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COMPLETE removal of the uterus by the abdominal route according to any of the procedures hitherto described with which I am familiar has not always proved either an easy or wholly satisfactory operation in my hands. Moreover, my observation of the work of a number of highly trained pelvic surgeons during the past twenty years, together with the verbal testimony of others, convinces me that I am not alone in this experience. I have witnessed one death on the operating table from uncontrollable hemorrhage which occurred while an experienced gynecologist, possessing uncommon skill and mature surgical judgment, was performing an abdominal panhysterectomy by a widely practiced technic for complicated pelvic pathology. Repeatedly I have seen other men of merited renown as pelvic surgeons encounter annoyance and suffer embarrassment from obstinate venous bleeding which defied their resourcefulness during the execution of this operation. Occasionally, too, damage to the ureters has been observed. And, in one instance, it was my misfortune a few years ago to sustain a fatality from fulminating streptococcus peritonitis within seventy-two hours after an abdominal total extirpation of the uterus according to one of the best accredited plans.

Consequently, during the past four years I have been endeavoring to perfect a technic which would be relatively simple, easy of execution and reduce to a minimum the three chief dangers; namely, (1) hemorrhage; (2) infection; and (3) damage to the ureters. It is my belief that the operation presently to be described not only meets these major requirements but possesses in addition substantial minor advantages.

Since perfecting the operation, I have made a reasonably comprehensive but not exhaustive survey of the literature, because I soon learned that an astonishingly large number of ingenious and meritorious modifications of standardized procedures have been described, and it has not been possible for me to scrutinize all of them in detail. I have, however, examined a number of American, English, French, and German textbooks and systems, and have reviewed closely the procedures listed in various indices covering the earlier literature, as well as that of the past decade, without finding this plan de-

scribed. If it later develops, however, that I have simply rediscovered a technic which has been previously described by another who antedated me in working along this line, I shall most willingly admit his priority of discovery, and herewith dedicate this publication to his memory and to the advocacy of what I believe to be a good operation based upon sound surgical principles.

Of historical interest in connection with the presentation of this new panhysterectomy technic is the fact that this happens to be the semicentennial anniversary of the first carefully planned total extirpation of the uterus by the abdominal route. On January 30,

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1878, W. A. Freund first performed this operation for cancer of the uterus by a method which he had carefully worked out upon the cadaver. Moreover, in the doing of it he made use of the posture which later was perfected by and is generally accredited to Trendelenberg.

Three years later, in 1881, Bardenheuer who was familiar with Freund's cancer operation, performed the first panhysterectomy by the abdominal route for a myomatous uterus.

In America, Dr. Mary A. Dixon Jones on February 16, 1888 was the first to perform panhysterectomy for uterine fibroids. She first did an abdominal subtotal hysterectomy and then removed the cervix by the vaginal route.

In January, 1889, Dr. L. A. Stimson proposed and carried out his epoch-making contribution to hysterectomy, namely preliminary ligation of the ovarian and uterine vessels.

The operation of panhysterectomy was further popularized in these early years of its history through the work of W. M. Polk, James Eastman, G. M. Edebohls, H. J. Boldt and F. Krug in America; Trendelenberg, Schauta, Chrobak and notably A. Martin in Germany; F. B. Jessett and Thomas Keith in Great Britain and by Gouillaud, who was the first to perform it in France in 1891.

Many ingenious and creditable modifications have been suggested from time to time since this early pioneer development of abdominal panhysterectomy until today at least four plans may be regarded as

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sufficiently well standardized and widely enough employed to be worthy of brief description. In all of these I shall omit that part of the technic which deals with the appendages, since the variations employed in this part of the operation are irrelevant to the purposes of this communication.

PLAN I.—The uterine appendages having been appropriately dealt with, the vesico-uterine peritoneum incised transversely, the bladder freed and pushed well down and the broad ligaments laid open to expose the uterine vessels, these are divided and ligated at the level of the internal os. Strong traction upward is now made upon the uterus while the operator, using sharp dissection applied

close to the cervix, encircles it repeatedly, each time at a lower level, and divides all structures attached to it until the vaginal vault appears like the top of a tent. This is first opened at an advantageous point; ballooning occurs, and detachment is completed by a circular incision close to the cervix. An assistant follows the knife throughout the dissection applying a hemostat to each bleeding vessel and to the vaginal vault at strategic points as it is cut across. This procedure may be aptly described as the peeling-out operation.

A modification of this plan is to core or ream the cervix out, leaving a thin cylinder of cervical tissue to which the supporting basal ligaments are attached.

