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SURGERY

OF THE

RECTUM AND PELVIS

SURGERY

OF THE

RECTUM AND PELVIS

BY

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NEW YORK

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WITH TWO HUNDRED AND EIGHTY-ONE ILLUSTRATIONS AND HALF-TONE PLATES

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PREFACE.

A COMPARISON of this work with those on diseases of the rectum by the same author which have preceded it will show at a glance its increased scope.

The impossibility of separating diseases of the rectum in practice from so-called gynæcology and genito-urinary diseases is apparent in such cases as laceration of the sphincters, proctocele, recto-vaginal fistula, pelvic abscess in women, displacements of the uterus, acute and chronic prostatitis, and hypertrophy of the prostate; all of which are constantly associated with rectal symptoms.

In enlarging this work, to include the surgical procedures necessary for the cure of these allied affections, the author has simply followed what experience has proved to be the natural course of his own practice.

He can only hope that in its new form the book will meet with the same favor that has attended former editions.

CHARLES B. KELSEY.

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SURGERY

OF THE

RECTUM AND PELVIS.

CHAPTER I.

ANATOMY.

THE rectum is the terminal portion of the large intestine, extending from the sigmoid flexure to the anus. In its natural position its length varies in different persons from six to eight inches. Its upper limit is difficult to determine with accuracy, except from the fact that it is separated from the sigmoid flexure by a slight constriction which becomes more apparent when attempts are made at dilatation. From this upper point it gradually expands below into a pouch, the ampulla, and then again suddenly contracts under the grasp of the muscles which close its lower end.

The curves of the rectum are exceedingly important in a practical point of view. There are two, one antero-posterior, the other lateral. The former is double From above downward it follows the curve of the sacrum and coccyx, being concave in front and convex behind. When it reaches a point opposite the tip of the coccyx, it suddenly reverses its direction, turns sharply backward, and ends at the anus, about one inch in front of the tip of that bone.

By this backward curve of its lower end, which is represented in an exaggerated form in Fig. 2, it is separated from the vagina in the female, and from the urethra in the male, by a triangular space having its base at the perineum, its upper wall at the vagina or urethra, and its lower at the upper wall of the rectum. The angle of junction of these two curves is well marked, measuring from twenty to thirty

degrees; and the curve is not without influence in the function of defecation, since, by it, an obstruction is formed to the downward course of the fæces.

The lateral curve is generally a single one from left to right, starting at the left sacro-iliac synchondrosis and ending at the median line

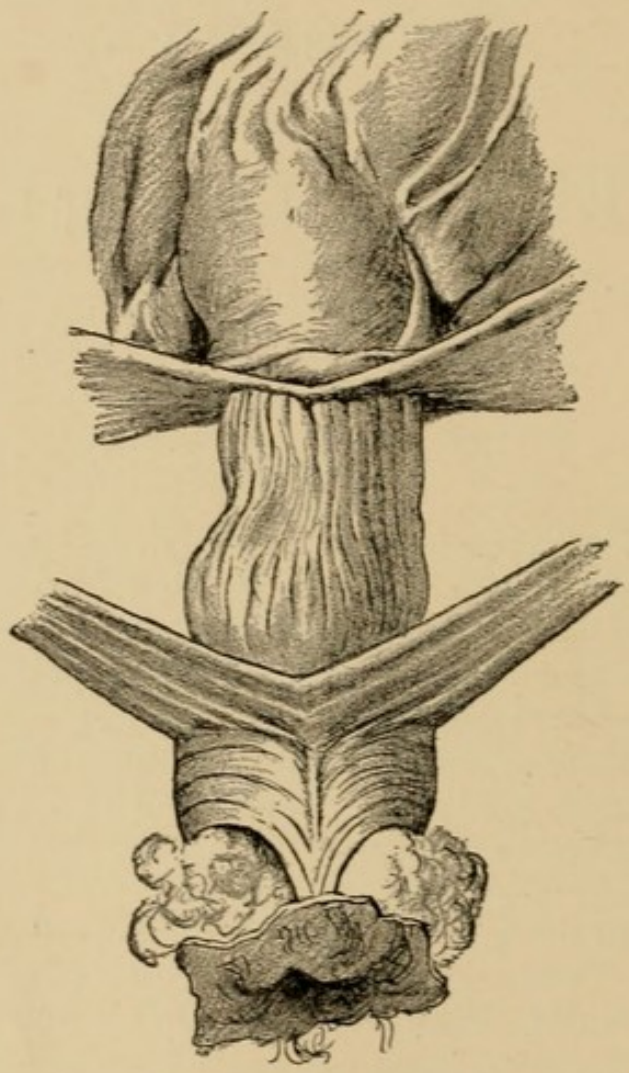


FIG. 1.—Dissection of Rectum.

at a point opposite the third sacral vertebra, from which point it generally passes straight on to the anus.

For convenience of description the rectum is usually divided into three portions, named first, second, and third, from above downward. The third extends from the anus to the tip of the prostate, is about an inch and a half long, is firmly closed by the sphincters, and gives attachment to a portion of the levator ani muscle. The second por-

tion is often described as reaching from the apex of the prostate to the rectovesical fold of peritoneum; but, as the point of duplicature of the peritoneum is not only variable in different individuals, but at different times in the same individual, it is better to adopt a fixed bony point, as the third piece of the sacrum; in which case the middle portion will measure about three inches in length. The first portion extends from the third sacral vertebra to the left sacro-iliac synchondrosis; its lower part is partially, and its upper completely,

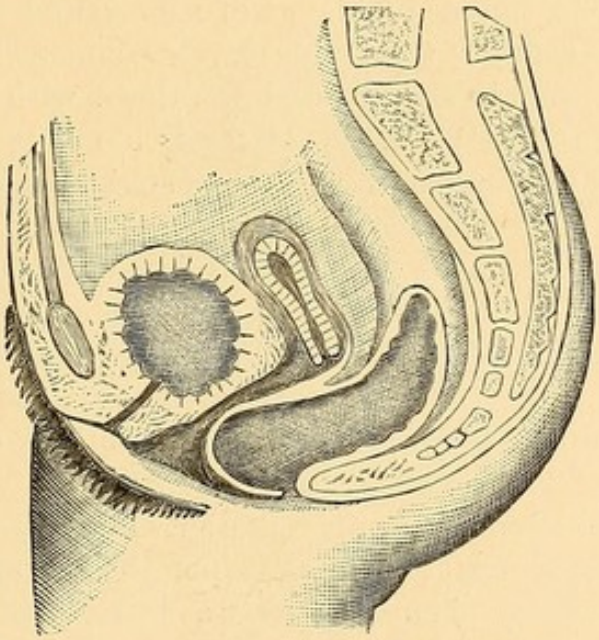


FIG. 2.—Exaggerated Curve of the Rectum.

surrounded by peritoneum, which, in the upper part, forms the mesorectum attaching it to the sacrum.

The most important surgical relations of the rectum are on the anterior surface. The third portion is surrounded laterally and posteriorly by a bed of connective tissue rich in fat and blood-vessels. In front, however, it is directly in relation with the membranous urethra in the male, and with the vagina in the female; though at the anus it is separated from them both by its backward and downward course.

In the second portion, also, the lateral and posterior surfaces have no special surgical relations; while the anterior is in direct contact with the prostate, the base of the bladder, the seminal vesicles, and, sometimes, at its upper limit, with the peritoneal fold of Douglas.

This portion is closely connected with the bladder in the male, and with the vagina in the female, by connective and muscular tissue; and the two cavities may easily be made to communicate by any morbid process or by a surgical procedure. The prostate, when large, may project over the sides of the rectum, or the latter may receive the prostate in a groove on its upper surface.

The first, or upper portion, unlike the other two, has important surgical relations on every side. Posteriorly it is in whole or part covered with peritoneum, and is separated from the sacrum by the pyriformis muscle, the sacral plexus of nerves, and the branches of the internal iliac artery. On its sides it is in contact with the adjacent convolutions of small intestine, and lower down with the levator ani muscle and the connective tissue of the ischio-rectal fossa. In the male it is in relation, in front, with the posterior surface of the bladder, from which it is separated by coils of small intestine. In cases of retention, either of urine or fæces, the two may be brought into actual contact. In the female it is in relation, anteriorly, with the broad ligament, the left ovary and Fallopian tube, the uterus and vagina. When the rectum and uterus are empty, the coils of small intestine pass down between them to the bottom of the fold of Douglas.

From these relations it is apparent that enlargements and malpositions of the uterus must act directly upon the rectum. The vessels may be so obstructed by uterine disease as to cause hemorrhoidal troubles, or interfere with operations for their relief. The rectum may be entirely occluded by the pressure of a uterine tumor or by a bony growth or cancerous mass springing from the sacrum; and a hasty examination of the rectum may lead to the diagnosis of a tumor in its anterior wall, when in reality the normal uterus alone is felt. The advantage of a rectal examination in all doubtful cases of pelvic disease is also manifest.

The rectum terminates below in the anus, which is tightly closed by the external sphincter muscle. The skin around its border is thin and pigmented, covered with fine hair, and contains a great number of sebaceous follicles and muciparous glands. The skin passes deeply into the anal orifice, and its point of junction with the mucous membrane is in some persons indicated by an indistinct white line. This white line of junction corresponds to the division between the external and internal sphincter muscles, and also to the point at which many of the terminal filaments of the internal pudic nerve perforate

the gut. Both skin and mucous membrane at the anus are remarkable for the development of erectile tissue; the arteries coming from the inferior hemorrhoidal, and the veins being very numerous, winding, and twisted.

The rectal wall is composed, as are the other parts of the intestine, of four layers: an external or peritoneal; a muscular, divided into longitudinal and circular; a submucous connective-tissue layer; and, most internally, the mucous membrane. The total thickness of these coats collectively varies greatly in different subjects, the varia-

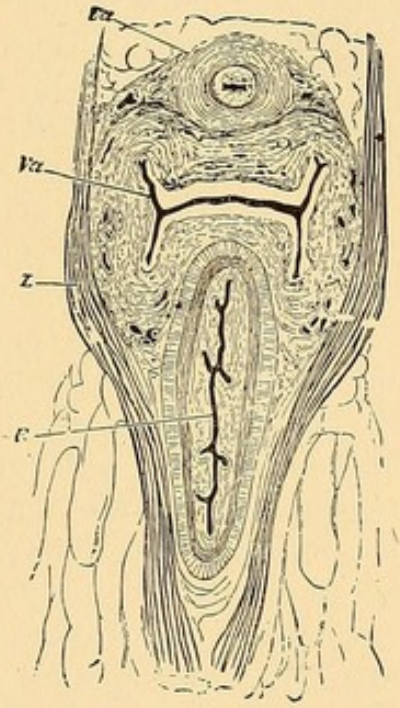


FIG. 3.—Horizontal Section through Urethra, Vagina, and Anus. (The anus considered as about an inch long, and including the terminal portion of the rectum.)

tion being chiefly in the muscular coat, the others remaining pretty constantly of the same thickness.

The upper portion of the rectum is entirely surrounded by peritoneum, and has, besides, a fold of attachment to the anterior face of the sacrum, known as the meso-rectum. The meso-rectum is about four inches long, blends with the meso-colon above, and extends down as low as the third or fourth sacral vertebra, from which point its two layers are reflected over the sides and anterior surface of the rectum on to the posterior wall of the uterus and upper limit of the vagina in the female, and upon the bladder in the male, forming the *cul-de-sac* of Douglas. The meso-rectum may be so short as to dis-

appear when the rectum is distended; or it may be entirely absent, in which case the peritoneum passes directly from the sides of the rectum to the sacrum. Between its two layers may be found some loose connective tissue, the hemorrhoidal vessels and nerves, and the lymphatics. In women it generally covers the upper part of the posterior vaginal wall, so that the latter is separated from the rectum by peritoneum for about one-third of an inch. By every expansion of the bladder or rectum, as well as by tumors of the pelvis, the fold is carried farther away from the anus, as may easily be demonstrated on the cadaver by forcible injections of the bladder.

In the fact that the muscular coat is arranged in two layers, an external longitudinal and an internal circular, the rectum resembles the other portions of the alimentary canal; but in the farther arrangement of its fibres it resembles the œsophagus more closely than the intermediate portions. The fibres are spread out into two uniform layers, and are not arranged in bands crossing each other in basket network and leaving sacculi between the meshes as in the large intestine.

The longitudinal fibres are the direct continuation of the three longitudinal bands of the large intestine. Upon reaching the rectum these blend into one continuous sheath, which, however, is somewhat heavier on the anterior surface of the bowel than on any other.

The circular layer is reinforced at certain points, notably at the internal sphincter, which is merely a collection of these fibres, and at various points higher up where they are again gathered into bundles either partly or completely surrounding the bowel, known as the third sphincter. This supposed muscle will be described more fully later.

The submucous tissue forming the bed upon which the mucous membrane rests is sufficiently lax to permit of considerable sliding of the mucous membrane on the muscular coat. In it the blood-vessels ramify, and from it perpendicular processes are given off which perforate both the internal and external muscular layers and are finally lost in the sheaths of the muscular fibres, or go entirely through the muscular layer and blend with the fibrous stroma of the surrounding fatty tissue. These processes from the submucous tissue, together with the lymph and blood vessels, serve to bind the various layers of the rectal wall together (Fig. 4).

The mucous membrane of the rectum corresponds in its general characters with that of the other parts of the bowel, being modified,

however, in certain particulars to suit its location and function. Its thickness is about three quarters of a mm.; it is redder and more vascular than that of other parts of the large intestine; it glides freely on the tissue beneath, and is so ample as to be gathered into

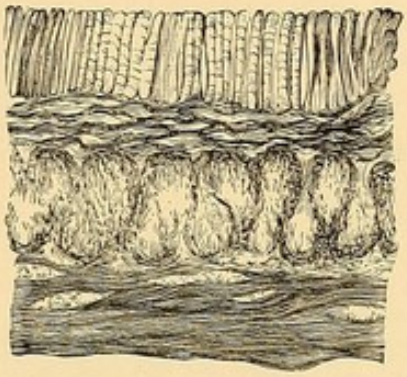


Fig. 4.—Section of Rectal Wall.

folds at various points, which are of considerable surgical and anatomical interest. At its point of union with the skin of the anus, it is gathered into vertical folds which diminish when the bowel is distended, but do not entirely disappear, and hence are not due solely to the contraction of the sphincter. These vertical folds have received the name of *columnæ recti*, or columns of Morgagni.

Between the lower ends of the *columnæ recti* little arches are sometimes stretched from one to the other, forming pouches of skin

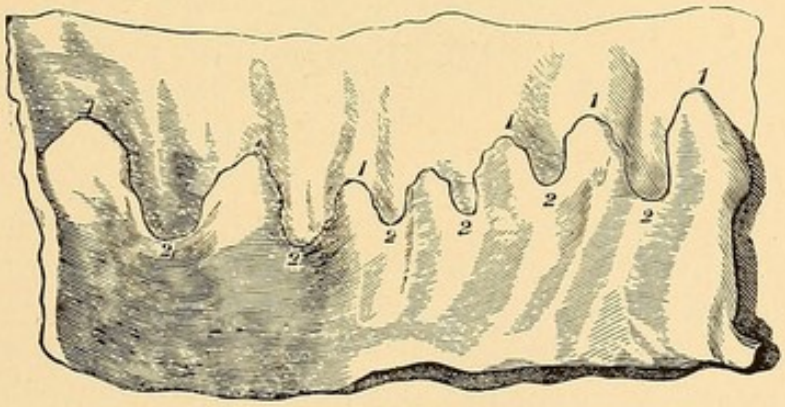


Fig. 5.—Columnæ Recti.

and mucous membrane. These are more developed in old people, and may retain small pieces of hardened fæces or foreign bodies in their cavities, which are directed upward, and thus give rise to suppuration and abscess.

These little pouches, or sacculi, have quite recently been brought

into rather an undue prominence by the attempts of certain charlatans to locate in them many of the causes of rectal disease. They have always been known to anatomists, as Figures 5 and 6 will prove; but the fact is that both these drawings, and more especially the first one, are diagrammatic exaggerations for the sake of clearness.

For some years I have been on the watch for these pouches in my rectal examinations, with the result of concluding that they do not generally exist to any such degree as these diagrams would indicate;

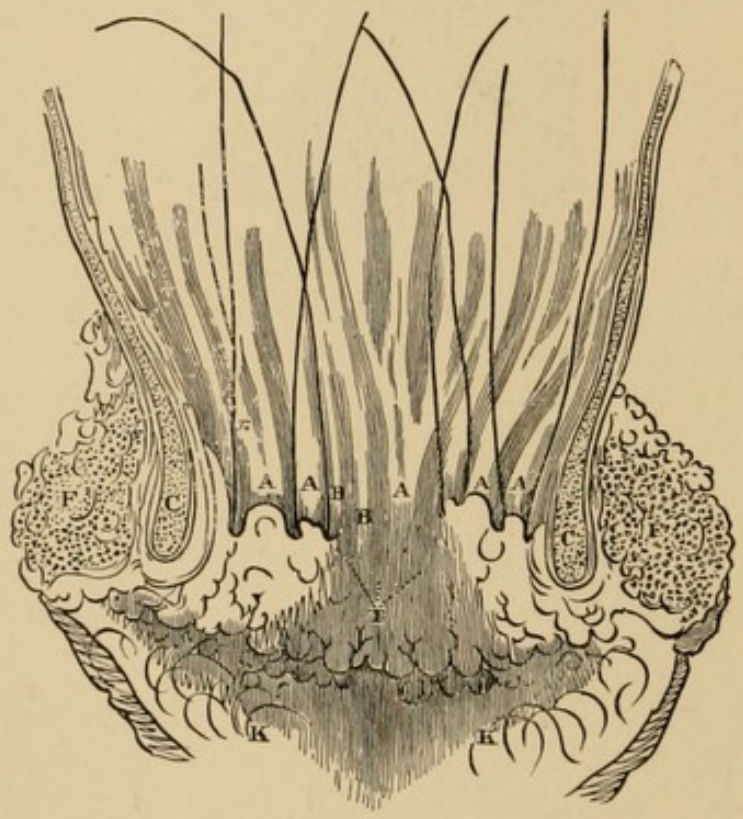


FIG. 6.—Sacculi of Rectum (Horner).

and that, even when one or two of them are found, they are, in the majority of cases, of no pathological significance.

The muscles which may properly be included in a description of the rectum and anus are the external and internal sphincters, the levator ani, ischio-coccygeus, retractor recti or recto-coccygeus, and the transversus perinæi.

The external sphincter muscle is a thin, subcutaneous layer of voluntary fibres, about half an inch broad on each side of the anus, surrounding it in the form of an ellipse, and having a narrow, pointed insertion anteriorly and posteriorly. It is about two centi-

metres thick, and is divided into a superficial and a deep portion. The superficial is inserted, both in front and behind, into the subcutaneous cellular tissue. The deeper and thicker portion is inserted posteriorly by a narrow, flat tendon into the posterior surface of the fourth coccygeal vertebra. Anteriorly it is inserted into the central tendon of the perineum in common with the transversus perinæi and bulbo-cavernosus, and in women with the sphincter vaginæ. The action of the muscle is to close the anus and, under the control of the will to antagonize the proper dilators of the anus as well as the peristaltic action of the bowel and the contraction of the diaphragm. The superficial band of fibres acts only in puckering the skin. The

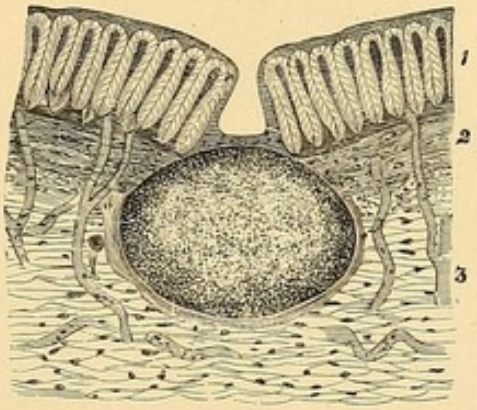


FIG. 7.—Section of the Rectal Mucous Membrane. 1. Follicles of Lieberkuhn. 2. Muscular layer of mucous membrane. 3. Submucous connective tissue and vessels, with a solitary closed follicle, over which the tubular follicles are wanting.

nerve-supply comes from the hemorrhoidal branch of the internal pudic and the hemorrhoidal branch of the fourth sacral nerve.

Great variations will be found in this muscle in different persons. In some it is strong, in others weak. In some it closes the anus so tightly that a finger cannot be inserted without pain; in others a full-sized Sims' speculum can be passed without difficulty.

The internal sphincter is an involuntary muscle situated immediately above and partly within the deeper portion of the external sphincter, being separated from it by a layer of fatty connective tissue. Its thickness is about two lines; its vertical measurement, from half an inch to an inch; and it is a direct continuation of the involuntary circular fibres of the bowel, growing thicker and stronger as they approach the anus. It also is supplied by the hemorrhoidal branch of the internal pudic.

In dissecting this muscle for demonstration, it should be ap-

proached from the mucous surface of the bowel. It will be found answering to this description in a general way in most cases, but is subject to many variations, due to its different degrees of development in different subjects. In some it is very well marked, in others scarcely distinguishable from the rest of the circular muscular fibres.

The levator and ischio-coccygeus muscles form a true diaphragm to the pelvis by giving an uninterrupted muscular and tendinous plane from the lower border of the pyriformis, behind, to the arch of

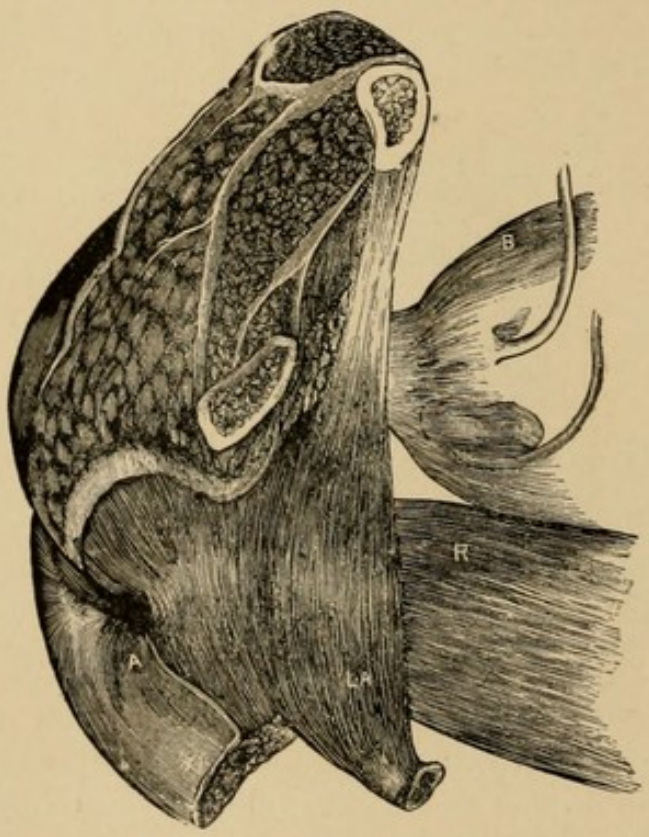


FIG. 8.—Side View of Levator Ani.

the pubes in front. That part which is named ischio-coccygeus is usually described as a separate muscle, though in no way differing in function from the larger portion, and only distinguishable from it by its more tendinous structure. It is situated just in front of the sacro-sciatic ligaments, and arises by aponeurotic fibres from the sides and tip of the spine of the ischium, from the anterior surface of the lesser sacro-sciatic ligament, and often from the posterior part of the pelvic fascia. It is inserted, also by aponeurotic fibres, into the border of the coccyx and lower part of the border of the sacrum. Owing to its tendinous origin and insertion, the greater part of the

muscle is composed of aponeurotic fibres. It is in relation superiorly, by its concave surface, with the rectum; inferiorly, by its convex surface, with the sacro-sciatic ligaments and the gluteus maximus; posteriorly its border is in contact with the lower border of the pyriformis; and anteriorly it is directly continuous with the fibres of the levator ani. Its action is to draw the coccyx to its own side, or, when both muscles act together, to fix that bone and prevent its being thrown backward in defecation. Its nerve-supply is from the anterior branch of the fourth sacral nerve.

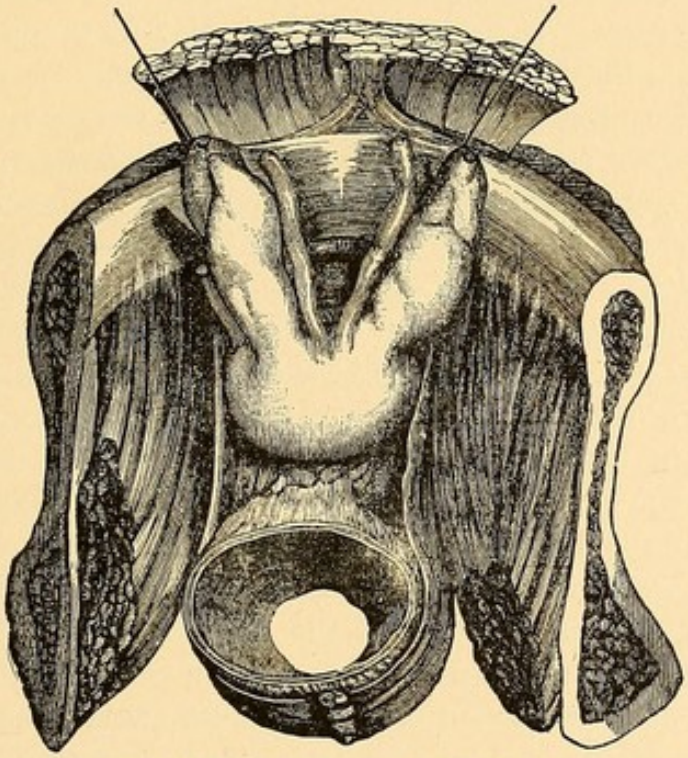


FIG. 9.—Levatores Ani seen from Behind.

The levator ani proper, which constitutes the remaining portion of the pelvic diaphragm, is in its general shape an inverted cone, supporting the pelvic contents in its cavity and allowing the rectum and prostate to pass through its apex. Considering each lateral half of the muscle apart, we find it made up of a delicate layer of muscular fibres forming a thin, curved, and quadrilateral sheet, broader behind than in front. Its upper border is stretched across the pelvis from the pubes to the spine of the ischium, arising from both these bony points and from the tendinous line of union of the pelvic with the obturator fascia, which runs antero-posteriorly between them. Its attachment to the pubic bone is at a point on its inner surface

near the middle of the descending ramus and a little to one side of the symphysis. This attachment will be found to vary somewhat in different dissections, being sometimes a little higher or a little lower on the bone, and sometimes on the cartilage between the bones. The muscular fibres may also be traced at times upward into the pelvic fascia above its junction with the obturator (Figs. 8 and 9).

From this extensive though delicate and in great part membranous origin, the fibres proceed downward and inward toward the median line. Those most anterior unite with those of the opposite side beneath the neck of the bladder, the prostate, and the adjacent portion of the urethra. These fibres are concealed by the pubo-prostatic ligament or anterior fold of the recto-vesical fascia, from which they also sometimes take origin in part. They are in relation, in front, with the posterior surface of the triangular ligament. This portion is sometimes separated from the main body of the muscle by a cellular interval, similar to those often found in other parts of this thin muscular sheet.

The fibres which arise from the tip of the spine of the ischium are inserted into the side of the tip of the coccyx, while the fibres immediately in front of these (precoccygeal) unite with those of the opposite side in the median line and form a *raphé* which extends from the point of the coccyx to the posterior border of the sphincter, and thus complete the floor of the pelvis.

The fibres which arise indirectly from the upper part of the obturator foramen and from the brim of the pelvis by means of the pelvic fascia, pass downward and inward, forming a curve with its concavity upward, and may be divided into vesical and anal. The vesical pass into the sides of the bladder. The anal fibres in part pass backward and meet behind the bowel, and in part blend with those of the external sphincter at its upper border, there being no distinct line of separation between the two muscles.

The relations of the levator ani are of great surgical importance. Superiorly its surface is covered by the superior pelvic fascia (the recto-vesical layer of the pelvic fascia), which separates it from the peritoneum and pelvic organs. The space between this fascia and the peritoneum is the superior pelvi-rectal space of Richet. Its inferior surface is separated from the obturator internus muscle by the obturator fascia, and beneath this is the ischio-rectal fossa. The posterior part of the muscle is in relation with the gluteus maximus.

The actions of this muscle are various. First, it acts as a support

to the pelvic organs, and antagonizes the diaphragm and abdominal muscles when they act upon the abdominal contents. By enclosing the neck of the bladder the muscle acts upon it also, and in the act of defecation, when the muscle is contracted to open the anus, the neck of the bladder is pressed upon and the urethra closed. By enclosing the bladder, vesiculæ seminales, prostate, and rectum in its grasp, the muscle produces a sympathy among these parts which will often be found very distressing in diseases of the rectum or after operations for their relief—such as impossibility of micturition, erections, and lancinating pain due to spasmodic action of the muscle. The muscle also aids the longitudinal fibres of the rectum in their opposition to the dragging of the fæces; and the anal fibres also draw the rectum upward and forward, and compress it on the sides, and thus aid in the expulsion of its contents.

The voluntary sphincteric action of this muscle in connection with the ischio-coccygeus is of considerable power. It is brought to bear at a point about an inch and a half above the anus, and no doubt in a measure accounts for the partial control over the passage of fæces often seen after destruction of both the internal and external sphincters.

The muscle receives a filament from the fourth sacral nerve on its pelvic surface, and another from the internal pudic.

The transversus perinæi also has an action in defecation. Its fibres do not always blend with those of the opposite side in the median *raphé*, but the two muscles are sometimes continuous, traversing the anterior extremity of the external sphincter. In such a case the two muscles form a continuous half-ring, the concavity of which is directed backward and embraces the anterior part of the rectum, assisting powerfully in defecation by pressing the anterior against the posterior wall of the bowel in conjunction with the external sphincter.

Arteries.—The rectum is supplied with blood from five arteries, one single and two pairing.

The superior hemorrhoidal is single and is a direct branch of the superior mesenteric. It is the direct continuation of the parent trunk, passing into the pelvis behind the rectum in the fold of the meso-rectum, and dividing into two branches which extend, one on each side of the bowel, to its lower end. About five inches from the anus these subdivide into smaller branches, about seven in number, which pierce the muscular coat about two inches lower down. Then they descend between the mucous and muscular layers at regular inter-

vals to the end of the bowel, where they communicate in loops opposite the internal sphincter, and anastomose with the terminal filaments of the middle and inferior hemorrhoidal arteries.

The middle hemorrhoidal arteries—one on each side—are not constant in their origin, sometimes coming from the hypogastric or the inferior vesical, and sometimes from other sources.

The inferior hemorrhoidal arteries—also pairing—are usually given off from the internal pudic near the point where it crosses the

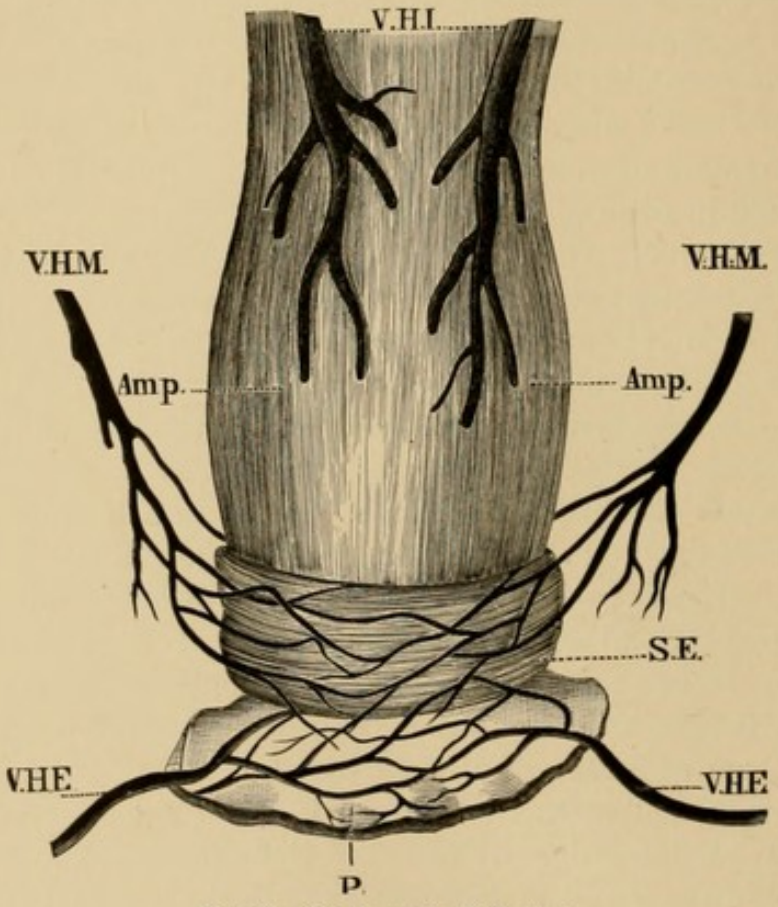


Fig. 10.—Blood-supply of Rectum.

tuber ischii. They cross through the fat of the ischio-rectal fossæ, and are distributed with the middle hemorrhoidal to the lowest part of the rectum, and to the anus and adjacent skin.

Veins.—There are three sets of rectal veins, as there are three sets of arteries—the superior, middle, and inferior; and these are so arranged as to form two distinct venous systems—the one, rectal, and returning its blood to the vena portæ; the other, anal, returning its blood through the internal iliac. The first, or rectal circulation, is made up of the superior hemorrhoidal vein; the second, or anal,

is made up of the middle and inferior hemorrhoidal veins, the middle receiving its blood from the anus, and the inferior from the adjacent integument. The middle hemorrhoidal ascends obliquely into the ischio-rectal fossa; the inferior starts horizontally from the skin of the anus and empties into the internal pudic.

The middle hemorrhoidal is formed from two venous trunks, one on the anterior, the other on the posterior aspect of the rectum,

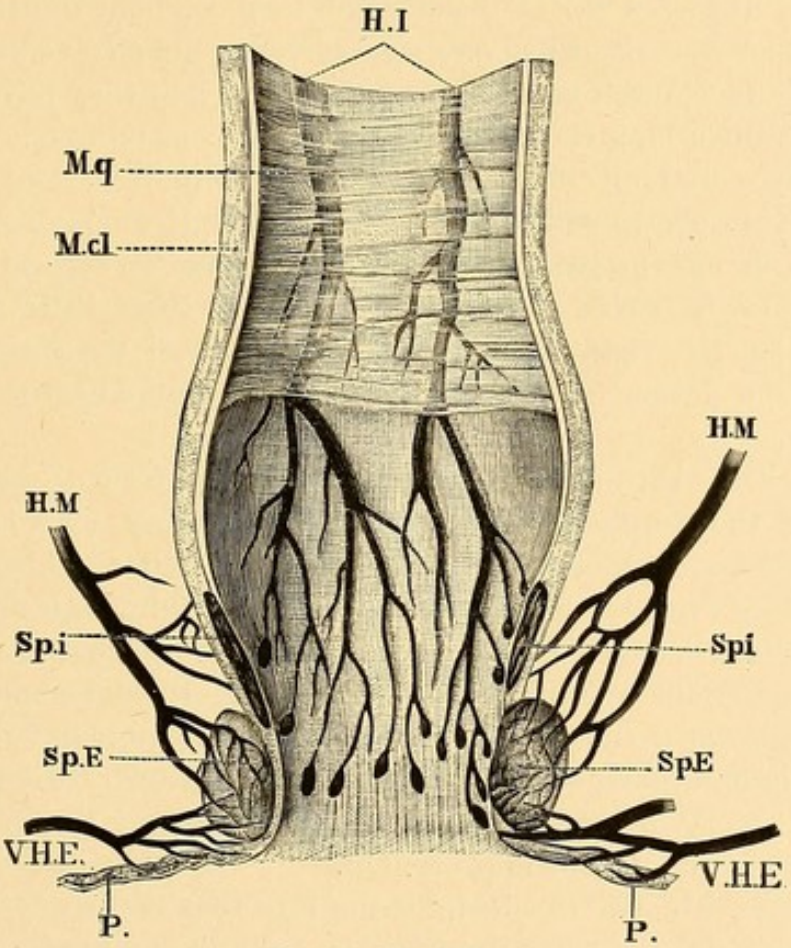


FIG. 11.—Rectal Veins.

which, by anastomosing with the corresponding branches from the opposite side, surround the sphincter in a venous circle. From this circle spring the collateral branches, which, by their successive division and anastomoses form a true venous plexus. The inferior hemorrhoidal vein also has a plexiform arrangement at its origin, but its branches are situated between the skin and the inferior border of the external sphincter. The rectal pouch is not, therefore, supplied with blood from the external hemorrhoidal veins, but only the anus and the region of the sphincters.

When, on the other hand, the venous circulation of the rectum proper is injected from the inferior mesenteric vein, three or four large venous trunks may be seen on the external surface of the rectum, ascending on the sides and posteriorly (Figs. 10 and 11). These veins make their appearance suddenly by five or six branches, which perforate the wall of the bowel about three inches from the margin of the anus. If the rectum be opened longitudinally, and the mucous membrane dissected up to a sufficient height (about four inches), it will be seen that these five or six large veins, already visible on the outside of the bowel, come from within, and that they have already pursued quite a long course under the mucous membrane. They are formed by collateral branches, and especially by about a dozen primitive branches, which originate about half an inch above the anus and ascend in parallel and flexous lines for several centimetres to unite into common trunks. Each of these little ascending branches has its origin in a minute pool of blood, the size of which varies in the normal state from that of a grain of wheat to that of a small pea.

These little sacs are arranged in a circular form around the extremity of the rectum. If carefully dissected they may be seen to be connected with the little veins before mentioned, and also with another little vein which perforates the internal sphincter near its lower edge, and empties into one of the rudimentary branches of the external hemorrhoidal plexus. Many of these little communicating branches between the external and internal hemorrhoidal systems pass through the substance of the external sphincter. It results from this that when the external sphincter is contracted the anastomosis between the two systems is prevented.

The disposition of the rectal veins into two distinct systems, the one internal and the other external, is fully in conformity with our knowledge of the development of the rectum and anus. The rectal *cul-de-sac* is at first situated at some distance from the perineum, and as it descends it carries with it its own proper vascular supply. The anal depression is of necessity provided with an independent set of veins, and when the rectum and anus are finally united into one canal the two venous systems also unite.

The internal hemorrhoidal veins also communicate freely with other branches of the internal iliac around the trigone of the bladder by means of minute branches, from one-half to one mm. in diameter, which pass through the prostate and vesiculæ seminales.

Nerves.—The nerves of the rectum and anus are derived from both the cerebro-spinal and sympathetic systems. The former are branches from the sacral plexus, the latter from the mesenteric and hypogastric plexuses. The spinal nerves are derived from the third and fourth sacral, which supply visceral branches to all the pelvic organs, anastomosing with branches from the sympathetic. The muscular branches from the same nerves have already been spoken of in connection with the individual muscles. The fifth sacral nerve also sends a small twig to the coccygeus. The posterior branch of the superficial perineal nerve from the internal pudic supplies the skin in front of the anus, while the anterior branch gives several small filaments to the levator ani.

The inferior hemorrhoidal branch from the pudic supplies the lower end of the rectum, the external sphincter, and the skin of the anus. This nerve may come direct from the sacral plexus through the lesser sacro-sciatic notch. The posterior branches of the sacral nerves also supply the skin over the coccyx and around the anus.

The tonic contraction of the external sphincter muscles is, in part at least, due to the influence of a nerve-centre located in the lumbar region of the spinal cord. If the nerve-connection of the sphincter with the spinal cord be severed, relaxation of the muscle takes place. The fact that division of the cord in the dorsal region does not affect the sphincter, except temporarily by shock or depression, proves that this centre is not located above the lumbar region. This nerve-centre is subject to various influences ; and the sphincter may either be relaxed, or its tonic contraction increased, by local stimulation, or by the influence of the will or emotions.

Though the dependence of the sphincter for its tonic contraction upon the lumbar nerve-centre seems so great, still it is not absolute. In the case of a man in whom the sacral nerves were entirely paralyzed by an injury, and in whom, therefore, there was no nerve-connection with the lumbar centre except perhaps through the sympathetic, Gower observed the maintenance of a certain amount of tonic contraction, which could be inhibited and relaxation produced by stimulation of the mucous membrane of the rectum and anus. From this it would appear that the tonic contraction of the sphincter, as is known to be the case in the arterial system, is habitually dependent on a spinal centre, but may, nevertheless, exist without the action of that centre. The paralysis of the muscle which follows brain lesions

is probably due merely to inhibition of the spinal centre, and not to the injury of any centre located in the cerebrum.

The distribution of the spinal nerves serves to explain many of the reflex and so-called anomalous symptoms of pain which are encountered in diseases of the rectum and anus.

The chief nerve-supply of the rectum is at the lower portion and around the anus—the middle and upper portions possessing very little sensibility; so little, in fact, that the gravest diseases, such as cancer or ulceration, may exist and not manifest themselves by pain.

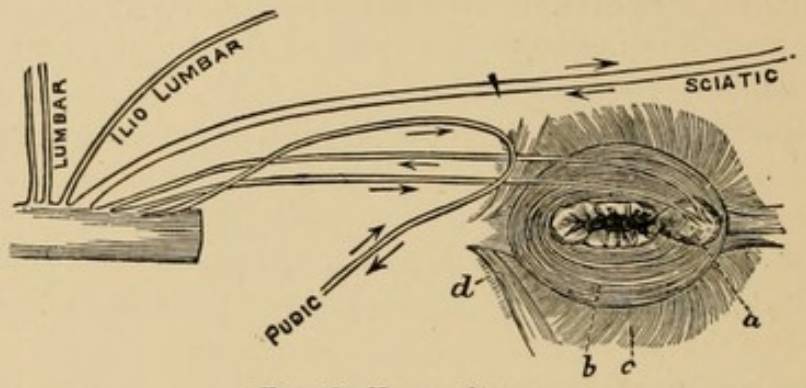


FIG. 12.—Nerves of Anus.

The pelvic plexuses of the sympathetic are placed one on either side of the rectum and vagina. Each is composed of prolongations from the hypogastric plexus above, united with branches from the sacral ganglia. The spinal branches to the sympathetic are mostly from the third and fourth sacral nerves. From the back part of the plexus thus formed are given off the inferior hemorrhoidal nerves, which join with the superior hemorrhoidal from the inferior mesenteric artery and perforate the rectal wall.

Lymphatics.—The lymphatic vessels of the rectum are arranged like those of the intestine, generally in two layers: one beneath the peritoneum and one between the mucous and muscular coats. Immediately after leaving the bowel some of the vessels pass through small adjacent glands, and all finally enter the glands in the hollow of the sacrum, or those higher up in the loin.

But just as there is an internal and external system of veins, one proper to the rectum, the other to the anus, so is there another lymphatic system, which comes from the integument around the anus and passes to the glands in the groin; and these two sets of vessels freely communicate with each other. A knowledge of this fact is of importance in the diagnosis of cancer of the rectum; and the glands

which are deep in the pelvis along the sacrum should always be felt for, as well as those located in the groin.

The supposed "third sphincter" of the rectum has been a matter of study and discussion for many years. All that is really known about it may be briefly summarized as follows:

What has been so often and so differently described as a third or superior sphincter ani muscle is in reality nothing more than a band of the circular muscular fibres of the rectum.

This band is not constant in its situation or size, and may be found anywhere over an area of three inches in the upper part of the rectum.

The folds of mucous membrane (Houston's valves) which have been associated with these bands of muscular tissue stand in no necessary relation with them, being also inconstant, and varying much in size and position in different persons.

There is nothing in the physiology of the act of defecation, as at present understood, or in the fact of a certain amount of continence of fæces after extirpation of the anus, which necessitates the idea of the existence of a superior sphincter.

When a fold of mucous membrane is found which contains muscular tissue, and is firm enough to act as a barrier to the descent of the fæces, the arrangement may fairly be considered an abnormality, and is very apt to produce the usual signs of stricture.

CHAPTER II.

GENERAL RULES REGARDING EXAMINATION AND DIAGNOSIS.

To one who has been trained in the habit of making a diagnosis before undertaking treatment, it seems superfluous to insist upon the necessity of a physical examination in cases of rectal disease. The symptomatology alone may be of great value in the diagnosis of rectal disease, but it is almost never sufficient in itself for a diagnosis. There is a train of symptoms common to almost all diseases of this part, and which infallibly point to trouble of some kind, but they do not tell what that trouble is. For this reason the practitioner who attempts to treat a case of supposed disease of the rectum without first making a direct examination, uselessly risks his reputation as a diagnostician; and in my own practice I am guided by the simple rule that patients, male or female, who have not yet come to the point which makes them willing to submit to an examination, have not yet reached a point which admits of treatment. An examination, especially in women, is sometimes, though not often, difficult to obtain, and the dread of it keeps many sufferers from seeking relief; but still the rule I have laid down is the only safe one, and the surgeon who allows himself to be persuaded into "recommending something for piles" will sooner or later have a mistake in diagnosis laid to his charge, nor will the fact that he was moved by consideration for the patient's sensibilities save him from blame.

I generally find that, to one unaccustomed to the examination of patients suffering with disease of the rectum or pelvis, the diagnosis is surrounded by many imaginary difficulties. The same idea is well fixed in the minds of patients who, under the false impression that an examination and diagnosis necessarily mean a painful use of instruments, will defer treatment until disease has made irreparable progress. The surprise of such patients when a diagnosis is made by mere sight of the anus, or at most by a painless digital examination, is only equalled by that of the young practitioner when he is

told that only in exceptional cases is it necessary to use any speculum whatever.

The secret of successful diagnosis of these diseases consists in taking nothing for granted. Every affection of the lower ten inches of the bowel can be either seen or felt, if the practitioner will only take the necessary trouble to go about it in the proper way; and a disease which can be felt or looked at is generally easy of diagnosis. The man who fails to detect the nature of a rectal trouble is generally the one who has either refused to employ the necessary and yet simple methods by which alone a diagnosis can be reached, or else has not sufficient skill and experience to interpret the physical conditions found.

To one in the daily practice of any department of surgery a routine method soon recommends itself as most likely to eliminate errors and lead to a correct conclusion; and the following is the one which has been adopted by myself.

The patient's name, age, condition in life, etc., are first entered in a case book. Next he or she is urged to tell the story of the disease in all its details. By the time the patient has told the story the surgeon should be in the possession of certain information, and if not he must proceed, by a few direct questions, to try and obtain it. What he must know is this: How long has the patient been sick? Is there any pain; if so, of what character, and is it in any way dependent upon the evacuation of the bowels? Is there any protrusion of the bowels at stool; and if so, what is its character, and does it return spontaneously or is it necessary to replace it? Are the bowels regular, or is there diarrhœa, and of what character? Is there any bleeding? In addition it must be discovered whether there has been emaciation, febrile action, and discharge of any sort.

From such a verbal examination much may be gained. In fact, the positive diagnosis can sometimes be made. But, on the other hand, it is astonishing how often the most intelligent patient will utterly mislead the examiner; and, though I have great confidence in this indispensable history as a prelude to physical examination, experience has taught me *never* to trust to it alone, for the simple reason that, although it may convey all the information necessary, the surgeon is never sure that he is not being unwittingly led upon a false track by the most intelligent answers his patient is able to give.

And yet an examination to a lady is not a pleasant thing. It is in fact a thing which will cause her to suffer silently for many years

rather than submit to it. It is only when suffering has forced her to it that she will submit; but that point has always been reached when she consents to consult a surgeon or a specialist for treatment. Then she expects to be examined (in fact, has very little respect for the surgeon if he does not examine), and it remains for him to make the unavoidable examination in the way least offensive to his patient.

For an ordinary examination of a lady a trained female attendant should be in waiting. After the history has been taken and the physician has in a measure gained the confidence of his patient, she is handed over to the nurse, who arranges the patient on the table, covers her with a sheet, and, when all is ready, signs to the doctor. His work may be done at a single glance, or may require careful investigation and examination with finger or instruments; but when it is done the patient is again given over to the nurse, and when she is once more herself the diagnosis is made, and the question of treatment may for the first time be entered upon.

I do not know that it is necessary to dilate upon this point any further, except to say that in women the whole pelvis should always be thoroughly interrogated. I could fill a large volume with the histories of cases of women suffering from some palpable disease of the uterus or adnexa who have applied to me for supposed rectal trouble. In fact, if there is any disease in any pelvic organ in the male or female which may not cause symptoms referred to the rectum, I fail at the moment to recall it. In men the bladder and prostate may need careful examination. In women the pelvic organs can be most satisfactorily examined through the rectum. The man who is equal to this kind of work may fairly be considered a surgeon. To attempt to practise as a specialist in diseases of the rectum without the years of training implied by such work is to embark without compass, rudder, or chart.

For a rectal examination alone in male or female, the left lateral position is the best, and the correct Sims position is not necessary. Either natural or artificial light may be used. For many cases there is little choice between the two, but for illumination within the rectal pouch artificial light has the advantage, and electric light reflected from a forehead mirror will be the most satisfactory.

A simple inspection of the anus and adjacent skin and mucous membrane is often sufficient for a diagnosis, though it should never be trusted to alone. External hemorrhoids, and internal ones when brought down by the use of the closet or enema, external fistulæ,

ulceration, skin diseases, many venereal affections, pin-worms, abscess, and fissure, may all be recognized in this way. A glance at the anus, too, may indicate to the practised eye the existence of serious disease within the rectum proper, for a discharge may flow from it which marks ulceration above, and it may be relaxed and patulous from overdistention or partial destruction of the sphincter.

By using gentle force in pulling the anus open with the fingers, the mucous membrane may be everted to a considerable degree,

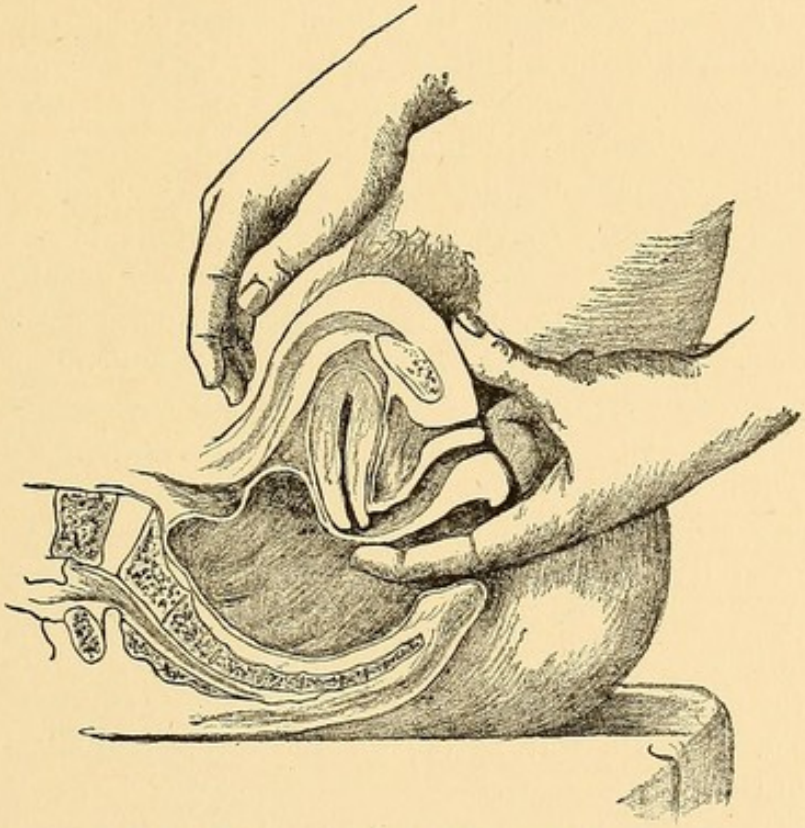


Fig. 13.—Bimanual Pelvic Examination per Rectum.

especially if the patient can be brought to assist by an effort at bearing down. In this way a fissure may almost always be brought into view without the use of a speculum of any sort, and a good view of the radiating folds and lacunæ may be obtained.

It may or may not be necessary to give an enema to any particular patient, but it should always be at hand if the diagnosis is not clear without it. There are three classes of cases in which it is indispensable—those in which a protrusion is caused at stool which cannot be produced at will with the patient on the table; those in which the rectum is so filled with fæces that no examination is of

any value; and those in which it is desirable to make a visual examination very high up or to pass the rectal sound.

Suppose that the enema has been given, the patient is in position and there is no protrusion, no opening of a fistula, no fissure just within the anus, and no capillary hemorrhoid. In fact, no disease is manifest.

The next step is the digital examination of the rectum. With the patient on the left side, the right index finger should be used to examine the posterior wall, and the left for the anterior wall, so that the whole rectum may be felt by the palmar surface of the finger.

The condition of the sphincter muscle is first to be noted. Its resistance should be overcome by a slow and steady pressure with the ball of the finger, and not by a sudden exertion of force, for such an attack is always met by increased contraction. The force of the muscle will be found to vary greatly in different people. In the aged or debilitated it is lax; in the strong and healthy it is the opposite, and the finger can scarcely be passed through it without pain and sometimes a slight laceration of the tender mucous membrane. When inclined to spasmodic contraction, as it sometimes is in persons of nervous tendency, a satisfactory examination may be impossible without the use of ether, on account of the pain.

Unless an obstruction is encountered, the finger may be carried up the bowel its full length, and pressed as far as possible beyond this point. Additional distance may be gained by passing the three remaining fingers backward along the inter-gluteal groove, instead of closing them in the palm as is generally done, and pressing the knuckles against the soft parts; for the knuckles prevent the full passage of the index finger.

In this way three and a half or four inches of the rectum may be carefully explored, together with the prostate, the neck of the bladder, the uterus, the anterior surface of the coccyx and lower part of the sacrum, the ovaries, broad ligaments, and tubes, the vesiculæ seminales, and vasa deferentia. In other words, all that part of the bowel which is most subject to disease is brought within reach. But after this is done the examiner may be no wiser than before, and to appreciate fully the condition of the rectum by the sense of touch alone requires a facility of exploration which most practitioners never attain. In the majority of cases a digital examination will be made to discover whether or not the patient is suffering from internal hemorrhoids; and in the majority of cases also the examiner will be

no wiser on this point after than before, for a soft internal hemorrhoid is a difficult thing to detect by the finger alone, being readily mistaken for the natural mucous membrane of the part, especially when the latter is abundant and gathered into folds, as it is apt to be.

Ulceration is another condition which it is sometimes difficult to

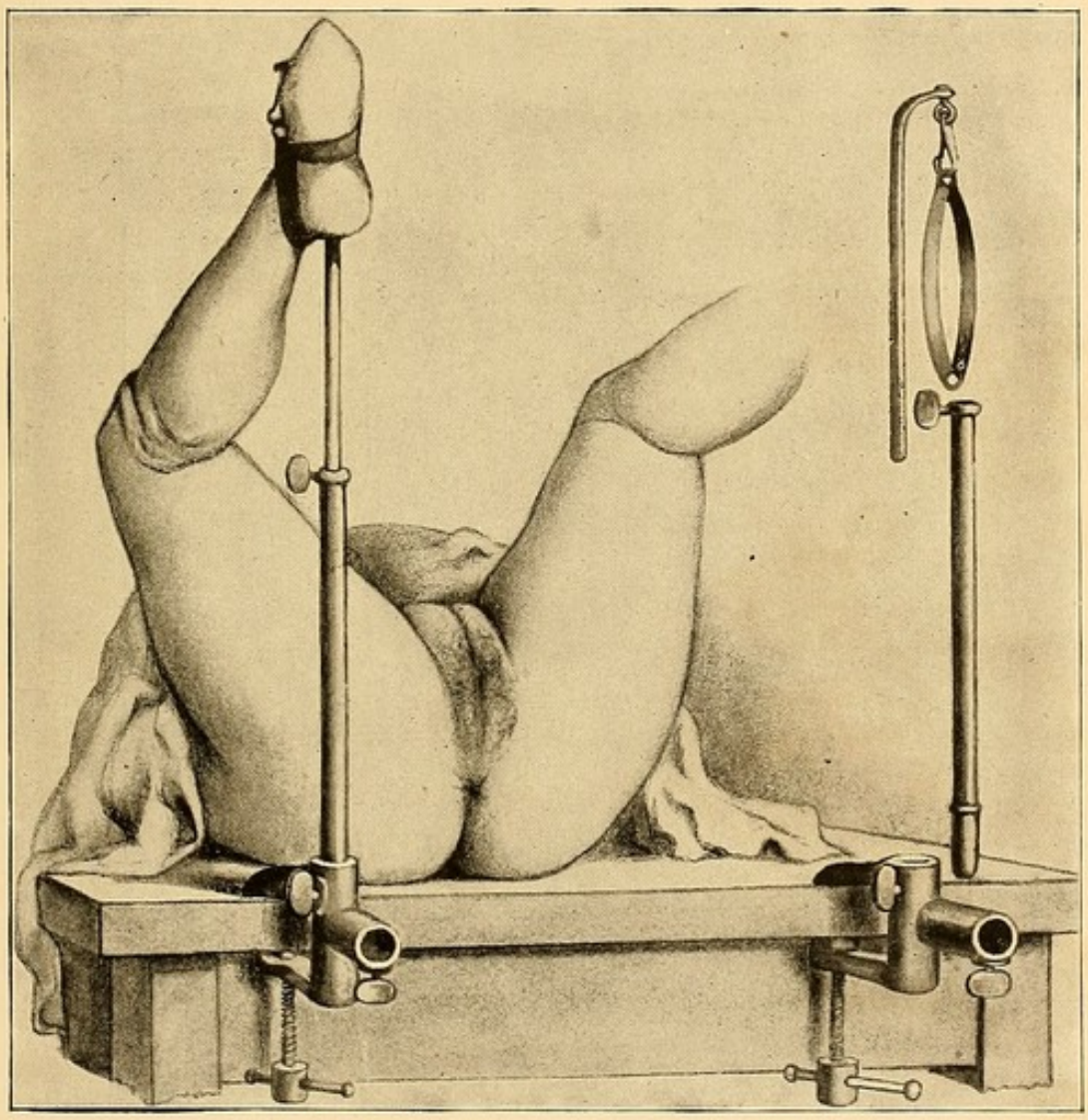


FIG. 14.—Leg Supporters Attached to Table.

detect, especially when superficial and not attended by much induration; and so is the opening of a blind internal fistula; and yet, so well educated may the finger become that other methods of examination may be almost completely discarded. To carry diagnosis to this point it is first necessary, by oft-repeated examinations, to become perfectly familiar with the feel of the normal bowel. After this

knowledge has been gained, a gentle sweeping of the ball of the finger over the whole inner surface of the lower three inches of the rectum will detect any change in it, however slight.

A stricture of small calibre cannot easily be mistaken, though one which admits the finger without constricting it may easily be over-

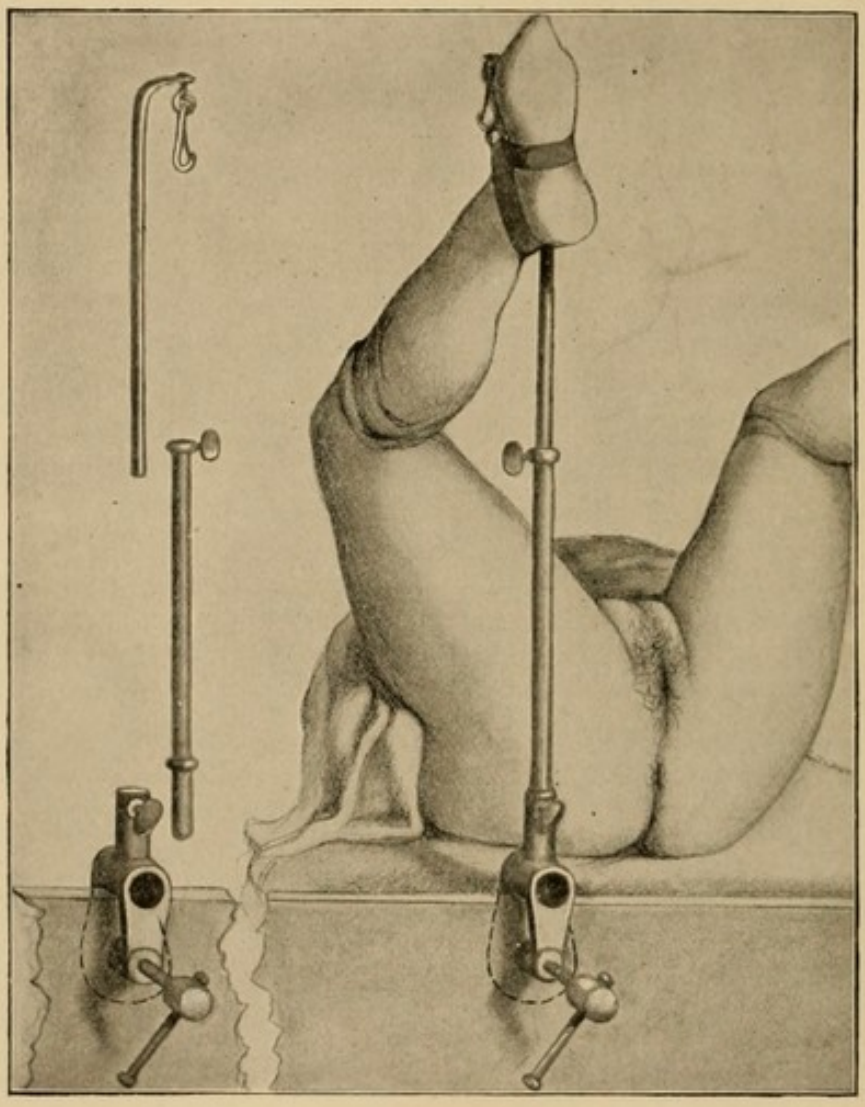


Fig. 15.—Leg Supporters Attached to Bed.

looked. A stricture small enough to engage the end of the index finger firmly, marks the limit of safe digital examination, and the finger should not be forced through it for the sake of feeling what is above, for an attempt to do this may be followed by fetal rupture.

The next step in the examination of women, should the diagnosis still be obscure, is bimanual exploration of the pelvis by means of

one finger in the rectum. For this I cannot too strongly recommend the upright supports of Edebohls shown in the cut. By their use the abdominal muscles are as much relaxed as it is possible to get them without the use of an anæsthetic, and the patient is in the most favorable position for examination. Figs. 14 and 15.

Should even this be unsuccessful the examiner still may have recourse to an anæsthetic, and for this the patient should be in the same position.

For examination by the sense of touch above the reach of the finger, recourse may be had to bougies. Of these there are two



FIG. 16.—Soft Bougie.

forms which are of value. One is the red, soft-rubber instrument with tapering and slightly bulbous point, shown in Fig. 16. This is made in twelve sizes, and for diagnosis a No. 7 is about the best. They are perforated to allow of the injection of water through them.

Another useful form of instrument is shown in Fig. 17. It is a sound for which the profession is indebted to Dr. Andrews, and

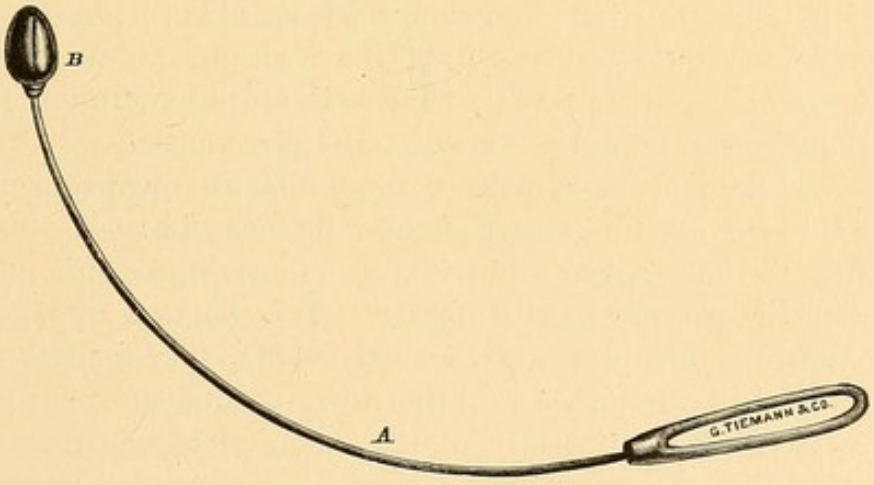


FIG. 17.—Andrews' Sound

which, after many trials, I have found better adapted for diagnosis than any of the instruments with flexible shanks. It is based on the principle that the rectum can be sounded by an inflexible instrument of proper curve, exactly as the urethra can be with Van Buren's sound, and it is used in the same way. It is a more difficult instrument to pass than the urethral sound, and is not to be recommended

to beginners; but with care, gentleness, and skill it is most satisfactory. It is of hard metal and fitted with tips of various sizes. It is fourteen inches long; but it does not explore the same number of inches of gut, for the reason that when the tip reaches the movable part of the sigmoid flexure, eight or ten inches from the anus, it no longer slides along the bowel, but carries the bowel along with it till the tip can be seen to impinge against the abdominal wall generally a little to the right of the umbilicus. For examination of the upper rectum and lower sigmoid flexure, however, it is much better in my hands than any similar instrument with a flexible handle supposed to follow the natural curves of the canal. Dr. Andrews' model is all metal, but for lightness I have substituted hard-rubber bulbs.

The old-fashioned red, hard-rubber bougie is unnecessarily stiff and dangerous, and should be discarded, having no advantages over the softer ones either for the purpose of diagnosis or for that of treatment. The better fitted a bougie is for allowing the use of force the more dangerous it is.

These instruments are all used for the same purpose—that of feeling for a stricture located above the reach of the finger; and with any of them the unpractised hand will generally detect an obstruction in the perfectly healthy bowel at about four inches from the anus. I have had patients in whom I have never been able to pass any sort of a bougie without first injecting the rectum, no matter what manœuvring I resorted to; and I have seldom told a student to pass a rectal bougie that he did not at once discover a stricture. To pass a bougie into the rectum is rather a more difficult operation than to pass one into the urethra, the triangular ligament in the latter being replaced by the curves, the folds of mucous membrane, and the promontory of the sacrum in the former. Independent of Houston's valves of mucous membrane, it is not improbable that a slight degree of invagination of the upper into the lower part of the rectum may often be produced by pressure of the end of a bougie from below upward, and into the sulcus thus formed the point of the bougie may easily pass. For the sake of overcoming these folds of membrane, the most minute directions have been given as to how the bougie should be introduced and gently urged along each successive inch of the bowel by changing its direction and manipulating the handle. But such rules are of little value, for the simple reason that the obstruction is seldom of the same kind or in the same place in two different persons. The instrument should be passed gently, for force

is never allowable here more than in the similar operation on the urethra; and when an obstruction is met with, the handle should be gently rotated, withdrawn, and again passed onward till by frequent repetitions of this manœuvre it is made to pass.

Before attempting to pass any form of bougie the upper bowel should be gently distended with as much warm water as can easily be retained. By this simple manœuvre the normally closed canal is changed into a smooth cylinder, the obstructing folds of mucous membrane are removed, and the only obstacle remaining is the promontory of the sacrum.

For the purposes of exact clinical study and report, a scale such as is shown in the cut (Fig. 18) should always be at hand for measuring rectal bougies.

I have been using for some time a set of bougies exactly similar in make to the soft-rubber ones, but six instead of twelve inches in



FIG. 18.—Scale of Bougies.

length. They are not adapted for diagnosis, but for the patient's own use when prolonged dilatation is necessary, and I only speak of them in this connection to avoid confusion.

In case disease actually exists high up in the bowel, the attempt to pass an instrument is full of danger. A patient may easily recover from a false passage made in the urethra, but such will seldom be the case with the rectum, for here when the instrument leaves the bowel it enters the peritoneum. To understand this danger it is only necessary to remember that the bowel is generally ulcerated both above and below the seat of a constriction, and is sometimes weakened to such an extent that it will allow a bougie to pass through it without the use of any appreciable force on the part of the surgeon. The bowel may also be lacerated without being directly perforated by the bougie, for the stricture may be pushed upward or dragged downward on the point of the instrument till the bowel gives way.

Supposing, now, that a rectal bougie cannot be passed eight or

ten inches up the bowel, is it safe on this account alone to make a diagnosis of stricture high up? I should hesitate long before doing so, and should make many careful attempts to pass the instrument at different times, carefully exploring through the abdominal wall for induration, and watching for the usual signs of obstruction. There are one or two points worthy of remembrance in this connection. The first is that the obstruction due to a stricture will always be at the same point in the canal; and another is that when a bougie has once become engaged in a stricture it is firmly grasped, and the resistance to its withdrawal is equal to that encountered in introducing it farther. The feeling conveyed to the hand under these circumstances is diagnostic, and is like that which is felt when the effort is made to withdraw a sound from the grasp of a stricture in the urethra.

And yet the value of this means of exploration is very great, and although a bougie may pass a stricture without detecting it, successive failures to get an instrument through into the sigmoid flexure would, in my own practice, lead me to diagnosticate an obstruction.

Let us suppose once again, that all this has been done and yet the examiner has discovered no disease. At this point he must take a decided responsibility, for if, from the patient's history, he believes that disease actually exists, he must still go on and find it; but if he has no reason to believe this, he may abandon the search at this point and commit himself to the opinion that there is no physical lesion.

If he decides to go still farther, there is but one line of investigation to be followed, and this consists in the administration of ether, and possibly the dilatation of the sphincter, and the use of the speculum. Should these fail, nothing remains but an exploratory laparotomy.

It will be noticed that up to this time the question, "What speculum do you use? has not been answered, and for the reason that up to this point in the examination I use no speculum; and as the vast majority of examinations will lead to a diagnosis before this point is reached, it follows that in about ninety per cent. of all cases I use no speculum at all.

An entirely too exalted idea of the value of the speculum exists. For ordinary examinations it is unnecessary, and the diseases which cannot be detected by the routine practice already described will not very often be detected by the simple use of any variety of this in-

strument. So strongly has this experience been impressed upon me that I have abandoned the use of every form of speculum *for ordinary diagnostic purposes*, unless at the same time its auxiliary means can be employed—the administration of ether. With ether, a light, and a speculum, a diagnosis may often be made which would

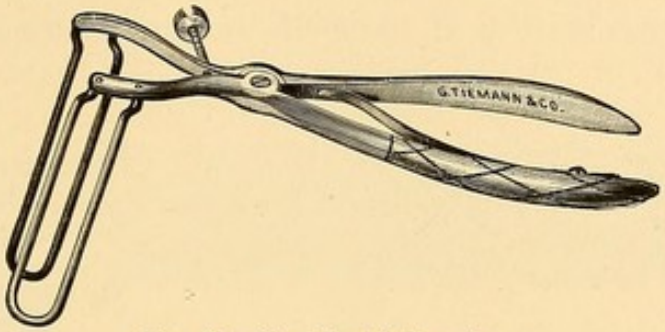


FIG. 19.—Sims' Rectal Speculum.

otherwise be impossible ; but to use a speculum without ether, for the purpose of exploring the rectal pouch, is merely, in the vast majority of cases, to inflict useless suffering.

This does not apply to the question of treatment, but simply to diagnosis. For there exists a certain class of diseases, notably ulcers, which, when their situation is accurately known, can be

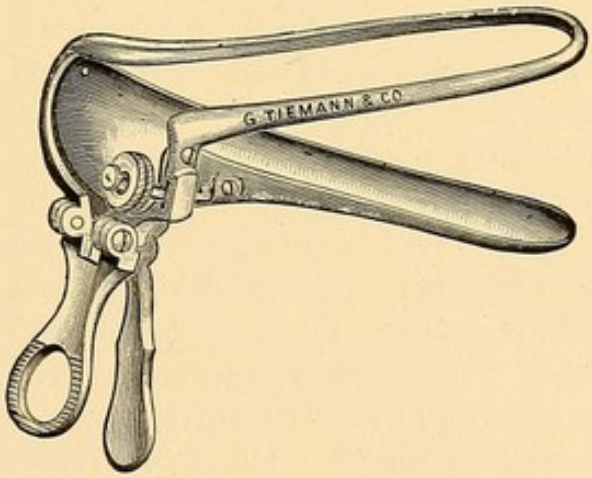


FIG. 20.—Author's Speculum.

brought into the field of vision by a speculum and thus treated by direct applications ; but this is a very different matter from taking a patient who complains, perhaps, of but the single symptom of rectal pain, introducing some variety of speculum by which only the most imperfect view can be obtained, and, because nothing is discovered

(as in the vast majority of cases nothing will be), pronouncing the patient free from disease.

Should a speculum seem necessary there is an infinite number to choose from. The best of all when ether is used is the one shown in Fig. 19. For the purpose of local applications without ether, and after a diagnosis has been made, I use either the one shown in Fig. 20, or the Aloe instrument (Fig. 21), made fully an inch longer than the

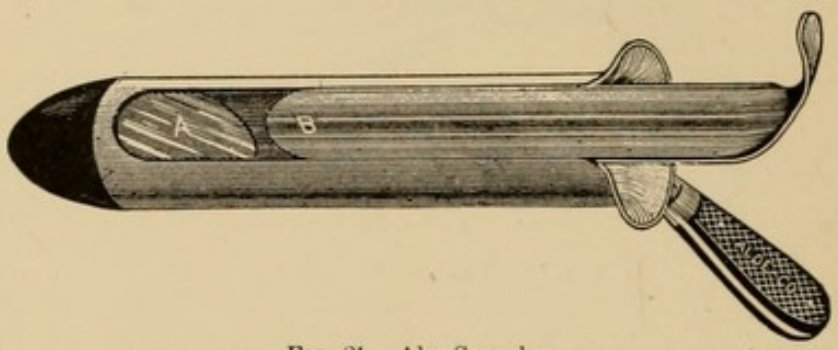


FIG. 21.—Aloe Speculum.

original. A medium-sized blade of Sims' vaginal speculum answers every purpose, though Van Buren's modification has a great advantage, the notch allowing a very much larger surface of the bowel to come into view.

By the use of the very long straight cylindrical specula shown in Figs. 22 and 23 and a forehead mirror, it is unquestionably possible, with a patient as shown in Fig. 24, to see much farther into the rectum and sigmoid flexure than has usually been supposed.

For the knowledge of this fact we are indebted to Kelly, and I do not hesitate to acknowledge its great value. By these instruments I have not only diagnosticated the exact seat of a circumscribed ulceration and polypoid growths very high in the rectum, but have cured the same by local applications and removal in cases certainly otherwise incurable except possibly by colostomy. The great objection to Kelly's instrument is, however, the small extent of rectum brought into the field of vision at any one time. I have had much more satisfaction with an Aloe speculum of equal length made for this express purpose.

The stretching of the sphincter is in itself an almost entirely harmless proceeding, but one which necessitates the previous administration of ether. It should not, however, be done, as was at one time the usual method, and as it is often done at present, by introducing the thumbs back to back, and forcibly and suddenly separat-

ing them till they touch the tuberosities on each side. A better way is to introduce first one finger, then two, and finally four in the form of a funnel, and gradually bore into the anus; or to introduce two fingers and make pressure on all sides of the opening till it becomes patulous. Instead of one or two seconds, this procedure should occupy five minutes, and should be done so gently as not to lacerate the mucous membrane. The dilatation should also be made to include the internal as well as the external muscle. If this dilatation be carried to a sufficient extent, the firm, cord-like feel of the external sphincter may be made to completely disappear. The paralysis induced in this way is always temporary, and I have never known it

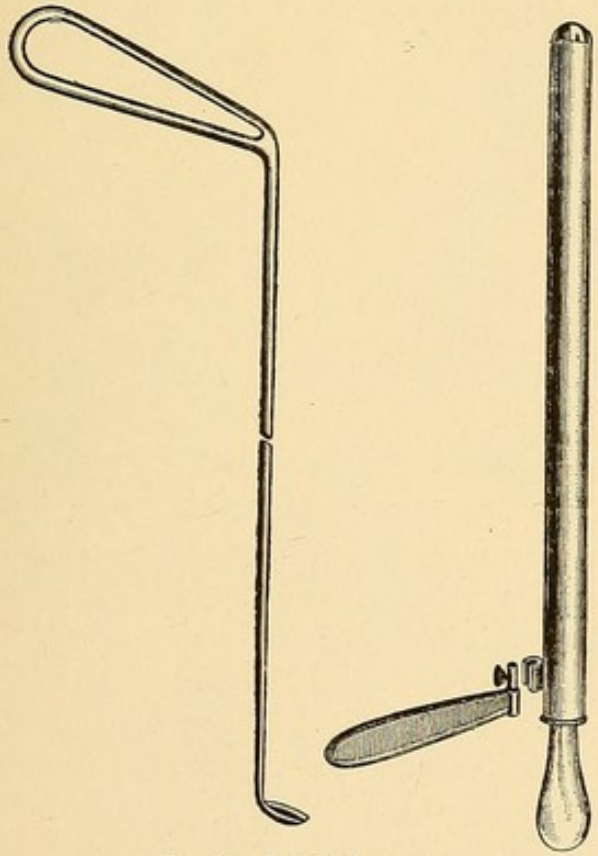


FIG. 22.—Kelly's Speculum.

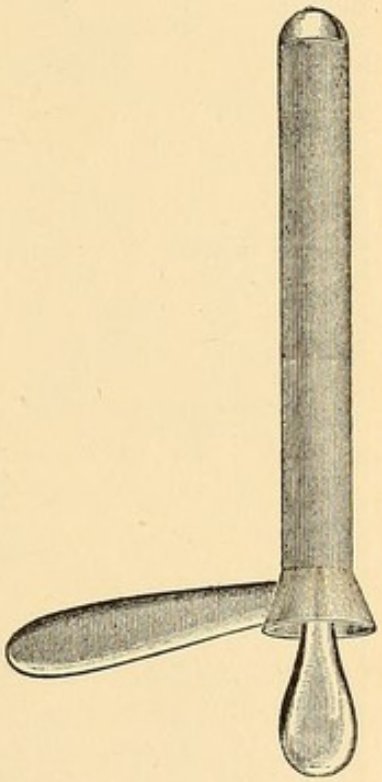


FIG. 23.—Kelly's Speculum.

to be followed even by a temporary incontinence of fæces. After coming out of the ether the patients are usually conscious of only a sense of soreness in the part, but are never incapacitated for their usual duties. This stretching of the sphincters is a necessary preliminary in almost all operations within the rectum.

From what has been said it may readily be seen that the diagnosis of stricture above the reach of touch or vision is a difficult matter.

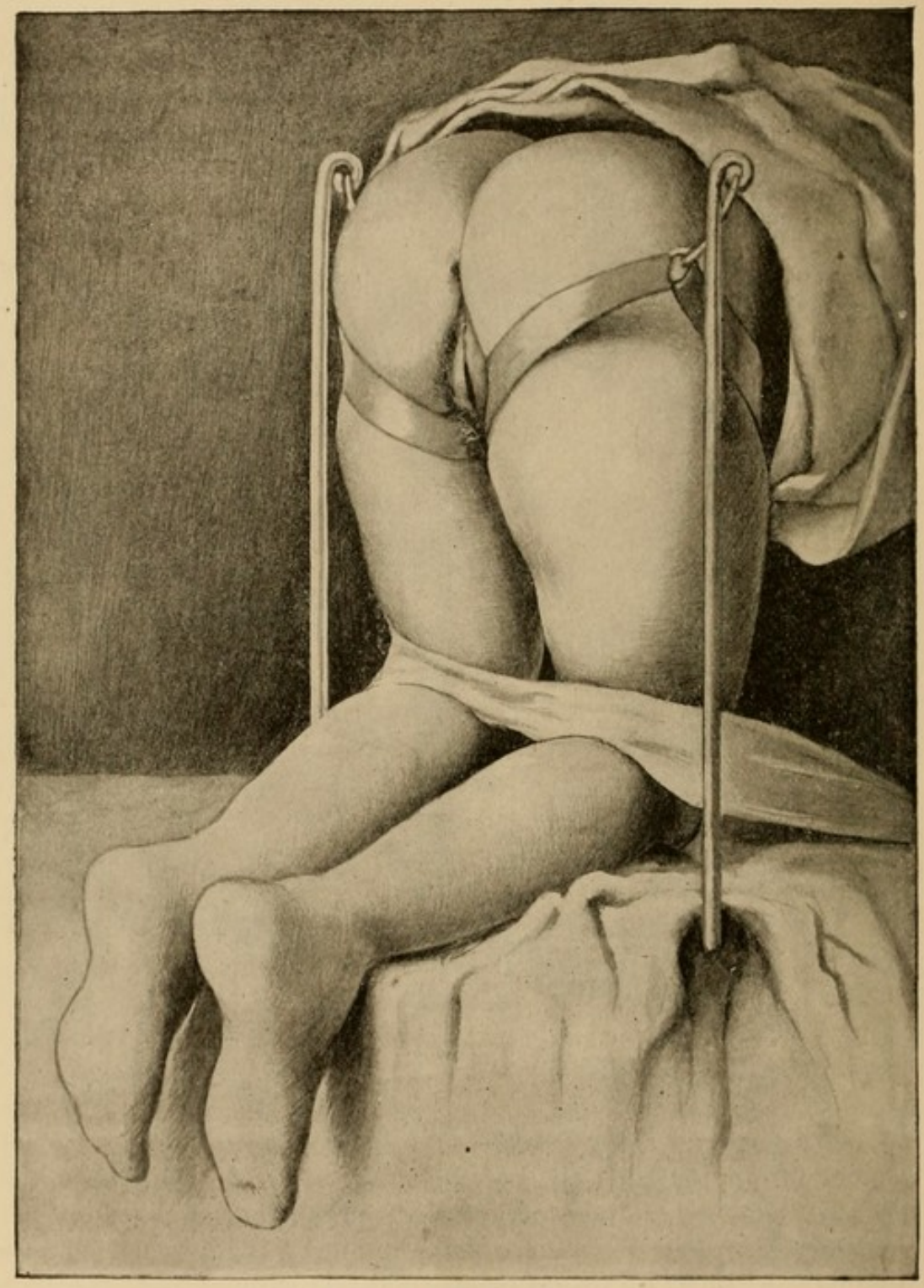


FIG. 24.—Position for High Rectal Exploration.

