated hernia, the most rational treatment is the free opening of the sac, its excision at the level of the neck, the resection of the exuberant parts of the vagina and then suture.

When we are dealing with a protrusion of all the posterior wall of the vagina pressed forward by the intestine which distends the abnormally developed pouch of Douglas, we would be tempted to combine an extensive posterior colporrhaphy with an abdominal hysteropexy, followed by obliteration of the pouch of Douglas by the abdominal route.

2. Treatment of Uterine Deviations.

The importance given to uterine deviations has been very varied. For a long time they were practically unknown; catarrhs and inflammatory engorgements were the two principal condi-

[1] Berger, Vaginal Hernias. *Congrès franc. de Chir.*, Paris, 1896, T. X, p. 34.

tions; then, following on a sort of reaction, came a description of the deviations as essential diseases, in particular inflammatory states of the uterus or adnexa. In fact, uterine deviations rarely give place to pathological trouble when they exist alone; certain dysmenorrheas appear, however, to be in relation with an exaggerated anteflexion of the uterus; moreover, the deviations may contribute to keep up or to aggravate inflammatory conditions of the uterus and are themselves sometimes a cause of sterility. It is, therefore, indicated to treat them.

Normally the uterus is in a state of slight anteversion with a moderate anteflexion.

This disposition may be exaggerated and anteversions and anteflexions of a pathological order are to be seen. Most often one has to treat retrodeviations, retroversions or retroflexions. Finally there is sometimes an extreme laxity of the ligaments and the uterus oscillates in the pelvis, sometimes being anteverted and sometimes retroverted.

In all cases we should be careful to find out if there is any perineal insufficiency, or metritis or inflammation of the adnexa, as these lesions should be the object of special treatment.

Exaggerated Mobility of the Uterus.

Among certain women, as we have already said, we sometimes get anteversion and sometimes retroversion, and most frequently the latter owing to the backward pressure of the intra-abdominal organs. These women, who complain mainly of reflex nervous trouble, neurasthenia, various pains, pains during walking, have almost always gastric troubles and constipation. If they are examined with care, we will find that they have also enteroptosis, a vertical dislocation of the stomach, movable kidney, etc., etc.

Order them a belt pressing from below upward on the hypogastric region. If the abdomen is developed or relaxed, a *fortiori*, if there is enteroptosis, we recommend a belt, which must accurately fit the projecting iliac spines of thin women. Corsets relieving the lower abdomen or even belts with pneumatic cushions, such as those of Enriquez, are useful. Finally insert a Hodge pessary or one of its derivatives.

General treatment to make the patient stronger and to calm her nervous system should never be neglected.

Anteflexion.

Pathologic anteflexion may be congenital or acquired.

Congenital.—It results from an arrest of development and is habitually associated with other malformation states of the cervix which is conical, strictured and obliterated at the level of the anterior lip and of the vagina, the anterior lip of which is too short.

Acquired.—It is not accompanied by any deformity of the cervix other than that which may result from a concomitant inflammatory state.

It is distinguished by dysmenorrhea and by a relative sterility.

A whole series of operations has been suggested for it; some are destined to act on the cervix and on the deviation at the same time. The simple dilatation of the uterus with laminaria tents suffices generally to markedly ameliorate the condition of the patient.

Retrodeviations.

Retrodeviations are frequent and are distinguished by the fixation or mobility.

Many fixed retrodeviations should be seriously considered; they belong to a class of lesions which Pozzi calls lesions of cure, "lesons de guerison."[1] With the exception of renewed attacks of inflammation, there is hardly any pain. There are also concomitant inflammatory lesions which should be treated. The minor means are the following: Hot injections, massage, hydromineral cures, etc., and in case of failure, in women near the menopause do not hesitate to do a total castration. In younger women be more conservative and attend to the cervix, curette the body and reconstitute the perineum, and if necessary do not hesitate to profit by the anesthesia to open the abdomen and liberate the uterus maintaining it in good position, by using any of the various procedures we have described.

[1] Pozzi, Indications for Treatment in Retrodeviations of the Uterus. *Revue de gyn.*, Paris, 1897, p. 387.

Mobile Retrodeviation.—The pathological importance[1] of this condition has been wrongly denied by several gynecologists. Various operations have been devised, such as hysteropexy, inguinal or abdominal shortening of the round ligaments, vagino-fixation, etc. When the retrodeviation is associated with another lesion, such as perineal insufficiency, lesion of the cervix, etc., giving rise to operative intervention, we should treat simultaneously the deviation by a surgical operation which permits of an immediate cure. We should be authorized also

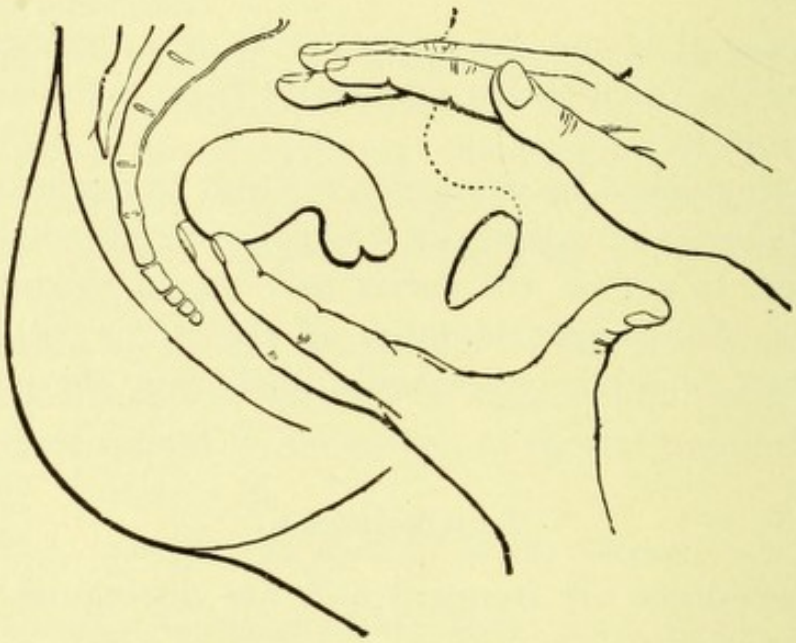


FIG. 362.—Lifting up of the body of the uterus with two fingers inserted into the posterior fornix, while the abdominal hand follows the displacement (Schultze).

to intervene surgically in women who must be cured rapidly to earn their livelihood.

If, on the contrary, the woman is in such a condition that she can take a prolonged course of treatment, and is not exposed to fatigue, immediately the question of orthopedic treatment arises. It would seem that there is a reaction against the abuse of surgical interventions, which were so widely practised ten years ago.

Schultze,[2] who has always advised orthopedic treatment, advises the redressing to be carried out as follows:

[1] Richelot, We Must Redress Retroversions. *Cong. franc. de Chir.*, Paris, 1905, p. 306.

[2] Schultze, Zur Therapie hartnäckiger Retroflexion der Gebärmutter. *Samml. klin. Vortr.*, 1891, No. 24.

In order to reduce the organ in cases of mobile retrodeviation he lifts up the body of the uterus by means of two fingers introduced into the vagina, or into the rectum, and carrying out this manipulation under the constant control of the other hand, which follows the organ through the abdominal wall (Fig. 362). When the body of the uterus has been raised as far as the superior rectus, which is not difficult to do in spite of pressure which is exerted in the direction of the arrow, the extremities of the fingers

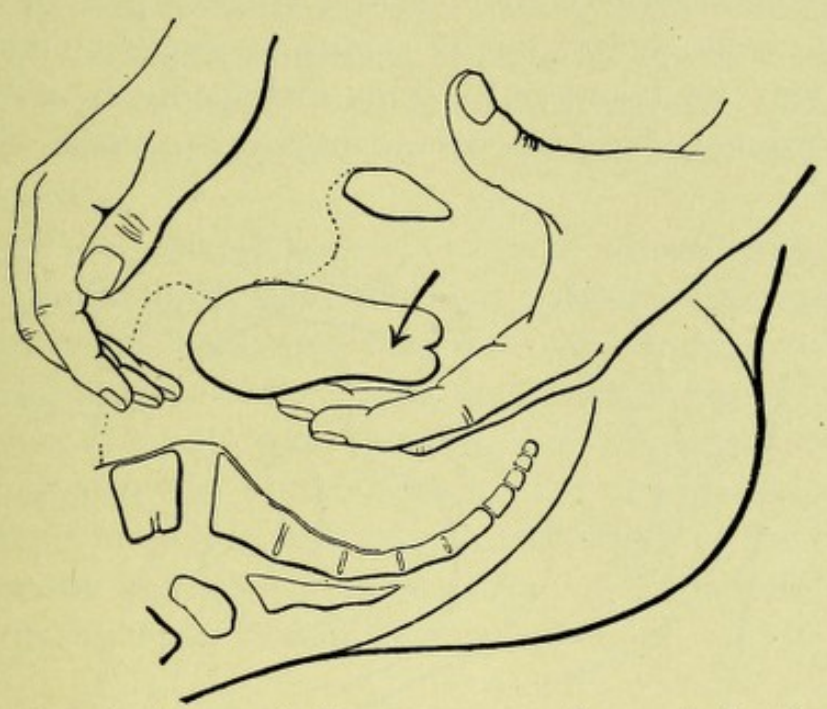


FIG. 363.—After having exercised a pressure on the cervix in the direction of the arrow so as to help the redressing, the hand on the hypogastric hooks the fundus of the uterus.

of the hand on the hypogastrium receive the fundus of the uterus, and convey it very gently forward, so as to leave it in its normal position, behind the symphysis. During this time, the fingers inserted in the vagina as in figure 364, recognize if the superior portion of the cervix has preserved its suppleness and its normal flexibility. Make certain of the reduction of the redressed organ otherwise it will reoccur. We now insert a pessary, which by putting tension on the posterior fornix of the vagina, and pushing it upward, draws the cervix in that direction.

Use a Hodge pessary or better a Schultze, or Smith, or Thomas and never use intrauterine pessaries, which may give rise to

trouble. If a simple vaginal pessary is not sufficient to hold the uterus in place, it is because of perimetric adhesions; the surgical operation then is indicated.

Pozzi in France, and Kustner in Germany,[1] are the defenders of the bloodless methods. After a bimanual reduction of the deviation, they maintain the uterus with a pessary. This ought not to be considered as a simple palliative; it should permit of the consolidation of the means of fixation of the organ. Its employ is necessarily a more or less lengthy period, from some months to some years; finally a cure is brought about and the pessary may be taken out. This orthopedic treatment would give, according to Kustner, results superior to those of operative treatment.

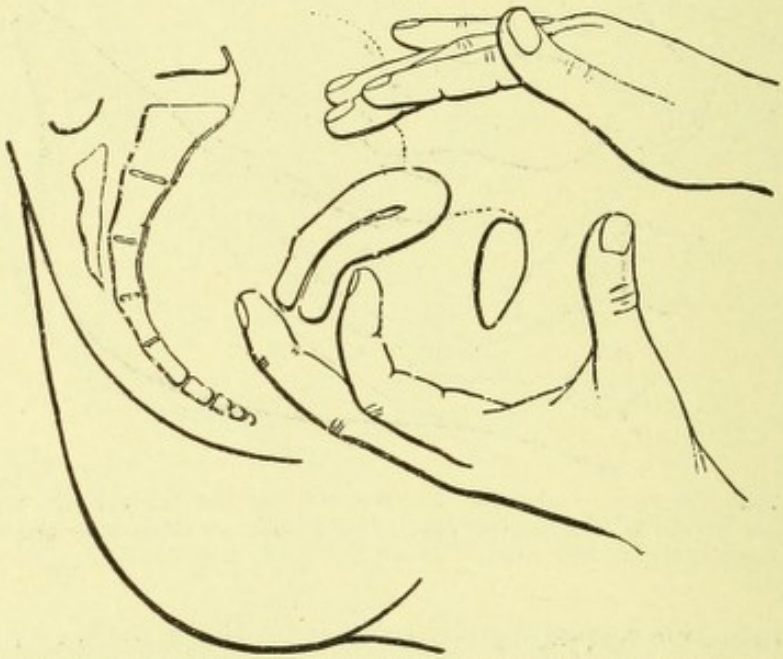


FIG. 364.—The uterus redressed, the fingers in the vagina determine the suppleness of the superior portion of the cervix (Schulze).

Retroflexion of the Gravid Uterus.

Retroflexion often redresses itself during the course of pregnancy; but this is not constant and when the deviation persists toward the fourth month, complications in the bladder occur, which abandoned lead to a retention of urine and to that grave form of gangrenous cystitis, so well studied in France by Pinard and Varnier.[2]

[1] Küstner, *Handb. d. Gyn. de Veit.*, 1907, T. I, p. 132.

[2] Pinard and Varnier, *Ann. de gyn.*, Paris, 1886, T. II, p. 338; 1889, T. I, pp. 85 and 338.

There is then absolute necessity of reducing the deviation at this moment. In general it is very easy, and in all cases we have observed we have been able to do it by simply pushing back the fundus of the uterus into position with the extremities of the two fingers engaged in the vagina, and making it pass from below upward along the concavity of the sacrum. It is important not to act on the angle of flexion, but to commence the reduction by acting upon the most posterior portion of the fundus of the uterus. The organ having been redressed stays in place if the reduction has been done toward the fourth month, at the time when vesical troubles appear. The uterus is then of such a volume that it cannot fall back into the pelvic excavation.

In exceptional cases, where by reason of adhesions the manual reduction is impossible, then one may open the abdomen, break down the adhesions and redress the uterus.[1] Some gynecologists do an anterior fixation of the organ and insert a pessary. These manipulations are only to be thought of if the pregnancy is very early; if it is near the fourth month, they are useless, and we should content ourselves with simple redressing of the uterus as we have already indicated when speaking of the manual redressing of the uterus when vesical troubles come on.

Uterine Inversion.

Uterine inversion may result from a fibrous polyp or follow on an accouchement.

Puerperal Inversion.—Whatever the form or age of the inversion, the surgeon should first of all seek to do the reduction by simple means. If the placenta remains adherent to the fundus of the inverted uterus, commence by separating it and then reduce it.

This is most often done by *manual taxis*. The cervix is held firmly by forceps in the hands of an assistant, who continues a sustained traction. The operator with the left hand presses down the abdominal wall, and immobilizes the uterus; with his right hand introduced into the vagina, he compresses the body of the uterus, renders it supple, and then endeavors to reduce it, always

[1] Frankenstein, *Deutsch. med. Woch.*, Leipzig, 1910, p. 1038. Maiss, *Monatschr. f. Geb. und Gyn.*, Berlin, 1910, T. I, p. 773. Cristofoletti, *Gyn. Rundschau*, 1910, p. 446.

endeavoring to find the point by which reduction is most easily carried out. In general pressure on the fundus is inefficacious, and it would be better to begin with the parts near the pedicle. Pinard insists on two points: only to commence taxis after having pushed the uterus back into the vagina; second, only to use traction in the interval between contractions, if one performs reduction immediately after confinement.

Slow Methods.—Replace the manual action by a continuous pressure carried out for several days: first, by tamponing; second, by instruments acting on the fundus of the uterus by a rigid stem, the pressure being administered by an undrainable bandage or English repositor; third, by pressure with air and water pessaries, Braun's and Champetier's bags, which give a certain number of good results.

These methods have the inconvenience of their lengthy duration and pain they cause, the complications which they may cause, such as fever and pelvic peritonitis, etc.

Whatever the procedure employed, once reduction is obtained, give a little ergotine and tampon the uterine cavity with iodoform gauze.

If one fails or if the uterus appears to be threatened with gangrene, we must do our reduction by a *surgical operation*, either by the abdominal or better by the vaginal route. Vaginal hysterectomy is only indicated if there are grave hemorrhages which threaten life immediately or if the inverted organ presents manifest signs of gangrene. The old procedures, of removal of the inverted portion with a crushing instrument or serre-nœud or elastic ligature, which were used for the purpose of destroying the arteries and peritoneum before the prolapse of the organ, have all been abandoned to-day.

Polypoid Inversion.—The first indication to fulfill is to remove the myoma. As it is often difficult to say where the tumor exactly ends and the true tissue of the uterus begins, it is well not to do there and then a section close up to what appears to be the insertion of the polyp. Taking hold of the protruding portion of the polyp with forceps, it is split vertically by degrees until we reach the deep part of its cortex; nothing is simpler then than to enucleate it. In a certain number of cases as soon as one has removed the tumor which draws upon the fundus of the

uterus, it reduces of itself. If not we may proceed to the reduction as in puerperal inversion. As in these cases we are generally concerned with women of a "certain age," the uterus frequently contains fibrous nodules and thus the indications of the radical operation are increased, and we can resolve more easily to do vaginal hysterectomy than in puerperal inversion.

CHAPTER IV.

EXTRAUTERINE PREGNANCY.

Summary.—General indications of treatment of extrauterine pregnancy. —T. of pregnancy during the first five months in absence of complications.— T. of the peritoneal hemorrhage of encysted hematocele either intra- or subperitoneal.—T. of pregnancy after the fifth month, old fetal cysts.

In the course of its evolution extrauterine pregnancy may be attended by numerous complications. In the primary period that most to be feared is hemorrhage, which may be very abundant, constituting thus a veritable peritoneal inundation, placing the life immediately in danger or failing that it may lead to the formation of hemorrhagic collections in the pouch of Douglas, such as retrouterine hematoceles, or more exceptionally to subperitoneal effusions or intraligamentary hematoceles. At a more advanced period, when she approaches term, the extrauterine pregnancy may be the cause of complications. Finally after the death of and partial absorption of the fetus, the lithopedion and the sac containing the skeleton may, by reason of the development of adhesions, cause abdominal troubles. At all periods, therefore, infection is possible, as the sac may suppurate and as we have seen after long years of silence, a lithopedion may inflame, suppurate, and open into the bladder or rectum.

Also, in presence of an extrauterine pregnancy, we must act quickly.[1]

Formerly, the death of the fetus was aimed at either by modifying the health of the mother by hunger, by hemorrhages, or by administration of strychnine in slightly toxic doses, or directly by the death of the ovum by electrical applications or injections of morphia.

[1] Runge, Beitr. z. Aetiol. Sympt. u. Therapie de Extrauteringravidität. *Arch. f. Gyn.*, 1903, T. LXX, fasc. 3. Segond, Treatment of Extrauterine Pregnancies, Cong. franc. d'obst., gyn. et ped., second session, Marseilles, 1898, and *Revue de gyn.*, Paris, 1898, p. 801. O. Küstner, Ueber Extrauterinschwangerschaft. *Samml. klin. Vortrag.*, Leipzig, 1899, No. 244.

To-day its treatment is exclusively surgical.

Every extrauterine pregnancy when diagnosed should be operated on. Some years have elapsed since Martin showed that by expectant treatment we got 16.9 per cent. of cures and by operation 76.7 per cent. We should like to add that if intervention is early the percentage of cures is still higher. Kustner in 107 cases had only two deaths, one of which was from peritonitis in a patient with hepatic cirrhosis, when the operation had been long and in the other, a woman who was anemic from former hemorrhages which were extremely abundant. Strauch (Moscow) operated 91 tubal pregnancies and had no deaths.

From the point of view of indications to fulfill it is well to divide them into those cases before and after five months of pregnancy.

1. **Pregnancies Observed in the Course of the First Five Months.**—If there are *no* complications, some gynecologists carry out an expectant treatment, holding themselves in readiness for the least sign of danger. It is a line of conduct which would permit of argument if the ovum were dead or if there had been an expulsion of a decidual membrane, but, if the ovum were continuing to evolve, it cannot be considered seriously for a moment.