PLAN II.—The preliminary steps dealing with the appendages having been carried out, the uterine vessels divided and ligated at the level of the internal

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os, and the bladder separated from the cervix and carried down sufficiently to expose the anterior vaginal wall, the operator now applies a stout clamp parallel and close to the cervix on either side, embracing in its bite the parametrial tissues and basal portions of the broad ligaments quite down to the vaginal vault. These tissues are now divided. The vagina is opened anteriorly, the cervix is grasped with a volsella and drawn forward into the pelvis, while its vaginal attachment is divided laterally and behind with curved scissors or a knife.

PLAN III.—This is the Doyen operation. Without preliminary disposal of the appendages, the uterus is grasped with a heavy volsella and drawn strongly upward and forward over the symphysis. A blunt instrument is then introduced from below into the vagina by an assistant and carried well up into the posterior fornix. Cutting down upon this, the operator opens the posterior vaginal wall. Through this opening the cervix is grasped and drawn into the culdesac. Its vaginal attachment is then divided laterally and anteriorly, which permits it to be drawn

sharply backward and upward. The bladder is separated from below as it comes into view, and the uterine vessels and appendages are dealt with in sequence as they are approached.

PLAN IV.—One other plan, with various minor modifications, deserves special mention for two reasons: first, because it is championed by a number of excellent pelvic surgeons and, undoubtedly, is a better operation than any one of the three already mentioned; and second, because the original was devised by an American, Dr. J. F. Baldwin<sup>1</sup>, of Columbus, Ohio, and published in 1916. It differs essentially from the three plans outlined above in the fact that, after the initial opening into the vagina is made, the index finger or a strong hook is introduced to serve as a guide and aid in completing the cervical detachment. Quite different also

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is the Baldwin method of suturing the round ligaments into the angles of the vagina and of closing the latter by a purse-string suture, which further serves to invert its cut margin.

*Comment.*—It cannot be denied that each of these plans, as well as a great many similar procedures that may justly be considered minor modifications of these type operations, possesses distinctive merit. Nor can it be justly contended that the vast majority of total hysterectomies cannot be comfortably and satisfactorily executed by one of these established methods. But we are less interested today in the larger percentage of successes that can be legitimately credited to the end-results of an operative procedure than we are in the smaller num-

<sup>1</sup>Am. Jour. Obst., 1917, lxxv, 263; Trans. Assn. Obst. and Gynec., 1917, xxix, 280.

ber of technical difficulties, complications and failures that persistently crop up to mar our records. Such deficiencies in no inconsiderable number are to be found recorded in every tabulated statistical study of the end-results of abdominal panhysterectomy that I have reviewed. It is highly improbable, therefore, that any experienced pelvic surgeon will deny that, by any technic now in vogue, occasionally he finds this operation difficult of execution; that hemorrhage is frequently troublesome, and occasionally embarrassing, even to the

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extent of jeopardizing one or both ureters in the urgent necessity of its immediate control; that measures to combat or prevent postoperative shock are now and again required; that actual damage to ureters still occurs; and that, in rare instances, a fulminating streptococcus peritonitis brings a rapid exodus to his patient and profound mortification to himself. Such, at least, are my own convictions, which are based not only upon personal experiences but also upon the observations and testimony of a number of exceptionally competent gynec-

eologists with whom it has been my privilege either to be associated or intimately acquainted during the past twenty years.

Consequently I have given much thought to the development of a simplified technic for abdominal panhysterectomy which could reasonably be expected to reduce to a minimum these irritating and disastrous occurrences, with the result that the operation now to be described has been gradually evolved. Five features of it were specifically designed to achieve this end, namely:

1. Complete separation of the cervix posteriorly, as well as anteriorly, below the level of the external os by means of blunt dissection applied according to a carefully devised anatomic plan and confined to

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its relatively avascular mid-section. The specific purpose here is not only separation of the bladder and rectum but, particularly, segregation of the loosely attached, fan-shaped lateral plexus of veins on each side into a narrow zone adjacent to the basal portion of the broad ligament in front and behind, so that they may be included in a single clamp to be applied to the latter prior to its detachment. By this simple device the free bleeding usually encountered in the lower lateral cervical region, which requires the application of multiple hemostats and sutures uncomfortably close to the ureters, is completely avoided.

2. Detachment of the divided and ligated uterine vessels from the lateral margins of the cervix down to the basal portions of the broad

ligaments, in addition to detachment of the bladder and pubocervical fascia anteriorly, in order to drop the ureters considerably farther away, where they are practically safe from mechanical injury.