In reality strictures above the rectal pouch are rare; and when they exist they are usually malignant, for this part of the bowel is free from many of the influences which, by exciting ulcerative action, result in the cicatricial contractions which so often affect the lower three inches of the rectum.

After the use of the bougie, which is at best an uncertain means of diagnosis for this condition, and after a study of the symptomatology and a careful examination through the abdominal wall, there is but one means left for diagnosis, and that consists in exploratory laparotomy. Examination by introducing the whole hand into the

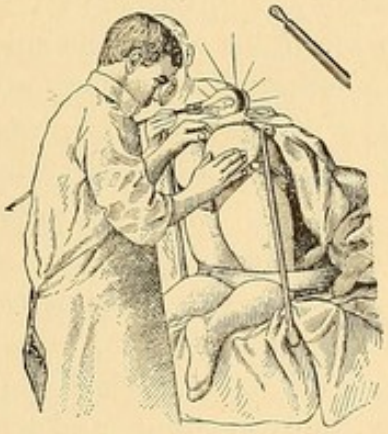


FIG. 25.—High Exploration.

rectum is so much more dangerous than laparotomy that its future employment may be abandoned.

I can add nothing more to what has already been said on this point, except that the man who has foolishly allowed himself to be beguiled into prescribing some salve for a cancer, when he thinks he is treating hemorrhoids, because his patient objects to an examination, need not feel hurt when he finds himself placed in a ridiculous light by some better man than himself who has made his diagnosis before beginning treatment. All his tender regards for the foolish susceptibilities of his nervous lady patient will bring him no mercy in her judgment. She is willing to admit that she may have been foolish, but she will make no allowance for the foolishness of her physician, and in fact he deserves none.

There are but three ways of making a diagnosis—by question, by sight, by touch. The man who has exhausted these will seldom fail, and, should he do so, need not be ashamed. The man who neglects any one of them will sooner or later make some error which he might easily have avoided.

CHAPTER III.

GENERAL RULES REGARDING OPERATIONS.

In no branch of surgery is antisepsis so difficult to establish and asepsis so difficult to maintain as in the surgery of the alimentary canal. The mucous membrane is exceedingly difficult to clean, the colon bacillus is always present, and is probably the most common cause of suppuration and peritonitis, after operations upon it; and in addition we have all the other micro-organisms which are to be avoided in any branch of surgery.

It is quite true that in two or three of the minor operations on the rectum, such as piles and fistula, even if no effort is made to avoid suppuration, and we do not seek for union by first intention, our patients recover without accident and without detriment except loss of time. In these operations ordinary cleanliness as to hands and instruments, and the avoidance of any direct introduction of septic matter seem all sufficient to avoid grave complications. But here the list ends absolutely, and as we enter the more serious work of intestinal and abdominal surgery absolute asepsis becomes simply a matter of life or death to the patient.

The operator who pays no attention to asepsis in a minor operation will find it very difficult to practise it in a major one; for technique in surgery becomes second nature, and only constant study and attention will render it perfect. Whereas the surgeon whose hands and instruments are always sterile before touching his patient, will be as clean in a hemorrhoid case as in a laparotomy, although the after-dressings and management of the wound may be totally different.

Laying aside all theories, the best practical rule for an operator to be governed by is that not only he, but his patient, and everything that comes in contact with himself, or his patient, or the wound, directly or indirectly, is septic until rendered aseptic by artificial means. These means are either the use of chemicals, as bichloride of

mercury, mechanical scrubbing and washing with strong soaps, or the application of steam or dry heat. Because of the labor and care necessary to insure perfect asepsis most men at present prefer to do their operating in hospital operating-rooms, where all the facilities are at hand, and with a corps of trained assistants especially educated in this work. There is no detail of antisepsis, however, which cannot be perfectly carried out in any private house with sufficient care and trouble. Most of my own major surgery is done in the perfectly appointed operating-theatre of the New York Post-Graduate Hospital, but by no means all of it; and when once the theory of cleanliness has been thoroughly grasped any practitioner will be able to do an abdominal section, should emergency demand it, with as faultless a technique as in the best appointed hospital, if he understands what asepsis implies, and is willing to devote the necessary time and trouble to securing it.

Preparing the Patient.—The patient is best sterilized by first taking a general bath in hot water with green soap a few hours before the operation. This is the only part that should be left to the management of any nurse. The field of operation should always be attended to by the surgeon at the time of operation if he wishes to be sure of his results. By this rule all the annoying preparations for operation to which the patient is subjected for days before the event, and which have a depressing mental effect; such as packing the vagina several times with iodoform gauze; scrubbing the abdomen and poulticing the site of the incision with soap, are avoided. When the patient, in a clean night-gown, after the bath, is under ether upon the operating-table, all final preparations may be made in a few moments under the eye of the operator.

The Surgeon and Assistants.—The surgeon and all assistants who are to handle instruments or sponges—in other words all who come in immediate contact with anything which may touch the wound or adjacent parts—should submit to the following preparations.

The hands and arms up to the elbows should be scrubbed for five minutes with green soap, hot water, and a nail-brush which has been recently boiled and is kept in a solution of bichloride 1 to 1,000. Special attention should be given to the nails, and after the scrubbing they should be carefully cleaned with knife or nail-cleaner which is also sterile and kept for that purpose. Rings should be removed and nails pared moderately short. The best nail-cleaner is a sharpened stick of olive wood.

Nurses who are to assist around the operating-table in handling sponges, the cautery, etc., will usually be safe if after this scrubbing of the hands and arms they are completely covered with a white gown, buttoned behind, which conceals all of their other clothing and which has been freshly rendered sterile by being thoroughly steamed for half an hour. The hands and arms should finally be soaked for five minutes in bichloride 1 to 1,000, and the nurses may be considered fit for their work.

Even the operator and the assistant who is to handle instruments will do fairly well with this preparation, but more is desirable where the facilities permit. After the preliminary scrubbing already described, the surgeons should remove their clothing down to their underclothes and put on white duck or heavy linen trousers and jackets, the sleeves of which reach only to the middle of the arm and leave the elbow bare. A second scrubbing with soap and cleaning of the nails is then absolutely necessary, and a final immersion of hands and forearms in bichloride 1 to 1,000, for five minutes.

Instead of bichloride solution for the hands many prefer a wash of permanganate of potash (hot, saturated solution) to be removed with a hot saturated solution of oxalic acid, which in its turn should be washed off with hot water. This may easily be done in hospital, but in private the bichloride is easier, and I believe it to be equally efficient. At least I have found it so.

The most frequent errors in technique come from touching things which have not been sterilized after all these preparations have been made. In the excitement of the operation, or from ignorance or carelessness, a bottle is grasped which though it may hold sterilized catgut is not itself sterile outside; or gauze is wanted from a glass jar the outside of which is not sterile, and the person who has handled the jar is no longer clean, and should leave the operating field, and again scrub his hands. A special assistant should always be at hand for just such calls as this. He or she is not supposed to be sterilized or to come into contact with anything touching the wound, and it is his or her particular work to uncork bottles, change basins, handle pitchers of hot water, raise or lower the operating-table, etc., but never to touch anything which is to come in contact with the field of operation.

Instruments.—All these except knives are best sterilized by boiling in a one per cent. solution of washing-soda fifteen minutes before each operation. If this is done in a large, shallow, porcelain-lined

dish, which is covered by another of the same size, the two dishes may be placed directly on the instrument table, from the gas-burner or stove upon which they have been boiled, without changing them. When the dish forming the cover is taken off and turned down, two perfectly sterile dishes are at hand. A third, preferably of glass, which has been previously placed in boiling water, to hold needles and sutures, will usually suffice for any operation.

If the knives be subjected to this boiling, the edge will quickly be taken off. A better plan is to immerse first the handle, and then the blade in pure carbolic acid, wash off the acid with sterilized water, and lay the knife on the instrument-table ready for use.

Ligatures and Sutures.—Catgut, silk-worm gut, silk, horse-hair, and kangaroo tendon for ligatures or sutures can now be bought in convenient form, and reliably prepared from almost any surgical instrument maker and many druggists. Kangaroo tendon is used almost exclusively for hernia operations. Silk-worm gut may be purchased in bundles, and sterilized by boiling with the instruments at the time of operation. The same applies to silk, which should be wound on glass spools, and may be either kept sterile in a jar till needed, or freshly boiled with the instruments at the time of operation. Catgut may be bought already prepared, though for a surgeon with large practice it is much cheaper to buy it in large quantities and prepare it himself. Much elaborate preparation has been indulged in to render catgut sterile. My own plan is very simple.

From any dealer buy such sizes and quantities of gut as are desired. It is best to select it personally, for numbers of sizes vary so as to be no guide. Buy what is known as "bow-lines," which are cut to the standard length of one metre, coiled, and tied separately. A certain number of these strings, depending on the size, form a bundle which is tied round by a separate piece of gut and sold in that form. The number of bow-lines in a bundle will vary from one dozen to six dozen, depending on the size of the gut. To prepare for use simply drop the whole bundle, still bound together, into a covered jar containing commercial ether. Leave in this any convenient length of time, from two days to weeks, pour off the ether which will have removed the fatty matter and replace it by a solution of alcohol and bichloride 1 to 3,000. After standing in this solution for a few days the gut is fit for use. As the strings are only one metre long, when one has once been removed from the solution during an operation it should never be returned to the bottle. In this way the bottle will

remain sterile indefinitely, although I am in the habit of occasionally changing the solution for security, and the bichloride will after a time weaken the gut.

The tensile strength of catgut and its power of resisting absorption, but especially the latter, may be greatly increased by soaking it for a time in a solution of bichromate of potash. A formula for the solution is bichromate of potash fifteen grains, water one ounce,



FIG. 26.—Sealed before Sterilizing.

alcohol fifteen ounces. The gut, after previous preparation as described, should be left in this for fifteen hours and then placed again in alcohol, or in bichloride alcohol as may be preferred. By care and exactness in the use of the potash gut may be so prepared as to last almost any desired time. It may in fact be rendered almost unabsorbable by excess of chromic acid. In this way very small gut may be made to do the work of that which is much larger; which in fine work is a considerable advantage; and the time which will be required for its absorption may be accurately regulated by that during which it is subjected to the acid.

All of these different materials for sutures and ligatures are put up in a very neat form by George Leavens, Bible House, New York, and for one who is only called upon to operate at comparatively long intervals I know of no more convenient arrangement.

Pieces of gut about three yards long are wound on glass rods and placed in a glass tube containing alcohol. The tube is hermetically

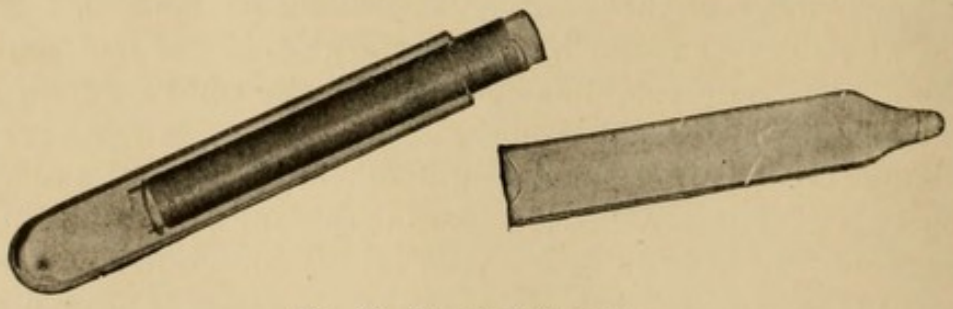


FIG. 27.—Opened at Operation.

sealed, and the contents sterilized by heat (250° F.). Across each tube a scratch is made with a file to facilitate breaking. When a piece of any material is needed the tube is first held in bichloride

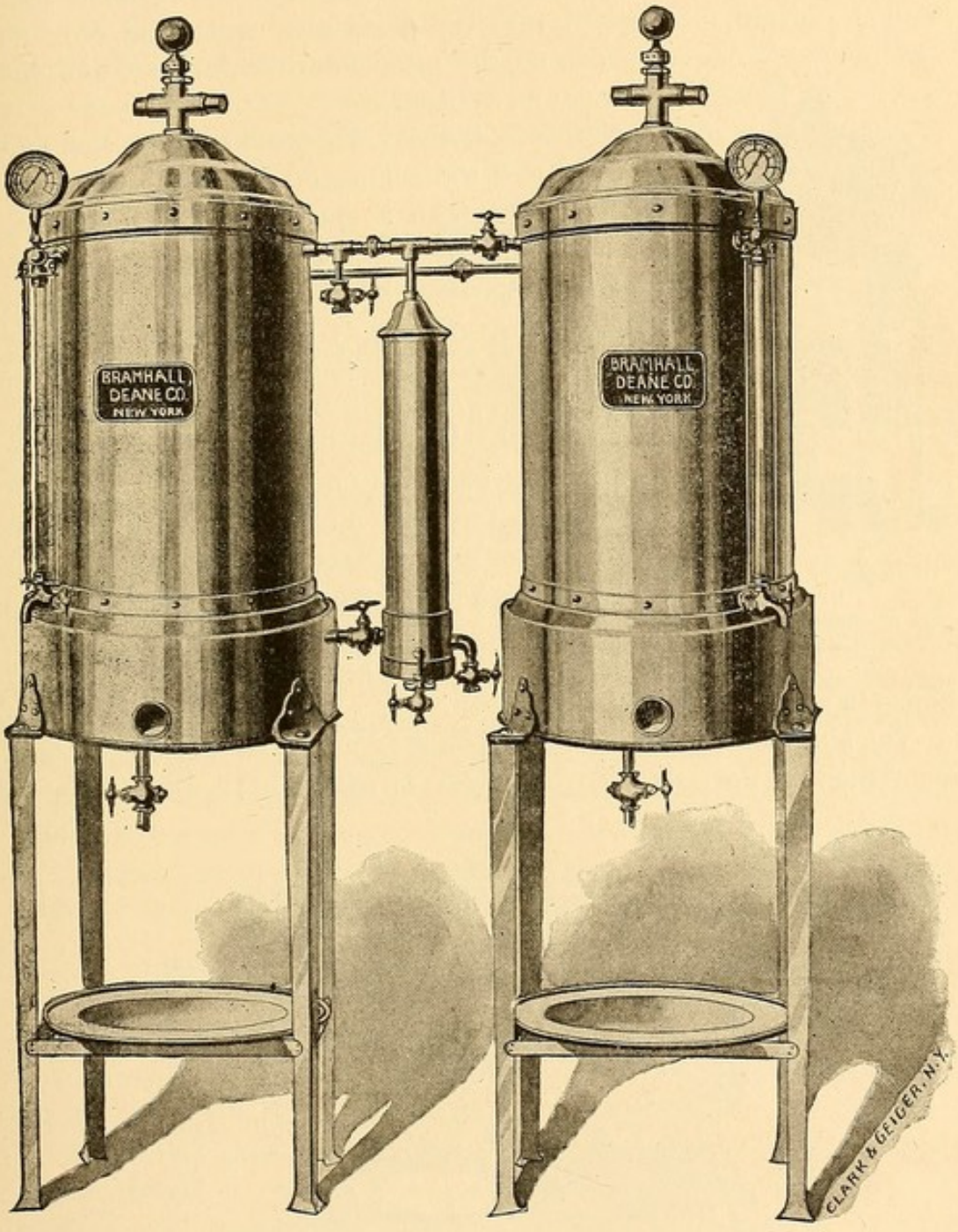


FIG. 28.—Sterilizer for Hot and Cold Water.

solution till the outside is sterile, or it is grasped in the hands covered with a sterilized towel, and by a combined pulling and bending motion the tube is broken where it is scratched. The enclosed rod, with the suture, is dropped into the glass dish containing alcohol, which is on the table for this purpose, and the gut is cut as needed.

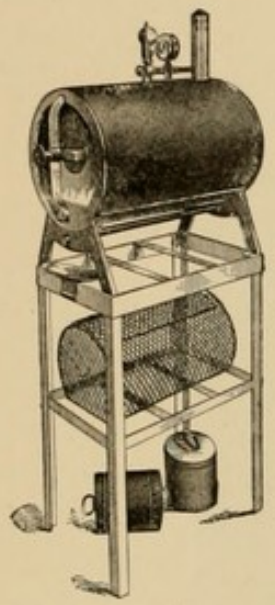


Fig. 29.—Sterilizer for Dressings.

Sterilized Water.—To provide both hot and cold sterilized water hospital operating-rooms are usually fitted with a special steam apparatus, such as is shown in Fig. 28. In private houses, water that has been boiled and is still nearly at boiling point, can easily be brought from the kitchen; and cold distilled water can readily be obtained in five gallon demijohns.

Dressings.—For sterilizing towels, dressings, operating gowns, suits, etc., the apparatus shown in Fig. 29 is especially adapted in hospitals. In private houses a small sterilizer such as is shown in Fig. 30 may be carried to the operation, or everything may be prepared by the operator before leaving his own home, and carried to the house in sterilized towels.

The sterilizer shown in Fig. 30 is one arranged by Dr. Meyer, and answers every purpose. There are several others in the market, more

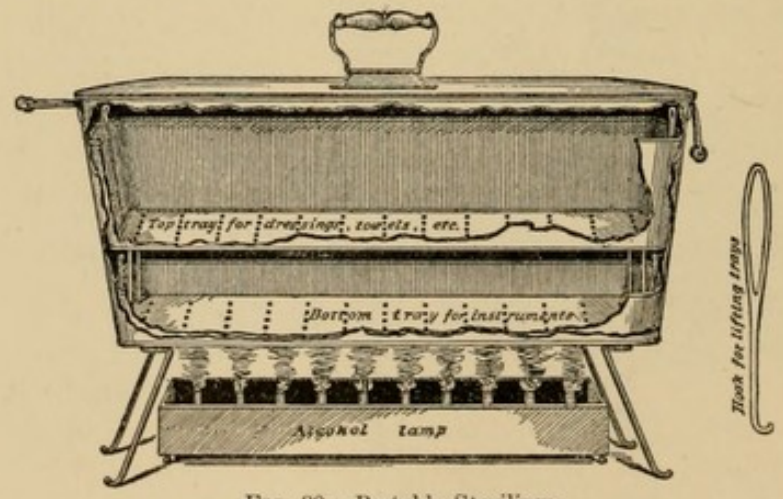


Fig. 30.—Portable Sterilizer.

or less perfect, and each surgeon will, after a time, adopt some routine plan and style of apparatus which will best meet his requirements.

Sponges are best made of pads or balls of absorbent gauze, of various sizes, for vaginal, rectal or abdominal work. The pads should be about half an inch thick and range in size from two inches square up to eight inches, for holding back the intestines in cœliotomies. The balls, which are made by filling a small, square piece of gauze with other pieces and confining the whole with a puckering string, which is cut short, should be about half the size of a billiard-ball.



FIG. 31.—Sponge-holder.

These are chiefly of advantage in the rectum or vagina, and should be held in sponge-holders. An excellent sponge for work in private can be made of simple balls of absorbent cotton, which has been thoroughly sterilized.

The gauze pads can be thoroughly and easily washed, and re-sterilized, by boiling after each operation, and kept in a glass jar in a solution of bichloride 1 to 2,500. Either of the forms of sponge-holders shown in Figs. 31 and 32 will answer perfectly.

The fashion of the hour is to use gauze or absorbent cotton exclusively for dressings, and many of our young house-surgeons are unfamiliar with any other material. Gauze for an occasional operation can be purchased at any supply store, already sterilized and packed in glass or tin boxes. It is of three varieties generally—the plain sterilized, the same impregnated with bichloride, and with iodoform. For general surgery a gauze which has been medicated with balsam of Peru is also much used. Care must be taken not to use bichloride



FIG. 32.—Sponge-holder.

or iodoform gauze to any extent in large wounds to prevent toxic constitutional effects.

Drainage-tubes.—These are best made as wanted at the moment of the operation. In every well-appointed operating-room a jar of gutta-percha tissue in bichloride solution will be found. When a drain is wanted roll a piece of plain gauze to the size and length desired, cover it with a wrapper of this tissue, cut off the ends evenly, cut fenestra in the sides of the gutta-percha to allow of free endosmosis, and the tube is complete. It is much better than glass, and very

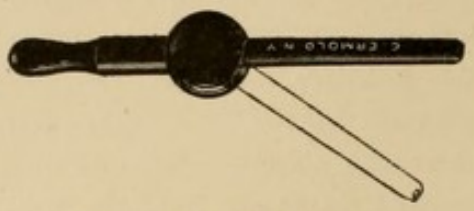


FIG. 33.—Nozzle for Irrigator.

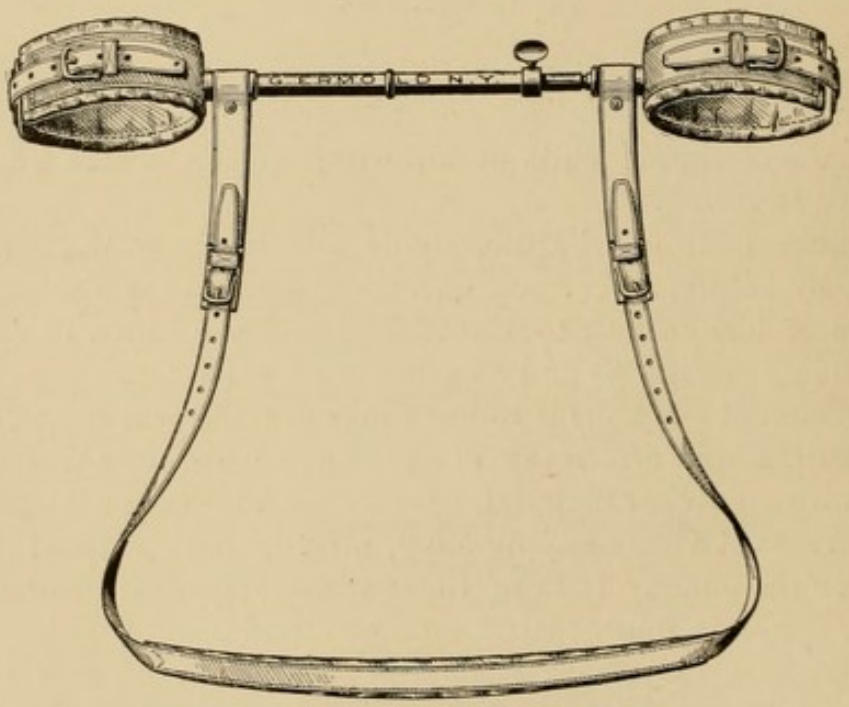


FIG. 34.—Clover's Crutch.

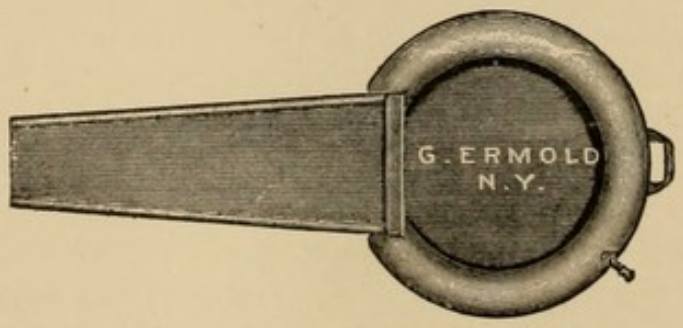


FIG. 35.—Ovariotomy Pad.

much better than a simple roll of gauze without the rubber covering, which in abdominal work becomes so thoroughly agglutinated to the living tissues by means of plastic exudation as to be practically immovable in a few hours without violence and pain.

Irrigation in a private house is usually done with a fountain syringe suspended near the table. The important point is to have the stream readily under control and to have the nozzle and all that end of the tube liable to be touched during the operation sterile. The best nozzle is the hard-rubber one shown in Fig. 33, by which the stream can be turned on or off in a moment. This and a yard of tubing can easily be sterilized with the other instruments and attached to a fountain syringe at the house. Two other essentials for all rectal or gynæcological work in private houses are the Clover's crutch

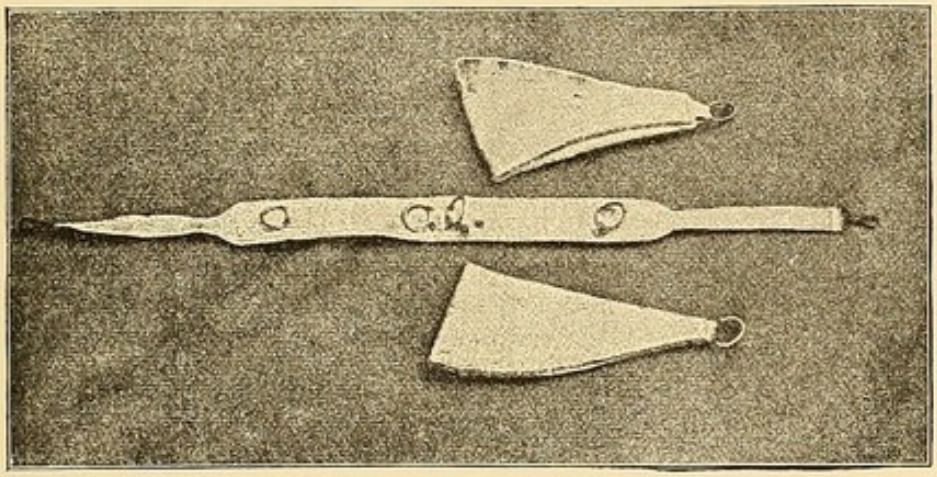


Fig. 36.—Kelly Leg-holder.

(Fig. 34), or some modification of it, and the Kelly ovariotomy pad (Fig. 35).

The Kelly leg-holder is a good one, and avoids the disadvantage of the cross-bar, which is often in the way during the operation (Fig. 36).

Final Preparations.—When the instrument-table has been completely covered with sterilized towels so that no part of the top or edges can be seen; when the instruments have been sterilized and laid in the dishes upon the table with the bottles of sutures and ligatures previously uncorked; when sponges, dressings, and irrigator are ready, the patient previously etherized may be placed upon the operating-table and the parts to be operated upon scrubbed and cleaned.

For working within the rectum the anus should first be gently but thoroughly dilated with the fingers. A Sims speculum (Fig. 17) should then be introduced and the rectum thoroughly irrigated with 1 to 500 bichloride. This will not be found too strong if it is allowed to flow out as fast as introduced. Next, the mucous membrane should be thoroughly wiped off with pledgets of iodoform gauze, and if the operation permits it, a plug of gauze should be passed into the gut above the field of operation to prevent the descent of mucus or fecal matter.

Essentially the same course may be followed in vaginal work, except that the vagina should first be well scrubbed with green soap and a small long-handled brush.

For the skin and parts near the site of the incision I am usually content with a thorough scrubbing first with green soap and brush; with shaving the skin; and with final thorough washing with bichloride 1 to 500; but, if all previous preparation of the parts has been dispensed with, this must be done very thoroughly and under the personal direction of the operator.

If the lithotomy position is decided upon, the feet and legs should be encased in loose linen bags which come up to the thighs; the abdomen and edges of the table covered with sterilized towels pinned together with sterilized safety-pins, and over all it is well to throw a large square sterilized sheet, which has a hole cut in the middle to expose the site of operation (Fig. 37). A similar sheet or heavier canvas cover with an oval opening answers well for abdominal cœliotomies.

From what has been said it will be seen that the essentials of antisepsis, either in private or hospital practice, are boiling water, water which has either been boiled and allowed to cool, or distilled; plenty of towels; and finally an apparatus by which towels, gowns, and dressings can be subjected to steam for half an hour, and instruments boiled in a solution of washing soda for ten or twenty minutes. The rest is a matter of technique depending entirely upon the operator, and no amount of previous preparation will enable a man whose methods are faulty to go through an operation antisepticly.

The Paquelin cautery is an instrument so frequently used in operations about the rectum that a word or two about its care and management may be useful. When properly handled it is perfectly reliable; under other circumstances it becomes a source of constant annoyance. The most frequent cause of failure to work will be found to be the forcing of the vapor of benzine into the tip before the latter

is hot enough to ignite it, and hence the coating of the hollow tip with non-inflammable deposit which renders the instrument useless until it has been burned out over a Bunsen burner. Recently many patterns of this instrument have been put upon the market, and



Fig. 37.—Patient Prepared for Operation.

except for the fact that the tips are made much lighter than when protected by patents, they all seem to work about equally well, and none have any advantage over the original form, in which the benzine is contained in a glass bottle without any absorbent material. The one shown in Fig. 38 has the advantage of dispensing with the alcohol flame or gas-jet necessary to start the instrument in the old patterns.

Hemorrhage from the rectum during an operation must be met in the same way as in any other surgical procedure—by ligature, hot water, or temporary pressure. Hemorrhage coming on after an operation is usually best met in one of two ways. Should it be cutaneous, or come from just within the external sphincter, a compress and T-bandage properly applied will always give sufficient pressure to control it.

The compress should be graduated or cone-shaped, and should be of ample size to fill the fold between the nates. The bandage must be strong and heavy and applied with force. Care must be taken to protect the bony points of the pelvis against which the bandage rests by pads of cotton. When applied in this way a direct pressure of

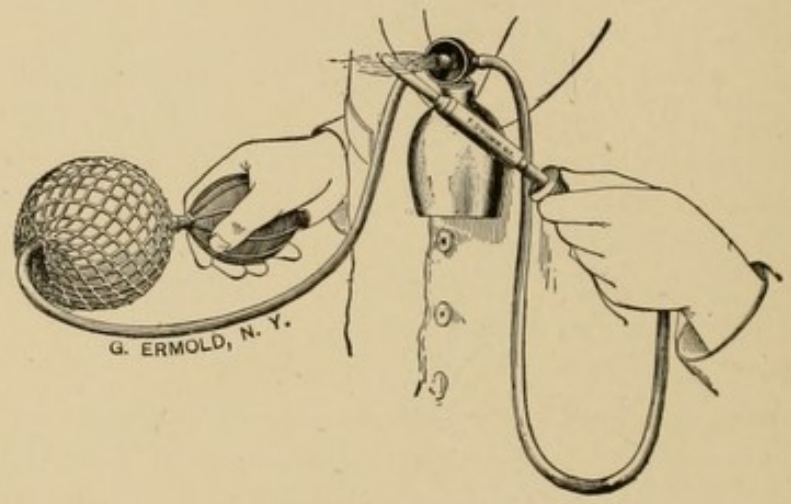


FIG. 38.—Paquelin Cautery.

many pounds may be brought to bear against the anus—a pressure which will always be effective against a superficial hemorrhage.

Where the bleeding comes from the rectal pouch the danger is much greater, and prompt surgical interference may be necessary to save life. This form of bleeding is concealed, and only shows itself first by an uncontrollable desire on the part of the patient to go to stool, and not by any oozing from the anus. The patient sits upon the commode and passes perhaps a pound or more of clotted blood, feels relieved, and returns to bed. In a little while the same thing is repeated and all the usual constitutional effects of hemorrhage begin to be manifest. I have known a patient to die from this cause in the ward of a large hospital because a stupid nurse did not appreciate the necessity for calling surgical aid.

Many directions have been given for dealing with this condition,

all more or less elaborate. The general idea which still possesses the mind of the amateur is that some sort of a packing should be put into the rectum *around some sort of a tube*—why, I cannot imagine. The bleeding comes from the rectal pouch, not from the anus; and it is as impossible to pack the rectal pouch by inserting a tube wound with gauze into the anus, as it would be to make pressure on the inside of a bottle by crowding in a tight cork. The best of all ways is as usual the simplest. While the patient gives chloroform to himself, if no assistant be at hand, put two fingers into the rectum and rapidly clean out the blood-clots. Then begin and pass in strips of gauze, each two yards long and four or six inches wide. Pass the first one as far up as possible, tie the second to it and pass it after it; and so with a third, and a fourth. When the cavity begins to seem full, crowd the whole mass as far up as possible, and pass in as much more as the pouch will contain, leaving the free end of the last protruding. Such a packing may be allowed to remain at least a week and will cause no pain or uneasiness. Flatus will escape beside it without the presence of any tube, and it will soon soften so as to make but little pressure; but for the first twenty-four hours after its introduction concealed hemorrhage is a practical impossibility.

Retention of urine is of frequent occurrence as a complication of certain affections of the rectum, and after operations upon these parts, both in men and women, and it should always be in the mind of the surgeon. It is not generally of long duration, and it may often be overcome by a bath and hot applications without having recourse to the catheter. The possibility of its occurrence should never be lost sight of. Carelessness in this matter may end fatally from congestion of the kidneys.

CHAPTER IV.

CONGENITAL MALFORMATIONS.

THE rectum and anus are developed separately, the former from the internal and middle layers of the blastodermic membrane, the latter from the external. The lower portion of the primitive intestine terminates at first in a cloaca common to it and the urachus. About the eighth week a partition is formed dividing this cavity into the uro-genital and the rectum, the partition being the perineum. At the same time a depression has been forming in the skin at the site of the anus and gradually extending upward to meet the blind rectal pouch.. These unite about the end of the fourth week.

The malformations of the rectum and anus found at birth are due either to a failure on the part of nature to form a depression in the skin sufficiently deep to meet the closed rectum above; to failure of the rectal *cul-de-sac* to descend sufficiently to meet the depression which is formed; or to an arrest of development of the tissues between the rectum and genito-urinary tract.

These congenital malformations have been classified by different writers into various groups. We shall adopt in the following pages that of Papendorf.

1. *Narrowing of the Anus or Rectum without Complete Occlusion.*—The narrowing in these cases may be very slight, or may reach such a degree as hardly to admit of the passage of meconium. It is generally annular in form, resembling the contraction which would be caused by tying a tape tightly around the tube; though it sometimes involves a considerable extent of bowel, as in a case reported by Cheever, where the narrowed portion above the sigmoid flexure was eighteen inches long and was impervious to solids. There may be no symptoms caused by such a contraction, and the child may grow to adult life suffering only from obstinate constipation. On the other hand, when the stricture is tight it will give rise to all the usual signs of such a condition in the child—absence of free passage

of meconium, distention of the abdomen, and vomiting. The diagnosis is easily made by a digital examination, should the symptoms be sufficiently marked to lead the attention of the surgeon to the rectum, for the stricture is generally near the anus.

It has happened to me in the course of practice to meet several examples of this form of disease, and one of the most notable points in connection with them has been that they have usually first been diagnosticated in middle life, their congenital nature being made plain by the absence of any disease which could cause them, and more especially by the absence of any associated ulceration or deposit in the adjacent parts of the rectum.

The treatment of this form of obstruction consists either in gradual dilatation or in proctotomy. My own experience in these rare cases tends to the conclusion that gradual and systematic dilatation will accomplish little, and that nothing short of a free division or a complete excision of the contracted part is likely to be of much permanent benefit.

2. *Closure of the Anus by a Membranous Diaphragm.*—The membrane in these cases may be of greater or less firmness and thickness, and may be composed of skin or of mucous membrane. It is sometimes so thin as to bulge out with meconium when the child strains or coughs, and has been known to rupture spontaneously. It is also occasionally perforated, like the hymen, and allows the escape of considerable quantities of meconium, thus tending to conceal the actual condition till the fæces become solid and obstruction takes place.

This is the simplest of all the forms of congenital malformation of the anus, and, unfortunately, one of the rarest. It is easily diagnosticated by simple inspection of the parts ; and the treatment consists in making a crucial incision through the membrane. The remains of the membrane, like those of the hymen, which it strongly resembles, will shrink up so as not to cause trouble or deformity.

3. *Entire Absence of the Anus, the Rectum ending in a Blind Pouch at a Point more or less distant from the Perineum.*—In these cases there may be a slight depression at the point where the anus should be found ; or there may be no trace of the anal orifice, the *raphé* of the perineum extending over the spot and back to the coccyx. The presence of a slight anal depression is not to be considered as an indication that the rectal pouch is near the surface—in fact, some of Cripps' figures would seem to indicate exactly the re-

verse. The external sphincter muscle is also sometimes present and at others entirely wanting. The pouch of the rectum in these cases may hang loose in the pelvis or abdominal cavity, or be attached to some adjacent part; and the space between it and the perineum may be filled up with cellular tissue, or, in other cases, a distinct fibrous cord may be traced from the rectal pouch to the skin, as is shown in the plate (Fig. 39).

If the pouch of the rectum be not at too great a distance from the skin, a sense of fluctuation may be felt by firm pressure with one

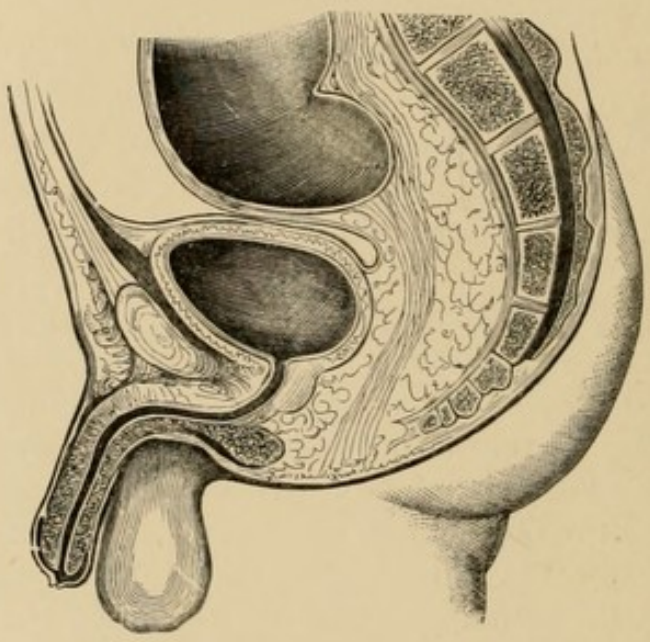


Fig. 39.—Rectum ending in a Blind Pouch.

finger over the anus and the other hand on the abdomen. In females, valuable aid in diagnosis may be obtained by the introduction of a finger into the vagina. The use of a stethoscope over the anus, and of percussion on the abdomen, has been recommended to detect the rectal pouch filled with gas; and also the irritation of the skin over the anus to provoke efforts at defecation. An effort should always be made, where there is complete absence of the anus, to discover whether the rectum may not have some outlet through the bladder or vagina, which will place the case in one of the classes soon to be described.

4. *The Rectum may be the same as in the Last Variety, and the Anus be Normal* (Fig. 40).—The septum which separates the rectal and anal pouches in this case is generally within easy reach of the

anus, and may be so thin as to permit a sense of fluctuation. In most cases, however, the septum is thicker, and is composed of cellular or fibrous tissue, lined both above and below by mucous membrane. It may be perforated, like the hymen, at some point, and allow of the slow dribbling of meconium. There may also be more than one septum. Voillemier reports one case in which the rectum was divided in this way into four distinct compartments, the upper one containing meconium and the others mucus. There is generally little difficulty in the diagnosis of these cases, provided only a digital examination be made when the infant begins to show the effects of

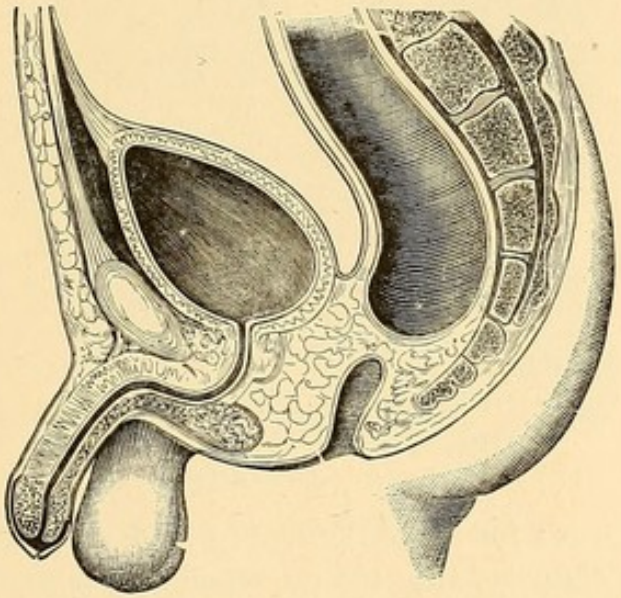


FIG. 40.—Rectum ending in Pouch; Anus Normal.

the obstruction; but the danger lies in the fact of the normal anus, which is apt to allay suspicion as to the true nature of the difficulty.

In the diagnosis of the third and fourth varieties it is of the greatest importance to determine the position of the rectal *cul-de-sac*. Unfortunately this is seldom possible with any degree of accuracy. If the pelvis be of normal shape and the genital organs in the natural position; if on crying or straining there is a distinct protrusion in the anal region, then the probability that the pouch is within easy reach is strong. But the cases in which any protrusion or fluctuation can be detected, even by tickling the perineum, pressing upon the abdomen, or exciting the child to sneeze or cough, are very rare; and any attempt to cause a protrusion by the use of purgatives is utterly unjustifiable.

It has been recommended to delay operation for a day or two, if the symptoms are not very urgent, in order to give the rectum an opportunity to become more distended and prominent. Such advice is quite erroneous, as, in the first place, the meconium becomes less by the absorption of fluid, and—what is more important—while we are waiting the time may slip away when alone a chance of success exists.

Nearness of the tuberosities is often a sign that the rectal *cul-de-sac* is high up. Exploration by the bladder or vagina sometimes

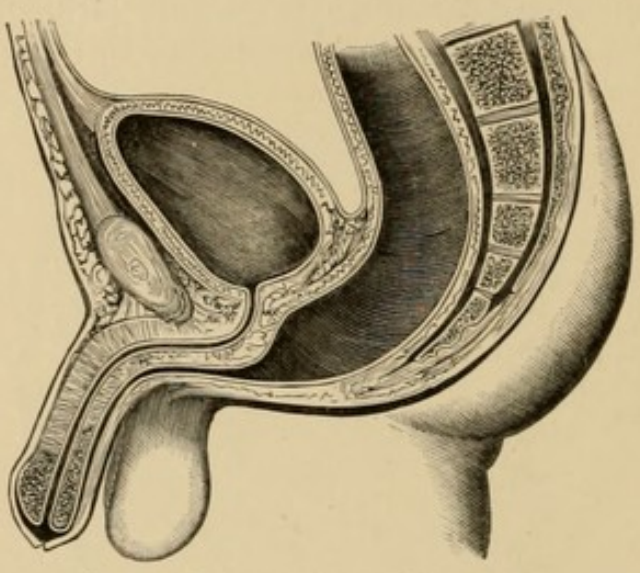


FIG. 41.—Rectum ending in Glans Penis.

gives useful results; for if the vagina or bladder fill up the concavity of the sacrum, it is proof that the intestinal *cul-de-sac* is high up, and colostomy is indicated from the first.

In one case of this fourth variety which came under my notice the child had reached nearly four years of age and was well nourished, but was suffering from chronic intestinal obstruction. The history was simply of constipation ever since birth, and of no passage for several days before coming to the hospital. Examination revealed what seemed to be a thin membranous partition at about one inch and a half from the anus. There was marked bulging of the rectal pouch against the finger when the child cried, and at one point a small depression in the septum could be made out with the end of the finger. Although the finger could not be made to enter this orifice, pressure against it seemed to dilate it to an extent sufficient to cause the escape of a stream of fluid fæces several inches from the anus when the finger was removed. Operation was refused and the child passed out of sight.

5. *The Anus may be Absent, and the Rectum may open by an Abnormal Anus at any Point in the Perineal or Sacral Region.*—When the rectum terminates in the glans penis, the labia, or at some abnormal point in the perineum, the lower portion of it is usually of a fistulous character, as shown in the plate (Fig. 41), but lined by true mucous membrane; and the anus, whether in the perineum or at the base of the sacrum or tip of the coccyx, is always narrow and insufficient for its purpose. A modification of this class of abnor-

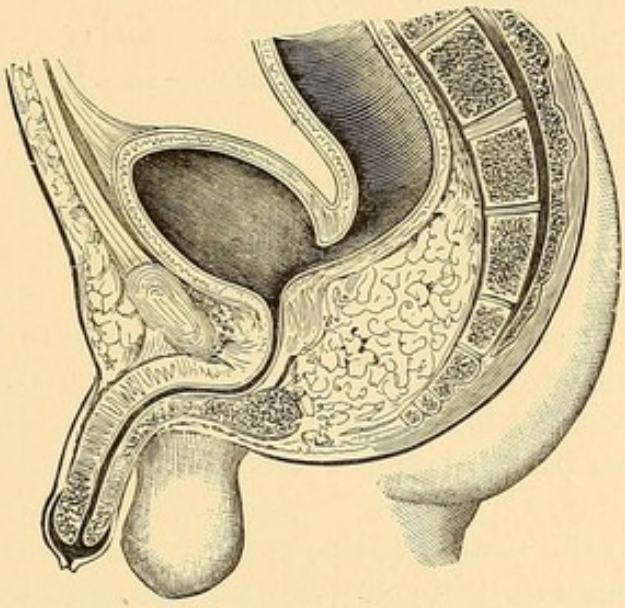


FIG. 42.—Rectum ending in Bladder.

malities is found in those cases where the rectum terminates in two openings at a greater or less distance from each other.

6. *The Anus may be Absent and the Rectum may end in the Bladder, Urethra, or Vagina* (Fig. 42).—Forty per cent. of all cases are included in this class, and that in which the rectum opens into the vagina is the most common. In females the opening is seldom, if ever, into the bladder, but sometimes it is into the urethra. In males it is more often into the bladder than into the urethra, and in such cases the rectum may terminate either by a narrow duct running obliquely through the bladder and opening in the *bas-fond* between the orifices of the ureters, or by a free opening. The symptoms of this condition will of course vary greatly according to the location of the abnormal opening. When the communication is between the rectum and bladder, the fact will be shown by the mixture of the meconium with the urine, rendering the latter thick and greenish in color. The amount of meconium present will also indicate

whether the opening is large or small. This condition is generally fatal, from the development of cystitis and from intestinal obstruction, unless the condition be relieved by the appropriate surgical interference.

When the communication is urethral in the male, the meconium will often escape independently of the act of urination ; and although the first flow of urine may be mixed with meconium, the remainder will be clear. The prognosis is not as bad in these cases as in the vesical variety, several being recorded in which life has been preserved for a number of years. Gross relates one case in a man aged thirty, and Bodenhamer cites several others in which children have lived three or four years.

In the female the prognosis is more favorable than in the male, from the greater facility with which the meconium escapes.

Where the abnormal opening is between the vagina and rectum, and is of considerable size, as it generally is, the prognosis is not necessarily grave. Women have been known to live to a good old age, even to reach one hundred years in the case of Morgagni, with this malformation, and to perform all the duties of wives and mothers, without even being conscious of anything abnormal (Fournier, Ricord).

In absence of the rectum, if there exists a vesical communication the intestine is high up and colostomy is indicated ; if, on the other hand, there exists a communication with the urethra, the intestine is low down and should be searched for in the perineum. When there is a communication between intestine and bladder, the possibility of a malformation of the ureters and of the genital tract must be borne in mind.

7. *The Rectum and Anus are Normal, but the Ureters, Uterus, or Vagina empty into the Rectal Cavity and discharge their Contents through it.*—This species of malformation is rare, and is usually attended by other signs of imperfect development. It is not incompatible with life or with conception.

8. *Total Absence of the Rectum.*—This variety differs only from the third in the amount of the rectum which may be absent. It may or may not be attended by an absence of the anus, but is usually only one of the signs of arrested development. The blind pouch of the rectum may hang loose in the abdomen or pelvis ; may be attached at the base of the sacrum or to some of the adjacent parts ; or may be continued down as a fibrous cord to the site of the anus.

9. *Absence of the Large Intestine.*—This is also attended by an absence of the normal anus, the place of which is supplied by an abnormal opening in the umbilicus, or at some remote part of the body, as, for example, the side of the chest, or the face. With this abnormal opening the small intestine, or what remains of the colon, communicates.

Thus far only arrests or excesses of development have been mentioned. The rectum and anus are, however, liable to certain diseases during fetal life which may result in narrowing or completely obliterating their calibre. Among these are enteritis and proctitis.

The longest possible period of life in a child with absolutely impervious rectum has not yet been determined. In a case reported by Cripps the diagnosis was made on the third day, but treatment was not permitted, and the child was brought back thirty days later, still to all appearances quite well, but with distended abdomen and fecal vomiting. How much longer she might have lived had not operative measures been immediately fatal, cannot be judged. Another case has been recorded in which the trocar was used on the twenty-seventh day, giving temporary relief, and there are accounts of even longer periods.

The prognosis depends in great measure upon the form of the anomaly. In the varieties first described, in which the condition is easily remedied, it is exceedingly good. It is also good in cases where the rectum communicates with the vagina. In all the others it is bad, and too much must not be expected from the line of treatment to be described. An opening may be made either in perineum or groin, life may be prolonged, immediate relief may be given, and occasionally adult age may be reached in comfort; but the operations themselves are severe and sometimes fatal, and when immediately successful the children do not seem to thrive. Cripps has tabulated one hundred of these cases of all varieties, and his table is very instructive. It is as follows:

16 cases	colon opened in groin,	11 died.
3 "	" " " loin,	2 "
17 "	puncture,	14 "
8 "	coccyx resected,	5 "
39 "	perineal dissection or incision,	14 "
14 "	communication with vagina,	1 "
3 "	miscellaneous,	3 "
100 cases.		50 died.

Of the fifty deaths, fourteen were from peritonitis, ten from failure to give relief, and nineteen more probably from the same causes, though the cause is not recorded. In spite of this unfavorable showing, the surgeon must do what he can. There is always the hope that the rectum may be reached from the perineum; and even if this fail, a child with an artificial anus in the groin may be very comfortable.

The treatment of the class of congenital contractions of the anus and rectum, and of the class of membranous septa, has already been referred to and is exceedingly simple and generally attended by good results. The treatment of the remaining varieties, except the eighth and ninth, which do not admit of surgical interference, may be guided by the following general propositions:

1. *An Operation should always be performed without Delay.*—There is nothing to be gained by waiting for the rectal pouch to become distended with meconium, and there is much to be lost. If the obstruction be complete, death is a necessary result; being produced, generally within the first week, by peritonitis, rupture of the overdistended bowel, or by a gradual wasting without acute symptoms. Even in cases where a certain amount of meconium makes its escape by a narrow orifice, and delay is not, therefore, as necessarily dangerous as in cases of complete obstruction, nothing is to be gained by delay, and an immediate operation may avoid a paralysis of the bowel from overdistention.

The only exceptions to the rule of early operation are those in which there is a free communication between rectum and vagina. The patient is in no danger, and the operation can be performed better as the parts become better developed. And, again, in cases of communication between the rectum and urinary tract the demand for operation is not immediate, and time may be taken to watch the case and determine whether the opening be vesical or urethral. In fact, several weeks often elapse before such a child is seen at all by the surgeon.

2. *If there be any Chance of establishing an Opening at the Normal Site of the Anus, the Surgeon should at first direct his Attention to this Procedure.*—And since in most cases it is impossible to tell that the rectal pouch may not be within easy reach from the perineum, it is generally good surgery to make a tentative incision at this point.

Before attempting any operation on a child's pelvis, the surgeon

should remember the exceeding smallness of the space in which he is obliged to work, even in its natural state ; and also that the normal measurements may be decreased in any case of congenital malformation. These normal measurements, according to Bodenhamer, who made them on two new-born, well-developed male infants at full term, are as follows :

First case : From one tuberosity of the ischium to the other, one inch and one line. From the os coccygis to the symphysis pubis, one inch and three lines. From the os coccygis to the promontory of the sacrum, one inch and two lines.

Second case: From one tuberosity of the ischium to the other, one inch. From the os coccygis to the symphysis pubis, one inch and one line and a half. From the os coccygis to the promontory of the sacrum, one inch and one line.

The means at the disposal of the operator for reaching the rectal pouch through the perineum and establishing a new outlet consist in puncture, incision (proctotomy), and in the formation of a new anus by a plastic operation (proctoplasty). The operation by puncture consists in plunging a trocar through the perineum in the supposed direction of the rectum, for the purpose of establishing an outlet. It may be done without a preliminary incision, or after a careful dissection which has failed to reach the desired point.

3. *The Use of a Trocar as an Aid in finding the Rectal Pouch, before or after Incisions through the Perineum, is not sanctioned by Modern Surgical Authority.*—In the faint hope of finding one thing which he does not know to be there, the surgeon takes the risk of wounding two things which are always there—the peritoneum and the bladder—and a wound of either of these may be fatal.

Another and almost equally strong objection to this procedure is the fact that it is utterly useless even when successful. It allows of an immediate escape of the contents of the bowel, but that is all. No such opening can be made to do duty permanently as an anus by any amount of care or subsequent dilatation.

The peculiar mortality attending the use of the trocar is shown by the fact of fourteen deaths in seventeen punctures, mostly from peritonitis. The conformation is often such that it is impossible to avoid peritoneum even when a successful puncture is made and meconeum is evacuated ; for the peritoneal sac may extend down on the lower end of the *cul-de-sac* so as nearly to cover it, then be reflected on to the bladder in the usual way. In such a case, if a punct-

ure be made from below, the trocar will enter and leave the peritoneal cavity before reaching the rectal pouch, and when this is reached it is simply allowed to drain into the peritoneal cavity after removal of the instrument.

4. *The Results of Attempts to establish an Outlet for an Imperforate Rectum by means of Incisions alone through the Perineum are not favorable as regards the production of a Useful Anus.*—The operation consists in cutting through the perineal tissues, stroke by stroke, until the rectal pouch is reached and opened. The incision should be longitudinal and should reach from the scrotum to the tip of the coccyx. Should the fibres of the external sphincter be encountered beneath the skin, they may be carefully separated as near the median line as possible and drawn to each side. The direction of the dissection, which it is needless to say should be made with the utmost care, should be backward toward the concavity of the sacrum in the line which the rectum normally follows. Additional safety may be secured by the introduction of a sound into the male bladder or the female vagina. The finger is to be frequently used as a director in exploring for the rectal pouch, while the hand of an assistant makes pressure on the abdomen. In this way the dissection may be carried to the depth of an inch or possibly an inch and a half, but at this point, if unsuccessful, it should be abandoned for fear of wounding the peritoneum.

This operation, though it may be successful in allowing the escape of meconium and in prolonging life, does not, in most cases, result in a useful anus for any great number of years. This is the experience of the greater number of writers upon this subject. Van Buren says: "I have in several instances succeeded, by careful dissection, in reaching a fluctuating point of a blind rectal pouch, and in establishing a free outlet for the meconium, but in no case has it proved permanently useful. It has always been necessary to employ bougies or tents more or less constantly to keep the new canal from contracting, and the care, and pain, and trouble of fighting against the closing stricture, and the persistent tendency to obstruction and fecal accumulation, have invariably led to early death. At present I know of no such case treated in this way in which a permanently satisfactory result has been attained." Amussat, Sir Benjamin Brodie, Velpeau, Benjamin Bell, and many others, have borne testimony to the same effect. On the other hand, cases are occasionally seen where the result is more favorable, but they constitute a small

minority of the whole. What the operation really accomplishes is the formation of a fecal fistula, with all the discomforts attendant upon such a condition.

Proctoplasty.—This operation is the same as the last, with the addition of two important features. In the first place, the rectum is drawn down and stitched to the skin ; and, second, to facilitate this, when necessary, either the new anus is made just at the tip of the coccyx, or that bone is exsected and the anus made in the place it occupied. Where much of the lower end of the rectum is deficient, it may not be possible to draw the *cul-de-sac* down to the skin without more traction and dissection than it is safe to employ. In such cases the excision of the coccyx, as originally recommended and practised by Amussat, and more recently by Verneuil, besides adding to the chances of finding the rectal pouch, diminishes the distance over which the rectum must be stretched. Unfortunately, in the cases where the operation is most needed—those in which the rectal pouch is farthest from the skin—the operation is not always practicable ; and in other cases the adhesions of the rectum to the bladder or vagina may be an insuperable obstacle.

The treatment of the class of cases in which the rectum opens into the vagina offers a fair chance of success. If the opening be sufficiently large to permit of free evacuation, there need be no hurry to operate before the age of puberty. At this time the conformation of the parts will have changed, there will be more room in which to work, and a better result may be obtained. Also there sometimes develops such an amount of sphincteric power in the vagina, and so little inconvenience is caused by the condition, that the surgeon should seriously consider the propriety of any interference whatever. Cases are on record in which this malformation has existed in wives and mothers without their ever having suspected that they were different from other women. On the other hand, if the opening be merely fistulous in character and only large enough to permit of dribbling of meconium, the condition will grow more serious as life advances ; and as the character of the fæces changes from fluid to solid, more or less obstruction begins to be manifest, the colon becomes distended with solid matter, and the condition will end fatally unless relieved.

The treatment of these cases is comparatively easy, because a bent probe passed through the vaginal opening and turned toward the perineum marks the end of the rectum and can be cut down

upon through the skin. After this has been done the rectum should be carefully dissected from the vagina and drawn down to the surface, if possible. This is known as Rizzoli's operation, and is performed as follows (Fig. 43):

The instruments necessary are a knife, a uterine sound, small toothed retractors (Fig. 44), blunt-pointed scissors, medium and fine

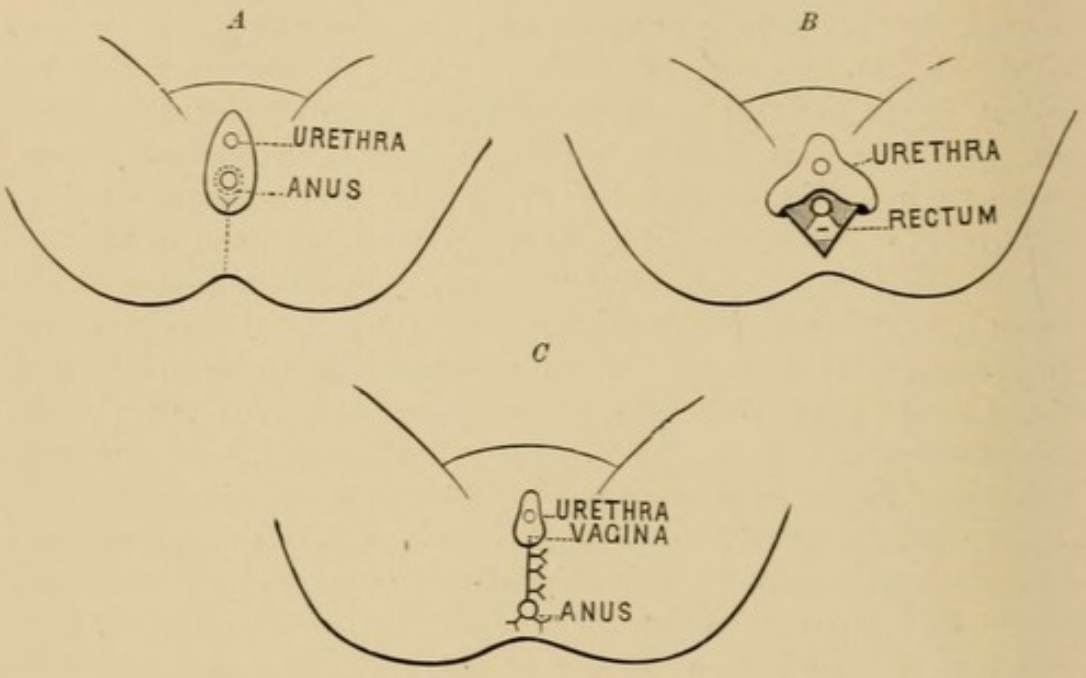


FIG. 43.—Rizzoli's Operation.

A shows the relative position of the parts and the line of incision (dotted).
B shows the parts separated and the anus dissected out.
C the operation completed.

full-curved Hagedorn needles, needle-holder, artery forceps, and fine catgut.

With the patient in the lithotomy position, and the feet either in the stirups or the legs held up by a Clover's crutch, the vaginal anus, lower end of the rectum, vagina, and perineum should first be ren-



FIG. 44.—Toothed Retractor.

dered thoroughly aseptic. The best way to accomplish this is first to wipe out the anus and rectum carefully with pledgets of iodoform gauze held in dressing forceps. Next wash out the rectum thoroughly with 1 to 500 bichloride solution, and plug it lightly, so as

not to distend it, with a pledget of iodoform gauze. The vagina and perineum should next be scrubbed with green soap and nail-brush, washed with bichloride solution 1 to 1,000, and finally with ether.

The sharply curved uterine sound is passed into the rectum through the vaginal orifice. An incision is made in the median line reaching from the margin of the anal orifice in the vagina to the tip of the coccyx, and carried deeply enough to reach the surface of the rectum, but not deeply enough to open it. The dissection of the rectum requires caution; and when it has been exposed as far as possible by this median incision, the knife is to be carried round the vaginal anus, and the remaining part of the rectum separated from its connections until the anus can be placed without much traction in the posterior angle of the wound as near as possible to the coccyx. The separation of the rectum anteriorly should be freely done, and after the separation of the anus it is not difficult. The margin of the anus is next stitched to the posterior angle of the wound, next the sides of the vagina are united, and lastly the perineum. This order of procedure is of great importance when working in so small a space. Usually the fæces pass readily and no dilatation of the orifice is required; but should this be thought too small, it may be enlarged by a posterior median incision. It is essential that the anus should be fixed as far back as possible, as the tendency of cicatrization is to draw it forward, and after the effects of the operation have passed it will be found nearer the vagina than expected. In stitching the anus to the perineum the needle should never enter the calibre of the bowel, otherwise asepsis is at an end. The success of the operation will depend in great measure upon avoiding suppuration, and to do this in any operation involving the rectum requires the most elaborate precautions.

Pack the vagina lightly with iodoform gauze, cover the perineum with a separate piece of the same, and apply a T-bandage. The water should be drawn for the first three days, and the perineal pad changed at least twice a day. The bowels may be moved at the end of the second day with salines and an enema.

In case of Failure to establish a New Anus in the Anal Region, Colostomy should at once be performed.—The teachings of different authorities will vary as to the propriety of first performing the perineal operation before resorting to colostomy, according to the views of each one upon the question of the desirability of colostomy. Some follow the rule I have laid down, that it is always better to at-

tempt the perineal operation where there is a chance of its succeeding; others limit the latter operation to cases where the rectal pouch is known to be near the skin, and in all others turn their efforts at once toward the colon. The abdominal operation is obviously the only one where the rectum ends high up in the pelvis, and it is generally to be preferred in that class of cases where it opens into the bladder or urethra. After the performance of colostomy, when the child has developed, it may be possible to do a successful perineal operation and subsequently close the opening in the groin, but my one single attempt to do this ended fatally from the perineal operation.

Rectal Diverticula.—In connection with this subject of congenital malformations it may be of interest to know that a few cases of true diverticulum of all the coats of the rectum, similar to Meckel's diverticulum from the ileum, have been observed. Ball gives one in full from Hulke; and Maas, of Würzburg, has recently reported the following: The patient was a boy, aged fourteen. Shortly after birth the abdomen began to swell, and increased in size as years passed by, without affecting the general health, till the age of thirteen. At this time the swelling became much larger and caused dyspnœa and palpitation. Congenital hydronephrosis on the left side, or cystic degeneration, was diagnosticated. An exploratory incision was made, but the idea of an operation was abandoned and the boy died suddenly. The tumor proved to be an immense diverticulum from the upper part of the rectum, filled with fourteen litres of thin fæces and containing gas. The opening of communication was at the posterior and inferior aspect of the pouch. The rectum was strongly compressed by the tumor.

CHAPTER V.

PROCTITIS AND PERIPROCTITIS.

Inflammation of the rectum may be catarrhal, dysenteric, diphtheritic, or gonorrhœal.

Catarrhal proctitis may be acute or chronic. The acute form is often due to irritation, perhaps more often from the presence of hardened masses of fæces in the rectal pouch than from any other cause. Ball thinks in some cases this may be due to chemical action the result of putrefactive changes. Of this I have no proof, but the direct mechanical irritation and subsequent ulceration caused in this way I have become familiar with from clinical observation.

In children the presence of pinworms may cause sufficient irritation to produce the same condition. Other causes are the abuse of drastic purgatives; the prolonged sitting on a cold or wet seat; and the existence of some other disease in or near the rectum acting as an irritant, such as a neoplasm, an intussusception, or an abscess around the rectum.

Traumatic proctitis may arise from a multitude of causes. Foreign bodies which have passed along the rest of the canal may become lodged in the rectum, or may be introduced into the anus and cause direct injury to the rectum. It may be due to the frequent and improper use of the syringe either by the patient or a heavy-handed nurse.

By far the worst cases of chronic catarrhal inflammation of the rectum I have ever seen were due to small, benign polypoid growths situated high up in the rectum. In some the disease had existed at least ten years and had caused the usual amount of irritation. The patients had all this time been treated for ulceration of the rectum; acid had been frequently applied, the strongest astringents had been used, the "ulcer" had been cut and scraped; and when the polypus was finally removed the mucous membrane, from anus to sigmoid flexure, was soft, thickened, boggy, granular, and bleeding

freely. With all this there was no actual ulceration and no loss of substance, the most marked symptom being the profuse hemorrhage and mucous discharge.

In almost all cases of prolapsus of any duration there will be found a certain amount of acute or chronic catarrhal proctitis complicating the original trouble and disappearing spontaneously with its removal; and the same is true of many cases of internal hemorrhoids. The mucous membrane covering the tumors at first becomes inflamed, generally from direct injury, and the inflammation thus commenced is continued up the rectum till the symptoms of proctitis or ulceration are superadded to those of the original trouble.

A large class of cases of catarrhal proctitis is found among women with uterine misplacements. Any disease of the uterus which causes undue pressure upon a certain spot in the rectal wall may set up an inflammation of the mucous membrane at that point, the symptoms of which may mask the primary disease. Many cases of women suffering from rectal symptoms, with pains in the back, loins, and thighs, and the passage of bloody and mucous stools, will be found to come under this category.

Another cause of catarrhal proctitis, according to Esmarch and Bushe, is gout, alternating with the manifestations of the disease at its usual localities.

Dysenteric proctitis is not uncommon in the southern portions of the United States, and is by no means unknown in certain regions of the North, especially in New Jersey. The acute cases are much more apt to come under the observation of the physician than the surgeon, but the chronic ulceration and strictures are often brought to the rectal specialist for diagnosis and treatment. More will be said upon this class of cases under the chapters on Ulcerations and Stricture.

There is also a distinct follicular proctitis in which the inflammation in its first stages is confined entirely to the deep follicles. These may be felt as small nodules in the substance of the mucous membrane; and their orifices, which are red and swollen, can be distinctly seen with a speculum, sometimes as many as three or four in the field of vision. The disease is chiefly confined to the upper part of the rectum, but may involve also the sigmoid flexure and descending colon.

Diphtheritic proctitis is a local manifestation of the general poisoning, exactly analogous to the inflammation of the air-passages, and

attended by the same production of membrane, in males in the rectum, in females generally also in the vagina. It is an indication of the profound effect which the specific poison has had upon the system.

Gonorrhœal proctitis in men is generally due to the habit of passive pæderasty resulting in direct contagion. In woman it may be due either to this cause or to the inoculation of fissures or erosions of the anal mucous membrane by a gonorrhœal discharge from the vagina flowing over the anus. The disease is rare and will be further described under Venereal Affections.

In the acute variety of catarrhal proctitis the inflammation does not extend deeper than the mucous membrane, which is congested and hyperæmic. In the chronic the inflammation involves the submucous and muscular layers. The acute generally ends in resolution in from eight to fourteen days where the cause can be found and removed. It may, however, in severe cases go on to actual gangrene, and after extending over a large part of the large bowel terminate fatally. The chronic results in infiltration and consequent thickening of the rectal wall, and may end in ulceration, either superficial and confined to the epithelial layer of the mucous membrane, or deep and involving the whole thickness of the mucous layer. What is described as follicular ulceration (ulceration affecting the mouths of the tubular follicles) may result from chronic inflammation, and these ulcers, which are very minute at first, may coalesce and gain in depth till they cause perforation of the bowel. When the perforation is above the peritoneal reflection a fatal peritonitis may result; when lower down, an abscess or fistula. A chronic proctitis may in this way be a cause of stricture, and may result in the hypertrophy known as chronic parenchymatous proctitis.

Under the head of simple proctitis should be included the great mass of so-called syphilitic strictures. Their gross appearances are familiar to all. By digital examination a rigid canal is reached just within the rectal pouch. The walls contract like a cone until often at the upper part the passage of the finger is impossible. The upper part is fluted, the mucous membrane is sometimes smooth and movable, at others completely destroyed. The rectum as a whole is movable, and vaginal examination allows the fibrous mass within the rectum to be felt, but the vagina is not adherent to it. There are no enlarged glands.

Under the microscope the glands of the mucosa will be found to

have completely disappeared. Irregular papillary projections penetrate the thickened and hardened epithelium which rests directly upon the subjacent connective tissue, it being impossible to distinguish what appertains to the chorion of the mucosa or to the cellular layer. The epithelium has changed from the cylindrical to the stratified pavement variety and taken on the Malpighian type. In the deeper parts is seen a process of hardening, and, in general, a thickened layer, completely hardened, where the cellular contours have disappeared. At some points the mucous membrane is adherent. The epithelium rests directly on the subjacent fibrous tissue. There are neither muscularis mucosæ nor glands. Between the epithelium and the muscular layer, dense fibrous bundles are seen, heavily charged with embryonal cells. At certain points these fibrous bundles appear gathered around the blood-vessels. Embryonic cells, strongly colored by the reagents, exist in abundant masses in the lymph-spaces which separate the fibrous bundles and around nearly all of the blood-vessels, which are, moreover, rare in the fibrous thickening and only capillary, their endothelium being tumefied, the nuclei of the endothelial cells very marked and brightly colored by reagents. In the peripheral portions the unstriped muscular fibres show no changes, but the vessels in this layer or beyond are altered and the endothelium of the arteries is somewhat proliferated. Both arteries and veins are surrounded by considerable embryonic masses.

In other words, we have to do with an inflammatory affection characterized by a perivascular sclerosis with complete disappearance of the glands of the mucous membrane and transformation of epithelium.

That syphilis plays any rôle in the causation of such a stricture I cannot believe. In the first place many of these patients have never had any manifestation of syphilis unless this be syphilis, and if this be syphilis it is often the first, last, and only symptom of the disease. I do not refer now to patients who deny syphilis either from ignorance or from design, but to women and physicians in whom to suspect syphilis is to disregard all rules of evidence and common sense.

In the second place, this condition never yields to either mercury or iodine. To account for this it is customary to say that the treatment is undertaken too late. But why is it *always* too late? The cases are seen early, for they are attended by great pain and suffering. They wander from doctor to doctor and often give a history of prolonged antisyphilitic treatment, but are never relieved by it.

In the third place, in no other organ of the body are true syphilitic lesions ever found at all comparable to this one. Syphilis does cause stricture of the larynx, trachea, and perhaps also œsophagus, but these contractions are due to the cicatrization of lesions primarily ulcerative, they are irregular cicatrices and salient bands which deform the organ and in no way resemble the regular conical stricture of the rectum due to hypertrophy and sclerosis which we are considering. If this stricture be syphilitic it is a lesion peculiar to the rectum and unique in the history of syphilis.

The symptoms of proctitis in the acute form, are a sensation of heat and weight in the part which may amount to actual pain, and may involve the bladder, uterus, and sacral region, and radiate into the loins and down the thighs. The anus also becomes painful, red, and contracted, and in children the mucous membrane may become slightly everted from the swelling and tenesmus. The evacuations soon become painful and increased in number, and the fæces are streaked with mucus, blood, and pus. There is apt to be also a train of symptoms referable to the bladder and to the generative organs, such as painful micturition, cystitis, and leucorrhœa.

With these local symptoms there may be more or less constitutional disturbance, fever, and loss of appetite. As the discharge from the inflamed surface increases in amount, the desire to empty the rectum produces more frequent evacuations, so that while at first the fæces are only stained with pus and blood, later the evacuations consist entirely of the muco-purulent matter, and the anus may become excoriated by the discharge.

In the chronic form the symptoms are all less marked. The diarrhœa may alternate with constipation, and the discharge will occur only at the time of defecation. This condition may last for years. An examination of the rectum during the acute stage of proctitis will generally cause considerable pain. The rectal mucous membrane will be found intensely congested, and the temperature, as shown by the thermometer or even by the finger, will be increased. In the chronic stage the solitary glands may occasionally be recognized as small round prominences in the substance of the mucous membrane.

Proctitis is generally found associated with stricture of the rectum and may be either the direct cause of it or a secondary result of it. In the latter cases the mucous membrane below the stricture will be found congested and covered with pus or bloody mucus,

while above it is eroded and destroyed, sometimes only superficially, at others for its entire depth. The other layers will be found hypertrophied, especially the circular muscular layer.

The treatment of proctitis consists first of all in an endeavor to discover and remove the cause of the congestion, be it what it may. If hemorrhoids are at the bottom of the trouble they must be removed, and the same with polypus. In the cases associated with uterine disease it may be necessary to first turn the attention to this organ and rectify a displacement or operate upon a lacerated cervix.

In treating the proctitis itself both local and general measures may be adopted. Absolute rest in bed, with a diet of milk, meat, and eggs, which leaves the least possible amount of fecal residue, should be strictly enforced. The bowels should be moved by saline cathartics in small doses to produce semi-solid stools, or by the compound licorice powder. In the acute stage the pain and tenesmus may best be treated by injections of starch water, bismuth, and opium, given in doses small enough to be retained. The use of the speculum or suppositories should be avoided on account of the pain caused by their introduction.

In the chronic stage astringents are necessary, and sulphate of zinc, tannin, and nitrate of silver may each be tried. If the spot of diseased mucous membrane can be reached through a speculum, it may be painted with a five- or ten grain solution of nitrate of silver and a brush. If the disease covers more surface, an injection of a solution of nitrate of silver (grs. ij.–℈ i.) will more likely come in contact with the whole affected part, and this should be followed immediately by a more copious enema of warm water. Such an application should not be made oftener than every third day. For the treatment of the ulceration and stricture resulting from this disease the reader is referred to the appropriate chapters.

Periproctitis occurs in several distinct varieties, the most serious of which is of septic origin, is diffuse and not circumscribed, and is the chief cause of death after surgical operations upon the rectum. I have fortunately met it but few times, though I have seen it follow the division of a small fistula in hospital and end fatally.

Even with very diffuse inflammation death may not always be the immediate result. In one case of internal proctotomy for stricture the chill and inflammation set in at the usual time, when it comes at all—about the third day. In this case I had great hopes of saving the patient, as the abscess was plainly visible in the ischio-rectal

fossa and was freely cut. Large masses of black, sloughing cellular tissue were discharged through the incisions, but no healthy pus. In a few days openings formed between the abscess and the rectum. The patient dragged on for several months, but there was never any healthy reparative action, and he was finally worn out by repeated hemorrhages from the erosion of small vessels and by a communication formed between the rectum and bladder. On the autopsy there seemed to be no part of the pelvis which had not been invaded by the disease.

I have also seen a cold abscess form around a cancerous stricture without giving rise to any symptoms, and progress till death resulted in exactly the same way—exhaustion and opening into the bladder.

This is the complication which, in spite of antisepsis, sometimes occurs after operations upon the rectum, and which it is the one object of the surgeon to avoid. In the acute form it is analogous to puerperal septicæmia. In its general symptoms it follows closely the clinical history of pyæmia.

In the way of prophylaxis much may be done by antisepsis during and after all operations on the rectum. There is no operation on the rectum too trivial to be done with care and cleanliness; and yet the capital operations which are now matters of daily occurrence show what results may be obtained by proper attention to these details. This is not the place to go into the details of each surgical operation, but I have learned the greatest single element in prophylaxis to be the careful attention to all antiseptic precautions. A cut should, moreover, never be made through the rectal wall into the cellular tissue without at the same time allowing for the free escape of all the discharge from such a cut by a division of the sphincters.

In the way of treatment for periproctitis, life may be saved by free incisions and antiseptic irrigations where the inflammation shows any tendency to become circumscribed; but otherwise the disease is fatal.

Gangrenous Cellulitis.—There is a form of gangrenous cellulitis which sometimes affects the ischio-rectal region. It is a rare disease and is generally idiopathic. In it there is no pus formed, but the cellular tissue and the skin over it become necrosed and slough in large, black masses. The adjacent portion of the rectal wall may be involved and the rectum be laid open for a considerable extent. The disease is attended with fever and great prostration; the tendency to

relapse and extension is marked, and the cavity left after separation of the slough closes very slowly. Jordan, who has given a short clinical report of a few cases, has always seen it in large, heavy men who eat too much and drink heavily. In such, a very slight irritation, such as is caused by sitting on a wet seat, is sufficient to start the trouble. These cases not infrequently end fatally from extension of the gangrene into the pelvis, or exhaustion. The treatment consists in early and free incisions and in supporting the powers of the patient.

The other forms of periproctitis—those which are not due to surgical operations and are distinctly circumscribed—will be treated of under the head of Abscess.

CHAPTER VI.

ABSCESS.

Abscesses in the region of the anus and rectum are best classified according to their anatomical location into superficial, ischiorectal, and pelvic. Of each of these there are several different varieties.

Considering first the superficial variety, the simplest form will be found to be that which involves the skin of the margin of the anus alone, and which generally originates in one of the minute glands of the part. Such an abscess may be due to traumatism, or to any irritation—such as the use of improper paper after defecation, prolonged walking or horseback riding, a menstrual discharge, or a discharge due to diarrhœa or dysentery—to suppuration beneath an inflamed pile, or to the presence of a caseating tubercular nodule. I have several times seen it follow injections of carbolic acid into hemorrhoids, the pus forming beneath the mucous and muscular layers and burrowing downward to the anus till it lay superficially over the sphincter.

This form of disease is always distinctly circumscribed, is generally about the size of an almond, is found by preference in robust persons, more often in men than women, seldom in old people, and almost never in children. It generally goes on rapidly to suppuration, breaks spontaneously on the cutaneous or mucous surface, and heals without the formation of fistula ; though in cachectic patients it may pursue a contrary course, the skin over it becoming thin and violet-colored, and finally rupturing, leaving a permanent subcutaneous fistula, which by subsequent burrowing may reach a considerable size. Such is apt to be the course in the cases arising from the injection of carbolic acid.

The treatment of such an abscess consists chiefly in the attempt to avoid the formation of a fistula, and the best means for accomplishing this end is an early incision as soon as suppuration appears

inevitable. Resolution is hardly to be expected, but it may be sought for by the use of laxatives, rest in the horizontal posture, and the application of a bladder of ice. The incision should be large enough to allow of the free exit of pus, and after it has been made the part may be poulticed for a day or two, and the abscess cavity then dressed with lint, care being taken to keep the lips of the incision separated.

Another frequent cause of superficial abscess is the acute inflammation and suppuration of an external hemorrhoid, which generally comes on after an attack of constipation and straining at stool, or may be due to the same causes as the last. The suffering caused by such a condition, as by the one last described, is out of all proportion to its apparent importance, and is sufficient to incapacitate a person of sensitive organization from all accustomed duties. The remains of former external hemorrhoids are always liable to this accident, and by the proper abortive treatment the inflammation may sometimes be overcome without suppuration. If, however, suppuration appears to be inevitable, a small, sharp-pointed bistoury should be quickly passed through the little tumor.