Generally, the removal of the gravid tube is done by the abdominal route; in some cases on intervention has been essentially conservative, and some surgeons have removed successfully a tubal mole after incision of the tube, and have afterward sutured the incision, which treatment seems hardly suitable to moles in this stage of retrogression.[1] Total castration, advocated for the purpose of putting an end to all recurrences, appears a contraindication to us.[2] We have seen a number of our operated cases have a series of normal pregnancies after removal of a pregnant tube, and hence we do not advocate castration unless at the same time there is an inflammation of the adnexa on the opposite side, or in short, lesions which of themselves demand removal.

In rare cases of tubo-interstitial pregnancy do a hysterectomy, with the intrauterine opening of the sac by a sound passed by the dilated cervix (H. Kelly), a practice which will be, so we

[1] Muret, *Rev. de gyn.*, Paris, 1898, p. 195.

[2] Sens, Critical Study of Eighty-nine Observations of Recurrent Ectopic Gestation, *Th. de Paris*, 1901, No. 202.

think, little followed. In such a case we are tempted to do a wedge-shaped excision of the uterus, as well as a removal of the tube followed by suture, and when we have to deal with *an inundation of the peritoneum*, the immediate operation is indicated. On this score the danger of shock enters in and possible errors of diagnosis. These objections have no value. With large injections of serum, either if occasion requires intravenous, we do not fear shock in these cases. As to errors of diagnosis, such as intestinal obstruction, torsion of the pedicle of a tumor, etc., these demand the immediate opening of the abdomen and do not contraindicate operation.

Expectant treatment gives 86 per cent. of deaths, and operation 85 per cent. of cures.

If we have a hematocele the operation is indicated all the same. It should be done abdominally if there are successive attacks showing that hemostasis is not complete. It is then indicated not only to remove clots but to find the bleeding point and tie it; then remove the bleeding tube, completely closing the abdomen and leaving, without drainage, the blood which has not been evacuated during the operation. In such cases the simple vaginal incision which leads to a continuation of hemorrhage should be rejected.

On the contrary, if the hematocele is well encysted, and particularly if it is infected colpotomy is indicated. Exceptionally in certain cases of pelvic subperitoneal hematocele or inguinal hematocele in order to evacuate the seat of trouble, we do an ischio-rectal incision (Lejars), or an inguinal subperitoneal incision (Pozzi). The indication is always the same, that is, to go to the spot where the collection points and incise and drain it.

2. **Pregnancy After the Fifth Month.**—If the fetus has passed 35 to 36 weeks, it is viable; we must operate immediately without waiting false labor, because at that time the infant dies rapidly, and the pains use up the mother's strength and place her in a less favorable operative condition.

If the fetus is *living* but *is not yet viable*, opinions are divided. Some say that the mother only should be thought of and that an intervention should be made. This idea is founded on the fact that complications may occur and, also that the fetus is frequently doomed or if it arrives at term is malformed. Others

find that there is a real exaggeration in the operative indications, and that one should wait, and give time to the fetus to develop, and that one should exercise a continuous watch over the patient, being ready to operate if the least complication arises, or if the mother becomes enfeebled.

When the operation is decided, we must determine by what route to do the intervention? Some gynecologists, particularly in Germany, operate by the vagina. This route is dangerous if the placenta is inserted in the pelvis; the extraction of the infant is dangerous and often there is great difficulty in stopping any hemorrhage.

We should operate by the abdomen, open the sac at a point where it is thin, draw out the infant by the feet and tie the cord. Then comes the crux of the question. Some operators, fearing a prolonged suppuration and hernias following and finding that the sac is friable and difficult to fix, wish to remove both sac and placenta. Others, desirous of avoiding hemorrhages which sometimes follow immediately after separation of the placenta, advocate the marsupialization of the sac, and await the spontaneous separation of the placenta. The line of conduct is advised by Baudelocque, and supported by Pinard, who had 16 cures in 17 cases.

We should distinguish between cases. If the fetus is free in the peritoneal cavity, or if during the primary maneuvers there is a partial separation of the placenta and a consequent hemorrhage, then removal is necessary. If the enucleation seems easy and there is no insertion of the intestine on the placenta, then hemostasis of the tube or of the epiploon is easily procured, and removal is a matter of discussion; personally, we advise it because it is a means of cutting short the duration of the treatment. If the placenta is inserted only partially into the intestines, we should have no hesitation in leaving it.

If the fetus is *dead*, indications of an immediate operation present themselves, such as hemorrhage, peritonitis, etc., etc. In absence of complications it is better if the death is recent to wait some time, as the intercystoplacental circulation progressively diminishes. It is prudent not to wait too long, and to operate before six weeks' time because of the congestion which accompanies a return of menstruation.

Intervention is often indicated later and we should not wait until a lithopedion forms.

Finally, if we have to deal with an old fetal cyst, tolerated without any complications, or having a fortiori suppurated, we should operate. The fetal cyst should be removed like a cyst anywhere else: the suppurating cyst should be opened where it points, and the lithopedion should be taken out and drainage made of the pocket.

In a single case, the rule that one should open where it points, ought not to be followed, and that is when the cyst points in the rectum; even then, if there is a beginning fistula in the intestine, it is preferable to do a free posterior colpotomy in such a way as to drain it, and to make repeated lavage of the pocket, and thus endeavor to get a cure of the rectal fistula. As to cysts opened in the bladder, they may be very simply cured by simple evacuation through the dilated urethra, if the fetus has not yet attained five months; if, on the contrary, the fetus is older than five months, we should be forced to do a more complex intervention, either by the endovesical route or the intraperitoneal.

CHAPTER V.

MENSTRUATION TROUBLES AND STERILITY.

Summary.—Menstruation troubles.—Primary or secondary amenorrhea.—Menorrhagia and metrorrhagia.—Dysmenorrhea.—Troubles of the menopause.—Treatment of sterility.

1. Troubles of Menstruation.

Under the name of menstruation is understood a discharge of blood from the uterus at certain regular intervals during the sexual life of woman, which normally varies from 13 and 15 to 45 and 50 years.

This discharge may not occur, amenorrhea; or may be too abundant, menorrhagia; or occur with difficulty, dysmenorrhea; finally its cessation may be accompanied by a series of complications at the critical period called the menopause.

I. Amenorrhea.

Amenorrhea may be *primitive*, as menstruation does not occur at the regular age; it results from a simple retard in the establishment of menstruation from an arrest in the development of the reproductive organs, or from an atresia, which may occur at various points in the genital canal, and preventing blood from issuing externally. In this case it is not strictly speaking amenorrhea, but a menstrual retention.

In presence of a primary amenorrhea the first point is to discover if the amenorrhea is due to an arrest of development or menstrual retention. An examination of the genital organs in a young virgin is always a delicate matter. We should in the absence of menstrual molimen temporize, in the hope that it is simply a retard in the appearance of menstruation, treating the anemia if it exist, and make her lead a life in the open air, treating the constipation which according to Kelly is always associated with amenorrhea. If, on the contrary, the young girl suffers period-

ically, there is probably a menstrual retention, and we should then do a genital examination and treat the hymeneal or vaginal imperforations as soon as these are discovered.

If this examination demonstrates an arrest of development in the uterus, one is almost at a loss to do anything. Also, if ovarian pains are excessive and nothing can ease them, do an ovarian castration. Knowing the action of X-rays on the ovaries, we might be tempted to do some radiotherapy. We do not know if it has already been tried, but it appears to us that attempts might be made.

If there is no pain, and no trouble but the absence of menstruation, we should content ourselves with a general treatment, so as to cause the patient to turn her thoughts from her genital organs.

Secondary amenorrhea or suppression of menstruation may be due to varied causes. The first idea that the gynecologist conceives is that of pregnancy, but after having proved this not to be the case we must look for other causes of amenorrhea.

Cicatricial atresias are exceptional; generally it is due to constitutional trouble (chlorosis, tuberculosis, acute or chronic diseases, obesity, etc.) or functional (change of climate or regime or nervous exhaustion, etc.). The treatment consists in treating the cause. Emmenagogues such as rue, sabine, apiol, etc., have not any well demonstrated action. We may use saline and drastic purgatives, permanganate of potash, electricity (faradic currents, continuous currents, static bath with sparks drawn from the lumbar region).

With amenorrhea is sometimes associated *supplementary menstruation*, vicarious or ectopic, a hemorrhagic discharge occurring from the nose, stomach, intestine, etc. This supplementary mensturation is sometimes a cause of relief to the patients which should be respected; exceptionally if it becomes so abundant as to endanger life, we may be forced to remove the ovaries (Webster, Fischel).

II. Menorrhagia and Metrorrhagia.

Menorrhagia is only an exaggeration of the normal flow. *Metrorrhagias* are hemorrhages which occur between menstrual periods. Sometimes it exists in connection with general disease

by alteration of the blood (hemophilia, scorbutus, grave icterus, phosphorus poisoning, cachectic states, and the commencement of certain pyrexias), and most often in connection with a local lesion connected generally with the uterus demand, and these hemorrhages usually an indirect treatment, that of their cause. We will make a special mention of certain menorrhagias of the young girl, which appear to be mainly of functional origin, and combined with vasomotor troubles brought on by a relaxation of the tissues following on their rapid development at puberty. They demand a general treatment.

As uterine hemostatics we may recommend repose in bed, hot vaginal injections at 48° to 50°, ergotine by the stomach or subcutaneously,[1] hydrastis canadensis,[2] stypticine,[3] adrenaline,[4] choloride of calcium,[5] electrical applications and vaginal or uterine tamponing.

III. Dysmenorrhea.

It is very frequent to see women complain of pain in the pelvis, back, and thighs, and of a slight nervous excitability at the time of menstruation. We cannot say that there is dysmenorrhea except in cases where the increase in these troubles becomes pathological. The pains may sometimes be such that the patients have to take to bed, covered with sweat, the extremities cold and they sometimes lose consciousness; sometimes they have nausea and vomiting.

It is difficult to give precise therapeutic indications for the treatment of dysmenorrhea, as the causes of the troubles are still very imperfectly known. In certain gross lesions (pelvic inflammations, myomas, retroflexions), a causal treatment is necessary. Unhappily, in the majority of cases, the cause is not precise. Mechanical dysmenorrhea has been described. An acute curve in the cervical canal, a contraction of one of the orifices of the cervix, a clot or membrane preventing the flow of

[1] Seigle ergot 10 to 60 centigrams daily, in pills or cachets; Yvon ergotine, a centimeter cube injected subcutaneously night and morning.

[2] Fluidextract of hydrastis hamamelis, viburnum, 10 grams of each daily: take thrice daily 20 drops of this solution in a little water.

[3] Four to six tablets or capsules daily containing 5 centigrams of stypticine.

[4] Fifty centigrams to 1 gram of 1 to 1000 solution subcutaneously.

[5] Four grams daily in a potion of 150 cm. cubes to be taken by soupspoonfuls every two hours.

hemorrhage; this theory is much discussed to-day. That which is generally admitted is that in dysmenorrhea there is a spasmodic state of the uterus of which the cause is imperfectly known.

When the pains appear give sedatives (phenacetine, pyramidon, chloral, valerianate of ammonia, antipyrin, etc.), applications of hot water bags to the abdominal wall and mustard baths for the feet.

With the exception of menstruation, endeavor to stimulate the general state by repose, in particular after the midday meal; and by a substantial alimentation, by a calm life in the open air and by regular evacuations.

Uterine dilatation is sometimes useful; curettage followed by applications of iodine, carbolic acid, and glycerine, etc., have been advised. Fleiss says that applications to certain points of the nasal mucous membrane with a strong solution of cocaine stops the pains, and has described sexual points in the nose. Kolischer has obtained analogous effects by cocainizing other mucous membranes: that of the cervix uteri and rectum, and it would seem to be due to suggestion. The ingestion of ovarian preparations was advocated by Gibbons.

In incurable cases, do ovariectomy; this is authorized, if the continuity of the pains affects the general state. Still it is not certain that all these troubles would follow on this mutilation.

IV. Troubles of the Menopause.

When the menopause comes and even more after the artificial menopause produced by bilateral castration, we sometimes see a series of troubles follow, which persist in certain people during many years; these are heat flushings, insomnia, pain in the head, migraines, a neuro-muscular or psychic neurasthenia and sometimes obesity.

Walking in the open air, motor trips, and absence of excessive physical excitation and moral emotion, a regime for obesity, and regular action of the intestine constitutes the general base of the treatment.

Against these heat flushings and nocturnal sweatings, we find that hot baths about 40° are often very useful. Ovarian opotherapy is very useful. As the ingestion of the raw ovary is

very often repugnant to patients, give ovarine, powder of desiccated ovary or ocreine, dried corpora lutea, based on the idea that the corpus luteum is the active part of the ovary.[1]

By these means we find a notable amelioration in the state of the patients.

2. Sterility.

The number of sterile marriages is about the same in different countries, oscillating between 11 and 13 per 100. Formerly it was customary to impute the sterility to the woman. It is known to-day that in 46 per cent. of cases sterility is dependent on the husband, exceptionally due to loss of puissance, but generally due to azoospermia; that in 12 to 13 per cent. of cases, it results indirectly from the husband, who has transmitted gonorrhea to his wife, rendering her sterile, so that in 59 per cent. of cases the guilty person is the husband (Sanger). We should always think of this whenever a woman comes to consult us in order to have children. *The treatment of sterility in woman should never be undertaken until an examination is first made of the husband to determine the state of his generative functions.*

Once the state of the husband is found satisfactory, in order to treat sterility well, find out the cause.

The history, especially that dealing *with the study of the physiognomy of menstruation*, gives as Pinard remarks, important information.

A woman who commenced to menstruate at 12 to 15 years, and whose menstruation has always been painful, particularly in the first twenty-four hours, has probably a flexed uterus, with more or less contraction of the canal.

A woman who menstruates late, from 16 to 20 years, and irregularly, losing little, and complaining of pains about the ovaries, is a woman whose ovular evolution is difficult and imperfect. Often it is a thin woman with hereditary antecedents of rheumatism, gout, arthritic troubles, and antecedent personal history of urticaria, migraine and herpes, etc.

A woman who commenced normally to menstruate, but loses

[1] Give two sheep ovaries daily or 10 to 30 centigrams of ovarine one-quarter of an hour before meals.

less and less and at longer intervals, is often affected with precocious and exaggerated embonpoint; in such a case the ovules no longer mature.

In a woman whose menstruation is normal at the commencement, but which becomes more frequent and abundant and contains clots has generally a fibromatous uterus.

Having put our questions, we should proceed to the *direct examination* with the object of finding out if there exists an obstruction either preventing the progression of the ovule toward the uterus or the ascension of spermatozoa, or a pathological state of the endometrium preventing the fixation of the fertilized ovule. In very exceptional cases we may find that the woman is a virgin. Vaginal examination combined with palpation will show us deformities, uterine deviations, and the existence of false vaginal routes, etc. The examination with a speculum may show a thick opaque or yellowish obstruction or cork, as the French express it, on the cervix.

The results of this examination will give indications of treatment.

Metritis, uterine fibromata, uterine deviations, stenosis or inflammatory states of the cervix may be treated in the usual way. In uterine flexion, dilatation and redressing with laminaria tents, followed by dilatation with a catheter and followed by Hegar's bougies renders splendid service.

If it is a case of imperfect ovulation, Pinard recommends an absolute milk regime at intervals during one or two months. The obesity disappears, the menstruation becomes normal and fecundation soon occurs.

In cases of irregular menstruation, at first small with an infantile uterus (enlarged cervix with a very little body), we must have patience and abstain from all surgical intervention, and be content to favor the general development of the organism by exercise, a suitable hygiene and thermal cures.

Static electricity often renders service in women where the uterus is normal and the menstruation ceased suddenly.

Temporary repose for the genital organs, and alkaline vaginal injections are useful adjuvants of treatment in nervous women.

PART V.

OPERATIONS ON THE URINARY APPARATUS.

CHAPTER I.

CHEMICAL EXAMINATION OF THE URINARY APPARATUS OF WOMAN.

Summary.—Questions, frequency and pain of micturition.—Examination of urine.—Examination of the urethra (meatus, Skene's glands, canal).—Examination of the bladder (percussion, palpation, catheterization, cystoscopy).—Examination of the ureters (vaginal examination).—Examination of the kidneys.—Intravesical separation of the urine.—Catheterization of the ureters.

1. **Interrogation.**—If we have to deal with a woman who complains of urinary troubles we should begin by hearing the patient and then questioning her.

1. Inquire into the *state of micturition*, its *frequency* and *pain* that accompanies it.

(*a*) *Frequency.*—Is the patient required to urinate frequently? Is it continuous during the twenty-four hours or only diurnal? or nocturnal? If the frequency prevent her sleeping is it due to cystitis?

If the frequency ceases in the recumbent position, and only exists in the standing position or while walking, we may conclude the vesical symptoms have as origin a lesion of the neighboring parts. It is generally a question of a uterine affection, a uterus too heavy for its means of suspension, perhaps due to a sclerous hypertrophy of inflammatory origin, or to its means of support having disappeared, as that happens in perineal tears with prolapse.

(*b*) *Pain.*—When does the patient suffer?

Before, during or after micturition?

Pain during micturition indicates a urethral inflammation.

Pain after indicates an inflammation of the bladder.

2. We can thus rapidly get an idea of the *general state* of the patient and of her various functions.

2. **Examination of the Urine.**—After questioning the patient, we should proceed to an examination of the urine.

To do this with a man, we use several glasses; the first contains the secretions of the canal and indicates the state of the anterior urethra, while the second denotes the state of the posterior urethra and bladder.

This separation is less important in case of women because the urethra is short and the secretions less abundant. However, it has its importance; thus if the patient micturates in two or three glasses, the first indicates the state of the urethra; the two others the state of the bladder. Above all the third, which is obtained by the expression of the contracted bladder against the neck of the bladder.

I will not insist here on the character of pyuria or hematuria, or on the conditions in which these phenomena occur and their symptomatic value; that would lead us into lengthy discussions which have nothing special to do with the female urinary system.

3. **Examination of the Urethra.**—To do this examination we commence by placing our patient in such a position so as to use a speculum.

(*a*) First, inspect the *meatus* by separating carefully the labia majora and minora, and thus enabling us to see any lesions of the mucous membrane and swelling or redness. We sometimes find a reddish little tumor which is inserted immediately behind the meatus; it is a urethral polyp which explains symptoms of hematuria.

It is rare to find that the urethral mucous membrane forms a hernia around the circumference of the meatus; generally it is a question of prolapse of the mucous membrane.

At other times we find a hard circular thickening of the meatus which indicates a malignant neoplasm of the urethra.

Finally, we may sometimes discover that the urethral orifice is extremely dilated without any other sign of inflammation; we may then conclude that the woman utilizes her urethra for other uses than the evacuation of urine, and these cases are not so rare as one would at first suppose.

American gynecologists insist on the necessity of always find-

ing out apart from urethritis, the state of the canals called Skene's glands, which may be easily seen by separating the meatus with two hair-pins bent at right angles. Kelly advises this (Fig. 365).