3. The possibility of a postoperative streptococcus peritonitis from the cervix is reduced to a minimum not only through preliminary surgical toilet of the vagina and cervix, but also by reason of the fact that at no stage of the operation is the cervix squeezed by the application of forceps to it; nor is it at any time drawn into the pelvic cavity; nor is either a finger or hook introduced into the vagina adjacent to the cervix to serve as a guide in detaching it. Only the knife en-

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ters the vagina, and this is discarded as soon as the vaginal detachment<sup>4</sup> is completed.

4. By means of a specially devised angle suture the severed basal segments of the broad ligaments and the uterosacral ligaments are firmly anchored to the lateral angles of the vaginal vault in such a way as to guarantee its adequate support. The usual round ligament attachment to the vaginal vault is, of course, also utilized.

5. The complete absence of hemorrhage, which is accomplished without the application of multiple clamps and sutures, greatly simplifies the technic, and permits perfect exposure of the field at every step, so that an accurate anatomic dissection is carried out with ease and ra-



pidity and without fear of damage to the ureters. The time required for completion of the operation is, therefore, substantially reduced and the danger of surgical shock is eliminated.

#### TECHNIC OF THE OPERATION

1. The bladder and rectum should be empty. Preliminary thorough surgical toilet of the vulva, vagina and cervix is first carried out. In addition, the entire vagina, vaginal portion of the cervix and, particularly, the external os and cervical canal are thoroughly treated with the official tincture of iodine, twenty per cent mercurchrome or Scott's solution. The external os is then tightly closed by aseptic suture and a dry sterile gauze pack is introduced into the vagina, one end of which is left outside to which a clamp is attached so that it can be readily withdrawn just before the vagina is opened above. The usual surgical toilet of the abdominal wall is then made and the sterile draperies are properly arranged.

2. A lower midline incision is made from the symphysis to the umbilicus.

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3. Adequate exposure of the pelvis is secured through use of the Trendelenberg posture, together with the judicious use of wet gauze packs.

4. The body of the uterus is now grasped firmly with an appropriate instrument and lifted well up, provided only that its pathology is known to be benign in character.

If, however, malignancy has been demonstrated or is suspected, the operation must be modified to include removal of both tubes and ovaries, and it is particularly stressed that no compression whatever should be applied to the uterus, either by instruments or by the surgeon's hands, until its extrinsic blood and lymphatic channels have been absolutely blocked by ligation and division of its four cardinal circulatory trunk systems, namely, the two ovarian and the two uterine. This I believe to be a sound and effective precaution against the possible dissemination of malignant cells by squeezing them out into adjacent vascular currents.

5. A transverse, crescentic incision is now made through the vesico-uterine peritoncum at the upper margin of its loose attachment to the uterus and is carried laterally on each side to the uterine attachment of the round ligament.

6. Into the angle of this incision on each side the index finger is introduced and burrowed bluntly through the loose areolar tissue of the upper portion of the broad ligament, perforating its posterior layer close to the uterus and below the level of attachment of the round ligament, the fallopian tube and the utero-ovarian ligament.

7. This aperture is bluntly enlarged sufficiently to permit the approximation of these three structures to form a single pedicle, to which two stout clamps are applied, and amputation is done between them close to the uterus.

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8. Transfixing ligatures replace the two clamps on the severed appendage stumps, while the two applied to the cornua of the uterus are henceforth used as tractors. The original instrument with which the body of the uterus was grasped for the purpose of elevating it is now removed.

9. Traction upward upon the uterus now brings clearly into view the skeletonized uterine vessels, which are clamped and divided on each side at the level of the internal os. Ligatures now replace the clamps on these vessels, care being exercised not to include any cervical tissue in passing the needle.

10. The severed uterine vessels may now with ease and safety be bluntly dissected away from the cervix down to the point of their emergence above the thick basal segment of the broad ligament on each side.

11. The uterus is now drawn strongly upward and the bladder is easily sepa-

rated by blunt dissection with the gauze covered index finger first from the cervix and then from the anterior vaginal wall well down below the level of the external os.

In most instances the line of cleavage along the course of least resistance here is between the bladder and the pubo-cervical (subvesical) layer of fascia, so that after the bladder has been pushed well down close inspection of the cervix anteriorly will disclose that it is covered by a thin but definite layer of fascia. It is in this fascia that the troublesome vascular plexus is contained. If now a T-shaped incision be made through the fascia with the transverse cut a little below the level of the internal os and the vertical one over the middle of the cervix, the fascia layer together with the vessels may be easily freed from the cervix with the index finger and pushed laterally on each side, so that the vessels are nicely segregated adjacent to the basal segments of the broad ligaments.