There is also a form of superficial abscess which lies nearer to the mucous membrane than the skin, and is due to the acute inflammation of an internal hemorrhoid, either just at the verge of the anus or within the sphincter. This is in reality a circumscribed phlebitis in a venous pouch which is shut off from the general circulation. A circumscribed, tense, exquisitely painful tumor is formed, varying in size from a grape to an almond, which, after a few days of suffering, ruptures spontaneously and allows the escape of a small quantity of pus. Such an abscess, when within the bowel, is always liable, as will be shown later, to result in the formation of a blind internal fistula or of a chronic ulcer if left to its own course, and should, therefore, be treated by early incision.

There is still another variety of superficial abscess, more serious in its consequences than those already described, for the reason that it affects the subcutaneous tissue and not the skin, and is diffuse and not circumscribed. The symptoms of this form of disease vary greatly in different cases. In cachectic persons pus may form in large quantity and break into the bowel with very slight local or general symptoms, and a blind internal fistula may result. The diagnosis is generally easy. There will be the usual pain, tenderness and swelling ; and, if the pain be not too severe to admit of the attempt, fluc-

tuation may be obtained by introducing one finger into the rectum and making counter-pressure with the other hand outside.

There is little use in hoping for resolution in an abscess of this kind, and all active attempts to cause it will be found to do harm rather than good. The proper treatment is an early free incision. If pus has already formed or the skin has begun to grow thin over the abscess cavity, the incision should be free enough to allow of the easy escape of the contents, for in this way only can the formation of a fistula be avoided. In such a case drainage should be resorted to after the incision, and every effort should be made to secure healing from the bottom of the cavity.

Ischio-rectal Abscess.—An abscess of the ischio-rectal fossa is bounded by the levator ani muscle superiorly, and by the skin below, with the rectum on one side and the adjacent portion of the pelvis on the other.

The causes of ischio-rectal abscess are various. Traumatism in some form accounts for many, and the injury may be either from within or without. Kicks, falls, wounds by the point of a syringe, perforation of the bowel by pins and fish bones, operations for hemorrhoids, and injections of carbolic acid into them, have all been followed by this complication. They may also result from rupture, ulceration, or perforation of the rectal wall in connection with stricture. Finally, they may be due to a tubercular deposit in the wall of the gut which has softened and caused perforation. This is a frequent cause of blind, internal fistulæ.

An abscess of the ischio-rectal fossa shows itself with all the usual symptoms of acute inflammation and can hardly be mistaken for anything else. It may begin with chill and considerable constitutional disturbance, there will be severe pain, and the skin will be hard, red, and œdematous sometimes over a considerable part of the buttock. The pus, if allowed to take its own course (which it never should be), generally finds its way both to the cutaneous and mucous surfaces, and a complete and deep fistula results. It may, however, tend upward in the perineum, being less confined in that direction, and the prostate and urethra may be pressed upon, causing retention of urine. Retention of urine is by no means an uncommon result of this condition, and I have known it to result fatally before its existence was even suspected.

The prognosis of ischio-rectal abscess depends almost absolutely upon the treatment adopted. If it be poulticed and allowed to

take its own course, a fistula of greater or less extent is the certain result.

There is but one proper treatment for this form of trouble, and that is an early and free use of the knife. It may be considered a rule that an acute inflammation in this region will go on to suppuration, and hence that antiphlogistic measures adopted with a view of securing resolution are useless. As soon as the hard, brawny swelling appears, therefore, and without waiting for the pointing of pus, it should be freely and deeply incised. Ether will be necessary to perform this operation properly. A long, fine, straight bistoury should be inserted into the centre of the swelling and pushed forward till pus issues by the side of the blade. It may be necessary to carry the point fully four inches upward and to repeat the puncture more than once before pus is found. Then make an incision from two to three inches in length through skin and cellular tissue. Into this the index finger should be passed, all sloughing tissue should be broken down, and all pockets opened up till it is certain that a free communication of all parts of the abscess with the external wound has been established. Wash out the abscess cavity with a solution of bichloride 1 to 2,000 till no more pus or debris can be seen in the returning injection. The cavity should be packed with iodoform gauze and the wound dressed antiseptically. After a few days of antiseptic dressing the surgeon can judge whether the cavity is closing promptly or whether the case is to be a long one, only healing by a slow process of granulation. In the former condition the antiseptic dressings may be continued till healing is complete; in the latter they may as well be abandoned and the cavity left to its own course, care being taken to prevent burrowing by drainage and free escape of pus. Though by this line of treatment I have frequently avoided the formation of fistula, I have not had much success in securing rapid closure of the abscess cavity, and healing has usually required many weeks. Should another opening form after a free incision, as it sometimes will, the surgeon need not reproach himself. Pus often has a way of finding its own exit in spite of any plain road which may be laid out for it with a knife.

These abscesses should not at first be laid open into the rectum, unless they have come very near to the rectal surface—a point which is generally misunderstood in practice because of the confounding of an abscess which may ultimately result in a fistula with fistula itself. The treatment is that of abscess, and not

that of fistula, and is especially directed toward the prevention of fistula.

Should the abscess have been neglected till it has opened externally, it is still essentially an abscess and not a fistula, and the treatment described may still be carried out with a fair prospect of success in avoiding an opening into the bowel. I wish to emphasize this point strongly, for I have seen very unfortunate results follow free division of both sphincters for deep abscess, and it is a step which should always be avoided if possible. That it is possible in this class of cases I have occasionally proved to my own satisfaction, and I do not hesitate now to try every means with which I am acquainted, at any cost of time to the patient, before resorting to the usual plan of dividing everything between the abscess cavity and the bowel.

If, however, the case has been neglected till an internal opening has formed and the skin over the ischio-rectal fossa has also become perforated—if, in other words, several days or even weeks have gone by—the abscess will probably have to be laid open into the gut to secure satisfactory healing. The rule of practice must depend upon the amount of tissue between the abscess and the cavity of the gut. If there is enough of this, so that there is a fair chance that perforation will not occur, the case is to be treated simply as an abscess and independently of the gut. If, on the other hand, perforation is probable, the case may be treated as a fistula from the outset, as fistula is sure to occur. Of course, errors in judgment may occur, and a second operation may on this account become necessary.

Deep Pelvic Abscess.—The levator ani muscle forms a true diaphragm to the pelvis. Pus which forms below it is easily evacuated by the knife or discharges spontaneously upon the surface of the perineum or within the rectum, and although incurable fistulæ may result, life is seldom endangered.

Between this diaphragm of the pelvis and the peritoneum which is in relation with it on the pelvic side, there is a considerable space filled with loose connective tissue.

Abscesses in this location may assume vast proportions, burrowing laterally into the subperitoneal connective tissue of the iliac fossæ, or almost anywhere else in the true pelvis; discharging into the bladder, or rectum high up; mounting above the bladder or pointing in the groin or loin, passing downward out of the pelvis into the thigh, and causing retention of urine or intestinal obstruction by pressure.

Pelvic Abscess in the Male.—These abscesses are due to the same causes as those last described and to some others. They may be secondary to diseases of the urinary organs, such as gonorrhœa, acute inflammation of the prostate, or rupture of the urethra and extravasation of urine.

The perforation of the gut by a rectal bougie or by the point of a syringe, and the landing of an enema in the perirectal cellular tissue, will set up this form of disease. It may be a result of appendicitis, and it may be in its origin entirely disconnected with the rectum, and due to disease of some neighboring part, or to necrosis of some adjacent bone of the pelvis or spine. In the latter case, the abscesses are generally of the variety known as cold abscess, and are apt to be preceded for a long time by pain at the point of disease in the bone. These may be diagnosticated by microscopic examination of the pus discharged and a search for bone débris.

The symptoms are often obscure and far from characteristic. There is more or less vague pain in the pelvis and lumbar region, which is seldom intense and generally increased by defecation. Fever may be entirely absent, is seldom continuous, and chills are only occasionally met with when pus is formed. On the other hand, the patient may soon sink into a typhoid condition with high temperature and diarrhœa. Vesical symptoms are more marked than intestinal ones, for there is apt to be great vesical irritation with incontinence or retention of urine. There are but two ways of making the diagnosis. The first is by examination of the rectum and discovery of the phlegmon; the second is by finding that the patient has evacuated a large quantity of fetid pus by the rectum or bladder. The same condition in the female leads naturally to a pelvic examination, but I have known a man to wander from one hospital to another for weeks without examination and hence without diagnosis.

Even when the diagnosis of the existence of the condition has been made, it may be impossible for a time to determine its origin, for psoas abscess, abscess from hip disease, periproctitis, and perinephritis may each cause a collection of pus in the pelvis.

The prognosis is necessarily grave. In the beginning the patient is exposed to all the dangers of septicæmia, and the immediate results being favorable the ultimate ones may still be disastrous, being those which always attend upon prolonged suppuration—chronic invalidism, visceral complications, anyloid degeneration of the liver and kidneys, and tubercular deposits. In the comparatively small

number of cases in which spontaneous healing occurs the patient still may have to meet the results of extensive cicatricial contraction. There may be stricture on the one hand or incontinence on the other. The rectal stenosis may be so great as to cause complete obstruction.

Regarding the termination of these abscesses, Ségoud has collected important statistics. Thirty-five perforated the urethra, and seventy-seven other parts; generally the rectum, but occasionally the perineum, the ischio-rectal fossa, and the obturator foramen. Twenty per cent. are fatal, and many leave fistulous communications with the urethra or rectum which are never cured.

The treatment of deep abscess in men may now be described in two words—incision and drainage. The incision should be made as soon as the diagnosis of the presence of pus is reasonably established. It is true that these abscesses tend naturally to discharge themselves into the rectum or bladder, and that by waiting for this an operation may often be avoided; but this by no means constitutes a cure, rather, on the contrary, a life of chronic invalidism. If the pus be approaching the surface through the perineum, the incision should be made here; if toward the rectum, it should be met through that cavity; should it appear in the groin or thigh, free incisions must be made for its outlet; and should a tumor arise in the iliac fossa or above the bladder, the operation must be done through the abdomen. The incision must be free enough to allow of the escape of all the contents, washing out the abscess cavity, and the establishment of thorough drainage.

Zeller has advocated a perineal incision whenever possible, even after pointing has taken place into the rectum. He objects, very properly, to the incision into the rectum that it is too small, does not tap the abscess at the most dependent part, is not free from risk of hemorrhage, and does not prevent the formation of urethro-rectal fistula, which is much more intractable than urethro-perineal fistula. From my own experience I should judge that to reach pus by a perineal incision would seldom be practicable, and yet I have seen a free opening into the rectum refuse to heal in spite of dilatation and drainage.

CHAPTER VII.

PELVIC ABSCESS IN WOMEN.

MANY of the causes already enumerated as acting to produce pelvic abscesses in men are also effective in women, but their influence is hardly to be considered in comparison with the two great causes—septic and gonorrhœal inflammation, extending from the endometrium through the Fallopian tube, to the pelvic peritoneum. As a rule there is no pelvic cellulitis, and hence no pelvic abscess, not preceded by a peritonitis; and hence the consideration of pelvic abscess in women includes the consideration of all that group of conditions which make up so large a proportion of what is called the "diseases of women"—salpingitis, pyosalpinx, abscess of the ovary, pelvic peritonitis, pelvic cellulitis, perimetritis, and parametritis.

The two most frequent exciting causes of pelvic abscess in women are gonorrhœa and septic poisoning following the puerperal condition. Both of these act by setting up first an endometritis which extends by direct continuity to the Fallopian tube, thence to the pelvic peritoneum, and finally to the pelvic cellular tissue. The amount of inflammation excited, the extent to which it reaches, and the number of structures involved in its course, depend entirely upon the virulence of the infection.

It can hardly be denied also that there is a class of post-partum pelvic inflammations in which no such direct extension of the inflammation can be demonstrated—cases so acute and so virulent that death supervenes within a few days, and in which the septic poisoning seems to be directly from the endometrium to the body of the uterus, the pelvic peritoneum, and the cellular tissue through the lymphatics.

When the inflammation extends into the pelvic cellular tissue there is an effusion of inflammatory products, which may subsequently undergo absorption or break down into suppuration. Whether these abscesses are originally extraperitoneal, or whether

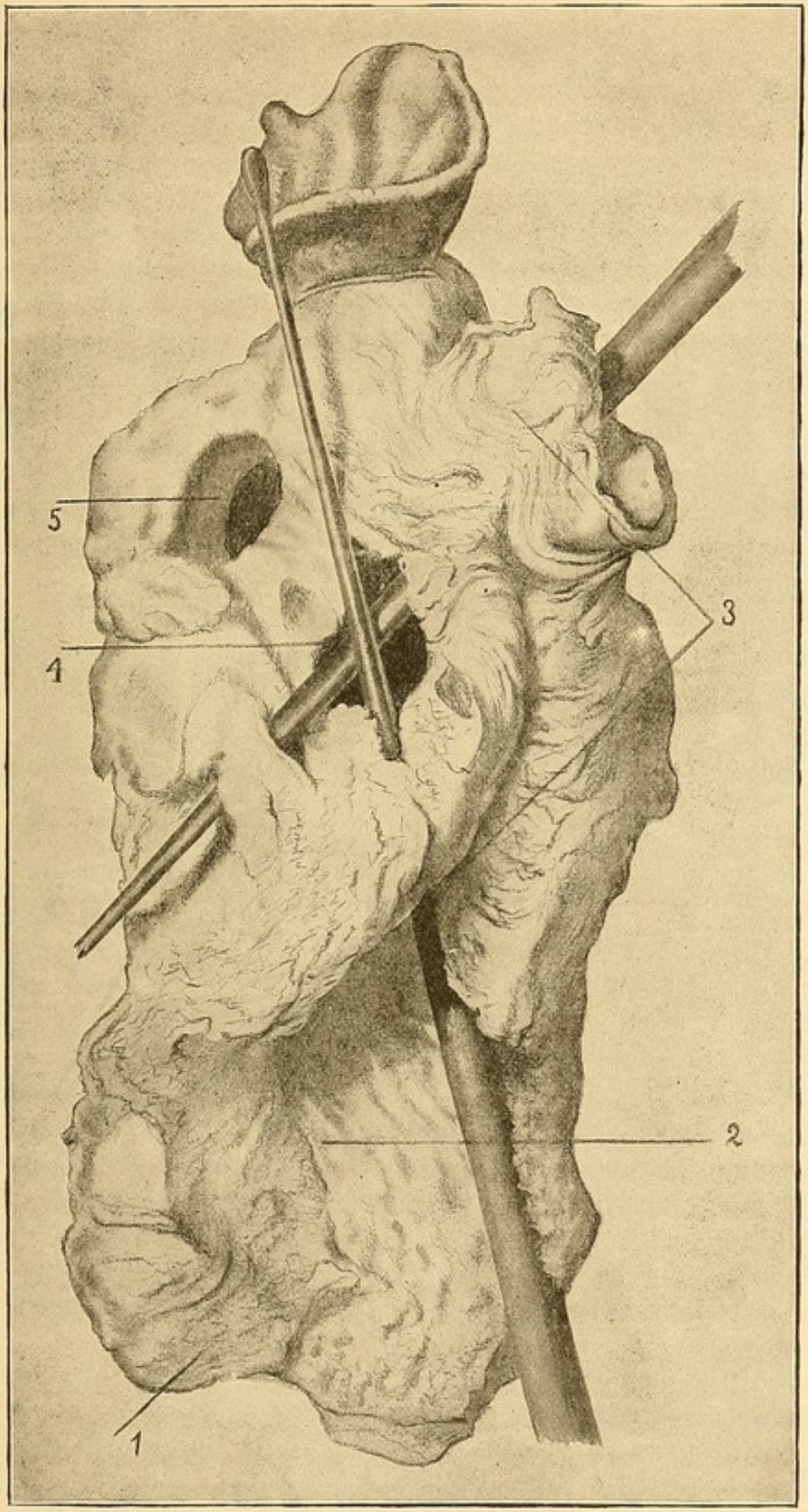


FIG. 45.—Pelvic Abscess in Female, Causing Stricture of the Rectum and Intestinal Obstruction.

in every case the abscess is first formed within the peritoneal cavity and subsequently extends to the extraperitoneal cellular tissue, is a point which has been much discussed. Doubtless it is true that in the great majority of cases pus is only found in the cellular tissue as a direct extension from a focus of suppuration which is anatomically within the peritoneal cavity. The suppuration after once invading the cellular tissue may extend to any part of the pelvis; and, as in the male, may find an exit at a point far removed from the original point of infection. These abscesses when they open spontaneously generally do so into the rectum, vagina, or bladder; but there is no limit to their burrowing, and they may open at any point between the thorax and the thigh.

The symptoms of pelvic abscess in women, though perhaps not more marked than in men, are much better appreciated, for the reason that the disease has been more carefully studied and its dependence upon uterine disease is better understood. They are those of pelvic inflammation, beginning generally with gonorrhœa or puerperal sepsis, and going on to hemorrhage, fever, pain, and uterine discharge, with chill, rapid pulse, tender and swollen pelvis, and the well-known signs of septic poisoning. By the symptoms alone it is impossible to tell to what extent the inflammation may have extended and exactly what structures are involved. Whether we have to deal with a salpingitis, an abscess of the ovary, or a peritonitis and abscess of the connective tissue, can only be determined by physical examination, or by waiting till a discharge of pus at some point makes the diagnosis clear. Fortunately, in women suffering with these symptoms, an examination of the pelvis is a matter of course. The difficulty will consist not in establishing the fact of a pelvic inflammation, but in determining its exact character and extent; and in distinguishing between pus confined within the tube or ovary and abscess in the peritoneum or cellular tissue. To so distinguish is, however, of the utmost importance from the standpoint of treatment; for pus confined within the tubes or ovaries can only be removed by vaginal or abdominal cœliotomy; while pus confined to the peritoneum or cellular tissue may perhaps be evacuated without opening the peritoneum.

The distinguishing marks of pyosalpinx and ovarian abscess are the presence of a boggy or fluctuating circumscribed, adherent tumor, with a sulcus between it and the uterus, into which the fingers can be pressed. With pelvic abscess, on the contrary, no dis-

tinct circumscribed tumor can be made out by conjoined manipulation. The pelvis is simply filled with a boggy or perhaps fluctuating mass, the extent of which cannot be exactly determined.

The prognosis of pelvic abscess in women when left to its own course is bad. When the pus is confined to the tube or ovary the patient is a chronic invalid; and when it escapes spontaneously through rectum, vagina, or bladder, the abscess cavity seldom closes. Pus in the pelvic cellular tissue will usually find an escape if the life of the patient be spared, but only in few cases will spontaneous closure of the abscess cavity occur.

Treatment.—The first step in the treatment of pelvic inflammation in women is to limit its extent and prevent the formation of pus if possible. In every acute case due to an endometritis whether gonorrhœal or post-partum, the treatment should be commenced by curettage. The endometrium is the focus of infection, the peritonitis merely an attempt on the part of nature to limit the disease. By removing the cause, if it be done in time, we prevent further ravages in the adnexa and pelvis. In every case of gonorrhœa, therefore, in which the cavity of the uterus has become involved; and in every case of puerperal fever in which the temperature does not rapidly yield to antiseptic douching of the interior of the uterus, the curette should be employed without delay, provided pus has not already formed.

The instruments necessary for curettage are shown in the following cuts.

Every operator has his own preferences for instruments. The uterine dilator shown in the cut has no screw attachment. The force is regulated entirely by the sense of resistance conveyed to the hand of the operator. The catheter shown is perhaps the one most often used, and best adapted to secure a return flow. The only objection to it is the care necessary to keep it perfectly clean. When the cervix has been thoroughly dilated a double current instrument is not at all necessary and a simple glass female catheter will answer every purpose.

The speculum shown is a modification of that of Edebohls, in which the weight which makes it self-retaining is supplied by loading the handle.

With the patient in the lithotomy position the vagina and vulva are first scrubbed with brush and green soap and irrigated with bichloride 1 to 500. The speculum is then introduced and the anterior lip of the cervix firmly seized with the double tenaculum, which is

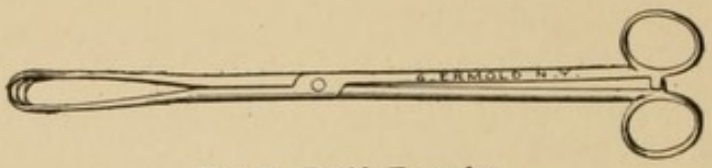


FIG. 46.—Double Tenaculum.

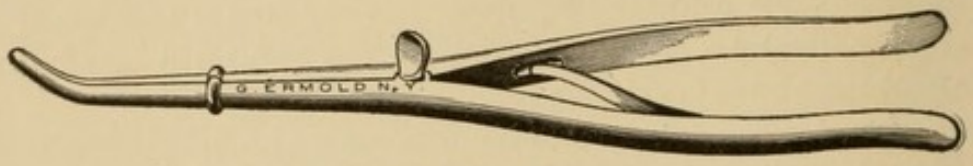


FIG. 47.—Uterine Dilator.



FIG. 48.—Curette.

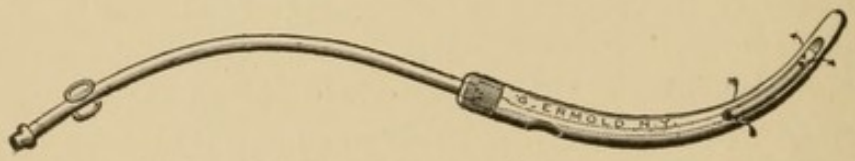


FIG. 49.—Intra-uterine Catheter.

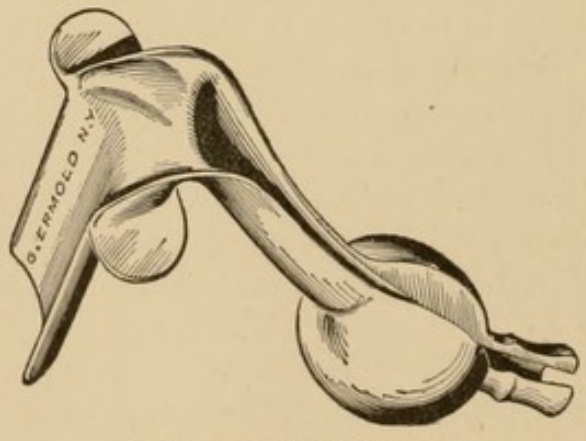


FIG. 50.—Self-retaining Speculum.



FIG. 51.—Uterine Applicator.

given to an assistant, who holds the uterus well down. Introduce the dilator and gradually dilate the cervix till the larger curette will pass easily. Trouble may be encountered at this point, and it may be necessary to pass a small, straight, blunt-pointed bistoury and nick the internal os before the dilator can be introduced.

With the larger curette the endometrium should be removed completely, first of all around the internal os to gain room for the free use of the instrument. The cavity of the uterus should next be attacked with some method in order that no parts may be missed. It is well first to scrape the anterior wall completely, then the posterior, then each lateral. The small instrument should then be substituted and both cornua thoroughly cleaned. In a thin and flabby organ great safety may be gained by keeping one finger on the outside of the womb for counter-pressure against the curette within. In this way the instrument may be distinctly felt by the finger of the other hand and perforation may be avoided. Above all, the operation should be done thoroughly and no endometrium be left. There is no danger from mechanical violence to the womb if the instrument be used till a distinct sensation of grating against the firm muscular tissue of the organ be appreciated. When the operation is complete the womb should be thoroughly washed out with warm saline solution and a strip of iodoform gauze introduced. It is not at all necessary to pack the uterus, a simple strip of gauze for drainage answering every purpose.

After curettage the treatment of an acute pelvic inflammation resolves itself into rest, purgation, and hot douches. To rest in bed must be joined absence of sexual intercourse. By some strong cathartic several watery evacuations should be secured, which will not only unload the large bowel of any scybalous masses, but which will cause depletion by withdrawal of a certain amount of fluid from the circulation. Finally, hot vaginal douches should be given at least twice daily, with the patient lying upon her back and the hips elevated and shoulders lowered. The temperature of the water should be only just below the point which will cause actual burning—about 100° F.—and not less than a gallon should be used each time. To avoid physical exertion on the part of the patient, this is much better superintended by a nurse.

We come finally to the surgical treatment of the results of pelvic inflammation—the formation of abscesses in tubes, ovaries, peritoneum or cellular tissue; and here several rules of treatment may

be enunciated. After the presence of pus has once been diagnosticated, all preventive treatment may be abandoned, and surgical methods are alone to be considered.

If the surgeon can, in any particular case, be sufficiently sure of his diagnosis to assert that there is no pus in either tubes or ovaries, but that it is confined solely to the peritoneum or pelvic cellular tissue, he may seek to evacuate it through the vagina, or possibly through the abdominal wall extraperitoneally. The abscess sac may be sufficiently movable to allow of its being stitched to the abdominal wall before evacuation; or the sac may be opened and drained from the vagina, and the abdominal exploratory incision closed; or both incisions into the sac may be possible, in which case a strip of gauze may be passed through the abscess cavity from the abdominal through the vaginal incision.

In some cases the patient will continue to drag on a miserable existence after the pus has found an insufficient opening for itself through either rectum or vagina. At longer or shorter intervals there are attacks of acute pain lasting several days or perhaps weeks, and finally relieved by a flow of pus through one or the other cavity. It may be possible in such a case to enlarge, with dressing-forceps, the opening already existing into rectum or vagina, and secure sufficient drainage to bring about a cure. Abdominal section is more dangerous in these than in the cases where no sinus communicates with the external world on account of the very existence of the sinus. After ablation of the sac, the sinus becomes a direct point for entrance of septic matter, which must be closed if possible, after thorough curettage and cauterization, by suturing from within the abdomen.

While until within a few years it was always taught that the only way of removing pus-tubes and ovaries was by abdominal section, more recent work has shown the great advantages of vaginal over abdominal cœliotomy in many of these pus cases. Just as it was formerly advised to open an extra-peritoneal abscess through the nearest point—the vagina if possible, and allow of drainage in the most dependent part of the sac, it is now known that all collections of pus in the pelvis, extra- or intra-peritoneal, tubal or ovarian, can be evacuated by this route, and many of them better by this than any other. The most marked exception, perhaps, is in the class of abscesses which have already distinctly pointed upward toward the abdominal wall.

The pelvis may be opened through the vagina either in front or behind the uterus; tubes and ovaries brought down into full view, and returned or removed as their condition seems to demand; pus cavities anywhere thoroughly evacuated; and drainage established with much less risk of causing septic peritonitis than where pus-sacs are ruptured in an attempt to enucleate them through an abdominal

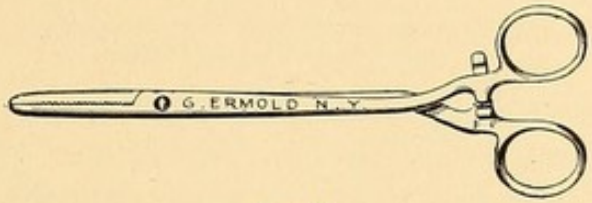


Fig. 52.

incision, the pus necessarily coming in contact with the pelvic and abdominal contents. Moreover, the fact that this can be done without inflicting an unsightly scar is by no means a trivial one.

In many of these cases it is best to remove the uterus with the purulent collections. Especially is this true where both adnexa are purulent, and where pus-cavities have already communicated with rectum or vagina. The uterus, even after both adnexa have been removed, may still keep up a constant trouble, which can only be cured by a secondary operation of hysterectomy. Its removal through the

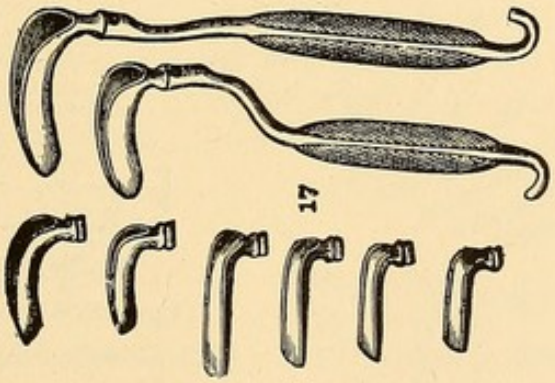


Fig. 53.—Vaginal Retractors.

vagina when this has been opened to reach pus in the pelvis adds nothing to the gravity of the operation, in fact allows of much better drainage, and gives more room for the operator.

There is one decided contra-indication to these operations through the vagina—a deep and narrow pelvis. Where the pelvis is broad and shallow there is abundance of room for manipulation. In other

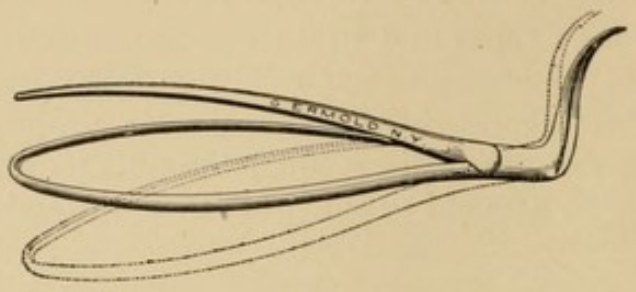


FIG. 54.—Cleveland Ligature Carrier.

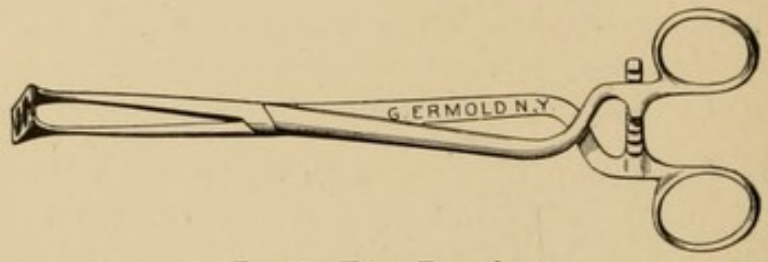


FIG. 55.—Heavy Tenaculum.

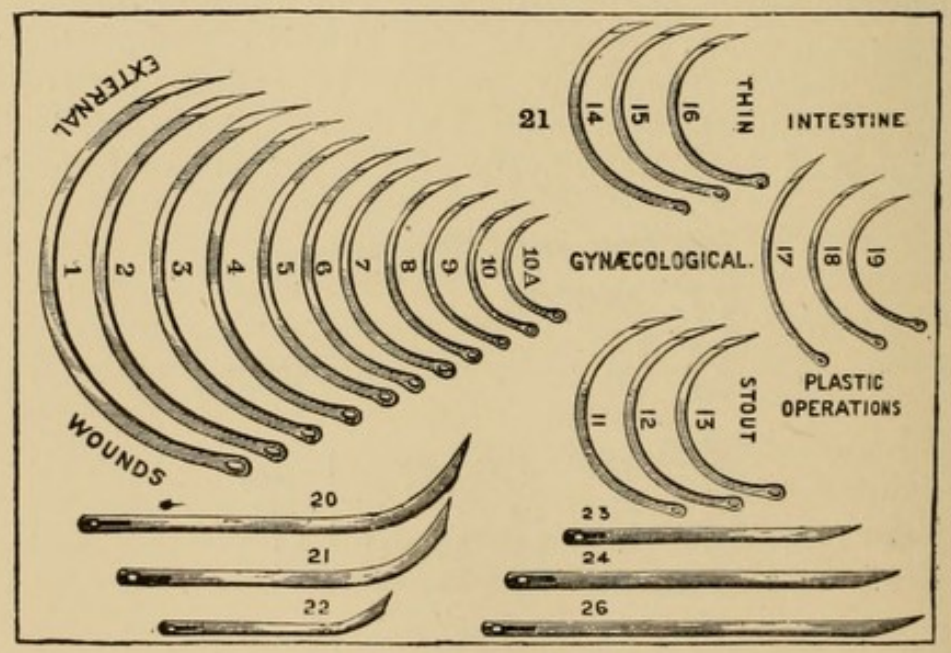


FIG. 56.—Hagedorn Needles.

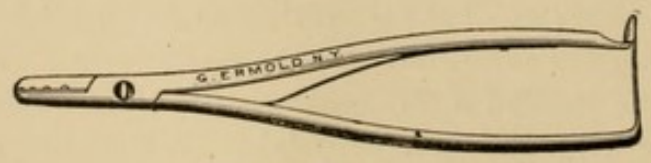


FIG. 57.—Needle-holder.

cases it may be better to operate from above or to gain additional room by lateral incisions in the vulva.

Vaginal Hysterectomy.—There are two different methods of operating; one in which the broad ligaments are secured by clamps, the other in which ligatures are used in place of clamps. If clamps are to be used, at least two dozen should be at hand of different sizes. Jacobs' clamp is shown in Fig. 52. It is a large heavy instrument, and can well be supplemented by smaller and more delicate ones.

The other instruments necessary are self-retaining speculum, a set of vaginal retractors with two handles (Fig. 53), long strong scissors, the Cleveland ligature-carrier (Fig. 54), strong double tenaculum (Fig. 55), full curved Hagedorn needles, large and medium (Fig. 56), needle-holder (Fig. 57), and catgut in three sizes—heavy, medium, and fine.

With the patient in the dorsal position and the legs in upright supporters, scrub the vagina and labia with green soap, curette the cervical canal, and plug the womb with iodoform gauze; irrigate thoroughly with 1 to 500 bichloride, and wash finally with sterile water. Have the irrigator filled with an ample supply of sterile water. The self-retaining speculum will alone often give sufficient room for all manipulation, but the other retractors may be used on the sides and anterior wall of the vagina, as necessary.

Seize the cervix through both lips with a strong tenaculum, draw it down and make a transverse incision through Douglas' pouch into the peritoneal cavity. Should there be free bleeding from this incision it is well to whip over the posterior cut edge with a continuous suture of fine catgut, and to include in this suturizing the free edge of the peritoneum.

Through this incision alone many pus sacs may be evacuated, and if tubes and ovaries be found free from pus the operation need proceed no farther; the pus-cavity being simply drained by packing with gauze.

A pus-tube or ovary may also be brought down and removed through this incision without rupture, and if there has been no soiling of the peritoneum the incision may be closed. Should it be necessary, however, to completely remove the uterus and adnexa, the next step is to make an incision around the anterior lip of the cervix low enough down to avoid the reflection of the bladder, and connect the ends of this incision with the former one. With the finger and

handle of the scalpel dissect up the bladder from the uterus until the peritoneum is again opened in front, and if there is bleeding from the cut edge of the vagina continue the overhand suture of the cut edge to the peritoneum, as on the posterior lip of the incision.

The ligation of the broad ligaments in sections may now be carried out. For this purpose either the ligature-carrier or a strong curved needle may be used, and heavy catgut is the best material.

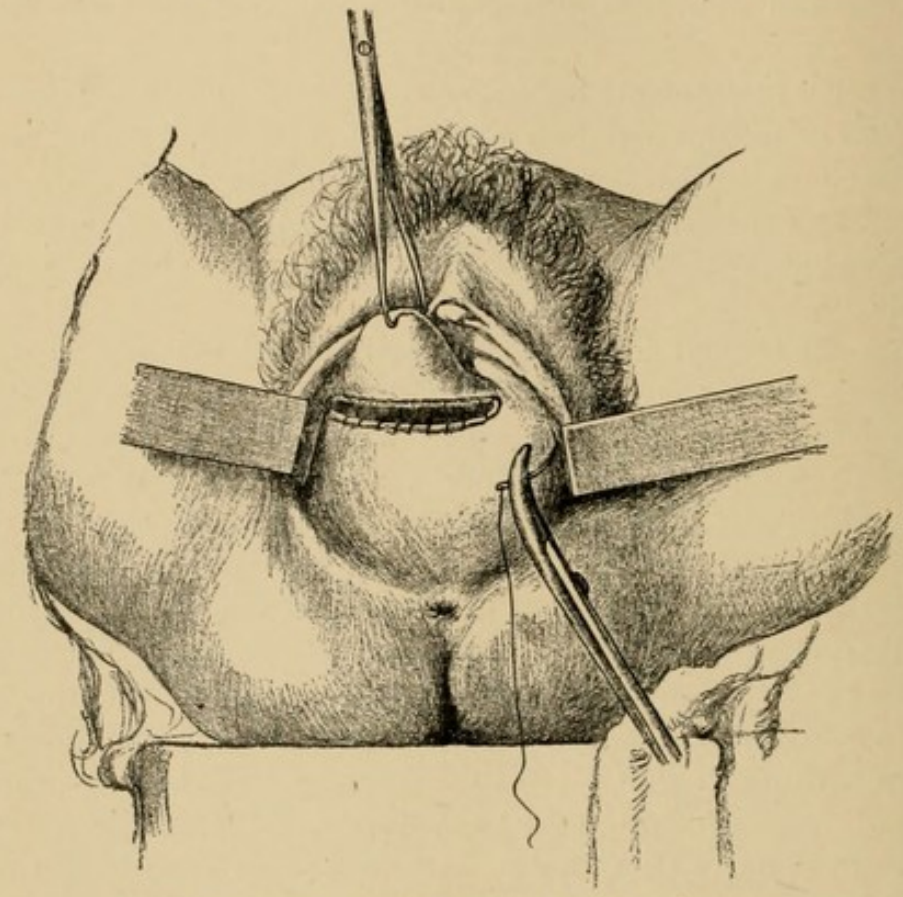


Fig. 58.—Opening Douglas' Pouch in Vaginal Hysterectomy.

The first ligature on each side should include the uterine arteries and avoid the ureters (Fig. 59). Both ends of the ligature should be cut short, and the tissue between the ligature and the uterus cut through with scissors as close to the uterus as possible. Before dividing the tissue it is well to seize the tissue outside the ligature with a small clamp. In case the uterine artery be not firmly secured the bleeding point in the stump is then in plain view and under full control, and a second ligature may easily be passed by transfixing the stump with an armed needle. The ligation of the lower segments of the broad ligaments and their division allows the uterus to be

brought still farther down, and a second ligature may be passed on each side and another segment divided again close to the uterus. Three ligatures on each side will usually be sufficient (it may be done with two) and the last should pass outside of the ovaries so that they will be left attached to the uterus and come away with it.

After opening the peritoneum both above and below, it is easily possible by dissecting well into the uterine tissue on each side to

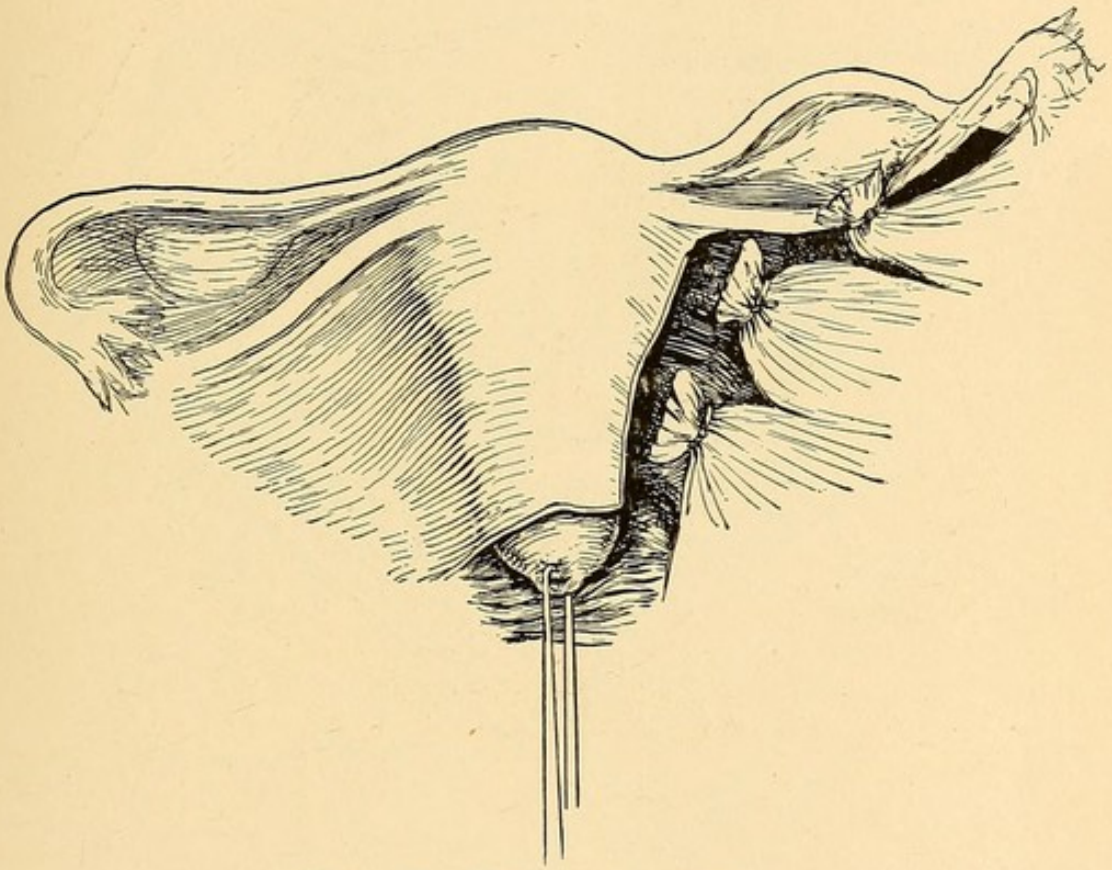


FIG. 59.—Vaginal Hysterectomy with Ligatures.

avoid the uterine arteries entirely, thus leaving only the upper part of the broad ligament to be ligatured or clamped and dispensing with the first ligature around the uterine artery on each side.

In some cases after ligating the uterine arteries on each side, the uterus may easily be rotated upon itself and the fundus pulled down into the wound while the cervix is released. This causes a half turn in the broad ligaments and facilitates ligating the remaining portions, and is thus of advantage when not too much time or force is required to effect the manœuvre.

The operation with clamps differs in no way from that with the

ligature, except that each section of the broad ligament is clamped instead of ligated before division; but the completion of the operation is decidedly modified. The clamps should be left *in situ* thirty-six hours, the wound and vagina around them packed with iodoform gauze, and the handles covered with aseptic dressing where they protrude between the thighs. Their presence adds considerably to the

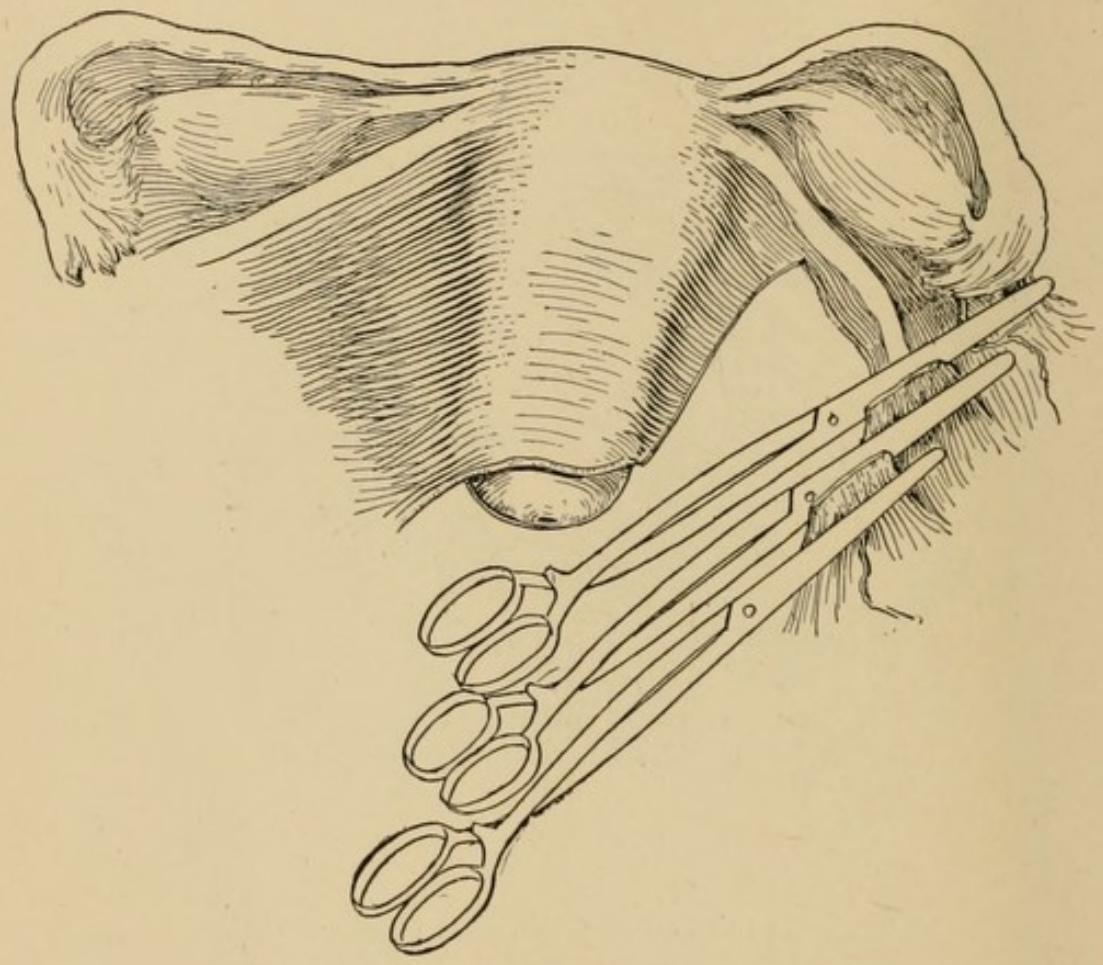


FIG. 60.—Vaginal Hysterectomy with Clamps.

discomfort of the patient while they remain, and there is always some risk that one may become loosened and bleeding result. Their removal after thirty-six hours is also a cause of nervous irritation to the sufferer.

With the ligatures, on the other hand, if the operation has been aseptic, the wound in the vagina may be completely closed by sutures after the stumps have been drawn down into the vagina and thus placed outside of the peritoneal cavity (Fig. 61), or the wounds in the broad ligaments may be closed by continuous suture, the lower

stumps on each side drawn through the vaginal wound and this also sutured.

But unless the operation has been aseptic, that is, unless the pus has been removed in its ovarian or tubal sac without rupture and

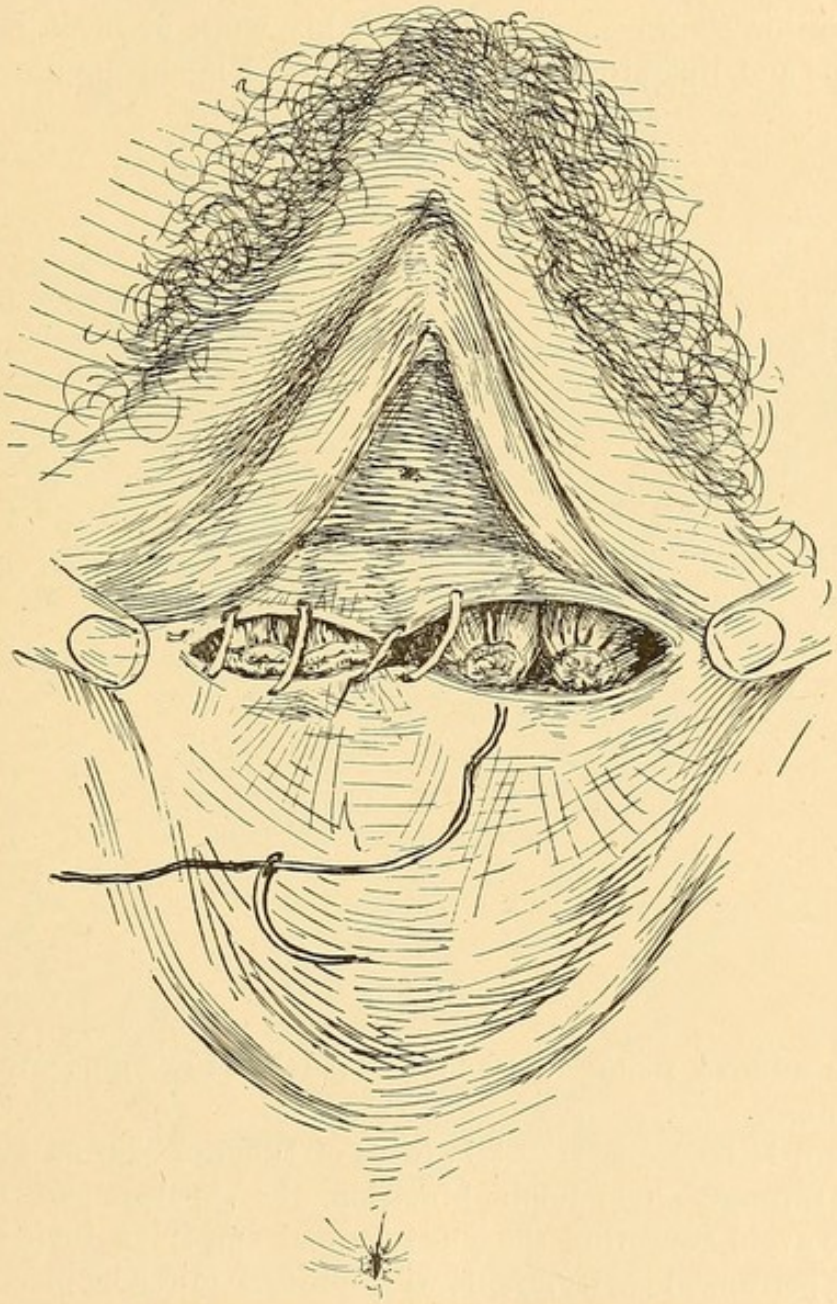


FIG. 61.—Closing the Vagina after Hysterectomy.

soiling of the wound, no attempt to close the vaginal incision should be made. It should on the contrary be stuffed with bichloride gauze and left open for drainage.

In operating for extraperitoneal abscesses or those sacculated within the peritoneum at some stage in this operation the wound will be deluged with pus. It is just here that the great advantages of this procedure become manifest, for under a steady irrigation the pus escapes through the vaginal incision without fouling the abdomen. The operator continues steadily with his work of breaking down adhesions and liberating pus, until the broad ligaments are secured

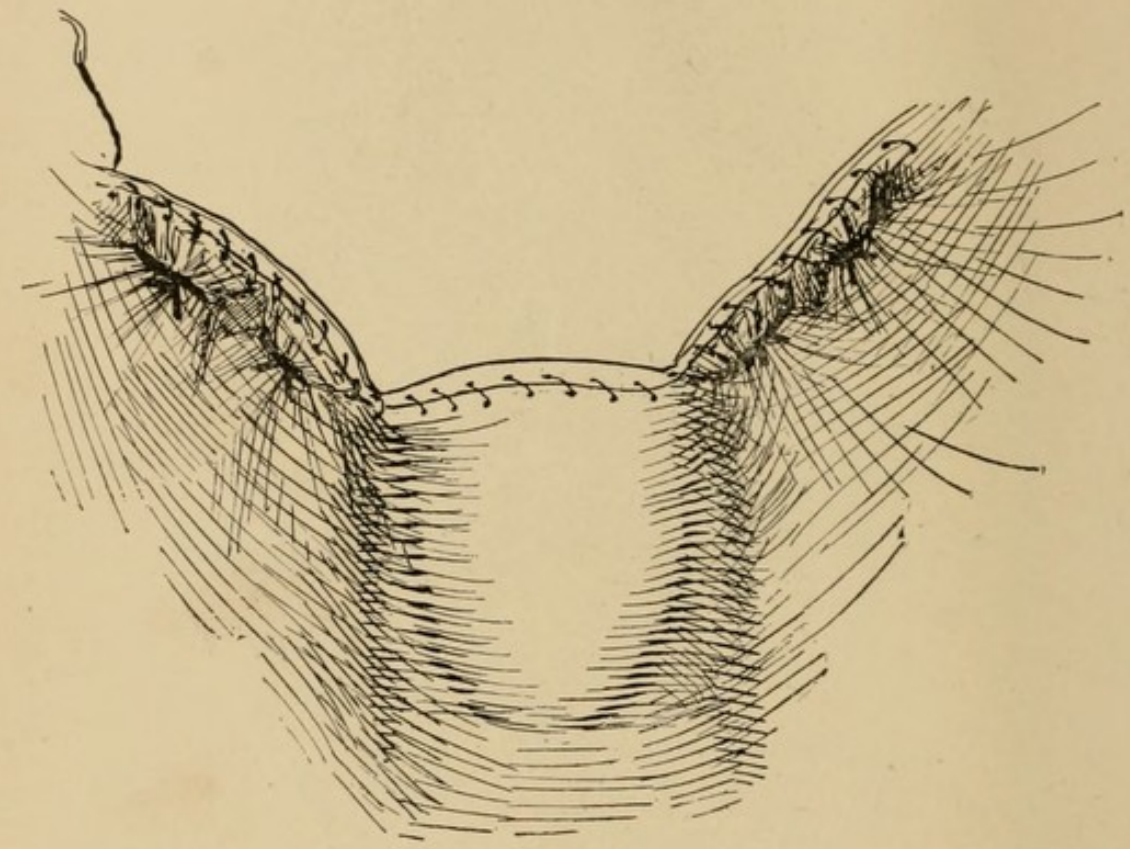


Fig. 62.

and the adnexa removed, when the pelvis and vagina are packed with gauze.

Should it be deemed best in cases of tubal or ovarian abscess to operate through an abdominal incision, the greatest care must be taken to avoid rupturing the pus-sacs and emptying their contents into the peritoneal cavity. This will, however, often be unavoidable, and every precaution must be used to prevent the contact of the pus with the adjacent parts by careful use of flat sponges. If the abdominal incision is closed after such an operation drainage should previously be made through the vagina, and the pelvis should be carefully wiped free from all blood and pus, but not irrigated. When

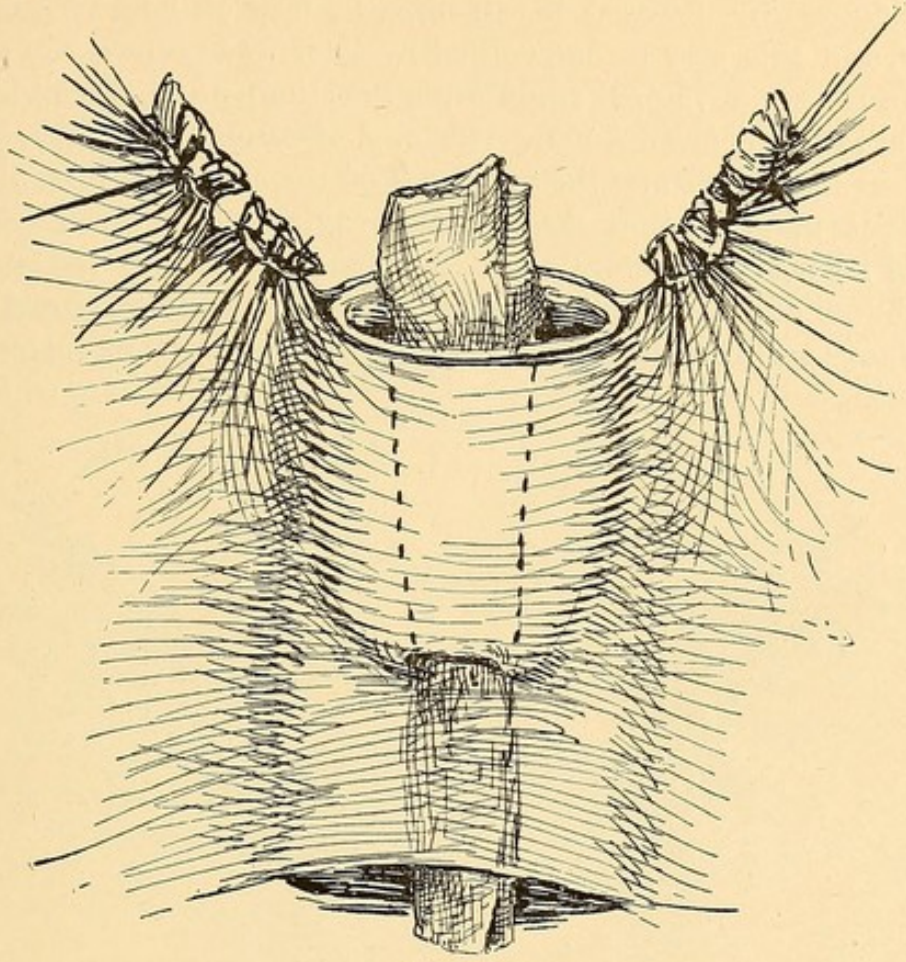


FIG. 63.

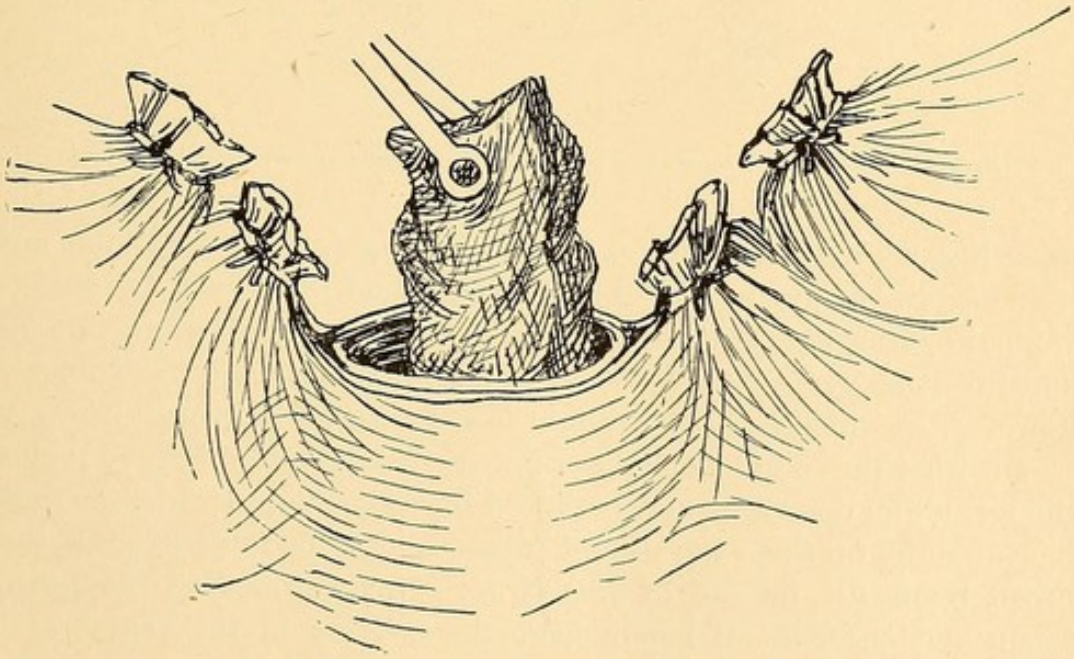


FIG. 64.—Abdominal Hysterectomy with Drainage.

both adnexa are diseased it will often be best also to remove the uterus, and this may be done either by total or supra-vaginal excision. In the supra-vaginal amputation the stump of the cervix is left, and the vagina is not opened. The only advantage of this operation is the saving of time and the avoidance of the slight bleeding always attendant upon cutting through the vagina. The cervix should always be curetted before such an operation to avoid infection of the wound, and after the amputation it may either be closed by a continuous suture as in Fig. 62, or a gauze drain may be introduced

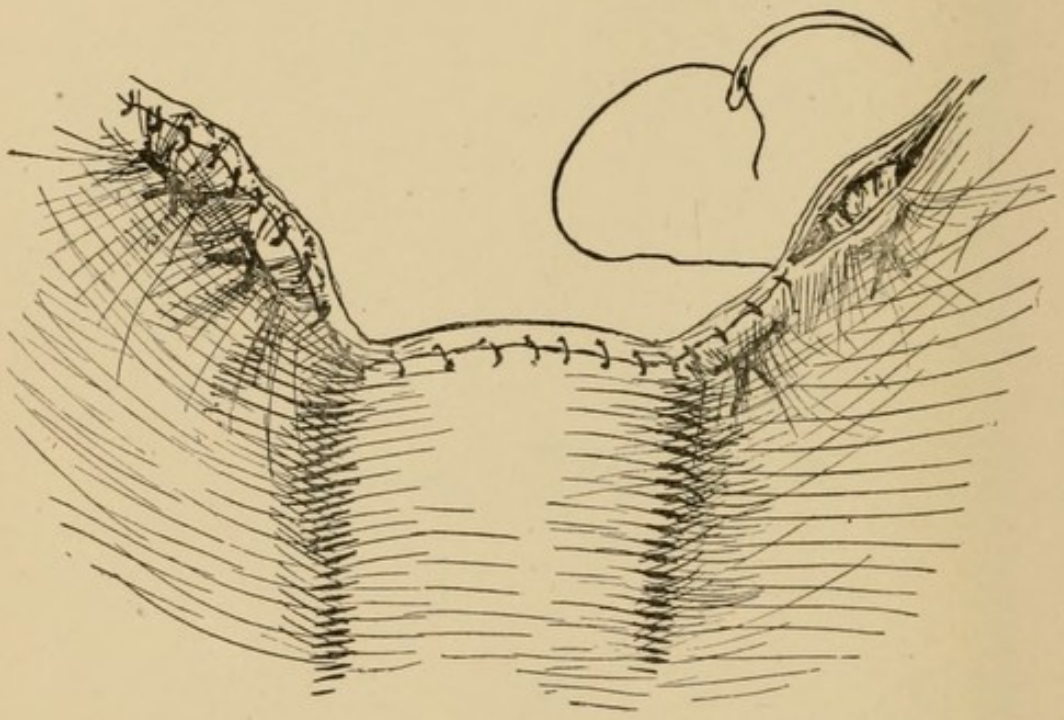


Fig. 65.—Abdominal Hysterectomy with Closure of Vagina and Peritoneal Incision.

as in Fig. 63, depending upon whether the operation has, or has not been aseptic, as in Fig. 63. Another argument in favor of the supra-vaginal operation is that by not removing the stump of the cervix an additional safeguard remains against vaginal hernia—an argument, however, to which but little weight is attached by most operators.

In either the complete or the supra-vaginal operation I much prefer the technique described and practised by Edebohls, in which he first ligatures the uterine arteries and subsequently the remainder of the broad ligaments instead of *vice versa*. Having removed the entire organ and checked all hemorrhage the incision in the vagina and peritoneum may either be packed with gauze to allow of drainage,

as shown in Fig. 64, or the complete closure of the wound may be carried out as shown in Fig. 65.

In cases of post-partum sepsis, with high temperature and pelvic phlegmon, it will generally be safer to do a partial operation and evacuate the pus through a vaginal incision at first than to attempt complete removal of the uterus and adnexa with the patient in such a condition. Should the patient survive the attack and subsequent more radical treatment be necessary it may then be carried out with much better prospect of success.

CHAPTER VIII.

FISTULA.

A FISTULA which is not due to ulceration and perforation of the rectal wall from within is the result of a previous abscess, and, therefore, in enumerating the causes of abscess those of fistulæ have also been given. Like the abscesses from which they arise, they may well be divided into superficial and deep ; or into those of the anus, which are subcutaneous and involve at the most only a few fibres of the external sphincter, and those of the rectum and pelvis, which open into the bowel at a higher point, or perhaps on the surface at a

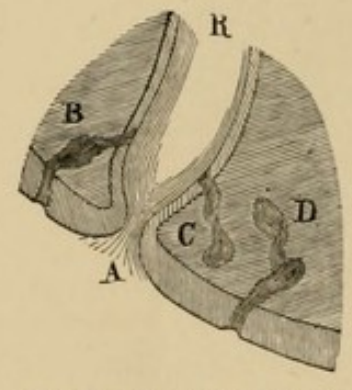
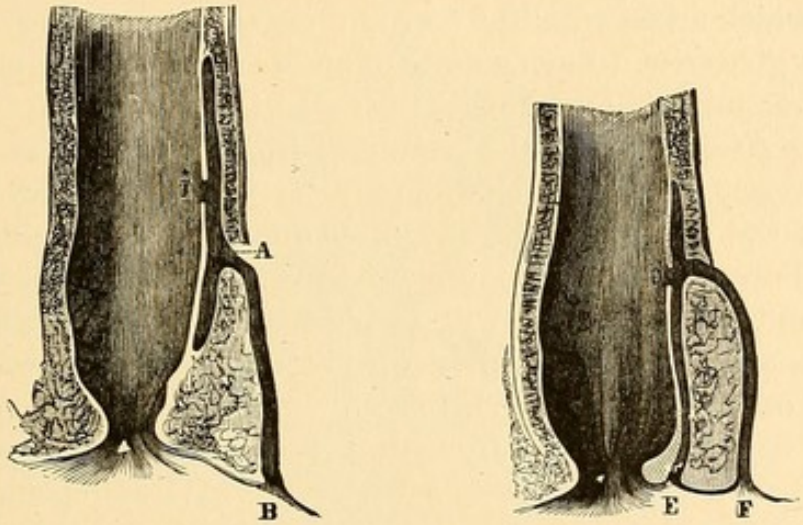


FIG. 66.—Varieties of Fistula.

considerable distance from the rectum. Both the superficial and deep may also be divided into the complete, or those which open both on the skin and into the bowel ; the external, which open only on the skin ; and the internal, which have an opening only within the bowel (Fig. 66).

Superficial Fistulæ.—On account of the special laxity of the submucous connective tissue in this region, abscesses show little tendency to spontaneous closure, and fistula is the common result when left to their own course. In the subcutaneous fistula the external orifice may be at some distance from the anus or in the radiating

folds. The presence of more than one external orifice is rare in subcutaneous fistulæ; and an internal opening will be found in most if properly searched for. The best way to settle the question of the presence or absence of an internal opening in any doubtful case is by injecting milk through the external orifice. In the vast majority of cases the milk will be found in the rectum, and the internal orifice will be found just within the external sphincter. In some the opening will be found in the radiating folds entirely below the



FIGS. 67 and 68.—Fistulæ with Double Tracks.

fibres of the sphincter, and in others it may be much higher up the bowel.

The internal orifice does not in all cases mark the superior limit of the fistulous track. This may run several inches up the bowel under the mucous membrane when the internal orifice is just within the external sphincter (Figs. 67 and 68).

The track of a fistula is sometimes straight, extending directly from one orifice to the other; in other cases a track, properly speaking, does not exist, and both orifices open directly into the original abscess cavity. If the external orifice be very small, the cavity may at any time become distended with pus and give rise to all the symptoms of a fresh abscess till the pus finds an exit through either the old opening or a new one. The track is lined with lardaceous tissue, the result of chronic inflammation, and in this may be found numerous blood-vessels of new formation. This tissue, by preventing all contact with the walls, necessarily prevents healing. On the other hand, the track is sometimes lined with healthy granulations which

are capable of being formed into new tissue, and for this reason a fistula will sometimes, though very rarely, heal spontaneously.

The symptoms caused by this class of fistulæ vary greatly. At first they are those of the abscess in which they originate. After that the one great symptom is the incessant discharge, sometimes slight, at others abundant; sometimes purulent, at others serous; always fetid; sometimes containing fæces and gas. Besides the discharge there may be no symptoms at all, or there may be more or less uneasiness in the part, and pain on defecation, with the constipation which arises from the fear of a passage, and the symptoms to which it gives rise. Such a state of affairs may exist for many years without aggravation or causing the patient to seek relief.

Deep Fistulæ.—Fistulæ resulting from ischio-rectal abscesses differ greatly in their extent and gravity from those last described. In them the track is large, and often double or branching, and the external opening may be far away from the anus. The whole perineum and gluteal region will sometimes be found brawny and indurated, and twenty or thirty openings may be counted, with the scars of others which have closed.

The fistulæ resulting from deep pelvic abscesses are of many different varieties, all of them severe. The external opening may be far away from the anus, and there may be several tracks and openings which may branch off from each other, or all may communicate with a common abscess cavity in the pelvis. When an internal opening alone exists it may be in the rectum, vagina, urethra, bladder, or any part of the alimentary canal.

The track in some of these cases has been known to take a remarkably irregular course. Sir A. Cooper mentions an autopsy where a fistula opened in the groin, followed the course of the spermatic cord, and ended in what seemed like an ordinary fistula in ano; and cases in which the pus has burrowed under the gluteal muscles and finally opened in the thigh, loin, or even nearly at the popliteal space, are not uncommon.

Blind Internal Fistula.—Fistulæ about the anus with internal openings alone have a somewhat special pathology. When caused by an abscess it is generally by one of the deep variety which has opened into the rectum high up and continues to discharge in this way. The abscess causing such a fistula may, however, be a small submucous one or a large subcutaneous one. There is another and perhaps more common class of internal fistulæ in which the opening

is not the result of the breaking of an abscess, but is first formed by ulceration, and the track is a secondary consequence.

A circumscribed ulcer which perforates the mucous membrane and results in internal fistula may be due to several causes : to rupture of an inflamed internal hemorrhoid ; to the application of strong acids to hemorrhoids ; to operations upon the rectum ; and especially to tubercular ulceration.

Such a condition is a very painful one. The opening, which may be large enough to show a distinct loss of substance to the touch,

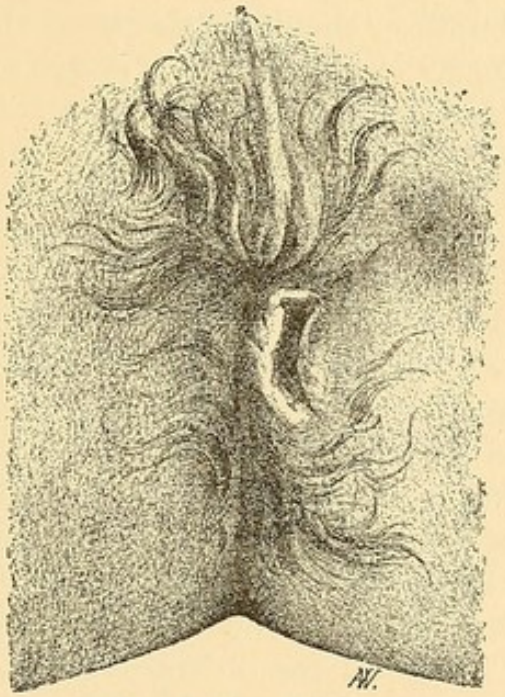


Fig. 69.—Tubercular Fistula.

catches and retains particles of fæces, causing a burning pain which may last many hours after defecation. As a result of the opening an abscess forms after a time, with the usual symptoms, the induration of which may be felt externally. When the abscess is small and the induration not extensive, a speculum examination may reveal the ulcer ; but the fistulous track and abscess may escape—a mistake which will render all treatment directed toward the cure of the ulcer of no avail. There may indeed be several ulcers, only one of which has a fistula connected with it.

Fistulæ of this variety differ very much in character ; but taking them as a class, I know of no branch of rectal troubles so apt to lead to errors in diagnosis or mistakes in practice. Some of them are

perfectly apparent by even a cursory examination. The internal opening may be so large that the finger enters an abscess cavity on introducing it into the anus, while the skin of the ischio-rectal fossa is reddened and thinned and the pus is about to break through the surface. This condition is most frequently seen as a result of tubercular deposit (Fig. 69). On the other hand, the internal orifice may be so small as scarcely to admit the finest probe, there may be only a small straight track and no abscess cavity, and the condition may require the most thorough and careful examination under ether for its detection. The patient may complain only of pain strongly resembling that of fissure or simple neuralgia of the rectum, and the purulent discharge may be so slight as to escape notice.

The mere diagnosis of the existence of a fistula, except in the blind internal variety, is usually attended by little difficulty. The examination of the extent and variety of a fistulous track, however, is a matter requiring delicacy and skill. The best position is on the affected side, with limbs flexed on the abdomen. The examiner should be provided with probes of every variety, from the small ones made of pure silver to the soft metal uterine sound ; and it is better not to begin the examination with any preconceived idea as to the direction of the track, for this is exactly what the probe is to determine. The instrument should be allowed to follow the track, and not be forced toward the gut, or indeed in any direction. After it has gone as far as it will, the index finger of the other hand may be introduced into the rectum and try to detect the end of the probe. Sometimes it will be found free in the rectum ; sometimes it can be felt covered only by mucous membrane, but no internal opening can be discovered ; and again, rather to the surprise of the operator, it may not be felt at all, having passed directly away from the bowel.

In the diagnosis of the blind internal variety there is a chance for much skill. I have known a small fistula of this kind to escape detection by a dozen different men, and to be treated for almost every other form of rectal affection. The absence of any external orifice misleads the superficial examiner at the beginning, and the failure to make a thorough examination completes the error.

There are two signs of this condition which will in every case lead to a correct diagnosis. The one is the discovery of the internal orifice, the other and more valuable is the induration which invariably attends a track of any size. The whole course of a fistula can often be

marked out distinctly by the detection of a whip-cord hardness running around the anus under the skin.

Treatment.—A fistula may heal spontaneously or after a very slight excitement to reparative action, such as the mere passage of a probe in making an examination. It has been mentioned that the track is sometimes lined with healthy granulations, and that these may result in new tissue which shall close it. I have the notes of one such case where a fistula of several years' standing closed spontaneously without even the passage of a probe to excite it to reparative action, but I have never seen more than one.

Setting aside these cases, we are at once brought to the question, which will often be asked by the patient, and which the surgeon may not always be able to answer to his own satisfaction—whether it is always best or even safe to try and cure a fistula. In certain cases of Bright's disease, cancer, cardiac and hepatic affections, etc., all surgical interference may be contra-indicated; but the question is most apt to arise in tubercular patients. My own practice has always been to operate upon tubercular cases as upon others when there was any hope of effecting a cure of the local affection. There are several rules which should be carefully regarded in this class of cases, however. No cautious practitioner would think of operating either in a very advanced, or rapidly advancing, general tuberculosis. Cough, when violent and frequent, is also a decided contra-indication, interfering, as it does very certainly, with the healing of the wound. Moreover, in every case where there is any suspicion of tuberculosis, the whole extent of the fistula should be thoroughly curetted or destroyed with the Paquelin cautery. There is no doubt that a tubercular fistula may be the first symptom of what will later develop into a general infection, and that its complete destruction may prevent a general deposit, as may happen in tubercular deposit in the testicle.

The after-treatment of a tubercular patient is always a matter of great importance, for these incisions may refuse to heal even when they look perfectly healthy. The patient should not be confined to bed any longer than is absolutely necessary, and if his general health is better in the open air he should be encouraged to go out as soon as the wound will permit, even though rectal wounds do heal better in the recumbent posture. But here the general health must take precedence. The diet should be the most nourishing possible, change of air should be sought, tonics of all varieties should be given, and

the local treatment should be gently stimulating. It is often useless, however, to change local dressings and to worry over the wound. If the cut shows no tendency to heal, and there be no sinus to account for the sluggishness, it is the patient himself who must be cared for, and the particular form of dressing will make little difference.

In cases of fistula in tubercular patients, or those in feeble general health from any other cause, the sphincters should be interfered with as little as possible. They are apt to be weak at the best, and the less cutting of them that is done the better.

Having decided, then, to try and cure the fistula, many ways are open. In certain selected cases a cure may be effected by stimulating the track and allowing a free discharge of pus without any cutting operation. For this purpose dilatation of the external orifice by sea-tangle tents, the introduction of drainage-tubes, injections of turpentine and iodine, and applications of nitrate of silver and caustic potash have all been successful. Treatment by any of these methods requires time and patience, and the result cannot be looked upon as at all certain; and yet all of them hold out a certain slight prospect of success, if the patient be in condition to submit to their trial.

In cases of recent abscess of the ischio-rectal fossa where the pus has broken out on the skin but no internal opening has yet formed, the chances of success by this method are very good. The patients should be kept in bed and the outer opening be enlarged to allow of free escape of matter. Then, by free drainage and injections of bichloride 1 to 2,000, the abscess cavity is very likely to heal. In older cases, where a true pyogenic membrane has formed, the applications must be much stronger, and in these turpentine, iodine, or caustic potash will succeed much better.

When it has been decided to lay the fistula open into the gut, there is but one method which can be thoroughly recommended, and that is the knife. The elastic ligature and *écraseur* need not be considered except in cases where the patient is too timid to submit to the knife. The silk ligature is unsurgical and the elastic ligature and galvano-cautery wire possess no advantages to an operator who does not fear hemorrhage, and who acts on the surgical principle that what vessels he may cut he can also secure.

The operation for fistula by incision may be greatly facilitated by the observance of several minor details. In this, as in other operations on the part, the bowels should be thoroughly emptied on the previous day. In all cases in which the track is of any considerable

depth, or in which, on account of sensitiveness of the patient, the surgeon has not been able to assure himself of the exact extent of the disease and the absence of any side tracks or diverticula, ether should be given and the anus gently and completely dilated before the operation. It is only in the simplest cases that the incision may be made without ether, and then the best chance of a thoroughly satisfactory exploration is missed, and the way is opened for an incomplete and therefore unsuccessful operation.

For deep tracks, if a knife is used, it should be strongly made, for it is not a very difficult matter to break an ordinary scalpel in a deep fistula. A heavy steel director may also be snapped in an attempt to bring the end out of the anus preparatory to making the incision; and should the internal orifice be high up, and the external at some distance from the anus, so that the amount of tissue to be divided is large, it is often better to discard the knife and use a pair of strong scissors.

When no internal orifice can be found, but the mucous membrane feels undermined and the probe can be felt by the finger in the rectum, separated only by a thin layer of mucous membrane, it is a good plan to force an internal opening and treat the fistula as though it were complete. When there are two internal openings, both should be included in one incision. When, after the incision, the diseased integument is found to overlap the cut and hang into it, it should be cut away; and in old tracks the healing may be hastened many days by thoroughly scraping out the lardaceous wall with the handle of the scalpel, or even scarifying it in several places, so that a healthy reparative action may be set up.

Where the fistulous tracks exist in great numbers, two or three operations may be advisable at intervals, rather than to attempt to do all at one sitting, lest the patient's reparative powers should be unequal to the task thrown upon them. In such cases there will often be found two or three tracks which may be considered as primary, into which the others run; and each of these, with its branches, may be dealt with at a separate operation. Many of the tracks will be found to run away from the bowel under the skin of the buttock or toward the scrotum, and these may be induced to heal by laying them open, without interfering with the sphincters. It will sometimes be necessary to divide the sphincter several times, however, before the cure can be completed, and a certain degree of incontinence may be expected as a result.

In the matter of dressings after the incision much skill may be displayed. Immediately after the operation a dressing of plain or iodoform gauze should be introduced and kept in place by a T-bandage. To save the patient as much pain and annoyance as possible, this should not be removed till after two or three days, when it will have become soft and loose from the discharge. Subsequent dressings may be of the same material and should be changed daily. The wound should not be tightly packed with lint. It will heal from the bottom if its surfaces are kept apart or separated daily by the finger of the surgeon. Care is always necessary to prevent an immediate union of the cutaneous edges of the incision. In my own practice I seldom use any dressing at all after the first, but merely introduce a finger into the wound two or three times a week to secure healing from the bottom, and apply sufficient gauze to the surface to catch the discharge.

Healing may be indefinitely delayed by too frequent dressings, or by stuffing the wound tightly with the intention of forcing it to heal from the bottom. Under such treatment healthy granulations may entirely disappear, and the cut surface assume a mucous-membrane-like appearance and so remain. Standing or walking always delays, and may sometimes entirely prevent healing. The same result may follow the use of too powerful antiseptic solutions in the hands of an enthusiastic dresser in hospital.

During the treatment the burrowing of pus and the formation of a new pocket should always be carefully watched for and met by incision.

The hemorrhage in an ordinary operation for fistula is seldom profuse enough to cause the surgeon any uneasiness, and is almost always easily controlled by packing the incision with gauze and making firm pressure with a compress held in place by a T-bandage. A free arterial hemorrhage from a vessel well up to the rectum must be treated either by ligature or tampon.

Under the most favorable conditions a fistula which is but a straight track may require so large an incision that a couple of months may be required for healing. In some cases this long delay may be avoided by a simple method of introducing deep sutures to approximate the sides of the cut. The old pyogenic membrane must first be completely removed and the track put into condition to heal by first intention. Two or three wire sutures are then introduced to draw the deeper parts of the cut together, and the edges are approx-

imated carefully with catgut. If the attempt be successful much time will be saved, and if it fail nothing is lost ; but, except in slight cases with a straight track and easily approximated edges, the attempt at union by first intention will fail.

The general idea of the operation of cutting a fistula in ano, is that a director should be introduced into the external orifice, brought out into the rectum through the internal opening, or at a point where its end approaches most nearly to the mucous membrane, then bent and brought out of the anus, and that the tissues upon it should be cut.