(*b*) Then examine the *canal of the urethra.* Here again *simple inspection* gives, in some cases, important help in our diagnosis, as, for example, in certain cases there exists a certain degree of

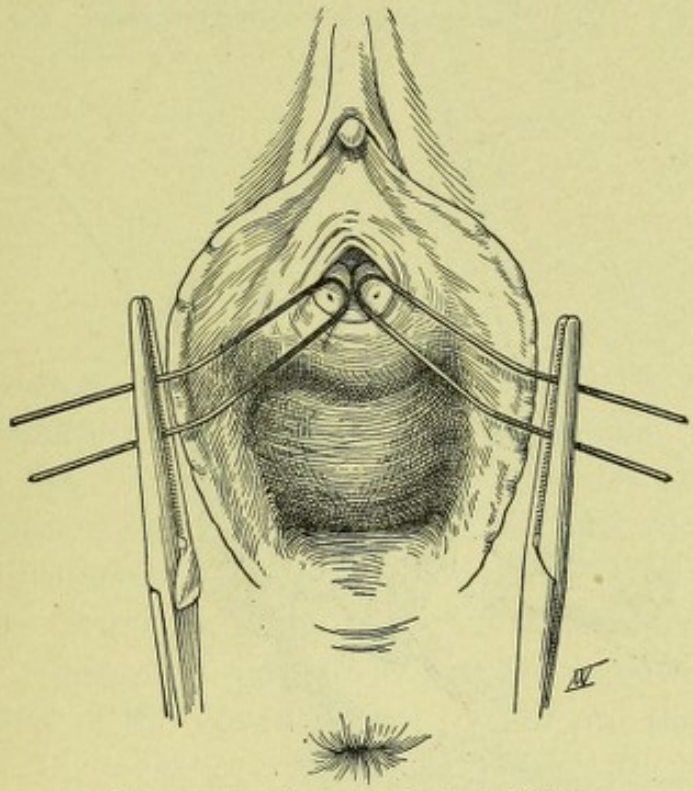


FIG. 365.—Skene's glands (Kelly).

prolapse of the urethro-vaginal wall or urethrocele. It is easy to recognize by examining the anterior wall of the vagina, what corresponds to the urethra and what to the bladder. The urethral portion, bulging like the "back of an ass," has regular folds and is separated from the more spread out vesical portion by a constant transverse furrow.

In a general way, simple inspection is always insufficient to diagnose the diseases of the urethra; we must have recourse to other means, and above all to *palpation.* The index-finger being introduced into the vagina, the palmar face is applied to the inferior wall of the urethra, and may cause a drop of pus to appear at the orifice of the meatus. We thus examine the urethral secretions and find out, at the same time, the changes in

the canal, which may be thickened, tense, and painful as in the inflammatory condition, or, on the contrary, hard with the sensation of a rigid cord, and nodular as in neoplasms. Finally, in certain cases we find either resistance or fluctuation, denoting a sub-urethral abscess.

This external palpation of the canal having been done, we do an *exploratory catheterization* with a speculum and mandrin

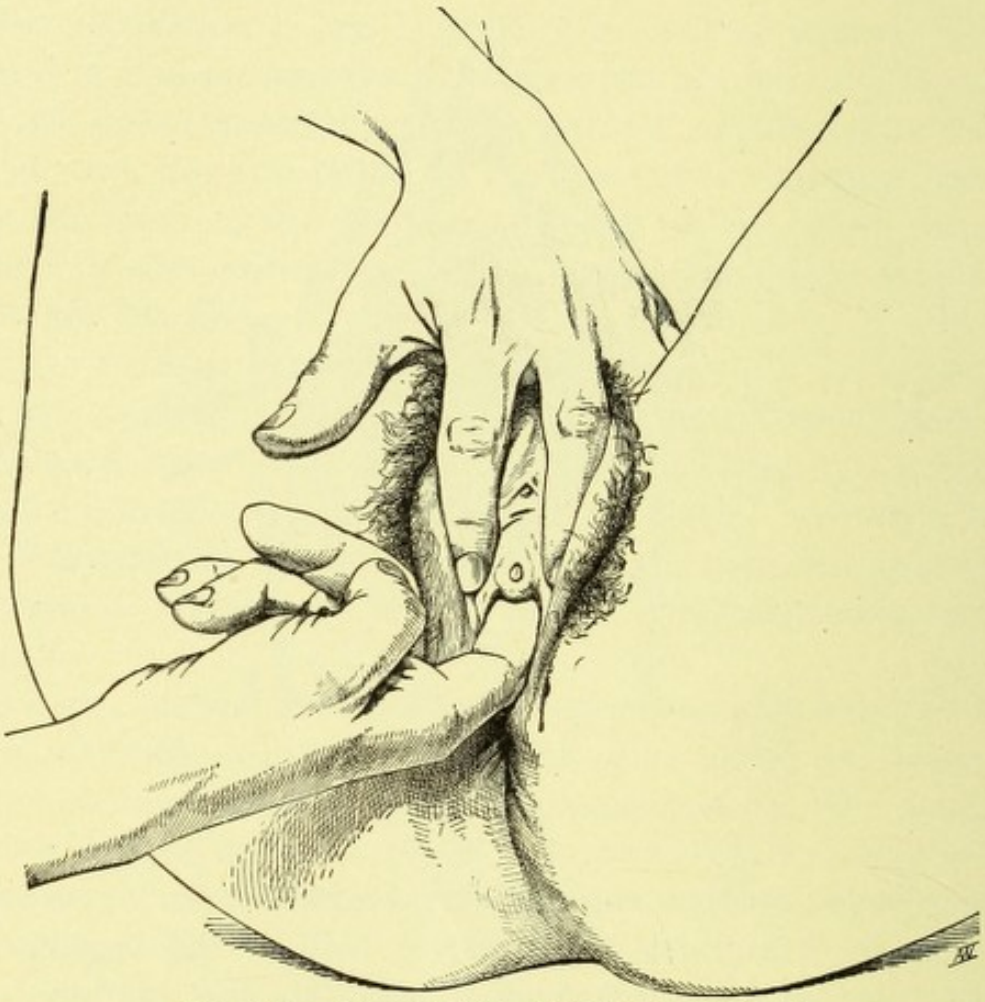


Fig. 366.—Examination of vaginal secretions.

which is gently introduced into the bladder. We can thus find out the degree of sensibility of the canal and its dimensions.

(*d*) The examination with the *urethroscope* will be often very useful. In order to do it we take a metallic tube of 8 to 10 mm. diameter, furnished with a mandrin to prevent injuring the urethral mucous membrane during introduction of the instrument. It is introduced just into the bladder; then, having withdrawn the mandrin, it is gradually drawn out toward the meatus, while a light is thrown on the scene of operation from a mirror.

We can thus see the neck of the bladder, then the whole of the urethra, which at first looks like a flattened out tube, then has the aspect of a transverse split, and finally that of a vertical split at the level of the meatus. We may thus distinguish everywhere on the urethral mucous membrane vegetations, ulcerations, and the orifices of the glands of the urethra.

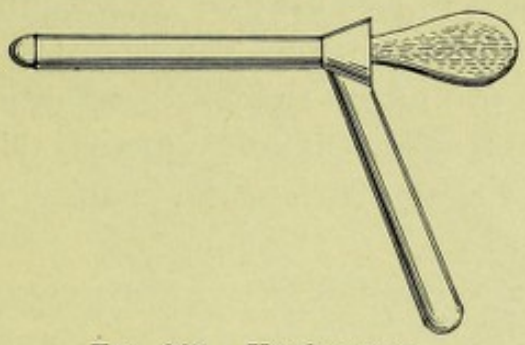


FIG. 367.—Urethroscope.

4. **Examination of the Bladder.**—(*a*) This is first done by *abdominal palpation;* in certain cases of vesical retention the bladder takes the form of a tumor projecting into the abdomen, a variety of tumor which we must always think of when we are examining a rounded and fluctuating mass situated above the pubis. Before doing an examination it is better to catheterize the bladder. Abdominal palpation enables us to study the state of the sensibility of the bladder, and to find out the seat of pain on pressure. In pressing on the bladder gently and slowly we may sometimes reawaken pain; by brusquely raising the hand from the abdominal wall we may also provoke pain if there is an inflammatory lesion.

(*b*) The *vaginal examination* permits us to find out, in certain cases, the existence of thickening induration tumors, and also pain in the interior wall of the bladder if it is combined with abdominal palpation.

This bimanual palpation is an excellent means of exploration of the bladder, and above all, if one, as a preliminary, places the patient in the Trendelenburg position.

(*c*) Then place a *speculum against the fourchette*, so as to depress it, and we may examine the anterior vaginal wall and find out if there is any prolapse of the vesico-vaginal wall (cystocele) or vesico-vaginal fistulas.

(*d*) To *do catheterization* with a speculum and mandrin, we

can determine the depth of the bladder and the sensibility of its posterior wall; in the normal state no pain should be produced; if there is any sensibility, it is the bladder that is inflamed.

(*e*) Afterward take a catheter and introduce it into the bladder and evacuate it. Having done this, inject a solution of lukewarm boric acid slowly and gradually and continue until the patient feels inclined to micturate.

If the bladder is healthy, we can easily introduce 150 to 200 cm. cubes without producing the least sensation. If, on the contrary, the patient resents the introduction of 25, 30 or 60 c.c., this shows that the physiological capacity of the bladder is diminished.

Finally, *cystoscopy* enables us to form a complete knowledge of the vesical mucous membrane. This examination, which is generally done in men with a *prismatic cystoscope*,[1] may be done in a woman with a simple urethroscope. In order to distend the bladder it suffices to raise the pelvic region strongly, so that the contents of the abdomen fall toward the diaphragm; the air enters into the urinary reservoir as soon as the urethroscope is in communication with the atmosphere. American surgeons place the patient in the genu-pectoral position, with the chest in contact with the table, slightly arching the back, taking the precaution to remove anything tight which might compress the upper part of the abdomen (Fig. 368).

We may also, as we have said, place the patient in the Trendelenburg position, on an inclined plane, with the shoulders resting against shoulder pieces (Fig. 369).

After *cocainizing* the urethra, if the meatus is not 1 c.c. wide, it is dilated with Kelly's conical dilator or with Hegar's bougies. Introduce the speculum in the direction of the urethra, inclining it at first a little toward the sacrum and then turning round the symphysis; as soon as the mandrin is drawn out, the bladder balloons with air.

Once the bladder is filled and the urethroscope in place, we light up the bladder with a frontal mirror and lamp, which is thoroughly examined.

If it is healthy, the mucous membrane appears smooth and

[1] See Hartmann, Surgery of the Genito-urinary System in Man. Paris, G. Steinheil, 1904.

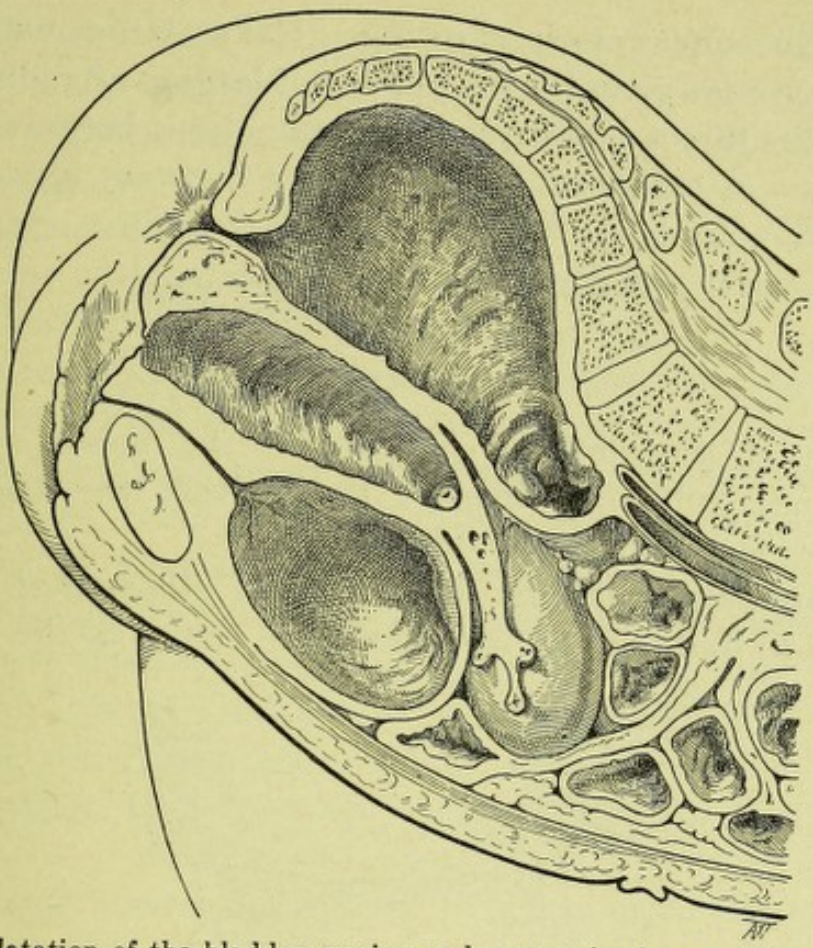


FIG. 368.—Dilatation of the bladder, vagina and rectum in the genu-pectoral position (after Kelly).

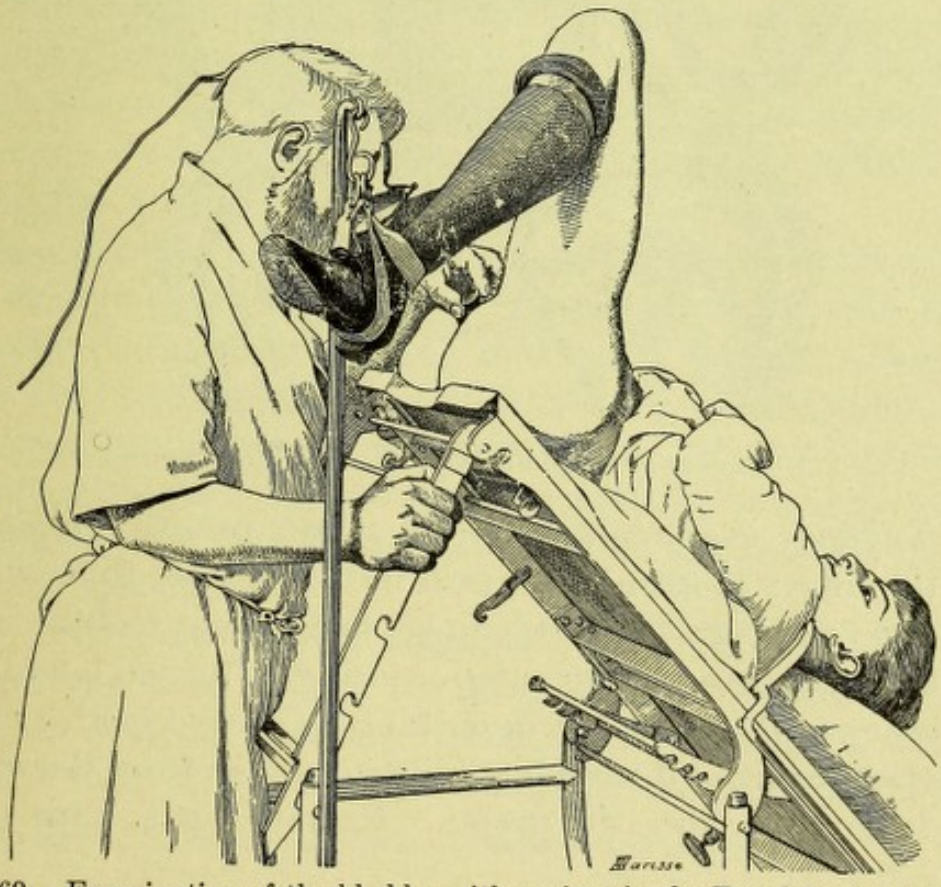


FIG. 369.—Examination of the bladder with patient in the Trendelenburg position.

pale or with some vessels showing. Examination with Nitze's cystoscope always gives the impression of larger and redder vessels than with the direct urethroscopic examination, because with this latter means of exploration, the bladder becomes less congested

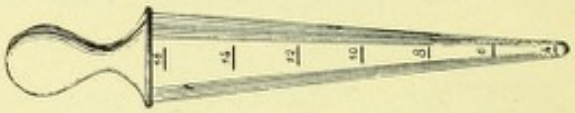


FIG. 370.—Kelly's conical dilator.

by reason of the elevated position of the pelvis. With the urethroscopic tube, we inspect successively the trigone and different segments of the bladder.

5. **Examination of the Ureters.**—(*a*) *Abdominal palpation* enables us to find out any pain along the course of the ureter.

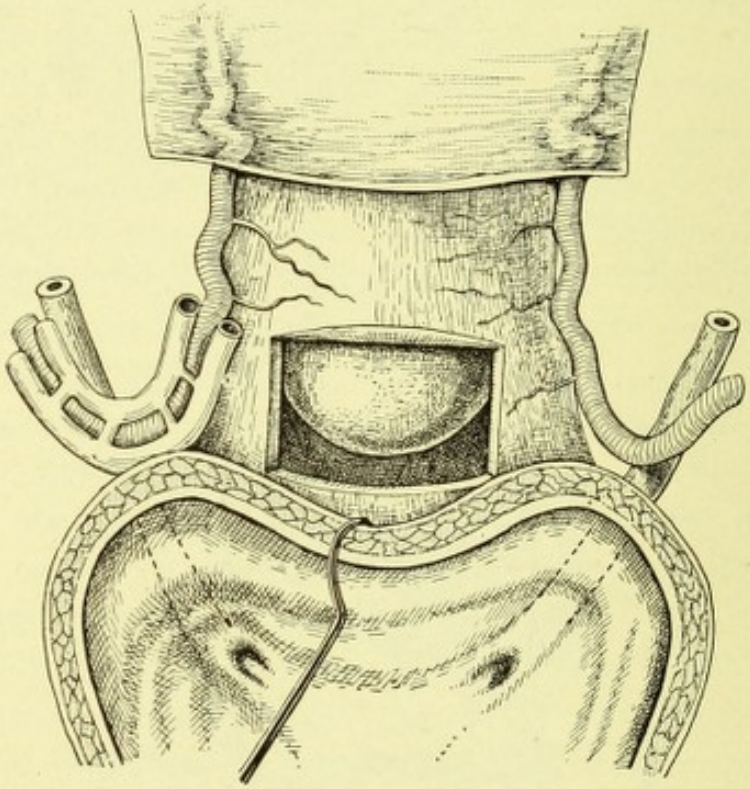


FIG. 371.—Relations of the ureters with the vagina (Dartigues).

(*b*) Vaginal examination gives more precise indications. When the finger is introduced into the vagina by following the median line as far as the cervix uteri, one cannot feel the ureter, but if the finger being in the anterior fornix, is turned laterally we feel anterior to the cervix, in describing an arched course around the anterior fornix and stopping a little distance from the median line, a little hard cord, the ureter. Normally it is hard to dis-

cover. If one finds a thick and hard cord, during vaginal examination which is outlined against the vaginal vault, and situated outside the median line, we may be sure that we have to deal with a diseased ureter.

6. **Examination of the Kidneys.**—Examination of the kidneys reveals nothing in particular in a woman; bimanual palpation is generally carried out as in man.[1]

In order to appreciate their functional value, we may have recourse either to urethral catheterization, or to intravesical separation, so simple in its technic that any doctor may practice it without any preliminary education with the instrument constructed by M. Gentile for our old assistant, Dr. Luys.

This apparatus is introduced closed into the bladder; make the india-rubber septum bulge, and applying the instrument against the inferior wall of the bladder, we are able to make a recess, the urine from each kidney accumulating on each side of the septum, and afterward evacuated externally by the two tubes.

The urine flows naturally and every 20 or 25 seconds we may see drops issuing which correspond to the intermittent ejaculation of the ureters.

This apparatus has given me excellent results.

Catheterization of the ureter, which one is able to do with the prismatic cystoscope in man, is most often done in woman directly through a urethroscopic tube. Its technic has been fully worked out by the American surgeons, Kelly in particular.

In order to avoid dilatation of the bladder when the air enters, it is recommended to introduce the urethroscopic tube to partly open the vagina in such a way that it fills with air, which presses back the vesico-vaginal septum toward the abdominal wall. In these conditions if one introduces the urethroscope, this septum is raised a little toward the vagina, but rarely above the horizontal, and thus its ureteral orifices are brought on a level with the speculum.

In order to see them, draw back the urethroscopic tube until the mucous membrane of the deep orifice of the urethra appears on a line with its internal extremity. The handle of the instrument is then raised, and the speculum directly pushed into the

[1] See Hartmann, Surgery of the Genito-urinary Organs in Man.

bladder to a depth of three cm. Lowering this handle in such a way as to bring the end of the urethroscope on the same plane as the base of the bladder, we progressively incline the instrument

FIG. 372.—Luys' separator in position.

laterally until one sees the ureteral orifice, which ordinarily appears when one has traversed an arc of 15° to 30° about the median line.