Steps 10 and 11 serve further to drop the ureters well away from the cervix

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where damage to them is scarcely possible, if reasonable care is exercised in the subsequent application of clamps and sutures.

12. Strong traction upward and forward is now exerted upon the uterus, and a transverse incision is made through its posterior peritoneal reflection one centimeter above the level of attachment of the two uterosacral ligaments. The lower peritoneal flap resulting is quite firmly attached to the posterior wall of the cervix, and sharp dissection vertically downward for at least two centimeters is necessary in order to free it sufficiently to permit introduction of the left index finger. Below this level the peritoneal and rectal attachment is quite loose and blunt dissection is now utilized, first to free the peritoneum from the cervix, and is continued downward to release the rectum from the vagina below the level of the external os. Bleeding does not occur in this step of the operation, if care is exercised not to carry the dissection laterally on either side into the broad ligament zone.

13. If the uterus now be lifted well up, the two index fingers may readily be

apposed below the level of the vaginal portion of the cervix by invagination of the anterior and posterior vaginal walls respectively, thus demonstrating that the bladder and rectum have been freed from the vagina sufficiently low down.

14. The two uterosacral ligaments are now clamped, divided and ligated close to their cervical attachments.

15. The dense basal segment of the broad ligament on each side, together with the vascular plexus adjacent to it, which has been segregated through the earlier blunt dissection carried out over the central zone of the cervix in front and behind, may now be easily grasped close to the lateral border of the cervix, divided and securely ligated, the clamps being removed. If the cervix is elongated, this step has to be repeated at a lower level.

16. The vaginal vault now comes up into plain view on all sides and the sterile gauze vaginal pack is withdrawn from below. Note that even at this stage of the operation there are no clamps in the pelvis and that no troublesome hemorrhage has been encountered. The anterior vaginal wall is incised, the vagina

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promptly balloons and the incision is extended around the cervix, four clamps being applied to the vaginal vault as it proceeds; one anteriorly in the midline, one laterally to each angle and one posteriorly in the midline, as the entire uterus is lifted out of the pelvis, without the cervix at any time having come in contact with any intrapelvic tissue.

17. Special angle sutures now replace the two angle clamps as follows: the needle is first passed through the anterior vaginal wall into the lumen of the vagina one centimeter mesial to the angle clamp; it now twice transfixes the stump of the basal portion of the broad ligament, forming within it a liberal mattress suture loop; from here the needle again enters the lumen of the vagina, piercing its posterior wall also one centimeter mesial to the angle clamp and, further, is made to transfix the stump of the uterosacral ligament. When tied, this suture closes the lateral vaginal angle and snugly apposes to it for support both the strong basal segment of the broad ligament and the uterosacral ligament.

18. Further complete or partial apposition of the anterior to the posterior vaginal wall by suture, depending on whether or not drainage is to be employed, is now quickly executed.

19. A single mattress suture on each side now first engages the closed vaginal

vault anteriorly and mesially to the angle suture, transfixes the stumps of the round and utero-ovarian ligaments and passes back to engage the posterior vaginal wall opposite the point of entrance. When tied, this suture snugly apposes the round and utero-ovarian ligaments to the vaginal vault, thus affording additional support to the latter and neatly suspending the ovaries.

20. The cut margin of the vesico-uterine peritoneum is now neatly sewed to the free edge of the posterior peritoneal flap, leaving the pelvis completely peritonealized with the vaginal vault and the ovaries strongly supported.

*Modification A.*—If for any reason unilateral or bilateral salpingo-oöphorectomy is indicated, the above technic becomes even simpler and is readily modified according to well established procedure to meet this requirement.

*Modification B.*—If exposure of the cervix for the lower dissection is rendered difficult by reason of benign pathology in the corpus uteri, such as enlargement from a myomatous change, it is recommended that a subtotal hysterectomy at or above the level of the internal os first be done. The cervix may then be easily and speedily removed by the technic detailed above.

*Comment.*—The perfected technic of this operation has been a gradual development during the past four years, in which period I have performed it a number of times for various types of uterine pathology. Thus far I have had no mortality and no postoperative complications, other than the minor ones uniformly associated with any major abdominal procedure. The operation is, therefore, now offered not with the optimistic fancy that no untoward results will later be chargeable to it, but with the confident belief that it possesses the following distinct advantages:

1. Each step of the operation is anatomically and surgically sound in principle.

2. It is relatively simple, easy of execution and consumes substantially less time than has been hitherto required by most operators for abdominal panhysterectomy.