This is the idea conveyed to the student by his lectures, and to the practitioner by his text-books on general surgery ; and in many, perhaps the majority, of cases this simple procedure will be curative, for many fistulæ are straight tracks running not very deeply into the tissues, and it is to them, and to them only, that the operation applies. But no practitioner will cut many fistulæ in this offhand, routine way before meeting with a case in which such an operation will either prove a signal failure or will result in irreparable injury to the parts. It is a fact, I believe, that fully fifty per cent. of all operations for fistula, even in hospital, are failures, either from faults in the operation or lack of care in the after-treatment.

Perhaps the first lesson taught by an unexpected failure in effecting a cure by this operation is that a fistulous track is something to be followed by a careful dissection, and not a thing to be laid open by a single sweep of the knife along a director which has, by more or less force, been entered at one opening and made to pass out at another ; for by this course not only is the track often left in great part undivided, but the director is forced into healthy tissue and parts are needlessly sacrificed.

Instead of this, the track should be followed, step by step, from its external opening along its whole course ; and to do this the director need only be introduced a short distance at a time or not at all. By thus following carefully the course of the fistula, and dissecting it out to its end, no unnecessary sacrifice is made of adjacent healthy tissue, and side tracks or diverticula are recognized as they are met. This is much easier than to pick them out in the bottom of an extensive, bleeding, and irregular wound.

A word about the director. The one ordinarily used (Fig. 70) is too blunt at the end for fine work. It should be of steel, delicately made, and probe-pointed ; silver is too flexible for ordinary work. These have been made for me in three sizes (Fig. 71).

With regard to side tracks or branching diverticula, the rule is that all such should be dissected up exactly as the main track should be; but to this there are very important exceptions. The rule may perhaps be modified in this way: As many tracks should be divided as can be done without risk of incontinence of fæces in either sex, or of destruction of the perineum in women, or of too great injury for the reparative powers of the patient.

As a rule, both the sphincters in either sex may be divided once in the median line without danger of incontinence. It is better, how-



Fig. 70.

ever, to divide as little as possible. The inner should be left intact, if possible; the division should be straight across the muscular fibre, and not slanting; and a double division of one, and especially of both sphincters, should not be resorted to as a primary operation, unless with the distinct understanding on the part of the patient that more or less incontinence may be the result. In operating for fistula, no matter how simple, it is well to be on guard against the patient who is subject to intestinal catarrh with diarrhœa, either constantly or at intervals. A sphincter, the sufficiency of which would never be questioned by one whose bowels act naturally once a day, may be a cause of great unhappiness during even a slight attack of diarrhœa; and a single cut through the external muscle may lead to this result in a strong man. Stretching the muscle may do the same. In

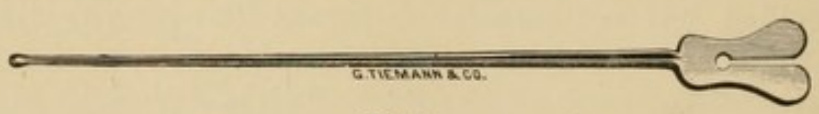


Fig. 71.

women and feeble patients there is more risk than in men otherwise healthy.

In these modifications of the rule of complete division cases of tracks running upward along the bowel are not included, for these should be divided as are those nearer the anus. Here the supposed danger of hemorrhage often stops the operator with his work half-completed; and one of these tracks will often heal spontaneously after the opening of the lower one into which it empties. But it is not safe to trust to this chance. These upward branches are of two

distinct kinds. In one the track runs directly beneath the mucous membrane, and may be so found with the director ; and in this there is little danger of hemorrhage in its division, for the blood-vessels are all outside of it. In the other variety the track runs deeper in the wall of the gut, under the muscular layers, perhaps even away from the rectal wall into the perirectal tissues. In such cases there is great danger of hemorrhage, and the amateur surgeon may easily get beyond his depth.

The exceptions to this rule of complete division will be found in three classes of cases—those of the horseshoe variety, the recto-labial variety, and the old cases of extensive disease where the whole anal and perineal regions are riddled with openings. In these cases all the ingenuity the operator possesses will be demanded to effect a cure without resulting incontinence.

Horseshoe fistula has been defined differently by different writers. In a typical case it is a form of fistula in which there are one or more external openings on each side of the anus and an inner opening in the rectum in the median line behind. It is shown in Fig. 72. But

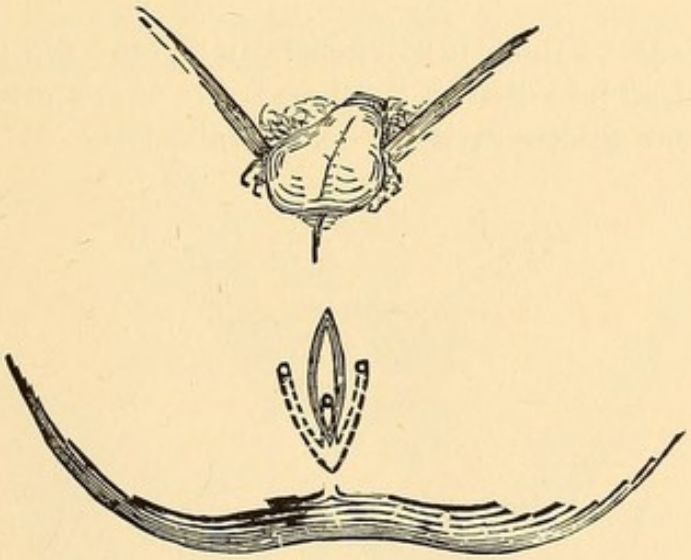


Fig. 72.

a horseshoe fistula may have only one external opening, and yet the abscess which has caused it may entirely surround the gut in horseshoe form. Nor need the internal orifice be in the median line, either behind or in front. The name applies to the shape of the abscess which has resulted in fistula, and not at all to the location of the openings. In this form of disease the pus in its burrowing has

extended from one side of the gut to the other, and the resulting fistula may be complete, incomplete, or of the blind internal variety. The internal opening may be at any point, and the external may be on the opposite side of the body from it.

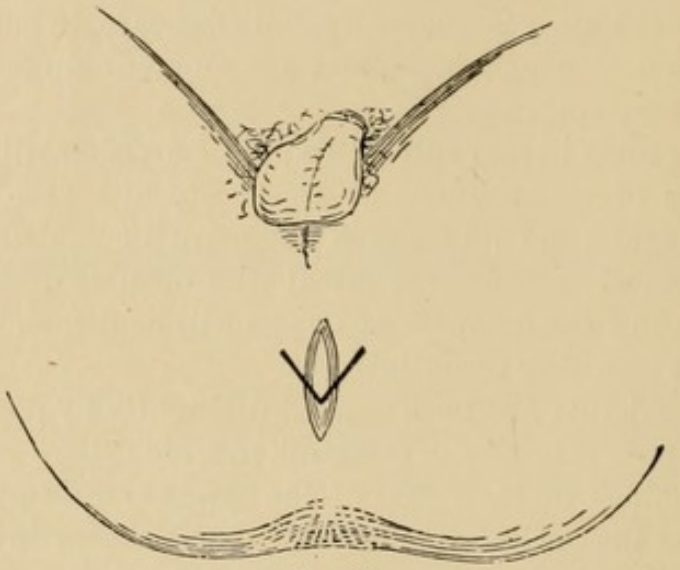


FIG. 73.

In these cases I think it will generally be observed that the openings do not lead into distinct fistulous tracts of any great extent, but rather into one abscess cavity of considerable size.

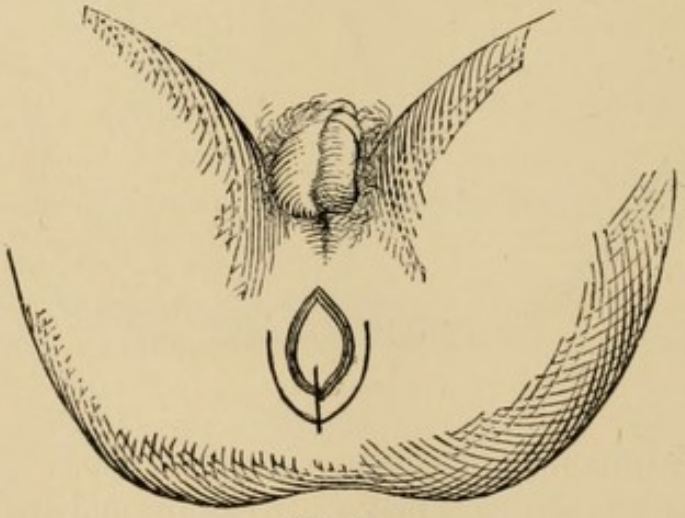


FIG. 74.

It is evident that in operating upon such cases as these there is a chance for much skill in effecting a cure at one operation and still preserving the sphincteric power. And I may say that a patient

who has been left with incontinence of fæces after this operation is apt to be very unforgiving, especially when it happens to be a lady who has been rendered loathsome to herself, afraid to trust herself in society, and doomed to the constant wearing of a napkin. I have

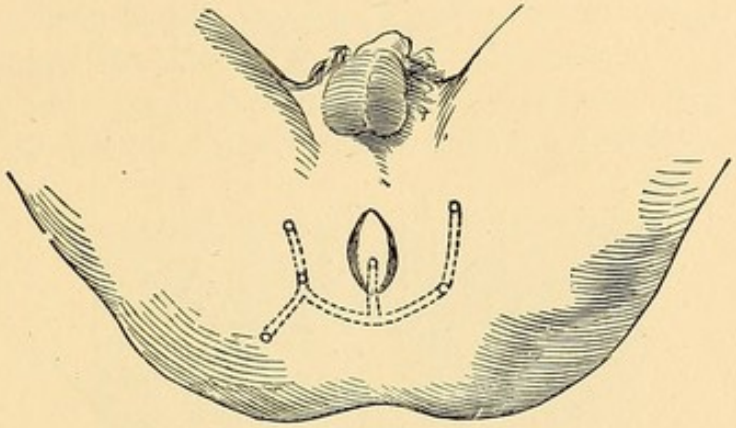


FIG. 75.

seen several such, and by means to be referred to have relieved some, but from the ill-fortune of others I have come to warn my own patients that incontinence may possibly result, when I see any reason to anticipate such a conclusion.

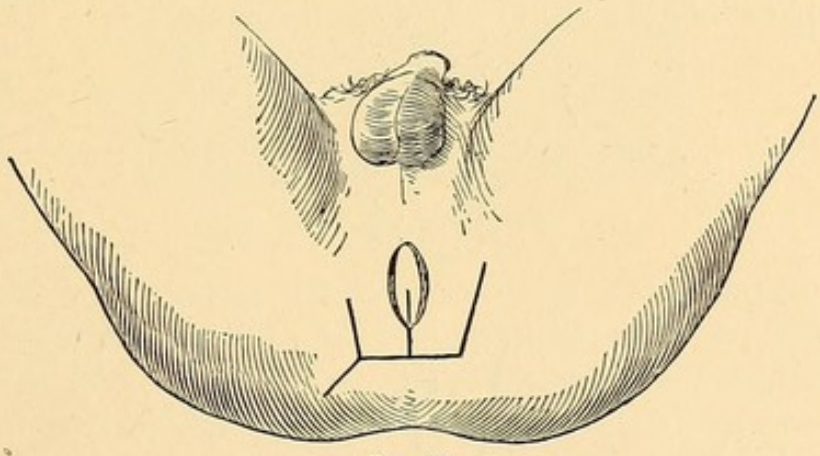


FIG. 76.

Taking now a case of horseshoe fistula, such as is shown in Fig. 72. The ordinary operation would consist in two complete divisions of the sphincters on opposite sides (Fig 73), probably resulting in incontinence. The correct method consists in one complete posterior division, and then the opening of the lateral tracks into this posterior cut, as shown in Fig. 74.

This principle may be made to cover nearly all of this class of cases. Where several external openings are grouped around the anus they may all be connected by one incision, and from this incision

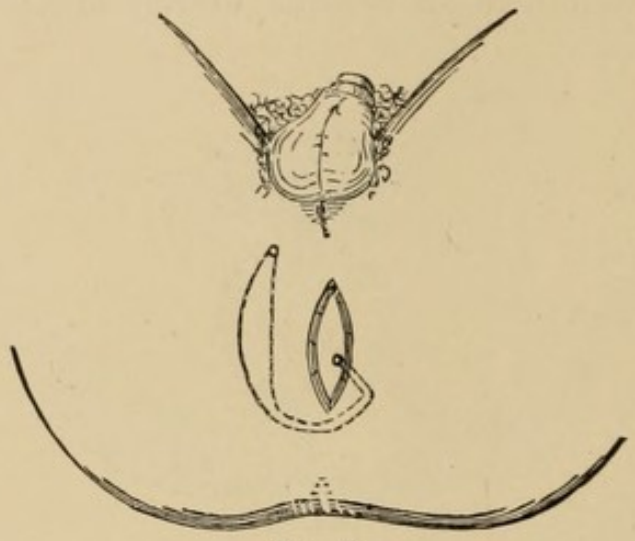


Fig. 77.

a probe may be passed through the internal opening, and this, too, divided with the sphincter.

A more complicated case of the same variety is shown in Fig. 75, and the incisions by which it may be cured with but a single division of the sphincter are shown in Fig. 76.

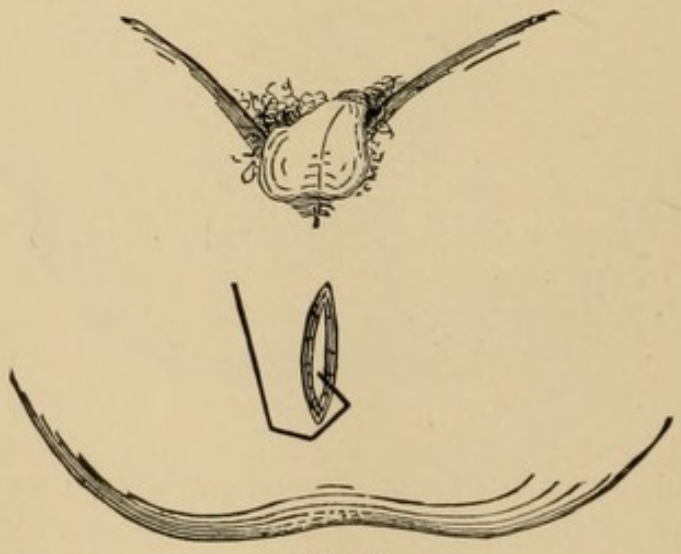


Fig. 78.

In case the external opening be at a considerable distance from the anus, and on the opposite side of the body from the internal, as

shown in Fig. 77, the method is essentially the same, the thing to be avoided being a slanting cut through the rectum and healthy tissue. By following the ordinary rule in such a case—passing a director into one opening and out of the other, and cutting upon it—all but a small portion of the lower end of the bowel would be completely severed by a deep incision. Fig. 78 shows the cuts that were made by which a cure was effected without incontinence.

It may easily occur that in a complicated case it is found impossible to divide all of the tracks without a double or even triple

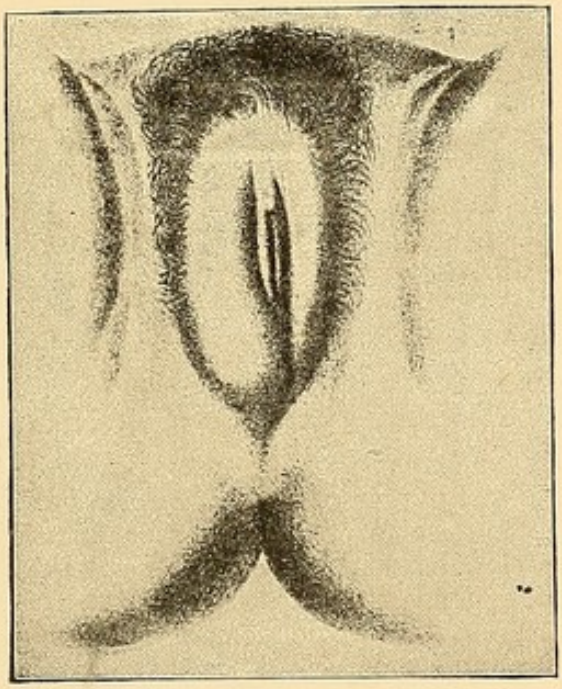


Fig. 79.—Vulvar Abscess.

division of the muscles. In such cases the safer practice is to do such an operation as has been indicated upon all the tracks that can be included in a single division of the muscle, and to trust to other means of cure for the balance, at least till the first wound has healed.

The second class of cases in which it may be unjustifiable to divide all the tracks at the primary operation is that of the recto-labial fistulæ.

This form of disease is in most cases due to inflammation of one or both vulvo-vaginal glands or their ducts, leading to suppuration and the final escape of pus, both on the labia and within the rectum (Fig. 79). There may be numerous external and internal openings.

In the case shown in Fig. 80 there were three distinct abscesses, one in each labium and one near the anus, unconnected with each other, and only one of which connected with the gut. In the case shown in Fig. 81 there was a labial opening on each side. The right track had opened on the anterior wall of the rectum in two places, the left in one, and the right and left tracks communicated by a submucous track in the rectum. In such a case the division of both tracks

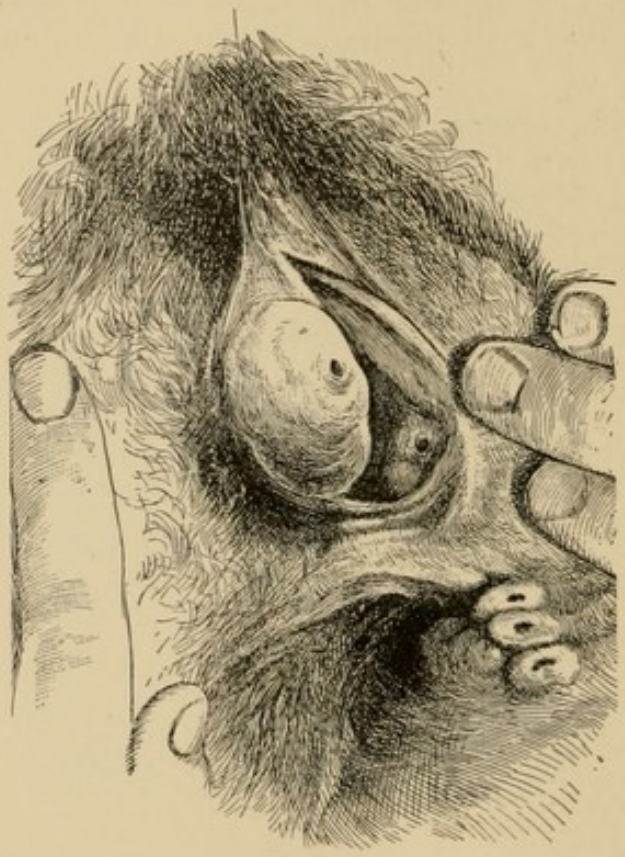


Fig. 80.

would result in a complete double division of the whole perineum, as well as the external sphincter.

The cuts made at the primary operation are shown in Fig. 82.

A probe was first passed through the track on the right side, from the external opening down to the verge of the anus, its end cut down upon and brought out through the skin of the perineum at the point B. From this point it was carried along the fistula to the internal opening on the same side, and this part of the track divided with the sphincter. The director was then again passed from the opening D to the first cut, and the cross-track divided. Finally all of the submucous tracks were slit up, and the track on the left side from its

internal opening as far as was possible without complete division of the sphincter at that point. Setons were then passed along what remained of the original tracks, and tied. The result was a perfect cure without incontinence.

The only rational treatment for the ordinary blind internal forms of fistula is by incision into the gut. The only exception to this is in acute cases of ischio-rectal abscess seen within a day or two after the pus has forced its way into the gut. In such, a free external incision and a thorough cleaning out of the abscess cavity may

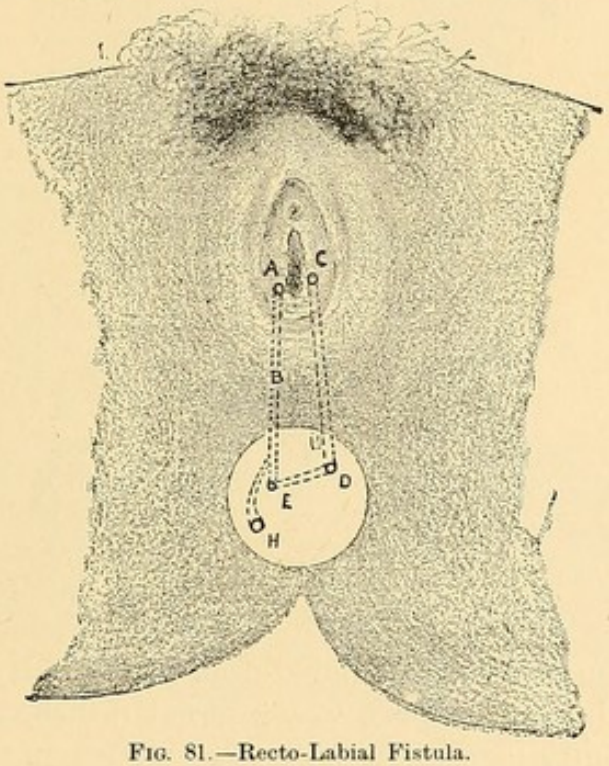


Fig. 81.—Recto-Labial Fistula.

avoid the necessity for cutting into the bowel and dividing the sphincters.

Where the probe readily enters from the gut an abscess cavity or a track running downward toward the skin, it should be bent into a hook, brought as near the surface as possible, and a counter-opening made upon it. Through these two openings a director should be passed and the whole cavity laid open into the gut. In whatever direction the track leads, it must be followed to its end and freely divided. Much delicacy and patience are sometimes necessary to accomplish this so that no side tracks are missed; the probes and directors may need to be very delicate, and much time may be required; but the success of the operation depends upon the thorough-

ness with which it is done. Free drainage at the most dependent part of the incision should always be provided, and to do this it may or may not be necessary to cut deeply through the sphincters. There is always more or less induration around an old fistula and when this

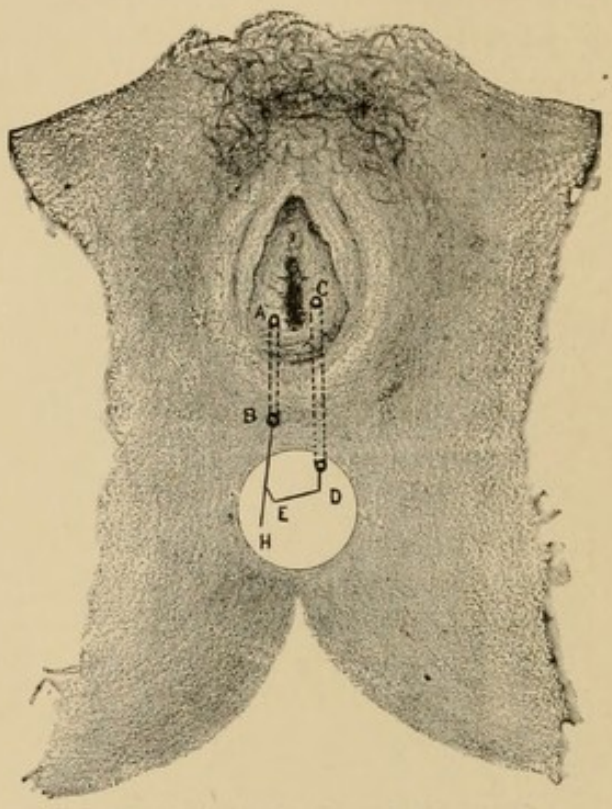


FIG. 82.—Incisions for Recto-Labial Fistula.

can be felt through the skin I have often cut directly down upon it without any director through the internal orifice, and have then found no difficulty in passing a director onward to the internal orifice.

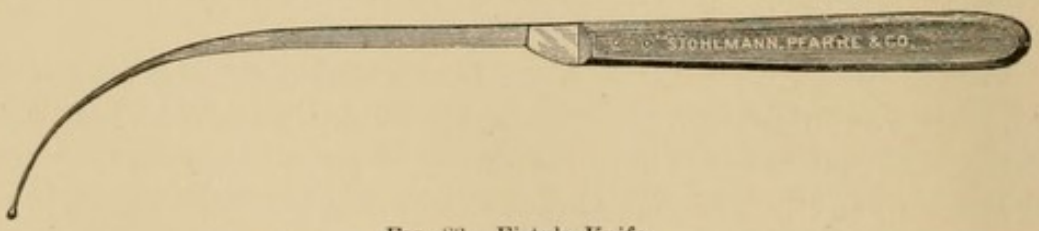


FIG. 83.—Fistula Knife.

The knife shown in Fig. 83 with flexible probe point will often be found useful.

Large abscesses of the pelvis in the male, which have opened into the rectum should be treated by the introduction of a drainage-tube and daily washing out with boracic acid solution. Those located in

the ischio-rectal fossa should be opened on the skin, thoroughly cleaned out, and treated by drainage and injections to give the internal opening a chance to close without dividing the tissue between the two openings, which is often considerable. Should this fail the ordinary operation may be done.

In fistulæ with very long and deep tracks, or in those with many smaller ones, a cure without an amount of cutting which shall necessarily lead to incontinence may be impossible. Fig. 84 is taken from

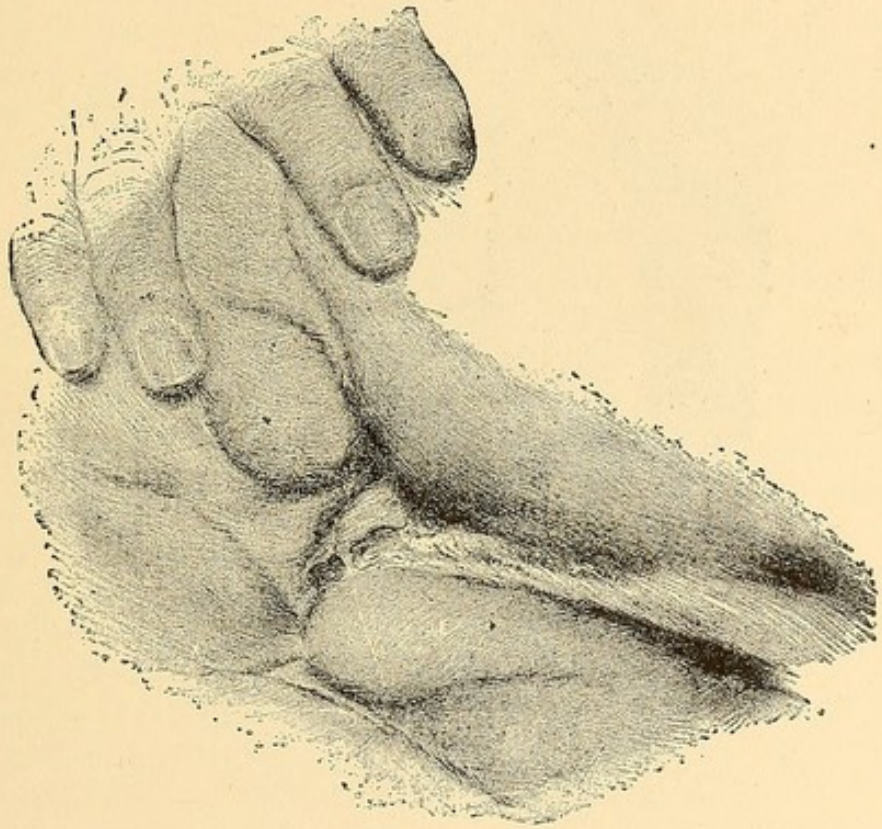


FIG. 84.—Cicatrix of Fistula.

a case of the latter variety, where the openings and tracks were so numerous and the patient's general condition so bad, that a cure was for some time despaired of. By several operations, however, undertaken at intervals, they were all finally laid open and cured, with the result shown.

In the case shown in Fig. 85 the external opening was over the great trochanter, and the case was very naturally mistaken for hip-joint disease by several operators.

The cause of incontinence after operations for fistula has been the subject of considerable argument, for in some cases a single in-

cision through the external sphincter has been followed by this untoward accident, while in others very extensive and numerous incisions have left the patient still with good control. Smith believes it to be due not so much to the division of the sphincters as to division of the circular muscular fibres of the lower part of the rectum; while Esmarch holds rather to the theory that it is due to division of the nerves supplying the muscle more than to the division of muscular fibres.

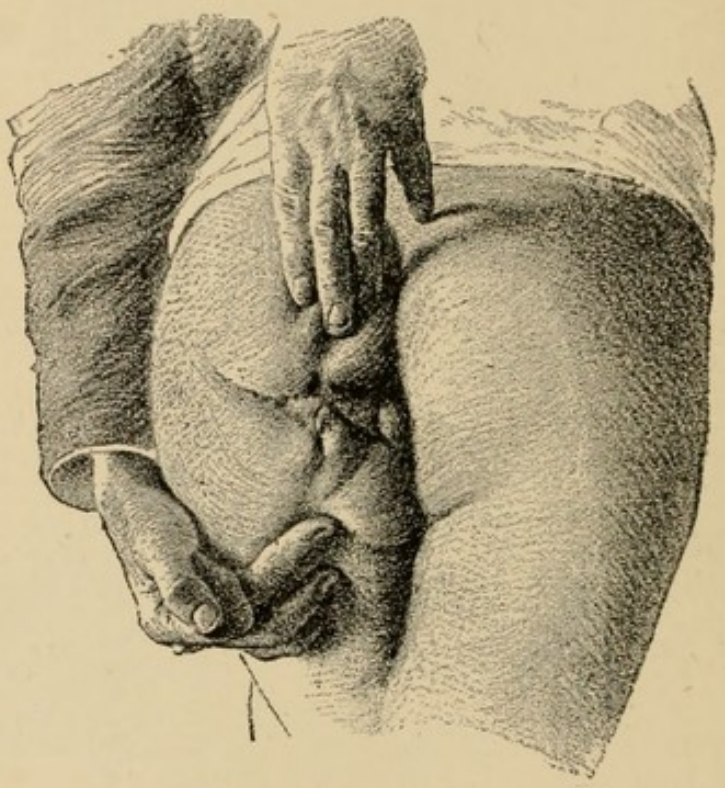


Fig. 85.—Cicatrix of Fistula.

In my own mind the explanation lies in the fact of vicious cicatrization, by which the ends of the divided muscles are not brought into apposition in healing. On this supposition it is easy to understand why a single cut may result in loss of muscular power, the ends of the sphincter being separated by an interval of half an inch, and the muscle therefore having no fixed point of support; while in other cases several incisions which have healed properly may still leave the segments of the muscle in shape to act as one undivided circle. The simplest form of the same condition is seen in lacerated perineum in the female. Here a single rent is followed by almost complete incontinence; and although the perineum may seemingly be perfectly restored by operation, there will be no return of sphincteric power

till the cut and separated ends of the muscle are brought into apposition.

The condition is one which entails a greater or lesser degree of misery, depending upon the consistence of the fæces and the regularity with which they are voided. To a man who has one solid, natural evacuation before going from his house in the morning, there may be no suffering and little annoyance, except what arises from the involuntary escape of wind and the soiling of the person with the natural mucous secretion of the bowel. The fact of inability to control the passage does not necessarily imply that the passages escape in a way to cause annoyance, for when they are of natural consistence and passed with regularity there is generally sufficient warning to allow the patient to seek the closet, which he has learned never to be far away from at a certain hour. The greatest suffering comes in women when the bowels are loose; then there is absolutely no chance to avoid the consequences; a napkin is constantly worn, and the patient soon becomes a confirmed invalid.

If the anus be open and patulous, more or less prolapsus may follow; and this is a fresh cause of tenesmus and discharge, complicating and increasing the original trouble. The train of nervous symptoms following this condition is often in itself serious, and apparently out of proportion to the physical disability.

In the treatment of this condition the operator has an ample field for the exercise of all his ingenuity, for no two cases will be found exactly alike, and the operations must vary accordingly.

Some will be seen at a glance to be manifestly incurable—such, for example, as the one shown in Fig. 85, where the sphincters have been cut again and again in different directions till the anus has lost entirely its original shape, and it would be difficult to find any trace of the sphincter by the most careful dissection. Most cases, however, are amenable to operation and relief, and a successful operation brings much sincere gratitude to the operator.

There are two guiding principles in operating. The first is to find the ends of the sphincter and unite them by suture; the second is applicable where the first is impossible, and consists in producing an artificial tightening and closure of the anus without much regard to sphincteric action.

The first indication may often be followed out at the time of the original operation for fistula, and is, in fact, done in the operation for immediate closure of the incision by suture of the wound, under

antiseptic precautions. In extensive tracks and abscess cavities the operation may fail, but in single deep cuts it often succeeds, and it is always worthy of trial with the object of obtaining direct and immediate union of the ends of the muscle and avoiding possible incontinence.

In cases such as are shown in Figs. 86 and 87 the operation is the same as in lacerated perineum—cutting down upon the ends of the muscle, freshening the edges of the original incision, and bringing them together with wire or catgut sutures.

In a case such as is shown in Fig. 88 the operation is much more complicated. This patient, in spite of all the cutting which had been

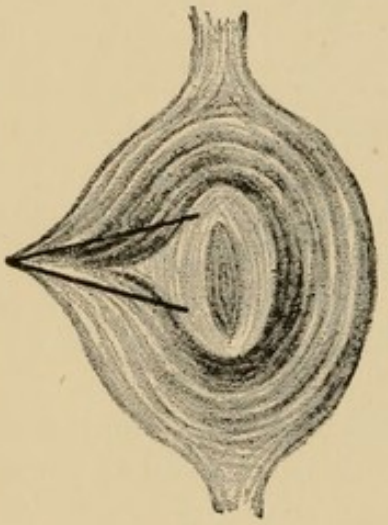


FIG. 86.

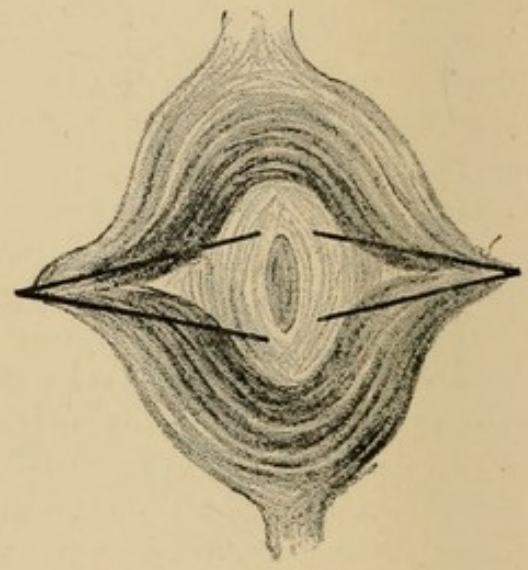


FIG. 87.

done, was still suffering from a blind internal fistula when he came under my care. In the figure the parts are not at all stretched open. The anus is seen as an irregular circle composed of cicatricial tissue, which held it wide open. The cicatrix extended an inch and a half into the rectum on all sides, and no mucous membrane was seen till beyond this point. The anus and lower part of the rectum presented an open tube about an inch in diameter, entirely without any power of muscular contraction. At the point where the folds of mucous membrane first appeared there was an opening leading into a deep sinus in the right buttock, and this was opened up, relieving the patient of the pain and purulent discharge from which he suffered.

Even in this case, with anus and lower part of rectum converted into an open, unyielding tube, the patient did not complain of incon-

tinence, though there could have been no action of either sphincters or levator, and hence no control. He simply had a natural passage every morning and was never subject to diarrhœa.

In such a case the anus could only be closed by a plastic operation. The plan I proposed was to dissect the mucous membrane loose, draw it down, and stitch it to the skin, after freshening the cicatricial ring of the anus so as to first give a mucous lining to the parts; then, by a subsequent plastic operation, or perhaps by the cautery iron, to close the outlet of the canal. But after the fistula was cured, the patient, suffering really no inconvenience, declined

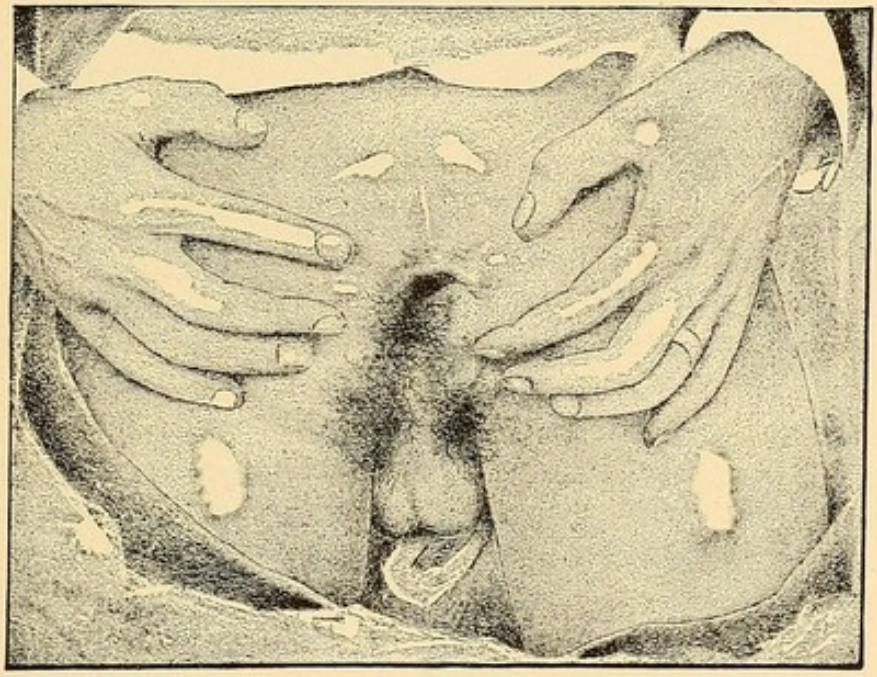


FIG. 88.—Incontinence after Fistula.

further operation. The case proves, better than any I have ever seen, that complete loss of sphincteric power is not always attended by any inconvenience.

After what has been said of the origin and extent of abscesses of the pelvis it is evident that there may result from them a class of fistulæ which are not to be operated upon by any of the methods we have described—fistulæ so deep and extensive as to contra-indicate all operative interference. And yet much may be done, even in the worst cases of this kind, and by proper treatment many may be cured. The first attempt of the surgeon, when the opening of the abscess is near the bowel in the perineum, should always be toward

effecting a cure without cutting the track into the bowel. External and comparatively free incisions may be made, which shall not implicate the anus, and through them drainage-tubes may be passed into the abscess cavity so that it may be freely emptied. Through the drainage-tube stimulating injections may be made, and the

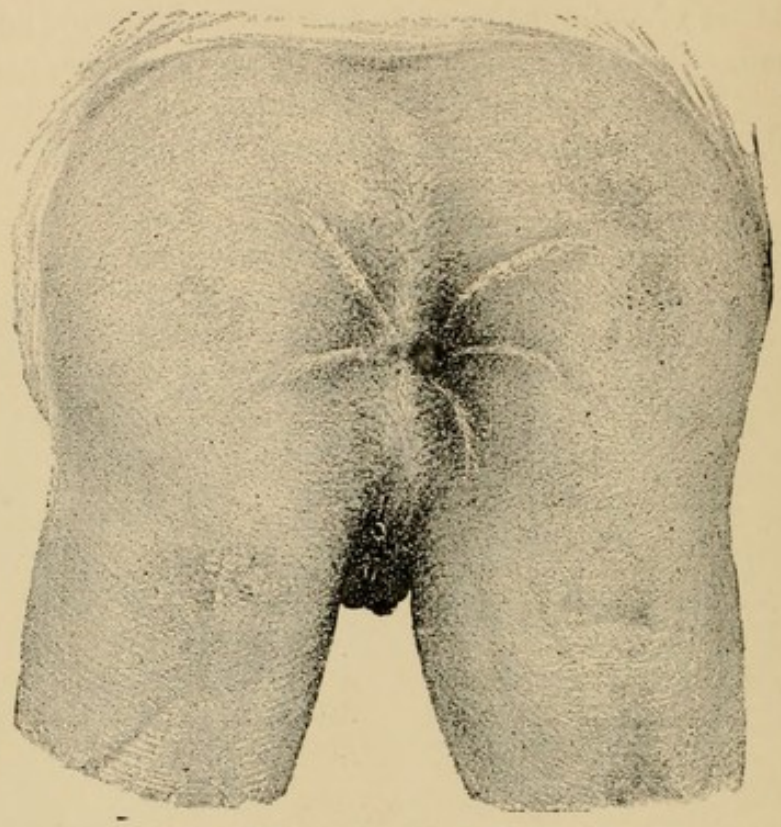


Fig. 89.—Result of Operation for Incontinence.

abscess treated as an abscess elsewhere would be, by rest and attention to the general health. A cure may sometimes be effected in this way in a very unpromising case.

Pelvic abscesses which have opened far away from the bowel, as in the loins or buttocks, must be treated on general surgical principles. I have cured one in a woman by following two tracks from their openings in either loin down into the pelvis under the sacrum and thoroughly draining the pelvic abscess. Generally, however, these must be treated by laparotomy, the abscess being first attached and the sinus being subsequently induced to heal if possible.

In fistula complicating stricture of the rectum, attention should always first be turned to the latter; for if this can be cured there is a prospect that the former may undergo spontaneous closure, and if

the stricture be not relieved it will be of little avail to cut the fistula. Many awkward mistakes have happened to good surgeons by failing to detect this complication of diseases.

Recto-urethral Fistula.—This is generally due either to direct traumatism, surgical or otherwise, or to some ulcerative or suppurative process. The operation usually performed to cure the condition consists in making two flaps from the mucous membrane of the rectum, turning their raw surfaces toward the urethra, and suturing them there. All antiseptic precautions should be carefully carried out.

With a scalpel an incision (Fig. 90 AAA) is made around the fistula, extending entirely through the mucous membrane of the rectum, which is opened as widely as possible with a speculum. The flaps thus marked out are dissected loose from circumference toward the opening until the line BBB is reached, and must depend for their nourishment upon the space left between the line B and the edge of

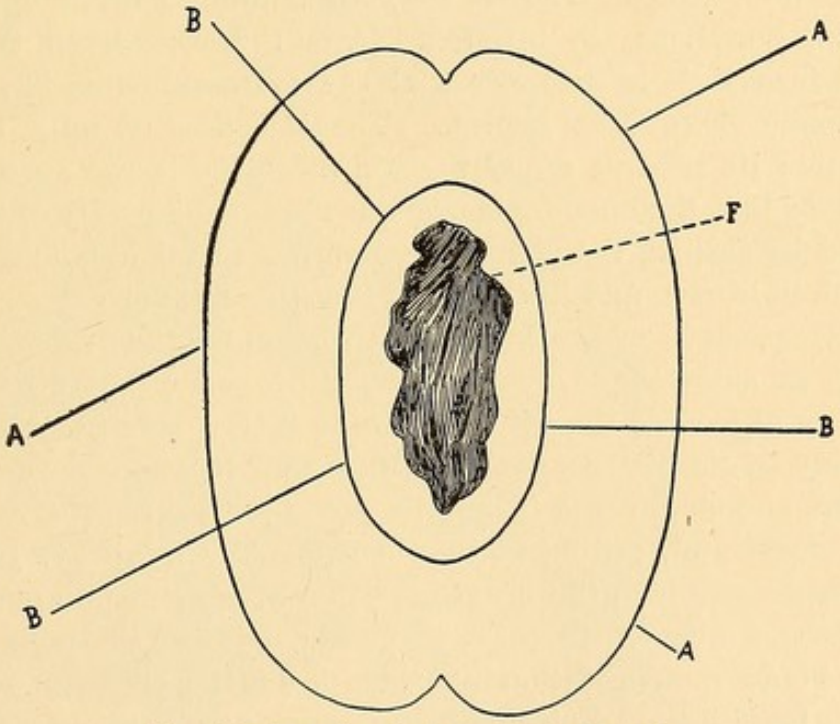


FIG. 90.—Operation for Recto-Urethral Fistula.

the fistula. The raw surfaces of the two flaps are then turned toward each other and the urethra and sutured in this position with fine chromicized gut, which is buried in the substance of the flap so as not to appear on the urethral surface. A catheter should be tied into the bladder, and three times a day the bladder should be irri-

gated with a boric acid solution. The bowels should be moved on the third day.

Intestino-vesical Fistula.—The majority of these cases will be found due to abscesses, next in frequency come those caused by cancer, and finally those said to be due to simple ulceration. When the fæces pass from the rectum to the bladder an amount of local and constitutional disturbance will result which generally renders the condition a fatal one unless the communication be closed by surgical operation.

An effort should first of all be made to decide upon the point of intestine involved—whether it be in the small or large bowel. Digital examination per rectum may reveal a cancerous stricture, in which case it is fair to conclude that the opening is near the disease and caused by it, either by direct extension of the malignant process, or as a result of secondary inflammation and abscess.

The character of the fæces passed in the urine may also give valuable information. If food be passed undigested, an opening in the small bowel may be inferred. If, on the other hand, the fæces be well formed, it is probable that the communication is either in the sigmoid flexure or rectum. The injection of milk into the rectum and its prompt appearance in the urine is the surest of all indications that the opening is near the rectum. In sixty-three cases collected by Cripps, the communication was rectal in twenty-five, in the colon in fifteen, and in the small intestine in twelve.

The treatment consists in perineal section for the drainage of the bladder, in supra-pubic cystotomy for drainage, and also for the possibility of closing the fistula from the vesical side ; and finally in cœliotomy to discover the exact nature and location of the fistula. With the abdomen open, it may be possible to close the fistula by plastic work, and, failing in this, a colostomy is always indicated when the disease is in the large bowel and the artificial anus can be safely formed above. In cases of fistula between the rectal pouch and the bladder, an operation by means of Kraske's incision, with free posterior longitudinal division of the rectum, may hold out a prospect of success. These cases are fortunately rare, and in those of cancerous origin colostomy will afford all the relief possible. In colostomy for this purpose the gut should be cut completely across, and the distal end invaginated and dropped. No chances should be taken of the possibility of any fæces passing into the gut below the artificial anus (Fig. 91)

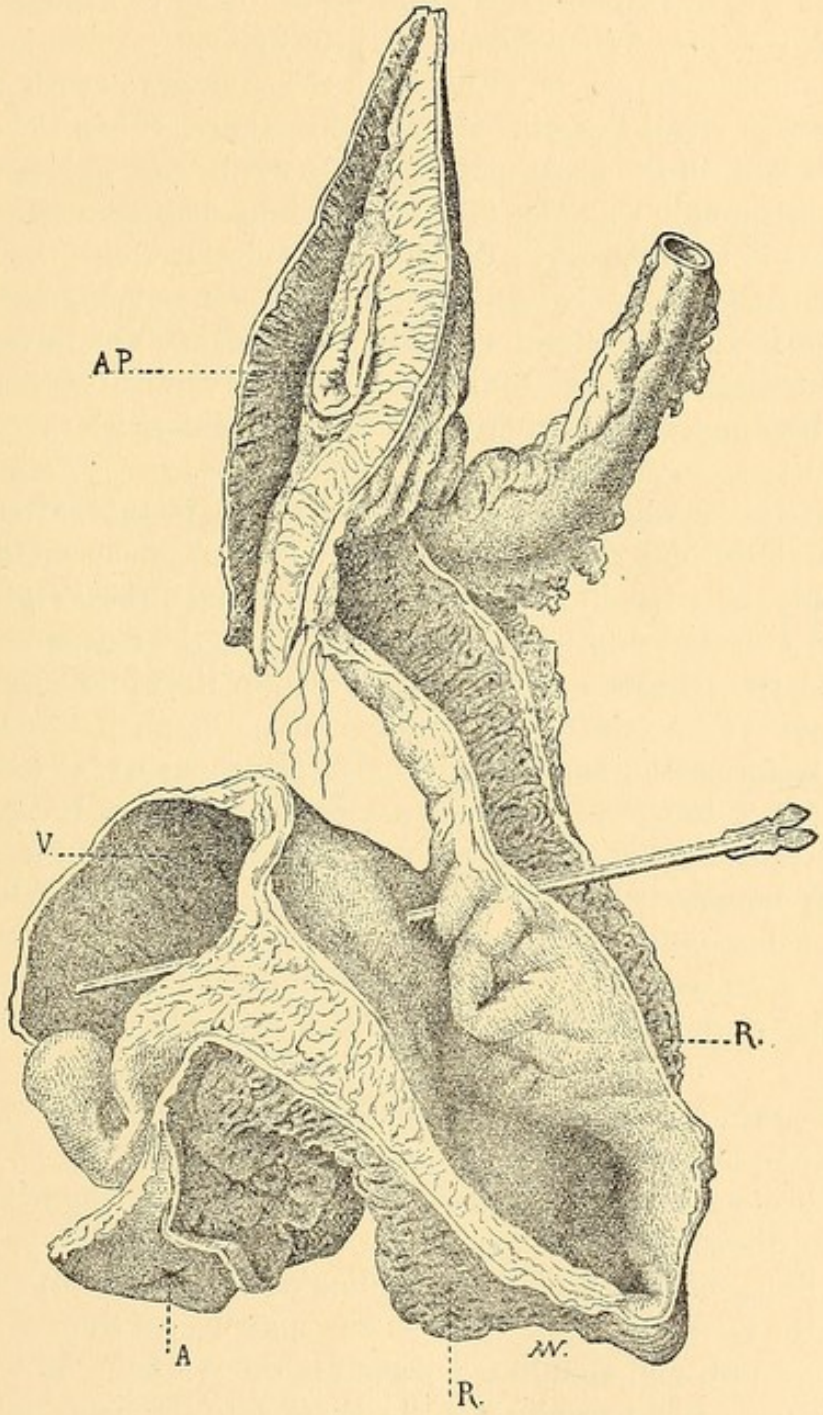


FIG. 91.
Intestino-vesical Fistula and Colostomy.

In the two cases of this disease on which I have operated, the fistula in one was due to abscess following the division of a stricture, and in the other to an abscess complicating a cancer of the rectum.

Intestino-vaginal Fistula.—As in intestino-vesical fistula, so here the communication may be either with the rectum, or with any part of the large or small intestine above the rectum. When the opening is rectal it will, in the great majority of cases, be due to laceration in delivery, although wounds, ulcerations, and malignant disease all play a part in the etiology. When the opening is above the rectum, it may be due to cancer, to abscess following non-malignant stricture of the rectum, to direct wounding of the intestine in vaginal or abdominal cœliotomy, or to rupture of the vagina during labor, with protrusion and strangulation of a coil of intestine through the laceration.

In these cases where the fistula is above the rectum, after efforts to secure closure by cauterization have been unsuccessful (they should only be tried in cases of small openings), the surgical procedure will at first depend upon the extent of the fistula. If it be small and the rectum beyond it be free, plastic work through the vagina may be successful. If, on the other hand, it be large and practically forms the end of the alimentary canal as far as the passage of fæces is concerned, a laparotomy is indicated. With the abdomen opened, the gut may be dissected loose and closed; the piece may be resected entirely and an anastomosis established, or if this prove impossible, a colostomy may be resorted to. Should it seem that a vaginal anus offers little advantage over an inguinal one, the intense vaginitis resulting from these cases need only be called to mind.

Recto-vaginal Fistula, when small, may be treated by cauterization. When larger, or when cauterization has been tried and failed, they are best sutured from the vaginal surface. The vaginal mucosa should be dissected off for a considerable space around the fistula, and the lining of the fistula itself should be thoroughly removed down to the rectal mucosa. The suture may be continuous, of fine chromicized gut, and should not perforate the rectum. In bad cases it may be necessary to make free incisions into the septum to allow of approximation of the edges, or to stitch the anterior lip of the cervix to the lower margin of the perforation, thus closing the communication between rectum and vagina, but turning the menstrual discharge into the rectum.

The method by flap-splitting consists in passing one or two fingers into the rectum for a guide and support, and splitting the edges of the perforation all around with scalpel or fine-pointed scissors. The rectal and vaginal walls should be separated from each other for at least half an inch.

Through the vagina unite first the rectal edges and then the vaginal edges. The sutures uniting the rectal edges will be buried in the recto-vaginal septum when the vaginal edges are sutured over them.

The first sutures should be entirely in the rectal wall and should not pass into either the vaginal or the rectal canal. A small full curved Hagedorn needle, armed with fine, fully chromicized catgut is best for the purpose. The flap of vaginal mucosa is pulled aside and the needle is entered under it in the substance of the rectal wall brought out at the edge of the fistula, entered again at the edge opposite and brought out one-third or one-half an inch from the edge.

After the rectal flaps have been united in this way, the vaginal flaps are united by a similar suture, and the former one is completely buried. Fine gut should be used and buried knots cut as short as safety allows.

The vagina should be lightly packed with iodoform gauze and the urine drawn till the gauze has been removed after the first few days. The bowels should be moved on the third day by laxatives and enema, and the sphincter should be stretched at the time of operation.

CHAPTER IX.

HEMORRHOIDS.

Although hemorrhoids may be defined in a general way as varicosities of the anal or rectal vessels, they present themselves under so many different forms and modifications that such a definition conveys but little idea of their characteristics.

For convenience they may be divided into external and internal; and these may always be distinguished from each other, though both may exist at the same time in the same patient. An external hemorrhoid originates in the subcutaneous veins which surround the anus; it is, therefore, entirely below the sphincter muscle, and though it may be partially covered by mucous membrane, it does not come from the rectum proper, nor can it be forced above the external sphincter muscle. An internal hemorrhoid originates, on the other hand, within the rectum, and may exist for a long time without appearing externally. When it does show itself outside of the anus, it is a result of straining, of increase in size, or of a lax condition of the sphincter; and after long exposure outside the body it may become changed in character and appearance till the mucous membrane covering it takes on something of the character of integument; but it may still, with proper management, be returned within the bowel, though it may not remain there for any length of time.

The distinction between an external and an internal hemorrhoid is not a purely arbitrary one, the one being below and the other above the external sphincter. A different set of blood-vessels is implicated in each case. An external hemorrhoid is a varicosity of an external hemorrhoidal vein, and is, therefore, an affection of the general venous circulation. An internal hemorrhoid is a varicosity of the middle or internal hemorrhoidal veins, which are parts of the visceral venous system. A glance at the venous anatomy of the rectum and anus will show the arrangement of these two sets of veins, and will also explain how, from the free anastomosis which exists between

them, it is improbable that one should be affected without influencing the other to a greater or less extent. Other secondary differences, which may arise from various causes, in the development, appearance, and characteristics of the tumors, will be considered later.

External Hemorrhoids.—A person of middle age who has not at some time suffered from an external hemorrhoid is indeed a rarity,

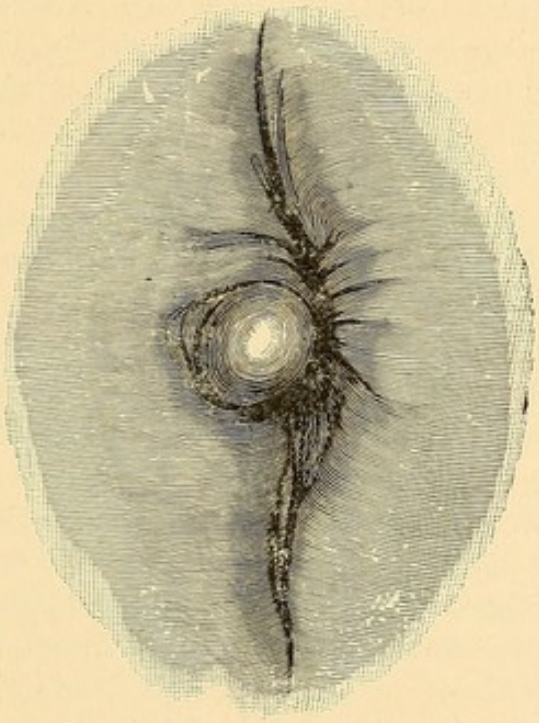


FIG. 92.—External Venous Hemorrhoid.

so common is this affection. It is perhaps useless to seek for the causes of a malady which is so universal, beyond a few which are well recognized and manifest. Amongst these are straining at stool, pregnancy, affections of the internal organs which interfere with the return of venous blood, and constipation. Outside of these cases where a manifest cause exists, external hemorrhoids will be found amongst all classes. Those who smoke and those who do not; the high liver and the abstemious; the laborer and the professional man; those who stand and those who sit, are all affected about equally.

An external hemorrhoid may appear in two different forms, which bear little resemblance to each other. The first is a small, round or elongated venous tumor (Fig. 92).

This is simply an extravasation of venous blood into the delicate subcutaneous connective tissue of the anus. The patient, often

while in perfect health, and without any appreciable cause, feels a sense of uneasiness at the anus. An examination made by himself shows a small, soft, painful lump, from the size of a pea to that of a grape, which disappears on pressure, but immediately returns. This is extravasated venous blood from a previously weakened and dilated vein which has ruptured. After a few hours the tumor becomes harder and more painful, and, if near enough to the surface for the blood to show under the tense skin, it will appear as a bluish black circumscribed swelling. The discomfort caused by this condition is out of all proportion to its apparent magnitude. The patient generally tries to keep about, but can neither sit nor stand with any comfort. The pain is a sort of dull ache which it is very hard to bear, and to gain temporary relief efforts are generally made every little while to force the lump above the sphincter. The pressure often gives a moment's relief, but not more, for the tumor does not come from above the sphincter and cannot be made to stay there.

When left to its own course, a bloody tumor of this variety may gradually decrease in size from the absorption of the fluid elements of the clot, the pain decreasing at the same time; and after a week or ten days of discomfort it is changed into a cutaneous hemorrhoid. Or the opposite course may be taken, and the tumor may show all the signs of an abscess and finally rupture spontaneously with the discharge of a little blood and pus, and with an instantaneous ending to a week of suffering.

There are two ways of treating such a tumor. The first, and best, is to lay it freely open and turn out the clot from its bed.

If the surgeon undertake this method of treatment, there are one or two hints which may be of value. The incision itself is painful, and should therefore be done with a sharp bistoury of the form shown in Fig. 93, and it should be done instantaneously. Again,



Fig. 93.

care should be exercised to empty the clot entirely out of its bed, otherwise a small wound remains which will not readily heal, because the sac is prevented from contracting, and the patient is obliged to wear a bandage, perhaps for a week or longer, to keep from soiling the linen with a sanious discharge. Under such circumstances, also, the pain is but little relieved by the operation. Again,

I have in a few cases seen the incision heal by primary intention and the sac again fill with blood, thus leaving the patient in the same condition, as regards suffering, as before operation. This is best avoided by placing a shred of lint in the cut. These, however, are untoward accidents which may attend an insignificant operation which usually gives relief to suffering, and allows the tumor to shrivel up and disappear except for a small tag of skin which may remain and form an external pile of the second variety.

This operation is so trivial and the relief so immediate that it is generally safe to perform it without any previous explanation to the sufferer; but should it not be permitted, another plan must be followed. A cathartic containing podophyllin (pil. podophyllin co.) should be given at once to secure two or three free actions of the bowels, the patient put upon his back on the bed or sofa, and a rubber ice bag filled with finely powdered ice placed against the part and kept there till the pain subsides. Cold usually gives great and immediate relief; but should it not, a poultice may be substituted. Under this plan of treatment the patient will probably be relieved in two or three days, so as to be able to get around with comfort, provided the clot is to be absorbed. In some cases, however, suppuration will occur, and in about a week from the time the swelling first appeared it will open spontaneously and discharge a few drops of pus. As soon as it becomes evident that this is to be the course of events, poultices should be applied and continued.

This form of hemorrhoid is comparatively trivial, but the suffering is often increased by improper attempts at treatment. Instead of being freely cut, they are often punctured with a needle by the patient. The result is the escape of a few drops of bloody serum, relief for an hour or more, and then renewed suffering from the bruising and squeezing which usually attend this attempt at surgery. I have seen them leeched by physicians, with the result of starting a slight bleeding which continued for several days, without, however, giving any relief. They are not infrequently injected with carbolic acid by those who have heard of this method of treating hemorrhoids, and the result is most unsatisfactory, for the pain is great and suppuration almost certain.

Those who have once been troubled with this form of hemorrhoids are very liable to repeated attacks. The veins are delicate and feebly supported, and a little unusual strain upon them is sufficient to produce an extravasation. The preventive treatment of this, and in

fact of all other varieties, consists in the maintenance of as perfect a state of the general health as possible, perfect regularity in the action of the bowels without straining, and the daily use of cold-water ablutions to the parts. Tobacco and alcohol must both be used in moderation, if at all; over-eating must be avoided; and if a careful regulation of the diet will not suffice to produce a regular, daily, natural action of the bowels, a slight laxative must be taken daily. One who is in the habit of having a passage each morning may easily bring on an acute "attack of piles" in a few hours by going to business without taking time to attend to this function.

In another form of external hemorrhoid the vascular element is insignificant as compared with the great increase in connective tissue

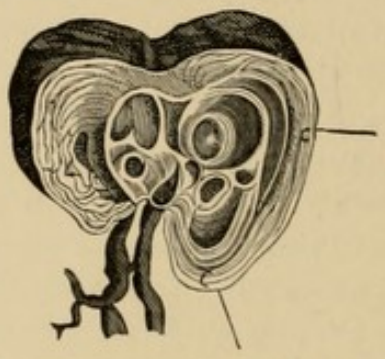


FIG. 94.—External Hemorrhoid after Injection of the Vein.

which occurs. This tumor seems at first sight to be only skin and connective tissue, and is often improperly spoken of as a condyloma, though we shall reserve that term for an entirely different condition.

Such a tumor may result directly from the other variety, or it may gradually form as the result of the irritation of more serious disease within the rectum; under the latter circumstances being generally due to the contact of irritating discharges with the skin. When the first variety has undergone acute inflammation, a tumor of this kind is the natural result; for resolution is almost never complete. The venous tumor becomes harder and larger, the skin over it firmer, it loses its vascular character and becomes a connective-tissue tag such as is shown in Fig. 95.

These connective-tissue growths may be single or multiple, and vary in size from a pea to a tumor the size of the thumb. The anus may be so completely hidden among them as scarcely to be discernible. They may be pendulous or attached by a broad base partially encircling the anus. They are often excoriated on the mucous aspect,

and thus give rise to an annoying and offensive discharge. At the base of one of them a fissure will often be found, and it has sometimes seemed evident to me that the latter was directly due to the violence resulting from the weight and dragging of the former.

The origin of these tumors should be well understood. When found at the anus in connection with a stricture of the rectum, they have been supposed to indicate syphilis as the cause of the stricture. I have no faith in such a theory. To me they indicate nothing but a continued irritation of the skin of the anus. They are, according to my experience, as frequent in cancerous as in non-malignant stricture, and often as well developed when there is no serious rectal disease.

It is safe to say that the surgeon will seldom be consulted for these tumors alone when they are quiescent—that is, when they are not acutely inflamed and therefore cause no pain. But they are liable to become inflamed on very slight provocation. The same causes which will produce the last variety will cause acute inflammation and suppuration in this. Then the patient presents

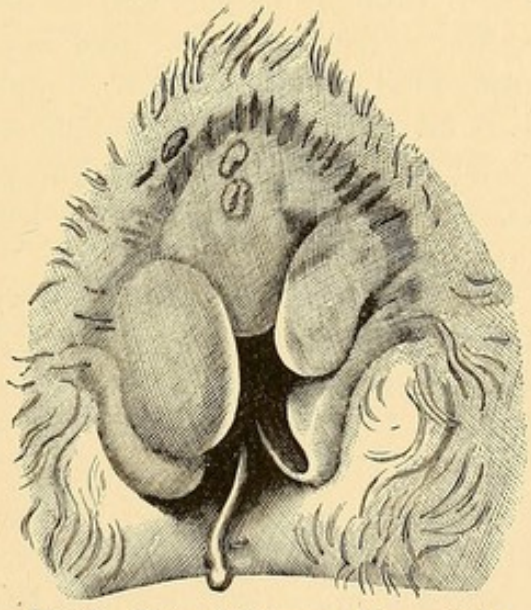


FIG. 95.—External Cutaneous Hemorrhoids.

himself with much the same symptoms as in the last case, except that the pain has been more protracted, because the patient is more accustomed to the annoyance of the tumors and is slower to seek relief. An examination will reveal a hard, tender, somewhat œdematous mass of tissue just at the verge of the anus. Its attached

base may surround nearly one-third of the anus and may be fully half an inch thick. It cannot be forced above the sphincter, or, at least, cannot be made to remain there. There may be two or three of these tumors. The outer surface is composed of skin, and the inner is smooth and shining, being composed in part of finer skin and



Fig. 96.—External Hemorrhoid with Increase of Connective Tissue.

in part of the mucous membrane in which the skin ends at the anus. It is plainly a connective-tissue tumor, having its attachment outside of the rectum, and not one composed of blood-vessels covered by the mucous membrane of the rectum.

It is necessary to be thus particular in the description of this form of hemorrhoid because of the painful errors often seen in its treatment. It is not a vascular tumor, and therefore the leeching and scarifications often resorted to never give any relief, while the force used at attempted reductions invariably makes matters worse. If allowed to take its own course it will seldom suppurate, but will gradually subside, and in a couple of weeks the pain will, in great measure, have disappeared, the tumor always, however, remaining somewhat larger than before the attack.

The treatment of this variety is essentially the same as in the last, although the cutting to be done is more considerable. It is particularly in this class of cases that cocaine may be used to the best advantage. If the base of the tumor be small, five drops of a four-per-cent. solution should be injected into it, and when it is no longer sensitive it may be seized with forceps and snipped off with strong scissors. There will be some bleeding, but generally only a little, and styptic cotton, with a compress and bandage, left on for a quarter of an hour will stop it. No after-dressing will then be necessary except cold water, or possibly a poultice to relieve pain. If the tumor be small, the patient will generally be free from pain and able to attend to his business on the following day. If it be larger it is better to keep him in bed for several days, with cold compresses or poultices to the wounds.

These operations are best performed when the tumors are quiescent and not acutely inflamed, as the pain will then be much less and the recovery much more speedy. But, unfortunately for the patient, he seldom wants anything done till he has had a good deal of suffering, and the doctor is seldom consulted except during an attack of inflammation. Under such circumstances nothing is gained by waiting for the attack to subside, although the operator must allow for the infiltrated condition of the parts, and not remove enough skin to cause subsequent stricture.

Supposing now that the patient declines operation, the case must be treated as follows: Absolute rest in bed, laxatives daily to keep the bowels free, an ointment of equal parts of extract of opium and extract of belladonna, with sufficient vaseline to render it soft, kept constantly and freely smeared over the parts, and hot poultices constantly applied. By this means the inflammation will gradually subside, and in an ordinary case the patient will be around in a week or ten days. There is nothing else to be done. Attempts at reduction always do harm and can by no possibility do good, and the same applies to leeching, scarification, and incision. Should suppuration occur the result will very likely be a subcutaneous fistula.

Internal Hemorrhoids.—In describing these tumors it is only necessary to make two classes, the capillary and the venous. The capillary hemorrhoid is in reality an erectile tumor, composed of the terminal branches of the arteries and veins, and of the capillaries which join them. This form of tumor is never of large size, and never projects far into the cavity of the rectum. To the naked eye and under the microscope it strongly resembles an arterial nævus. They may be situated high up in the rectum or low down by the sphincter; their surface is granular, and the membrane covering them is always of extreme thinness. This accounts for the chief symptom which distinguishes them clinically from the other varieties—the free hemorrhage which follows the slightest bruising of their surface, even in the act of defecation. Such a tumor never appears outside of the anus unless accompanied by some other rectal affection, but it may sometimes be seen by a careful pulling open of the sphincter with the fingers, and from some part of its strawberry-like surface there is pretty sure to be a jet of blood, coming *per saltum*. This is the form of hemorrhoid to which the name of "bleeding" most properly applies. In my own experience it is not as frequently met with as the varieties to be described later; and this probably for the reason that

after existing for a longer or shorter period in this form, it is changed into one of the others, and that patients do not seek relief till after such change has occurred. After a time the mucous membrane covering such a tumor becomes thickened, and as a result of repeated irritation there is an increase in the submucous tissue. The hemorrhage decreases in frequency, and finally ceases as the capillaries become obliterated by the increase in the connective tissue, and the capillary tumor is succeeded by the venous one.

The one symptom of a capillary hemorrhoid is the daily hemorrhage; and as this hemorrhage occurs at the time of defecation, and there is no pain at any time, the patient may be entirely ignorant of the fact that blood is daily lost. This is particularly the case with the class of patients seen in public practice who give little attention to themselves. In the higher walks of life such a loss of blood seldom occurs without the knowledge of the patient; but unfortunately it is often disregarded, especially in women, who are in the habit of losing blood at every menstrual turn, and who always shrink from an examination.

It is not necessary to relate in detail the train of constitutional symptoms which may follow the daily loss of a considerable quantity of blood. The anæmic look, the disturbance of the heart's action, the troubles with the digestive apparatus and with the sexual organs, the cessation of menstruation, are all well known.

This is the only form of hemorrhoid in which applications of nitric acid will be likely to result in permanent cure, and in this it works so well that it is hardly worth while to try other things. If the application be made thoroughly to the whole surface, a single one will be all that is necessary, in most cases, to entirely cure the disease.

The only other cases in which I use nitric acid are those of well-marked internal hemorrhoids which bleed freely at stool when protruded, and in which for any reason—such, for example, as pregnancy—it is inadvisable to attempt a radical cure. By touching the surface of these tumors with strong acid the bleeding may cease entirely for a considerable time, and the tumors may even diminish in size.

The Venous Hemorrhoid.—In this form of tumor the capillary network has disappeared, and in its place is found a mass of freely anastomosing veins bound together by connective tissue. The veins are tortuous, often varicose and dilated into sacs and pouches; and

there may be one or more arteries of large size, the pulsations of which may often be distinctly felt by the finger. Such a tumor is often of considerable size. Those shown in Fig. 97 are life-size. They are firm to the touch and smooth; liable to inflammation, erosion,

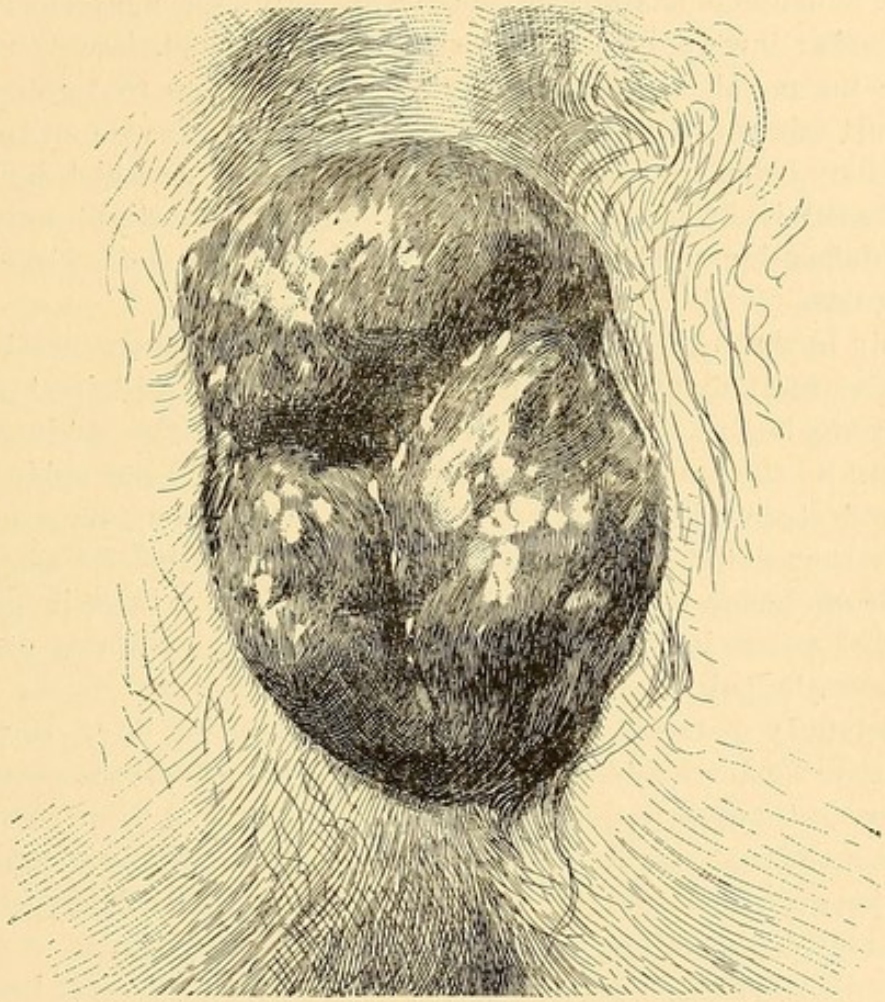


FIG. 97.—Internal Hemorrhoids.

hemorrhage, and prolapse. The hemorrhage which occurs is arterial in character and apt to be abundant.

Symptoms.—The two main signs of internal hemorrhoids are protrusion and bleeding; but there are many symptoms less diagnostic than these, but of fully equal importance. For example, there is a peculiar train of nervous effects which is quite characteristic of the disease, and which may be well marked before either bleeding or protrusion has appeared. These are, a feeling of discomfort in the rectum and a sensation that it has not been thoroughly emptied after

stool, which induces the patient to sit and strain for a long time; difficulty in micturition; diminished sexual power and desire; pain in the genitals, loins, and thighs; and formacation in the lower extremities. A very marked case of this last symptom was sent to me by Dr. Spitzka. The patient was himself a very intelligent physician, who had consulted Dr. Spitzka for supposed incipient locomotor ataxia; but no disease of the spine being found, he was referred to me for rectal examination, under the suspicion that a disease of this part might account for the condition. Such was found to be the fact, there being well marked hemorrhoidal trouble which had never manifested itself in any direct way, except by a slight uneasiness after defecation, and the cure of which put an end to the reflex symptoms.

Pain in the rectum of a sharp, lancinating character may be present as an early symptom, but it is not generally complained of until the tumor begins to descend within the grasp of the sphincter and appears at the anus at each act of defecation. If the sphincter be firm and strong, it is then apt to be severe and the tumor may become strangulated; but after the disease has existed for any length of time, and especially in persons past middle life, there is apt to be a loss of power in the muscle which, though it facilitates prolapse, decreases the pain attendant upon it.

The study of rectal reflexes is a very interesting one. In connection with hemorrhoids I have seen some remarkable nervous phenomena. I had a patient, a muscular young man, who was nearly overcome at each act of defecation by faintness. There was no pain, his piles were of moderate size and easily reducible, but every time they came down he very nearly lost consciousness.

Another symptom of rectal disease which I have never been able to understand is what I have often termed proctophobia—the sense of impending evil which is so common in rectal troubles. There is hardly any variety of pain or of functional nervous disease that may not be cured by the simple removal of hemorrhoids, and this applies as often to men as to women.

It will occasionally happen that internal hemorrhoids, though fully developed and of many years' standing, have never been known by the patient to cause any loss of blood, though such a case is very rare.

In ordinary cases the patient will reduce the tumors when they come down on defecation. They may, however, become strangulated

and be entirely beyond the patient's power of manipulation. In such a case, after a period of rest, and after the relief which may follow a spontaneous escape of blood from the overdistended vessels, the hemorrhoids may return of themselves or be put back by the patient.

If the strangulation be more intense, gangrene may set in and a part of the mass may slough, or a part may suppurate and pus be discharged. Under these circumstances there will be great pain and more or less constitutional disturbance, with fever and loss of appetite. The gangrene is very evident to the eye from the greenish or blackish color and fetid odor of the part, and is rather a favorable termination of the trouble, as it generally results in a radical cure.

Diagnosis.—It is not always an easy matter to discover an internal hemorrhoid, even though it be far enough advanced to cause hemorrhage and more or less uneasiness. When it has become hard it may be detected by the accustomed finger in a simple digital examination, but when soft and not overdistended it may escape detection. An examination should be made directly after the rectum has been emptied by an enema of warm water, when the water and the straining have brought it into prominence, and should be made with a speculum when there is any doubt. Under these circumstances it may generally be brought into view.

The existence of hemorrhoids in children has been denied by excellent observers of large experience. Gosselin does not admit the internal variety, and says plainly that he will believe in external hemorrhoids in children when he has seen them, or when a good observer, after a thorough examination, will say he has seen them. It may be safely stated that internal hemorrhoids in young children are exceeding rare. Of the external variety I have seen one perfectly clear case in a child of three years. The tumor was of the external venous variety, contained a large, dilated venous pouch in which the black blood could be distinctly seen, and was about the size of an ordinary grape. It was caused by the straining to urinate, due to a congenital phimosis, and disappeared spontaneously with the removal of the cause. My case-book at the New York Post-Graduate Hospital also shows one case of well-marked, prolapsing, internal hemorrhoids, operated upon with clamp and cautery, in a child about three years old, but this must be exceeding rare.

Treatment.—Before recommending anything in the way of a surgical operation, the surgeon must consider whether the case be-

fore him is one in which such a procedure is justifiable; and this brings us to the consideration of what have been called symptomatic hemorrhoids, as distinguished from those which are apparently idiopathic.

Internal hemorrhoids may be symptomatic of disease in a number of the viscera. They are often in men secondary to disease of the bladder, to enlarged prostate, or to stricture of the urethra, and in these cases where it is possible to remove the cause it must always be done. If hemorrhoids are dependent upon a calculus or a stricture of the urethra, they will probably disappear when these affections are cured.

In women hemorrhoids often depend upon disease of the pelvic organs, and in every female patient this dependence should be carefully inquired into, and, if found, removed. It may seem strange to say that I have cured hemorrhoids by an abdominal hysterectomy for fibroid of the uterus that were curable in no other way. It occasionally happens that a pregnant woman will suffer so severely from this complication as to demand surgical aid. Though it is better not to operate until some weeks after delivery, except in a case where the hemorrhage or the pain renders it unavoidable, still pregnancy is not an absolute barrier to surgical interference in this more than in many other affections, though the liability of producing miscarriage should be well considered.

Hemorrhoids may also be symptomatic of disease of the liver, kidney, heart, or lungs. There are few liver affections which need prevent operative interference in a bad case, but such interference should be preceded by general treatment pointing toward relief of the hepatic circulation. An excess of alcohol in the daily diet should be stopped, and a blue pill may be given with advantage every other day for a week before the operation. Affections of the lungs, except in a very advanced stage, need not prevent an operation.

Some patients will deliberately choose a course of palliative treatment, even knowing that it is not curative, rather than be cured by surgical means. For such the practitioner must be prepared to furnish what relief he can, and this is often very great.

It is sometimes necessary to treat a patient with internal hemorrhoids for the complication of strangulation when he is unwilling to submit to anything looking toward radical cure. His piles, owing to some accident, some nervous strain or irregularity in living, are down, have been down a day or two, and no manipulation on his

part will put them back. Examination shows them to be exquisitely sensitive, engorged, and possibly even gangrenous, and the sphincter grasps them with a power which cannot be overcome. This extremity may be the doctor's opportunity, and many a patient is willing to be radically cured, after forty-eight hours of such suffering, who has always been too timid before. Under such circumstances nothing is to be feared from an operation, and nothing to be gained by delay. The patient should be etherized and the tumors removed. The cure will be as rapid as under ordinary circumstances. Should, however, the patient still object to radical treatment, the following is the best course of procedure: Place her on her left side, smear the whole mass and the right hand freely with olive oil, cover the tumors completely with the fingers, and make gentle and firm pressure on the whole mass at once till a part of it slips up the bowel. If a single tumor will give place the others will soon follow.

This is not a matter of half an hour, but of one minute. If it does not succeed at the first attempt it probably will not at all; and the next step is to give ether to the point of primary anæsthesia and forcibly reduce the mass. With ether internal hemorrhoids can always be reduced when strangulated by a tight sphincter. Should the patient object to this, there is nothing to do but leave her in bed with ice to the parts and the ointment of opium and belladonna freely applied. The tumors may slough at one or two points even without the ice, and the ice must not be pushed too far on this account; but sloughing under these circumstances is one of nature's means toward a partial cure. Generally after a couple of days' rest in bed the patient will be able to reduce the tumors for herself.

Though it is difficult to conceive of a case of hemorrhoids that cannot and ought not to be cured, where the patient is in any condition to bear treatment, there are some which can only be cured after prolonged preparatory treatment, and these are generally in women. The doctor who does much rectal practice becomes of necessity very familiar with many of the diseases of women. He will not be long in practice before he encounters the following combination: A lady comes to him with hemorrhoids, upon which he operates, with perhaps the usual good result, though possibly only obtained after rather a slow and painful recovery. In the course of a few months the patient returns with much the same symptoms, though the hemorrhoids have been cured. Another examination is made, and the patient is found to have an enlarged uterus with a lacerated cervix, a

ruptured or greatly relaxed perineum, and a proctocele, or perhaps a uterine fibroid, all of which should have been cured before the operation for hemorrhoids was attempted.