In some cases, following an inflammation of the vesical mucous membrane, the ureteral orifice does not appear clearly. We are then guided by the discharge of urine at its level and we may insert a fine metallic stilette in order to find it.

CHAPTER II.

SURGERY OF THE URETHRA.

Summary.—Operations on the urethra (catheterization, dilatation, internal urethrotomy, external urethrotomy, urethrectomy, operations for incontinence of urine).—Treatment of diseases of the urethra (wound, foreign bodies, calculi, inflammation, suburethral abscesses, urethrocele, prolapse of mucous membrane, tumors).

1. Operations on the Urethra.

Catheterization.—Catheterization is one of the simplest operations, owing to the shortness and rectilinear direction of the female canal. The only precaution to take is only to act with the strictest antisepsis. We must only use sterilized instruments. Clean the meatus thoroughly and only do the operation under visual control.

The meatus is normally found above the tubercle which limits anteriorly the anterior column of the vagina. Above this landmark is the constant position of the external orifice of the urethra. It is sufficient in order to do the catheterization to engage the end of the sound well within it, then to slightly lower its extremity and at the same time push it forward. Before the extremity of the sound penetrates the bladder it is well to place one's thumb over its extremity in order to prevent the urine from flowing anywhere except into the destined receptacle.

Some difficulties which are exceptionally met with are connected either with the meatus being taken for peri-urethral excrescences or by the bent back protuberance of the anterior tubercle, which lies normally below this orifice, or that the canal is deviated anteriorly due to pregnancy or a uterine tumor, or backward due to a dilatation of its interior wall from a urethrocele. If we bear these in mind we will easily avoid them.

Dilatation of the Urethra.—The meatus is the least dilatable portion of the urethra; also when it is small and rigid, it is well

before commencing to do the dilatation to make some small lateral incisions.

If we wish to obtain a moderate dilatation, for example, in a case where we wish to do a cystoscopy, or a separation of urine, it is then sufficient to pass some Hegar's bougies or Beniques' straight dilators into the urethra.

FIG. 373.—Hegar's bougies with double graduation.

If one proposes to do a free dilatation, we may use Hegar's bougies and gradually increasing the caliber.

In order to dilate the urethra and vesical neck, we may use special instruments such as Tripier's hollow dilator, Guyon-Duplay's[1] dilators with accompanying mandrins, or Kelly's

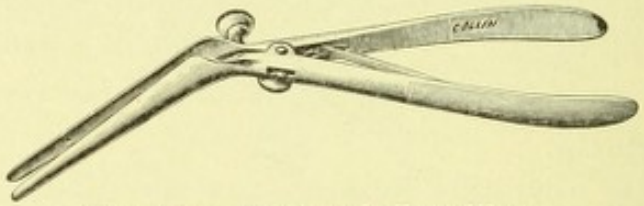


FIG. 374.—Tripier's hollow dilator

conical dilator, etc. The important point is to act with caution, never to dilate brusquely, and not to go beyond a caliber of 20 mm. diameter. We will thus avoid the somewhat rare complications such as rupture, tearing of the canal, hemorrhage, infiltration and incontinence of urine.

FIG. 375.—Pasteau's straight urethrotome.

These wide dilatations have been advised in the treatment of certain cases of painful cystitis. They are above all useful as preliminary operation to a digital exploration, to the extraction of a foreign body, or a curettage of the bladder.

[1] Hartmann, Painful Cystitis and Its Treatment. *Th. de Paris,* G. Steinheil, 1887.

Internal Urethrotomy.—Internal urethrotomy has only rare indications in women. It is carried out on the superior wall with Maisonneuve's urethrotome, or better with a straight urethrotome. The operation and following treatment have the same consideration as in the case of man.[1]

External Urethrotomy.—This is very simply done in woman by directly incising the urethro-vaginal septum. It may also be done as Legueu advises by the *sub-symphyseal route*, which enables us to surely avoid a fistula.

After having exposed the vulvar vestibule by separating the labia minora, we make above the meatus and between this and the clitoris a curved incision with its concavity inferior. With the bistoury scissors or finger we separate the urethra from the symphysis, stopping laterally when we reach the corpora cavernosa, which we must save, cutting through and tying, if necessary, the vessels which go to the urethra. This is incised on a line with its superior face on a cannulated sound.

Once the operation is finished, we suture the urethra after placing a sound in position and closing up the sub-symphyseal wound by buried catguts, which lift up the meatus toward the clitoris and give to the canal its normal curve. Some superficial silkworm-guts unite the borders of the vestibular incision.

Urethrectomy.—Legueu and Duval recommend the sub-symphyseal route and preliminary incision of the urethra on its superior wall so as to gauge from the commencement the extent of the parts to be removed. Having done this, free the interior wall of the canal to the extent of the future section. Before doing this, we insert two paraurethral sutures, one on each side, in the canal in order to prevent its retraction toward the bladder. The urethra is cut across in front of these sutures and fixed in the posterior angle of the vaginal wall. This is reconstituted by suture in front of the new meatus.

When it is necessary to extirpate all the urethra, the view obtained by the sub-symphyseal incision is not sufficient; Zweifel combines it with symphysiotomy. Mac Gill commences by a suprapubic incision, then lifts out the tumor by the vagina,

[1] See Hartmann, Surgery of the Genito-urinary Organs in Man. Paris, G. Steinheil, 1904.

which an assistant presses back below with two fingers introduced into the bladder.

The functional result of the partial extirpations is excellent; on the contrary, total removal, with incision of the vesical sphincter, is followed by incontinence. Also certain surgeons completely close up the urethro-vesical wound and establish a hypogastric meatus, on which a urinal may easily be applied (Mac Gill, Zweifel, Battle).

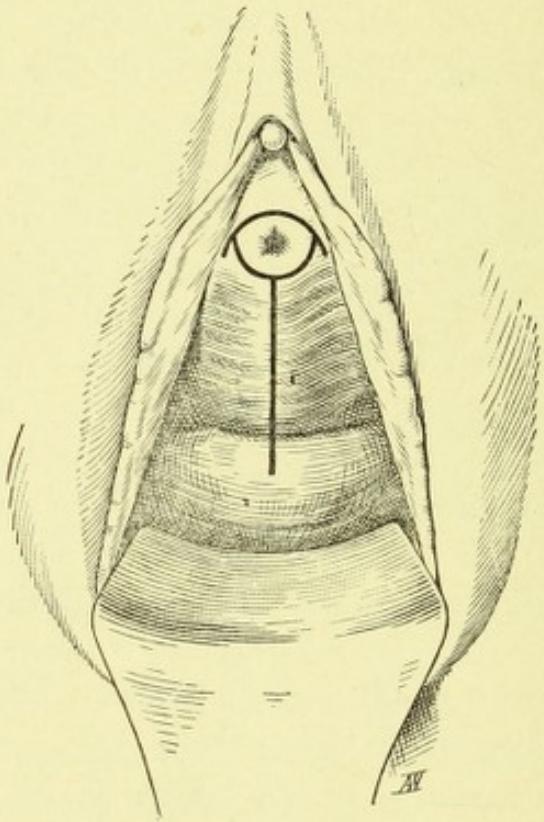


Fig. 376.—Trace of the incision for urethrectomy.

These urethrectomies have been done for neoplasms;[1] it is necessary generally to do at the same time an extirpation of inguinal ganglions.

Operations for Incontinence of Urine.—A great number of operations have been advised for incontinence of urine of urethral origin.[2]

[1] We have had occasion to do with the success of a durable resection of the terminal portion of the urethra for one case, up to now quite unique, of tuberculous structure, recalling by its aspect those of constrictions of the same nature in the rectum. (Hartmann, Hypertrophic Tuberculosis with Resulting Stenosis of the Urethra in a Woman. *Th. de Paris*, G. Steinheil, 1907, p. 1.)

[2] Cottard (H.), Operative Treatment of Incontinence of Urine in Women. *Th. de* Paris, G. Steinheil, 1906–1907, No. 63.

Some wish to constrict the canal; we may do this very simply by doing an *anterior colporraphy*, sub-urethro-vesical,[1] reconstituting at the inferior part of the urethra a solid column and at the same time tightening up the periurethral tissues. Associated with a perineorraphy, the anterior variety suffices most often to cure incomplete incontinence of women with prolapse and exaggerated laxity of the pelvic tissues.

Gersuny has endeavored to obtain the same result by doing around the cervix a *series of injections of paraffin.*[2] With a

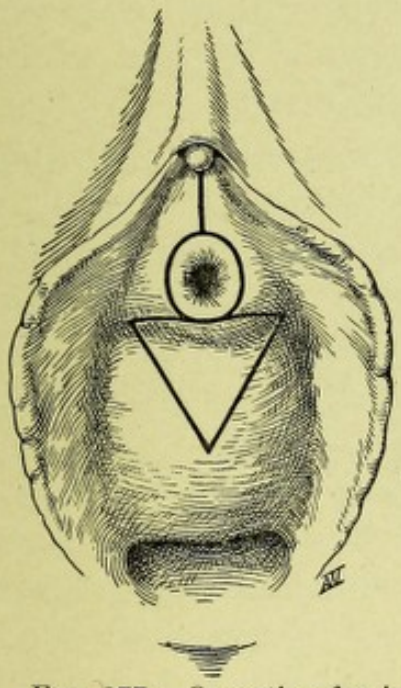


FIG. 377.—Operation for incontinence of urine. Trace of the incision.

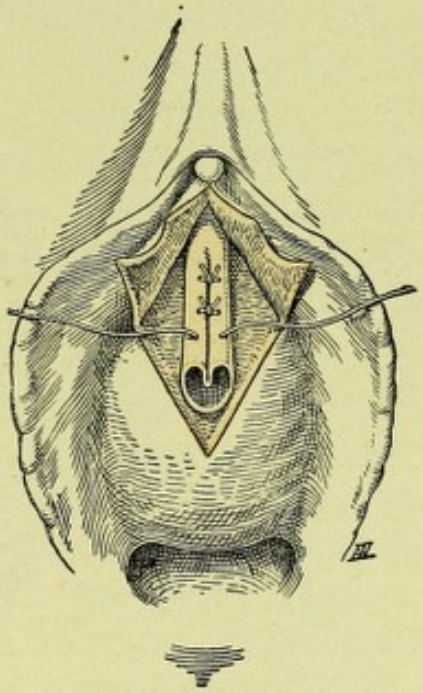


FIG. 378.—The urethra has been dissected. A fold is made on its superior wall.

syringe, the body of which is heated by a circulation of hot water, he injects, after local anesthesia, about 2 c.c. of fusible paraffin at 55° in the neighborhood of the cervix, circumscribing this with a series of small masses of paraffin.

Pawlick made an operation displacing and oblongating the urethra; Duret and we also construct the urethra and lift up the meatus toward the clitoris. Gersuny twisted the urethra, after dissecting up. Pousson combined torsion with raising of the meatus. Fritsch does a sub-pubic incision, separates the urethra and bladder from the symphysis, excises a long longitudinal

[1] This sub-urethral colporraphy may be done by denudation or by splitting.

[2] Gersuny, Paraffineinspritzung bei Incontinentia Urinæ. *Centr. Bl. für Gyn.*, 1900, Stein, Par.-inj. *Th. de Paris*, Stuttgart, 1904.

band from the superior wall of the canal and cervix, and then unites the urethral wound with a continuous suture.

The procedure which appears best to us is that described by Albarran; it is a rational combination of several operations that are done anteriorly.

A longitudinal incision commences at the clitoris and encircles the meatus. A triangular incision is made below this as in Fig. 377. The two triangular flaps having been dissected up, the urethra appears to form the base of the wound. This is

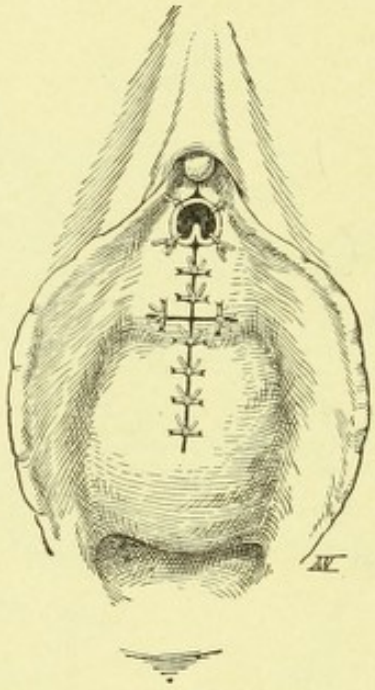


Fig. 379.—The folded urethra has been turned in through a half circle and then lifted up below the clitoris.

dissected up gradually, preserving its muscular tunic and separating below the vaginal wall up to within a little of the neck of the bladder. It is then easy to draw down the canal and to make on its superior wall a longitudinal fold which constricts it (Fig. 378).

The urethra having been constricted by a longitudinal superior fold is turned in for one-half a circumference and drawn upward; the meatus is fixed immediately below the clitoris and then the vaginal wound is sutured (Fig. 379).

In case of rebellious incontinence, Hofmeier[1] after an anterior colpotomy, lowers the uterus into the thickness of the urethro-vesico-vaginal septum so that we thus make a sort of sub-urethral

[1] Hofmeier, *Ann. de gynéc.*, Paris, 1906, p. 701.

plug which compresses the canal. We have had recourse to the same procedure and we have found it very useful.[1]

2. Treatment of Diseases of the Urethra.

Wounds of the Urethra.—The recent wounds are treated by immediate suture and the ancient by denudation and suture.

Foreign Bodies and Calculi.—If the foreign body or the calculus is near the meatus, visible and easily accessible, it is sufficient to dilate the meatus of the urethra in order to make the calculus come out by pressure from behind forward. If it is further back, it is extracted with a curette or better with a pair of forceps introduced through the urethroscope, and withdrawing at the same time the calculus, forceps and urethroscopic tube. If it is impossible to withdraw the calculus, we must do an external urethrotomy. In a certain number of cases the calculus is lodged in a diverticulum of the urethra; it is necessary, by a vaginal incision, to remove the calculus and to excise the pocket, terminating with a suture in two planes.

Urethritis.—At the commencement if there is an acute inflammation not only of the urethral, but also of all the vulvar region, we must give hot baths, vaginal injections of permanganate, applications of compresses soaked in the same solution, and prescribe abundant drinks. In some few days we give balsamic products, and if necessary, we have recourse to lavage of the urethra. These may be done with or without sound. If we use a sound, as the urethra is short, we should use straight sounds, with a back flow, which are introduced as far as the cervix; the liquid comes back to the meatus, washing the canal from behind forward (Fig. 380).

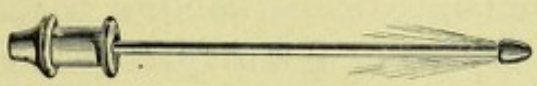


FIG. 380.—Cannula with recurrent flow.

Often reinoculation occurs through the existence of a series of other infectious loculi in the vagina, the uterine cervix, Bartholin's glands and above all in the little pockets described by Skene below the meatus.

[1] For the technic of this operation see Colpoceliotomy.

We must wash out these glands in a special manner, injecting into them, through fine cannulas, some drops of a solution of potassium permanganate, 1 to 300, emptying this by pressure and then re-commencing the injection. Carbolic acid in concentrated solution and nitrate of silver have been recommended. In order to put an end to the suppuration of these diverticula it has been advised to split the wall of mucous membrane which

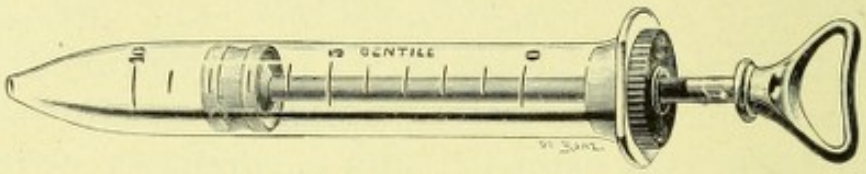


Fig. 381.—Sterilizable syringe.

separates them from the canal or to destroy them by insinuating into them the fine point of a galvano-cautery.

At a later period we have advised lavage of the urethra with a solution of oxycyanide of mercury and applications to the canal with pure ichthyol.

It is important to continue the treatment during the duration of menstruation and to pursue the infection wherever it is localized and not confining oneself to the urethra, as auto-infection is very frequent.

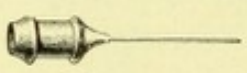


Fig. 382.

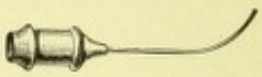


Fig. 383.

Fine cannulas for injections of the para-urethral canals.

A variety of urethritis, observed above all in women and rebellious to ordinary treatment, is *proliferating urethritis*, which may cause small urethrorrhagia and sometimes partial retention of urine. If the lesions are limited to the terminal part of the canal, we may obtain cure by doing a partial resection of the urethra; if they extend as far as the neck of the bladder, the resection of the urethra is not to be considered as it would lead to incontinence; Legueu advocates, in such a case, to destroy the vegetations after having practised a sub-symphyseal external urethrotomy. We have found simple destruction with the galvano-cautery quite useful, to be done in several sittings, advancing little by little into the depths, after local anesthesia and through the urethroscopic tube.

Sclerous urethritis is exceptional; it is treated with massage and dilatation done with Beniqués bougies and pushed as far as Nos. 55 and 60. If it fails, we may have recourse to internal urethrotomy or even to external urethrotomy by the sub-symphyseal route, removing the callosities and leaving without union the superior wall of mucous membrane so as to thus add a piece to the urethra (Legueu).

Suburethral Abscess.—Suburethral abscesses,[1] which often open into the urethra, may be followed by urethro-vestibular or urethro-vaginal fistulas; they are treated by a broad vaginal incision, curettage and tamponing. If the intervention is followed by a fistula, it is closed secondarily with a little operation.

Urethrocele.—Sometimes confounded with cystocele, urethrocele is easily distinguished by the fact that the seat of tumefaction is at the level of the urethra, in front of a transverse furrow, always visible on the vaginal wall and corresponding deeply to the neck of the bladder. The introduction of curved sounds into the canal shows that it is a pocket corresponding with the urethra.

To operate split the whole thickness of the pocket on a cannulated sound and excise a melon-shaped area from its inferior wall and afterward suture the parts together.

Prolapse of the Urethral Mucous Membrane.—Treatment consists in excision followed by suture, splitting the prolapse in the middle line antero-posteriorly we insert at each extremity two catguts which unite the mucous membrane of the urethra to that of the external face of the meatus; then excise successively each of the halves, right and left, suturing the mucous membrane as the section advances, doing in all points an operation similar to that of Whitehead for hemorrhoidal prolapse of the anus.

In infants Stoeckel after drawing down the prolapse ties it with a fine silk on a Nelaton sound; a cure is rapidly obtained after necrosis and detachment of the strangled mucous cylinder.

Tumors.—Small *excrescences* (mucous polyps, papillary angiomata, caruncles) which are observed often enough at the level of the meatus and are excised with curved scissors; then their surface of implantation is cauterized with nitrate of silver; if it is large enough insert a catgut suture. *Fibromata* and *myomata*

[1] J. Baury, Periureteral Myomata in Woman. *Th. de Paris*, 1895–1896, No. 103.

are extirpated by enucleation. In presence of *cancer* of the *urethra*[1] we should do urethrectomy. A particular point merits mention, *i.e.*, the possible existence of *periurethral malignant tumors*. In such a case spare the urethra without great inconvenience from the point of view of recurrence. In all cases we should remove as well as the tumor the inguinal glands.

[1] Percy, Primary Carcinoma of the Urethra in the Female. *Am. J. of Obstet.*, New York, April, 1903, T. I, p. 457. Yasuzo Karaki, Ueber prim. Karz. der Weib. Harnröhre. *Zeitsch. f. Geb. u. Gyn.*, 1907, Stuttgart, T. LXI, p. 151.

CHAPTER III.

SURGERY OF THE BLADDER.