3. There is complete freedom from hemorrhage or troublesome oozing throughout, which is accomplished by a carefully planned anatomic dissection that serves to segregate the vascular network surrounding the lower cervix, so that not more than four hemostatic clamps are required in the pelvis at any stage of the operation.

4. The danger of injury to the ureters is reduced to a negligible factor.

5. The accurate identification and preservation of the substantial basal portions of the broad ligaments and of the uterosacral ligaments for later coaptation to the vaginal vault by a specially devised suture affords an efficient guarantee against later prolapse.

6. The possible contamination of the field of operation or of the peritoneal cavity from the cervix harboring virulent organisms is reduced to a minimum.

7. The special technic recommended where malignant disease is sus-

pected (Step 4) constitutes an additional protection against possible recurrence, which possesses unquestionable merit.

8. Finally the factors which commonly produce shock and prompt exodus following panhysterectomy, such as excessive loss of blood, extensive mechanical insult to the tissues and prolonged operative manipulations, are completely eliminated through this simplified technic.

9 EAST CHASE STREET.

#### DISCUSSION

DR. FLOYD E. KEENE, PHILADELPHIA, PA.—In order to fully appreciate the operation which Dr. Richardson has just described I think it is necessary for one to see him do it.

Three points particularly stand out in the operation as of paramount importance. The first which I think should be stressed very strongly is not only the separation of the bladder anteriorly, but of the pubocervical fascia. In the case which Dr. Richardson operated upon in my clinic this line of cleavage between the cervix and the fascia was readily demonstrated and the fascia easily pushed off leaving the vascular zone well to the sides of the cervix.

Secondly, the technic affords a rapid and bloodless approach to the tissues posterior to the cervix. It took him a shorter time to thoroughly separate these tissues than it did for him to describe it. As a result of this complete separation, anteriorly and posteriorly, two comparatively thin zones of tissue composing the bases of the broad ligaments were exposed and with two clamps, one on each side of the cervix, the uterus was very easily enucleated. Furthermore, there was no soiling whatever of the field of operation from contamination with the cervix. The operation is one that is easily carried out, in his hands at least; it is bloodless and practically eliminates the danger of injuring the ureters. Those of us who saw the demonstration were unanimous in our belief that he has presented a very valuable contribution to the technic of total hysterectomy.

DR. BROOKE M. ANSPACH, PHILADELPHIA, PA.—I, too, had the pleasure of seeing Dr. Richardson perform this operation. It was done with dexterity, celerity and precision. It was almost entirely bloodless and I have never seen a more skillful demonstration of a surgical procedure. I have had one opportunity to try the operation and although I did not succeed as well as Dr. Richardson in avoiding loss of blood, I am sure I like the plan of operation better than the technic formerly employed in which the ureters were exposed in the posterior part of the broad ligaments.

DR. ARTHUR H. CURTIS, CHICAGO, ILL.—What disposition was made of the utero-sacral ligaments?

DR. E. H. RICHARDSON, BALTIMORE, MD. (Closing).—I went over the operation so hurriedly that I may have left out some minor steps. You will find in the descriptive technic that the utero-sacral ligaments are taken care of just prior to the separation of the basal portions of the broad ligaments and also that they are included in the angle suture devised to take care of the supporting structures at the end.