Treatment.—Of all the time-honored operative procedures known to the profession for the cure of hemorrhoids, it is but a waste of

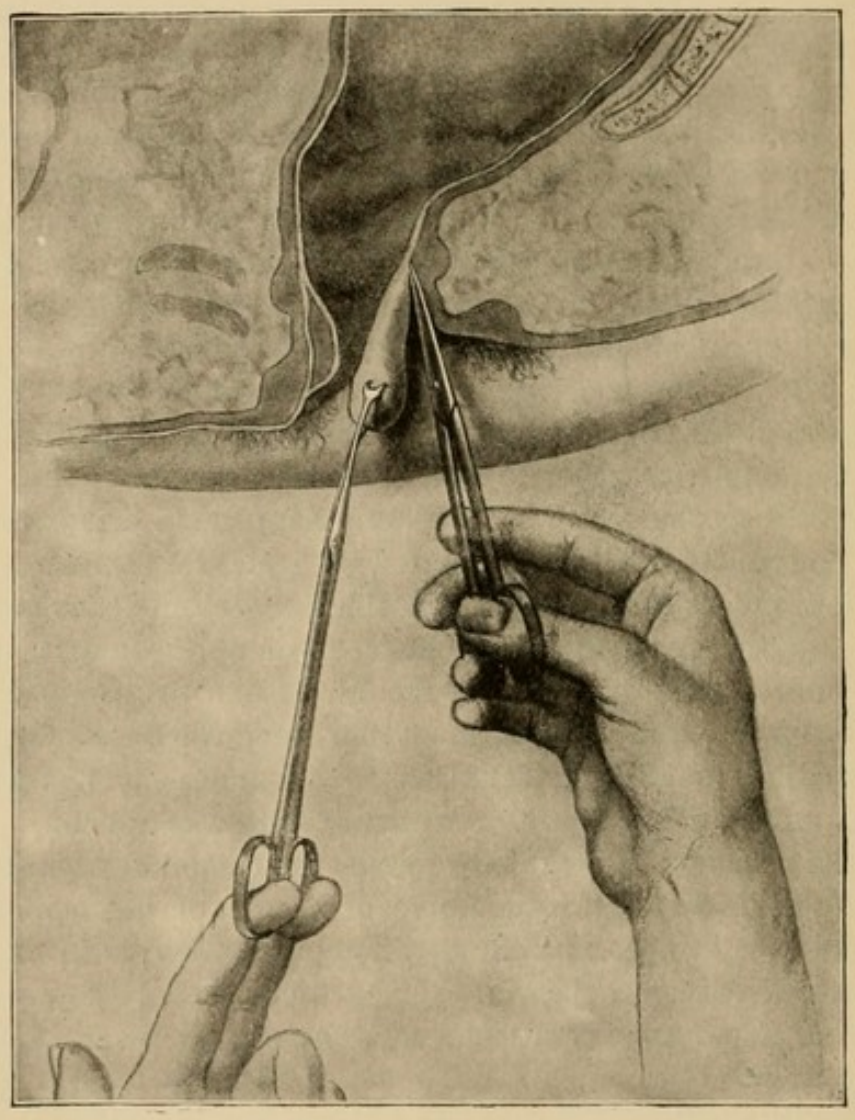


FIG. 98.—Operation by Ligature.

time to discuss at the present day more than a few. The first of these is the ligature.

The principle of this method is to dissect the hemorrhoidal tumor away from its attachments for a certain extent, and then to surround the remainder of the base with a ligature, and cut away the tumor. The advantage of this method is that the ligature is not placed

around the skin at the margin of the anus, for this is divided with the scissors before it is applied, and the ligature lies in the groove thus made, and by this means much pain is avoided and much time is saved in the treatment.

Regarding the details of the operation but little need be said. The tumor to be tied is seized with strong forceps and drawn down, the patient having been etherized and the sphincter previously dilated.

With strong scissors the lower attachments of the tumor all around, and especially the point of junction of the mucous membrane with the skin, are divided ; the ligature, which encircles what remains, is tied as tightly as possible, both ends are cut off short, and the greater part of the tumor below the ligature is also cut off, only sufficient being left to form a good and safe stump for the ligature to hold. The patient is prepared for the operation by the previous administration of a purgative, and the bowels are confined for a week or so after its performance, and then relieved by a cathartic.

This, in brief, is the operation with the ligature, and it is an exceedingly good one. I began my own practice by always performing it, and, did I not believe that something else was better, should perform it still. It is as safe as any operation can well be, and when properly done it cannot fail to cure ; and perfect safety and surety are two great points to be gained in any operation

But a considerable experience with this operation led me after a time to begin the search for something just as safe and just as sure, without some of the objections which any large number of cases will be sure to show pertain to this method.

The first objection which developed itself in my own practice was the great pain which the patient often suffered for the first week or ten days. It is distinctly claimed by the advocates of this operation that after the patient has recovered from the ether there is often no pain. I can only say that though this is sometimes the case, it is by no means the rule in my own practice or that of other American surgeons. My explanation of the pain I have often seen is that perhaps we in America do not carry the dissection as far up as it may be done, rather encircling the whole mass, except the skin, in the ligature, than dissecting it off ; and that consequently a cutaneous nerve is compressed by the ligature ; but no matter what the explanation, the fact remains that, having followed this method in every particular, I have more than once been forced to keep the patient

constantly under the influence of morphine till the ligature came away, and I know that many others have had a similar experience.

A second objection is the frequent necessity for the passage of the catheter for several days after the operation.

A third is the amount of blood lost during the operation, and the frequent necessity for leaving a considerable wad of lint in the rectum

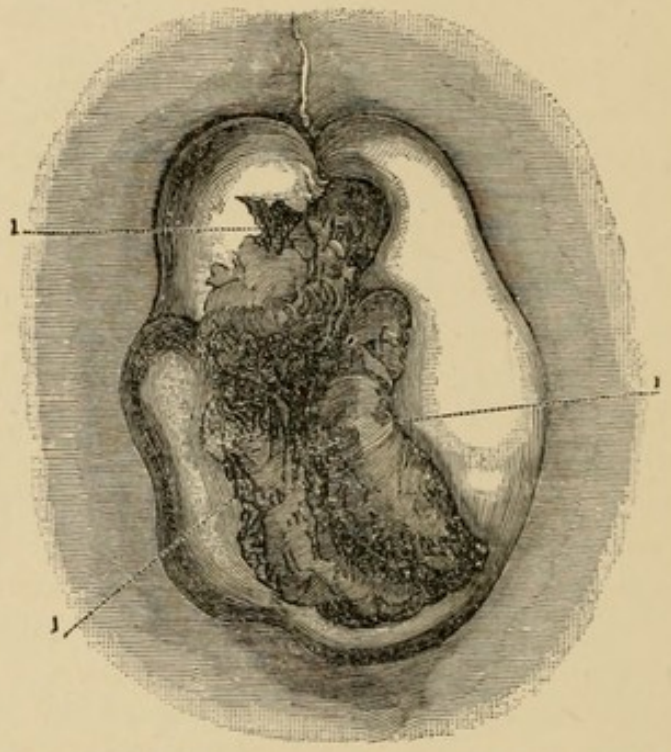


Fig. 99.—Internal Hemorrhoids, showing Line of Junction of the Skin and Mucous Membrane.

on account of the oozing, which causes great subsequent suffering and is only removable after three or four days, and then with considerable pain.

A fourth is the length of time required by my patients before they are able to resume active business.

It will be seen that none of these objections were of vital importance. The patients still recovered and were radically cured, and in the end were satisfied in spite of these difficulties; but still there seemed to me an opportunity for a more satisfactory operation.

Treatment by Injections.—As far as my own influence has gone, I have done what I could to take this method of treatment from the hands of the quacks and place it upon a recognized basis. The fact that after using it for some time and being much pleased with

it, I had a succession of bad and troublesome cases treated by this means, and that these cases have led me to practically abandon the method, in no way invalidates the reports of my own carefully observed cases published in 1885. In writing now I shall use less glowing terms than I did then. It is still, to my mind, a legitimate way of treating some cases, having in certain points exceptional advantages over all others; and in the fact that it does not apply equally well to all, and that it will occasionally be followed by disagreeable consequences, it in no way differs from other surgical operations. I say this so plainly in the beginning because I have so frequently been accused of having first advocated the practice and subsequently abandoned it, which is perfectly true. It is now at a point where every practitioner may try it for himself and come to his own conclusions regarding its value. All that can be said of my own practice is that while for a year or more I used it almost exclusively and was much pleased with its results, a succession of bad cases has led me decidedly to modify my views of its value and universal applicability.

The following rules should be observed in practicing this method:

The solutions of carbolic acid should be in pure water with sufficient glycerin added to make a perfectly clear and colorless mixture.

The glycerin and carbolic acid should both be perfectly pure, and as soon as the solution begins to turn yellowish it must be discarded.

The needles should be fine and sharp, and the syringe in perfect working order—one with side handles is preferable—and before using the syringe each time it should be sterilized.

Before making an application give an enema of hot water, and let the patient strain the tumors as much into view as possible. Then select the largest and deposit five drops of the solution as near the centre of the tumor as possible, taking care not to go so deep as to perforate the wall of the rectum and inject the surrounding cellular tissue. The needle should be entered at the most prominent point of the tumor. If the hemorrhoid does not protrude from the anus, a tenaculum may be used to draw it into view. After the injection has been made the parts should be replaced and the patient kept under observation for a few minutes to see that there is no unusual pain. The injection will cause some immediate smarting if it is made near the verge of the anus; if made above the external sphincter, the patient may not feel the puncture or the injection for several minutes,

when a sense of pressure and smarting will be appreciated. In some cases no pain will be felt for half an hour, but then there will be considerable soreness, subsiding after a few hours. If it increases instead of disappearing, and if on the following day there is considerable suffering, which may not perhaps be sufficient to keep the patient on his back, but is still enough to make him decidedly uncomfortable, it is a pretty good indication that a slough is about to form. For the reason that it is impossible to tell absolutely what the effect of an injection is to be until at least twenty-four hours have passed, it is better to make but one at a visit and to wait till the full effect of each one is seen before making another. If on the second day there is no pain or soreness, another tumor may be attacked ; and this will often be the case.

The objections to this procedure may be enumerated in the following order: pain, ulceration, marginal abscess, fistula. The impossibility of giving any definite prognosis as to the length of time necessary to effect a cure, or the amount of suffering the treatment will entail. The fact that the treatment does not result in a radical cure, but that the tumors reappear generally after two or three years.

There is still one point about which there should be no misunderstanding. From all the information attainable, I believe that my experience with this method is about that of the irregular practitioners who thrive by it, and that the proportion of cures, without any pain or bad symptoms, obtained by them is practically the same as my own. I have certainly tried all of the solutions ordinarily used by them, and some besides. The tincture of iron and the fluid extract of ergot are two from which I hoped for better results, but neither seemed to possess any advantages.

I believe I have now fairly stated the advantages and disadvantages of this plan of operating upon hemorrhoids, and have put, as far as my own experience enables me, each reader in position to choose for himself whether he will use it or not, except in one particular. All of the patients I had supposed cured by this method, and upon whose cases I based my former favorable report, have now returned to be again cured by some more lasting method. The relief afforded by this means seems to last about two years, and I find none of my patients are willing to submit to it a second time.

The question, in fact, narrows itself down to this: On the one hand we have a method of treatment which is safe, certain, and practically painless, but which involves the administration of ether,

the performance of what the patient dreads, a surgical operation, and a certain confinement to the house for a few days. On the other hand we have a method which avoids the ether, the surgical operation, and perhaps the confinement to the house, but which, in fact, involves a more serious operation than the other, only more quickly performed, and which is neither radical nor certain in its results, and always liable to be followed by serious complications.

As regards the comparative suffering caused by the two operations, the clamp or the ligature as compared with the injections, it may be taken for a fact that any considerable number of cases will show greater pain spread over a longer time with the latter than with the former; and all the patient actually gains in the most favorable case is the avoidance of a safe operation which he fears, while he submits to an uncertain one which he does not fear because of his ignorance.

Should the surgeon decide to employ this method, the following points may not be useless: Use the weaker solutions in preference to the stronger. Never use it in any of the forms of external tumors. In cases of large, prolapsing, and long-standing disease, expect pain and perhaps marginal abscesses. Be very cautious in prognosis as to the time the treatment will require and the amount of pain it will cause. In fact, it will generally be safer to acknowledge the uncertainty as to these two important points of the operation.

The Clamp and Cautery.—The operation with the clamp is generally known as that of Mr. Henry Smith, of London, and to him it owes its general introduction and acceptance by the profession, though he claims no originality in the method itself, but only in some of its details.

The essential idea of this operation is to seize the part to be removed, apply the clamp to its base as a temporary hemostatic, cut it off with scissors, and cauterize the stump. The clamp acts merely as a temporary ligature to prevent bleeding during the operation, and the cautery is to prevent bleeding after the clamp has been removed. The instruments which are indispensable are therefore four in number—a double tenaculum forceps to seize the pile, shown in Fig. 100, the clamp shown in Fig. 101, scissors, and the cautery.

The clamp is a modification of Mr. Smith's, which I have had made for my own convenience, and the difference can be seen at a glance. Mr. Smith's instrument (Fig. 102) is armed with ivory shields to prevent the possible effects of radiated heat; it has scissors han-

dles, and the edges of the blades are smooth. In my own there are no shields, and the handles are much larger. I was led to abandon the ivory shields because I found them practically unnecessary and



Fig. 100.

because they made the instrument more cumbersome. The handles were modified to give increased power and to avoid the general use of the screw for closing the blades. The edges were at first serrated to add to the crushing force, but experience has convinced me that

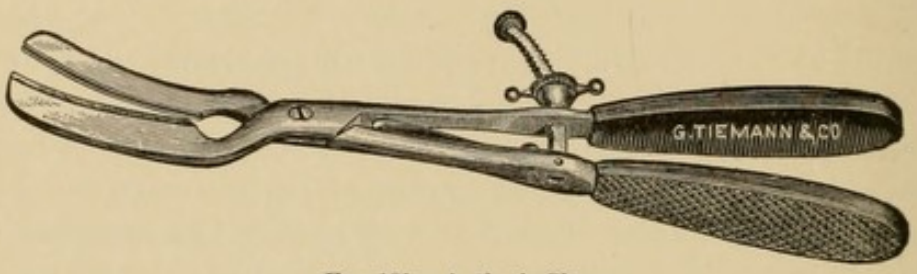


Fig. 101.—Author's Clamp.

even with this amount of power the clamp is incapable of crushing the tissues to any extent, and I have discarded the serration for antiseptic reasons. I have placed it on a tumor, screwed it up to its greatest possible power, and left it in this condition for fifteen min-

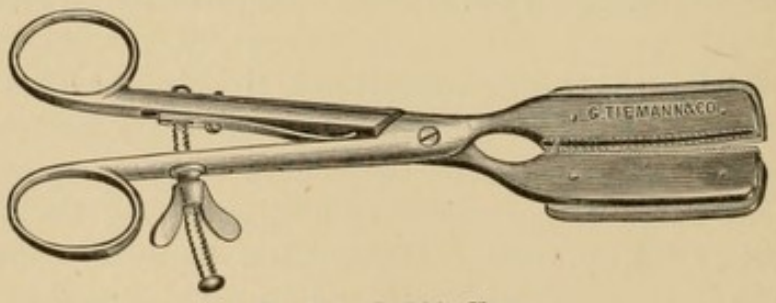


Fig. 102.—Smith's Clamp.

utes. While it was in position the hemorrhoid became cold and livid, but when the pressure was removed the vessels immediately filled up and the circulation was restored. It is for this reason that I say the clamp acts merely as a provisional ligature during the operation. In fact, no force capable of crushing the tissues to the point

of causing the occlusion of the vessels and the death of the parts can be exercised without much greater mechanical power than this clamp possesses. There can be no bleeding while the clamp is in position if the handles are firmly closed with one hand; but unless the cut surface has been thoroughly cauterized, there will be immediate bleeding on its removal. The advantage of the form of handle shown in my instrument over that of Mr. Smith is that an adequate pressure can be kept up for any length of time without the intervention of the screw, and by this fact the length of time consumed in operating is much diminished.

The cautery is the most important of all the instruments, being the most delicate.

Very little preparation for this operation will be found necessary in a healthy patient. When one in good health tells me his bowels are acting regularly I have about abandoned the time-honored custom of deranging their action with a purgative just previous to this operation; and if they have moved on the morning of the operation, all that is necessary is a simple enema of warm water an hour before the operation begins. If given an hour before, it will generally all be passed before the arrival of the surgeon. If given after the arrival of the operator he stands a good chance of receiving a large portion of it in his lap and on his towels the moment he dilates the sphincter.

The operation is performed in the following manner:

As a rule the patient is etherized, in order to permit a free dilatation of the sphincters. The tumors are next seized and removed one by one. No speculum is necessary for this, but if one be used the large Sims rectal speculum is the best. The tumor is seized with the forceps and held out of the anus, while the base at the juncture of the skin and mucous membrane is divided as in the ligature operation, and the clamp applied to what remains of the pedicle in the sulcus thus made. The forceps are next detached, the tumor cut off with the scissors (but not so short but that a good, firm stump remains), and the cautery is then taken from the assistant, whose sole duty it should be to have it always ready, and applied thoroughly to the stump of the hemorrhoid. No haste should be used in this step of the operation. The pedicle should be thoroughly charred with the platinum at a red heat.

When this has been done the clamp may be loosened, without being removed, to see if any vessel in its grasp is still inclined to

bleed; and if a bleeding point appear, it is again tightened and the cautery is again applied. Thirty seconds is an abundance of time for each tumor. The secret of success in this operation is found just here. If all the cut surface is thoroughly cauterized while the clamp is on, there can be no hemorrhage; but if more surface is cut than is cauterized, hemorrhage may reasonably be expected and the operator is to blame. Thoroughly cauterize the entire incision, except the initial one made before the clamp is applied, and trust nothing to the clamp or to nature is the advice I always try to impress most strongly on those studying this operation.

When all the piles have been removed, the stumps will naturally retract within the sphincter and no dressing will be necessary.

The thing most difficult for the unpractised operator to understand is at just what point to apply the clamp; and this can best be learned by experience, as it really constitutes the delicate point in the operation. There is no difficulty when the tumor is an internal one arising fairly from the mucous membrane above the sphincter, and not involving the skin of the anus. In such a case the clamp does not implicate the muco-cutaneous junction at the anus, and removing too little tissue will not leave unsightly and annoying tags of skin, nor will removing more than is necessary result in cicatricial contraction to a serious extent. But where the margin of the anus tends to roll over, as is shown in Fig. 99, considerable experience is necessary to learn just how much tissue to include in the clamp.

When it is necessary to divide the skin of the anus with the scissors before applying the clamp, there will be a little bleeding, which is easily stopped by a compress and bandage; but when the clamp is applied only to parts covered by mucous membrane, and used without any preparatory cutting, the operation is almost bloodless, and under any circumstances it is unnecessary to soil more than a single towel. This is a great desideratum in cases of enfeebled patients, besides enabling the operator to have his wounds perfectly dry without the use of any lint or other dressing.

No dressing of any sort is necessary after the clamp operation, except a pad of gauze covered with vaseline, and a T-bandage applied for a few minutes to arrest oozing from the preliminary incisions in the skin. If the patient seems to be doing well and complains of no untoward symptoms, the parts need not be ex-

amined for ten days, and all that is required is cleanliness to the wound.

The bowels should be confined for forty-eight hours, and about thirty-six hours after the operation—in other words, at night of the following day—they should be encouraged to act by a slight laxative, either a pill or a saline. A single dose will generally be sufficient, and when the time comes for the bowels to move, an enema of water should be thrown up the rectum to facilitate the passage. In this way an almost complete clearing out of the rectum is secured on the second day. The patient dreads this first motion, but is agreeably disappointed, often being surprised that he has much less pain than his hemorrhoids caused him in each passage before they were removed.

The bowels may be treated in this way after the ligature operation with great advantage.

I do not wish to convey the idea that no pain follows this operation, but I can honestly say that many patients have less pain on the day following it than they have suffered daily from their hemorrhoids for years before. I usually expect some of that annoying spasm of the levator which no stretching of the sphincter can prevent; and when this is present it will begin a few hours after the ether, and may last for the following day or two; but it is not generally sufficient to prevent a good night's sleep, and it is often so slight as to cause no comment by the patient. It is very exceptional for any anodyne to be necessary, even on the first night after operating. Even this spasmodic contraction of the muscle is not always present.

The length of time the patients are confined to the house of course varies. They are generally sitting up on the second day, or at most the third, and walking around the room tending to their own wants; the men smoking and reading, the women receiving visits or sewing; and one of the details about which the physician needs to be most strict is to keep the patient quiet in the house until the healing has so far advanced as to make active exercise safe. Many of my own cases come from a considerable distance, and are anxious to return to their own homes as soon as possible. I usually aim to secure at least ten days, but I find they are very apt to depart at the end of a week, and occasionally five days sees them on their journey.

I do not mean that this should be encouraged or recommended,

for it is very much better that the patient should remain quiescent until the wounds are well advanced toward cicatrization; but it shows better than anything else the general condition of the patient when there is no suffering which induces him to wish to stay in his room.

The Operation of Excision, or Whitehead's Operation.

This consists in amputating the entire "pile-bearing" region of mucous membrane. An incision is made around the anus at the junction of the skin with the mucous membrane; the latter, with the hemorrhoidal tumors, is dissected upward till the upper limit of the hemorrhoids is passed, and then amputated by a circular incision. The mucous membrane is then drawn down from above and stitched to the skin. Various modifications have been made in the

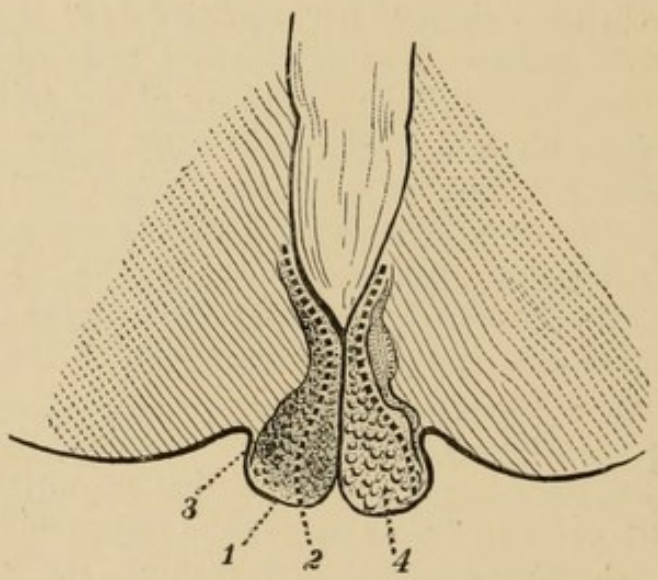


FIG. 103.—Operation by Excision. 1, Hemorrhoid; 2, incision; 3, junction of skin and mucous membrane.

technique, all intended to facilitate the performance of a naturally unnecessarily tedious operation; but no essential change has been made in the guiding principle.

This operation is based by its advocates upon the proposition that neither the ligature nor the cautery are radical operations, because they only remove the hemorrhoids and do not remove all of

the "pile-bearing area"—a proposition which I believe to be absolutely untenable either in theory or as shown by clinical experience. There are, moreover, two serious practical objections to this method of operating.

The success of the operation depends entirely upon securing union of the adapted surfaces by first intention. Failure in this means bad stricture of the rectum; and failure to get union by first intention is nowhere more common than in this part of the body. A sufficient number of these cases are now on record in the practice of the best hospital surgeons in New York to render this operation one of doubtful propriety while we have so many more reliable ones as we now possess. It is true that stricture may follow either the ligature or the clamp, but in the nature of these operations, consisting, as they do, in the removal of successive segments of mucous membrane, sufficient strips of normal tissue are almost always left to prevent this accident, and a good operator will take especial pains to preserve enough mucous membrane to prevent closure of the anus by cicatrization. In Whitehead's operation the whole mucous membrane is dissected up and amputated, more being brought down from above to take its place. If this holds, all is well; if it fails to unite by first intention, there is a wide ulcer completely surrounding the anus, and a stricture is the necessary consequence. The slight stricture which may result from either the ligature or clamp operation is easily curable by suitable treatment. This one is not, and in one case I have been forced to do a complete extirpation of the rectum for such stricture and ulceration in a case operated upon in one of our large New York Hospitals.

I have also recently seen several cases which illustrate another danger of this method, and one which I had not thought likely to occur. The patients have all been operated upon by hospital surgeons, and in all the anus now presents a peculiar appearance, at first sight resembling a slight but complete prolapse. The incision in the operation had been outside the muco-cutaneous injection; the mucous membrane had been drawn down to meet it and had united by first intention. Result: a ring of excoriated mucous membrane, in half of its extent fully an inch wide, surrounding the entire circumference of the anus, and ending, without any shading off, but suddenly and abruptly, in healthy skin. The condition is an exceedingly annoying and troublesome one and can only be relieved by fresh surgery. I have now the notes of several

such cases which have applied to me for relief after submitting to this procedure.

On the whole, it may be said that the operation, though more difficult of performance than either the clamp or the ligature, yields excellent results in skilled hands, but is liable to be followed by very annoying after-consequences in the hands of those less experienced. In time of convalescence, after pain and reflex disturbance, and certainly of cure, it has no advantages over the others described.

CHAPTER X.

PROLAPSE.

Of prolapse of the rectum there are two distinct varieties.

Prolapse of the Mucous Membrane Alone.

This, which is sometimes spoken of as "partial" prolapse, because only a part of the wall of the rectum is involved in the descent, is well represented in Fig. 104.

Prolapse of all the Coats of the Rectum, including, when the disease is of sufficient extent, the Peritoneum (Fig. 105).

The first form is a mere everting of the mucous membrane of the lowest portion of the rectum, rendered possible by the laxity of the submucous connective tissue. It is seen as an accompaniment of old cases of hemorrhoids, and its mechanism may be studied at any time upon the horse, in which it occurs naturally at the close of each act of defecation.

The second variety is an exaggeration of the first, in which, after the submucous connective tissue has yielded to its utmost, the whole thickness of the rectum begins to descend, and finally protrudes. It follows, of necessity, that after this protrusion has reached a certain length the peritoneal coat must also descend outside of the body, and this condition is shown at a glance by reference to the plate. In both of these forms the protrusion begins first at the part of the rectum nearest the anus.

Prolapse of the Mucous Membrane Alone.

This is perhaps the most common variety of the disease. It is found in children most often between the years of two and four, and in adults it is more frequent in women than in men. Its causes are various. Among them may be enumerated the following: Those which tend mechanically to draw down the mucous membrane, such as hemorrhoids, polypi, vegetations, and tumors. Those which tend

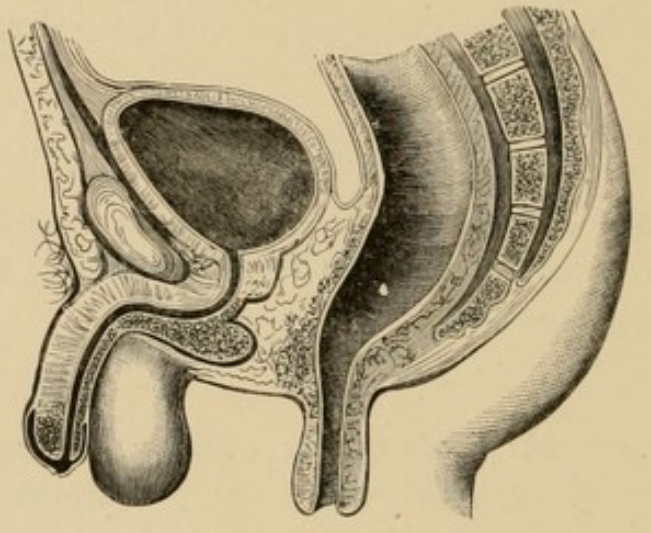


Fig. 104.

First Form of Prolapse.

to weaken or to destroy the action of the sphincters, such as ulcerations or incisions. Those which cause muscular spasm, such as fissures, worms, dysentery, phimosis, cystitis, calculus, stricture of the urethra, and enlarged prostate. Those which produce permanent dilatation and weakening of the sphincters, such as spinal paralysis and traumatism. To this lack of tonicity of the sphincters may be attributed the frequent occurrence of prolapse in feeble and badly nourished children. Those which produce œdema and swelling of the pelvic tissues, such as pregnancy, parturition, fecal accumulations, and hepatic lesions. To these causes it may be proper to add one anatomical one — the undeveloped sacrum in children,

which, by its straightness, leaves the rectum comparatively unsupported.

The first form of prolapse generally comes on gradually and seldom suddenly. It may be partial or complete as regards the circumference of the rectum, being in some cases of hemorrhoids confined to one side of the aperture, and in others involving the whole circumference. It presents itself as a scarlet or livid mass (depending upon the state of contraction of the sphincter) projecting from the anus, covered with the natural secretion of the bowel, directly continuous with the skin on one side and with the mucous membrane on the other, and arranged in folds which radiate from the central aperture toward the circumference. It is at first spontaneously reducible, or at least easily replaced by a slight pressure, and remains reduced till the next act of defecation ; but as the amount of prolapsed membrane increases, the difficulty in reduction becomes greater. At first, also, there is no pain, but after a time the act of defecation comes to be

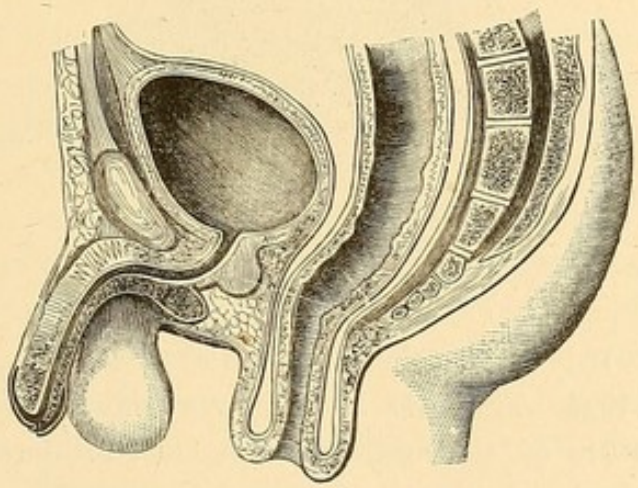


FIG. 105.

Second Form of Prolapse.

greatly dreaded by the patient, and the suffering continues till the tissue is replaced.

As already said, the second variety of prolapse differs from the first in the fact that it is composed of the whole thickness of the bowel, and, therefore, when of sufficient length, of peritoneum also.

It is probable that every prolapse of more than two inches in length may contain peritoneum ; and it follows from the anatomy of the parts that the peritoneum will extend lower on the front than behind. In the peritoneal pouch thus formed there may be located coils of intestine, an ovary, or a part of the bladder. In this form of prolapse there is no groove or sulcus, and the absence of such a groove is, therefore, no proof of the non-existence of a fold of peritoneum in the tumor.

It is a mistake to suppose that this second variety is not met with in children, for it is only an exaggerated form of the first, being the next step in the descent after the submucous connective tissue has yielded its utmost ; and exaggerated cases of prolapse are often seen

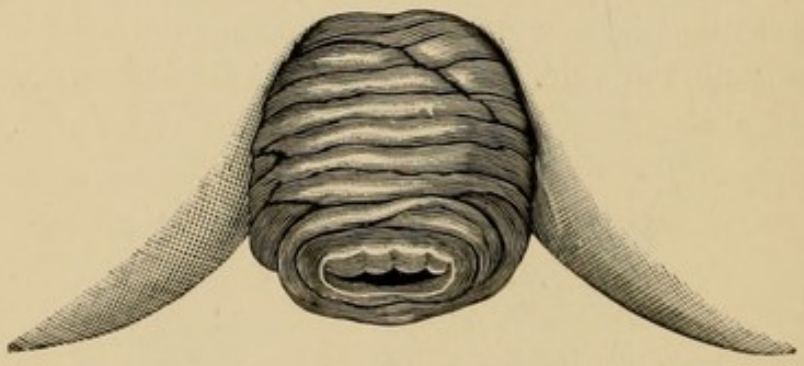


Fig. 106.

Prolapse.

in children. It is distinguished from the first variety, first of all, by its size (Fig. 106). The first is never very large ; while the second, from the nature of the case, must be of considerable dimensions. Again, a prolapse of the second variety is generally of long standing. The second generally follows the first, but a prolapse may be of this variety from the beginning, resulting, in such a case, generally from violent straining, and coming on suddenly. The first variety is not firm and thick to the feel ; the folds of mucous membrane radiate from the orifice to the circumference, and the opening is circular and patulous. In the second the orifice is slit-like and is drawn backward by the attachment of the meso-rectum, or, in females, forward by the closer attachment to the vagina. The form of the tumor is conical,

its walls are thick and firm, and when pressed between the fingers the gurgling of gas in a contained loop of intestine may sometimes be detected, and a resonance may be obtained on percussion.

If such a tumor be carefully dissected, the coats of the protruded bowel will be found enlarged, the mucous membrane will be seen to be thickened and dense in structure, especially at the free extremity, and it will also sometimes be found eroded and granular. The submucous areolar tissue will be seen to be infiltrated, and the muscular layers hypertrophied. Owing to these changes the bowel is actually increased in size and becomes too large to be retained in its proper place, which explains the difficulty often experienced in reducing it and in keeping it reduced, in spite of the constant straining and desire for defecation, which it produces. These changes in the mucous membrane may in rare cases result in the production of a foul, hard, bleeding, eroded mass.

The causes of the second variety are the same as of the first, and need not again be enumerated. The symptoms also are the same, with the addition of more or less incontinence of fæces in old cases; but the treatment is not the same in all respects, for certain measures which may be safe when a prolapse contains no peritoneum may be fatal under the opposite condition.

A prolapse is apt to increase slowly in size as time advances. In children especially, it may at first cause little apparent discomfort. The bowel is usually replaced by the parent after defecation, and the condition is well borne till more or less inflammation and erosion of the parts set in. Then each act of defecation is greatly feared. After a time the protrusion becomes more frequent and remains down longer, till finally it is down most of the time. Then suddenly a change occurs and replacement is no longer possible. This will bring the case to the surgeon, and he will find all the difficulties increased four-fold by the existence of one of two conditions—inflammation or strangulation.

When inflammation has occurred there will be more or less febrile action and constitutional disturbance. The prolapse will be swollen, hard, and painful if the inflammation is in progress; if it has passed off, the tumor will be left larger and harder than before, from infiltration. The mucous membrane will be thickened, and may be

eroded or ulcerated, and the difficulty of reduction is greatly increased from the changes which have occurred in the tumor. Strangulation is rare, but may occur where the tumor is large and the sphincter firm. It may be temporary when properly met, or it may result in sloughing which shall involve a whole or part of the tumor. It may result in a cure by sloughing, or it may extend and cause death from peritonitis. When the sloughing involves the whole prolapse it is also apt to cause a serious stricture. When it involves only the mucous membrane it may cause just sufficient subsequent contraction to effect a cure. These changes are not apt to occur in the first form of the disease, and are generally confined to the second or third.

The bleeding from a prolapse is not generally a very important matter. More or less of it occurs at stool, but seldom to a serious extent. It is more apt to be a general oozing than a free hemorrhage.

It would seem that there ought to be little difficulty in diagnosticating this form of disease. The most common error is to treat a child for it and overlook the polypus which is the cause of it; but this is generally the result of prescribing for what the parents call a "coming-down of the bowel," without making any examination, and can hardly be called diagnosis. I have often seen large, prolapsing internal hemorrhoids described by intelligent physicians as prolapsus, and this arises from a failure to justly appreciate the different nature of the two affections. Both are protrusions of the mucous membrane from the anus, it is true, but they do not resemble each other. They are often found associated, the prolapse being secondary to, and caused by, the dragging down of the internal hemorrhoids; but even then they may easily be distinguished from each other. One is a new growth composed of connective tissue and blood-vessels, covered by mucous membrane, and even when large is definitely and plainly circumscribed. It is not a part of the natural rectum, but an adventitious formation which may be removed, leaving the rectum much as it was before. Prolapse, on the other hand, is a part of the rectum itself merely displaced. The mucous membrane is not changed; there is no new element added; it is not a circumscribed tumor or collection of tumors, but a more or less voluminous

mass of the rectal wall. They resemble each other very little, except that they are both covered by mucous membrane.

In adults, an old, eroded, bleeding, and infiltrated prolapse may be mistaken for malignant growth, and I have seen cases in which the difference could only be made out by most careful examination.

But by far the most important point for the practitioner is to distinguish one form of prolapse from another, and particularly this one from the ones next to be described. Too much stress cannot be laid upon this point, for, although the disease is not at all an uncommon one, its pathological anatomy does not seem to be well understood. To the minds of many, one prolapse is still very much like another, except that there may be a difference in size, and therefore in the amount of surface to be cut off or painted with nitric acid ; and until this idea is thoroughly eliminated there will still be an occasional case, in which it has borne its fatal fruit in the way of treatment. When it once begins to be understood that putting a clamp or knife to one of these protrusions may involve all the risks which would follow the ablation of an inguinal hernia, a great advance will have been made.

It will generally be impossible to decide by physical examination whether a prolapse of the second class contains peritoneum or not, unless the case be one of true rectal hernia in which the *cul-de-sac* of peritoneum contains a loop of small intestine or some of the pelvic organs. Such cases are rare, and the only safe rule is to act on the supposition that every prolapse not manifestly of the first variety may contain peritoneum, and act accordingly.

Rectal Hernia.

Under its proper title of archocele, or rectal hernia, this affection is seldom found described, and this fact might make it appear to be rarer than it really is. The external variety of it, however, which occurs as a complication of extensive prolapsus, is not particularly uncommon, and will often be found referred to in medical literature under the head of "prolapsus containing loops of small intestine." Such reference is generally limited to a casual men-

tion of the possibility of the condition, and the condition itself has seldom been described with any approach to completeness.

There are several varieties of this affection, that in which the sac is composed of an old prolapsus being the most common. This may be characterized as the external form. In this the sac is first formed, and remains ready at any time for the reception of its contents. It may never be occupied, or it may suddenly be filled by a loop of in-

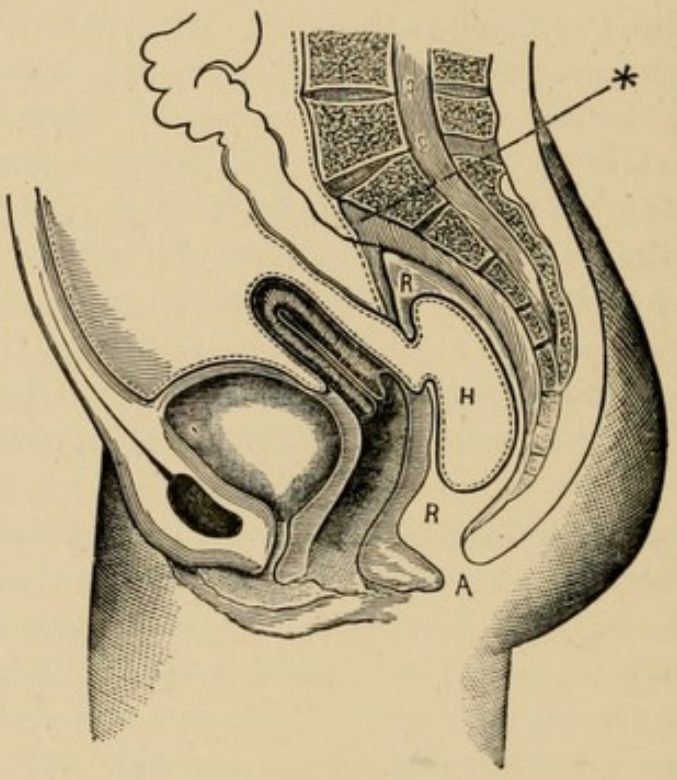


Fig. 107.

Internal Rectal Hernia.

testine as a result of a sudden strain or violent action of the abdominal muscles. There is another variety, which may be known as the internal, in which the relation is somewhat different. In it the rectal wall at some especially weak point yields to the pressure of the pelvic contents, bulges in on one side in the form of a sac, and finally forms a considerable tumor occupying the rectal pouch (Fig. 107). The favorite site for such a sacculation to commence is at the recto-vesical *cul-de-sac*, and such a tumor may never come below the sphincter.

The sac of an internal hernia is not always composed of all the layers of the gut, for the reason that the muscularis is apt to be weakened before such a condition can arise, and in the subsequent increase in growth it may rupture and leave only peritoneum, cellular tissue, and mucous membrane.

Another variety is that in which no proper hernial sac can be found, the coils of intestine lying loose in the rectal pouch or projecting beyond the sphincter. These are the cases described as spontaneous rupture of the rectum, to distinguish them from the results of direct traumatism, such as might be caused by a foreign body puncturing the rectal wall or the pelvic diaphragm. Many of these cases are undoubtedly the result of the rupture of a previously existing hernial sac, and are therefore merely complications of the varieties already described. It is possible that rupture of the rectum may occur as a result of severe straining where there has been no previous hernia, but it does not seem probable that such rupture ever occurs without the existence of previous disease which has weakened the wall of the rectum at the point where the rupture takes place, except in cases of direct traumatism, as in childbirth, or the introduction of foreign bodies. The immediate cause of the rupture is probably an overdistention of the sac with loops of intestine filled with gas and fæces, and then a straining on the part of the patient by which fresh coils of intestine or more air and fæces are forced into the sac.

The contents of the hernial sac are generally loops of small intestine; quite frequently, however, portions of the colon and sigmoid flexure have been found, and occasionally an ovary or the uterus. The size of the hernia may be so small as to lead the unwary into the belief that it is a simple prolapse composed entirely of mucous membrane, or it may reach the dimensions of an adult head. After the rupture of the sac the intestine may escape to the length of several yards.

Diagnosis.

Nothing need be said upon the diagnosis of a rectal hernia in which the coils of intestine protrude from the anus uncovered by any hernial sac. In an internal rectal hernia (one which has not

passed the anus), and which has not ruptured, the diagnosis will lie between it and an intussusception; but a careful examination with the finger should reveal the presence of a sac containing loops of intestine which can be pressed out of it into the general peritoneal cavity; of a pedicle to the tumor thus formed; and of an opening in the wall of the bowel which constitutes the mouth of the sac.

In ordinary cases of hernia which have become external, the diagnosis will lie between hernia and prolapsus without hernia. Often the different coils of intestine within the prolapsus can be felt between the fingers, the index finger being passed up into the rectum and the thumb remaining outside. The coils may also be reduced from the sac with a gurgling noise, and the sac may be tympanitic on percussion, especially in front. The thickness of the mass and its pear shape are also points of importance, and the peculiar enlargement in circumference which it undergoes when the patient strains, instead of the mere lengthening which occurs under similar circumstances in a simple prolapsus. A careful examination here also may enable the surgeon to trace the pedicle up into the pelvis, and the position of the opening into the rectum, as it is turned back toward the coccyx by the bulging of the anterior portion of the tumor, is worthy of notice. The diagnosis is always complicated by the condition of irreducibility, but even here tympanitic resonance on percussion, and gurgling of air on palpation, remain to assist the examiner. The flattened appearance of the lower abdomen, the sinking in of the umbilicus, and the folds of the abdominal wall radiating from it, may also indicate that the abdomen has lost a part of its natural contents.

Treatment.

The first step in the treatment of prolapse to which the surgeon will be called to attend will generally be to effect the reduction of the mass; after this has been accomplished the treatment may be either palliative or curative. In children a prolapse may generally be reduced by laying the patient across the lap on its face and making gentle pressure on the protruded bowel with the fingers, which have been well oiled, or with a soft greased rag. If this cannot be accomplished by a gentle taxis and without bruising the parts,

the child should at once be etherized and a curative procedure adopted. It is scarcely worth while in a child to stop to try the various methods of reduction which have been recommended, where the taxis has failed, before resorting to this step.

In an adult, however, ether and operative interference may both be declined, and the surgeon may have to tax his brain to accomplish the reduction without the aid of an anæsthetic. In such a case, after gentle taxis has been tried with the patient in the knee-elbow position and failed, cold should be applied while the patient remains on the face in bed with a pillow under the pelvis; and this may be alternated with warm poultices and with plentiful applications of an ointment composed of equal parts of extract of belladonna and extract of opium. By these means, the most effectual of which is position, reduction may almost always be accomplished. When by the action of the sphincter the prolapse has become gorged with blood and œdematous, the surgeon is often tempted to resort to leeches. They will generally give relief and may greatly facilitate reduction, but they are not free from the danger of a concealed hemorrhage within the rectum after the prolapse has been replaced. Attempts at manual replacement must not be carried far enough to bruise the parts or set up inflammatory action.

Two questions may arise in this connection. Should reduction be tried when the tumor is inflamed, and should it be tried in case of a circular slough? In answering the first question, the distinction must be made between a prolapse which is merely strangulated and one which is inflamed. The appearances may be much the same, but an old prolapse in an old person when found in this condition is much more apt to be inflamed than strangulated, for the sphincter muscle in such cases has generally lost the power of forcible constriction. The danger in returning an inflamed prolapse into the body is that the inflammation may extend and cause general and fatal peritonitis; and, as a rule, it is safer not to employ the taxis in such a case, but to put the patient in bed and treat it by local applications and rest till the acute symptoms have disappeared.

The occurrence of a circular slough as a result of strangulation is a very serious complication. The tumor is generally of the second variety, has become first irreducible, then inflamed, and finally

strangulated. At the apex, around the opening, there will be seen a black ring of dead mucous membrane and connective tissue of greater or less extent, perhaps already partially separated and hanging in shreds. The patient will exhibit more or less constitutional disturbance and fever, with fretfulness and evident suffering.

The gravity of this condition consists in the fact that a circular slough is very apt to be the cause of a severe stricture after cicatrization has occurred. If the prolapse be a long one, and the slough is at its apex, three or four inches from the anus, the stricture will be at a corresponding distance up the rectum when it is reduced; and its extent and severity will be in proportion to the amount of tissue which has been involved both longitudinally and in depth.

The treatment of this complication resolves itself into the ablation of the tumor. In this way the future stricture is removed, and whatever contraction there may be resulting from the operation will be at the anus, where it is easily handled, and not at a point within the rectum.

The palliative treatment is directed entirely toward diminishing the frequency and the amount of the prolapse, and in children a cure may sometimes be obtained by these means without resorting to surgical interference. The act of defecation is first to be regulated, and should be performed with the patient in the recumbent posture. One buttock may also be drawn aside so as to tighten the anal orifice, with advantage; and any source of irritation which produces frequent defecation and straining in the act must be removed. After the action of the bowels, if the prolapse has occurred, the bowel should be thoroughly washed with cold water and a solution of alum (℥ i. to ℥ viij.) before it is returned. Another favorite wash is composed of the tincture of iron, twenty to thirty drops to four ounces of water. The patient should then be confined to the bed for some time, and pressure should be applied over the anus by a pad kept in place by a T-bandage in the adult, or by a broad strip of adhesive plaster in children, applied so as to draw the buttocks into close apposition.

If any palpable cause for the disease can be found it must be removed. I have cured a bad case in a child by doing away with the

irritation caused by pin-worms. Calculus, phimosis, constipation, and polypus must all be remedied if they are present.

After the bowel has ceased to come down with the act of defecation, an astringent injection may be given every night with advantage and allowed to remain in all night. The general health should be carefully attended to; tonics should be administered where they seem to be indicated; and, if well borne, cod-liver oil may be used to fulfil the double indication of tonic and laxative. In children these measures may, as has been said, be curative, and, in fact, the disease often ceases spontaneously at about the time of puberty; but in adults they are not at all likely to be so.

After inflammation or partial strangulation has once occurred, unless it has worked a cure by sloughing, it is almost useless to hope for a cure by palliative treatment. The conditions have become changed; the tumor is thickened and increased in size; it has become too large for its former natural position in the pelvis, and acts as a constant source of irritation.

Should radical operative treatment be decided upon, there are several effectual methods. There is, in fact, one principle which lies at the foundation of the treatment of prolapse by operation. If the tumor be easily reducible, it may be retained in the body by diminishing the size of the anus. If it be not easily reducible, a part of it may have to be removed, the remainder reduced, and then the anus diminished to retain it. All plans of treatment are directed toward the accomplishment of one or both these things, and it remains only to choose between them.

In cases combined with internal hemorrhoids, the operation for the removal of the latter by either the clamp or ligature may easily be extended so as to cure at the same time the former condition. In such a case the proper course to pursue is to divide the prolapse into several sections with the scissors, and operate upon each one exactly as though it were an internal hemorrhoid. Caution must be exercised as to the amount of tissue removed, lest too great a degree of cicatricial contraction result.

Cauterization.

In children in whom milder measures have failed, a very effectual means of cure is the application of fuming nitric acid to the mucous membrane of the prolapsed part. The bowel should first be carefully wiped off with a towel or sponge, and the acid then applied by means of a small stick all over the mucous membrane, but not at all to the skin adjacent. Ether is not necessary, and after such an application the bowel should be replaced, a pad of lint firmly applied over the anus by means of broad strips of adhesive plaster, and the bowels confined by means of opium. Stuffing the rectum with wool causes unnecessary irritation. After three or four days the straps may be removed and the bowels moved with castor oil while the child lies in bed and the buttocks are pressed together by the nurse. In a large proportion of cases the cure will be found complete, though in a few cases I have seen a return of the disease after a few months. In any case, however, the benefit will be found to be very great, and should the disease return, a very careful search should be instituted for some existing source of irritation, such as polypus, phimosis, or calculus. In case of a recurrence, a second application will be effectual in causing a cure.

This treatment, though successful in children, is by no means always so in adults. Deep sloughs may occur in old persons with debilitated constitutions; and as a result of such a slough there may be severe hemorrhage. Stricture of the rectum may, without doubt, be caused by too free use of this remedy, but since it follows its abuse and not its proper use in appropriately selected cases, it can hardly be considered an objection.

Linear Cauterization.

In adults this is undoubtedly the best means at our command for dealing with all but the gravest cases of this affection, and the best means of applying it is that recommended by Van Buren, with Paquelin's cautery.

The patient is first etherized and placed in Sims's position. Van Buren reduced the prolapse, and applied the iron with the aid of

a speculum, though I prefer that the iron be first applied and the tumor reduced afterward. In either case from three to six vertical stripes should be made upon the mucous membrane, with the iron heated to a dull-red heat. The cauterizations, according to Van Buren's method, should begin about three inches up the rectum, and end at the junction of the skin and mucous membrane. They should also be deeper at the end, where there is no danger, than at the beginning, where the bowel may be perforated. He recommends that the iron be bent at a right angle a short distance from the end, so that it may be the more thoroughly applied to the concavity of the rectum, and that in mild cases a small iron should be used, "no thicker than an ordinary probe" (Fig. 108). I use the ordinary iron, and burn from the apex of the tumor to the sphincter, after the mass has been well pulled down with forceps. In bad cases the sphincter muscle may be burned through at two opposite points, after reducing the bowel. By this burning through the sphincter the patulous condition of the anus is overcome. The result of the operation is to decrease the circumference of the anal orifice, and also to bind the mucous and submucous to the muscular coat by a series of linear cicatrices, and in this way to effect a cure. The patient should be confined absolutely to bed till the wounds are entirely healed, so that a recurrence of the descent may be effectually avoided.

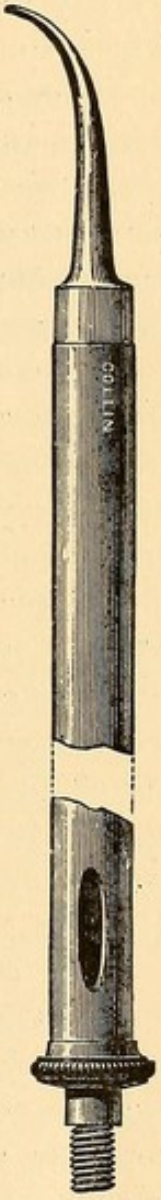


FIG. 108.
Cautery Iron.

For some time after the healing, and after the patient is allowed to be up and about, in fact, until the full effect of the operation has been obtained, a bed-pan should be used. The first operation, if thoroughly performed, will probably result in permanent cure. Should it not, it may be repeated. The only danger in connection with it is the occurrence of secondary hemorrhage when the sloughs separate, and of primary hemorrhage from large veins at the time of the application of the iron.

Amputation.

The moment we begin to think of cutting off a prolapse we approach the danger line. Cauterization is almost never followed by any bad results, unless it is carried to an unnecessary extent which subsequently produces a stricture; but amputation of an apparently innocent tumor may be fatal from a wound of the peritoneum, hence the necessity for the care in diagnosis already insisted upon. A prolapse consisting of the mucous membrane alone may be amputated *in toto* without danger; one of the second class must be approached very cautiously, and the operator need not be greatly surprised if he unexpectedly opens the peritoneum.

In the operation much judgment and experience are necessary to decide how much tissue to remove. A great deal of subsequent contraction must be allowed for, and a troublesome stricture may easily be produced. It will generally be sufficient to remove two or three longitudinal strips, and perhaps to then burn through the sphincter in a couple of places. The part to be removed is seized in the clamp, which is thoroughly screwed up, and cut off with scissors. A considerable stump must be left, and this must be thoroughly burned with the cautery heated to a dull red. If the iron be white the danger of bleeding is increased. After the iron has been thoroughly applied to every part of the cut surface, the clamp may be relaxed, but should not be removed till it is evident that there is to be no bleeding.

After such an operation, what is left of the tumor should be reduced, if possible, and the pad and bandage applied as after linear cauterization. In case the tumor is still too hard and swollen to be reduced, even after the operation, it must be dressed with a cold compress, and the case left until the shrinkage which is sure to follow has taken place. After this operation the treatment is somewhat different from that after the simple linear cauterization. In the latter the tumor still exists, and care must be taken to prevent its coming out of the body by confining the bowels. After the clamp has been used, it is generally better to encourage the bowels to move after the second day by the administration of a saline or the compound licorice powder.

The suffering after this operation is not generally severe. No dressing of the wound is required except frequent washing with warm water and the application of a soft cloth to the parts to catch the discharge which escapes from the anus. The patient should be kept in bed till the wounds are entirely healed, and for the first few days the surgeon must inquire carefully after the action of the bladder. All things considered, the operation is a very satisfactory one, much more so than the analogous operation of removing sections of the tumor with the ligature.

There remains to be considered the small class of cases of extensive disease which cannot be cured by any method so far enumerated, and which lead us at once into the domain of major surgery. Attempts have been made to suture the sigmoid flexure or upper rectum to some point within the pelvis, such, for example, as the promontory of the sacrum, and thus prevent the descent of the bowel, but not with any great success.

Ventral Fixation of Prolapse.

In a few cases I have opened the abdomen and stitched the sigmoid flexure to the abdominal wall, in much the same way as in ventral fixation of the uterus, and my success has been greater than I anticipated, giving me a couple of rather remarkable cures. The method is, however, only adapted to cases of intussusception of the upper rectum or sigmoid flexure into the lower, and would, I think, hardly succeed in an old incurable case of simple prolapsus, even though it might be of the complete variety.

My reason for supposing this is that it is impossible to stitch any part of the sigmoid or upper rectum to the abdominal wall which would be near enough to the portion prolapsed to act as a permanent support for it.

Resection of Prolapse.

In these cases we are reduced to a simple resection of the prolapsed gut, an operation which necessarily includes opening the peritoneum and which requires all the attention to antisepsis and details which would be required in a resection of any other piece of intestine.

The instruments necessary are:

Scalpel.
Straight, blunt-pointed scissors.
Six hæmostatic forceps.
Fine catgut.
Full-curved medium-sized needles.
Needle-holder.

After thoroughly scrubbing the perineum and shaving it, the rectum should be well irrigated with 1 to 500 bichloride.

The prolapsus should then be brought down to its fullest extent by traction with the hæmostatic forceps upon the mucous membrane. This can easily be done by catching it first on one side and then on

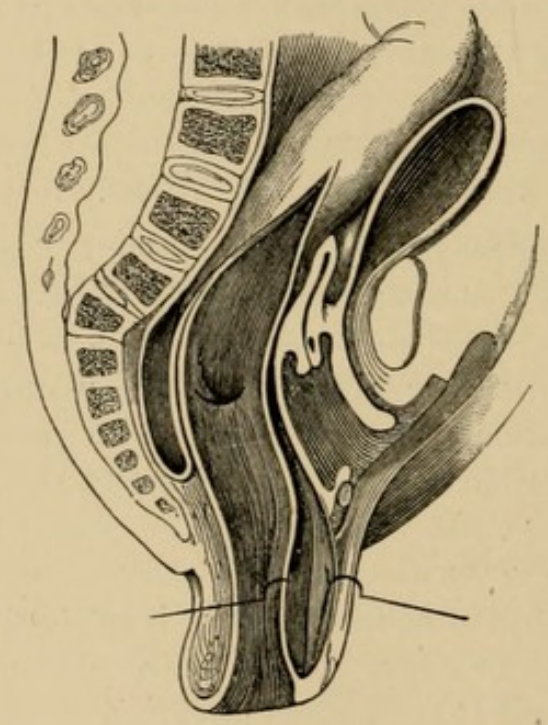


FIG. 109.

Prolapse with Peritoneum Opened.

the other, and gently everting it. When all has been brought down the last pairs of forceps may be left attached, and they, by their mere weight, will prevent its return.

The prolapse should next be thoroughly scrubbed with soap and brush, irrigated with 1 to 500 bichloride, and wiped with pledgets of

iodoform gauze; and all of the subsequent steps of the operation should be done under a stream of sterilized water.

With a knife an incision is made through the mucous membrane only, across the anterior half of the mass just below the external sphincter, and with the handle of the scalpel the mucous membrane of this portion is turned down as far as the apex of the tumor. But little bleeding will follow such a blunt dissection, although considerable may be caused by the preliminary incision.

The posterior segment of the tumor is next treated in the same way, the result being that the mass is entirely deprived of its mucous membrane as far up into the gut as the operator may think necessary. In many cases of very large tumors this removal of the mucous membrane will so diminish the size of the tumor that it will be unnecessary to proceed any farther. The detached mucous membrane may, under these circumstances, be amputated, and the cut edges stitched to the sphincter, thus completing the operation.

In other cases after the removal of the mucous membrane it will be evident that only the covering of the tumor has been removed and that the mass of the prolapse consisting of fat, peritoneal sac, and possibly intestinal contents still remains. The fat must be removed in pieces and the peritoneal sac opened and excised. Fig. 109. The same care and deliberation are necessary as in any operation for hernia. The peritoneal pouch will generally be found on the anterior segment of the tumor and seldom in both anterior and posterior. After the sac has been excised the peritoneal edges are united with fine cat-gut, and the suture of the mucous membrane completed as in the previous case.

The dressing should consist of a large pad and firm straps of adhesive plaster to draw the buttocks together. This should be allowed to remain for at least a week. The bowels may then be gently encouraged to move by salines, the patient lying upon a bed-pan and the nurse pressing the buttocks together to prevent any extrusion of the bowel during the act. This precaution should be observed for at least a fortnight.

Verneuil has invented a new method, which consists in dissecting down upon the rectum from behind in the median line, gathering it up into transverse folds by sutures in its walls which do not pene-

trate its calibre, and, after thus shortening the tube, attaching it by sutures to the sides of the coccyx and sacrum to prevent its further descent.

In cases in which curative measures are out of the question, the hemorrhages and the erosions may be relieved by suitable applications, rest in bed, defecation in the recumbent posture, etc. Subsulphate of iron is perhaps as good an application to the bleeding surface as any other; and weak solutions of nitrate of silver often have a good effect upon the erosions.

CHAPTER XI.

INTUSSUSCEPTION.

THE essential difference between the disease now to be considered and the forms of prolapse already described, consists in the fact that while in the latter the bowel begins to slip down from its lowest portion at the anus, in the former the lowest portion remains in its proper position and the bowel from above is telescoped within it. Under these circumstances it is evident, as is shown in Fig. 110, that the affected portion of the bowel must consist of three different and

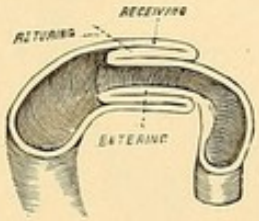


FIG. 110.
Intussusception.

distinct cylinders—an outer one, which contains the other two, and two included portions, one of which is the entering and the other the returning bowel.

When the upper part of the rectum becomes invaginated in this way within the lower, the included portion will not always appear at the anus, as in the cases of prolapse already described, and yet there is little doubt in my mind that the upper part of the rectum may occasionally become invaginated into the lower without causing any symptoms except great difficulty in defecation.

This is a rare form of disease, though it is frequently supposed to

exist to account for old and severe cases of constipation. The symptoms are peculiar, and are yet almost diagnostic if the patient be sufficiently intelligent to make himself understood. The thing most decidedly complained of is a peculiar straining and difficulty in defecation. The patient will say that when he strains the bowel seems to become closed, and that no amount of effort will overcome the obstruction. This story is common enough and means nothing but constipation. But when he or she complains that to have a passage an unnatural position has to be assumed, I always begin to be suspicious of intussusception. One of my patients could only relieve himself in the knee-elbow position, and another only when lying

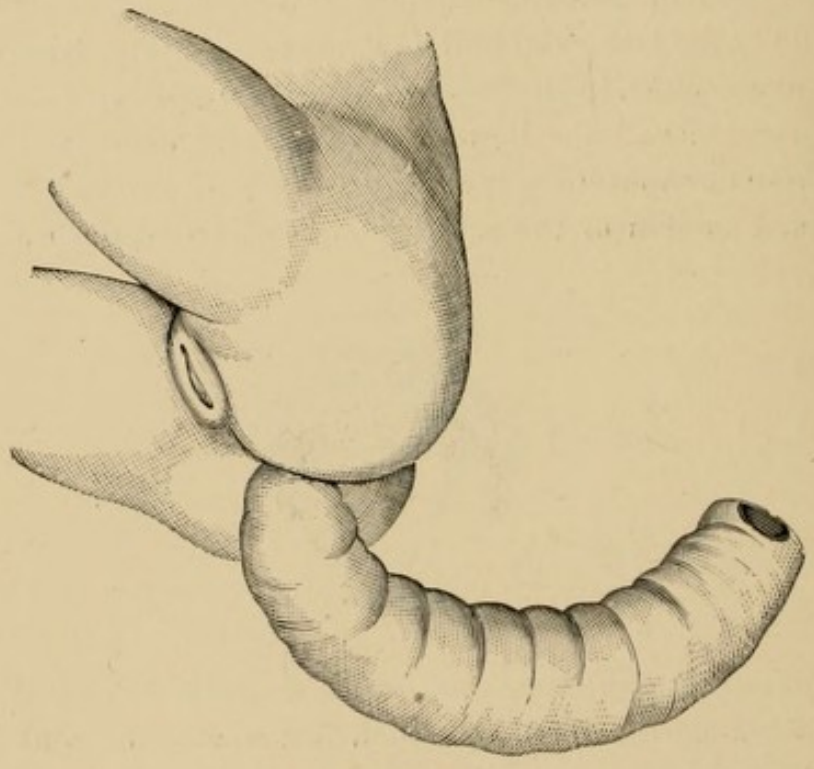


FIG. 111.

Prolapse of Invaginated Intestine.

down. When this history is given, and a digital examination shows an absence of any change in the gut, such as stricture, a temporary invagination at the time of defecation may be strongly suspected. It is possible in some cases to feel the tumor caused by the condition in the rectum when the patient assumes the natural position of defe-

cation and strains down. The treatment consists in linear cauterization of the upper part of the rectum. The iron should be an old-fashioned, olive-pointed, actual cautery iron with small tip, heated scarcely more than black, and applied lightly at four or five points. The thermo-cautery is too powerful an instrument, for it must be remembered that the peritoneum is just under the iron. My preference, however, in the future will be for the operation of ventral fixation already referred to under prolapse.

When the invagination is of sufficient extent, a distinct sulcus may be felt by the finger between the extruded portion and the mucous membrane, which is continuous with that of the anus. The bottom of this sulcus, or the point at which the entering portion becomes directly continuous with that into which it enters, may also be felt by the finger if it is low enough down; if not, it may sometimes be detected by the aid of a soft catheter. When a portion of the bowel still farther removed from the anus has become invaginated into that immediately below, the included portion may or may not descend sufficiently near to the anus to be felt by rectal touch, and the sulcus may not be apparent. It is evident that between a case of prolapse in which all the coats of the rectum appear through the anus, and in which a sulcus can be felt by the finger passed around the protruded portion, and a case in which the ileum is telescoped through the ileo-cæcal valve and appears at the anus, the difference is one of degree, and of location, and not of kind.

Such a protrusion as this is evidently composed of an entering and returning portion of the bowel, each in its whole thickness, and between them there are two surfaces of peritoneum in apposition, one covering the descending and the other the ascending portion. The peritoneal *cul-de-sac* thus formed is generally empty; if there has been sufficient inflammation the serous surfaces may have become united to each other.

The diagnosis of this form of prolapse rests chiefly upon the presence of the sulcus; and this is the first point to be determined in the examination of every case. The size is of little value in the diagnosis. An inch of rectal mucous membrane may protrude in the first form, or an inch of the ileum may protrude in the third, and at first sight they may appear very much alike. A large, cocoanut-

shaped tumor is generally of the second variety, while a very long one is more apt to be of the third. An intussusception in the course of the intestine at a distance from the anus is not likely to project more than a few inches outside the body.

The sulcus merely proves the fact of invagination; but when we consider that the ileum projecting through the anus has been mistaken for cancer, polypus, and hemorrhoids, that it has been cauterized, incised, and cut off, and that these errors in diagnosis have led to fatal results, its importance as a diagnostic point can hardly be overestimated.

In Fig. 112 is shown a diagram of an intussusception anywhere along the length of the gut. The conditions are essentially the same.

There is the ensheathing part, 1; the entering portion, 3; and the returning portion, 2, which must be carefully distinguished from each other. The former (1) is sometimes spoken of as the intussus-

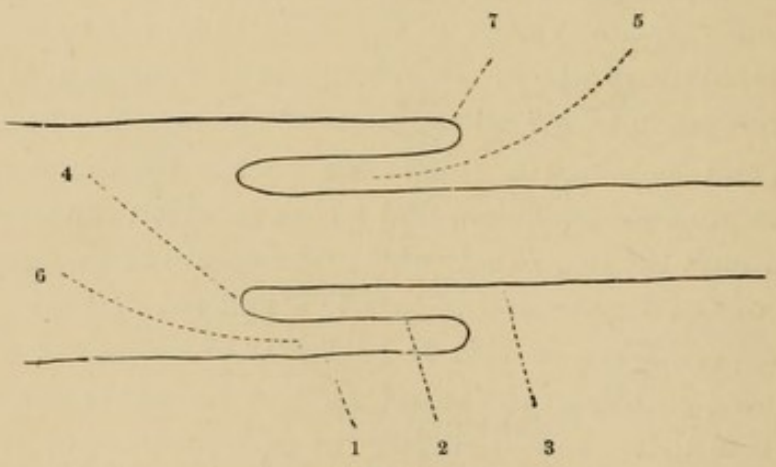


FIG. 112.

Intussusception.

cipiens, and the other two combined as intussusceptum. Within the sulcus (6) two mucous surfaces are in contact with each other, and within the space (5) two serous surfaces. The point (4) where the entering portion (3) becomes the returning portion (2) is known as the apex of the intussusception, and the point (7) where the returning portion joins the sheath is the neck.

Of this condition there are many varieties and degrees. The most

common, forming nearly one-half of all the cases, is the ileo-cæcal, or that in which the ileum and the cæcum pass into the colon, carrying the ileo-cæcal valve at the apex. This variety also is the most extensive, the cæcum sometimes passing the whole length of the colon and protruding from the anus. The next most frequent form is that which is confined to the small intestine; more frequently to the lower part of the jejunum, but quite often to the ileum, and occasionally to the duodenum. In these the amount invaginated is generally short and the tumor correspondingly small. After these in frequency come the cases affecting the colon, sigmoid flexure, and rectum. When the large bowel is affected it is most often near its termination, the descending portion passing into the sigmoid flexure, the flexure into the rectum, or the upper part of the rectum into the lower. These latter forms are necessarily limited in extent, for when once the invagination has been fairly formed, and after the entering portion has been grasped, the increase in length is always at the expense of the sheath. The apex (Fig. 112) remains constantly the same, and the turning-in is not done at this point, but at the neck. If, therefore, the neck be within the rectum, the intussusception must be limited by the length of the rectum remaining between the neck and the anus, and must be comparatively short.

An intussusception of the rectum or sigmoid flexure will also, as a rule, be straighter and less curved than one of the bowel higher up because of the absence of the mesentery in the tumor. As the involution goes on at the neck of the tumor, the mesentery is drawn in between the two inner layers, in the form of a cone, with the base upward. The traction upon this causes a curve of the contained cylinder, the concavity of which is toward the attachment of the mesentery. In the small intestine this curve is very marked at times, and the meso-colon may cause the same appearance in cases involving the large bowel. The traction of the mesentery causes, also, other changes. The axis of the contained portion is not the same as that of the sheath, and the orifice is drawn into a slit-like shape and turned against the side of the sheath, so that it may be difficult to detect it with the finger. The curve of the inner portions may be so sharp as to cause complete obstruction, and the pressure upon the sheath may be so great as to cause sloughing and perforation. This

is, indeed, the chief cause of the obstruction which results from intussusception, though the obstruction may not become complete until some indigestible substance has been propelled into the already narrowed passage, or until the lumen becomes almost completely closed by a gradual thickening of the different layers of the gut, due to congestion and inflammatory exudation in their walls.

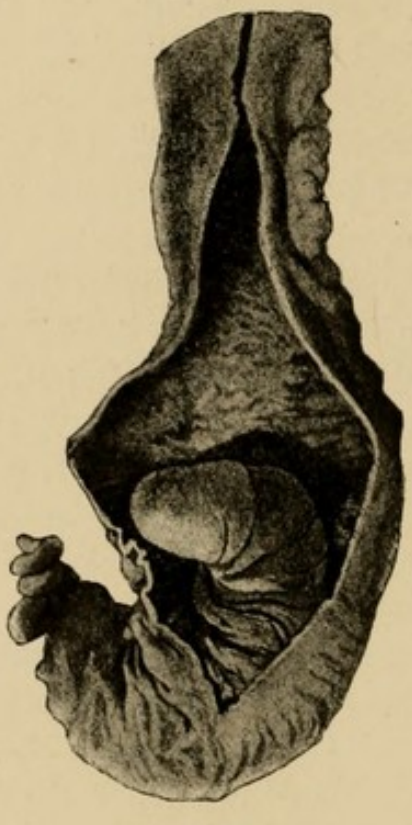


FIG. 113.
Intussusception.

The obstruction, and the strangulation which are generally present to a greater or less degree, cause certain other changes. The bowel above the implicated portion may be simply distended and congested, it may be filled with a large mass of fæces, or it may be ulcerated and perforated. If the case has been acute, death may supervene before any of these effects are noticeable; if chronic, there may be more or less thickening from infiltration.

The serous surfaces in apposition in the two contained portions are apt to become united by adhesions due to peritonitis. These

may be found at any part of the intussusception, and may vary much in extent. There may be only a few bands near the apex or neck, or the two surfaces may be completely agglutinated.

The adhesions may appear at any time after the third day, may be extensive in an acute case or absent in a chronic one, and there is no regularity in the time of their appearance or their extent. When present they are the chief obstacle to reduction, whether spontaneous or the result of any kind of treatment.

The strangulation of the contained portion may cause in it certain other changes. The walls may become much swollen by the

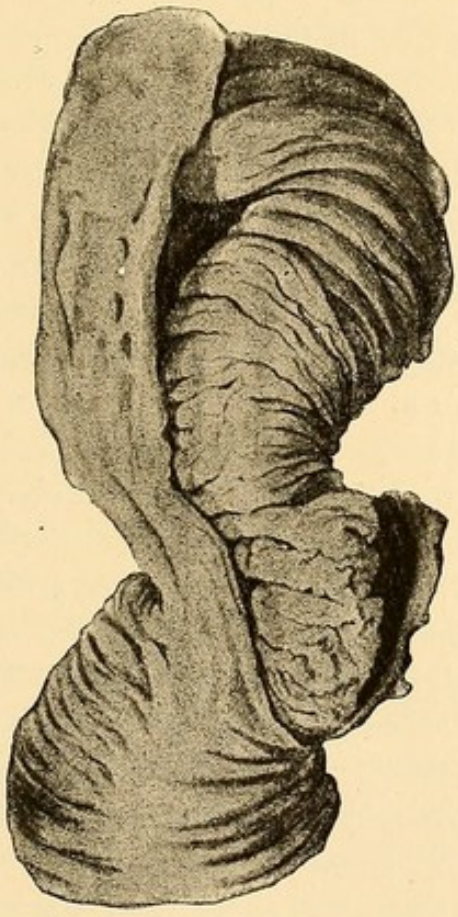


FIG. 114.
Intussusception.

transudation of serum, the peritoneum congested, the mucous membrane infiltrated ; blood is effused between the mucous surfaces of the outer and middle layers, and the whole contained portion becomes in this way irreducible. Should the strangulation be sufficiently severe,

gangrene may supervene upon this condition. This is nature's method of cure. It is more apt to take place in acute than chronic cases, and may involve the whole or only a part of the contained portion. As a result many feet of bowel may slough off and be passed in cylindrical form, or only small portions of mucous membrane may be discharged. In one case there is reason to believe that about four yards came away, piece by piece, *per anum*.

The disease is twice as common in males as in females, and is greatly more common in children than in adults. More than one-half the whole number of cases occur in children under ten years, and of these nearly one-half occur before the age of one year. In adults the trouble will generally be found to involve the small intestine; in children, the large.

Strangulation is much more frequent where the outer layer is composed of the small than where it is composed of the large intestine, because of the greater tightness of the constriction. In the latter case the congestion may be only moderate in degree, and the condition may last many weeks without gangrene or ulceration. This condition is known as chronic intussusception.

If sloughing occur at all, it may happen at any time after the first week; generally, however, it occurs within three weeks, though it may be delayed for a much longer time. In one case the separation of fragments of intestine extended over an interval of three years.

In about one-half of the reported cases a favorable termination has followed spontaneous separation; in the remainder death has occurred after a longer or shorter interval. Several pathological changes may occur. The peritonitis which serves to unite the serous surfaces of the contained portions may become general and cause death. The ensheathing portion may become ulcerated and perforated, allowing of the extravasation of fæces. The ulceration may perhaps be due to the lateral pressure of the end of the contained portion against the side of the cylinder which contains it. Separation by sloughing leaves the upper end of the ensheathing portion united with the lower end of the healthy bowel, and results in complete amputation of the contained portion. Extravasation may also occur from a deficiency in this union at the time when separation occurs.

While these pathological changes are going on in the contained portion, the sheath may show comparatively little change beyond some congestion and thickening.

In studying the symptoms and diagnosis of this affection, it is best to accept the arbitrary division of cases which has been made into the ultra-acute, acute, subacute, and chronic. In the first the patient dies within twenty-four hours. The second covers the cases which last from two days to one week; the third, those lasting from a week to a month; and the fourth, those lasting more than a month.

In acute cases the symptoms will be found to vary somewhat, according to the part implicated, but the attack generally begins with a sudden and violent pain. The pain resembles colic, is intermittent, and may or may not be accompanied by vomiting. If the rectum be implicated, the first symptoms may be tenesmus, bloody passages, and the appearance of the intussusceptum at the anus. The strangulation and engorgement cause diarrhœa, tenesmus, and bloody passages after a time, whatever part of the bowel is affected. It is rare that the lumen of the gut is so completely closed that no fæces pass.

In about one-half of all the cases a tumor can be felt, and this symptom is more frequent in children than adults. It varies in location according to the part involved; is usually hard and resisting; is more prominent when active peristalsis occurs; and may change its position when the bowel is contracting strongly, or may be moved by enemata. It is not generally very large, and its size is no indication of the amount of intestine involved. In quite a large proportion of cases, especially in children, it may either be felt in the rectum or be seen projecting from the anus. When within the rectum, the soft, velvety feel, the sulcus, and the slit-like orifice into which the finger can be passed present characteristic signs of its nature. When it projects from the anus, the presenting part is not generally more than three or four inches in length, is conical in form, and its nature may sometimes be diagnosticated by the appearance of the ileo-cæcal valve and the orifice of the appendix vermiformis. This variety of intussusception is more often chronic than acute, and the tumor does not, as a rule, appear at the anus until after the symptoms have

lasted from one to three weeks, while in an acute case it may be discovered on the second day.

Vomiting of some kind is a nearly constant symptom of intussusception, but it varies much in character and in the time of appearance. The more acute the case, and the higher up the disease, the sooner will it appear and the sooner will it become stercoraceous. In cases involving the rectum it may never be present, while in those involving the ileum it may be the earliest symptom. Stercoraceous vomiting is rather a sign of complete obstruction than an indication of its location. It is only present in about twenty-five per cent. of the acute cases and seven per cent. of the chronic, and Treves points out that it has a direct dependence upon the diarrhœa. Where the latter is marked and constant the vomiting is comparatively slight, and *vice versa*. In other words, where the obstruction is not complete the bowels relieve themselves in the natural direction.

In the acute form the constitutional state can hardly fail to attract attention. In young children it is simply one of collapse, and the more acute the case the greater the shock. The ultra-acute cases (those fatal within the first twenty-four hours) are fatal from shock, and are almost always seen in very young children.

In chronic cases the symptoms are all more obscure, as will be apparent from the fact that the condition has been mistaken for almost every form of disease of the abdomen. The course of the disease is irregular, the pain uncertain and often absent for long periods; the passages may be normal at times, alternating with both diarrhœa and constipation, and occasionally streaked with blood; the vomiting is not constant, and feculent vomiting is rare; the general condition of the patient is that of one suffering from chronic disease. The end may come from the onset of complete obstruction with the usual symptoms, or simply from exhaustion and the effects of long-continued partial obstruction.

Prognosis.

The prognosis in all varieties of intussusception is bad, the general mortality in all forms being seventy per cent. The younger the patient the more acute will be the disease and the greater the mor-

tality. The ultra-acute cases are rare, but are all fatal. The acute cases are very fatal, and especially so in children. The chronic cases are nearly all fatal, and the best results are found in the sub-acute, or those lasting from a week to a month.

Spontaneous cure may occur in three ways: 1st, by reduction; 2d, by elimination; 3d, by the production of a fecal fistula. Spontaneous reduction is rare, and the diagnosis is always open to doubt. It can only be suspected from the relief which sometimes quite suddenly follows all the symptoms of intussusception; and it can only happen in cases where the physical changes have been comparatively slight and no extensive adhesions have formed.

According to Treves spontaneous elimination occurs in about forty-two per cent. of all cases, and is extremely rare in children under two years of age. It is much more common in the variety affecting the small intestine than in any other. Cure by the establishment of a fecal fistula is so rare as to be almost unknown.

The fact that the intussuscepted portion is sloughing off can generally be made out pretty clearly by the symptoms. If the obstruction has been complete, the passages again appear and are bloody, foul, and marked by small shreds of gangrenous mucous membrane or by large pieces of gut. If the case is to terminate favorably, there will also be an abatement of the worst symptoms, but quite a large proportion of cases die even after elimination has begun, from exhaustion, perforation, or subsequent ulceration.

Diagnosis.

The diagnosis of the fact of intestinal obstruction is by no means always easy, for there are many other conditions marked by pain, vomiting, and constipation, which are its three chief symptoms; but having accomplished so much, the diagnosis between intussusception and the many other causes of obstruction is sometimes an impossibility. Under these circumstances the discovery of the end of the invaginated portion in the rectum with its sulcus around it makes everything plain at once.

Moreover, after the existence of intestinal obstruction has been

made out in a child it is safe to consider an intussusception as the cause, and act accordingly, examples of other forms of obstruction in them being very rare.

If the patient be an adult and rectal touch throws no light upon the case, the next point is whether the condition be acute or chronic. If acute, the diagnosis will rest between intussusception on the one hand, and volvulus, hernia (either external or concealed), strangulation by bands, obstruction by foreign bodies (generally a gall-stone), and peritonitis with perforation, on the other. A few hints are all that can be given to aid at the bedside, and mistakes must be expected. Volvulus generally affects the sigmoid flexure, and the pain is apt to be referred to that spot. It is a disease of adult life and old age. The constipation is absolute, not even allowing of the passage of blood. There is no distinct tumor, and there is apt to be constant tenesmus.

With hernia of any kind, or strangulation by bands, there is likely to be a history of former attacks of peritonitis or of obstruction in eighty per cent. of the cases (Treves). The onset is sudden, the pain and vomiting very severe, the constipation is complete, except what matter may come from the intestine below the disease, and no blood is passed.