Summary.—Operations on the bladder (vestibular section, colpocystotomy, colpocystostomy, lithotrity, curettage).—Treatment of diseases of the bladder (foreign bodies and calculi, cystitis and prolapse of the vesical mucous membrane).

1. Operations on the Bladder.

Cystotomy.—The bladder may be opened in women in various ways: above the pubis, suprapubic cystotomy; below the pubis it is the old vestibular section of Lisfranc; by the vagina it is colpocystotomy.

Perineal Section.

Vestibular section, suggested and practised in 1823, has been taken up again latterly by Legueu under the name of subsymphyseal section. The first stages of the operation are identical with those of subsymphyseal external urethrotomy.

The superior face of the urethra being freed, the finger separates the retro-pubic fibrous tissues, aided by a scalpel, the point of which is directed upward so as not to injure the canal. As soon as one has reached the level of the bladder, the separation is very easy.

We may then incise the bladder or cervix. In principle it is better to respect the latter. We make a vertical incision in its wall between the two ascending veins of the anterior face of the bladder and then place on each lip a suspensory suture so as to be able to explore the interior of the urinary reservoir.

When the operation is finished, close the vesical wound in one or two planes; suture the soft parts of the vestibule with the aid of interrupted catgut sutures, leaving a little median drain which is soon removed. A catheter is left in.

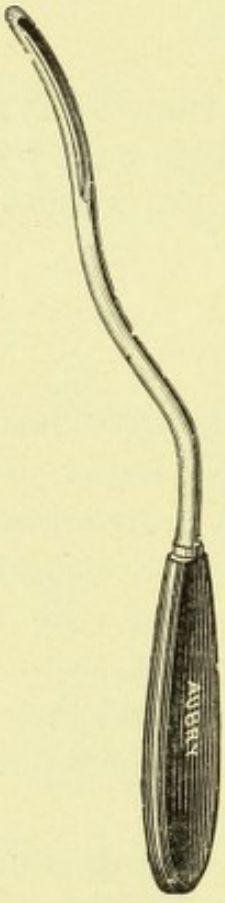


FIG. 384.—Catheter for vaginal section (Hartmann).

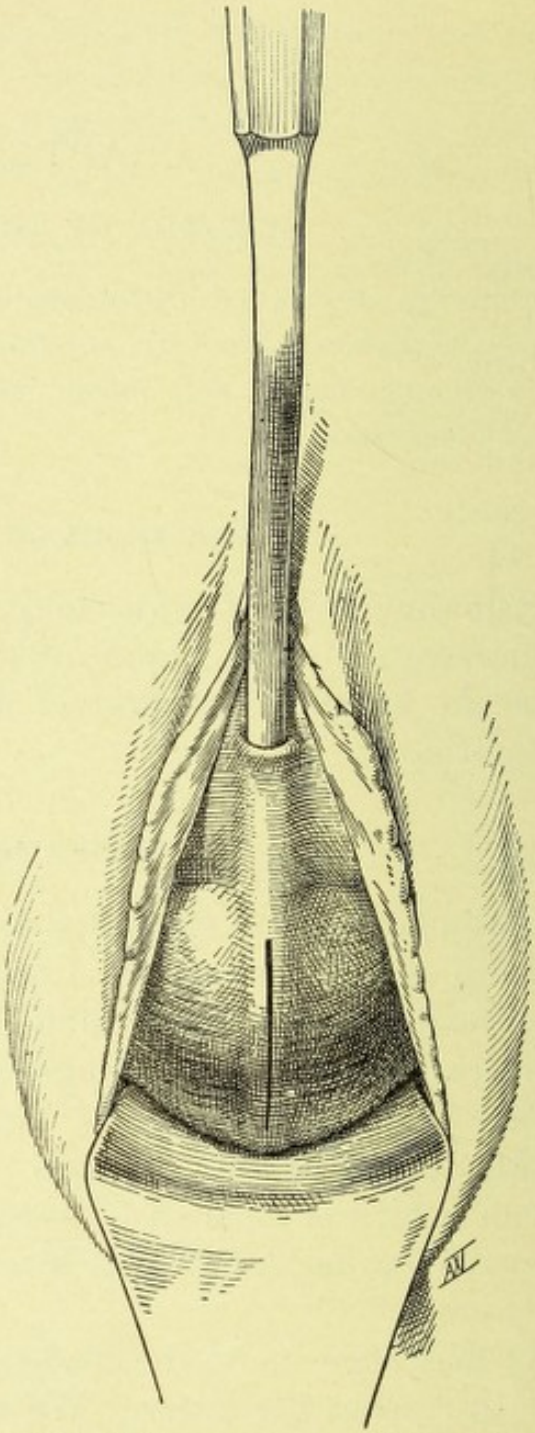


FIG. 385.—Colpocystotomy. The catheter makes the vesico-vaginal septum bulge. The incision commences anteriorly a little behind the transverse groove which indicates the situation of the neck of the bladder.

This procedure is particularly applicable to cases where the vaginal route cannot be used because of the hymen.

Colpo-cystotomy.

The patient is placed in the usual position for vagino-perineal operations; the bladder is washed out, then moderately distended by the injection of 150 to 200 c.c. of lukewarm boracic acid.

An assistant draws down the posterior wall of the vagina with speculum; with an ordinary catheter or better with a special coude catheter, which is grooved for a distance of about 4 cm. (1 1/2 inches) along its intravesical convex portion (Fig. 384). This catheter should be maintained in the median plane so as to save the ureters. The surgeon, with his index-finger against the groove, punctures the vagina about 1 cm. behind the neck of the bladder; by aid of the grooving, he is enabled to push in the bistoury from 1 1/2 to 2 cm. and to incise the whole thickness of the vesico-vaginal septum by a sort of transfixion; he is thus certain of avoiding any slipping and of being able to make a section of the vesical mucous membrane corresponding very exactly to that of the vaginal mucous membrane.

The intra-vesical operations (extraction of a calculus, of a foreign body, etc.) having been done, we suture in two planes the incision in the septum and then place in a catheter, which is left in for 10 to 12 days.

Rochet, fearing the consecutive formation of a fistula, makes about 1 cm. behind the meatus a transverse incision of 3 to 5 cm. about, which only goes through the vaginal mucous membrane. Then he separates with the grooved sound or with blunt scissors the vaginal mucous membrane of the urethra and bladder; he then incises the latter.

Kelly places the patient in the genu-pectoral position, punctures the bladder with a condé bent at right angles, about 1 1/2 cm. from the cervix uteri and then brings the bistoury into the median line in the direction of the urethra until he judges the incision sufficiently large.

Colpocystostomy.—If we propose to keep the incision in the vesico-vaginal septum permanent, in order to make a fistula in the bladder as is done in certain rebellious cases of chronic cystitis, it is well to prolong the incision a fair distance backward

until we reach the neighborhood of the cervix uteri in order to avoid persistence of a cul-de-sac at this level and then as the wound has a tendency to heal spontaneously and closes rapidly, stitch the vesical mucous membrane to that of the vagina.

It is unfortunately not always possible because of the friability of the mucous membrane and its adherence to the adjacent layers resulting from inflammatory conditions. In such a case we must be content with passing a large drain into the bladder, from the urethra to the fistula, uniting its two extremities with a suture. After a few days take the drain out and the fistula is thus formed. If later it has a tendency to contract, enlarge it with the thermo-cautery.

It is well to use boracic acid to wash out the vagina in order to prevent stagnation of urine and the formation of phosphatic concretions. Although there may be from time to time fibrinous detritus obliterating the fistula, we should always make our vesical injections with gentleness. They pass by the urethra and come out by the fistula.

Lithotrity.—Lithotrity in a woman is more difficult than in a man which is due to the absence of a grown recess and to the fact that fragments of calculi, instead of becoming united are disseminated over the whole extent of the bladder. We should also follow Guyon's counsel[1] and create an operative field by pressing down, with the help of the lithotrite, the vesico-vaginal wall near the neck. This is done in order to cause the calculus to curve there. It is then seized and broken up.

Curettage of the Bladder.—Curettage of the bladder has been done through the *urethra*.[2] After anesthesia and washing out of the bladder introduce a long and sharp curette and then using the vaginal finger as a support we curette the interior wall of the bladder. For the remaining surfaces of the bladder curettage is always less perfect as the wall recedes under the pressure of the curette and risks being perforated. It is important to curette thoroughly the region of the neck of the bladder and once the curettage is finished, do a free lavage of the bladder (1 to 1000 sublimate) or nitrate of silver (1 to 500), creosote (1 in 100), and even pure tincture of iodine. Pezzer's large catheter is left in

[1] Guyon, *Annals of gynécology*, Paris, 1891, T. I, p. 241.

[2] Coursier, Treatment of Rebellious Cystitis in Woman. *Th. de Paris*, G. Steinheil, 1894.

and serves to instil each day, in the morning nitrate of silver 1 to 50 and in the evening gomenol 1 in 20.

2. Treatment of Diseases of the Bladder.

Foreign Bodies and Calculi.—Foreign bodies are often frequently observed in the female bladder. In a great number of cases it is possible to extract them *per vias naturales*. This extraction is facilitated by using special instruments, such as a blunt hook which locks.

It is made by Collin and recommended for the purpose of drawing hair-pins out of the bladder, these being the most common of foreign bodies. It is generally easy enough to seize the pin, but often difficult to extract it. The pin is introduced by its rounded end; once in the bladder, it props itself up

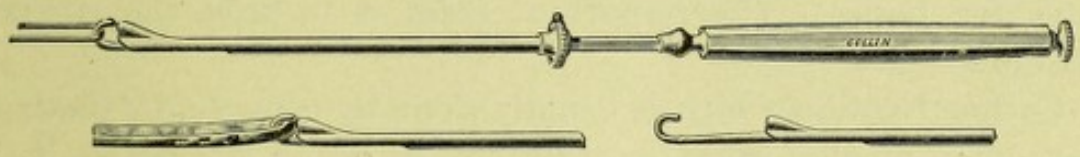


FIG. 386.—Locking hook.

by its two points against the neck of the bladder or takes a transverse position; once having seized it, we must draw it gently

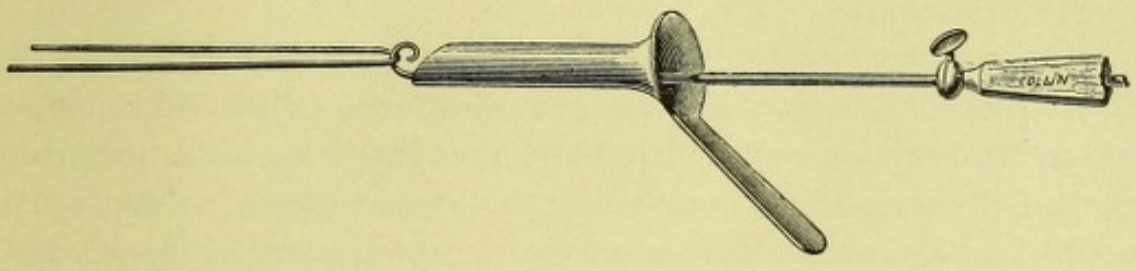


FIG. 387.—Needle seized with the blunt end, curved hook is pulled through the urethroscopic tube.

out. First determine the situation and direction of the foreign body with the urethroscopic tube, and then under the visual control bring it to be in good position and extract it.

If this fails, dilate the neck of the bladder and with the finger turn it round and draw it out with its convexity toward the cervix and thus remove it with the greatest facility.

If the foreign body is encrusted break up with a lithotrite the phosphatic incrustations which surround it.

If the foreign body cannot be extracted by the urethra, then do one of the vesical sections, particularly colpo-cystotomy, which although not to be strongly recommended for removal of neoplasms, is excellent for the removal of calculi and foreign bodies.

Cystitis.—The general indications of treatment are the same in both sexes. In a woman with cystitis we should always look for any concomitant affection of the genital system which may cause and keep up the inflammation of the bladder. This question of relationship between the disease of the genital and urinary systems in women is still badly known and demands more study to elucidate it.

Prophylactic treatment is very important; we still see too many cystites following on catheterization. We should avoid useless catheterization and only do it when the bladder is felt distended above the pubis. The important point is to have the strictest antisepsis.

Catheterization which is usually done by a nurse demands as many and as important precautions as a big operation if we wish to avoid formation of a cystitis. This may even develop in the absence of catheterization after the extensive operations for cancer as example. In these cases, as in those where one is obliged to have recourse to catheterization, we should first give a little urotropine.

Gangrenous cystitis, which has often been studied during the course of retroflexion of the gravid uterus[1] and after colpo-hysterectomies for cancer, may be prevented by an appropriate treatment consisting of redressing the gravid uterus at the fourth month and the peritonization of the denuded parts of the bladder after removal of the cancer (Kronig).

For certain forms of *rebellious cystitis* colpocystostomy, generally done in America, renders useful service by assuring the drainage and continuous elevation of the bladder. The fistula ought only be closed when the bladder condition is cured, if the pus has disappeared from the urine and the pressure of the oval-headed sound on the internal wall of the bladder causes no pain.[2]

[1] Pinard and Varnier, *Ann. de gyn.*, Paris, 1887, T. VI, p. 85.
[2] Hartmann, Painful Cystitis and its Treatment. *Th. de Paris*, G. Steinheil, 1887.

Prolapse of the Vesical Mucous Membrane.—This condition has already been observed to occur through the meatus.[1] It is distinguished from prolapse of the urethral mucous membrane by the absence of an orifice in its center and by its complete independence of the canal in all its length. Treatment consists in excision of the prolapsed mass after hypogastric cystotomy so as to see well what one is removing and not cause a lesion of the urethra.

[1] Vary, Hernia of the Bladder Through the Urethra. *Th. de Bordeaux*, 1894–95. No. 82. Villar, *Arch. provinc. de Chir.*, Paris, 1905, p. 373.

CHAPTER IV.

TREATMENT OF URINARY FISTULAS.

Summary.—Vesico-vaginal fistulas.—Prophylactic treatment.—Spoon taneous cures.—Preparatory treatment (cystitis, strictures of the vagina).—Operation.—General technic.—Simple denudation.—Treatment of fistulas situated opposite the cervix uteri.—Operations in several stages.—Special procedures applicable to large losses of tissue.—Utero-vesical fistulas (direct and indirect obliteration).—Utero-vaginal fistulas and destruction of the urethra.—Fistulas of the urethra (T. prophylactic and curative, T. by direct obliteration, by urethral grafts, by nephrectomy).

1. Vesico-vaginal Fistulas.

Vesico-vaginal fistulas are due to various causes. They are frequently observed after difficult labors.

Following on prolonged compression of the fetal head, the tissues become gangrenous, and as a result there is often considerable loss of substance, complicated by the presence of faulty cicatrices and adhesions to the neighboring bones and particularly the pubic arch. From this develop multiple lesions the cure of which is sometimes most difficult as these lesions may occur not only in the vesico-vaginal septum, but also in the cervix uteri, in other parts of the vagina and in the urethra. To-day owing to the improvement in obstetrics the number of these fistulas has considerably diminished; on the contrary, operative fistulas have increased in number. They are met with after vaginal hysterectomy, total hysterectomy, and in particular colpohysterectomy for cancer and even after certain surgical interventions such as symphysiotomy and vaginal Cesarean section.

The treatment of vesico-vaginal fistulas is still a question of the hour. Numerous procedures are published every day and many of them are re-editions of old methods. It is important to recognize the variability of the lesions we have to deal with, thus obliging the surgeon to recognize divers procedures he has to follow according to circumstances.

I. Prophylactic Treatment.

Prophylactic treatment consists in the union of vesical wounds at the time of their production. A non-sutured wound may sometimes heal spontaneously by simply leaving a catheter in, but we must not count on this fact, but always try and get immediate union of the operative lesions of the bladder. To obtain this union, we avoid the insertion of perforating sutures and particularly those of a non-absorbable character like silk. Under such circumstances we are exposed to the migration of the suture into the bladder and the formation around it of a secondary calculus. Do, therefore, a suture in layers and afterward leave in a catheter whenever possible and particularly after vesical lesions following on colpohysterectomy, instead of leaving the line of union in contact with the vaginal wound and of inserting a drain or tampon, try and cover over the line of suture with the drawn down vesico-uterine peritoneum, which is the best means of obtaining healing by first intention.

This prophylactic treatment is evidently not applicable to fistulas following on labor, which result from the separation of gangrenous tissue and cannot consequently be immediately sutured. It has been advocated by some to obtain a covering by cauterization and in particular by touching up with nitrate of silver or the thermocautery. The efficaciousness of this method has not been established. Perhaps, if it is crowned with success, it may be merely a question of one of those spontaneous cures seen in a certain number of cases. It is the opinion of some gynecologists that these cauterizations are injurious, because, if a cure is not obtained, they only lead to the formation of cicatricial tissue, the presence of which renders later intervention more doubtful and difficult (Stoeckel).

It has been advocated by others that to favor the spontaneous cure of vesico-vaginal fistulas we should put the patient in certain positions, in ventral decubitus to unilateral decubitus on the opposite side from the fistula. All these methods have been abandoned now-a-days.

We confine ourselves to the removal of foreign bodies if there are any, to vaginal irrigations and to pelvic baths and to leaving the catheter in.

As these spontaneous cures take a certain time to come about we do not immediately operate on vesico-vaginal fistulas, inasmuch that after labor the tissues are more friable and more vascular, that in the fistulas which supervene on a surgical intervention there often exists a neighboring suppuration, which may prevent the insertion of the suture. We must wait until the fistula ceases to diminish spontaneously and the tissues have taken on their normal appearance and there are no pathological secretions in the neighborhood.

We will not be able to operate before the sixth or tenth week; in general, the patients themselves decide tardily for an operation.

If an operation has failed wait two or three months before deciding to do a second operation.

II. Pre-operative Treatment.

The first point is to treat the vagina and the bladder. If we have incrustations of lime, ulcerated or granulated surfaces, we must cure these, and modify the alkalinity of the urine by repeated injected hot boric acid, and afterward drying the vagina and vulva with tampons of cotton wool held in forceps and then applying nitrate of silver to the ulcerated surfaces. If at the same time as the communication with the bladder there exists a recto-vaginal fistula do away with the latter, so as to avoid infection from the intestine.

When the vagina is constricted by cicatrices, commence gradually to dilate, doing repeated tamponing with antiseptic gauze or by introducing a series of gradually increasing aluminium balls. Continue the dilatation until we no longer find any cicatricial band projecting into the vagina. The resistant bands should be severed under visual control and with great prudence, particularly those which border on the rectum or posterior fornix.

This preliminary dilatation which the American surgeons, Sims and Bozeman, have so well studied is still practised, but rejected by the majority. It is quite certain that it gives a good dilatation and that it leads to a relaxation of and at the same time a freeing of the edges of the fistula in that we do away with the retraction of the cicatricial adhesions which draw in opposite directions, but is difficult and painful, requires some weeks time

and leads to an injurious maceration of the vagina. It does not give any better results. Personally we have never had recourse to it.

On the contrary, there is no discussion on the necessity of treating the lesions which may exist in the urinary system, and treat the pus in the urine which is a cause of non-union and of dilating the possible strictures of the urethra.

The preparations of the operation are not special; give a bath, purge and shave the vulva the day before and once the patient is anesthetized do a final cleaning up of the vagina.

III. Operation.

General Technic.—The position for operation is a matter of much discussion. American surgeons have recourse to the lateral or genu-pectoral position. We prefer the *dorso-sacral one.* The important point is *expose the fistula well.* We do this with

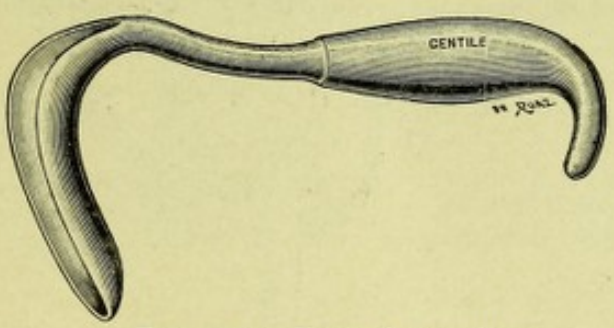


Fig. 388.—Vaginal speculum.

various retractors and draw down the cervix when possible to the vulva and in stretching the walls of the vagina around the fistula with Museux's forceps (Fig. 389).