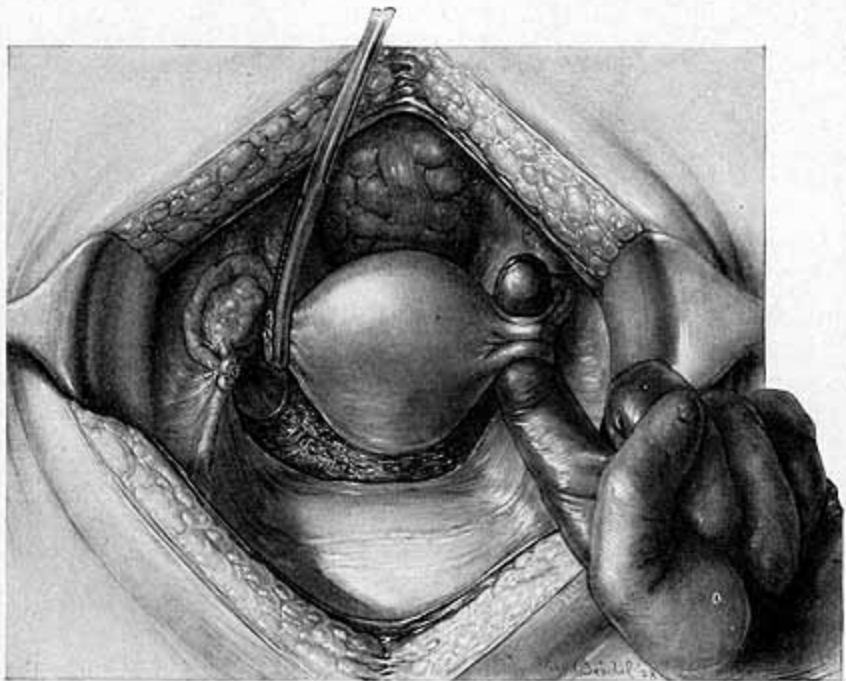


Fig. 1.—The vesicouterine peritoneum has been divided transversely. The index finger has perforated the broad ligament and supports the round ligament, the fallopian tube and the uteroovarian ligament. On the opposite side these structures have been divided and the pedicle has been transfixed and ligated.

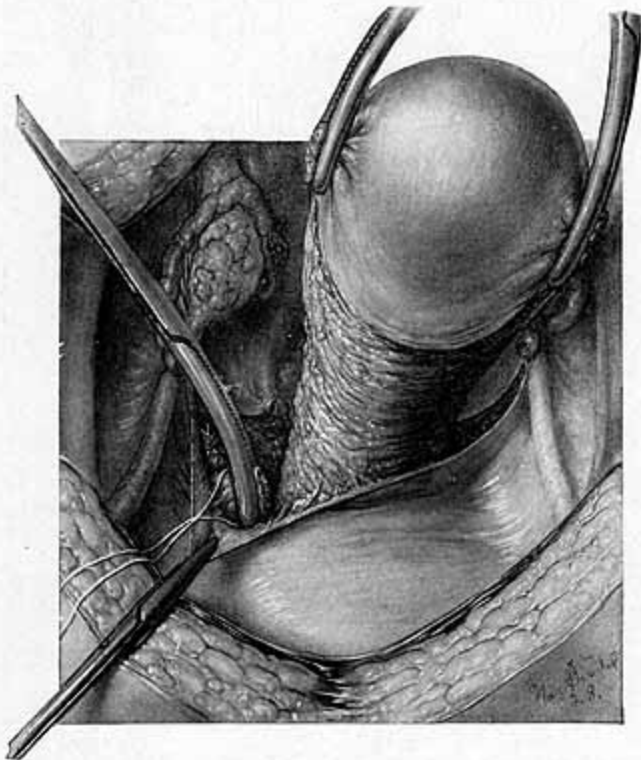


Fig. 2.—The uterine vessels on one side are shown clamped and divided at the level of the internal os with a ligature placed around them. The vessels have been bluntly freed from the cervix down to the basal segment of the broad ligament.





Fig. 3.—The uterus is lifted strongly upward while the bladder is being separated from the cervix by blunt dissection strictly confined to the mid-cervical zone.

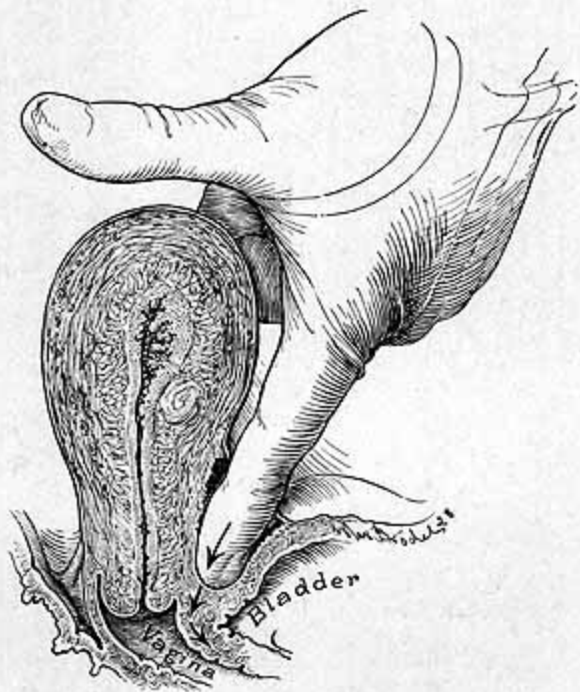


Fig. 4.—Sagittal view with arrows indicating the plane of the bladder dissection.