Gall-stones large enough to cause obstruction are very rare. The history of previous ones passed will be of great help, as will also the history of previous hepatic colic, or acute obstruction relieving itself.

In chronic cases the diagnosis rests between intussusception on the one hand, and stricture of the intestine (from any cause, either within the gut or from pressure without), fecal impaction, and gall-stone on the other.

Stricture may be detected by the use of a bougie; failing this, a cancerous mass may be felt, and the history will point to long-standing ulceration with the usual symptoms. A tumor pressing upon the gut can often be made out by careful examination, especially through vagina or rectum. Fecal impaction may be felt through either the rectum or abdominal wall, and the tumor is generally characteristic. A gall-stone passing slowly along the small intestine, causing a chronic obstruction, must be diagnos-

ticated by the rules given for detecting it when causing acute obstruction.

A peritonitis from perforation may cause all of the symptoms of an acute obstruction. The points in the differential diagnosis are as follows: in peritonitis the vomiting seldom becomes fecal, but remains bilious to the end; the constipation is less marked, and the patient generally passes gas and liquid fæces or small quantities of solid matter; the tympanites is also less marked, and the coils of intestine are less pronounced; the pain begins with great severity at one point, and extends over the whole abdomen (the same thing may happen in acute obstruction, but in such cases the other symptoms —fecal vomiting, absolute constipation, absence of the passage of gas *per anum*—are all equally severe, while in peritonitis they do not correspond in severity with the intensity of the pain); the temperature is elevated in peritonitis, and normal, or even less than normal, in obstruction.

It will thus be seen that the differential diagnosis is shrouded in difficulty, and that the difficulty is rather greater in a case of chronic than of acute obstruction. A well-marked case of invagination, whether acute or chronic, is, however, the easiest of all the forms of occlusion to distinguish, and the diagnosis can generally be made with sufficient approach to certainty to guide the surgeon in the selection of his plan of treatment.

Treatment of Intussusception.

It is evident that the treatment of the conditions we have been describing must differ in every particular from that of those previously described. When the invagination has occurred in the rectum — that is, when the upper part of the rectum has become telescoped into the lower and has appeared as a prolapsed mass outside of the anus—the case may still be relievable by the methods of reduction and taxis. The mass must be replaced by a process exactly the reverse of the one by which it came down, the most dependent portion being first carried into the body and the entanglement unfolded in this way. In a child, with the assistance of anæsthesia, the inverted position, and gentle manipulation with the fingers, or

possibly with a soft bougie, this may sometimes be accomplished where the point of constriction is low down near the anus.

In cases, whether of adults or children, where the constriction is still higher in the intestine, and manipulation with the hand or bougie is out of the question, various other mechanical means may be tried with a prospect of success. These consist in applying indirect pressure to the invaginated portion and to the constricting part by means of copius injections of water or hydrogen gas.

With regard to laparotomy a distinction must again be made between children and adults. In children the disease runs an acute course, often fatal in forty-eight hours, and what is to be done must be done as soon as possible. If, therefore, insufflation or injections fail after a fair trial, nothing remains but to open the abdomen. It is useless to hope for spontaneous reduction or gangrenous separation in a child. Quoting Treves once more, spontaneous elimination occurs in only two per cent. of cases during the first year of life, in only six per cent. between the ages of two and five, and forty per cent. of all cases of spontaneous elimination are subsequently fatal.

Laparotomy in a young child holds out a fair chance of success, and the earlier it is done the better the prospect.

On this point Wiggins's study of one hundred and three collected cases gives much valuable information.

Of these nearly fifty per cent. occurred during the fourth, fifth, and sixth months in nearly equal proportions, and eighty-nine per cent. were of the ileocæcal variety. Cure by sloughing was met with twice. Thirty-nine of the cases were treated only by means of enemata or inflation, or both. Of these sixteen, or forty-one per cent., recovered. The average hour after the onset when the treatment was begun was the forty-first. The average age of the twenty-three cases which terminated fatally was about five months. The average hour following the onset when treatment was begun was the sixty-ninth. "In several cases collapse followed the administration of the enema, and in nearly all cases there is the same story of the inefficiency and uncertainty of the method, the tumor disappearing only to return after a short interval, and the treatment repeated again and again, the occasional repeated administration of chloroform, with alternating injections of air or water, combined with massage, often

roughly applied, till finally death mercifully came to the infant's relief."

"The history of the treatment of infantile intussusception by the method of intestinal distention, by either air or water, as evidenced by the testimony which has been presented, is certainly a dark page in that of our science. It is the story of empirical rather than scientific endeavor—one of hope deferred, of uncertainty, of prolonged torture, none the less cruel because it was performed in all kindness, and was generally considered to be the gentlest method of dealing with the disorder, and finally of a mortality of seventy-five per cent. of disaster."

Laparotomy was performed in this group of cases sixty-four times, resulting successfully in 32.8 per cent. The average hour from onset to time of operation was the forty-fourth. The average age was six and one-half months.

"If we count only operations successful and unsuccessful that have been performed since the perfected technique of abdominal surgery has become generally known—say since 1889—and throwing out the cases in which the operation has not been completed, the bowel incised or excised, we have a total of eighteen cases, of which fourteen were successful and four unsuccessful, giving a still lower percentage of mortality of 22.2 per cent., which the writer believes is a fair estimate of the risk to-day of abdominal section performed on a young infant for the relief of this disorder, if performed within the first forty-eight hours of the onset."

In Wiggins's tables there is one successful case of laparotomy at the age of three months by Howit. I have, happily, since those tables were published, been able to add another of the same age, and these two are, as far as I know, the only ones recorded. My own case was seen within a few hours of the onset of the trouble, and the diagnosis was clear from the presence of the mass in the rectum. No time was spent in attempts at reduction and the abdomen was opened immediately. To this fact the good result is chiefly to be attributed.

In adults the operation is as positively called for as in children. The mortality of the disease is seventy per cent., and this has been greatly diminished by early operation. The cases which recover are

those in which spontaneous reduction occurs, and not those which become chronic, or in which gangrenous elimination takes place, for both of these generally end fatally after a time.

After opening the abdomen the first attempt should be toward reducing the invagination. This will almost always be impossible by any amount of traction from above, even in cases where it can easily be effected by pressure on the apex from below. The gut should be encircled by the fingers of one hand just below the apex, while the whole tumor is held in the other, and gentle pressure used to express

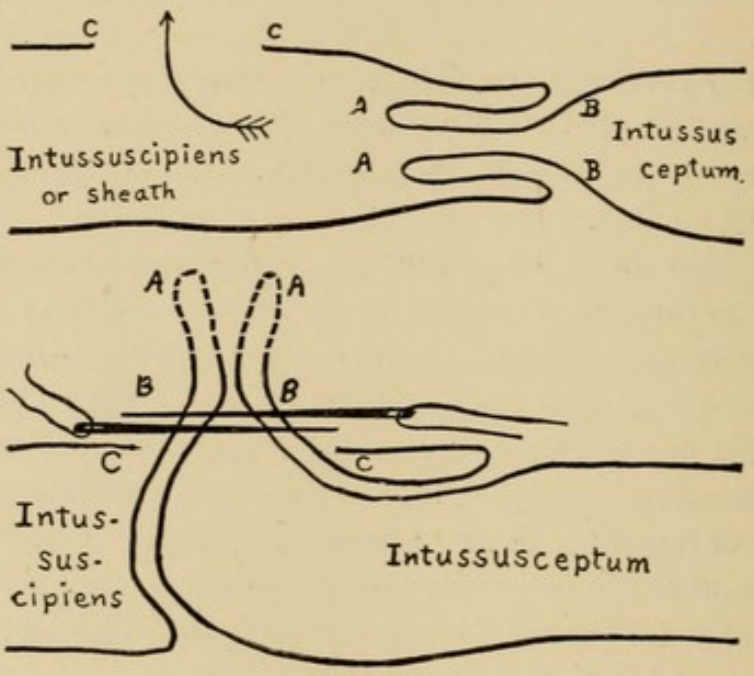


FIG. 115.

Maunsell's Operation Applied to Intussusception.

the contained from the ensheathing portion from below upward. If the conditions are such as to render reduction possible, there will probably be no gangrenous gut and the abdomen should be closed as rapidly as possible, and every effort directed toward overcoming the shock which is always present.

In case of failure to effect reduction, there are several courses to be considered. An artificial anus may be formed in healthy gut above the disease, but this will, in many cases, carry with it inevitable death from inanition, if the condition be allowed to remain. This plan of treatment is therefore only a temporary expedient for carry-

ing the patient over the shock of the condition and allowing nature to complete the elimination of the diseased parts, and involves always the idea of subsequent operation, should the patient survive.

Maunsell's plan of end to end suture may be used after opening the sheath and cutting off the contained gut as shown in Fig. 115. It would seem, however, that there might often be difficulty in bringing the points AA far enough through the incision CC without violence and laceration of the mesentery, to allow of suturing.

If for any reason Maunsell's operation is impracticable, an ordinary end to end anastomosis after resection of the tumor may be done, or a lateral anastomosis, preferably by Abbe's method.

The operation of excision with any form of anastomosis, though it may be successful in an adult, holds out little hope for a child with acute intussusception. The operation is long and severe, the shock necessarily great, and the patient in no condition to withstand so radical a measure. There is, as far as I know, no successful case under one year of age.

Treatment of Rectal Hernia.

The treatment of a true case of rectal hernia still remains to be mentioned. The radical treatment for the uncomplicated condition consists in oblation of the sac as already described. When the hernia has become inflamed the treatment should be directed toward reducing the inflammation by rest, local antiphlogistic measures, and opium. If reduction be possible it may be performed. If reduction be impossible and the hernia acutely inflamed, it must be treated, as a strangulated hernia elsewhere would be, by operation tending to divide the constriction causing the strangulation. If the constriction seems to be at the sphincter ani, it can easily be overcome by stretching, without a cutting operation and without opening the peritoneum. If it be at the neck of the sac the same manœuvre may be possible. Various methods of subcutaneous section of the constriction have been recommended, but none of them rest upon any clinical experience.

In case a rupture of the sac or of the rectum has already occurred and the intestines have escaped through the rent, there is still much for the surgeon to do, although the prognosis is almost hopeless.

Smith's case recovered, but here the accident occurred directly under the eye of the operator, and the bowel was immediately replaced before it had been long exposed to the air or had become inflamed.

It will be noticed that in every case but one where the rupture has been due to violence, death has been the consequence; and also that in every case but that one (Nedham's) an effort has been made at reduction, even though laparotomy were necessary for its accomplishment.

There is no doubt that the first duty of the surgeon is to replace the mass within the abdomen after cleansing it, and this is seldom an easy matter. The amount protruded is often enormous; it is also generally distended with gas and fæces; the rent through which it must be returned is more or less concealed from vision and touch; and the intestines constantly tend to pass upward into the rectum above the rent rather than into the peritoneal cavity. A part of the contents of the bowel may be pressed back into the abdomen by gentle manipulation, and punctures may be made to evacuate the remainder. The reduction, however, has seldom been completely accomplished without recourse to laparotomy.

After the reduction has been accomplished the rent must be closed by sutures—in itself an exceedingly difficult task, but one which is rendered easier by the abdominal wound already made, and which might be still further facilitated by a posterior enlargement of the anus by incision. After the rectal wound has been sutured the abdominal one may be closed, a tampon applied to the rectum, and opium with fluid diet administered; but the chances of a favorable termination of the case are very slight, the patient generally dying of collapse or peritonitis.

If the protruded bowel be greatly inflamed, and approaching gangrene in appearance, the surgeon must choose between replacing it and cutting it off. These cases must be studied and treated in the light of the results of intestinal resection and the establishment of intestinal anastomosis.

The case last reported by Quénu is the first in which an effort has been made to suture the rent in the prolapsus, through which the small gut has escaped, by means of a laparotomy. The operation, in spite of this failure, still seems feasible.

CHAPTER XII.

NON-MALIGNANT GROWTHS OF THE RECTUM AND ANUS.

UNDER this head will be included polypus, vegetations, condylomata, benign fungus, fibromata, lipomata, and the various forms of cysts.

Polypus.

A polypus may be defined as a benign tumor composed of one or more of the normal elements of the wall of the rectum;

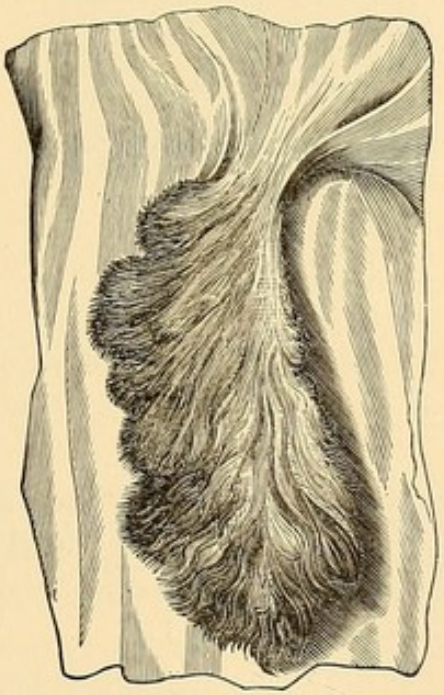


FIG. 116.

Villous Polypus.

an hypertrophy either of the mucous membrane or of the submucous connective tissue, or both. Those which are composed

of the elements of the mucous membrane are known and generally spoken of as "soft" polypi; while those into which the submucous connective tissue enters are known as the "hard" or fibrous. In

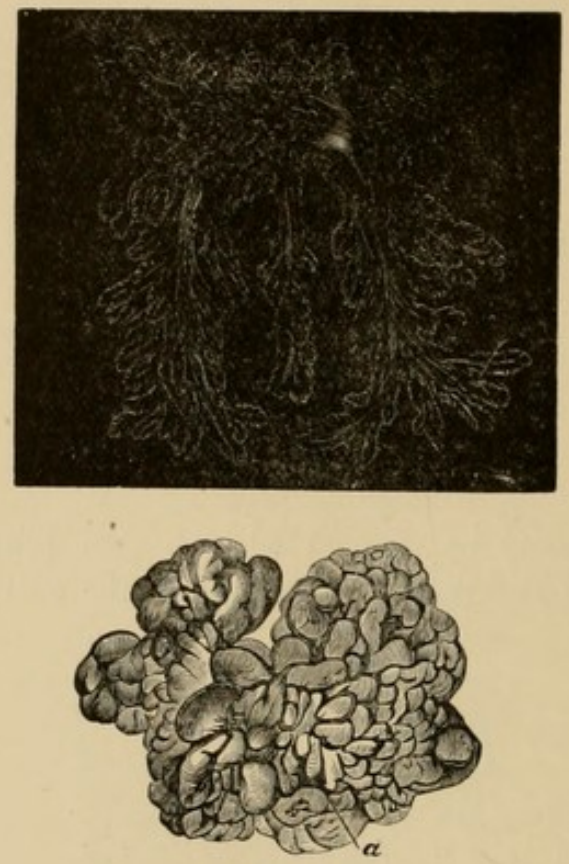


FIG. 117.

Villous Polypus.

many works the former class are spoken of as the polypi of childhood, and the latter as those of adult age—a classification of little practical value.

The mucous membrane, as has been shown, is composed of villi, of the follicles of Lieberkuhn or tubular glands, and of occasional closed or solitary follicles. A polypus composed of an hypertrophy of the villi is well represented in Fig. 116.

A polypus of this variety may reach the size of a pigeon's egg; it is soft to the feel, and has a shaggy or cauliflower surface. On section the cut surface is of grayish-red color, the substance of the growth homogeneous, and the fluid which may be forced from it by pressure will be found to be full of cylindrical epithelium. A micro-

scopic examination shows it to be composed of long, fine papillæ bifurcated at their extremities and covered by cylindrical epithelium.

Villous Polypus.

It is a question whether this form of growth should be classified with the polypi already described or with the warty growths whose

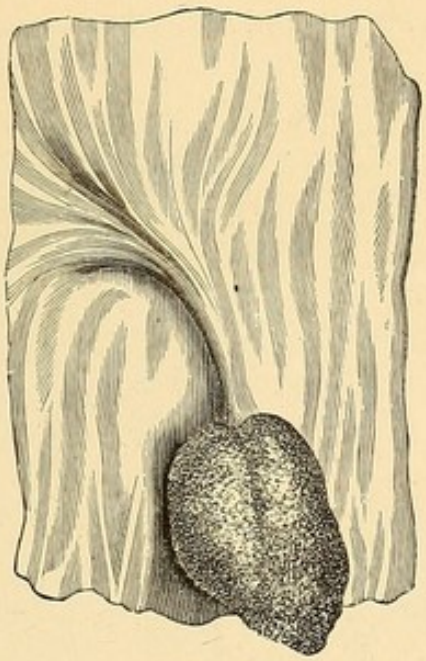


FIG. 118.
Glandular Polypus.

description is to follow. It consists of a hypertrophy both of the villi and of the follicles of Lieberkuhn, with a centre of connective tissue and generous vascular supply.

These tumors are very rare; they have the feel of a large, warty polypus with cauliflower surface, are of red color, bleed easily, and are of relatively slow growth. They adhere to the wall of the rectum by a pedicle, sometimes composed chiefly of mucous membrane, and at others large, short, and fleshy.

The pedicle may be absent, and the growth will vary in structure according to the proportion of its different elements. It may reach the size of an orange. It is found only in adults or in old persons, and the symptoms are the same as those caused by other polypi—viz.,

discharge and hemorrhage, but the hemorrhage is not a constant symptom, and varies greatly in frequency and amount in different cases.

Glandular Polypus.

The adenomatous polypi, or those developed from the glands of the mucous membrane, are well shown in Fig. 118.

These may be due either to an hypertrophy of the follicles of Lieberkuhn or of the closed follicles. They occur most frequently in

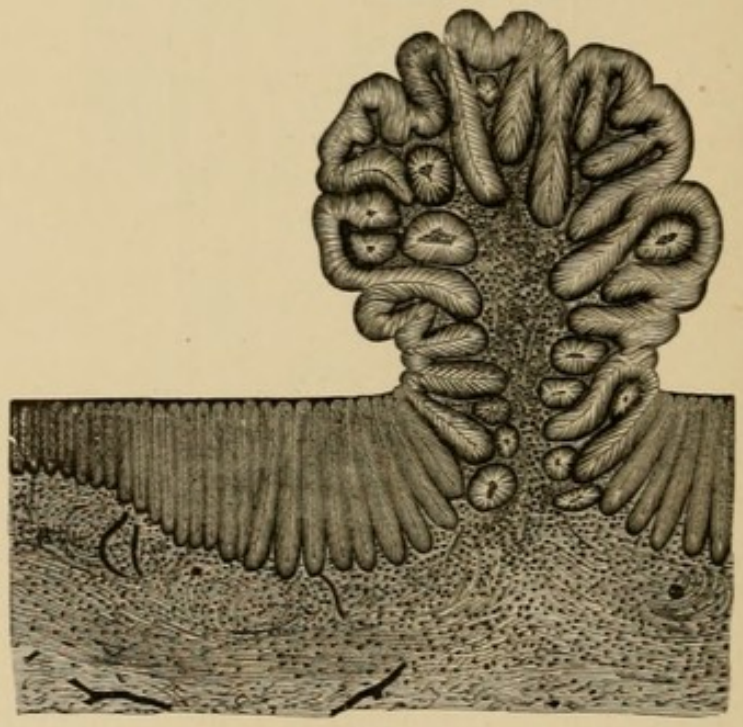


Fig. 119.
Section of Glandular Polypus.

young persons; are generally of the size of a small plum, rarely reach that of a pear, and yet Esmarch reports one weighing four pounds. They are very vascular tumors, and therefore of reddish color. They are sometimes smooth on the surface, but oftener mammillated, like a strawberry, and are attached by a pedicle, most often to the posterior wall, but occasionally to the sides of the rectum, and at a point generally within reach of the finger, but sometimes higher up. They may, indeed, occur anywhere along the large intestine, as high up as the ileocæcal valve.

The pedicle is generally large and short, and not long and slender as in the case of the fibrous polypi soon to be described ; but there are frequent exceptions to this rule, and these tumors will sometimes be spontaneously expelled by rupture of the slender pedicle in defecation.

Polypi which consists of an hypertrophy of the closed follicles of the rectum are often found in considerable numbers. Fochier removed

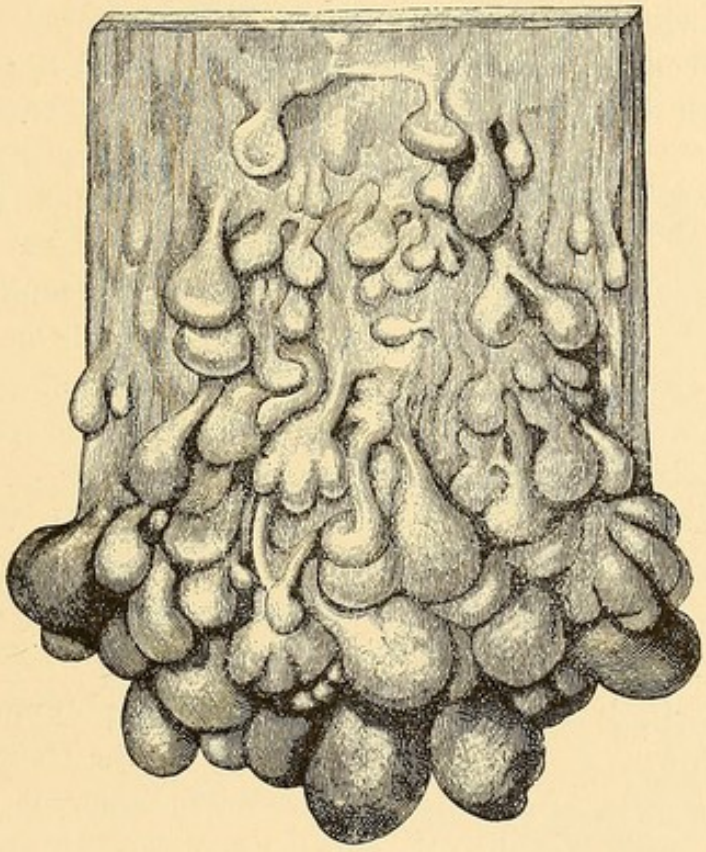


FIG. 120.
Adeno-papilloma.

severel hundred of them from a patient aged eighteen, and Richet from sixty to a hundred in a man aged twenty-one. Van Buren speaks of the same condition, adopting Broca's name of "polyadenomata." To this variety of polypus belong also certain cysts (closed follicles) distended by viscid and transparent fluid.

On section these adenomatous polypi are found to contain much viscid fluid, full of cylindrical epithelium and rudimentary glandular tubes. Under the microscope a vascular stroma of connective tissue

will be found, in which are enlarged glandular tubes, sometimes branching at their extremities, and also cystoid spaces filled with reddish viscid fluid.

The microscopic appearances of a section of such a polypus are shown in Fig. 119.

The following is the report of the microscopic examination of such a tumor removed in my own practice:

"I find the growth to be an adeno-papilloma. Its surface is covered with thickly set, delicate, rarely branching papillæ which are composed of connective tissue and blood-vessels and are covered by high, cylindrical epithelial cells. In the deeper parts are branching tubes lined with cylindrical epithelium. The stroma of the tumor is rich in young cells and highly vascular.

"This tumor is usually ranked as non-malignant, but it seems to lie on the borderland between the benign and malignant growths. It often returns upon removal, but rarely produces metastases.

"WILLIAM H. WELCH."



FIG. 121.
Adeno-papilloma.

Fibrous Polypus.

The hard or fibrous polypus, which is composed primarily of the elements of the submucous connective tissue, is much rarer than the soft variety, and is most commonly found in adults, where it may be isolated or multiple. It is chiefly composed of fibrous tissue, and resembles the uterine fibroid; but it may contain both muscular and glandular elements. When the glandular elements are filled with fluid which resembles glue, these tumors have been known as colloid; and when cysts are found filled with jelly-like substance, the name myxoma has also been applied.

These hard or fibrous polypi vary greatly in their degrees of

hardness to the feel, according to their turgescence and their composition. They may creak under the knife on section, and look very much like hypertrophied and œdematous skin, or they may resemble the better-known nasal polypus in their consistence.

The connective-tissue fibres are generally irregularly disposed, and cross each other in every direction, though a regular stratification, such as is seen in uterine myxomata, may be present. When seen in the rectum before removal, the surface is generally red from their vascularity; but after removal they are pale, and generally smooth, though sometimes uneven and irregular in surface, and covered with hypertrophied papillæ. The mucous membrane is generally easily stripped off, though if there has been local inflammatory irritation it may be firmly attached. The vascular supply is abundant, and distributed both to the substance and surface of the tumor. This accounts for their rapid development.

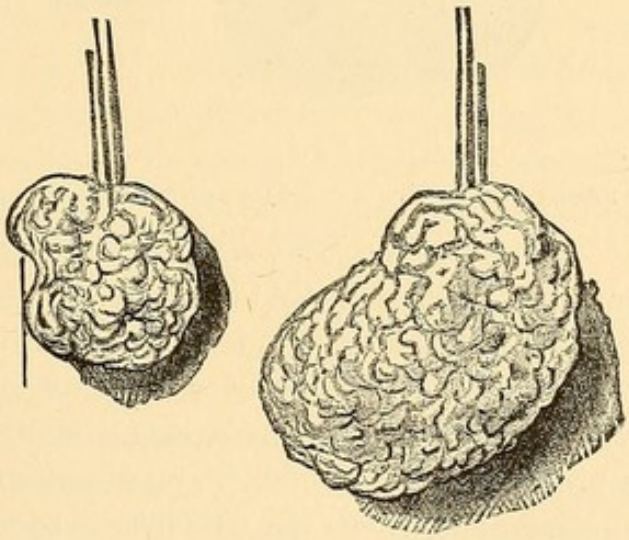


FIG. 122.

Fibrous Polypi.

The pedicle is generally very slight, and is formed mechanically by the traction of the growth on the mucous membrane beneath which it is located. It is composed, as in the soft variety, simply of mucous membrane and blood-vessels. There may, however, in a case where the pedicle has been formed by traction upon and prolapse of all the coats of the bowel by a tumor located primarily

above the reflexion of the peritoneum, be a peritoneal *cul-de-sac* within the pedicle.

If left to its natural course, the pedicle gradually becomes longer and more slender, and finally ruptures in the act of defecation, and in this way a patient may relieve himself of the growth.

These tumors are benign in character, and when once removed do not generally return at the same point. They may, however, recur, if not at the same point, at one very near it, and the same patient may be relieved of a succession of them.

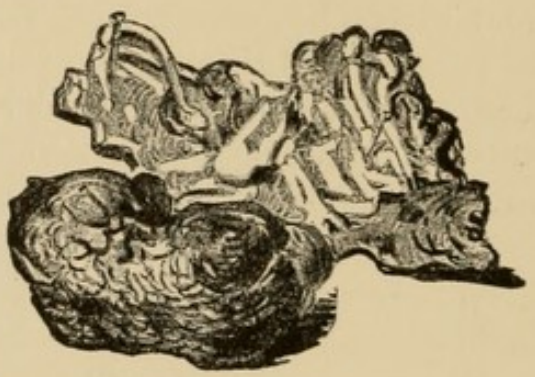


FIG. 123.

Fibrous Polypus with Attachment to Mucous Membrane.

Fig. 123 represents one of these tumors removed from a middle-aged man, in which case a diagnosis of malignant disease had been made.

Symptoms.—A rectal polypus may exist for many years and give no signs of its presence. The two chief symptoms which it is apt to excite are hemorrhage and discharge. The hemorrhage may be a daily occurrence, or may be present only at long intervals, and it may vary in amount from a few drops to a quantity which shall cause grave disturbance and alarm. When the mucous membrane covering the tumor has once become ulcerated, the hemorrhage will be frequent and the discharge will be more or less fetid. The vessels are apt to bleed freely when opened, because of their being embedded in fibrous tissue and of their inability to contract. When the tumor is so high and the pedicle so short as to be beyond the grasp of the sphincter, there is no suffering, unless the irritation of the growth has set up a

catarrhal proctitis ; but after prolapse once begins to take place the suffering may be very severe. The sphincter may become dilated and relaxed, or the pedicle may be firmly grasped by it after the act of defecation, and a cure may result from the strangulation thus caused.

The discharge from the rectum which a polypus may cause is sometimes extreme in amount and constant, escaping not only at the time of defecation, but at frequent intervals between, and being of an excessively fetid character. This discharge may, by its irritating qualities, cause secondary congestion of the rectal mucous membrane, erosions around the anus, vegetations, constant diarrhœa, and tenesmus ; and, joined with the loss of blood, the condition of the patient may be easily mistaken for that of chronic dysentery or even malignant disease.

Hemorrhage from the rectum in a child, with or without pain on defecation, generally means polypus ; and it often means the same in an adult, though it will oftener indicate hemorrhoids. The secondary symptoms, which seemed to point to dysentery, must never cause the original disease to be overlooked. There is, in fact, but little difficulty in the diagnosis of a polypus in the vast majority of cases ; but once in a while, where the attachment is broad and the pedicle not well marked, the question of benign or malignant growth may arise and be difficult to solve except by the microscope.

In the chapter on Cancer attention will be called to the fact that the distinction between epithelioma and a benign polypus of the adenoid variety cannot always be made by the microscopic examination ; and we here emphasize the fact that the diagnosis must rest *both* upon the clinical history and gross appearances, *and* upon histological investigation of the growth when removed. In children malignant disease is so rare that the chances are greatly in favor of benignity. Malignant growths, moreover, do not tend to spontaneous extrusion and are not pedunculated, and the presence of a pedicle is therefore greatly in favor of benignity. But given an adult with an adenoid polypus which has ulcerated and which is not pedunculated, and the diagnosis between it and malignant disease may be impossible, either by the microscope or the clinical history ; for the ulcerated and bleeding tumor may cause a wasting and cachexia which strongly resembles cancer. A soft polypus may also be mistaken for an in-

ternal hemorrhoid when no pedicle is present, but the point of attachment is different in the two cases.

Treatment.—The treatment of polypi is generally a simple matter, and consists in their extirpation, after which they rarely return. There are two dangers to be considered: the first is that the pedicle, when a pedicle exists, may contain large vessels; the other is that it may contain peritoneum. The extirpation of a polypus which has come down from its attachment in the sigmoid flexure, has been followed by death from wounding the peritoneum, at the hands of no less a surgeon than Broca. Where the pedicle is long and slender, the polypus may generally be twisted off by simple torsion without danger. It is generally safer, however, first to apply a ligature and then cut away the tumor. Should there be no pedicle, the mass must be extirpated as any tumor would be, and the hemorrhage which occurs must be treated upon general surgical principles.

Vegetations.

These growths, known also by the names of warts and papillomata, may be defined histologically as an hypertrophy of the papillary layer of the skin, and of the papillary layer only. They are composed of the connective tissue, the epithelial covering, and the blood-vessels, which, in their natural quantities, form the papilla of the derma.

The gross appearances of these warty growths are represented in Fig. 124.

Under the influence of any of the exciting causes which will soon be mentioned, little tumors resembling ordinary warts appear, and grow rapidly till they reach two or three millimetres in size. The extremity of the tumor shows a decided tendency to branching and bifurcation, and when there are many of them their branching extremities may fuse together and form a large flat tumor, which will be attached to the skin, however, by numerous little pedicles, so that, if shaved off, the skin will not be wounded except in numerous small points where the pedicles have had each its independent attachment.

When the wart is isolated it is dry, but when several are united they become macerated in the secretion of the part, which decomposes between them and gives rise to inflammatory phenomena. The tumor then becomes moist and fetid, and all the adjacent parts become irritated. According to the size of the growths, the condition

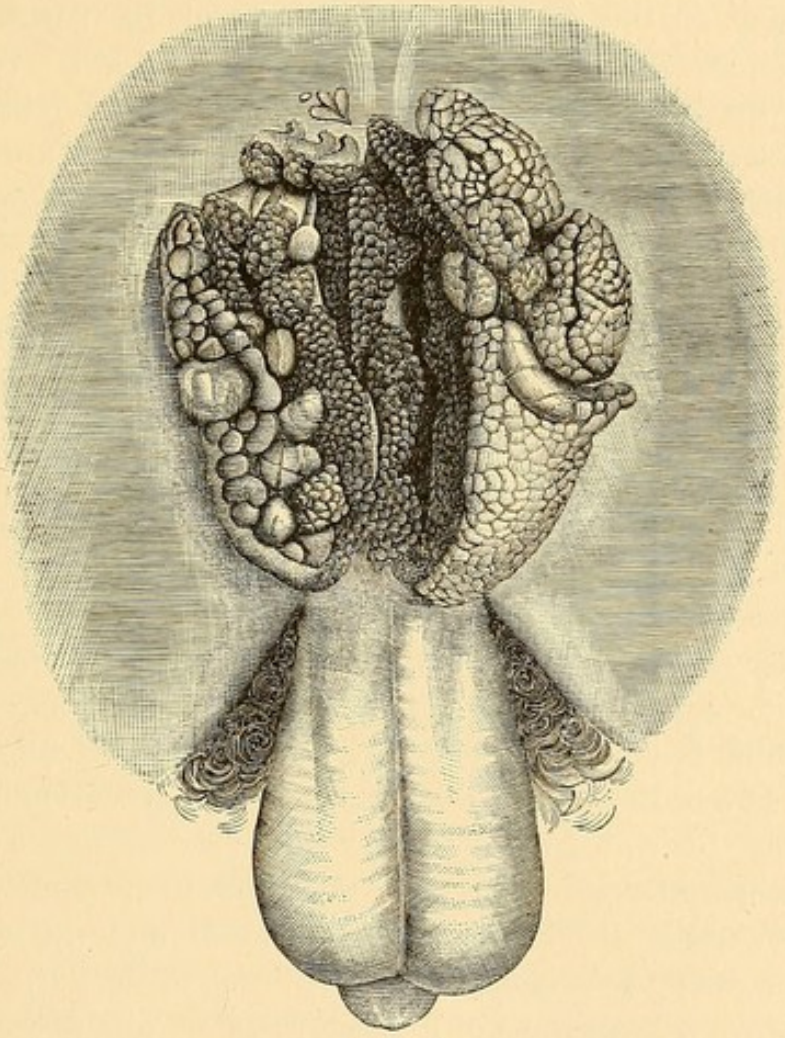


Fig. 124.

Non-syphilitic vegetations.

of the patient, the abundance of the secretions, and the irritation to which they are originally due, these vegetations take on various shapes, and have been described as cock's-combs, cauliflower excrescences, etc., etc.; but the elementary structure of them all is the same — an hypertrophy and branching of the papillæ of the derma.

On placing a longitudinal section of one of these warts under the microscope the following structures will be seen. In the centre, a framework of connective tissue composed of a prolongation of the papillary bodies of the derma; in the centre of this, a vascular loop; the whole covered by one or more layers of epithelium, the form and size of which are variable and depend apparently on several conditions, such as the moisture and dryness of the parts and the amount of pressure to which the growths are subject. When the connective tissue is abundant and the epithelial layer relatively thin, the vegetations are dry and hard. When the conditions are reversed they are moist. When the vascular network is greatly developed the tumors are red and turgescent, and bleed easily.

These vegetations were formerly considered as proof positive of the existence of syphilis, and even of sodomy, and were treated as such. Mollière relates how, at the time of Dionysius, there was a special hospital at Rome for the treatment of these growths; and Dionysius himself tells how the surgeons spared neither the iron nor the fire, and were not moved to pity by the cries of the patients, inasmuch as this disease was the result of unnatural intercourse between man and man.

The same false idea has lasted until the present time, and is even now far from unpopular; and yet the independence of these growths upon syphilis is beyond question, except to the extent that any syphilitic sore in this neighborhood may, by the irritation of its discharge, cause their production. They owe their growth, in the first place, to a special predisposition to the formation of warty growths on various parts of the body in the individual, and this predisposition is assisted by the presence of any irritation of the part. Thus the discharge from a gonorrhœa or a leucorrhœa, or any disease of the rectum or genitals may cause them to grow, and they may appear in persons apparently perfectly healthy and cleanly. Pregnancy has an undoubted influence upon their production, and they sometimes disappear spontaneously after delivery. From what has been said it is evident that these growths are neither contagious nor inoculable, and that anti-syphilitic treatment can be of no avail.

These vegetations may occur at any age from infancy to adult life, though they generally belong to the latter period. They may vary

in size and number from a single enlarged papilla at the verge of the anus to a mass such as is represented in the plate, and which weighs as much as a pound. The symptoms, in any case, will vary with their size, number, location, and the amount of the secretion. When they grow from one side of the intergluteal fold, and are large enough to press with their moistened surface upon the corresponding point of the opposite side, a second patch may be developed at the point of contact. The irritation from any other source would have the same effect. The development of the growths may be slow or rapid, and when the tumors are of large size the patient is constantly troubled by the feeling of a foreign body, by a sanious and foul-smelling discharge, and by fresh erosions and superficial ulcers in the adjacent parts. Great pain in defecation may be produced by a small wart situated just at the verge of the anus, and such a little tumor may give rise to all the characteristic symptoms of a painful fissure, including a slight discharge and an occasional drop or two of blood. They are not very infrequent on the line of junction of the mucous and cutaneous surfaces, just within the verge of the anus. They may also spring entirely from the mucous membrane, above the sphincter, though they are generally confined to the first inch of the canal, and in such cases give rise to a much more aggravated train of symptoms and to much difficulty of diagnosis. There they are generally smaller and harder than when on the cutaneous surface, and cause a serous discharge, which may be so profuse as to escape from the anus between the acts of defecation, and cause much suffering from pruritus and rectal tenesmus.

On examination in such a case the mucous membrane will be found dry and glistening, as a rule, though sometimes there may be a more or less extensive proctitis ; and the little, hard, tender, warty excrescence, which is the cause of all the grave train of symptoms and of so much suffering, may easily escape detection. The only treatment for such a condition is to seize the little tumor with the toothed forceps, and excise the mucous membrane to which it is attached. It may, however, return many times.

The diagnosis of these growths is not generally difficult, though care is necessary when they are small and located within the grasp of the sphincters. The mistake most commonly made is to consider

them as syphilitic condylomata ; and, indeed, they may not always be easily distinguishable from the raised mucous patch or flat condyloma which is a manifestation of true syphilis. A careful examination of a raised mucous patch can scarcely fail, however, to show the difference between its general character and that of a cauliflower growth which has sprung up from the surface like a shrub and is attached to it by numerous little pedicles. The two may exist simultaneously, the wart being caused by the irritation of the discharge from the other. There is little danger of mistaking these vegetations for malignant growths, though they have been known to assume a semi-malignant, epithelial character, and to return frequently after removal.

The surest, most rapid, and in every respect most satisfactory way of curing these vegetations is by simple excision with the knife or scissors. The ligature is often inapplicable, and cauterization is not always easy to limit in its action. The growths may, however, often be induced to dry and shrink up by applications of powdered alum or tannin, and by washing with astringent lotions, such as Labarraque's solution.

Condylomata.

There is a variety of mucous patch situated upon the skin near the anus to which the name condyloma lata, or vegetating condyloma, can alone be properly applied (Figs. 125 and 126).

The syphilitic condyloma first manifests itself as a red spot and by a slight effusion beneath the epidermis, which is soon rubbed off by friction, exposing a raw surface, generally covered by a grayish pellicle. This surface is subsequently elevated by an upward growth, and by branching off the papillæ, with formation of connective tissue and dilatation of the blood-vessels. Where this development of the papillæ has reached a considerable extent, the cauliflower appearance is the result, and what was at first a simple mucous patch may become a large pedunculated wart, surrounded by other vegetations which have sprung up around the original lesion, and which are due to the irritation of its presence.

It may be impossible to distinguish this form of syphilis from the simple vegetation already described, except by the history, the

fact of its infectiousness, and the results of treatment. Under the microscope both are composed of an hypertrophy of the papillæ of the derma. It ought not, however, to be difficult to distinguish between this syphilitic mucous patch, to which we here limit the name of condyloma, and the simple hypertrophy of the skin, such as is seen at the site of an old external pile.

This loose and undefined use of the word condyloma is much to be regretted. It is used here to denote only one form of growth, the syphilitic mucous patch.

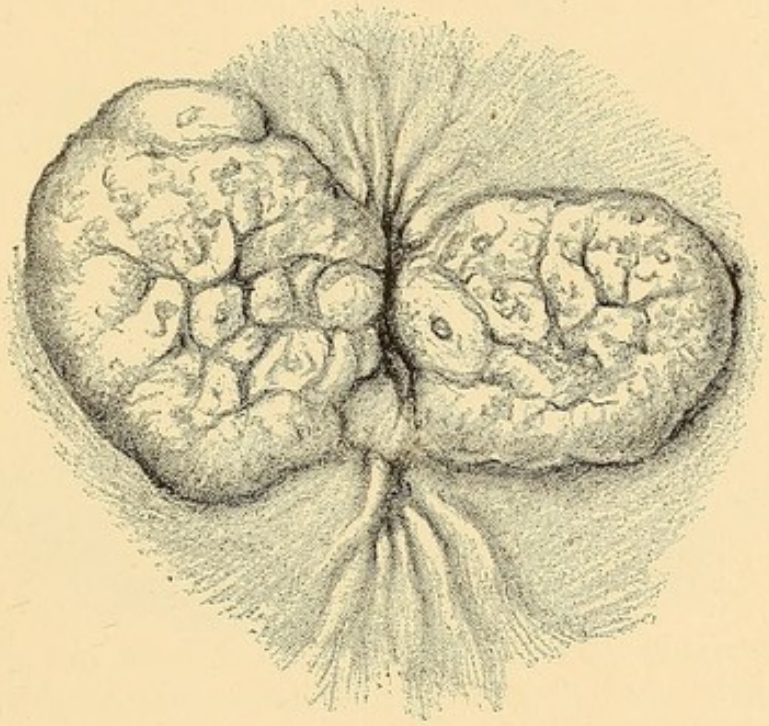


FIG. 125.

Syphilitic Condylomata.

There are frequently seen around the anus growths of skin which are attached by a broad base, are pinkish in color, soft, fleshy, glistening, moist, and irregular in shape, flattened where two are pressed together, or where one is subjected to the pressure of the buttocks, and which generally give out a slight secretion.

They generally have one of the radiating folds of the anus as their point of origin, and they differ from the class of vegetations last described in that they consist of an hypertrophy of the whole thickness of the skin, and not alone of the papillæ. The epithelial

element in them is not as marked as in the warts, and the blood-vessels are also less developed. They are merely the result of a localized chronic inflammation and thickening of the skin, and often follow an external hemorrhoid or any local irritation such as has been spoken of in connection with vegetations. They are generally isolated and few in number; but it may happen that after the irritation, to which they owe their origin, has ceased, the growth may continue, becoming harder and more movable, and resembling a true fibroma. Such a hard tumor may, under sufficient irritation, take

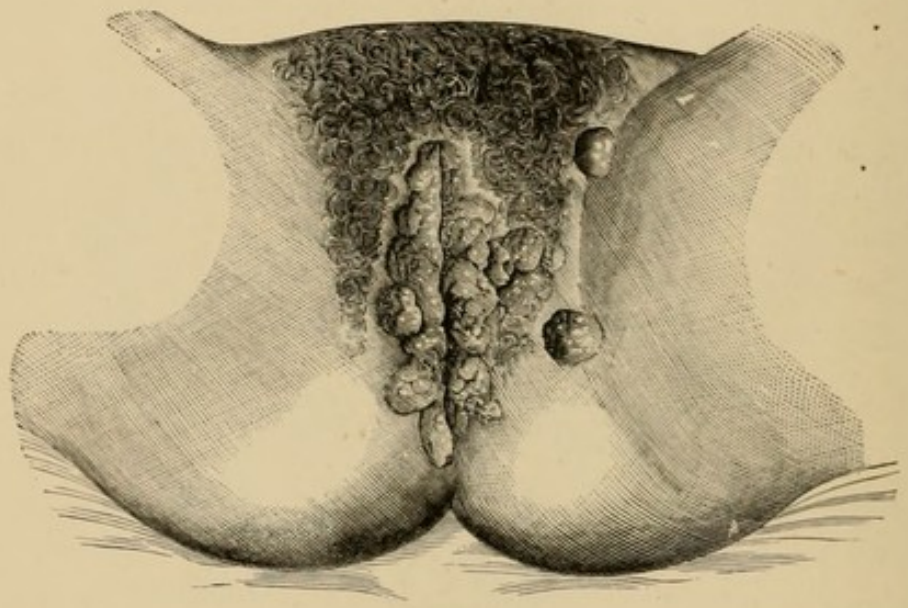


FIG. 126.
Syphilitic Condylomata.

on an ulcerative and suppurative action, its size all the while increasing, until a foul, painful, indurated mass results, which strongly resembles malignant disease.

Fibromata, lipomata, enchondromata, fetal inclusions and various forms of cysts have all been noted around the rectum, but their existence is so rare that no detailed description is necessary.

While speaking of tumors containing hair, etc., it may be well to refer to an affection which Dr. Hodges, of Boston, has described under the name of "pilo-nidal sinus" (*pilus*, a hair; *nidus*, a nest), and which has for some time been known in French literature by the

name of the posterior umbilicus. The affection is simply a ball of hair and dirt in a sinus between the anus and the tip of the coccyx. The sinus is a deep, symmetrical, somewhat conical dimple of congenital origin, representing an imperfect union of the lateral halves of the body, involving the integument alone, in which, as life advances, short hairs and other particles accumulate. These, by their irritation, cause a purulent discharge from the fistulous opening of

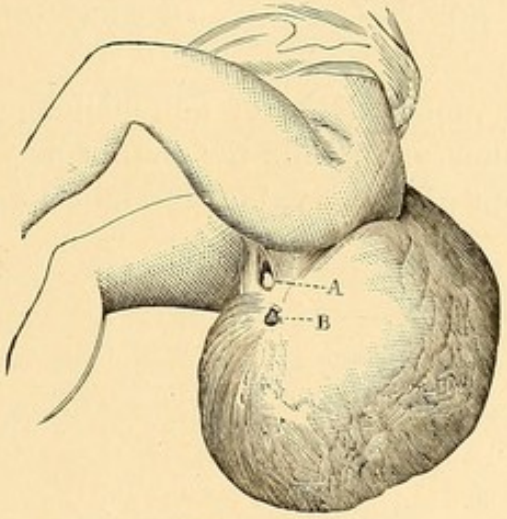


FIG. 127.

Congenital Tumor of Ano-perineal Region.

the cavity, and when the case comes under the observation of the surgeon it is usually mistaken for fistula in ano. The hair being removed, the sinus closes by granulation.

This affection is never found in children, never in men who do not have a large amount of hair about the nates, and so rarely in women that the records of the Massachusetts General Hospital included but a single instance, and in this patient there was, for a female, an unusual growth of hair. For the development of the affection there are necessary a congenital coccygeal dimple, an abundant pilous growth (hence adult age, and almost of necessity the male sex), and insufficient attention to cleanliness. The affection is, therefore, met with in persons of the lower class, and in hospital rather than private practice.

CHAPTER XIII.

NON-MALIGNANT ULCERATION.

The many different varieties of non-malignant ulcers which are met with at the anus and within the rectum may best be classified, from the standpoint of etiology, into the following groups:

1. Traumatic.
2. Catarrhal.
3. Tubercular.
4. Scrofulous.
5. Dysenteric.
6. Venereal.

Traumatic Ulcers.

The most frequent traumatism to which the rectum is subject is, perhaps, that arising from surgical interference with diseases of this part. In certain subjects wounds made here by the surgeon may refuse to heal under the best of treatment, and when no reason can be found except in the bad general condition of the patient.

There is no doubt, however, that the constitution of the patient is sometimes made to bear the blame when it more justly belongs to the operator; for wounds which will heal promptly under the treatment of one surgeon may become very intractable old ulcers under another. A perfectly healthy wound may be turned into a sluggish sore by too active attempts to induce it to heal. A fistula which has been cut and is doing well may be kept open indefinitely by stuffing it daily with lint; and a fissure that would heal in forty-eight hours may be changed into a bad sore by an occasional application of a point of nitrate of silver.

Another not very infrequent cause of ulceration is the presence and passage of hardened fæces containing perhaps undigested substances such as date-stones, cherry-pits, and seeds of fruits. We also know that fecal impaction will cause sloughing of the rectum, and MacCormac has reported an interesting case of fatal perforation from the pressure of scybala.

Some of the worst cases of traumatic ulceration I have ever seen have arisen from the unsurgical treatment of hemorrhoids. These are always liable to become at first eroded and subsequently ulcerated from extrusion and the passage of hardened fæces; and when to these causes of injury applications of nitric acid or injections of carbolic acid are added, a severe ulceration may be excited which, as in several cases which have come under my care, may result in stricture of the rectum.

An injury to which women alone are subject, and which is believed by many to go far toward accounting for the supposed greater frequency of ulceration and stricture in them than in men, is bruising of the rectal wall in parturition. Most of the standard authors mention such cases.

Catarrhal Ulceration.

A catarrhal proctitis, due to any of the causes mentioned as producing that condition, may result in severe and rebellious ulceration. In some of these cases I have had great difficulty in deciding upon the initial cause of the trouble. Men, sometimes physicians, come to me, apparently otherwise in perfect health and with no history of traumatism, with more or less extensive erosions and superficial loss of substance of the mucous membrane, complaining of the usual train of symptoms. In women I have learned to look for a causative influence in a malposition of the womb pressing upon the rectum; but the cause often escapes me in both sexes. Two of the worst cases I have ever seen, one in a child and the other in an adult, were due to the irritation of undiscovered polypi high up in the canal, and to injudicious treatment for the condition without diagnosis.

For some years back the quacks—who are ever active in diseases of the rectum—have been devoting their special attention to ulceration

of the sinuses of Morgagni, which they cure by slitting them up. For my own part I do not often see any of these little pouches which are sufficiently developed to admit of being slit open, to say nothing of concealing an ulcerated surface.

An eruption of herpes around the anus, similar to what is seen on the lips, may result, after rupture of the primary vesicles, in numer-

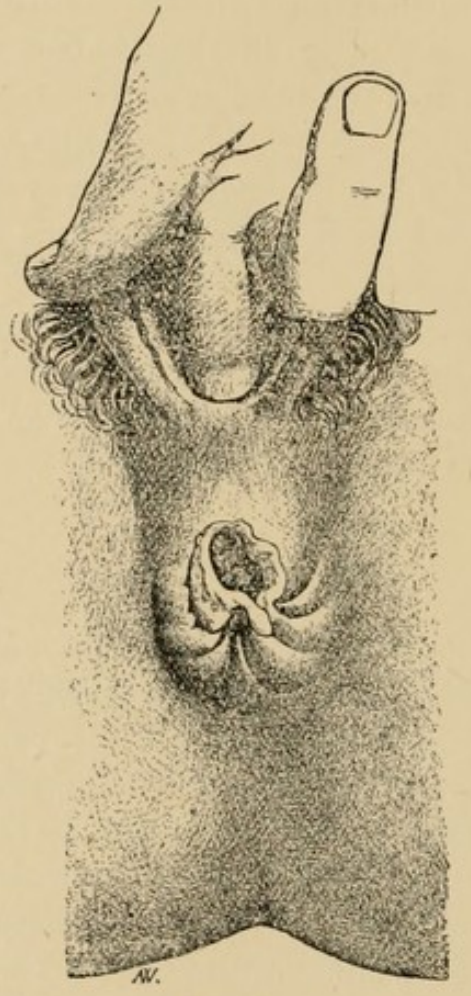


Fig. 128.

Inflamed Fissure.

ous small superficial ulcers of a reddish color and secreting a little pus. These may coalesce at their edges and form a serpiginous sore. They are apt to be accompanied by similar eruptions on other parts of the body, and must be carefully distinguished both from mucous patches and soft chancres. The ulcerations which result from acute

and chronic eczema and from pruritus present no special characteristics. They are generally due to the injury inflicted by the nails of the sufferer.

Irritable Ulcer, or Fissure.

An injury due to any of the causes already mentioned may, in certain persons, and when located at the verge of the anus, assume the characteristics of an affection which has been elevated into a separate class, and is known as fissure, or irritable ulcer. The irritable ulcer differs in no respect from other simple ulcers in the same locality, except in the fact of its irritability. There is nothing peculiar in the ulcer itself. It may be due to a slight rent in the mucous membrane from hard fæces; to a congenital narrowness of

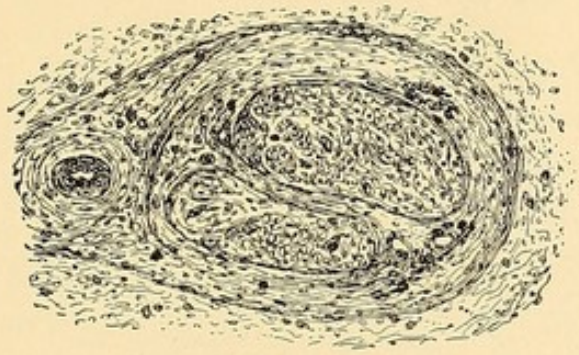


FIG. 129.

Microscopic Appearance of Nerve in Fissure.

the anal orifice and a naturally overpowerful sphincter; to the irritation of a leucorrhœal or gonorrhœal discharge in women; to an herpetic vesicle, or to the venereal sore which it so strongly resembles—the soft chancre. Any sore which is fairly in the grasp of the external sphincter is apt to become an irritable or painful one, and a fissure may be painless at one time and painful at another in the same person, or painless in one person and painful in another. An ulcer associated with contracture, spasm, and irritability of the sphincter is what is known as an irritable one, and without this condition it will not properly come under this classification; but a fissure may exist without causing any of these symptoms.

This contracture of the muscle may be temporary or permanent, and is due to the irritation of the sensitive nerve-filaments on the

surface of the ulcer by the passage of fæces, and to the reflex action excited thereby; and to many slighter causes, such as laughing, coughing, sneezing, or position. It may even come on spontaneously

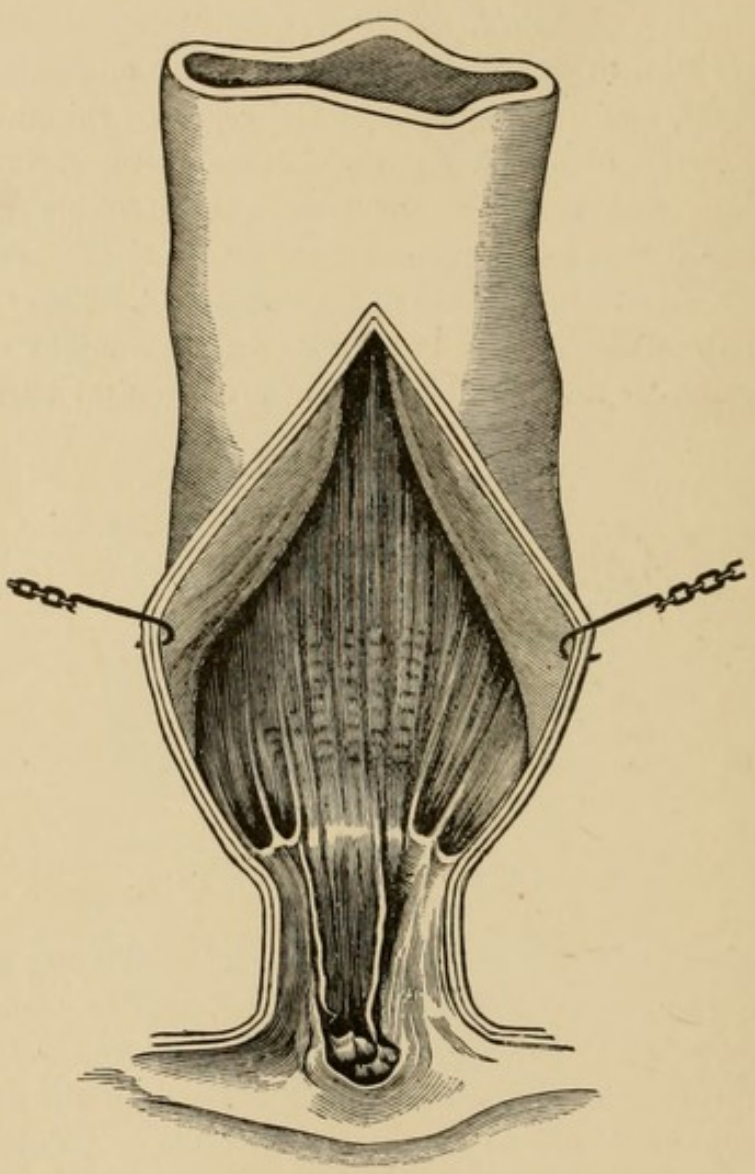


Fig. 130.

Tubercular Ulceration of Anus.

in persons of a highly nervous organization, or with such slight provocation as to appear to be spontaneous.

These ulcers are generally situated at the posterior commissure, but may be found anywhere on the anal circumference. They are generally single, but there may be two or three. They are more

common in women than in men, because constipation is more common in the former and because the skin is finer. They are confined to no age and are by no means relatively rare in infants. They are generally oval in shape, with their long axis vertical, and involve both skin and mucous membrane, being situated just at the junction of the two. In some cases they have the appearance of a simple erosion, in others of an old ulcer with grayish base and indurated edges which has involved the whole thickness of the mucous membrane and extended fairly down to the muscle beneath.

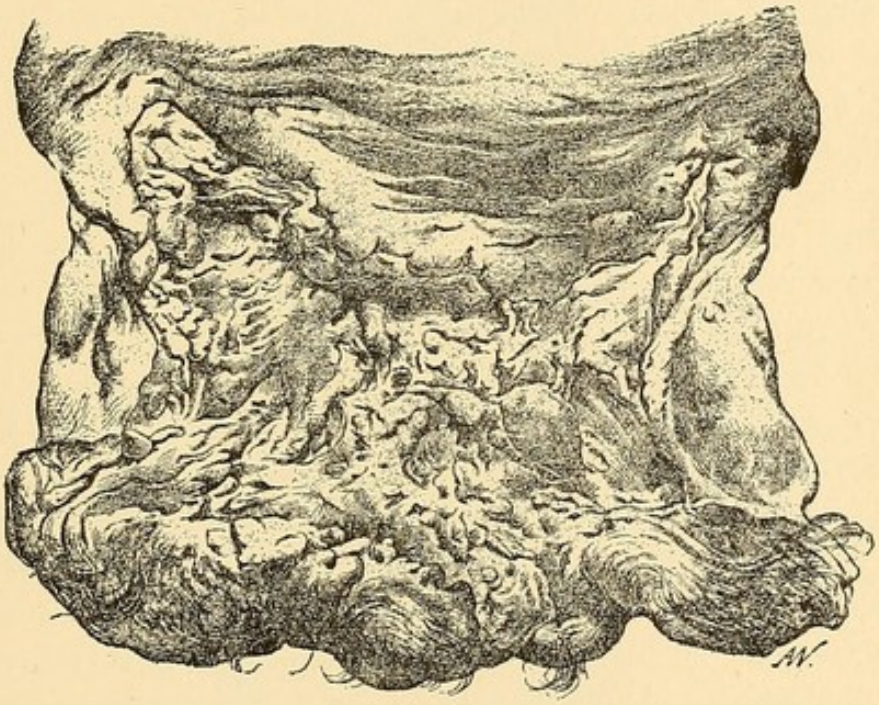


Fig. 131.

Fissure with Hemorrhoid.

Ball lays great stress upon the sinuses of Valsalva in the causation of fissure. Many authors have noted that at the lower end of a fissure there is often an inflamed cutaneous tag, and have stated that for the cure to be complete this tag must be removed in addition to the usual operation for the fissure. These authors have considered the cause of the fissure to be the usual tear or abrasion from straining or from a small foreign body, and the tag as only an accidental complication. Ball believes that in a large number of cases the etiology is as follows:

During the passage of a motion one of these little valves is caught by some projection in the fecal mass and its lateral attachments torn; at each subsequent motion the little sore thus made is reopened and possibly extended; the repeated interference with the attempts at healing ends in the production of an ulcer, and the torn-down valve becomes swollen and œdematous, constituting the so-called pile, or, as it has sometimes been called, the "sentinel-pile" of the fissure. He compares the condition to that of a "hang-nail" on the finger (Fig. 131).

Admitting this theory, it is easy to see why the old operations of stretching and division of the sphincter are so successful by putting an end to the slight laceration occurring at each movement, and giving final rest to the sore. Ball, however, goes farther, and asserts that merely snipping off the tag will cure the fissure.

The theory is an attractive one, and there is no doubt that the "sentinel pile" keeps the fissure from healing; but we have no proof that the fissure began in one of the sinuses, or that the tag of skin is anything more than a result of irritation, or, in fact, that it may not be the cause rather than the result of the fissure.

From what has been said of the etiology of these simple ulcers it is plain that they must present many variations in appearance; yet the diagnosis of each from the other, and of the whole class from those which are to follow, will not generally be found difficult if proper attention is given to the history, the appearance of the lesion, and its course. The disease is generally of a healthy type, and tends to self-limitation and spontaneous cure rather than to increase. The ulcerative action is generally superficial, and tends to extend on the surface rather than in depth. It is generally surrounded by the signs of reparative action, and with proper care will undergo cicatrization.

When, however, these ulcers are improperly treated, or when there exists such a constitutional state that healthy reparative action cannot be excited by treatment, any of these sores may assume a condition of chronicity and sluggishness with slow increase in size, gradually encroaching more and more upon healthy tissue till a large part of the anus and lower rectum is involved.

Such chronic ulceration of simple nature, and neither tubercular,

cancerous, syphilitic, dysenteric, nor lupoid, will be seen in all conditions of life and in both sexes. It may be very extensive, fully as great as in some of the varieties yet to be described, and may only

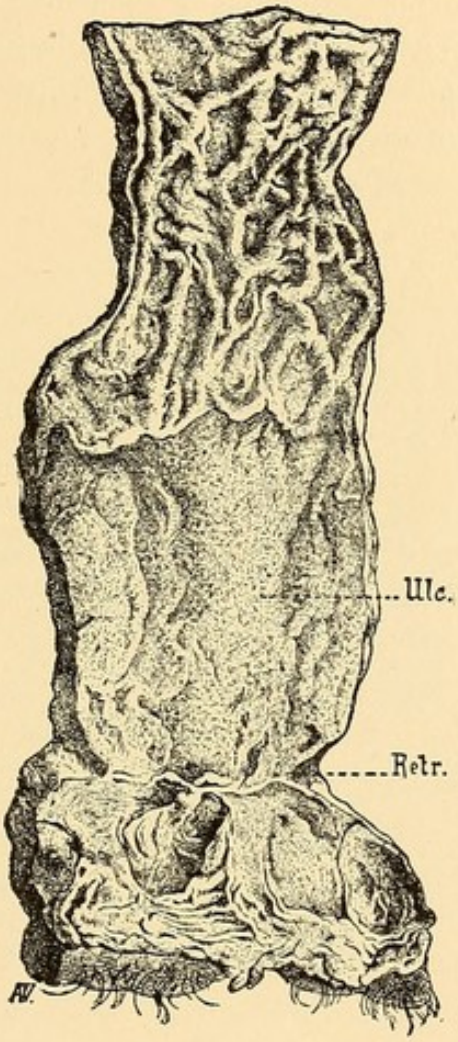


FIG. 132.
Tubercular Ulceration.

be diagnosticated from them by careful study. It may also be practically incurable, except by extirpation or colostomy.

Tubercular Ulcers.

Tubercular ulceration may occur as a primary affection, or as secondary to general tuberculosis anywhere along the course of the

alimentary canal, and it is sometimes seen involving the skin at the verge of the anus (Fig. 132).

The characters by which such an ulcer may be recognized are its pale red surface covered with a small quantity of serum, but devoid of healthy pus, and appearing as if varnished; the absence of all surrounding inflammation and of the granulations which exist in a healthy sore; its tendency to spread in depth rather than on the surface; the absence of any marked pain; the regular outline ending

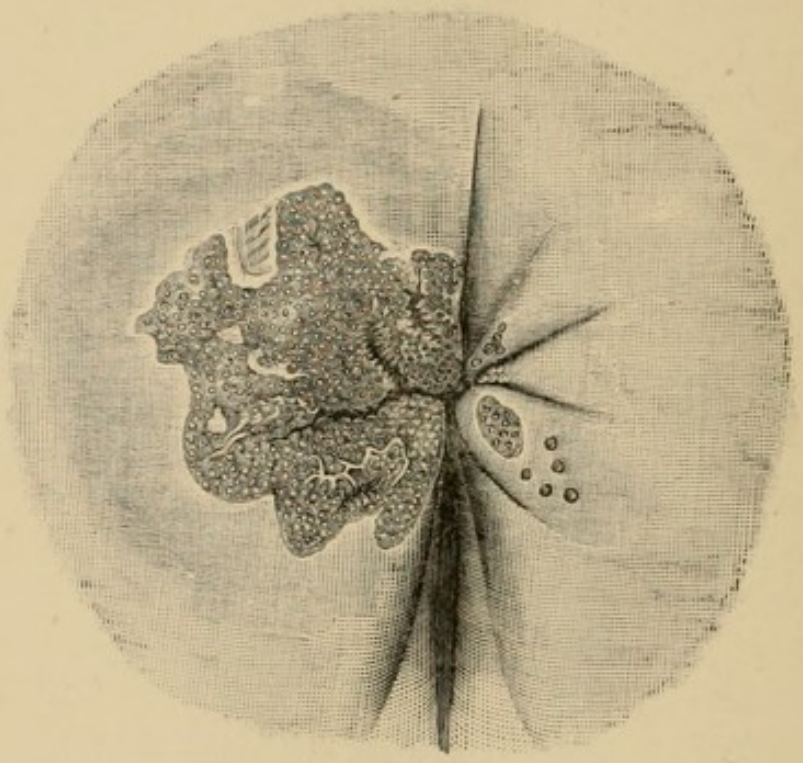


FIG. 133.

Tubercular Ulceration.

abruptly in healthy skin; and, above all, its chronicity and the utter failure of all remedies to affect its steady course. The diagnosis may be confirmed by the microscope. The tubercles caseate and break down, forming funnel-shaped ulcers. New tubercles are constantly formed in the bases and edges, and these in turn break down and increase the size of the ulcer, while several ulcers may finally coalesce. The process is sometimes limited in depth to the muscular layer, and at others only by the peritoneum.

Such ulcers may be the cause of stricture by the amount of inflammatory deposit which surrounds them. It is exceedingly difficult to induce them to take on a healthy reparative action; and if cicatrization begins, the process is generally incomplete and the cicatrix easily breaks down.

A tubercular ulcer starting in the wall of the rectum may end in perforation and fistula (fistula with large internal opening). Such an ulcer has also been known to cause sudden death from hemorrhage in a child, aged four years, the subject of acute general tuberculosis.

Estheomène.

Allied to the class of ulcers last named are those in which the scrofulous taint manifests itself, as it may do either in follicular ulcers of the rectum and large intestine, in lupus or *esthiomène*, and in rodent ulcer. The last two affect primarily the anus and perineum.

Follicular ulceration is due to a chronic inflammation and fatty degeneration of the follicles of the rectum. These, which, when first affected, appear as small caseous nodules, break and leave small, deeply excavated ulcers, which, being multiple, may coalesce and leave larger ones of the chronic variety, capable of subsequent healing with the formation of cicatricial tissue.

They may perforate the bowel or form fistulæ of the blind internal variety when low down, or cause peritonitis when higher up. They may be only one of many manifestations of the scrofulous tendency in the same patient, and they frequently coexist with pulmonary disease. When low enough in the intestine they may be seen through a speculum, sometimes three or four in the field at once.

Under the title *esthiomène* (lupus exedens of the ano-vulvar region) a number of phagedenic ulcerations, complicated with more or less hypertrophy of the nature of elephantiasis, have been described by different authors.

Dr. R. W. Taylor, who has made me a firm convert, after years of clinical observation, has come to the conclusion that there is no such distinct disease as *esthiomène*, and that the term should be dropped from medical literature. He believes, and I agree with him,

that any ulcerative process around the female genitals, syphilitic or otherwise, if neglected, as it is apt to be in the lower walks of life, may end in the great loss of tissue and hypertrophy of the surrounding parts which is generally described under this name. His conclusions, more fully quoted, are :

That a large and perhaps the greater number of chronic, deforming vulvar affections are due to simple hyperplasia of the tissues induced by irritating causes, inflammation, and traumatism. That chronic chancroid is a cause in a certain proportion of cases. That many cases are due to essential and specific syphilitic infiltrations. That other cases are caused by the hard œdema which often complicates and surrounds the initial sclerosis and perhaps gummatous infiltration. That many cases are due to simple hyperplasia in old syphilitic subjects who suffer from chronic ulcerations of the vulva long after all specific lesions have departed. That some cases also in old syphilitics are due to simply hyperplasia without the existence of any concomitant ulcerative or infiltrative process, and seem to be caused by conditions which usually, in healthy persons, only result in vulvar inflammation.

The ulcer is irregular in outline, with a granular base of a violet-red color, and there is a slight sanious discharge. The edges are but little elevated and are not undermined, and there is more or less hypertrophy of the surrounding tissue, which, in some cases, is exceedingly well marked. The ulcer may cicatrize in part, the cicatrix being thin and white, at the same time that the ulcerative process is extending in the opposite direction. At a little distance from the ulcer there is often a pathognomonic appearance of slight, reddish, hard nodules of tubercular lupus, separated from the primary sore by healthy skin. With this amount of disease the constitutional disturbance is often not sufficient to confine the patient in the house.

The diagnosis is not generally difficult, though the disease may be confounded with cancer, phagedenic chancroid, and with elephantiasis with secondary ulceration. It is best distinguished from cancer by the cicatricial bands which it leaves behind in its ineffectual attempts at healing, and from chancroid by the surrounding tubercles, which in lupus develop in the thickness of the derma and ulcerate secondarily ; while the ulcers which sometimes surround a chancroid

are ulcerous from the first, being due to secondary inoculation. The duration of the disease is indefinite, and it seldom leads to fatal results. It is best treated by destructive cauterization and raclage. The disease is well shown in Fig. 134.

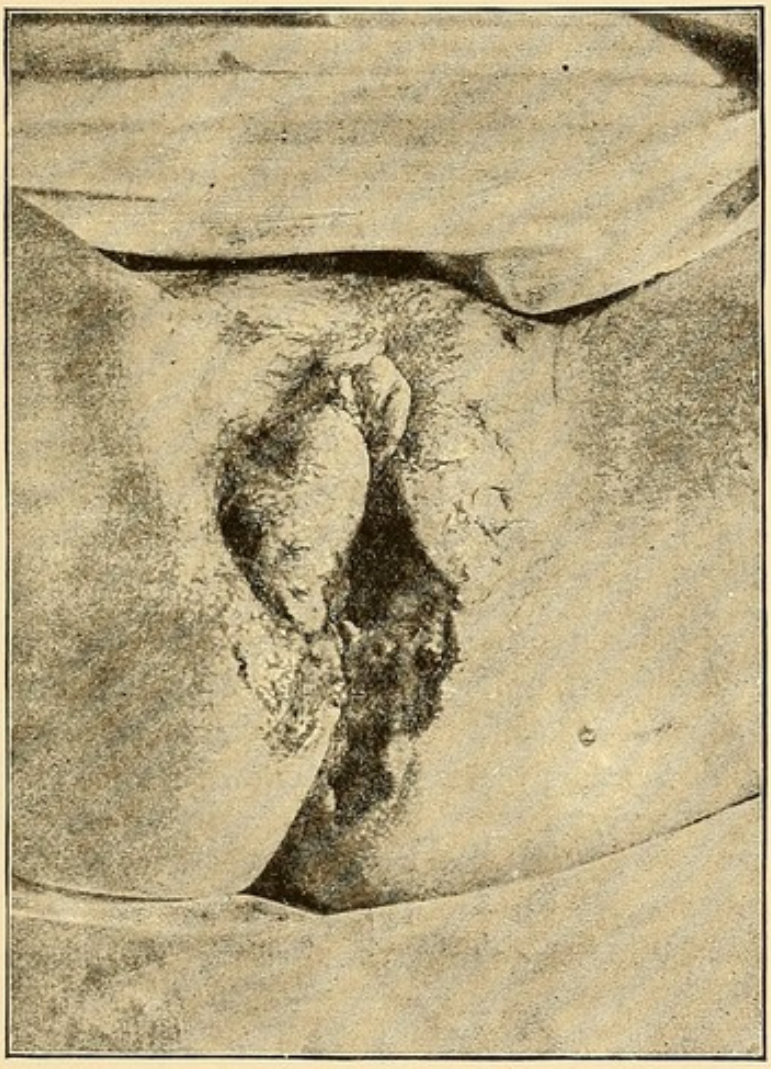


FIG. 134.

Esthiomène.

I have, by the kindness of Dr. Ill, of Newark, N. J., seen a very unusual case of this disease, inasmuch as the patient was only fourteen years old and had been suffering since the age of nine. The usual manifestations were perfectly characteristic, the labia were enormously hypertrophied, and the destruction of the rectum was so

great as to lead me to advise a colostomy. In this case there was a good history of congenital syphilis, and to my surprise the patient was very greatly relieved by anti-syphilitic treatment.

Rodent Ulcer.

This is very closely allied to epithelioma, and may, in fact, be considered one of its varieties; but it is distinguished from it clinically by the fact that it does not infiltrate surrounding tissue, does not involve the lymphatics, and does not become generalized. It is the same disease met with upon the face, and is exceedingly rare at the anus.

It is found by preference at the verge of the anus, and extending from this point upward into the rectum. It is irregular in shape, and its edges end abruptly in healthy tissue. Its surface is red and dry; it destroys superficially, attacking mucous membrane rather than skin, and undergoes rapid but only partial cicatrization under proper local and constitutional treatment. It never entirely heals, and it is not to be included among the causes of stricture. It is at first generally mistaken for a late syphilitic manifestation, but is distinguishable from it by the powerlessness of all treatment to prevent its steady progress. It is one of the most painful of all the ulcerative affections of this part, and ends fatally unless some other disease cuts short the history.

Dysentery.

In dysenteric ulceration the diseased portion of the lower bowel becomes infiltrated with fibrinous exudation, and, as a result of the compression which this exercises, is necrosed and sloughs. When the slough is cast off there results a loss of substance, and if this is superficial the membrane may regain its former state, but if deep, the usual callous cicatrix is produced in its place, and stricture is the result.

The ulcers resulting from this process vary much in size, location, and appearance. They may be minute circles, but are generally large, and, though their favorite site is the rectum or sigmoid flexure, they may be found anywhere in the large intestine. They

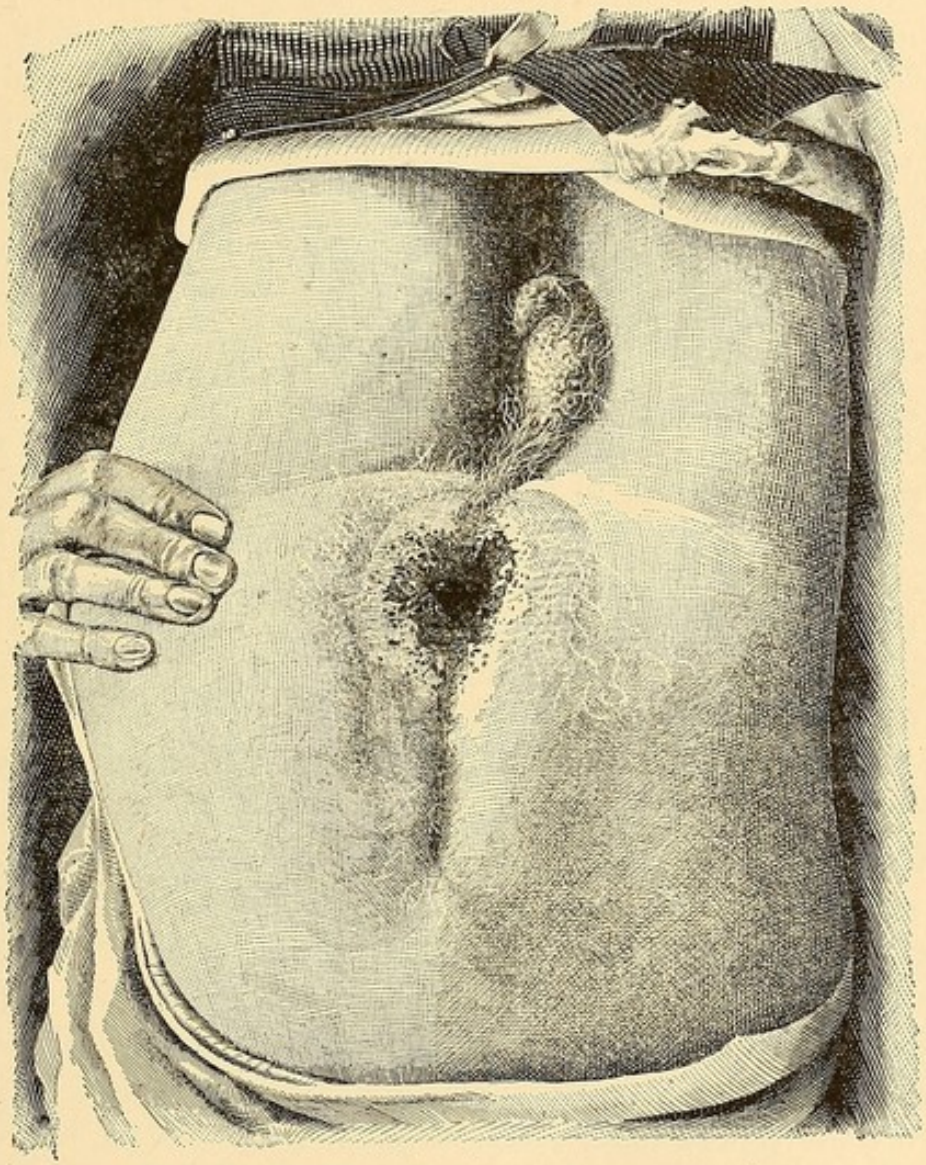


Fig 135.

Lupus.

may extend so as to coalesce and leave only islands of mucous membrane between the extensive patches. The process usually involves only the mucous coat, but may extend in breadth and result in perforation and its attendant evils. The coats of the bowel may become sinuous abscesses, so that, on dividing the prominent portion of mucous membrane between two ulcers, several drachms of pus may escape. Although all the symptoms of dysentery may result from ulceration due to other causes, there is no doubt that in this country the disease is one of the causes of chronic ulceration and stricture, and is more common than is generally supposed.

The venereal ulcers will be treated of in the next chapter.

Symptoms.

The symptoms of what is known as the irritable ulcer or fissure are so well marked as to render its diagnosis in most cases easy. The chief is the peculiar pain, which may be constant, but is always increased by defecation. The act of defecation itself may not be notably painful, but after the act, sometimes almost immediately, sometimes after a short interval, the characteristic suffering begins and may last in mild cases an hour or two, or in severe ones nearly all of the twenty-four hours. The pain is described by the sufferers as dull, gnawing, and aching, rather than lancinating, and with it there will often be associated neuralgic pain in the loins and down the thighs.

As a result of this suffering, at first periodic and later constant, a very miserable general condition is often developed. The sufferer soon learns to dread the act of defecation and to postpone it as long as possible, till a state of chronic constipation is produced which is overcome at long intervals by purgatives; and in this way the whole digestive apparatus is thrown out of order.

In women, also, there is apt to be reflex irritation of the bladder, with tenesmus; and in men there may be spasmodic stricture of the urethra. In women, also, it is not uncommon to find uterine trouble combined with that at the anus.

It is sometimes a matter of amazement to the physician to see how long a woman will suffer from a simple sore of this kind, and

to what a condition of invalidism she will allow herself to be reduced, before she will seek for aid.

It will sometimes be found that greater suffering may be caused by a simple erosion at the anus than by more extensive and deeper ulceration; and indeed the amount of pain is not at all indicative of the depth or extent of the sore. The element upon which the pain directly depends is probably the exposure of nerve-filaments. Moreover, the susceptibility to pain varies greatly in different people, and a woman of high nervous organization may be reduced to a condition of chronic invalidism by a sore which would not prevent a laboring man from attending to his daily avocations.

Ulceration within the rectum is also attended by a certain train of symptoms which render its existence extremely probable, and which in themselves are sufficient to denote the presence of an ulcerative process, though throwing no light upon its nature.