If the fistula is inaccessible because of the cicatricial bands we should not hesitate to incise them, doing, if necessary, a splitting of the vulva or even the paravaginal incision practised by Schuchardt.[1]

[1] Michaux advises in cases of fistulas situated high up to do an ischio-rectal incision parallel to and a good finger's breadth from the internatal cleft. This incision commences behind at the level of the anus and is directed forward for a length of about 10 cm. (3¾ inches) just to the point where the ischio-pubic arch and the labia majora meet. Separate the ischio-rectal fat with the fingers and press it back toward the tuberosity of the ischium. The vagina, pressed back with the finger, is punctured 3 or 4 cm. (1½ inches) from the cervix and the incision is made greater with the scissors. (Michaux, *Congrès français de chirurgie,* 1892, p. 717.

Before tracing the surface of denudation, it is well for the last time to determine in which way the approximation of the parts with the greatest ease and without tension is brought about. Having done this, without hurry and without tearing the parts by drawing on them too violently, commence the *denudation.* We must stretch the parts about to be cut and use a very sharp knife. Special-curved probe-pointed bistouries, which are often used, are useless and of little value; a scalpel with a long handle is sufficient. The venous hemorrhage

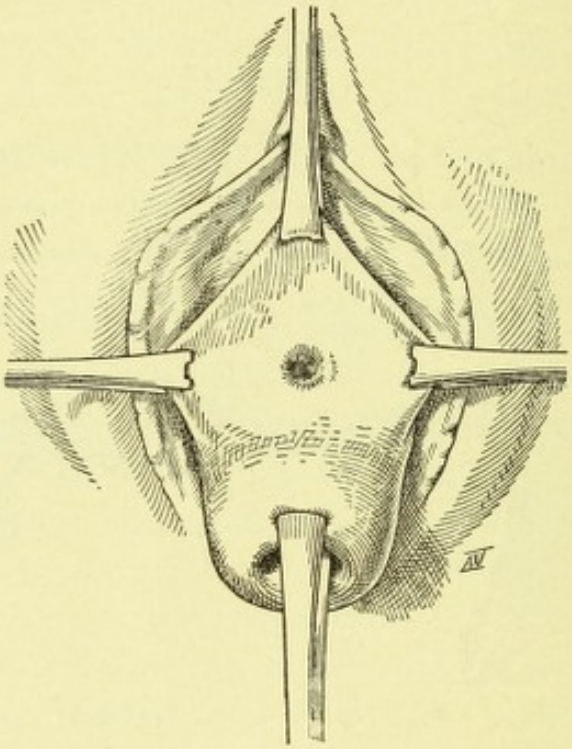


Fig. 389.—Vesico-vaginal fistula is well exposed by drawing down the cervix and by traction on the vaginal walls.

which occurs is of no importance and the insertion of sutures suffices to stop it; on the contrary, if there is an arterial spurt put a fine catgut about the vessel; serious hemorrhages may come on as a result of the neglect of this precaution.

In union we use sutures taking up the various planes, catgut for the deepest and silkworm-gut or silver wire for the sutures that project into the vagina. For suturing in one plane we use only non-absorbable sutures.

This small consideration of general technic in the operations on fistulas shows us that recent progress denotes a return to simplicity; the complicated instruments still to be found at the

makers' are useless and the usual instruments are sufficient without having recourse to special ones.

Simple Denudation.—Simple denudation is the most commonly employed procedure. It should be extensive, more than 1 cm. (1/2 inch) and should comprise the vaginal mucous membrane and all the thickness of the septum with the exception of the vesical mucous membrane.

FIG. 390.—Too small a denudation, carried out on the vesical mucous membrane, and perforating sutures. (Three faults.)

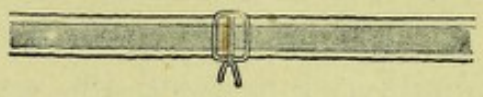


FIG. 391.—Probable failure owing to the smallness of the surface of denudation; possible incrustations on the intra-vesical portion of the sutures.

With the scalpel incise the vagina superficially around the fistula. Having done this seize the flap to be removed with a pair of toothed forceps and excise with the scalpel, taking care

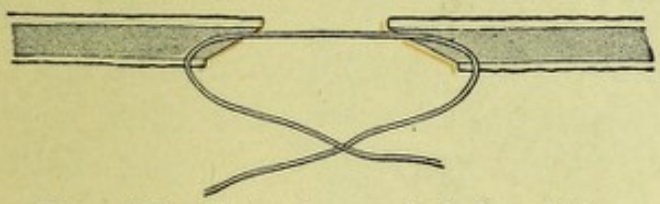


FIG. 392.—Extensive vaginal denudation with the sutures approximating a large extent of tissue and passing below the vesical mucous membrane.

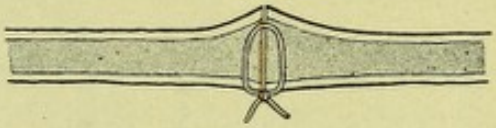


FIG. 393.—The parts are well and freely approximated; the sutures do not perforate the bladder.

to cut the tissues decisively and obliquely right to the end of the fistula. This denudation should be complete. If there are any non-denuded portions, draw upon them and excise them afterward with fine curved scissors.

FIG. 394.—Denudation in stair formation (bad).

FIG. 395.—After the denudation the parts approximate badly.

The denudation should be done obliquely from the vagina to the bladder. A stair-like denudation does not tend to a complete approximation of the surfaces (Figs. 394 and 395). During the whole stage of the denudation, an assistant with a stream of

saline washes away the blood from the field. The denudation having been finished a temporary compression with a sterilized gauze tampon suffices to stop the hemorrhagic oozing.

All that now remains is to unite the denuded parts. The sutures should pass under the denuded surface, and take up extensive and symmetrical surface, and should not be too numerous, having an interval of 1/2 to 1 cm. as a rule between them.

We must tie them sufficiently to bring the parts well into contact, but avoid the constriction of the tissues so as not to cause them to become gangrenous.

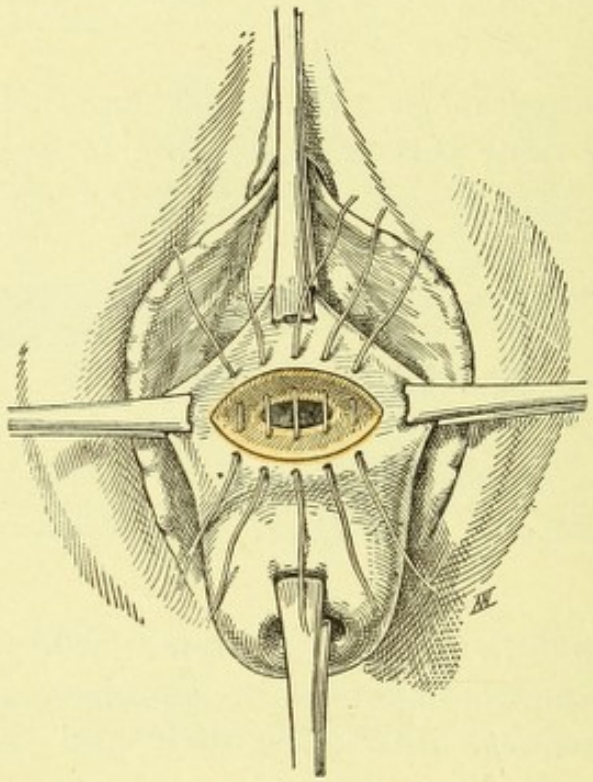


FIG. 396.—Suture after denudation.

We use sharply curved needles, held in a needle holder, to insert them and using a tenaculum sometimes to fix the tissues while we pass the needle. Commence by passing a medium suture, which enters the vaginal mucous membrane about 3 mm. from the edge of the denudation and appears just below the vesical mucous membrane and then takes up the lip on the other side.

The two ends of the suture are seized with pressure forceps; insert other sutures afterward and only commence to tie them when they are all in position. The union of the denuded surface

is done in the most favorable sense as regards the approximation of the parts, by following an oblique curved line shaped like a U; the only point of importance is to avoid lines of sutures that cross like an H or Y, etc.; the point of intersection of two lines of sutures always constitutes a weak point.

If the fistula is situated near the neck of the bladder, we must think of the ureters and make certain before commencing the operation that they do not open on its borders. In such a case we must dissect them a little in order to return them toward the bladder and be careful when passing the sutures at their level not to take up too much tissue in order to be sure of obliterating them.

When the denuded surfaces cannot be approximated, we should mobilize the fixed parts. In a case where the fistula adheres by one of its extremities to the pubis, Kelly merely introduces a tenotome through the vulva about 3 cm. (1 1/4 inches) from the fixed point and by the subcutaneous route frees the bony adhesion.

Generally we confine ourselves to continuing the denudation by a more or less lengthy incision and its edges are separated; at other times on a line with the cicatrix we split laterally or else we combine these two procedures, *i.e.*, we separate up a flap and then parallel to it make an incision so as to render the tissues mobile. Finally, when the surface of denudation has been modified afterward by adding two secondary denudations to the extremities of the primary denudation suture these latter so as to approximate the parts at their level and to have in the center, at the fistula, the tissues approximated without tension.

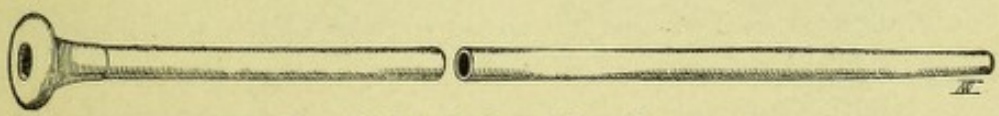


FIG. 397.—de Pezzer's catheter.

When the operation is finished, we tampon the vagina lightly with iodoform gauze and leave in a catheter. The best thing to do is to use a de Pezzer's catheter, which is easily introduced into the female urethra and which remains in good position without any need of being fixed in. If one does not possess this catheter, use a simple rubber tube, which is introduced after an injection

of boracic acid into the bladder, until the fluid flows out of the tube; the tube at this moment projects just beyond the sphincter; fix it to the meatus by a suture to hold it in good position. Leave the catheter in for about a week and give the patient about 20 grains of urotropine daily; wash out the bladder daily with a feeble solution of silver nitrate (1 to 1000) if there is pus in the urine.

The sutures are taken out progressively from the tenth to the fourteenth day under visual control; always press the fourchette down with a Sims' speculum. If one does not see them clearly, feel them gently with the finger, so as to determine their situation at once.

Splitting.—Denudation by splitting of tissues may be done in two different ways, either proceeding from the fistulous orifice or in proceeding from an incision encircling the fistula and passing about 1 1/2 cm. outside the incision.

1. *Denudation by Splitting Outward from the Fistula.*—De-

Fig. 398.—Denudation by splitting outward from the fistula.

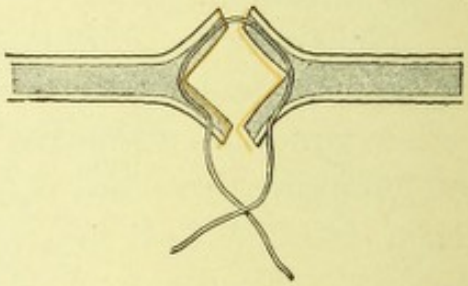


Fig. 399.—Suture after splitting.

scribed by Gerdy in 1841, and then abandoned in favor of denudation, this procedure was taken up again in 1864 by Duboue and then in 1896 by Phenomenoff, Ricard[1] and others. Around the entire circumference of the fistulous orifice at the union of the vaginal and vesical mucous membrane and in the cicatricial tissue is made an incision which is prolonged on each side into the vaginal mucous membrane. It is then easy to split each of the lips, in cleaving its vesical and vaginal walls over a variable extent of 1 to 3 cm. (Figs. 398 and 399).

Having done this splitting at the base of the wound we see the freed bladder, limp and floating around the fistulous orifice. Close it with a fine non-perforating, purse-string or continuous

[1] Ricard, *Congrès fran de chir.*, Paris, 1896, p. 927.

catgut and then suture the vaginal flaps above, being careful to pass the sutures through their base on a level with the dehedral angle resulting from the splitting (Fig. 400).

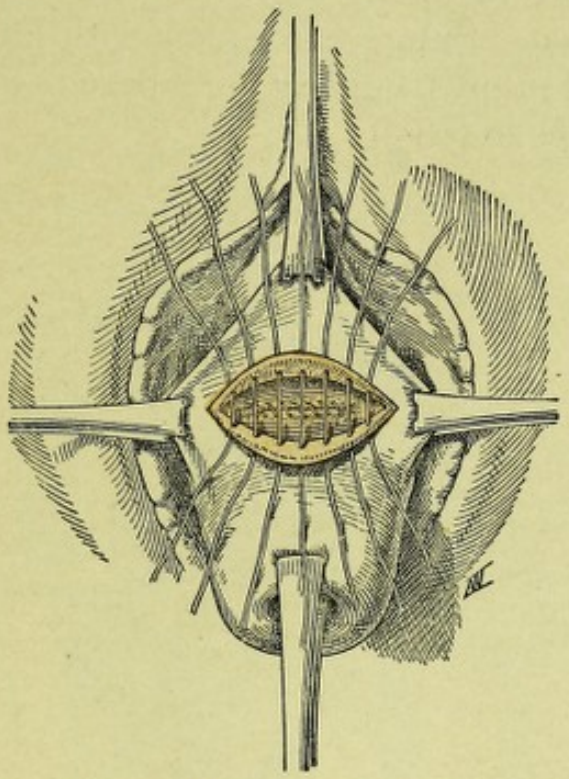


Fig. 400.—Suture after splitting outward from the fistula; the vesical mucous membrane is united; the vaginal sutures are inserted, but not tied.

2. *Splitting Outward from an Incision at a Distance from the Fistula.*—Braquehaye[1] makes an incision at a little distance from the fistula. The incision encircles it and then splits the vesico-vaginal septum in being directed from the incision to the fistulous orifice (Fig. 401).

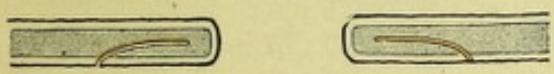


Fig. 401.—Splitting by an incision made at a distance.

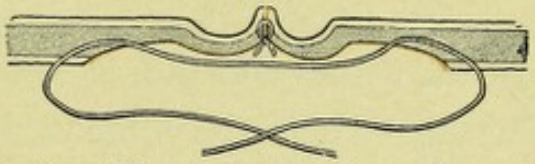


Fig. 402.—Suture of the under cut vesical mucous membrane. Insertion of vaginal sutures.

We must make a circular incision 7 mm. above and 12 below the fistula and then dissect up the islet of mucous membrane of the vagina, thus circumscribed to within 2 or 3 cm. of the edge of the

[1] Braquehaye, *Cong. français de Chir.*, Paris, 1899, p. 659, et *Bull. et Mém. de la Soc. de chir.*, Paris, 1900, p. 988.

fistula. We have thus a collarette of mucous membrane adherent to the fistula itself by a circular pedicle. This collarette is turned back into the fistulous orifice in such a manner that its mucous membrane surface faces the cavity of the bladder and its raw surface the vagina. Suture it together with fine catgut. Then insert the vaginal sutures, burying the collarette that was primarily sutured (Figs. 402 and 403).

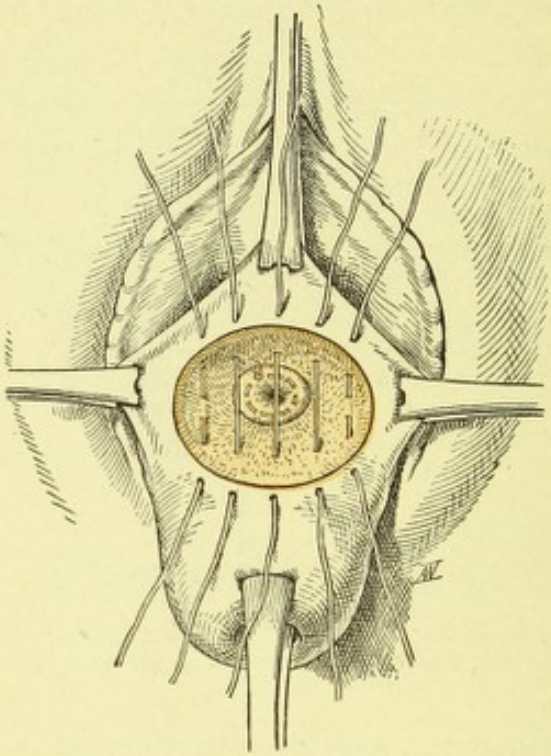


Fig. 403.—Suture after splitting by an incision at a distance; the collarette of mucous membrane is pushed back toward the bladder by a catgut purse-string suture; the vaginal sutures are inserted, but not tied. If they are tied the line of the vaginal union will be posteriorly situated to the bladder suture because of the asymmetry of the primary incision.

The closing is so much the more certain if the original circular incision does not pass at equal distance from the borders of the fistula and thus in consequence the two lines of suture do not correspond.

We have found this procedure very practical for closing fistulas situated at the far end of an infundibulum; we have thus cured fistulas with the greatest facility which had followed on vaginal hysterectomies, our colleagues having vainly attempted to close them by other means. The incision is made anteriorly to the fistula, which lies at the far end of the cicatricial tunnel and which corresponds to the vaginal fornix. The operation is simply carried out afterward.

Treatment of Fistulas Situated in the Neighborhood of the Cervix Uteri.—When working near a rigid cervix whose tissues cannot be placed in opposition like those of the vagina and when confroted with a fairly long fistulous track, we must deal with it in a special manner other than simple denudation of the vagina. From an oval incision encircling the fistula, branch off at the level of the junction of the vagina and cervix with a transverse incision and then split the vesico-uterine septum until the upper limits

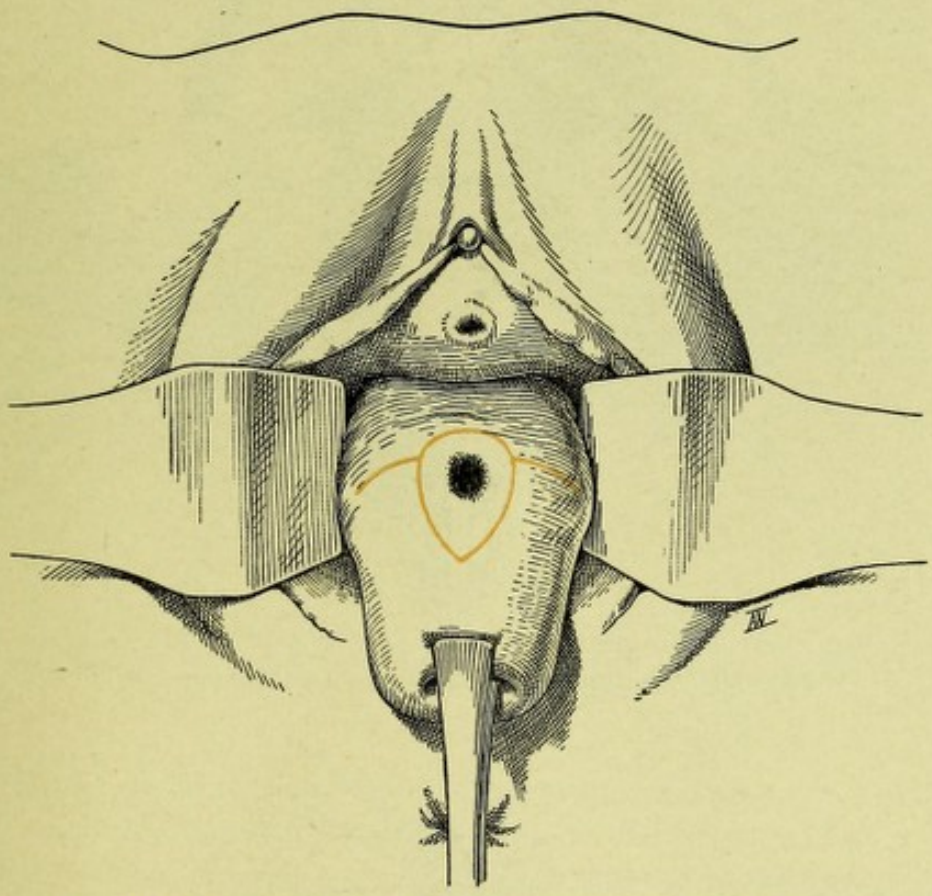


FIG. 404.—Denundation of a fistula against the cervix uteri.

of the fistula have been passed. Then completely excise the tract of the fistula, suture the vesical and the uterine gaps separately and terminate by closing the vagina (Figs. 404 and 405).