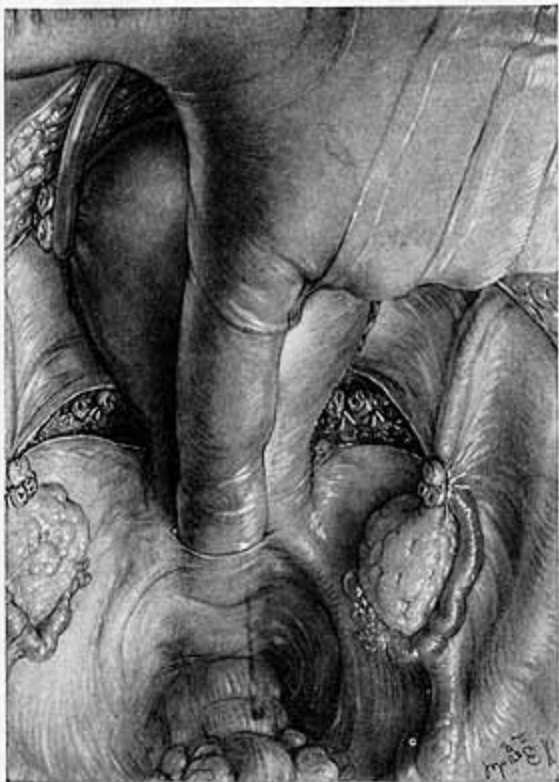


Fig. 5.—A transverse incision has been made through the posterior peritoneum at the level of the cervical attachment of the uterosacral ligaments. Blunt dissection is being applied to the mid-cervical zone in order to free the rectum well below the level of the external os uteri.



Fig. 6.—Sagittal view indicating the plane of cleavage between the vagina and rectum.

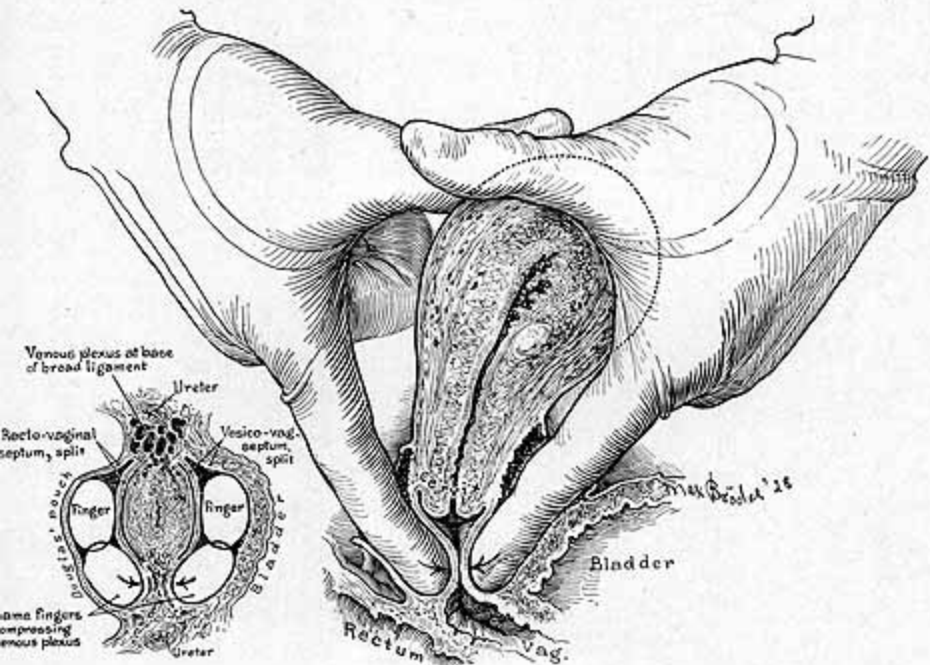


Fig. 7.—Sagittal view showing test being applied to determine that the freeing of the bladder and rectum has been carried to a sufficiently low level.

The inset shows the lateral cervical plexus of vessels before and after segregation.

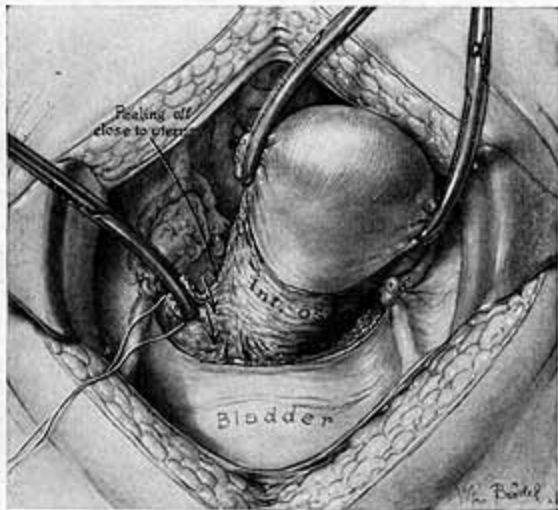


Fig. 8.—The basal portion of the broad ligament with the segregated lateral vascular plexus is here shown clamped and divided with a ligature placed around them.