The earliest symptom is morning diarrhœa, and that of a peculiar character. The instant the patient gets out of bed he feels a most urgent desire to go to stool. What he passes is generally wind, and some discharge resembling "coffee-grounds," both in color and consistence; occasionally the discharge is like the "white of an unboiled egg" or "a jelly-fish," more rarely there is matter. He, in all probability, has tenesmus and does not feel relieved; there is something of a burning and uncomfortable sensation, but not actual pain. Before he is dressed very likely he has again to seek the closet; this time he passes fecal matter, often lumpy, and occasionally smeared with blood. It also may happen that after breakfast, taking hot tea or coffee, the bowels will again act; after this he feels all right, and goes about his business for the rest of the day, only perhaps being occasionally reminded by a disagreeable sensation that he has something wrong with his bowel.

After this condition has lasted for some months, more or less, as influenced by the seat of the ulceration and the rapidity of its extension, the patient begins to have more burning pain after an evacuation; there is also greater straining and an increase in the quantity of discharge from the bowel; there is now not so much jelly-like matter, but more pus—more of the coffee-ground discharge and blood.

The pain suffered is not very acute, but very wearying, described as like a dull toothache, and it is induced now by much standing about or walking. At this stage of the complaint the diarrhœa comes on in the evening as well as the morning, and the patient's health begins to give way, only triflingly so perhaps, but he is dyspeptic, loses his appetite, and has pain in the rectum during the night which disturbs his rest.

We need scarcely call attention to the extreme gravity of this condition, or to the certainty with which, if untreated, and sometimes, indeed, in spite of the best treatment, it will end either fatally, or in stricture which will require the gravest surgical procedures for its relief. The picture is unfortunately a familiar one to every general practitioner, and a case of severe or extensive ulceration of the rectum is perhaps one which calls for as much skill in treatment as anything in the range of surgery.

Diagnosis.

The diagnosis of the existence of ulceration is generally easy with sufficient care, and may generally be made from the symptoms alone. A small ulcer within the grasp of the external sphincter may easily escape a cursory examination; but no ulceration, even in the upper part of the rectum, is beyond the reach of actual touch or vision; and none need, therefore, escape detection when the examination is properly conducted.

In many cases the diagnosis is plain, the sphincter will be found destroyed, and the rectum and vagina will present one common cavity of foul appearance, from which issues a fetid, purulent discharge. In other cases, by a careful and gentle pulling apart of the lips of the anus and a gentle straining down on the part of the patient, a small ulcer within the grasp of the sphincter, or, at least, its lower edge, will be brought into view without the use of the speculum or ether. In others a digital examination will reveal an eroded, painful spot within the rectum, and when the finger is withdrawn it will be found stained with blood.

In all such cases the diagnosis is easy; in others there is but one way to make a diagnosis, and the secret of success will be found in the proper use of the speculum. This is the way, I am sorry to

say, which is least often followed by the general practitioner. It is much easier to give a lady a diarrhœa mixture and trust in Providence for a cure than to gain her consent to be thoroughly examined; and for this reason many a case of curable disease has been allowed to reach an incurable stage before its existence has been certainly determined.

The existence of a chronic diarrhœa, or of a discharge of any kind from the rectum, is always a good and sufficient reason for a thorough physical examination; and with the instruments now at our command, no one need be in doubt as to the existence of ulceration in any part of the rectum.

The existence of ulceration being decided, its nature remains to be determined. We have already, in speaking of the different varieties, given some of the chief points in the differential diagnosis, and to these we must again refer the reader. In every case the history must be taken into account, as well as the appearance of the lesion. Of the many varieties we have mentioned, some may almost certainly be excluded from their great rarity. Amongst these are the true chancre, the tubercular deposit, and rodent ulcer. In the majority of cases, after excluding syphilis, the ulcer will be of the simple variety first described, modified more or less by the general condition of the patient, or it will be malignant.

Treatment.

In speaking of the treatment of ulceration of the rectum and anus, we will first deal with the simplest form, the irritable ulcer, and then with the more severe, postponing the question of stricture, which is the most frequent result of severe ulceration, to a separate chapter.

The treatment of fissures at the anus should, in the first place, be preventive in those persons in whom the skin of the part is sensitive and liable to cracks and small sores; and for such there is nothing better than the daily washing of the part with cold water and a soft sponge, and the avoidance of anything which may tend to irritate it, such as the use of printed or rough paper after defecation.

When fissures really exist, they may often be cured by a nightly application of Goulard's liniment on a pledget of lint, or by gently

touching the surface with a solution of nitrate of silver to coat the sore (gr. v. or x.– ℥ i.).

I have been surprised, in my own practice, at the remarkable results which can be obtained in the treatment of simple fissures by local applications without operation. The treatment must be carried out with great attention to detail, and by the surgeon himself, and not the patient. It will fail in many, but in many others it will succeed ; and I have the notes of many cures by this means, some of them in a very short time.

In children the fact that fissures and erosions may be due to the scratching caused by the irritation of pin-worms must always be borne in mind.

In fissures complicated with polypi, the polypus must always be removed at the time of the operation ; and in women suffering from the union of uterine and vesical trouble with painful ulcer, the uterus must be treated as well as the ulcer, or the operation on the latter will be apt to fail.

In cases where the treatment by local applications has failed the operation of drawing a sharp knife through the ulcer and muscular fibres directly beneath it is the one to which I give preference, preferring it to stretching, because it can be done in the most satisfactory way with cocaine, while stretching cannot, and because it can be done without any fear of subsequent incontinence, while stretching cannot. The cocaine (five minims of a four-per-cent. solution) should be injected beneath the ulcer. It is customary to use a fenestrated speculum in such an operation, but it may easily be dispensed with when a straight, blunt-pointed knife is used. The knife should be very sharp, and the operation must be skilfully done, but when properly done it is usually successful.

It is not necessary to cut entirely through the sphincter, and yet those fibres of it which form the base of the ulcer should be fairly divided, for it is by putting an end to the contractions of these fibres that the operation works its cure. The incision should always be extensive enough to produce a certain amount of relaxation of the muscle, and should begin in healthy mucous membrane above the ulcer, and end in the skin below.

The treatment of ulceration within the rectum is a much more

difficult matter than the treatment of that at the anus, and yet in principle they are the same. In both we give the ulcer rest, and try to assist nature in her own methods by avoiding anything which shall interfere with the process of repair. The general treatment of ulcer of the rectum may, therefore, be summed up in a few words—rest, diet, and local applications. I do not think I exaggerate when I say that without them no treatment is likely to be of much avail.

The rest in bed must in some cases be absolute.

This point being carried to the surgeon's satisfaction, milk diet need not be absolute, but may be varied with soups and easily digested solids, as bread and crackers, care being taken to secure soft and unirritating passages. With such diet as this it will sometimes happen that a movement of the bowels every two or three days will be all that nature requires, and as long as such a condition causes no uneasiness I am not accustomed to interfere with it by laxatives.

In cases where it is well borne, cod-liver oil may be administered both as food and laxative, often with excellent effect upon the general condition and the local trouble. In the way of local applications suppositories may answer a good purpose in disease low down. The menstruum should be of some substance which may be easily dissolved at the temperature of the body ; and in the way of drugs I have had more satisfaction with bismuth and iodoform than with anything else. I have also found it well occasionally to mix about the tenth of a grain of morphine with the suppository, and administer this at night and morning. It certainly ministers to the local rest of the part, and it renders rest in bed much more endurable in persons of a nervous tendency.

Certain good results may be gained by applications to the ulcerated spot by means of enemata or with the brush, and when the former are used, in cases where the disease is situated high up, the amount of fluid injected should be large. Three pints of water may be thrown into the upper part of the rectum, the sigmoid flexure, and the lower part of the colon, if the proper means be adopted, without causing any uneasiness at the time or any subsequent desire for an evacuation. Long, flexible, soft-rubber tubes may now be obtained from any of the surgical instrument makers, which are

suitable for this purpose. The tube should be small and the opening in it just large enough to hold securely the smallest end piece of an ordinary Davidson's syringe. The injection should be given with the patient on the side, and given slowly. The drug from which the best results may be expected, when used in this way, is the nitrate of silver, and the solution should vary in strength from twenty to forty grains to three pints of water. This plan of treatment has been very successfully employed in cases of dysenteric ulceration.

There is, however, no means of treatment in cases of localized ulceration high up the bowel at all, comparable in results with the application of nitrate of silver on a uterine applicator through a long speculum. Every strength may be used, from the weakest to the strongest, and no rules as to strength or frequency of applications can be laid down, for here will appear the skill and experience of the surgeon. I can only say that by the careful patient employment of this method I have cured several cases of severe chronic ulceration in the upper part of the rectum, beyond the field of ordinary vision by the usual forms of specula, which seemed at first sight to be amenable only to colostomy. The use of the instruments necessary requires special skill and practice, and often some training on the part of the patient; and the treatment is often protracted, but the results are exceedingly satisfactory.

The knife may serve a good purpose under several circumstances. Where the sore is of small dimensions and well limited in outline, even though it be above the external sphincter, it is sometimes of advantage to make an incision across the muscular fibres which form its base, and secure rest for it in this way. The operation is one of delicacy, but is also one which may assist greatly in the cure.

The application of strong nitric acid to a circumscribed ulcer of the rectum is often attended by the happiest results.

In treating these cases by local applications the surgeon must be prepared to ring all the changes, between a two-grain solution of nitrate of silver and fuming nitric acid, or pure carbolic acid. They are cases which require the utmost care, both as to the diagnosis in the first place, and the treatment; and many of them will end unhappily in spite of all that can be done. And yet, when they present themselves in their earlier stages, before irreparable injury has been

done, they are capable of being cured by the treatment which has been outlined.

I now remember no case of simple ulceration, where the disease was seen at all early, which I have failed to cure by one method or another, but it has often been by several combined, and only after



FIG. 136.
Irrigator.

months of treatment and the heartiest co-operation of the patient. In many cases the cure has been easy, especially in those where circumscribed ulcers within the bowel, which have long resisted treatment, have been found to depend upon blind internal fistulæ.

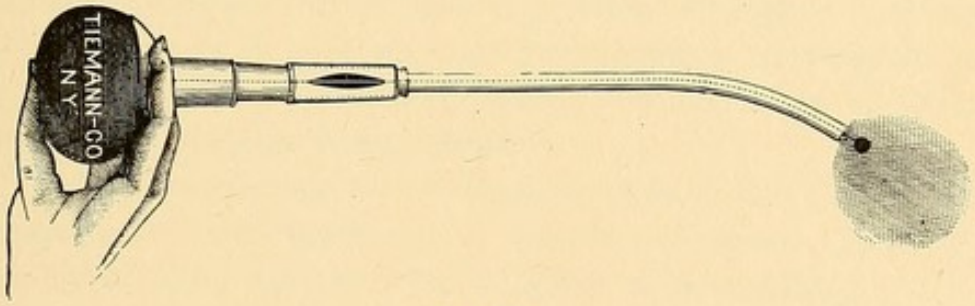


FIG. 137.
Insufflator.

The practitioner should be very cautious in his prognosis as to the time required for treatment, remembering that it will of necessity be long.

To accomplish anything with either tubercular or lupoid ulceration the treatment must be begun early. If a tubercular ulcer be completely excised or destroyed with the cautery before general symptoms of tuberculosis have shown themselves, there is a chance that it may be cured ; and if lupoid ulceration be attacked before it has done irreparable injury, and thoroughly excised, it may also be

induced to heal. By thorough excision, I mean cutting fully as wide of the disease as would be done were it known to be malignant—at least an inch in every direction.

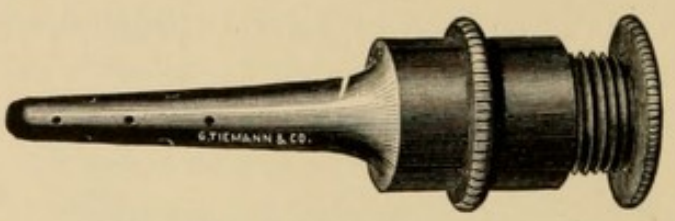


FIG. 138.

Ointment Applicator.

In the old and advanced cases, beyond the benefits of local treatment, there are only too methods to be followed. One is complete resection of the diseased part, the other is colostomy.

CHAPTER XIV.

VENEREAL DISEASES OF THE RECTUM AND ANUS.

THE venereal diseases of the rectum constitute a study which has never yet been mastered by either the syphilographer or the student of diseases of the rectum. Each has contributed a certain amount of information acquired by personal experience, but neither has ever completely covered the whole ground.

The term venereal diseases will be used here in its broadest sense, as including all those affections referable to, or directly caused by, the sexual act; and the number of such is very considerable, for there is scarcely any manifestation of venereal disease capable of affecting the soft tissues which has not at some time been observed in the rectum or anus.

Before considering the various forms in detail, a few words are unavoidable as to the modes of their acquirement. Some of them are local, some are the manifestations of a constitutional poison. The local ones may be acquired by accidental contact or by the practice of unnatural sexual vice. However disgusting this last phase of etiology may be, it cannot be set aside as a matter of ancient history, nor utterly disregarded in the practice of medicine of the present day.

There are many points at which this subject comes within the field of the alienist and neurologist, rather than that of the surgeon.

The French writers describe in detail the changes, malformations, and diseases of the rectum and anus produced by this practice, and it is on account of these only that this subject has been introduced. It is a well-attested fact that all of the supposed physical signs of the vice may be absent in those who have practised it for

years. A case reported by myself is one in point, and Kocher calls especial attention to the fact that among the Arab pederasts all of these signs are generally absent. Ligg describes a deaf-mute, thirty-five or forty years old, the victim of this habit, whose anus showed no trace of traumatism and was well closed, being marked only by an absence of the radiating folds. The mucous membrane of the rectum was also normal.

Although there is a perfectly normal type of anus, the changes which may be found in it without indicating disease are numerous. The tonicity of the sphincter differs greatly in different people in health. In some a Sims No. 8 speculum may be introduced without pain, while others can hardly tolerate the index finger. In some patients the radiating folds of skin are very strongly marked, while in others they are entirely absent; and the depth of the anal depression varies most strikingly in different people.

The changes which unnatural intercourse is supposed to produce are relaxation of the sphincter, disappearance of the radiating folds, and an infundibuliform shape of the anus, together with, in more marked cases, fissures, lacerations, abrasions, ecchymoses, ulceration, abscess, hemorrhoids, fistulæ, and incontinence. There is no doubt but that all of them may be produced in this way, but only under extreme conditions. It certainly would lead to error, however, to infer the existence of an unnatural practice from a lax sphincter or an absence of radiating folds in every case, or even in the majority of cases.

In studying these changes and their value in diagnosis, it will be safer to admit that, although the prolonged practice of the vice may certainly cause them to appear, they may still all be absent in old cases, and their mere presence will seldom constitute proof of the practice without additional evidence, usually only to be obtained from the confession of the patient.

The physical signs which indicate this vice are of two kinds—those due to physical violence and those due to direct contagion of venereal poison. The former will vary according to the age of the passive party, the tightness of the sphincter, the size of the male organ, the amount of violence used, etc., and also according to the frequency of the act. In a young child, and sometimes in an adult,

the injury may amount to actual laceration, and may be attended by profuse hemorrhage in consequence; but it is more apt to show itself in abrasions, bruising of the parts, and ecchymoses. These injuries may be followed by abscess, and hence by resulting fistulæ.

In less marked cases a single act may be followed by pain in the rectum, increased by defecation, tenderness to the touch, slight erosions, and perhaps by a slight sero-sanguinolent or mucous discharge. In cases of the long-continued practice, where marked changes have been caused, the physical signs are of a different character. Tardieu illustrates his work with a plate of a patulous anus in which the sphincter is entirely paralyzed; and Burgeon describes the rectum of an idiot, who for a considerable time had practised the vice, as much dilated and infundibuliform in shape, the mucous membrane being blackish, swollen, and ulcerated in spots, and the submucous and muscular layers hypertrophied to four or five lines in thickness. In such cases there will be incontinence of gas and fæces, fistulæ, and perhaps stricture following the ulceration.

With regard to the diagnosis in these cases, it will be seen that none of the signs enumerated are absolutely diagnostic, though they may be sufficiently so to excite the strongest suspicion.

The injuries caused by the practice of rectal masturbation are often much more severe than those due to sodomy or pederasty. It is this secret vice which lies at the bottom of all the remarkable cases of foreign bodies found in the rectum, generally of old men who have lost natural power. A bottle in the rectum explains itself, and it is useless to call out the story of diarrhœa or constipation with which the sufferer always provides himself.

One reason for the fatality of these cases is found in the length of time the true condition will be concealed by the patient before his shame allows him to seek medical relief; and another is that in the futile attempts to remove the body made by the patient it is generally pushed farther up, or, if friable, is broken.

Leaving, with this brief outline, the physical changes which may result from these practices, we come to venereal diseases of the rectum and anus which may be caused by them or in other ways.

Proctitis due to sodomy or pederasty may be either simple or gonorrhœal. The former is due to mechanical violence, and its pres-

ence without palpable cause, and associated with an eroded condition of the anus, is sufficient to excite a suspicion of the vice. The symptoms are a sensation of heat and weight in the part, a frequent desire to go to stool, more or less pain, often extending to the bladder, sacrum, and loins, and causing vesical tenesmus and a discharge of sero-purulent matter with the passages and between them.

With these local symptoms there may be more or less fever and loss of appetite, and an examination will reveal local rise in temperature and a congested state of the mucous membrane.

Gonorrhœa.

True gonorrhœa of the rectum, arising either from direct contagion or by inoculation with pus flowing from the vagina over the anus, is very rare. Rollett reports a case due to direct inoculation from the penis to the rectum in a patient who was in the habit of introducing his finger into the bowel to provoke a passage.

Tardieu has never observed a case, and Gosselin saw only one at Lourcine in three years.

In some experiments made by Bonière, he found it very difficult to inoculate the rectal mucous membrane with gonorrhœal pus placed upon it through a tube, though the anus was easily affected. On the other hand, Requin believes it almost sure to follow passive pederasty with a person suffering from the disease.

Individual cases will occasionally be seen reported, and most of the standard writers acknowledge its existence. In my own practice I have never had occasion to suspect its existence but once, and then I could not be positive ; the patient—a woman—denying any unnatural intercourse, and there being another explanation of the condition equally good.

The diagnosis must rest upon the confession of the patient, the existence of the deformities which point to unnatural intercourse, the severity of the inflammation, and the microscopic examination of the discharge. In gonorrhœal proctitis all the symptoms will be more severe and acute than in any of the simple varieties. The pain is greater, the discharge very abundant and greenish in character, escaping with the stools and also by itself ; the finger introduced will

at once detect the increased heat of the part, and a speculum examination will show intense redness and congestion. The mucous membrane is covered with thick discharge, bleeds readily when touched, and the follicles are enlarged and discharge pus. Although a very severe proctitis may be caused by other causes than gonorrhœa—such, for instance, as the prolonged use of drastic purgatives—the history of the development of the disease will be much more chronic.

The irritating discharge from the anus may cause erosions and fissures, or previously existing fissures may become inoculated with gonorrhœal pus and spread in superficial extent. The inflammation of the mucous membrane of the rectum may be so severe as to end in ulceration and loss of tissue.

The treatment consists in rest in bed, hot sitz-baths, anodyne injections of warm starch-water and opium, and perhaps of a solution of nitrate of silver (1 or 2 grs. to ʒ i.). The diet should be of milk and fluids, and the bowels should be kept gently acting with salines. By this means a cure may generally be affected in a fortnight or three weeks.

Chancroid.

Chancroids at the anus may be caused by direct contagion or by auto-inoculation, and though they may be due to unnatural intercourse, their presence is no proof in itself of the vice. They are much more common in females than males, constituting one in nine of all cases of chancroids in the former, and only one in four hundred and forty-five in the latter. To account for this disproportionate relative frequency it is only necessary to remember the possibility of accidental contact of the male organ in coition, and the facility of auto-inoculation due to the proximity of the rectum and vagina.

They may be single or multiple, may be situated at any point of the anal circumference, and may cover a large extent of surface. They often extend upward between the radiating folds of skin, and thus greatly resemble simple fissures ; or they may spread backward into the fold between the nates, following in extent the natural course of the discharge ; but they do not tend to spread upward into the rectum, or to involve the surface of the gut above the line of the sphincter. When they do so, which is rarely, they are of limited

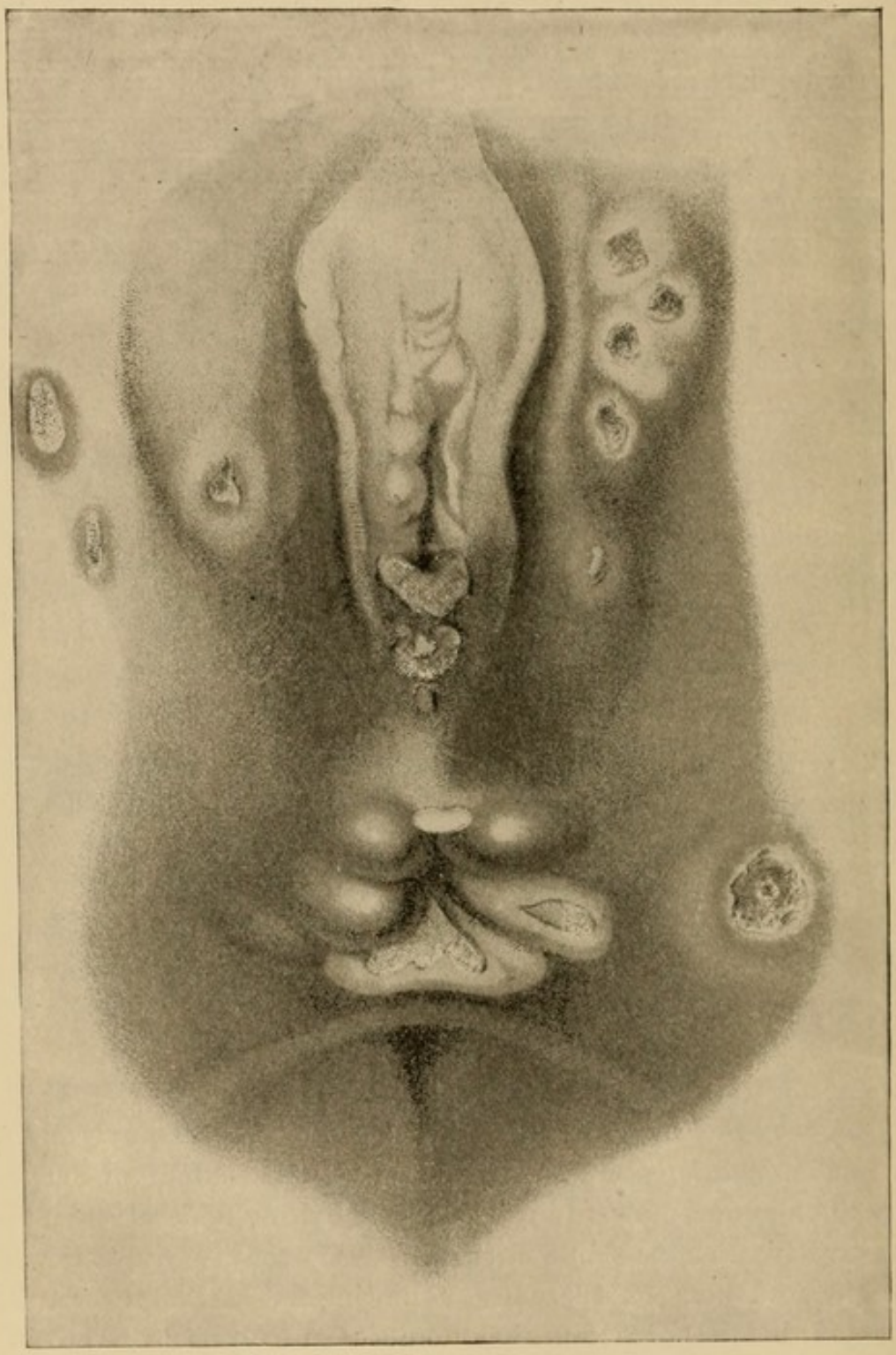


FIG. 139.

Chancroids of Anus and Vulva.

extent and well circumscribed. Their existence in the rectum proper has been denied by good observers, erroneously, I think, the mucous membrane there being believed to furnish no suitable ground for their inoculation.

The sores at the margin of the anus have the same general characteristics as when located in other parts. The base is soft and covered with the same grayish pellicle, the edges are sharply punched, and the secretion is profuse. They tend to spontaneous cure with cleanliness or with judicious cauterization, and are not very painful unless they are within the grasp of the sphincter, when they may cause the usual pain of fissure. Even when they have extended upward in this way they still heal kindly, and almost spontaneously; and no matter how completely they may have involved the anus or the surrounding skin, they seldom, when healed, leave any traces of their former existence.

In certain rare cases they may be accompanied by an undue amount of ulceration, known as phagedena; and in certain patients with other rectal disease, or in whom the scrofulous or syphilitic taint is marked, they may assume a chronic type and the healing be delayed for a long time; but even they may generally be induced to heal with proper care.

From this general description it is evident that only under exceptional circumstances will a chancroid extend far enough into the rectum, and cause sufficient destruction, and subsequent cicatrization and fibroid deposit, to result in stricture. That it may do so I am forced to believe from the testimony of others and my own observation; but it is none the less a clinical fact that it seldom does so, as all those having large experience with venereal sores will testify.

Chancroid as a Cause of Stricture.

Gosselin is usually quoted as the authority for the idea that chancroid of the anus is the most frequent cause of the severe ulceration, which results in the so-called syphilitic stricture of the rectum. It is rather difficult to tell exactly what Gosselin did mean in his much-quoted contribution to this subject, but there seems very little ground for supposing that he intended to convey this idea. Although

Bassereau had made the distinction between chancre and chancroid two years before, Gosselin's "chancre" still meant to him, indiscriminately, the hard chancre, the chancroid, and the mucous patch inoculated by the chancroid.

What he asserts is, that these strictures are neither primary, secondary, nor tertiary manifestations of syphilis, as such are generally understood, but something developed in the neighborhood of the primary sore, comparable to hypertrophy of the labia or condylomata following the primary lesion. They are "due to a special modification of the vitality of the tissues contaminated by the virus of the chancre, comparable to the lengthening and hypertrophy of the prepuce with contraction of its orifice which follows a chancre on its under surface, in which the disease is evidently neither an œdema, nor a specific induration, nor a constitutional affection, but a local lesion, due to the presence of the chancres, and consecutive to the inflammation which they have caused."

Dr. Mason's paper is very much stronger than Gosselin's, in that he plainly asserts the causation of stricture to be the phagedenic chancroid. He says he has seen "constriction of the rectum follow, and that very *shortly after* the healing of chancroids has taken place." Van Buren says: "I have also seen chancroids at the anus become phagedenic and extend within the rectum, and have verified, at a later period, the existence of stricture of the rectum from the cicatrization, as there was every reason to believe, of this same ulceration."

The weight of evidence is thus seen to be decidedly in favor of the possibility of the causation of stricture by phagedenic chancroid, but that any large proportion of strictures are in any way due either to chancroid or to syphilis has never been proved, while recent clinical and microscopic study is all against this time-honored theory.

The diagnosis of the chancroid in this location will be easy by auto-inoculation, if the probability of its occurrence is only borne in mind, and the treatment has been sufficiently hinted at. Cleanliness, local application of astringents, and attention to the general health are all that is necessary when the sore does not extend beyond the radiating folds.

There are two forms of phagedena which may complicate a chan-

croid at the anus—the acute and chronic. The former is rare, and strongly resembles phlegmonous erysipelas following a wound, in that it may involve the tissues to a great extent, cause deep collections of pus and destruction of tissue, and end fatally. The chronic is the one generally seen, and this may go on for a long time, healing in one spot while advancing in another. It is worthy of note that even after months of this process the sore still remains auto-inoculable.

There are other complications of the chancroid which may render the diagnosis difficult. The sore may itself be inoculated with syphilitic virus and assume some of the characters of the hard chancre, especially the induration. In such a case the diagnosis must rest in a great measure upon the combination of symptoms. The sore will present the appearance of the chancre, but the discharge will be more abundant than a chancre generally produces, and the pus will still be auto-inoculable. In addition, the glands in the groins will show the characteristic syphilitic induration.

Treatment of Chancroids.

In the treatment of chancroids of the anus many points of difficulty may arise. The sore, from its position within the grasp of the sphincter, may be so painful that nothing can be done to it except by the surgeon himself, and only then by the exercise of the greatest care and gentleness of manipulation; and although this pain may be at once relieved, either by incising the ulcer or dilating the anus, both of these procedures involve a great risk to the patient of auto-inoculation. The bowels should, therefore, be kept gently open by the daily administration of a laxative which will cause soft but not watery passages. The ulcer must be touched two or three times daily with a weak solution of nitrate of silver (grs. v.–ʒ i.) on a camel's-hair brush, and subsequently covered with a small pledget of soft lint gently laid into the fissure and pressed down with a probe. With a light touch this may be done without causing pain.

Should the ulcer have extended upward to the upper edge of the sphincter, there will be such contraction of the muscle that this plan of treatment is impracticable, because all parts of the sore cannot be reached by the brush. In such a case ether must be resorted to, a

speculum introduced until every part of the ulcer is exposed, and the surface thoroughly cauterized with fuming nitric acid. The acid must be carried under the edges of the ulcer, and every point must be thoroughly destroyed, for the operation will be positively injurious unless thoroughly done.

Should the ulcer have reached such an extent of rectal surface as to render it doubtful whether by any means of exposure every point of it can be fully seen, it is better not to try cauterization, but to be satisfied with astringent injections frequently repeated. These must also be made either by the surgeon or a thoroughly well-trained and skilful assistant, for no fresh wounds must be made by the point of the syringe, and no pain need be caused by its passage. A small glass point or a small soft-rubber catheter must be gently introduced on the side opposite the ulcer, and about four ounces of water thrown up and passed out to clean the surface of the sore. This should be followed by about two ounces of a solution of nitrate of silver (grs. ij.–℥ i.), and this application should be repeated at least three times in the twenty-four hours.

Phagedena in the chronic form must be treated by destructive cauterization, preferably with the Paquelin cautery, and every part of the ulcer must be completely destroyed. Subsequently anodynes may be freely used till the eschar separates and a healthy granulating surface remains. In the acute form of phagedena free incisions may be necessary in the fossæ and over the buttocks to let out pus and relieve tension, as well as the destructive cauterization of the sore.

Chancre.

True chancre at the anus is not very uncommon, though it often passes unnoticed from the slight annoyance caused by it. In men its presence is very positive proof of pederasty, there being no chance of accidental inoculation as in women. When, therefore, Péan and Malassez give the proportion of one chancre at the anus to every one hundred and seventy-seven in other parts of the body in men, they also give some idea of the amount of unnatural vice existing in Paris. The same observers give the proportion as one in thirteen in women. These sores are most likely to be mistaken for

simple abrasions, or, when between the radiating folds, for simple fissures. When typical in development they have the hard, raised outline and indurated base, but they are often mere erosions and strongly resemble the mucous patch. There is very little discharge, and what there is is not auto inoculable. They tend to spontaneous healing, but they may develop into mucous patches. Glandular enlargements in the groins should always be searched for, and in doubtful cases constitutional treatment may be delayed until the appearance of secondary symptoms.

True chancre within the rectum has seldom been observed, though how common it may be as a result of unnatural intercourse will never be known, so little local and constitutional disturbance does it cause. Ricord, Fournier, and Vidal de Cassis each report a single case, and these are about the only ones recorded. In that of the last-named the induration is said to have been so great as to cause stricture—a statement which must of necessity throw doubt upon the diagnosis. The difficulties attending the diagnosis of such a sore are manifest. Its mere appearance would scarce be conclusive, and the absence of any other sore which might be followed by general symptoms would need to be fully established, which in a woman is a very delicate thing to do.

Dr. F. Hartley has reported a typical and well-studied case of chancre within the rectum. Male, aged thirty-two, organist; admitted to Roosevelt Hospital September, 1890. No tubercular, renal, or cardiac history in family or self. Denies all previous venereal history. Had dysentery some years ago.

About three weeks before admission patient noticed severe pain on defecation, and a small lump just within the anus; pain now continues; tenesmus after each passage. Occasionally blood at stools. Has suffered from constipation a long time.

An ulcer is found just one inch from the anal margin; it is about the size of a quarter of a dollar; the base is indurated and the ulceration very superficial; sacral glands enlarged; no evidence of any other lesion.

Under ether the ulcer was cauterized with Paquelin cautery and dusted with iodoform, and the patient placed in the wards to await evidences of constitutional syphilis. Ten days later there was rose-

ola over chest and abdomen, and twenty days later still a papular syphilide of face, forearm, trunk, and portions of the extremities. The rectum was by this time healed, and the patient was put upon antisyphilitic treatment.

He subsequently confessed that three weeks before admission he was the victim of another man.

Secondary Syphilis.

The secondary manifestations of syphilis around the anal region are some of the syphilodermata, mucous patches, and condylomata.

Mucous patches are very frequent and assume two distinct forms, the ulcerative and the vegetating. The latter begins as a slightly raised red papule, which may, after a time, become a mere erosion or a distinct ulcer. They are generally multiple, and may be seated around the anus, within the radiating folds, looking exactly like simple fissures, or anywhere in the ano-perineal region.

They are easily confounded with either chancres, chancroids, or fissures, and the differential diagnosis may be extremely difficult, and only to be made by the history and the results of treatment. The points to be sought for are the raised edges and the grayish pellicle, which are not found in simple fissures.

Condylomata.

The surface of a mucous patch sometimes becomes elevated by an upward growth of branching papillæ, with production of connective tissue and dilatation of the blood-vessels. When this development has reached a considerable extent, a cauliflower appearance is the result, and what was at first a simple mucous patch may become a large, warty vegetation surrounded by other similar growths which have sprung up around the original lesion, and which are due to direct auto-inoculation.

These are known as vegetating mucous patches, vegetating condylomata, condylomata lata, syphilitic condylomata, etc.; and it is to them, to the exclusion of other warty growths of nonsyphilitic origin, and of tags of hypertrophied skin, that the name of condylomata should be limited.

The vegetating mucous patch is particularly common around the anus, and sometimes grows to a large size, nearly filling the inter-gluteal cleft. The secretion is in the highest degree infectious, and

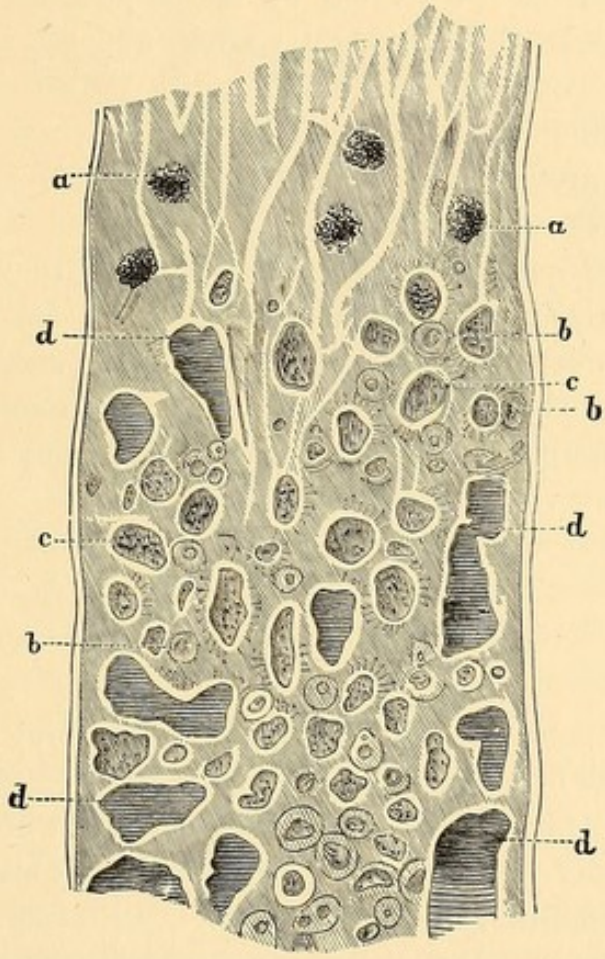


FIG. 140.

SYPHILITIC ULCERATION OF COLON.

a. Swollen follicles with gummy infiltration.
b. Commencing ulceration of follicle.
c. Ulcer showing subcutaneous connective tissue.
d. Ulcer exposing muscular layer.

is also auto-inoculable. The spreading of the growth, where it comes in contact with a moist surface, may be accounted for by direct auto-inoculation, and also by the general syphilitic infection, which, at this stage, is particularly apt to manifest itself in mucous patches at any point in the body which is both moist and irritated.

These growths are therefore found most developed in fat people of uncleanly habits in either sex.

The treatment is both general and local. Mercury is given for the syphilitic infection, of which these growths are the proof, and the sores themselves are treated by the application of calomel or iodoform in powder, by astringent washes, and the interposition of pieces of lint between the warts and healthy parts to avoid further local contamination.

Should the growths not yield rapidly to this treatment, they may be freely destroyed by acid.

One point of great interest in connection with these syphilitic condylomata is that they very closely resemble (so closely that to distinguish between them by gross appearances may be impossible) another variety of warty growth which is often seen in the same place, but has nothing to do with syphilis, and may be entirely independent of any venereal disease whatever.

The Mucous Patch.

Do mucous patches ever occur within the rectal pouch? From analogy with the fauces alone it would probably be safe to answer in the affirmative; but this is one of the points on which clinical evidence is especially to be desired. Mollière is the only observer with whom I am acquainted who has reported such a case. He describes a white, pearly, rounded plaque, in a subject evidently syphilitic, about one centimetre in diameter and five centimetres above the anus.

It is known that any ulcerative lesion, often of a very trifling nature originally, may in the rectum, under the influence of the irritation of the fæces, assume considerable proportions; and it has been assumed rather than proved that a mucous patch in the rectal pouch may in this way become the cause of destructive ulceration, subsequent cicatrization, and hence of stricture, so-called syphilitic. There is no clinical proof of this, as far as my reading goes, nor are we forced to accept any such theory, however probable and plausible it may be, to account for the strictures and ulcerations of the rectum which arise during the secondary stage of syphilis.

At this point we have to leave this question, with the others, for future accurate clinical observation, only observing that, as Mollière points out, at no other part of the body are mucous patches followed by retractile cicatrices.

Secondary Syphilitic Ulceration.

Of the existence of syphilitic ulceration of the rectal pouch occurring in the late secondary or early tertiary stage of the disease, there can be no more doubt than of the existence of the same condition in the fauces and trachea, where it is more easily discoverable and hence has been more often described. The ulcer is due to the deposit of syphilitic tubercle in the mucous membrane, which rapidly comes to the surface, disintegrates, and leaves a small, well-marked loss of substance, with clearly cut edges and yellowish, purulent base.

When these ulcers coalesce there is sometimes great destruction of tissue, and large cicatrices follow their healing. Their favorite seat is the lower part of the rectum, and when found in great numbers they will gradually decrease in frequency as the bowel is followed upward. (Fig. 139.)

This form of ulceration has been long recognized and has been thoroughly described, but better studied on the post-mortem table than in the consulting-room. It is, to my mind, entirely independent of any venereal lesion at the anus which may extend into the rectal pouch. It is syphilitic, and it belongs to a late stage of syphilis. It is, moreover, syphilitic ulceration of the rectum, and not of the anus, and it begins an inch or more above the external sphincter.

While thus freely admitting what others have described and what I have myself seen in a few cases—the existence of syphilitic ulceration of the rectum, I believe it to be a rare condition, one curable by constitutional treatment, and one which in no way accounts for the condition of hypertrophy of the surrounding tissues and stenosis so commonly described as "syphilitic stricture of the rectum." Both chancroids and secondary syphilitic ulcers *may* cause a stricture, but only in very rare cases, and the contraction is then purely cicatricial and not hypertrophic. (See Proctitis.)

Gummata.

The other tertiary manifestations of rectal syphilis are neoplastic in character. Circumscribed gummy deposits of greater or less extent have been quite frequently noted, and are scarcely as rare as would seem to be indicated by the statement of Fournier that he had never seen a case. Other observers have reported isolated cases.

The deposit may occupy any part of the circumference of the bowel, and in one of Taylor's cases was located in the recto-vaginal septum, and had ulcerated through, causing a fistula. The diagnosis of such a tumor, with its attendant ulceration, offers but few difficulties, and the treatment is both local and constitutional.

Ano-Rectal Syphiloma.

Instead of being circumscribed, this gummy deposit has been described as involving the whole circumference of the bowel, and extending from the sphincter as far as the upper limit of the rectal pouch. This is what Fournier has named ano-rectal syphiloma, and what he believes to be the explanation of the cases of so-called syphilitic stricture. For, although he recognizes that stricture may result from late secondary ulceration in the manner we have described, he believes that stricture from this cause is infrequent as compared with that produced by this diffuse deposit in the rectal wall.

As described by him, the disease commences as an infiltration of the rectal wall by this neoplasm. The deposit is entirely submucous, and occurs by preference in the rectal pouch, and always encircles the whole calibre. It may also involve the anus, and may take the form of anal tags and tumors described when speaking of condylomata.

At first it merely causes thickening and stiffening of the gut, so that it loses its dilatability, but there is no contraction and no ulceration until later. As the deposit increases in amount, the mucous membrane over it loses its vitality and becomes ulcerated, and the deposit itself finally degenerates into fibrous tissue, retracts, and causes stricture.

This description of the gross appearances and general character-

istics of the so-called syphilitic stricture will be recognized by all. Fournier was not describing any new affection, but simply, under a new name "ano-rectal syphiloma," endeavoring to give a complete history of the origin and development of the ordinary stricture as seen by every practitioner, and commonly attributed to syphilis for lack of positive knowledge as to its etiology, and his description in many points corresponds with clinical experience.

It must be admitted that in most of these cases of stricture there is more infiltration of the rectal wall, more occlusion of the canal by hard masses of tissue, more extensive disease, in other words, than can easily be accounted for by mere cicatricial contraction, but such a process as Fournier describes is unknown in any other part of the body, and equally unknown as any process characteristic of syphilis. Nor is it in any way amenable to anti-syphilitic treatment, the condition being simply a chronic hypertrophic proctitis, independent of syphilis.

CHAPTER XV.

NON-MALIGNANT STRICTURE OF THE RECTUM.

For convenience of reference the following table of the different varieties of stricture of the rectum has been prepared :

Congenital.	1. Complete. 2. Partial.
Acquired.	1. Pressure from without. 2. Spasm. 3. Dysenteric. 4. Inflammatory. 5. Traumatic. 6. Tubercular. 7. Venereal. From Chancroid. From Secondary and Tertiary Ulceration.

The congenital narrowing of the rectum, both complete and partial, which is sometimes seen, has been already described in speaking of the malformations of this part.

Stricture Due to Pressure from Without.

A tumor of any kind in the pelvis will not infrequently press upon the rectum so as to obstruct its calibre. An abscess in the pelvis in men may be accompanied by an amount of inflammatory deposit around the rectum sufficient to obstruct it ; and a pelvic inflammation in women may be accompanied by an exudation which, either by its size or in the form of bands across the bowel, shall partially close it. (See Fig. 45.)

I once did colostomy for stricture of the rectum with nu-

merous and large fecal and urinary fistulæ, due to old hip-joint disease and abscesses. Both rectum and urethra were tightly closed and almost entirely destroyed by chronic inflammation and abscesses in the surrounding tissues.

Spasmodic Stricture.

Much has been written in times past upon the question of spasmodic stricture of the rectum, but for a long time the condition was looked upon by the best authorities with great doubt, if not with absolute unbelief. Spasmodic contraction or stricture of the external sphincter is not an unusual condition, but spasmodic stricture of the canal above this point has always been a matter of belief and assertion rather than of demonstration.

I have already referred to the difficulty which often exists in passing a rectal bougie, from the natural confirmation of the parts. It is upon this difficulty that nearly all the arguments for, and the supposed cases of, spasmodic stricture rest. When the bougie cannot be passed a spasmodic or organic stricture is supposed to be the cause. When, after numerous trials, by a lucky manipulation an entrance is effected, the spasm has been overcome. To this may be reduced nearly all the reported cases of this affection which from time to time have appeared in the writings of those who have devoted attention to the subject.

Mollière, with his usual happy style, has gone very nearly to the bottom of this question.

He says that at a not very remote period there flourished by the side of Ashton, Curling, and the surgeons of St. Mark's Hospital, certain specialists as expert in finding strictures in the rectum as our laryngologists in discovering polypi in the larynx. These estimable practitioners gave themselves up to the daily exercise of dilatation by bougies, and to facilitate the practice one of them had invented a pair of pants of a special pattern, dressed in which novel livery his patients came daily to have a sound introduced into the anus.

This whole question of spasmodic stricture has been very ably discussed by Van Buren, and if the reader wishes to follow it further

he can scarcely do better than to consult that author. Uncomplicated spasmodic stricture of the rectum is a thing whose existence was for a long time not admitted by the best authorities, and which will seldom be found by a skilful examiner. It is, perhaps, too much to say that it never exists; but a well-marked case of it within easy reach of the finger, which can be plainly detected by an ordinary examination, and which disappears under chloroform, will seldom be seen.

Nevertheless, as my own chances of observation have increased I have come to have greater faith in the occasional existence of this condition as a surgical curiosity, agreeing in this with Ball, Cripps, and other later writers. The following is a case in point. The patient was a very nervous physician, worn out by suffering from rectal disease. His one chief symptom was pain in the rectum, caused by defecation and increased by the sitting posture, lasting often for many hours after a movement of the bowels. On touching the skin near the anus, in an attempt to draw the parts open for inspection, I found the pain was so intense as to cause him to cry out at the least touch. With much gentleness the finger was passed through the external sphincter, and met by a stricture at about an inch above—in other words, at the level of the internal sphincter or slightly above. A few days later he was etherized, and before giving the anæsthetic this condition was again verified both by myself and my associate. The ether was then given, and not till profound narcosis had been reached did the constriction disappear. The patient was found to be suffering from hemorrhoids and an ulcer the size of a silver half-dollar, but quite superficial, over the internal sphincter. The cure of these was followed by the relief of all symptoms.

This was certainly a case of purely spasmodic stricture, but too near the anus to prove the point under discussion—spasmodic stricture of the rectum proper; though if we may have spasmodic stricture of the unstriped muscular fibres of the internal sphincter, why may we not have the same an inch higher up?

Dysenteric.—Dysenteric ulceration with stricture has been already described under non-malignant ulceration. Stricture due to this cause is, perhaps, more often multiple than when due to any other.

Inflammatory or so-called Syphilitic Stricture.

Proctitis, when chronic and attended by sufficient changes in the structure of the coats of the rectum, will result in stricture; and so may any inflammation of the perirectal tissues.

It is to this cause that the large class of strictures which for many years have been classified as syphilitic is to be attributed. The impossibility of finding any venereal cause for this form of disease in a great many cases in private practice will be admitted by every observer, and a single case of so-called syphilitic stricture in which the existence of syphilis is manifestly impossible is a very hard clinical fact to overcome by theory. I have seen many such, and so have others, though the idea that a virtuous maiden lady of sixty or so, may have contracted syphilis without ever having been exposed or showing any evidence of the disease except an ulceration of the rectum following, perhaps, an operation for hemorrhoids, has been generally used to explain them. With this theory I have no sympathy. When this form of stricture occurs in a patient who has had syphilis, there may be some basis for supposing that it may be syphilitic, though I do not believe it to be so: when it occurs under circumstances which make the previous existence of syphilis an impossibility, both morally and clinically, some other etiology must be found.

Take, for example, such a case as the following.

A young lady of sixteen has typhoid fever with various complications. At one time the bowels become impacted and are dug out with the finger and a spoon by a nurse. Great pain is caused at the time and considerable bleeding. Never after that is the girl free from pain, and bloody discharge from the rectum. In a few months a fistula forms which breaks on the skin and also causes a free communication between rectum and vagina. An examination under ether shows advanced destructive ulceration of the rectum, tight stricture and a nearly imperforate hymen. A colostomy ends fatally from exhaustion and shock. Setting aside preconceived theories is it more logical to suppose that this stricture was caused by a rough attack upon the rectum with a spoon or by a lapse from virtue?

Traumatic Stricture.

A simple traumatism may result in stricture, either by causing ulceration and cicatrization or by exciting a chronic inflammation of the walls of the rectum. Amongst these traumatisms may be enumerated, applications of strong acids, the performance of some

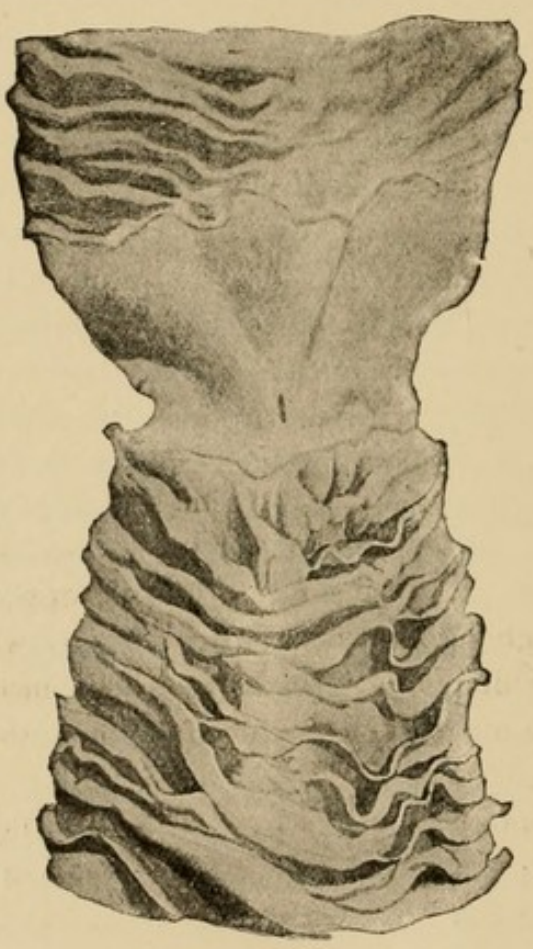


FIG. 141.

Stricture from Tubercular Ulceration.

surgical operations, foreign bodies, kicks and falls, and the injury produced by the head of the child at birth.

Tubercular Stricture.—There is no longer any doubt in my own mind that tubercular ulceration may result in sufficient narrowing of the canal to produce stricture. I have seen this occur too palpably to be mistaken.

Venereal Stricture.—The venereal sores capable of producing a stricture are the chancroid and the later syphilitic ulcers. We shall leave out of consideration the true chancre and the mucous patch, for the reason that their influence in the causation of stricture is still rather a matter of surmise than of proof, and the same thing may be said regarding gonorrhœa of the rectum.

For a description of these ulcerative venereal processes the reader may again refer to the last chapter.

Pathological Anatomy.

In studying the pathological anatomy of stricture there are several points to be observed, for changes will be found not only at the stricture itself, but both above and below it, and in the surrounding parts.

From what has been said already, it will be inferred that a stricture which is not the direct result of a deposit of new material in the rectal wall, as in cancer, will be composed either of cicatricial tissue, such as is found in other parts of the body, or else of hypertrophied connective tissue which is firm and dense and creaks under the knife on section. All the connective tissue in the rectum at the diseased point, whether submucous, subperitoneal, or intermuscular, will be found to have increased in quantity, and this accounts for the increased thickness of the rectal wall. The mucous membrane at the seat of stricture will generally be found destroyed, and replaced by granulation tissue on this fibrous base, which bleeds easily when scraped.

Above the constriction a process occurs which will be found to be almost constant. This begins by a dilatation of the bowel and an hypertrophy of the muscular layer, with, at first, a thickening of the mucous membrane. Later, the mucous membrane, due probably to the irritation of retained fæces, will show all the stages of ulceration, from simple congestion in some points to a complete destruction in others and an exposure of the muscular tissue beneath.

This ulcerative process may extend for several inches up the bowel. The wall of the bowel above the stricture may be as thin as paper in spots, and at such points perforation is apt to take

place. Fatal perforation from this cause has happened in my own practice a few hours after excision of a cancerous stricture. In a case reported by Goodhart, the changes of which we are speaking had gone on to actual gangrene, extending in spots along the transverse and descending colon, and were undoubtedly due to the intensity of the inflammatory action caused by the retained irritant matters. The bowel is also generally distended with gas and fæces, and the latter are more often fluid than solid, though fecal tumors, with their well-known characteristics, will sometimes be met.

The dilatation above the stricture may reach an enormous size, and may ultimately result in a *cul-de-sac* or pouch which will fill a large portion of the abdomen and dip down below the point of constriction, and an ulceration in this pouch may result in its perforation and the establishment of a fistulous outlet for the fæces. Such an opening may be into the rectum, either above or below the stricture, or into the pelvis, with the necessary result of abscess. An opening may also be made into the bladder in either sex, and in females into any part of the genital tract.

The cellular tissue in the ischio-rectal fossæ around a stricture may also become hard and lardaceous as a result of chronic inflammation ; and this change may extend to some distance from the original starting-point along the sacrum, as high as the promontory, and into the subperitoneal tissue of the iliac fossæ.

Abscess is always liable to occur in the neighborhood of the stricture, probably from lowered vitality in the parts, and this accounts for the relative frequency of fistulæ in this disease. These may be both numerous and extensive, and may make communications between the rectum and any of the adjacent organs.

Below the stricture the rectum may sometimes be found unchanged from its normal condition, but it will generally be ulcerated as it is above, or else there will be hemorrhoidal tumors, excoriations, and vegetations and tags of larger or smaller size. These growths are the result simply of irritation of the discharge from the process above.

Most strictures are located in the lower part of the rectum, and hence their presence is easily detected in the majority of cases. They are said to be far more frequent in females than in males, because

many of the causes which produce them operate chiefly in females, but my own statistics do not verify this idea. Age has little influence upon their frequency after the period of adult life.

A stricture may or may not involve the whole circumference of the bowel; and the contraction may be so slight as not to be apparent till the bowel is distended with the speculum, when a falciform band may spring out from one side. In more extensive disease there is still usually a passage for the fæces, but this may be very slight. The most extensive disease will be found to be due generally either to dysentery or chronic proctitis, and in such cases the calibre of the bowel may be lessened for a space of several inches.

Symptoms.

These may be grouped under two heads, those due to ulceration and those due to mechanical obstruction. In the great majority of cases the signs of mechanical obstruction will be preceded by those of the ulceration which has caused it. The symptoms of ulceration of the rectum are diagnostic and have already been described under that heading.

The one positive sign of a stricture is the obstruction, and this may show itself in several ways, generally at first by alternate attacks of constipation and diarrhœa. The constipation is mechanical, and is due to the accumulation of fæces above the constriction. The diarrhœa is secondary to the accumulation, which in time begins to act as a foreign body, setting up a catarrhal inflammation, as a result of which sufficient fluid is poured into the bowel to soften the hardened mass, and large quantities are discharged, only to be followed by a fresh accumulation.

It has often been asserted that a well-marked lessening of the rectal calibre must, in the nature of things, produce a change in the shape of the fæces; but this is not quite true. The flattened, tape-like stool is a sign of value when present, and should always lead to careful exploration; but it may not be present even in the worst cases of stricture, and it may exist without stricture, in the latter case being due to an irregular spasmodic action of the sphincters.

It is well known that, with the closest stricture high up, the

fæces may be reformed in the rectum below and be passed normal in size. At the bedside but little importance is to be attached to the statements of patients concerning this matter.

After a stricture has existed for a certain length of time, signs of obstruction may be manifest by abdominal palpation and inspection. The transverse and descending colon can be felt partially distended with masses of fæces, which will be dull on percussion, tender to the touch, somewhat movable, and pitting on firm pressure. After an attack of diarrhœa, or after a brisk purge, these accumulations may disappear, only to form again in a short time.

The condition of chronic obstruction with its attendant evils—dilatation of the bowel and intestinal catarrh above the obstruction, with ulceration and thinning of the intestinal wall—is thus insensibly established. One who sees many of these cases of chronic obstruction, and knows how dilated and weakened the bowel may become above the stricture, will be very cautious in the use of cathartics in this condition.

Acute obstruction may at any time be added to the chronic condition; but acute and complete obstruction are comparatively rare in stricture of the rectum; and acute obstruction as the first symptom of the disease, without the previous history of ulceration, is rarer still. In my own experience I have seen acute complete obstruction supervene upon the chronic condition in but few cases, two ending fatally in rupture of the colon, and the others relieved by operation.

Acute obstruction as the first and only symptom of stricture I have seen but once—a case of cancer between the promontory of the sacrum and rectum, occluding the latter by direct pressure. In one other case acute obstruction ended fatally before there were sufficient symptoms of rectal disease to enable us to make a diagnosis; the patient, a physician, complaining only of pain in the left iliac fossa, and of occasional passages of blood with the fæces. The autopsy revealed an annular cancerous stricture in the sigmoid flexure.

Generally complete obstruction does not occur without ample warning. It is more apt to appear suddenly where the stricture is high up in the rectum or at the junction with the sigmoid flexure.

It comes on with the usual signs of acute intestinal strangulation—pain, swelling of the abdomen, bloody passages, etc.—and it may

be caused by some indigestible substance which has been swallowed and refuses to pass the stricture, or merely by hardened fæces or prolapse of the bowel above into the constriction.

There is one important element in the obstruction due to stricture which must not be forgotten. It will sometimes happen that fatal obstruction will occur even when, on *post-mortem* examination, the calibre of the stricture is found to be large enough to permit the passage of the finger, showing that the obstruction could not have been due merely to the contraction of the new growth.

The explanation of the condition is not difficult. Stricture high up in the rectum is much more dangerous and liable to cause sudden and complete obstruction than when low down, on account of the greater mobility of the gut. Thus we constantly see patients going for years with stricture in the lower three inches of the gut, the calibre of which is so small as to cause constant wonder at the escape of any solid fæces; while, on the other hand, we occasionally meet with sudden death from obstruction in stricture higher up, where the amount of contraction does not seem sufficient to cause such result.

The fact is that a very small outlet will answer the purpose when the orifice is fixed, and the whole muscular power exerted in straining can be brought upon this fixed point. When, on the other hand, the outlet is not fixed by surrounding tissues, the gut bends on itself, the outlet is no longer in the axis of the force used, and the more the force the greater the obstruction due to flexure of the canal.

Stricture of the rectum, whether cancerous or benign, left to its own course, ends fatally, either by obstruction or by exhausting the sufferer's powers. After a few years these patients sink into a miserable condition, worn out by constant rectal tenesmus, by chronic intestinal obstruction, and by degeneration of the kidneys.

Diagnosis.

The first means of diagnosis in stricture is the examination with the finger; and, as the majority of strictures are confined to the lower portion of the rectum, this is in itself often sufficient. It is the best and safest and least painful of all the means of diagnosis when

properly executed, and yet it may be the immediate cause of death to the patient when roughly practised.

There is an inborn tendency on the part of many, when the index finger comes in contact with a tight stricture, to bore through the narrow passage which is left and feel what is on the other side—a tendency to be struggled against and overcome. If the surgeon has deliberately determined to practise divulsion, this is one way to do it ; but at present we are speaking of diagnosis, and forcible dilatation is not diagnosis, but a very grave surgical procedure.

The finger should therefore be passed slowly up to the stricture, and, unless the calibre admits of it without straining, it should not be passed farther. The condition of the parts below may also be appreciated, the amount of induration estimated, and a general idea formed of the nature and extent of the disease. In women the vaginal touch will generally be found of the greatest value and should never be omitted.

As a rule, all can be learned in this way that can be learned in any other where the disease is within reach of the finger, and nothing is to be gained by a painful speculum examination or the use of the bougie—means of diagnosis which, however valuable where the stricture cannot be felt by the finger, are of little use for the lower four inches of the rectum.

When a stricture is situated high up in the rectum or in the sigmoid flexure, the confidence in diagnosis which comes from actual contact of the finger with the disease is entirely lost, and there is perhaps nothing in the whole range of surgical diagnosis which requires more skill than the detection of stricture in this part, and nothing attended with more uncertainty.

A stricture in the locality in question must be examined for with the greatest care and gentleness, and the examination will often be negative in its results. The attempt to decide the question by the use of bougies is not always satisfactory and by no means free from danger. It is unsatisfactory to the general practitioner, because an obstruction will generally be encountered in trying to pass an instrument of any considerable size through this part of the bowel, and the passage of an instrument of small size, which is much easier, proves nothing. It is dangerous because a diseased bowel may easily be

ruptured with what may seem to the operator to be no more force than is justified in attempting to overcome the natural obstructions in this part of the passage.

If a hollow, soft rubber bougie is used for exploration, the opening at the lower end should be of a size to admit the small tube of a Davidson syringe, which should be fitted to it before the attempt to pass it is begun. Then, with a basin of warm water close at hand, the bougie may be introduced, and at the first obstruction the bowel should be filled with water until it is moderately distended. In this way the folds of mucous membrane are drawn out of the way by the distention of the whole bowel, and one great obstacle is eliminated. The next is the promontory of the sacrum, which is much more easily passed by a soft than by a stiff instrument. Without these precautions, and sometimes with them, the inexperienced examiner will find a stricture in the rectum of nineteen persons out of twenty, no matter how healthy they may be; and for this reason it is seldom safe to rest the diagnosis of stricture on the fact that a bougie cannot be made to pass. Moreover, a bougie of good size will often pass a stricture small enough to produce great trouble.

The sound made by Dr. Andrews, and described in the chapter on Exploration, is of greater value than the flexible rubber instrument, though more dangerous in unskilled hands. For my own part, if I could pass no bougie at all after proper trials, and if, under ether, I still failed to effect the passage of an instrument, I should not hesitate to make a positive diagnosis of a very tight stricture. Also, if a medium-sized bougie, say No. 7, passed easily, but a No. 8 could not be passed, and the symptoms pointed to old ulceration of the intestine, I should diagnosticate a contraction, but I should not do so till after several careful trials with the instruments.

It is in just these cases that high exploration of the rectum with reflected light and a long cylindrical speculum may be of great benefit. There is danger in its use, however, for a fatal laceration may as easily be caused by pushing against a stricture as by forcing a way through it.

Should the symptoms justify it, an exploratory laparotomy is always in order, and should be made as for left inguinal colostomy,

in order that an artificial anus may be established at the same time, should a stricture be discovered.

After the presence of stricture has been decided upon, the determination of its character may also be a matter of great difficulty.

As a first step in the differential diagnosis between malignant and non-malignant stricture, the length of time the disease has existed is of great practical help. Cancer of the rectum generally runs its course in two or three years. When, therefore, a patient says stricture and ulceration have existed ten, fifteen, or twenty years, a great point has been gained. When, on the other hand, a middle-aged patient says that the symptoms date back only a few months, and an examination reveals masses of hard tissue occluding the bowel, with more or less destructive ulceration, the disease can hardly be other than malignant.

By careful attention to the history alone, the nature of the affection can thus very often be determined.

In other cases digital examination alone is sufficient for the differential diagnosis. Generally cancer in the rectum presents itself to the sight and touch as a mass of stony hardness, nodular, irregular, and without pedicle ; growing in the substance of the rectal wall and involving all adjacent tissue ; with no tendency to isolate itself and hang free in the cavity of the gut. More rarely it is seen in the form of a deep ulceration with hard floor and raised hard edges—an ulceration so pronounced and so destructive as to leave no room for doubt as to its nature. Again it not infrequently presents itself as a bleeding, fungous mass involving the whole substance of the rectal wall, filling and occluding the gut, and perhaps extruding at each act of defecation.

In either of these three clinical forms the gross characteristics are diagnostic, and with experience it is not generally difficult to decide between malignant and non-malignant disease. The cases most doubtful are those where the rectum is occluded by dense masses of fibrous tissue. In these the amount of disease may be as great as, or greater than, in cancerous infiltration, and the hardness to the touch may be the same ; but the history of the case and the length of time it has existed will generally solve the question.

Enlarged glands in the groin or hollow of the sacrum are of great

value when found, and we always have the microscope to appeal to in case of doubt.

I would not, however, give the impression that this diagnosis between benign and malignant disease can always be made absolutely, either by the history or by digital examination, for such is not my experience, and I am occasionally very glad to secure a piece of the growth for microscopic examination before committing myself to a positive diagnosis.

The odor of cancer I have never been able to distinguish as anything diagnostic, and I confess to a feeling of relief when in Cripps's monograph on this subject I find that he also appreciates that in some cases the diagnosis may be difficult.

Greater difficulty may be found in the differential diagnosis of the different forms of non-malignant stricture from each other than in deciding the first great question of cancer.

Dysenteric contraction is known by the history and often by the extensive character of the fibrous induration. Tubercular disease may first be suspected from the patient's general condition, from the coexistence of lung trouble, or the family history ; and the diagnosis may then be confirmed under the microscope.

In congenital stricture in adult life the existence of a knife-edge constriction without ulceration or induration is diagnostic. Strictures resulting from slight traumatism, such as operations for hemorrhoids, may be recognized by the absence of any other exciting cause, as syphilis, and by the history of long-continued ulceration.

Treatment.

The treatment of stricture of the rectum is chiefly surgical. If a man still believes that all strictures not cancerous are syphilitics, he must use antisyphilitic treatment, and in most cases he will find it will have no effect upon the local condition.

It is well to exercise caution in this matter, however, for the general condition of these patients is never up to the normal, and a severe course of constitutional treatment may be productive of harm.

There are various means by which the comfort of these sufferers may be greatly increased without recourse to operative treatment;

and since in many cases the surgeon is limited to these means in his efforts to afford relief, it is well that they should receive careful attention. The most effectual of them will be found to be a careful regulation of the diet, the administration of laxatives on occasion, and rest. The diet should consist mostly of fluids, preferably milk. If milk is complained of, or causes large, solid passages, soups may be substituted. A certain amount of farinaceous food may also be allowed, such as toast and crackers ; but milk is the basis of the diet, and the other things are only intended to make that diet endurable. Many patients will assert from the outset that they cannot take milk, and this will occasionally be found true, but nearly all can take it, and considerable quantities of it daily for an indefinite period, if a little care is exercised in its administration.

The bowels should move daily without straining. Should any medication be necessary to secure this daily evacuation, a mild laxative will be found all-sufficient. The mineral waters or Rochelle salts answer every purpose. One of the most grateful ways to these sufferers of moving the bowels is to administer an enema of warm water through a long tube which will reach above the stricture.

Purgatives are always contra-indicated in stricture of any variety, because they cause straining and tenesmus, increase the tendency to congestion and its consequences, and because where obstruction actually exists or is threatened they may do great harm by exciting violently peristaltic action in an already weakened and ulcerated bowel. The opposite condition of diarrhœa is more difficult to meet, and often cannot be controlled by direct medical treatment, depending, as it does, on the ulceration associated with the stricture. It is best met by diet, rest in the recumbent posture, and bismuth with morphine.

The general strength of these patients is to be supported in every possible way, and in all of them where it can be borne cod-liver oil will be found to answer a good purpose.

When obstruction actually exists, operation is of course indicated, but much may be done in the way of general treatment before resorting to operation. Food by the mouth should be given, if possible, and opium in large doses to allay the violent peristalsis. In more than one case of complete obstruction I have secured an action

of the bowels after producing complete opium narcosis. No purgatives should be given. Tapping the distended coils of gut with a fine aspirator needle has also saved life in my own practice, but these things are only to be thought of when a laparotomy cannot for any reason be performed.

The surgical means at our command for the treatment of this affection are: *Dilatation*, *incision*, *excision*, *colostomy*.

Dilatation.

This, either alone or in connection with incision, is one of the most reliable agents for the treatment of stricture. By dilatation I mean gradual stretching, not forcible divulsion. The latter is a justifiable procedure; one which under certain conditions may accomplish great good, but one seldom applicable.

Whether dilatation be practised as an independent method of treatment or as a supplement to division, it should always be practised in one way. Nothing is productive of more evil than forcing a bougie through a stricture when the instrument is too large to be passed without pain and violence, and no good is ever accomplished in this way.

A bougie that is large enough to cause pain by stretching is always too large to do anything but harm.

The instrument best adapted for this purpose is the soft-rubber one. A size should be selected which will pass through the stricture without force and which may be left in place several hours without causing uneasiness. In this way absorption of the stricture tissue may be caused, and great benefit may result. It is a well-known fact that if the smallest filiform bougie be passed through a stricture of the urethra and allowed to remain for a day or two, a much larger size can then be substituted for it; and the same is true of the rectum. Any instrument the introduction of which causes pain will soon cause so much irritation as to render its use impossible; while with gentleness and time most non-malignant-strictures may be greatly benefited.

When the disease is so high up that the long bougie is necessary, its introduction should never be left either to patient or nurse; for even with the soft-rubber one mentioned great harm may be done. In

cases where the disease is nearer the anus I have had these same instruments made five inches long instead of twelve, and these may safely be entrusted to the patient. They are numbered in sizes from one to twelve.

The treatment by gentle dilatation will accomplish most in cases of limited severity and as a supplement to the treatment by incision. Most of the old fibrous strictures are too extensive to be relieved in this way, and in malignant disease it does harm.

Incision.

The treatment of stricture by linear proctotomy was introduced by the French surgeons, and, judged by their first enthusiastic reports, it seemed that by it alone a radical cure could be effected. Subsequent experience has convinced me that such is not the case, and that, like the analogous operation of external urethrotomy, it must be followed by dilatation to preserve the channel opened up by the knife. As a means of saving time, and of gaining a wider passage than can be hoped for from the bougie alone, it is of great value.

Two operations are spoken of—internal and external posterior linear proctotomy. The internal consists simply of a division of the stricture tissue alone by an incision in the median line behind, the cut being deep enough to completely divide all of the fibrous tissues. The external operation does this and more, inasmuch as it divides not only the stricture, but also all of the tissue between it and the anus, with the sphincters, and thus allows drainage and avoids one of the great dangers of septic periproctitis.

The originators of this operation employed either the Paquelin cautery knife or the chain écraseur for the incision, both of them being bloodless; and in my own first cases I used the cautery. But the bleeding with the external operation is not a matter to be feared, being easily controlled by packing the incision; and I now use a straight, blunt-pointed bistoury, passed into the bowel and through the stricture on the left index finger as a guide.

Care should be taken to have the incision reach well above and well through all the stricture tissue, and to be as nearly as possible in the median line behind.

The danger of subsequent incontinence from this incision, if the sphincters are in good condition when it is made, is not very great; but the wound at the anus generally takes many weeks to heal, and this is a great objection to it. There are two ways of avoiding this. One is to confine the incision to the stricture, leaving the anus intact, and to drain this incision by a tube brought out through the skin at the tip of the coccyx. This I have tried in several cases, with the result of saving much time. The tube should be left in till all danger of periproctitis has passed. If there be no rise of temperature by the fourth day it may be safely removed, and the wound caused by it will generally heal promptly.

Another method I have sometimes used is to divide the sphincters and then employ three or four deep provisional wire sutures between the anus and the stricture, leaving them loose and stuffing the incision with charpie. When all danger is past and granulation is well under way, the opposing surfaces are scraped and the sutures tightened. This may be done at about the end of the first week, and, as more or less firm union is pretty sure to result, considerable time is saved.

The one great danger of this operation is septic periproctitis, and, though, with proper precautions as to antisepsis and drainage this may be greatly lessened, it can never be entirely eliminated. The danger of primary hemorrhage is not great. No large vessels are cut, and all bleeding is within easy reach. Secondary hemorrhage I have seen once in a case of very extensive cancer divided with the cautery.

The after-treatment consists only in the use of the bougie, commenced as soon as the incision has begun to fairly close up—that is to say, after three or four weeks—and followed steadily and gently, as already indicated. The bougie should be used for three or four hours each day, or, as is my favorite practice, introduced when the patient goes to bed and left in all night.

In the great majority of cases the short instrument will reach above the disease, and after one or two trials its use may be left to the patient. If pain is complained of it is a sure indication that the instrument is too large and is doing harm.

My own experience with this method has been considerable, and

neither theoretically nor from experience can I recommend it in malignant disease. The danger of it is certainly greater than that of a colostomy, and nothing more than temporary slight benefit can be hoped for, as, in the nature of the case, subsequent dilatation can do little good.

While proctotomy must always be unsatisfactory in malignant disease, exactly the opposite has been the case in benign strictures, and here I have never had occasion to regret its performance. For all cases of non-malignant stricture which are not so far beyond the reach of local treatment that either excision or colostomy is indicated from the first, this plan of treatment will be found to give the best results and the nearest possible approach to a cure.

I have recently performed colostomy on a patient for whom I did proctotomy nine years ago, and who for five years after the operation was in a greatly improved condition, though at that time most men, I think, would have considered her beyond hope of relief from anything except a colostomy, so grievous was her condition. She, however, gained health and strength, and was able to keep the stricture well under control till about two years ago, when a large pelvic abscess formed on the left side, nearly occluding the gut above the original stricture, and discharging large quantities of pus into the rectum. For this second condition, together with the old stricture, I did the colostomy, as the combination was rapidly exhausting her.

Other cases I have now under observation in which the patients have been so greatly improved that they consider themselves entirely cured—cases in which all straining, tenesmus, and purulent discharge have ceased, and in which the patients have one natural, painless passage daily, but these have been cases of not too extensive destruction which have come under treatment comparatively early.

Excision and Colostomy.

In the severe cases of non-malignant stricture, and ulceration, with or without stricture, we are forced either to excision or colostomy. Excision is certainly the ideal method of treatment, as by it we cure our patient, but generally at the expense of subsequent incontinence. Still it is to be remembered that these patients seldom have any real

sphincteric power by the time the disease has advanced to a point to make excision necessary, and that when the discharge and consequent running to the closet have been cured by the operation they are generally fully as comfortable in this regard as before the operation. In choosing between excision and colostomy we have to choose between a comparatively severe and difficult operation, and one of slight risk, but which leaves a disgusting deformity. The patient and surgeon must work out the answer for themselves in each case. Personally I am doing many more extirpations than colostomies for non-malignant disease, and the patients are much better satisfied with an anus, even though it be an imperfect one, in the perineum than in the abdomen.

Were the technique of excision only sufficiently perfect to insure subsequent control of the evacuations it would be the preferable procedure in a large majority of cases.

Intestinal Anastomosis Around Stricture.

The following method of treating stricture by intestinal anastomosis, devised by Bacon, seems worthy of further trial. It consists in forming a new channel around the stricture by folding the gut immediately above the constricted portion of the bowel down over

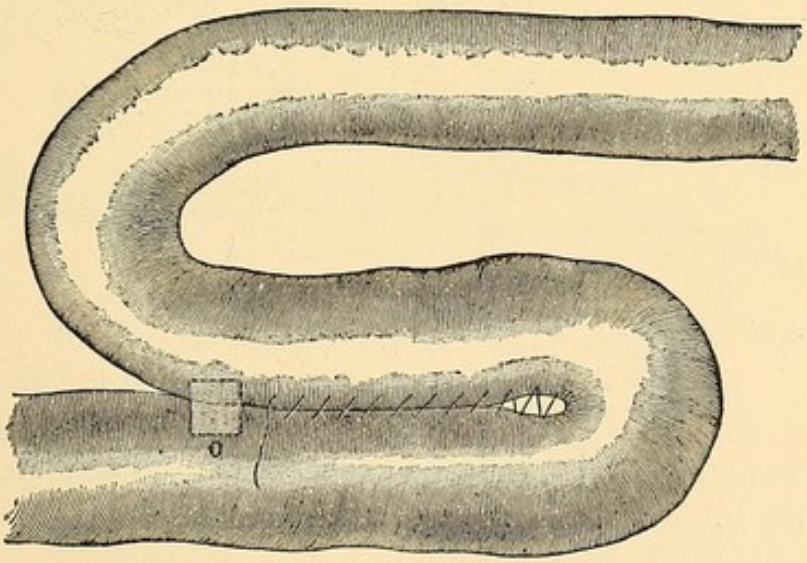


FIG. 142.
Anastomosis around Stricture.

the stricture and anastomosing it with the rectum just below the narrowed part of the gut, then at a subsequent operation clamping away the septum that has been formed by the union of the approximated surfaces of the folded piece of gut with the rectal wall. (Fig. 142.)

By this means the cicatricial stricture-band may be completely severed and kept from reforming, because the healthy gut utilized in building a new channel around the stricture acts as a connecting-link between the two ends of the stricture-band that is severed by the clamp. The irritation is removed and the cicatricial mass is gradually absorbed.

The anastomosing of the bowel above the stricture with the bowel below would in no case be of more than a temporary benefit, because the extensive amount of fibrinous connective tissue in the rectal wall would soon contract and cause fecal impaction.

The clamping away of the newly formed septum (Fig. 143, *A* to *B*) is the most important part of the operation, for by this means the new channel is added to the calibre of the rectum (*E* to *D*, Fig. 143), and all fecal obstruction is removed.

As most rectal strictures involve the levator ani, the anastomo-

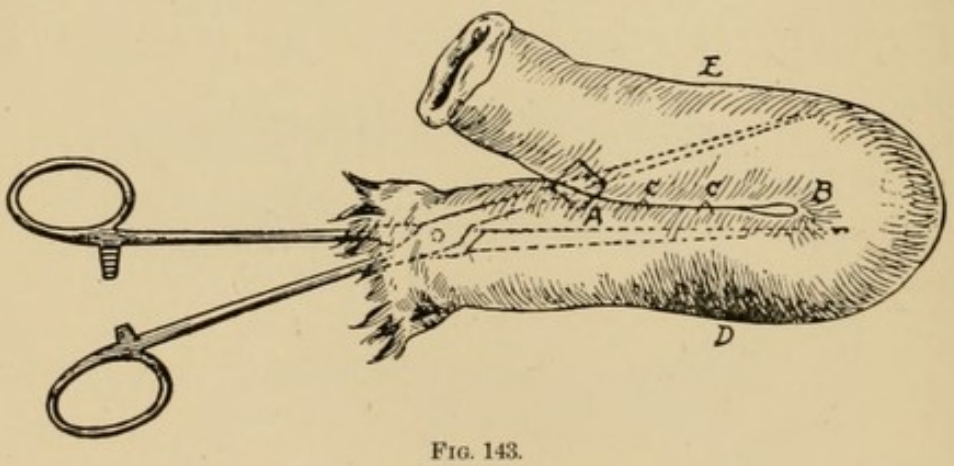


FIG. 143.
Clamping away Stricture.

sis could not be made by any device requiring sutures, and is only possible by the use of the Murphy button.

The operation is performed as follows:

After complete anæsthesia the patient is placed in the extreme

Trendelenburg posture, and a laparotomy is made in the median line from the pubis to the umbilicus. This incision will enable the operator to see the rectum and measure the extent of the contrac-

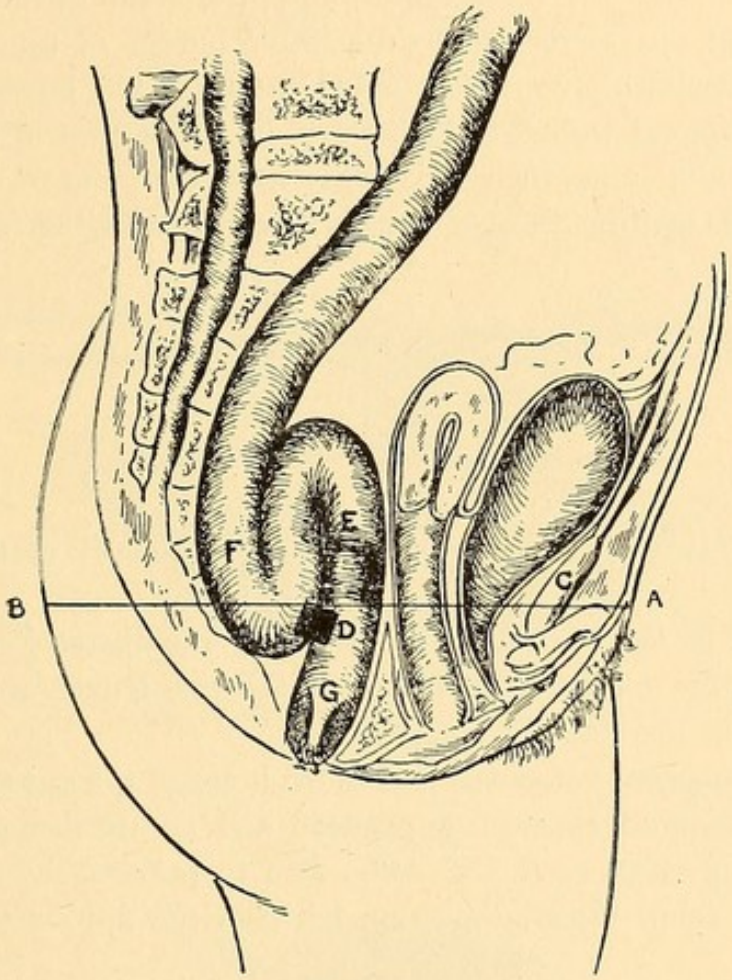


FIG. 144.