Operations in Several Stages.—Sometimes one fails in the treatment of a vesico-vaginal fistula. Fritsch advises then to make the line of denudation of the second operation perpendicular to that of the former operation, and to tie the sutures so that the two sides of the old cicatrix do not correspond to each other (Fig. 406). The operation in several stages may be done deliber-

ately. It is that in presence of very irregular fistulas there is often an advantage in not trying to obtain at first a closure of all the fistula, but to confine oneself, as Fritsch does, to suturing

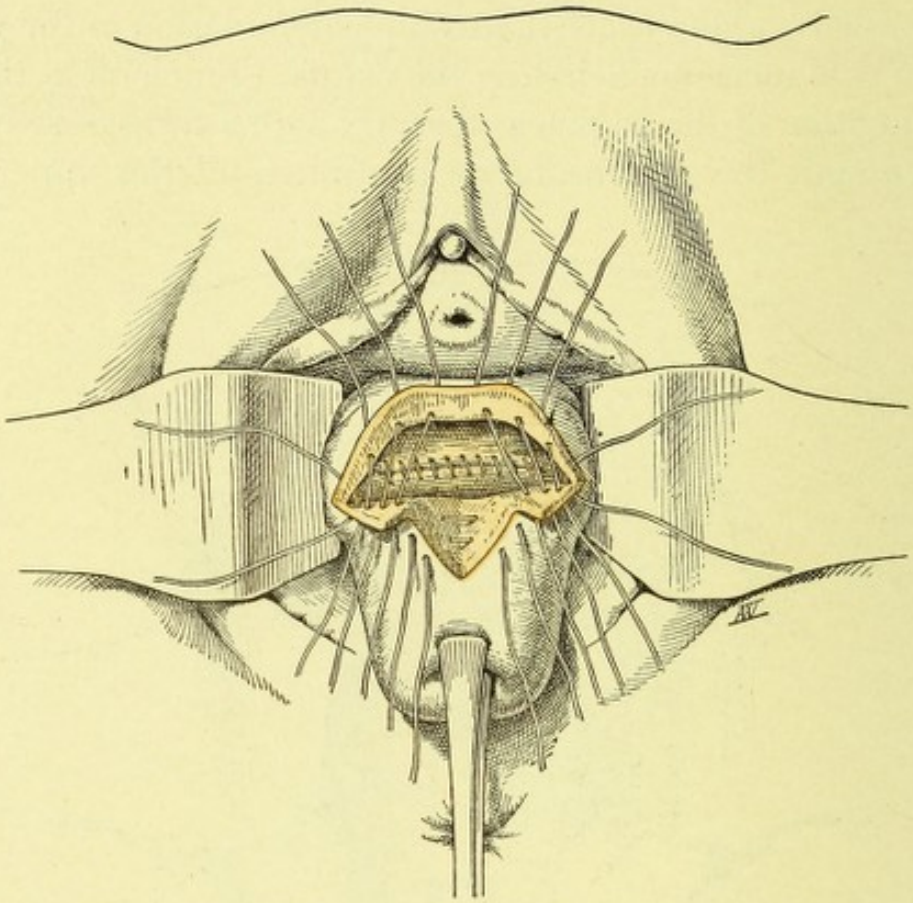


Fig. 405.—Suture after excision of a fistulous tract.

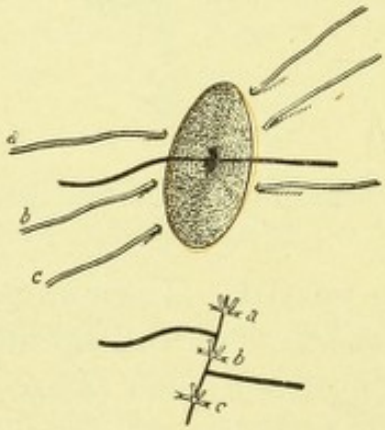


Fig. 406.—Denudation and suture of a fistula in a cicatrix of a former operation.

one of its prolongations, and only to close the remainder a month afterward, taking care that the second suture is in a sense perpendicular to the direction of the parts already united (Figs. 406 and 407).

Special Procedures Applicable to Large Losses of Substance.—If the fistula is very wide and there are at the same time extensive cicatrices of the vaginal wall, the procedures we have just described are insufficient. It is impossible to approximate the edges of such an extensive area, where generally the sutures cut through and the wound reopens.

Flaps.—In the case of a broad fistula occupying almost the whole extent of the vesico-vaginal septum, A. Martin[1] makes a few incisions in the vaginal mucous membrane at a certain distance from the fistula and parallel to it, which enable him to free the vagina while working toward the fistula;

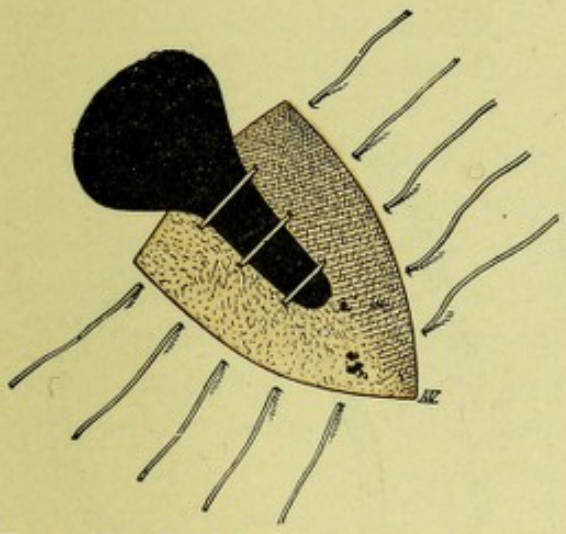


FIG. 407.—Partial obliteration of a prolongation of the fistula.

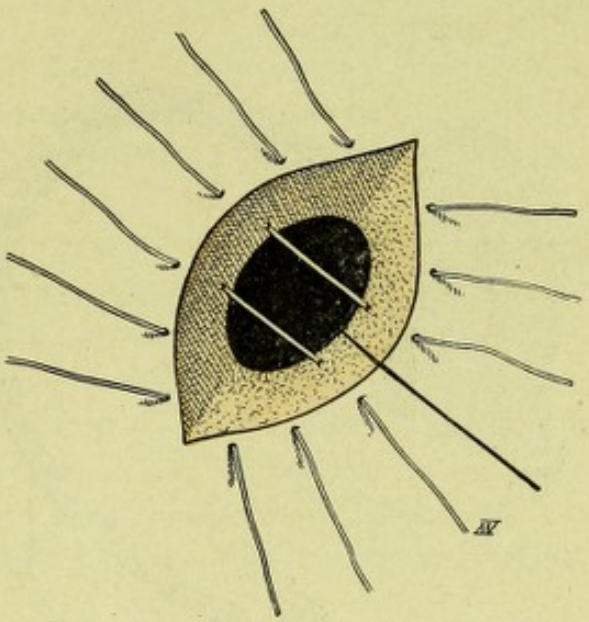


FIG. 408.—The prolongation is closed. Denudation and suture of what remains of the fistula.

the two flaps thus incised are directed toward the bladder and then sutured, while the vaginal wounds are united afterward in a colporraphy.

Trendelenburg[2] sutures a horse-shoe shaped flap to the lateral and interior edges of the fistula. This flap is detached by three of its sides from the posterior wall of the vagina. He does a second stage, four weeks later, and cuts the pedicle of the flap and fixes it to the posterior part of the denuded fistula.

Odenthal[3] cuts two lateral flaps having their pedicle at the level of the fistula; he directs them toward the bladder and then sutures them.

Fritsch advises the operation to be done in the following manner: he freshens the fixed edge of the fistula and then files the mobile edge by

[1] A. Martin, *Zeitsch. f. Geb. und Gyn.*, 1891, No. 19, p. 394. Rydygier avait déjà eu recours à la taille de lambeaux vaginaux au voisinage de la fistule (Rydygier, *Berl. klin. Woch.*, 1887, No. 31).

[2] Trendelenburg, *Samml. klin. Woch.*, 1890, No. 355.

[3] Odenthal, *Centr.-Bl. f. Gyn.*, Aug. 17, 1901, p. 945.

cutting a flap much larger than would be required to fill the orifice and as thick as possible. This flap is drawn over the surface to be covered. It is fixed by a primary row of fine catguts uniting its deep surface; the superficial sutures should exercise no traction and are only inserted if the flap has a tendency to be displaced.

Liberation of the Bladder.—Described and carried out by Jobert under the name of vesical autoplasty by "glissement ou locomotion," the rendering mobile of the bladder has latterly been utilized by a certain number of surgeons. E. C. Dudley in one case mobilized the vesical mucous membrane behind the fistula, and then sutured it to the anterior part already denuded on its vaginal surface.

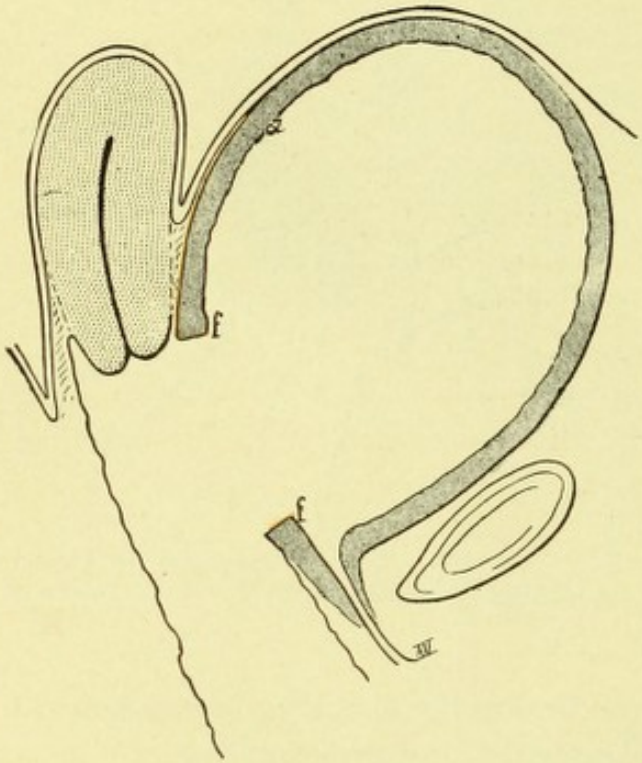


FIG. 409.—Freeing of the bladder. By an incision we split the vesico-uterine septum along the whole length of *af*.

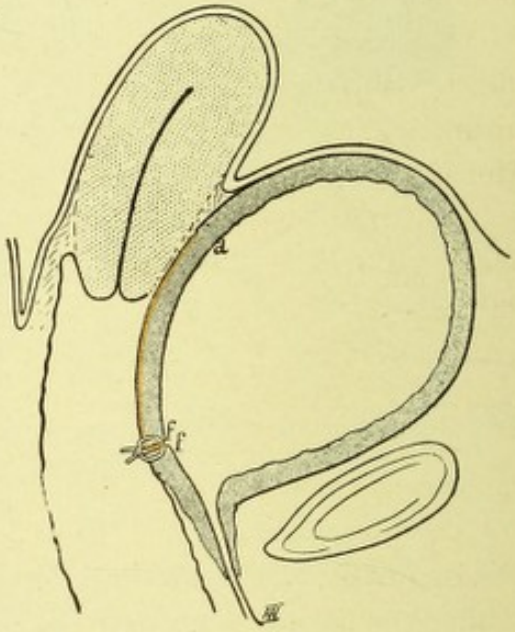


FIG. 410.—The bladder having been freed the loss of substance is done away with by the edges being sutured; *f* is now in contact with *f'*.

Mackenrodt[1] makes a long median incision in the vaginal wall, extending in front of and behind the fistula, and then he splits the vesico-vaginal septum laterally and antero-posteriorly. He carries out this separation of the bladder, if necessary, as far as the vesico-uterine fold. Having thus freed the entire base of the bladder, he is in apposition to suture it as in the diagram, by uniting the edges of the loss of substance. The vaginal wound is afterward closed and the uterus drawn down and if necessary it is used to close the perforation.

[1] Mackenrodt, *Centr.-Bl. f. Gyn.*, Leipzig, 1894, No. 8, p. 180.

Kelly[1] has recourse to mobilization of the bladder. He makes a crescent-shaped incision behind the fistula and separates the part in front of the vagina and cervix uteri.

The danger of these procedures of vesical mobilization is the possibility of injuring the uterus, which is sometimes displaced by cicatricial retractions.

Utilizing the Uterus.—Freund[2] has used the body of the uterus, in order to close large fistulas, the body of the uterus attached in the vagina after posterior colpotomy. The uterus is fixed as in the operation for "Bascule" of the uterus where it is drawn down into the vagina and fixed with the fundus below.

Occlusion with the Anterior Lip of the Cervix.—Wolkowitsch and Küstner detached the cervix and drew down the uterus and then after excision of the cicatricial ring encircling the fistula, stopped it up by uniting it with the denuded cervix.

Occlusion with the Posterior Lip of the Cervix.—In certain fistulas invading the cervix, its anterior lip may be wanting completely and in such a case we suture the posterior lip of the cervix to the edges of the fistulous orifice. Menstruation occurs by the bladder and results in no inconvenience.

Occlusion with the Vesico-uterine Peritoneum.—Bumm and Döderlein do a hysterectomy, and then use the vesico-uterine peritoneum in order to close the fistula. Bardescu draws down the vesico-uterine peritoneum, but without doing a preliminary hysterectomy and confine themselves to doing an anterior colpotomy.

Autocystoplasty and Colpocystoplasty.—Profiting by the fact that mucous membrane of the antero-superior wall of the bladder often causes a hernia into the vagina through the fistula, Witzel[3] simply denudes the hernial protrusion of vesical mucous membrane and sutures it to the lips of the denuded fistula. This operation had the inconvenience of definitely preserving an abnormal condition, *i.e.*, the prolapse through fistula and of partitioning the bladder and of leading to injuries of the ureter. Witzel abandoned it for an operation which is almost the opposite. By a suprapubic incision he seizes the posterior wall of the vagina through the fistula and draws it into the bladder, denudes its surface and fixes it to the freshened edges of the fistula. At a second stage and after perfect cicatrization, he separates the part of the vagina fixed in the bladder from the vaginal canal, which is then reconstituted by suture.

Suprapubic Incision.—Trendelenburg[4] places the patient in the position

[1] Howard A. Kelly, *Johns Hopkins Bulletin*, Baltimore, Feb., 1896.
[2] Freund, W. A., *Samml. klin. Wortr.*, 1895, No. 118.
[3] Witzel, *Ann. de Gyn.*, Paris, 1901, T. I, p. 285.
[4] Trendelenburg, Ueber Blasenscheidenfisteloperationen und über Beckenhochlagerung bei Operationen in der Bauchhöhle. *Samml. klin. Wortr.*, Leipzig, 1890, No. 355.

associated with his name and then does a transverse suprapubic incision and by this proceeding he freshens the fistula and then sutures it with sutures having a needle threaded to each end so that the two extremities may appear in the vagina and are tied in that canal.

Colpoclesis.—After simple colpoclesis or occlusion of the vagina,[1] he brings about a stagnation of urine in the vaginal fornix which has now become a diverticulum of the bladder. This leads to the formation of phosphatic calculi whose dimensions may become very considerable.

The pains lead to a destruction of the septum formed and things are restored to their former state. However, better technic in the treatment of vesico-vaginal fistulas has caused us to abandon this method of treatment.

There are, however, cases where the ureter has been destroyed at the same time as the vesico-vaginal septum and where the attempts at its restoration are constantly followed by failure. Fritsch advises a combination of a recto-vaginal fistula with a colpoclesis.

The important point is that there should not be any stagnation of urine in the vagina. To avoid it, make the recto-vaginal fistula as low as possible, immediately above the sphincter, and incise the parts transversely, which results in the production of a fold of rectal mucous membrane serving as a valve. Then excise from the vagina a ring of mucous membrane, and close it by a sagittal suture. Diminish as much as possible the capacity of the vagina, and denude in an oblique direction, so that it terminates exactly at the recto-vaginal fistula, and no cul-de-sac lies above it.

Chénieux[2] combines, in certain urethro-vesico-vaginal fistulas an *episrorraphy* with a hypogastric meatus.

2. Vesico-uterine Fistulas.

Vesico-uterine fistulas have been treated either by direct or indirect obliteration.

Direct Obliteration.—By a transverse incision is brought about the separation of the cervix uteri and the bladder. The separation is continued for a very considerable distance round the fistulous opening. The edges of the bladder portion of this are then freshened and sutured.

The uterine portion of the fistulous passage is excised and sutured. This done, the cervix is fixed anew to the vault of the vagina.[3]

Dittel, then Forgue, have had recourse to the transperitoneal

[1] A. le Double, Du Kleisis genital et principalement de l'occlusion vaginale et vulvaire dans les fistules uro-génitales. *Th. de Paris,* 1876.

[2] Chénieux, *Rev. de gyn. et Chir. Abd.,* Paris, 1906, p. 21.

[3] Herff, *Zeitsch. f. Geb. u. Gyn.,* Stuttgart, 1891, T. XXII, p. 1.

route.[1] After an incision of the utero-vesical pouch, encroaching on the anterior surface of the broad ligaments, the bladder is carefully separated from the cervix till the fistula is reached, which is then slit across, and any fibrous masses present are excised; then the edges of the fistula are freshened. The fistulous openings on the vesical and uterine sides are successively sutured; then the utero-vesical peritoneum is replaced.

Indirect Obliteration.—Indirect obliteration is very simply obtained by denuding and then suturing the lips of the cervix (hysterocleisis). Menstruation then occurs through the bladder.

3. Utero-vaginal Fistulas with Destruction of the Urethra.

The treatment for small fistulas is the same as that of running vesico-vaginal fistulas; but when there is almost complete destruction of the urethral canal, an autoplastic operation must be resorted to,[2] cutting flaps at the expense of the vagina and vulva. In some cases it has been possible to use flaps from a persistent part of the utero-vaginal septum.

We cannot describe all the various methods of procedure here they are so numerous.

Fritsch makes an incision on each side of the urethral gutter, separates the urethra from the vagina, folds it in on itself, and then covers it with the separated vaginal wall.

Péan cut two vulvo-vaginal flaps and folding them over toward the middle line suturing one to the other, thus reconstructing a urethral canal; he then marked out a flap on each side sufficiently large to cover over the bleeding surface left by the last flaps, at the same time replacing the loss of substance their removal had caused. For this purpose he dissected freely from within outward the integuments of the vagina and vulva, till it was possible to bring the inner borders of the flaps in contact by sliding them up, and then he sutured them together. Thanks to the laxity of the tissues in this region, this second part was easily performed. He sutured these two flaps a little out of the middle line, so that there would not be two layers of suture lying together, one superimposed directly on the other. The operation was finished

[1] Forgue, *Revue de gynécologie et chirurgie abdominale*, Paris, 1906, p. 503.