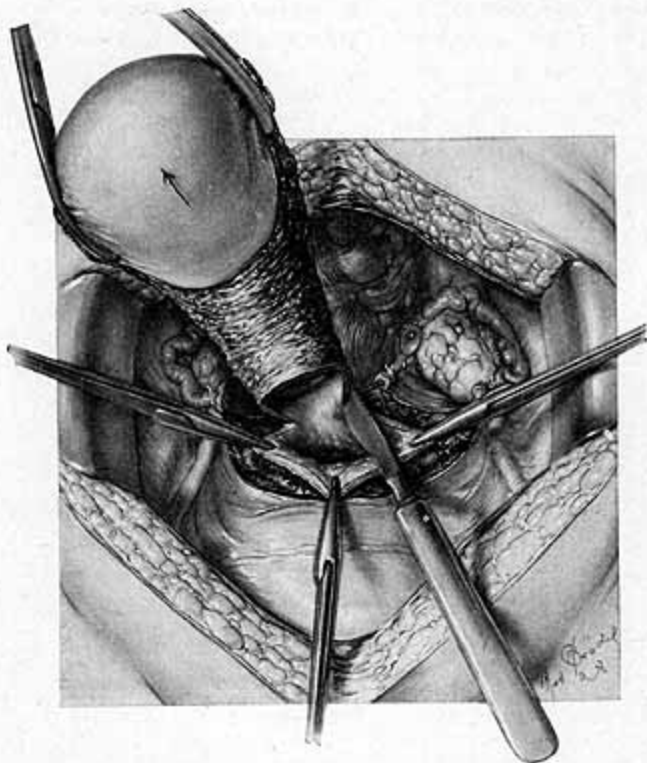


Fig. 9.—The final step in completing the removal of the uterus is here shown. The vaginal vault is being held up by clamps.

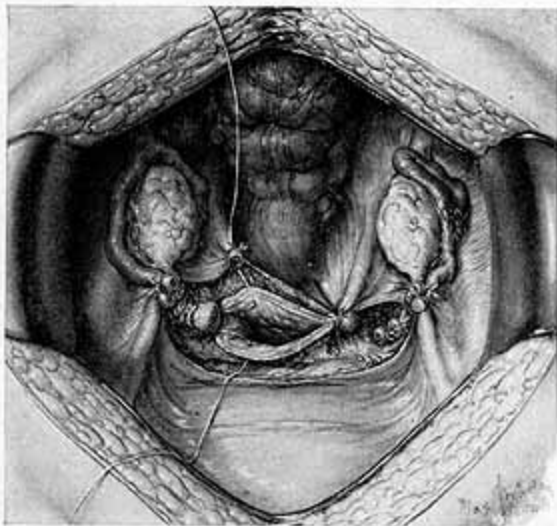


Fig. 10.—Showing the angle suture, which passes through the anterior vaginal wall, twice transfixes the basal segment of the broad ligament forming a mattress loop, penetrates the posterior vaginal wall and transfixes the uterosacral ligament. On the opposite side this suture has been tied, snugly closing the angle of the vaginal vault and approximating the supporting ligaments to it.



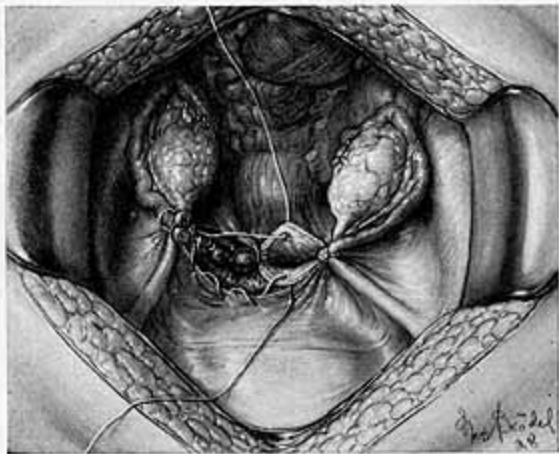


Fig. 11.—Further closure of the vaginal vault with approximation to it of the round and uteroovarian ligaments together with the margins of the peritoneal flaps.