[2] Delbecque, De la restauration de l'urètre chez la femme, *Th. de Paris*, 1892, No. 263. Cottard, Traitment opératoire de l'incontinence d'urine chez la femme. *Th. de Paris*, G. Steinheil 1906–1907, No. 63.

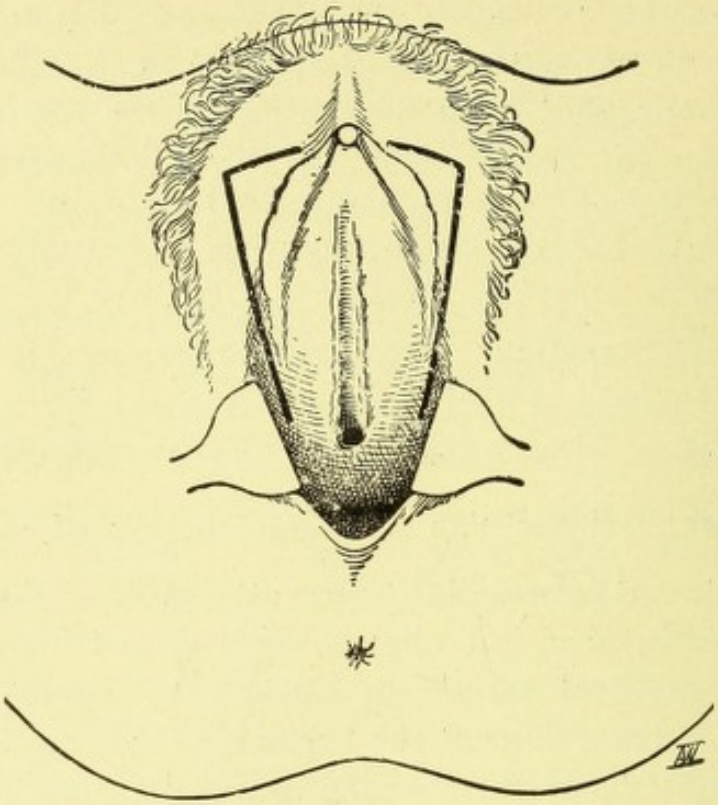


FIG. 411.—Incision for vulvo-vaginal flaps.

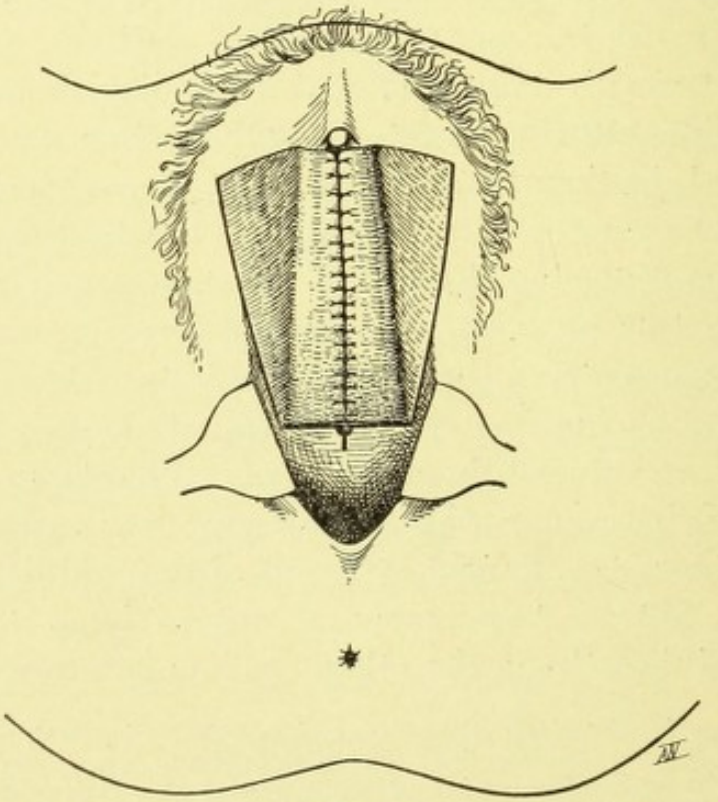


FIG. 412.—The flaps are folded over to form a canal.

by the union of the anterior borders of the flaps surrounding the new meatus (Figs. 411, 412, 413). Others have commenced by forming a canal on a level with the vestibule and then have fixed to the posterior border of this new urethra a flap cut at the expense of the vesico-vaginal septum and brought across.

Noble has ingeniously modified this part of the operation by dissecting a broad strip of tissue on the anterior wall of the vagina,

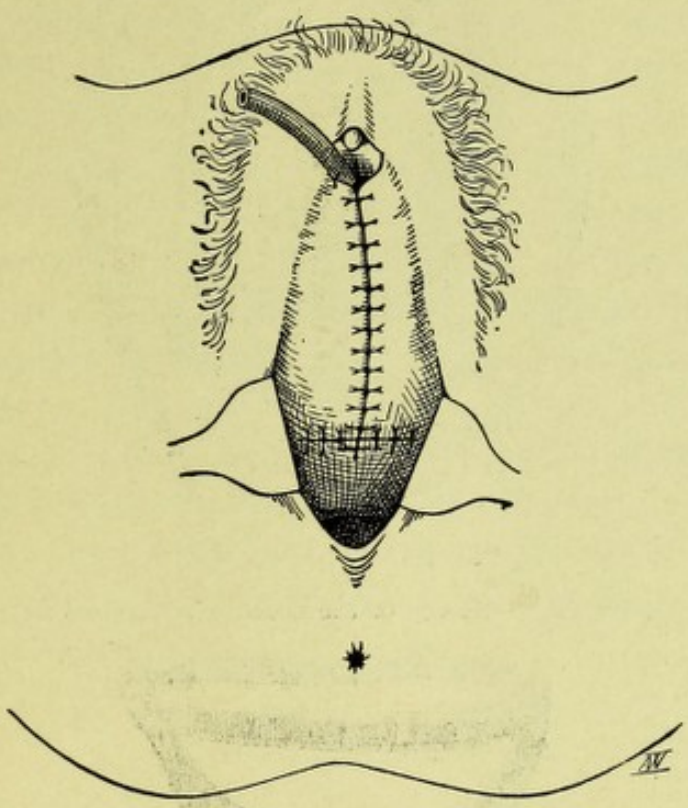


FIG. 413.—The raw surfaces are covered by the sliding up of lateral flaps.

having its apex downward and its base at the level of the vesico-urethral opening. With a pair of forceps introduced through the canal he has made, he draws this strip through, and fixes it with fine silk to the new meatus (Fig. 414).

As the leaving in of a catheter and catheterization are often the cause of nonunion, Fritsch advises bladder puncture and the fixing in the perforation of a small catheter till the flaps have united.

Whatever method has been employed, a complete continence of urine can hardly be expected; one can remedy this by the use of a pessary with a suburethral pad, which presses the walls of the new urethra together and hinders the outflow of urine.

In inoperable cases, the patient is condemned to the carriage

of a urinal or to a colpoclesis with a rectal fistula or a hypogastric cystotomy.

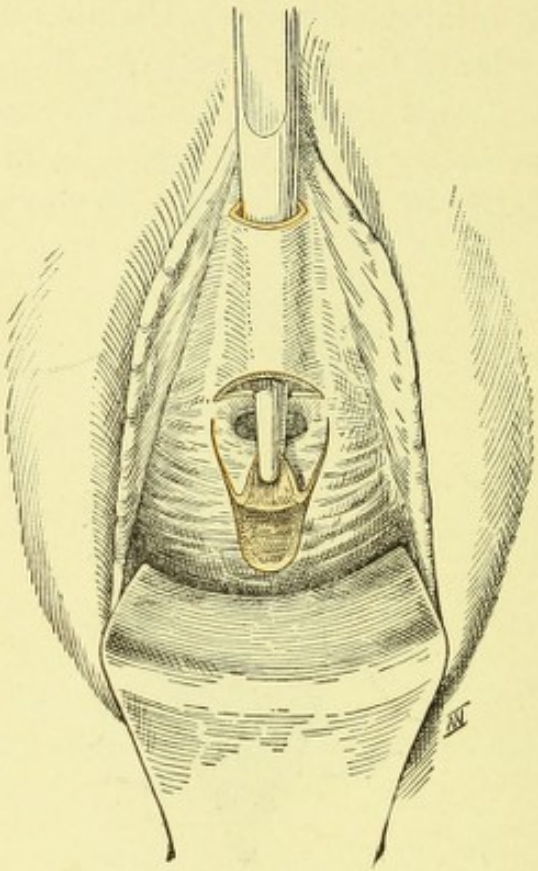


Fig. 414.—Closing of the urethro-vesical orifice.

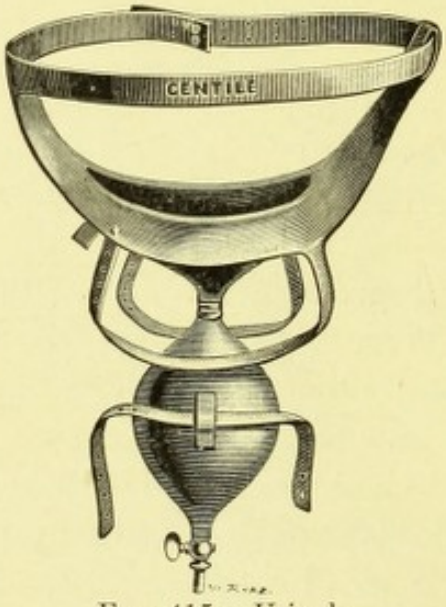


Fig. 415.—Urinal.

4. Fistulas of the Ureter.

Fistulas of the ureter are the result of traumatism either during labor or more often now-a-days during gynecological operations.

Prophylactic Treatment.—An exact knowledge of the course of the ureter, and the employment of well arranged proceedings in an operation, so avoiding a lesion of the ureter. If, however, in the course of an operation, a lesion of this canal is discovered, it must be treated immediately.

We refer to a former work for the study of the various methods of dealing with this condition.[1]

Curative Treatment.—Fistulas of the ureter may heal up spontaneously; thus some which are kept up by the presence of a ligature and close up directly this is removed. This cicatrization is only obtained, however, in cases where the loss of substance is restricted to one part of the circumference of the canal. Speaking generally, a fistula which lasts for more than six weeks gives very little hope of spontaneous cure. It is then necessary to have recourse to a surgical operation; beforehand, all that is to be done is to insure as complete asepsis as possible of the region of the fistulous opening, and to treat, if it occurs, the concomitant cystitis, the danger being above all the pyelonephritis that may result. In the presence of a fistula of the ureter, the surgeon possesses a series of methods of treatment which may be classed under three heads: first, plastic occlusion; second, ureteral grafting; third, nephrectomy.

I. Plastic Occlusion.

The first attempts at plastic occlusion were unsuccessful, and it was not till the work of Landau that healing of ureteral fistulas, after a simple plastic operation through the vagina, occurred.

Landau distinguishes the cases where the vesical end of the ureter is permeable and those in which it is impermeable.

If the vesical end is permeable a catheter should be introduced, one end going toward the kidney, the other passing down through the bladder and urethra. Leaving the catheter in place, the edges of the uretero-vaginal opening are freshened and then united by several sutures. If the vesical end is impermeable, an incision is made along it till the bladder is penetrated. From each side of this incision, a certain quantity of vesical and vaginal mucous

[1] Hartmann, Chirurgie des organs génito-urinaires de l'homme, Paris, G. Steinheil, 1904.

membrane is excised, thus creating a vesico-vaginal fistula, in the form of a very elongated ellipse into which opens the ureter, at its supero-external angle. The wound is then united.

Pozzi,[1] in a case of lateral fistula of the ureter, has employed the method of splitting. After having passed a ureteral catheter, he made a transverse incision at the level of the fistula; at the extremities of this transverse he made two longitudinal incisions, giving to the whole the appearance of an H lying on its side (⊐). After having cut the two flaps thus circumscribed, he brought them in contact and sutured the one to the other without the least difficulty.

Mackenrodt,[2] whose method of procedure has given a certain number of successes, circumscribed the fistulous opening by a circular incision and dissected out the extremity of the superior end furnished thus with a collarette, which he fixed to the vesical mucous membrane of the bladder after piercing it and introducing the expanded end of the ureter. Then he shut the vaginal wound by two layers of sutures.

Sellheim, in a case of bilateral fistula, where the two orifices opened into the bottom of a tunnel, made a vesico-vaginal fistula at this level; then, in a second operation, he sutured this fistula to the borders of a raised flap. The fistulous openings thus opened into a small vaginal diverticulum in communication with the bladder. Segond did a similar operation, fixing to the refreshed border of the vaginal fistula a flap cut from the base of the bladder.

II. Ureteral Grafting.

During the last few years plastic operations have to a great extent been replaced by ureteral grafting. Numerous methods of doing this have been recommended.[3]

The operation of Mackenrodt that we have described in connection with plastic operations is, in a way, intermediate between plastic operations and vaginal grafting by the vaginal route.

Other methods of vaginal grafting have been employed, but

[1] Pozzi, *Bull. et Mém. de la Soc. de Chir.*, Paris, 1887, T. XIII, p. 114.
[2] Mackenrodt, *Zeitsch. f. Geb. u. Gyn.*, Stuttgart, 1894, T. XXX, p. 310.
[3] Lutaud, Urétéro-cysto-néostomie, *Th. de Paris*, 1907.

now-a-days there is a tendency to abandon all these operations through the vagina and to do all cases of utero-cysto-neostomy by the abdominal route. This latter operation has sometimes been done by an extra-peritoneal route, but in most cases the intra-peritoneal method is to be preferred.

After a median celiotomy the ureter is sought for, and is usually easily to be found, as it crosses the brim of the pelvis, and is then followed downward. The peritoneum over it is incised, and it is dissected out a little so as to render it movable; then it is cut across above the fistula and implanted in the bladder, which has been forced up by a metallic sound.

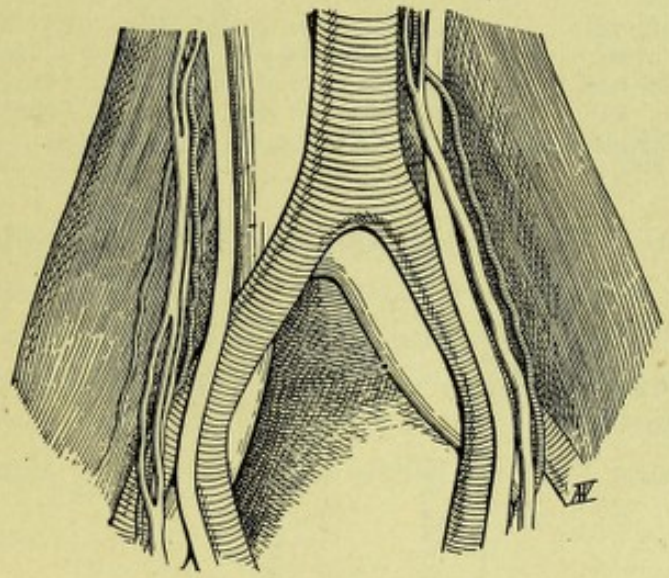


Fig. 416.—Relations of the ureter at the brim of the pelvis.

An incision of a centimeter and a half is made in the bladder. A loop of catgut having been passed through the ureter, at a certain distance from its section, its ends are taken and one is threaded on a needle and passed through the bladder wall from within outward at one extremity of the incision into the bladder; then the other end is similarly passed through the other end of the incision, then by drawing on each end the ureter is invaginated into the bladder (Fig. 418). In order to insure the free flow of urine, a snip should be made in the wall of the ureter opposite that carrying the loop of catgut. The bladder is then shut by two layers of sutures (Fig. 419).

Ricard has operated recently in rather a different manner; after having split the end of the ureter, he turns it back like the

cuff of a coat sleeve, and fixes the mucous membrane thus turned up to the adventitia by two ligatures of fine catgut (Figs. 420 and 421). He opens the bladder with a bistoury and in the small incision thus made pushes 1 1/2 to 2 cm. of the ureter into its cavity. The ureter, of which the extremity hangs free

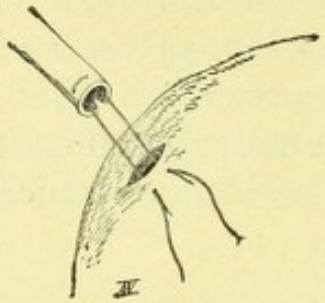


FIG. 417.—A loop of catgut through the ureter with the extremities brought through the bladder opening and out again through the wall.

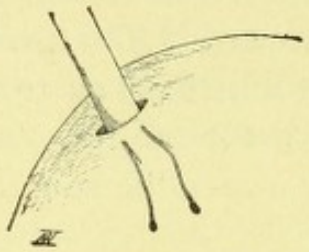


FIG. 418.—The ureter drawn into the bladder to be fixed by knotting the ends of the catgut.

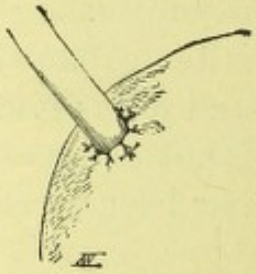


FIG. 419.—The bladder wall is sutured round the invaginated ureter.

in the bladder like the clapper in a bell, is fixed by a ring of catgut sutures which pass through all the layers of the bladder wall save the mucous membrane on the one side and the external and muscular walls of the ureter on the other. A second layer

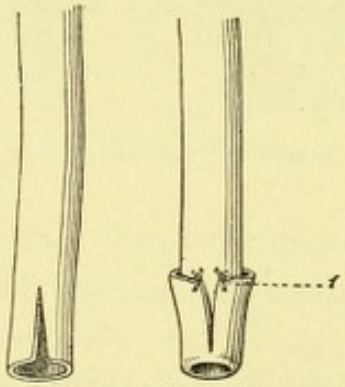


FIG. 420.—Ureter with end split.

FIG. 421.—Ureter with end turned up.

of sutures, also of catgut, are placed above the first, so as to bring at least one centimeter of the walls of the bladder and ureter in apposition (Fig. 422).

Payne[1] splits the inferior extremity of the ureter for a length of several millimeters; this forms two valves, which he fixes on each side of the vesical incision.

[1] Payne, *J. of Amer. Med. Assoc.*, Chicago, 1908, p. 1321.

In all cases, in order to avoid traction of the bladder on the ingrafted ureter, it is advisable to fix the bladder to the pelvic peritoneum by a strong suture, attaching it in front of the ureter.

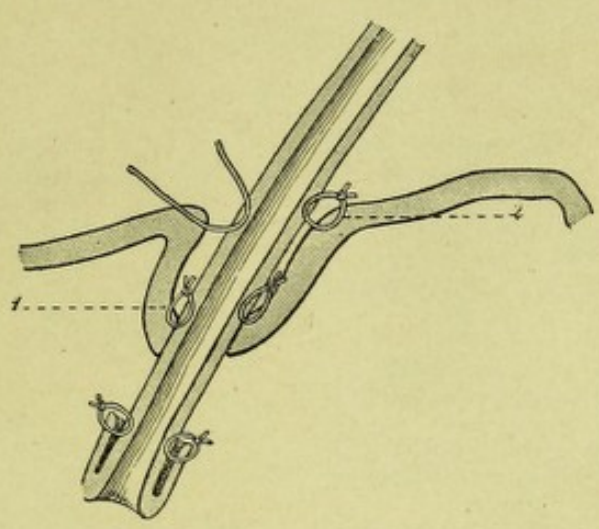


FIG. 422.—Sagittal section of the invaginated ureter.

III. Nephrectomy.

Nephrectomy is indicated when the kidney corresponding to the fistulous ureter is unhealthy, showing signs of pyelo-nephritis. It should only be practiced, however, if a preliminary examination of the functional powers of the other kidney shows this to be healthy.

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