Anastomosis around Stricture of Rectum.

Line *A* to *B* represents the lower limit of the levator ani.
D, the anastomosis buttons in position after sacral section.

tion, and to decide how much of the sigmoid he must use to fold over the stricture and anastomose below.

Having determined the amount, the sigmoid is drawn well up into the abdominal wound, and an assistant places a small Murphy clamp above and below that point of the gut selected for the anastomosis button. An incision is now made into the gut and the male half of the button firmly secured in position in the usual way.

The next step in the operation is to place the female half of the button in position just below the stricture, and is done as follows: An assistant takes the instrument (Fig. 145), places the female half of the button over the trocar-point, and inserts the button through the anus and up the rectum to the lower border of the stricture; keeping the point of the trocar guided anteriorly, he presses against the anterior rectal wall. The operator, by feeling down the pelvis through the abdominal incision, readily finds the point of the trocar, and by pressing directly over it with a pair of dressing forceps, the



FIG. 145.

Trocar for introducing Murphy's Button.

trocar perforates the rectal wall and carries the neck of the button with it.

This half of the button is now seized by the operator's left hand and, taking the male half in his right, the two halves are approximated and the anastomosis completed.

Sutures are now put in the peritoneal layer of the gut at *CC* (Fig. 143), so as to hold them in apposition and secure firm union and form the septum (*A* to *B*, Fig. 143); also to prevent the possibility of a loop of small intestine getting between the approximated surfaces.

The button will be expelled in time, and then an enema may be given to thoroughly empty the colon and rectum.

A clamp is now inserted through the anus, one blade of which is introduced through the button-hole (*A*, Fig. 143), and the other blade through the stricture-opening (*D*, Fig. 143), and firmly clamped upon the septum (*A* to *B*, Fig. 143). Each succeeding day the handles of the clamp are pressed together one or two notches until the septum is completely severed, usually by the third day. The calibre of the rectum will now be increased by the addition of the extra channel as represented (*E* to *D*, Fig. 143).

In cases where the rectal stricture extends down almost to the internal sphincter, the operation may be done by the sacral method.

Where the sigmoid mesentery is normal in length, strictures of the sigmoid may be treated by the same operation as for stricture of the rectum.

Stricture of the Anus.

In stricture involving the anus only and extending not more than an inch into the rectum the following operation may be performed.

The anus is divided in the median line front and back, Fig. 146.

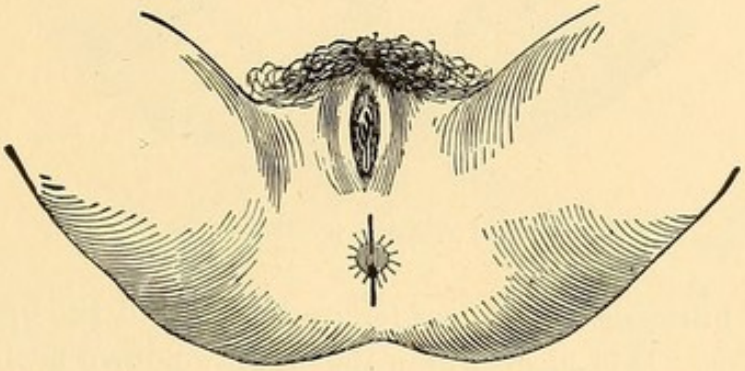


FIG. 146.

First Step in Operation for Stricture at Anus.

The mucous membrane is dissected up in front and behind until it can be drawn into the outer angles of the skin incisions, Fig. 147.

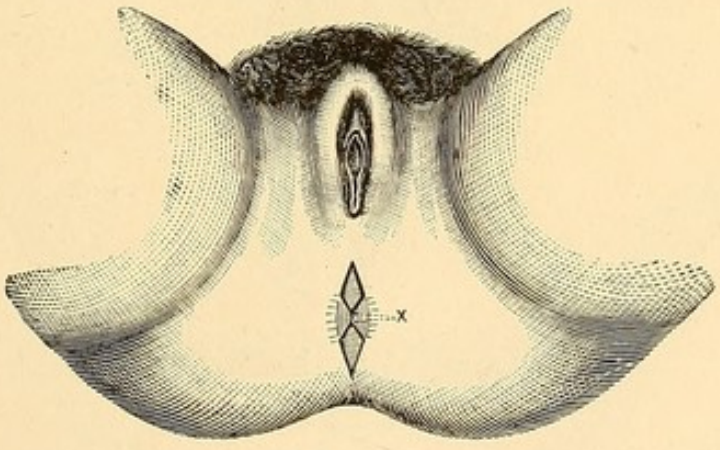


FIG. 147.

Second Step in Operation for Stricture at Anus.

The mucous membrane is then sutured to the free edges of the skin incision with the result shown in Fig. 148.

This operation is particularly adapted to strictures of slight extent, due to contraction of the skin of the anus—such as might be

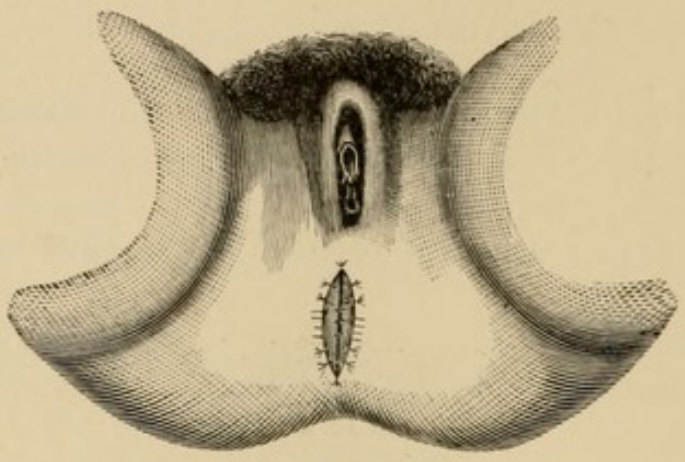


FIG. 148.

Completion of Operation for Stricture at Anus.

caused by burns or by too free removal of skin in the operations for hemorrhoids. It is successful in that it draws down healthy mucous membrane to take the place of cicatricial tissue.

In another class of cases the injury to the lower part of the rec-

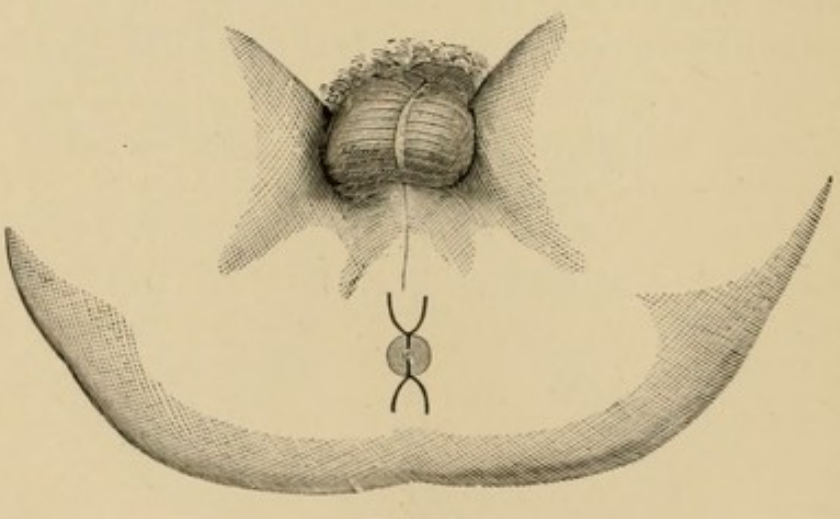


FIG. 149.

First Step in Operation for Stricture at Anal Mucous Membrane.

tum may have been so extensive that to dissect up and draw down sufficient mucous membrane to transplant into the anus would be attended by danger. These are cases in which more or less extensive

periproctitis has resulted in contraction. In them the skin around the anus must be drawn into the orifice to supplement the mucous membrane, instead of *vice versâ*, and for this Dieffenbach has recommended the following operation:

An incision is made front and back, as in the former case, but extending only as far outward as the margin of the anus, and this is joined by a semilunar incision anteriorly and posteriorly, as shown in Fig. 149.

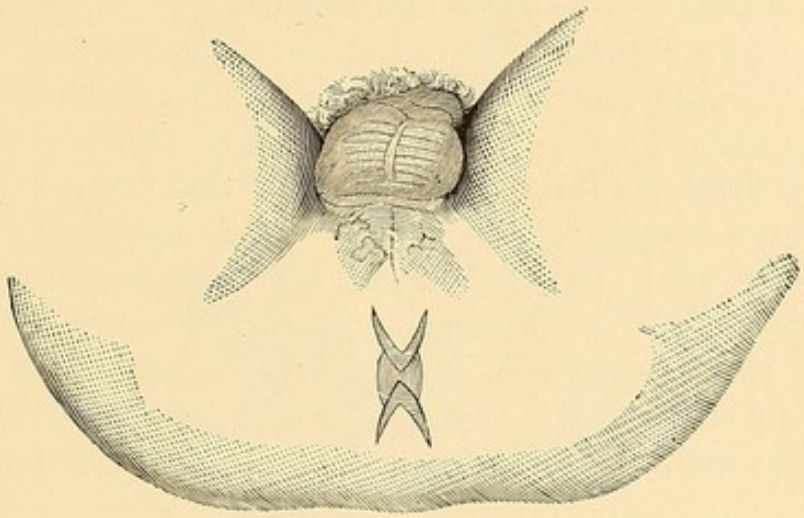


FIG. 150.

Second Step in Operation for Stricture at Anal Mucous Membrane.

The flaps of skin included in the semilunar incisions are next carefully dissected up from the cellular tissue, as shown in Fig. 150, drawn into the anal incision, and sutured, as in Fig. 151.

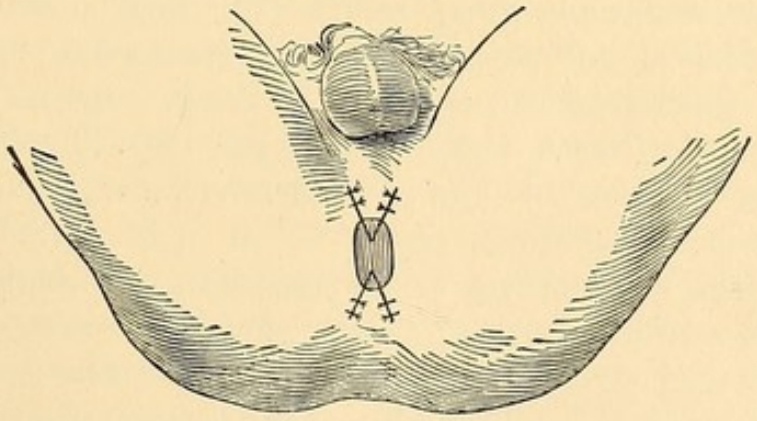


FIG. 151.

Third Step in Operation for Stricture at Anal Mucous Membrane.

CHAPTER XVI.

CANCER.

In a general way it is undoubtedly true that new growths in the rectum, when benign, increase slowly, tend to grow away from the wall of the bowel, to form pedicles for themselves and to project into the calibre of the canal, to remain movable, and not to involve surrounding parts; while with cancerous formations the tendency is just the opposite. In this way the diagnosis between a benign polyp and a cancerous infiltration of the wall of the rectum is generally easy.

But there is a class of tumors which occupies the border-line between the benign and the malignant, in which the diagnosis, either clinically or with the microscope, may be difficult and even impossible. In fact, recent careful study of these rectal tumors goes far to break down the lines between the varieties which are usually drawn; and Cripps, who has done such careful and valuable work in this department, is inclined to group nearly all of them under the single head of adenoma, holding that all are primarily affections of the glandular element. The true nature of the growths may perhaps best be gleaned from a comparison of Fig. 152 with Fig. 119, the latter being a benign polypus, and the former a malignant growth, but both being adenomata.

According to Cripps, the names malignant, semi-malignant, and simple adenoid will cover both the benign and cancerous growths of this part of the body, except possibly the form of colloid. Generally, but not always, it is possible to distinguish between them both clinically and microscopically.

After speaking of the innocent growth, which is soft, has a fairly

marked pedicle, and projects into the cavity of the bowel, he says: "In the more malignant varieties, the new growth frequently spreads as a thin layer between the muscular and mucous coats. In this form it often occupies several square inches of the bowel, while its thickness does not exceed a quarter of an inch. At first the mucous membrane lies intact over such a layer, but eventually it gives way by ulceration. This ulceration sometimes begins at more than one point, so that the mucous membrane becomes honeycombed, and portions of the subjacent growth may even sprout through it.

"The destructive process not only destroys the mucous membrane over the surface of the growth, but after awhile the new growth is

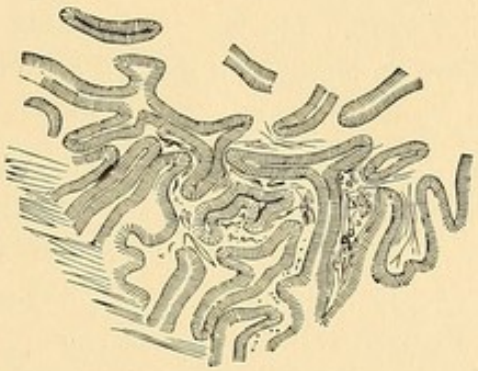


FIG. 152.

Cancer of Rectum.

itself destroyed by ulceration. While destruction is proceeding toward the centre, the growth is advancing toward the circumference.

"In this way a crater-like mass of disease is produced, the centre of which consists of dense fibrous tissue belonging to the muscular coat of the bowel, which appears for long to resist the ulcerative process. The margin of the crater consists of the mucous membrane of the bowel, heaped up by the extending growth beneath it, tucking it over in such a manner as to overlap the healthy membrane. The border is at times so irregular as to represent a series of nodules rather than a continuous line."

Stimson has also made a careful study of these growths. He says: "If it is admitted that cancer of the rectum is essentially a glandular or epithelial affection, one having its origin in the mucous

membrane, the borders of the growth, as being the freshest, most recent portions, must be examined, as in carcinoma of other organs, for evidences of primary changes and mode of development.

"These changes consist of hypertrophy of the mucosa by hypertrophy and hyperplasia of its epithelial elements, together with an abundant development of embryonal connective tissue between the tubules. They are the same as those found in a variety of neoplasm of recognized benign character known as polyp of the rectum, or polypoid adenoma. The formation of a pedunculated growth with a tendency to isolation in the one case, and of a flat growth with a tendency to spread laterally and into the underlying tissue in the other, may be explained partly by mechanical causes and partly by the degree of intensity of the changes in the submucous connective tissue.

"If the primary change occupies a limited area upon a natural fold of the mucous membrane, and if the muscularis mucosæ remains unbroken until the young embryonal cells produced below it, in consequence of the neighboring irritation, have had time to develop into adult fibrous tissue, the natural retraction of this new tissue narrows the base of the fold, giving it at once a polypoid form and opposing by its greater density a stronger barrier to the extension of the epithelial formation in this direction.

"The pedicle once formed, the neoplasm increases in the direction open to it, that is, into the lumen of the canal in all its diameters, and the dragging to which it is subjected by the constantly recurring passage of the fæces lengthens its pedicle and tends toward its final separation.

"On the other hand, if a broader area is occupied by the primary change, or if the processes are more intense and rapid, the pedunculation is absent or less perfect, and the epithelial growths of the mucosa break through immediately, or after an interval spent in overcoming the greater resistance offered by the partial pedunculation into the submucous tissue. Once established in that region, the spread of the disease is easy, and its ultimate generalization a question only of time.

"The second and final barrier to generalization is presented by the muscular coat of the intestine, but it is a barrier in which are many gaps, large ones along the lines of the vessels, and innumer-

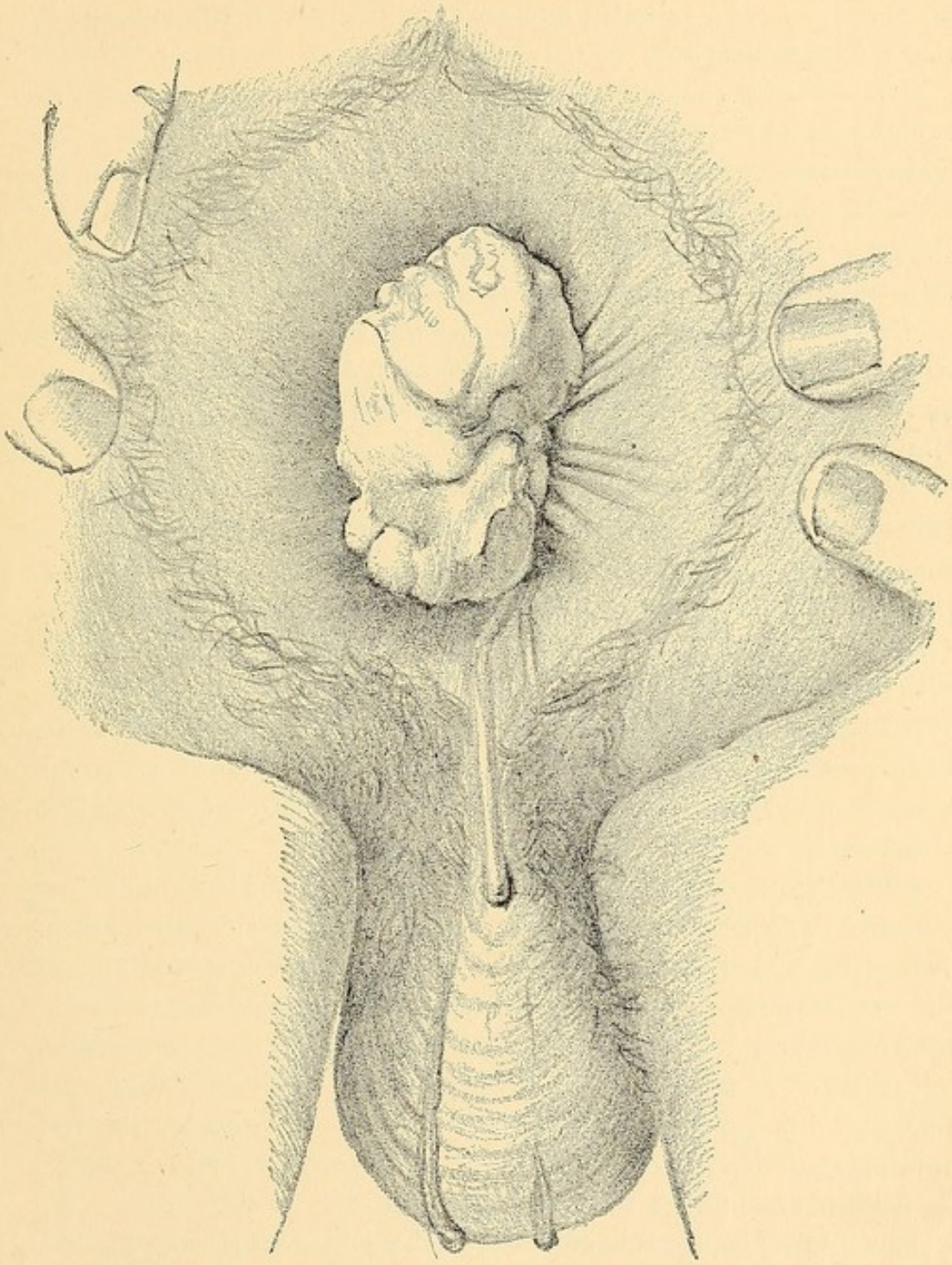


FIG. 153.

Cancer.

able small ones in the fine meshes of connective tissue which separate the muscular bundles and are continuous with the submucous tissue on one side and the pararectal tissue on the other.

"Here, too, the intensity of the process materially affects the rapidity of its extension; for if the proliferating connective tissue, which is most easily implicated while it is in the formative stage, is allowed time to reach its full development, to become fibrous, it forms, as it were, a second line of defence capable of offering a certain resistance after the first line has been carried."

Of all the varieties of true cancer the one most frequently met with is *epithelioma*, and this presents itself, here as elsewhere in the body, under two forms, distinguishable with the microscope and clinically.

The first (cancroid, lobulated epithelioma) contains the characteristic onion-like nests of squamous epithelium, and is the same form so commonly seen in the lip, though rarely about the anus. It has its point of origin at the anus, and not within the rectum, and begins as a hard, dry, warty nodule. It is slow in progress, covered at first with firm epidermis, and only begins to ulcerate late in its course. It seldom spreads far up the rectum, but tends rather to involve the integument, which it may destroy to an extent similar to that sometimes seen in the same variety of disease about the face. This form of disease is rare.

In the other variety (cylindrical epithelioma) the cells are columnar, and the growth resembles, in minute structure, the mucous membrane from which it springs. This variety, on the contrary, chooses the rectum proper for its development, and is found above the internal sphincter. It is easily distinguished from the former, but not so easily from a scirrhus which has begun to ulcerate. It is softer than the other, more vascular, and therefore more prone to bleed and undergo extensive degeneration and ulceration, and it rapidly infiltrates surrounding tissues.

Early in its course it is movable on the subjacent tissues, but it is seldom seen by the surgeon at this stage. At a later period it presents itself as a soft, friable mass seated on a hard, infiltrated base; ulcerated in spots, the edges of the ulcers being hard and raised.

Next to epithelioma, *scirrhus*, or hard cancer, is the variety most

frequently met with in the rectum. It arises, not, like epithelioma, in the mucous membrane, but in the submucous connective tissue; therefore, in the early stages of its growth the membrane is found normal and movable over the hard mass beneath. When cut into it shows the characteristic raw-potato-like hardness of scirrhus, and there is no distinct line of demarcation between it and the adjacent tissues. From the original tumor are often seen, and sometimes felt, hard, fibrous bands spreading out in various directions, generally longitudinally, in the bowel—the processes or claws from which cancer takes its name.

These tumors may soften down in parts and slough or ulcerate away. When ulceration has begun, a cavity with an irregular outline is formed in the midst of the hard cancer tissue, from which issues a fetid discharge mixed with more or less blood and pus. Although a large part of the growth may die in this way and be discharged, the steady increase in the disease is not checked. Indeed, the growth often seems to be most rapid in the bed of the part which has been destroyed.

Cancer of the rectum, like cancer elsewhere in the body, generally occurs in middle life or old age. There are, however, some interesting exceptions to this rule, cases having been recorded from the age of six years upwards. After the age of twenty the cases increase rapidly in number.

With regard to the relative frequency in the sexes, different statements will be found in the works of different writers, according to the experience each has had, and considerable reasoning has been indulged in to explain why the disease should be more common in the one sex than in the other. In a collection of one hundred and fifty cases of my own, I have found the disease about equally divided between the two sexes.

The symptoms of cancer of the rectum may be classified as follows: pain; those due to contraction, to ulceration, to invasion of neighboring parts; and, lastly, the generalization of the disease and the cachexia.

A cancer of the rectum often begins so insidiously that its existence is not suspected by the patient till it has made irreparable progress. This will be the case particularly when the disease is well up

in the bowel beyond the reach of the sphincters. On the other hand, the disease is usually attended with great pain, and the character of the pain may be of great assistance in diagnosis.

Attention has been called to the point in diagnosis that the existence of pain or cramp in the lower extremity in cancer of the rectum is a bad sign, suggesting a direct encroachment upon some of the neighboring nerves, either by implication and pressure of the glands, or by direct extension of the original disease.

In the later stages of cancer the pain is often the most important symptom to be met by treatment. It may then be due to the irritation of fæces upon an ulcerated surface, to the involvement of the anus in the ulceration, or to direct pressure on adjacent parts, and each of these is to be met by a different and appropriate treatment.

The symptoms directly referable to contraction of the bowel are often slight, and differ in no way from those caused by the fibrous stricture of the same part. It is often astonishing to the surgeon to meet with an advanced case of scirrhus in which the calibre of the bowel is so nearly occluded as scarcely to permit the passage of the end of the finger, and yet in which the patient has never had sufficient uneasiness to call for a direct rectal examination.

The hemorrhage from an ulcerated rectum in cancerous disease is seldom profuse enough to be dangerous, though by frequent repetition it may become an important factor in the ultimately fatal result. Only once in my experience have I seen cancer of the rectum manifest itself by profuse and nearly fatal hemorrhage as a very early symptom.

Above the contraction there may develop an ulceration which is not to be confounded with the breaking down of the cancer itself. (Fig. 154.) When the cancer itself once begins to break down and ulcerate, its extension is limited by no tissue of the body. The bladder may be opened and a permanent fistula result, in which case the passage is generally from that viscus into the rectum ; but the opposite may be the case—and the pain caused by the entrance of fæces into the bladder and their discharge through the urethra is one of the best of all the indications for colostomy. The prostate and seminal vesicles in the male and the recto-vaginal septum in the female may

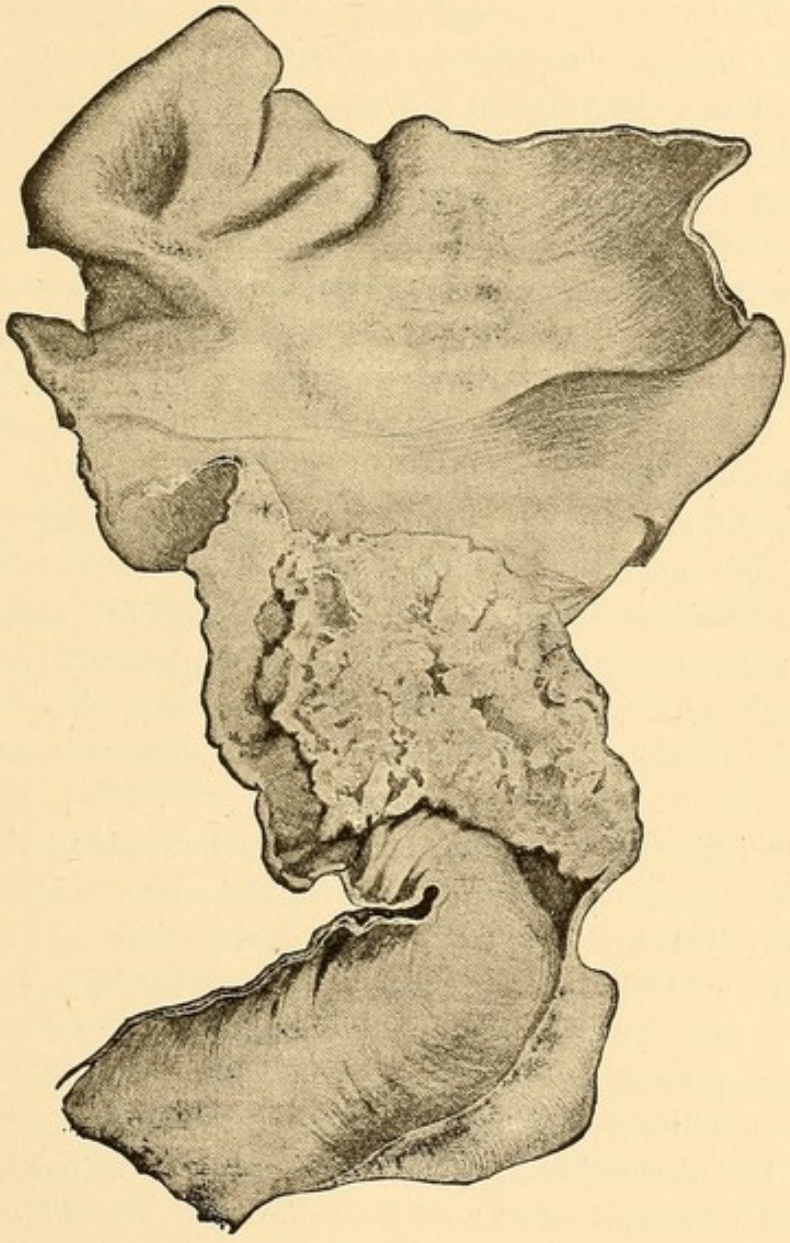


FIG. 154.

Cancer of the Rectum, showing Dilatation above the Stricture.

each be destroyed; in fact, any part near the disease may be implicated.

There are two sets of lymphatics which may be involved in malignant disease of the rectum, one coming from the anus and going to the glands in the groin; and one coming from the rectum proper and going to the glands in the hollow of the sacrum and lumbar region. The proper place, therefore, to feel for glandular involvement in the disease within the sphincter is along the spine, deep in the pelvis—a simple point which may decide the surgeon as to the proper form of operative interference.

From what has been said it is evident that there is little in the history which the patient will give of cancer of the rectum to distinguish it from ulceration and stricture of any other variety, except that when a patient of middle age complains of bloody and mucous discharges and difficulty in defecation, which have come on within a short time, and is at the same time losing flesh and strength, the examiner's suspicions should be aroused.

The diagnosis must rest chiefly upon a physical examination, however, and to make such an examination thoroughly, and yet safely, requires great care and gentleness; and to properly interpret the conditions which may be found, no little experience and knowledge.

In the majority of cases the diagnosis may be made by the history and by physical examination with the finger alone. Cancer in this locality is a disease of rapid growth, and when a patient says that stricture has existed any considerable number of years the idea of malignancy may be abandoned. Something also may be learned from the general appearance of the patient, but most of all from the digital examination.

When the disease is seen in its earlier stages, the hard, more or less distinctly circumscribed new growth which has infiltrated the wall of the bowel is diagnostic. The great difficulty is to distinguish between an advanced case where the rectum is partially occluded by hard masses of disease, and an old case of stricture and ulceration which is not malignant. This may sometimes be impossible except by the microscope, and inflammatory disease of the rectum is not infrequently mistaken for cancer.

When a soft, friable mass of epithelioma is found seated on a hard, infiltrated base which is ulcerated in spots, the edges of the ulcers being hard and raised, the diagnosis is also easy.

Cancerous stricture of the sigmoid flexure, or of the upper part of the rectum above the limit of digital examination, is the most difficult to diagnosticate, and may sometimes escape the most thorough search. It may also end fatally from acute intestinal obstruction before it has caused sufficient symptoms to make its existence suspected; for this part of the canal is very movable, easily forced out of its natural relations, and subject to complete occlusion by an amount of new growth which lower down in the rectum would cause only slight difficulty in defecation, as already explained.

I know of no other means of diagnosis in these cases than those already described under non-malignant stricture; but the experienced examiner, if he suspect malignancy, is much more cautious than with non-malignant disease in the use of the bougie, for he knows how easily a cancerous stricture will tear and cause sudden death.

In cases where the condition is more complicated and where secondary deposits—in the liver, for example—have begun to do their fatal work before actual obstruction has begun, the symptoms of stricture may all be obscured by the presence of others which shall more readily attract the eye. In one case I had made the diagnosis of cancer of the liver with ascites and great intestinal disturbance, some time before my attention was called to the rectum, and it became evident by examination that the affection of the liver was secondary to malignant disease high up in the rectum, which was also gradually involving the pelvic viscera.

The termination of the disease is more often by a gradual exhaustion of the patient's powers than by complete obstruction, although it may come in either way. The loss of rest which comes from the continual tenesmus and the pain are the most active elements in shortening life.

Treatment.

The treatment is general and local. In the way of general treatment nothing can be added to what has already been said under non-malignant stricture, except perhaps a word of advice against the too

early and free use of opium. No matter what line of treatment be followed or what operation may be done, in the end opium is apt to prove the sufferer's best and only friend. Nobody has less scruple against getting the full benefit of it than I, but unfortunately, when used freely in the first of the disease, it loses its effect when most needed, and to the pains of cancer are often added those of the chronic opium habit. Therefore I begin its use reluctantly in every case, holding off as long as seems wise, and then try carefully to regulate the daily dose.

In the surgical treatment of cancer it must be plainly understood that none of the means mentioned under non-malignant stricture—neither cautery, division, divulsion, dilatation, nor electrolysis—have any place. The resources at our command are only two—extirpation and colostomy. One of these should be performed as soon as the case comes under observation, and all other interference with the growth abstained from.

I know of nothing better calculated to fill a *surgeon* with disgust than the story of some poor sufferer that somebody has been using a speculum two or three times a week and applying caustics or electricity to his cancerous rectum. Not only is this kind of local treatment harmful by increasing the rapidity of the growth, but it is also much more dangerous than one without experience would believe. It has long been excellent surgery to either remove a cancer completely or else to let it alone.

Nothing is ever gained, and years of useful life may be lost, by postponing till a more convenient season an operation for cancer of the rectum, whether it be extirpation or colostomy. If colostomy is indicated at all, the time to perform it is immediately after it has been decided not to do excision, not after intestinal obstruction has set in, or after the sufferer has reached the closing days of lingering disease.

The choice between extirpation and colostomy in any case may be easy or may be very difficult. In some cases extirpation is manifestly not to be thought of and immediate colostomy may be done. In others, extirpation holds out so good a chance of prolonging life, and possibly even of effecting a radical cure, that it is plainly indicated. Between these two classes there is a large group of cases

where the indications for treatment are not as plain as they should be.

The late Dr. Van Buren, some years ago, tried to lay down the rules which should guide us in selecting cases for excision. They were very simple. The growth must be distinctly circumscribed, movable on subjacent tissues, and within easy reach by an incision through the perineum. Since his time Kraske has given us an entirely new operation. By an incision over the sacrum he proved the possibility of resecting portions of the rectum too high to be reached by an incision from the perineum, and too low to be reached by laparotomy.

By a combination of Kraske's operation and the old one by perineal incision, it has therefore become possible to either resect long pieces of the rectum, or to amputate long portions which would have been inoperable, according to Van Buren's rules, on account of their distance from the perineum. The advance must not be overestimated. We can now amputate six inches of rectum instead of three, or we can resect a circular carcinoma at a point six inches from the anus; but to do any good we must still confine our operations, as Van Buren insisted, to cancer of the gut, and not of the gut and surrounding tissues, and to an early stage of cancer at that.

In trying to reach safe conclusions on this subject it is necessary to be very accurate. There are many cases in which extirpation should certainly not be performed, and there are some which just as certainly should not be subjected to colostomy, at least until after excision has been tried. The former are those of extensive disease involving not only the rectum but the adjacent tissues, and in this class I personally include many upon which others would operate.

For my own part, I have finished trying to dissect a cancerous rectum away from the base of the bladder when it would almost require a microscope to decide whether all of the disease had been removed or not, for in such cases I expect an immediate recurrence, and often before the incision has healed. I have also finished removing the deep urethra, prostate, and seminal vesicles to make sure without a microscope that all of the cancer is removed, for in those cases I expect either death from the operation or immediate recurrence.

The cases in which extirpation should be done with a hope of cure are those of epithelioma low down in the rectum, and more especially those which begin at the anus and secondarily involve the rectum. These are the ones which are curable by excision, or, if not curable, those in which recurrence is longest delayed.

But besides these there is a class of cases in which the rule for treatment is still to be considered. These are the cases of annular scirrhus of the rectal pouch, or even of the upper rectum, which are manifestly removable without more than the average risk. In these we must determine which operation will give the greater length of life, extirpation or colostomy.

In extirpation we do a capital surgical operation, for the hope of cure in part, and failing this, for the certainty of palliation of suffering and the probable prolonging of life. In colostomy we do an operation with scarce any risk and with no hope of cure. But we invariably prolong life, and sometimes for several years ; we relieve pain ; we secure the greatest possible length of days next to a cure, and we lead the sufferer gently down to the grave.

In substituting an artificial anus in the groin for the natural one, it must be remembered that patients with cancer of the rectum, as a rule, have very little sphincteric power or ability to retain fecal matter. Either there is a constant discharge which necessitates the wearing of a napkin at all times, or there is a constant uneasiness and fear of accident which keeps them in close proximity to the commode day and night. To them one daily solid evacuation, even if it does escape from the groin, is a great advantage, and the choice is not between fecal control by the anus and incontinence in the groin, but between one or two daily solid evacuations from the groin and a constant leakage of bloody mucus and fæces from the natural anus.

The question of the immediate risk of excision will have considerable weight in determining the choice of both surgeon and patient. This is now reduced to about fifteen per cent. in the hands of skilled and experienced operators.

Regarding the question of radical cure, we find difficulty in establishing exact data, and have to take into consideration the reputation of the reporter. We find, however, a constant improvement in this regard, depending probably on the fact of earlier operation.

The operation is not followed by any after-consequences which are of sufficient gravity to contra-indicate its performance.

In a small proportion of cases there will be complete incontinence; in a greater number there will be partial control over the evacuations; in a majority the control will be sufficiently complete to prevent the occurrence of any annoying accident; in some there will be some cicatricial stenosis, and a fecal fistula is apt to follow the high operation.

Dr. McCosh, in a paper read before the New York Surgical Society, has carried the statistics down to a recent date and essentially changed them. In four hundred and thirty-nine operations there were eighty-four deaths, or 19.1 per cent.; and in three hundred and seventy-five operations there were thirty-two cases, or about ten per cent., showing no recurrence in four years. Unfortunately, there is no description of the location, character, or extent of the disease in these favorable cases.

Regarding the best way of performing the operation, the surgeon has his choice of several. Almost every surgeon whose name is prominently associated with the operation has had his own favorite way of performing it, but all of these may now be grouped under two general heads: the operation through the perineum, and Kraske's operation, or excision by an incision at the side of the sacrum.

The old operation by the perineum has many objections. The incision is too small for the work attempted; and though the growth may be removed it is only at the expense of great loss of blood, which is beyond the surgeon's control merely from lack of space in which to work. The operation is only applicable to growths near the anus which are to be amputated. Resection and suture rendered possible by the dorsal incision are impossible by the perineal.

Certainly the quickest operation, though often a very bloody one, is the one figured in the three following cuts.

The instruments necessary are:

Knife.
Strong straight scissors.
Artery forceps.
Curved needles.
Needle-holder.
Catgut.
Large sponges.

The patient being held in the lithotomy position by Clover's crutch, the index finger of the left hand is introduced into the rectum as high as the limit of the disease, and the knife is entered

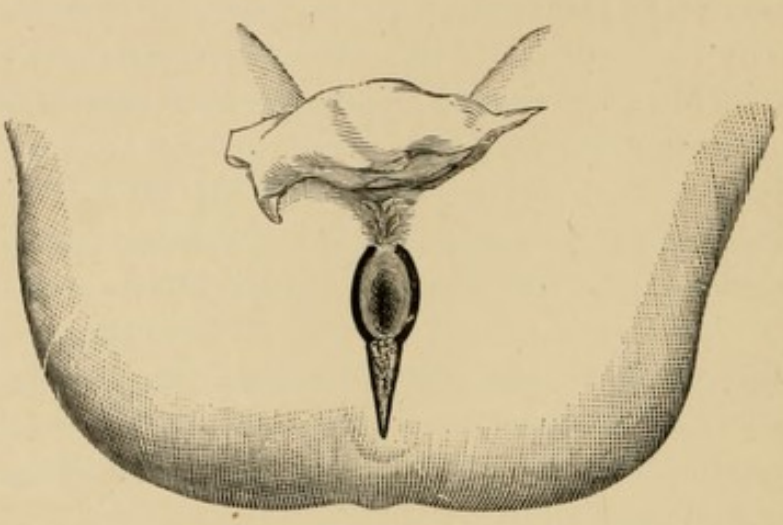


FIG. 155.

First Step in Excision of Rectum.

through the skin outside of the anus and carried upward in the cellular tissue behind the gut as far as the finger in the rectum shows it to be necessary.

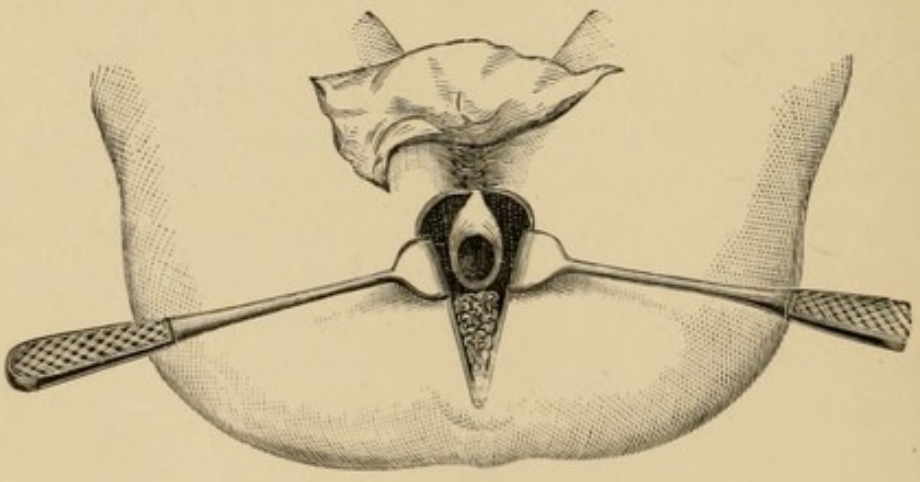


FIG. 156.

Second Step in Excision by the Perineum.

A deep dorsal cut is then made down to the tip of the coccyx, and past this point if necessary for room. Next the rectum is divided circularly between the lower limit of the growth and the

external sphincter, if possible. This incision should go deeply into the cellular tissues, and is ended by dividing the external sphincter posteriorly. In this way the sphincter is left in the skin flaps.

The diseased rectum is still to be dissected out as a cylinder, and this should be done boldly and rapidly with knife and scissors till the enucleation has proceeded to a level at least half an inch above the disease. The wound should be packed with sponges as fast as the cutting proceeds, and when the gut has been entirely freed from its attachments, the sponges may be removed and the vessels attended to. The bleeding will be excessive if the operator stops to

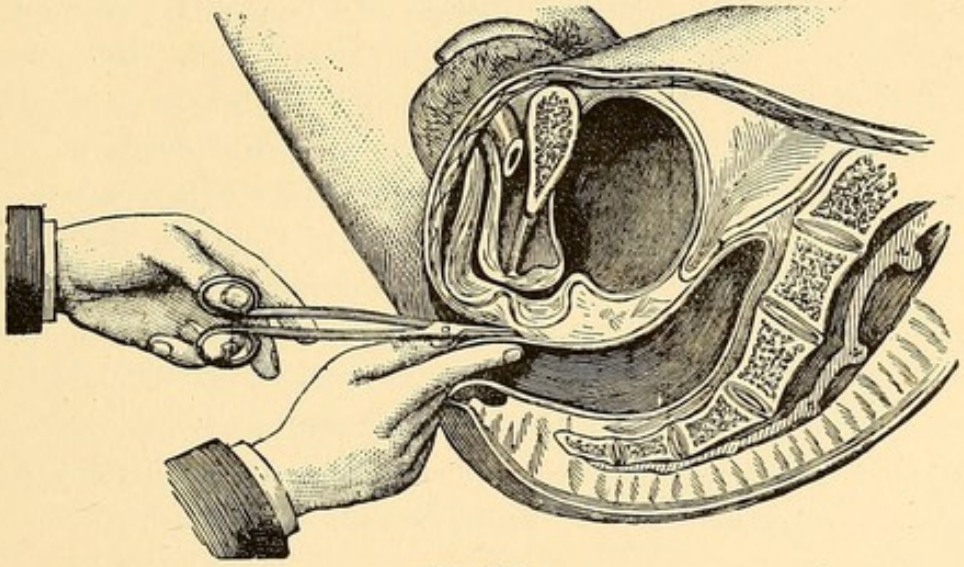


FIG. 157.

Third Step in Excision by the Perineum.

tie each vessel as it is cut, and the secret of the operation is to work as rapidly as possible and control the bleeding by pressure. After the bleeding has been stopped and the sponges removed, the rectum should be amputated with the écraseur or knife, care being taken not to lose the upper end, but to keep it in sight with a volsellum till it has been attached by a few stitches to the skin of the anus.

The rectum should not be drawn down too tightly by sutures, lest they tear out in the first day. The wound should be fully drained and stuffed with iodoform gauze, and no attempt should be made to get union by first intention.

I have performed this operation with very satisfactory results in

cases where, because of the involvement of the anus, the circular incision was made through the skin far out in each fossa.

The objections to this operation are apparent from a mere description, and much more so in its actual performance. If it be done slowly and carefully it takes a long time, mostly spent in tying vessels, and if done rapidly to avoid hemorrhage it is more or less of a blind plunge into the pelvis without any of the elements of precision which are always desirable in any surgical work.

Vaginal Incision.

The facility with which the rectum may be reached through the vagina has been pointed out by Rehn and Campenom. The posterior vaginal wall may be divided by a median longitudinal incision extending outward and downward through the perineum to the margin of the sphincter. The dissection of the rectum from its bed may be done almost entirely with the handle of the scalpel. After the diseased portion has been sufficiently liberated the gut may be closed with a ligature both above and below in resection, or above, in amputation, and the growth removed. After suture of the ends in resection, or fixation of the stump to the perineum in amputation, the vaginal incision may be closed. This incision allows very free entrance to the peritonal cavity also, as is shown in vaginal cœliotomy.

CHAPTER XVII.

KRASKE'S EXCISION OF THE RECTUM.

UNDER the general name of Kraske's operation are included all of the modifications of the dorsal incision. These have been many, each of them possessing certain advantages perhaps, but the guiding principle in them all is the attack upon the disease from behind.

The instruments necessary are:

A strong scalpel.
One dozen catch forceps.
Periosteal elevator.
Strong straight bone forceps.
Catgut (fine and medium).
Fine black silk.
Straight needles for intestine.
Large and medium curved Hagedorn needles.
Needle-holder.
Sponge-holders.
Two intestinal clamps (Fig. 158).

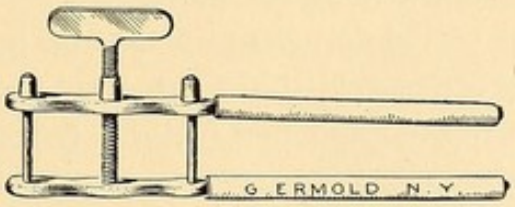


FIG. 158.
Intestinal Clamp.

At least four days should be allowed in which to prepare a patient for extirpation of the rectum, in order to have the bowel as

empty as possible at the time, and to postpone as long as possible the first fecal evacuation afterward.

On the first evening three compound cathartic pills should be given, and these should be repeated on the second. The day before operating the diet should be exclusively milk and beef-tea, preferably the latter, and, on the evening before, a dose of bismuth and morphine should be given. This should be repeated a few hours before the operation.

No preliminary preparation of the field of operation is necessary, but when the patient is under ether great care should be devoted to this point.

With the patient in the lithotomy position the perineum is first shaved and the cavity of the rectum thoroughly cleansed as high up as possible. This is done through a speculum, at first by prolonged irrigation with bichloride solution (1 to 500) and then by carefully wiping the canal with wads of iodoform gauze on the end of long forceps. This is necessary, because it is often of the greatest help to be able to introduce the finger into the rectum during the operation, because the gut may be lacerated in trying to remove it, and because in every case it must be cut across before it is removed. In doing either of these three things the whole wound is apt to become infected unless the most scrupulous care is observed, and the object of the preliminary disinfection of the calibre of the gut is to reduce this risk as much as possible.

The form of disinfection described may not be theoretically or practically perfect, but exactly in proportion to its thoroughness, and to the care with which the wound is kept clean during every stage of the operation, will be the mortality.

A small tampon of iodoform gauze may be left in the rectum, but too great a mass distends the canal, obscures palpation of the diseased part from the incision, and distorts the normal relation of the parts during the operation.

The patient is next turned on the face, or practically so, and the whole site of the operation scrubbed and disinfected. Soap and brush well applied, with subsequent washing with bichloride, and a final wash with ether will be found efficient.

The incision should be chiefly in the groove between the nates,

and need be carried to the left of the median line only at its upper limit. It should reach from opposite the promontory of the sacrum to the anus, and the knife should be carried directly down to bone at once. Flaps should be turned to left and right by a few strokes of the knife hugging the bone ; the flap on the right should lay bare that side of the sacrum, that on the left must be carried beyond the edge of the bone in order to expose the ligaments connecting it with the rest of the pelvis, and these should be divided.

A periosteal elevator is next passed under the sacrum from left

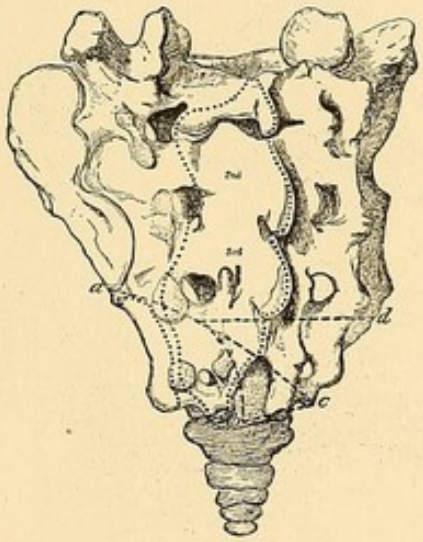


FIG. 159.

a d—Bardenheuer's Incision.
a c—Hochenegg's Incision.
a b c—Kraske's Incision.

to right (the operator stands on the left) at the level of the incision to be made across that bone, and is worked down to the tip of the coccyx, so as to separate all the soft tissues from the hollow of the sacrum. In this way the sacra media artery and the plexus of veins are lifted away from the bone, and troublesome bleeding during the rest of the operation may be avoided.

When the periosteal elevator has been removed one blade of a strong straight bone forceps is slipped under the sacrum in its place and the bone is divided transversely, the piece cut off being immediately dissected out. (Fig. 159) Usually this triangular piece of bone should consist of the last two sacral vertebræ and the coccyx.

Rydygier's osteoplastic incision is shown in Fig. 160. By it the sacrum is turned to the right like a trap-door and replaced after the operation. It certainly diminishes the deformity of the pelvis caused by the operation, but I have always thought it also increased the risk by rendering drainage less perfect.

The work thus far done constitutes merely the preliminary incision, and should be completed in much less time than it takes to de-

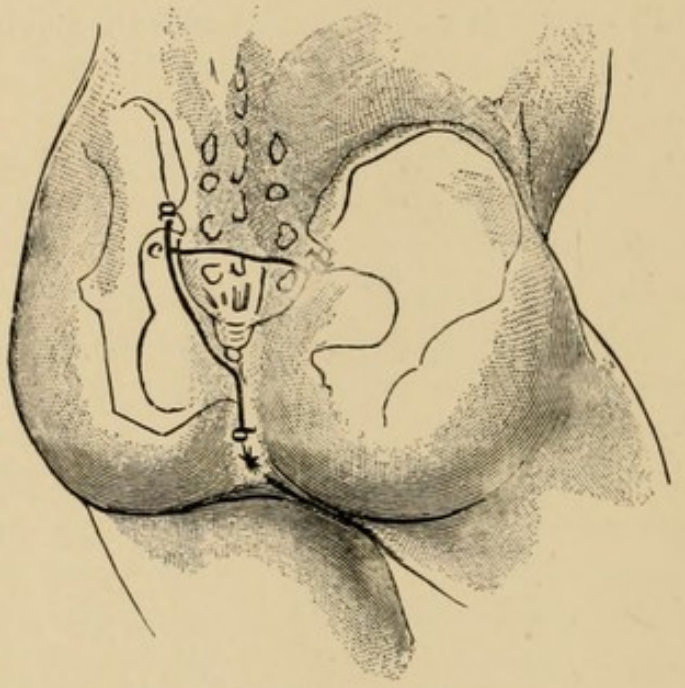


FIG. 160.

Rydygier's Osteoplastic Resection.
a b—Skin Incision.
c d—Skin and Sacral Incision.

scribe. Until after the end of the sacrum has been removed no attention need be given to hemorrhage, except what an assistant can give by pressure of sponges. The bleeding will be mostly venous and not very severe; most of it will be found to have ceased by the time the bone has been removed.

Should there be a steady, persistent loss of blood from just under the stump of the sacrum, it will be from the sacral plexus of veins and it may be very annoying. It may be controlled by the pressure of an assistant's finger, or by a long pair of forceps slightly

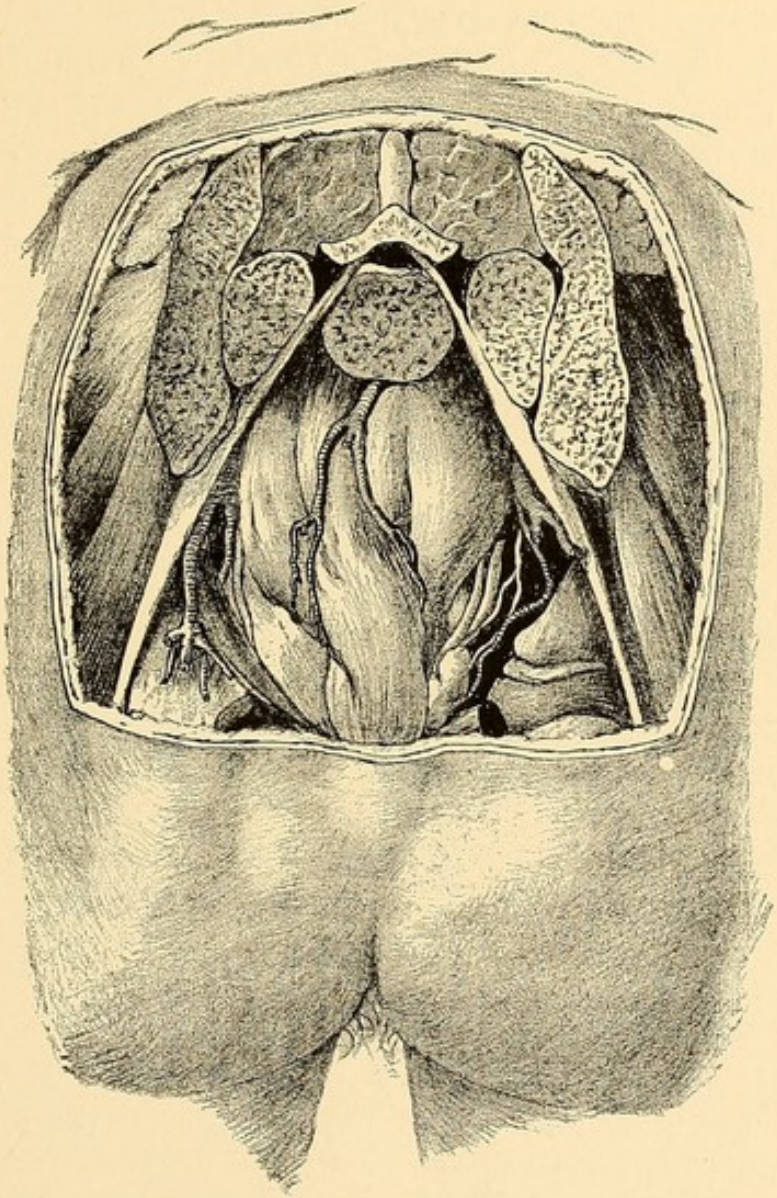


FIG. 161.

Posterior View of Rectum in Male.

curved, or by a ligature passed under it with a needle, but tying in the usual way without a needle is often impossible. Attention is called to this little point because it is often a troublesome one. When the rectum has been removed the bleeding will generally be found to have ceased spontaneously, but much time and many ounces of blood may be lost in unsuccessful efforts to ligature these vessels, when the pressure of an assistant's finger would save both.

The pelvis is now freely opened and the operation may proceed.

First the rectum should be isolated on each side by the finger. No cutting is necessary, as the gut will roll out of its bed with great ease to a certain extent ; but the finger cannot be passed completely under and around it on account of its size at this point, nor can it be drawn down at all on account of the firm attachments of the peritoneum and the mesorectum.

Any forcible attempt to drag it down at this stage of the operation is attended by great risk of rupture and consequent soiling of the wound, and all that should be attempted is gentle isolation on each side by separating it from its loose attachments with the finger, and discovering by touch the extent of the disease to be removed, which can generally be easily done by palpating the tube as it lies in the wound.

The next step in the procedure should be the deliberate opening of the peritoneal cavity as near as possible to the bottom of the recto-vesical or recto-vaginal fold. This is not always quickly accomplished, as the peritoneum is often covered by a considerable layer of connective tissue, and this may be nicked several times at various points before an entrance to the free peritoneal cavity is effected.

As the operator stands, unless he is ambidextrous, the most favorable point for opening into the cavity will be to the right of the gut, high up in the incision, as the gut is held over to the left side by an assistant. Care must be taken as the knife or scissors are used not to cut into the gut itself instead of into the subperitoneal connective tissue.

When once the peritoneum has been opened the right index finger may be passed into the cavity, hooked under the gut from right to left and forced out of the peritoneum again on the left side of the gut, and into the wound. In this way the upper rectum surrounded

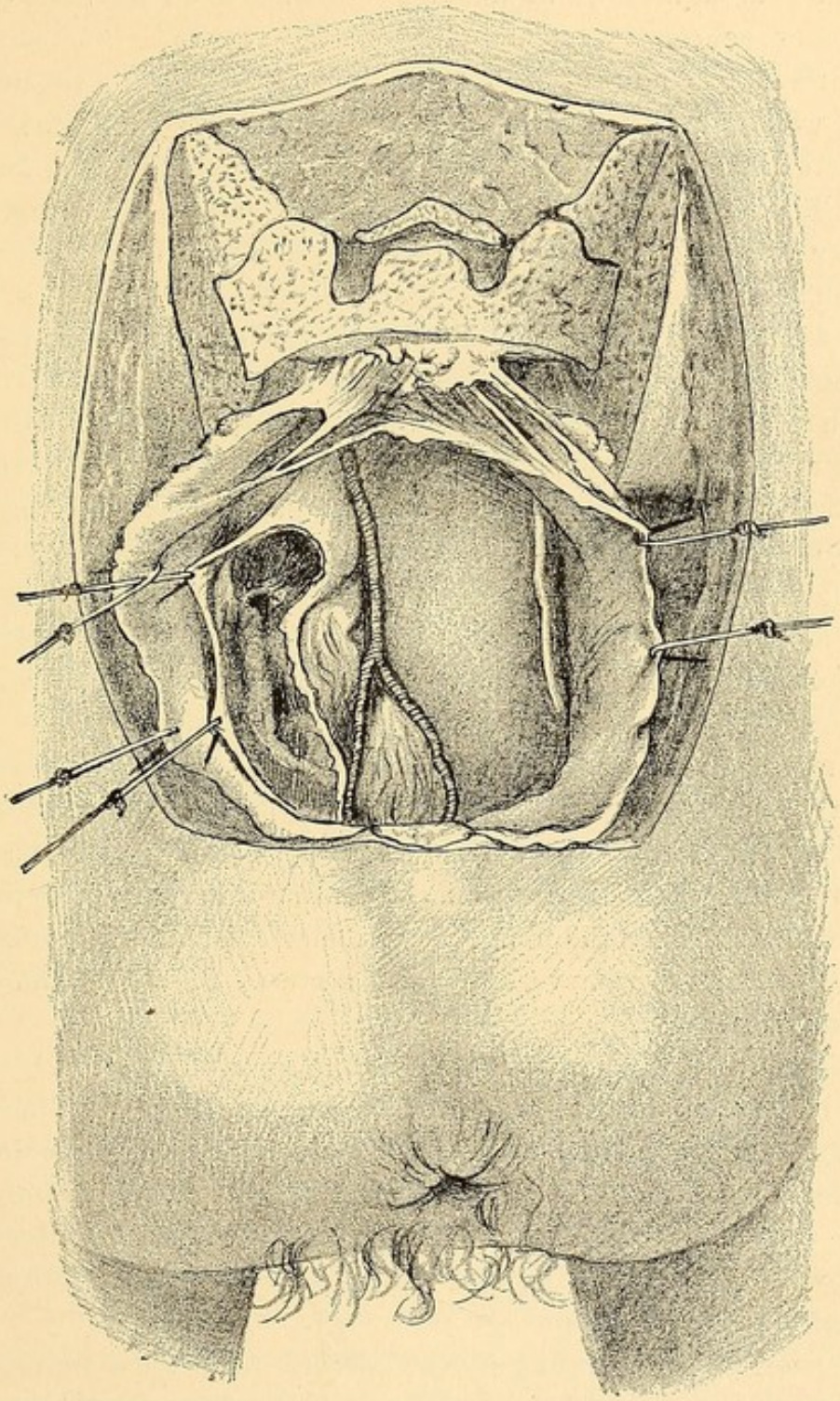


FIG. 162.

Posterior View of Rectum in Woman, Peritoneum Opened.

by its peritoneal layer, with its torn margin which went to make the *cul-de-sac*, comes into the wound and the gut is freed from one of its strongest suspensory ligaments.

The rectum is now held from coming down only by the meso-rectum, which binds it to the hollow of the sacrum, and, while gentle traction is made upon it with the index finger under it, as I have described, this last obstacle to its free descent may be cut away, but this, like every other step in the operation, should be done with precision and without violence.

It must be borne in mind that the nutrition of the upper end of the rectum after the removal of the disease will depend entirely upon the tissue which is now being cut, and this nutrition should be interfered with as little as possible. The bowel should not be forcibly stripped off from the mesentery and connective tissue, leaving it a mere tube without sources of nourishment, but the mesentery should be divided with scissors at some little distance from its attached border, so that any vessels coming from higher up and running parallel with the gut may be saved. Large veins may be divided between double ligatures to save blood.

The rectum has now been rendered freely movable, and the time has come to resect or amputate the diseased portion. By palpating the gut from without, the upper limit of malignant disease can easily be determined ; with non-malignant ulceration it may often be necessary first to cut across the bowel above the strictured and thickened portion and then to remove successive sections till healthy mucous membrane is reached.

Before dividing the gut a ligature of gauze or an intestinal clamp should be applied above the point of section, and the wound should be carefully protected with packing of gauze. The cut ends should be carefully wiped with pledgets of gauze and dusted with iodoform, and the upper one should be intrusted to an assistant who, by covering it with gauze and holding it out of the way, will keep from infecting the wound.

The lower end held firmly by the operator must then be rapidly dissected from its remaining anterior attachments and either cut off below the disease or removed down to the anus. In most cases of disease within reach of the finger by rectal examination, the latter

will be necessary, and the attachments of the levator on both sides must be cut by scissors or knife. Bold and rapid dissection at this stage will save much bleeding.

During all this part of the operation the constant danger of infecting the wound with the contents of the divided bowel must be scrupulously guarded against. Up to this time complete antisepsis is easy, but at this stage it is very difficult, and yet the life of the patient depends most certainly upon its being done successfully, for fouling of the wound with intestinal contents means high fever, prolonged suppuration, and a very high death-rate.

After removal of the diseased portion it should be carefully examined. At least an inch of healthy gut should always be removed above the upper limit of cancer, and in non-malignant disease the mucous membrane of the cut end of the upper segment should be rosy and healthy in appearance, and not purple and ecchymosed.

No hemorrhage need be feared in dividing the bowel. Unfortunately, it is never too well nourished, and a bleeding vessel or two on section is always a good sign.

The operator will find he now has the whole pelvic cavity at his command. In women the tubes, ovaries, and uterus can be plainly seen and palpated. Several times I have removed tubes and ovaries at this stage of the operation, but unless their removal is very imperative I had rather not do so. The shock of an extirpation of the rectum may be more than the patient can bear without any additional traumatism.

The next point to be decided is what to do with the upper end of the gut—whether to bring it down to the skin and suture it in the perineum, to suture it to any part of the rectum which may have been left below, or to bring it out in the middle of the skin incision and suture it just below the stump of the sacrum. This is always a delicate point, and, except in cases of disease high up, where a distinct resection and not an amputation has been done, and where some sort of end-to-end union is to be attempted, the location of the new anus will have to depend more upon the nutrition of the upper fragment than upon any preconceived ideas of the operator.

If the loose end of the gut seems well nourished, and can be loosened from its attachments sufficiently to allow of its being

stitched to the perineum to form an anus in the normal place, it will be a great advantage. If, on the other hand, the segment is pale and bloodless on section, if, in order to get it down at all, the mesentery has been freely divided, it is much safer to bring it out behind under the cut edge of the sacrum and attach it to the skin, as was originally the rule in all cases.

Of course an anus in the perineum is much more satisfactory than one in the sacral region; but next to the danger of infecting

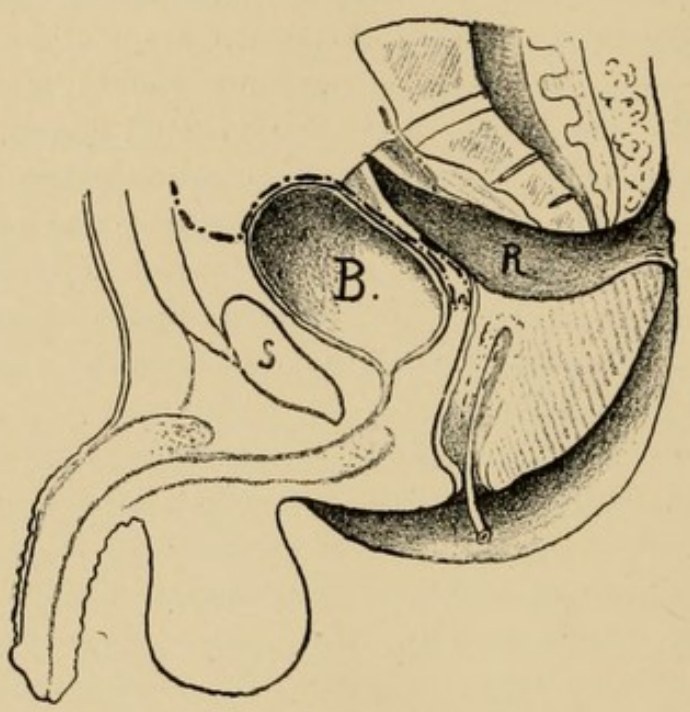


FIG. 163.

Rectum after Excision.

the wound during the operation comes the danger of sloughing of the end of the gut after the operation, and infection of the wound from this cause, and it may easily happen that an operation will be fatal in this way which would have been successful had the operator been content with a little less perfect after-result.

In cases of cancer, where all questions of future functional perfection are as nothing to the great one of prolonging life by removing the disease, it may be perfectly proper to disregard a minor point such as this and aim simply to save life at the least possible risk by forming the new anus in the sacral region. (Fig. 163.) But in cases

of non-malignant stricture and ulcers demanding excision the subsequent functional condition of the parts will prove a matter of more consequence. The surgeon may know he has as surely saved the life of such a patient as if he had removed a cancer, but the patient may not appreciate it, and may be tempted to compare his last state with his former, even though he may be cured of his disease and have gained greatly in flesh and strength. Therefore it is always better to bring the upper end down to the site of the natural anus when it can be done without too much danger of sloughing.

This point having been decided and the gut fitted to the position it is to occupy, and lengthened if necessary and possible to avoid tension, or shortened if more remains than is necessary for an anus in

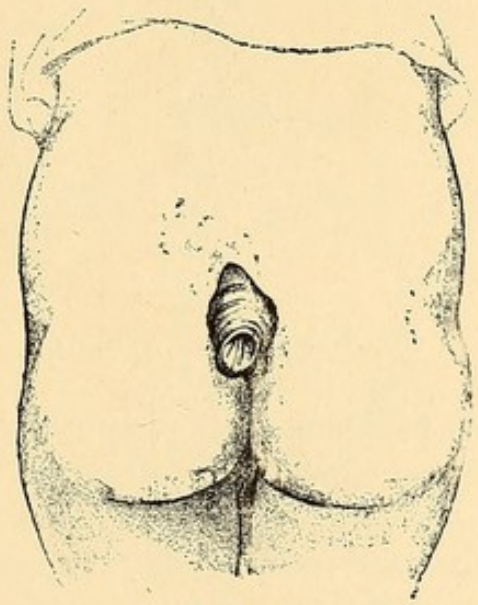


FIG. 164.
Sacral Artificial Anus.

the sacral region, the toilet of the peritoneum may be attended to. This is much the same as in an ordinary laparotomy—hot douches with saline solution, or sponging till all fluids are removed from the deep portions of the wound.

Should the operator prefer to close the opening into the peritoneum by a separate catgut suture, this should next be done. It is not difficult to find the ragged margins of what is left of the *cul-de-sac*, run them together by a continuous suture from below upward,

and finally close the peritoneal cavity by stitching the edges of the torn peritoneum to the peritoneal layer of the bowel. I do not, however, consider this separate suture necessary.

The end of the gut should next be stitched to the skin at the point decided upon, and all parts of the wound should be drawn together as carefully as possible by deep and superficial sutures. The cavity left by removal of the rectum is too large, however, for

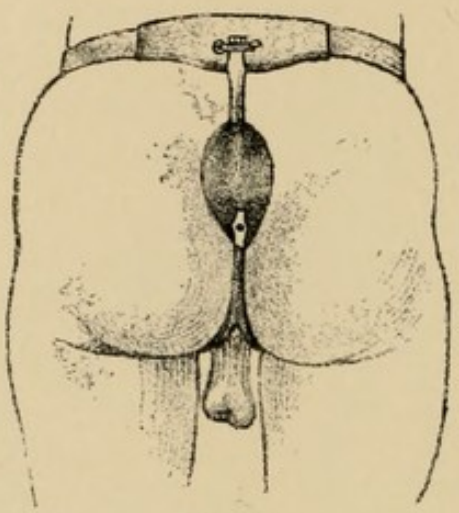


FIG. 165.
Truss for Sacral Anus.

perfect apposition or for union to be expected by first intention, and a drain of aseptic gauze should be passed down to its deeper parts. Free oozing will always take place from the bed from which the anal portion of the gut has been removed, and this can best be stopped by a few deep sutures in the final closure of the wound. In fact, it often cannot be stopped in any other way.

Usually a sharp rise of temperature—to 102°, or even 102.5°—may be looked for even in favorable cases at the end of the second day, but in those that are to do well this will subside in a day or two spontaneously, and the patient will make an uninterrupted good recovery. A successful case may be sitting up at the end of two weeks, and several of my own have returned to their homes at the end of three.

The most careful end to end suturing of the gut after the removal of the disease should always be practised. If the anus has also been

extirpated, then a very careful suturing of the end of the gut to the skin should be practised. The Murphy button is, generally speaking, not adapted to these cases for the reason that its successful use depends in great measure upon securing peritoneal approximation, and there is usually no peritoneum on the distal end of the gut after extirpation of the rectum.

When the suturing fails the vast wound will be found after two or three days to be full of fetid gas, pus, and fecal matter, and if the patient is fortunate enough to recover it is with a fecal fistula in addition to the anus provided by the operation.

In cases where a fecal fistula has resulted at some point in the line of incision, secondary plastic operations are often successful. As a rule the gut itself must be dissected out and closed with Lembert's suture, and then the wound covered by suturing the skin and subcutaneous tissue. Closing the skin over the opening in the bowel without closing the opening in the bowel itself is seldom successful.

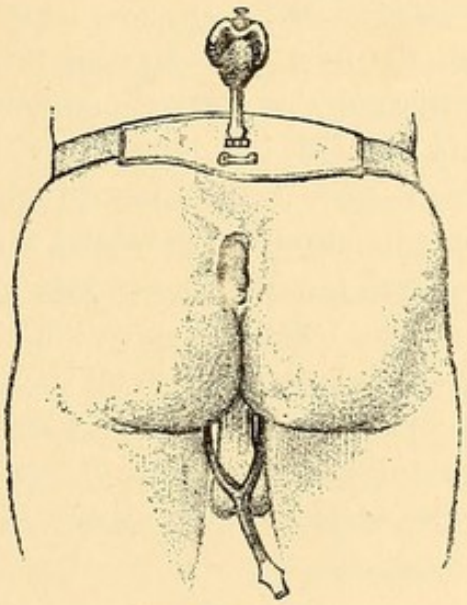


FIG. 166.
Truss for Sacral Anus.

In avoiding fecal fistula trust must be placed entirely in a careful suture of the cut ends, and the more careful the suture, and the more perfect the antiseptic precautions, the better chance there is of union without a large fecal abscess and subsequent fistula.

In amputation the upper end should be brought as near the site of the natural anus as possible, and if the sphincter has been left the inside of the anus should be vivified in order to give some chance for union. Fecal fistula may, it is true, result in any case, but the main object of the operator should be to avoid this result, and the more thought he devotes to it, and the more perfect his antisepsis, the less likely it is to occur.

Sphincteric Action after Extirpation.

Many attempts have been made to secure this very desirable result—most of them ineffectual. As a rule there will be no sphincteric action after an amputation, and all hopes of sphincteric power after destruction of the muscle upon which alone it depends may as well be abandoned first as last. The twisting of the end of the gut before suturing it to the skin may do something, and so may an opening in the substance of the glutens maximus muscle to which the end of the gut is sutured, but it is best not to hope for much from these expedients. The main thing to be hoped for is the avoidance of any contamination of the wound with fecal matter, and I can only say with regard to my own practice, that I now generally expect a patient to recover from the operation of extirpation of the rectum, and that by careful attention to all the details of antisepsis and careful suturing of the end of the gut I generally make out to avoid the large suppurating cavities full of fecal matter which were formerly the chief cause of death after my own operations.

Provisional Colostomy.

Colostomy is of much greater advantage in resection than in amputation. In the former we desire not only to have the site of operation as near sterile as possible before the operation, but especially to avoid the contact of fæces for as long a period as possible after the operation to facilitate union of the approximated edges. In the latter class of cases we provide a free outlet for the fæces and the provisional artificial anus is less necessary. The question of the amount of stricture caused by the malignant growth is also of some

importance. Should there be a free escape of fæces the gut may be rendered comparatively empty by catharsis previous to the operation and cleansed in the manner described at the time of operation. On the other hand should the stricture be tight there is sure to follow a free evacuation from the overloaded colon which greatly complicates the question of any primary union. Were it not for the additional shock of the formation and subsequent closure of the artificial anus I confess I should be glad to take advantage of the absence of fæces in the wound which it secures in all cases.

Many complications may arise during an operation for extirpation of the rectum. One of the most awkward I have ever personally encountered was to find a rectum absolutely devoid of mesentery and bound immovably to the hollow of the sacrum. All attempts to get it loose and bring it down resulted merely in stripping up one of the longitudinal bands of muscular fibres, and in the end I held in my hand six inches of stripped and injured gut which was entirely without any source of nutrition. As I was about to abandon the operation and turn the patient over for a left inguinal colostomy, it occured to me to make use of a loop of large gut, probably the upper freely movable part of the sigmoid, which during a great part of the time had been hanging freely in the field and occasionally getting in the way. This was drawn into the incision and stitched to the edges much as would be done in ordinary colostomy. It was then opened and the section between this opening and the end irrigated. Finally, the useless end of the gut was also stitched to the incision in the expectation that it would slough and come away, as it did. The man made a rapid and uneventful recovery.

Another complication, though not a frequent one, may be found in the consolidation of all the perirectal tissue by inflammatory changes in cases of old, non-malignant ulceration and stricture. Under these circumstances the isolation of the rectum may be a matter of the greatest difficulty, and beyond the powers of the inexperienced operator.

Such in brief is the operation for extirpation of the cancerous or strictured and ulcerated rectum. The most casual reader will at once be struck by the fact that it is an operation of absolute precision, very different in character from the old one through the perineum,

in which a more or less blind plunge was made into the pelvis for a piece of the rectum, and in which the loss of blood depended almost entirely on the speed of the operator.

The operation described may be done by an experienced man in about forty-five minutes, and its mortality will depend much more on keeping fecal matter and other intestinal contents out of the wound, both during the operation and the first days of healing, than upon the amount of shock.

My own first statistics showed the full death-rate of thirty per cent., but by attention to the details given above this has gradually been reduced until, at this time of writing, I have had no death in the last seventeen cases.

A wound into the vagina, though always to be avoided when possible, may often be necessary in order to fully remove the disease. Such a fistula may be closed during the operation. A wound of the urethra in the male, when slight, is to be treated as though the patient had submitted to an external urethrotomy, by the frequent passage of the sound to prevent contraction.

When a large piece has been taken from the urethral wall, a permanent recto-urethral fistula is the necessary result, and the danger of fatal inflammatory action is greatly increased from the presence of the urine in the rectal wound. Wounds of the peritoneum may or may not be sutured with catgut, as the operator prefers. As for the cases reported by Nussbaum and others, in which the whole neck of the bladder, the greater part of the prostate, and the seminal vesicles have been removed, and the patients have lived for years in comfort, they are merely curiosities of literature. That such a thing may happen has been proved, but that the operation should ever be undertaken in any case where such a result is necessary for the entire removal of the disease, has yet to be proved.

In certain cases where, from the extent of rectum removed, it is impossible to draw the ends together, or where, from the tightness of the stricture, it has been impossible to empty the bowel above of fæces, or where the wound has become soiled with the same during operation, Kraske postpones the suturing of the ends of the gut at the posterior segment till a future period, and forms a provisional sacral artificial anus, as shown in Figs. 163, 164. For this a subse-

quent plastic operation is necessary. Hochenegg has devised and applied the truss shown in the cut for use in these cases. (Figs. 165 and 166.)

Schede accomplishes the same end by a colostomy in the groin after the resection, and a subsequent closure of the artificial anus when the sacral wound has healed.

CHAPTER XVIII.

THE FORMATION AND CLOSURE OF ARTIFICIAL ANUS.

THE indications for the formation of an artificial anus, which are most frequently met in connection with rectal surgery, are:

Congenital malformations.

Intestino-vesical or vaginal fistulæ.

Severe ulceration of the rectum.

Cancer.

Intestinal obstruction.

The rules governing the attempt to form an artificial anus in the perineum in cases of congenital malformation have been sufficiently dwelt upon in the chapter devoted to that subject. Failing to find the rectum through the perineum, or, from careful study of the case, deeming it best not to make the attempt, the rule is to form an artificial anus in the left groin.

Attempts at establishing an anus in the anal region after the performance of colostomy in this class of cases are attended with greater danger than the original operation, and are not generally successful. They involve, when successful, also the closure of the artificial anus. I have had two fatal cases of this kind. Mr. Owen also reports two, and Byrd and Kronlein each a successful one.

The treatment of intestino-vesical and intestino-vaginal fistulæ has already been described. (See Fistulæ.)

The cases of *severe, non-malignant ulceration* of the rectum, with or without fistulæ, which are incurable by topical treatment, offer another indication for the formation of an artificial anus. These ulcers are generally either tubercular, or the result of simple proctitis, and many of them are as incurable as though they were cancerous.

They are generally, after a certain time, associated with stricture, and the patient is worn out by chronic intestinal obstruction joined to the exhaustion occasioned by the ulceration with its pain and tenesmus. Many of these cases are beyond the reach of cure either by local applications of any sort or by internal medication. Neither acids, scraping, nor burning will do any good after the disease has become of large extent, and the internal use of antisyphilitic remedies is generally worse than useless.

Colostomy in these cases will prolong life indefinitely by relieving obstruction if it exists, and by allowing the rectum to become quiescent by giving another outlet for the fæces. Ulcerations which have resisted all local treatment will heal by this means; and should they not heal, will cease to exhaust the patient by pain, tenesmus, and loss of sleep.

It is better to admit freely the limitations of our art in these cases, and advocate boldly the only remedial measure in our power, than to go on trying ineffectually to cure old and incurable ulcerations of the rectum by local treatment.

In cancer of the rectum the indications for colostomy are very clear, and there seems to be a growing tendency to earlier operation, though in this surgeons will differ according as they have greater or less faith in certain other palliative measures. The result of my own study and experience is tending more and more to convince me of the advantages of early operation in prolonging life beyond what can possibly be expected when the disease is left to its own course.

The statistics of every operator will vary according to the class of cases upon which he operates. Bryant, for example, the man who has done more than any other to advance the operation, reports a very heavy mortality, taking all of his cases together; but he evidently operates to save life on all the cases in which it is plainly indicated, regardless of the condition of the patient or the looks of his statistics. It is always easy to estimate the risk of the operation beforehand from the condition of the patient.

As to the benefits arising from the operation, too much can scarcely be said. That it prolongs life by the relief of pain, the prevention of obstruction, and retarding the growth of cancerous disease, is beyond question. That it substitutes in many cases a pain-

less death for one of great agony is also indisputable. The idea that it is as well to let a patient die as to subject him to a colostomy has no supporters among surgeons who have had any experience with these cases.

I can only say that, after trying every other means of treatment and being obliged to admit the fruitlessness of them all except extirpation, I came very early to admit the great benefits of colostomy, and have never performed it in any case in which either the patient or myself has afterward regretted it. This is exceedingly well exemplified in one of my patients upon whom I did the operation for non-malignant disease. The rectum has so far healed that I have offered to close the artificial anus; but she will not consent. The memory of her old sufferings is too vivid and her present comfort too great.

There can be no argument in favor of colostomy so strong as a single experience with a case of cancer of the rectum left to its own course and termination in fatal obstruction; and I think that no matter how strong one's prejudice against an artificial anus may be, a single case of this kind will convert him. There is no more painful death, and no class of cases in which the surgeon appears at a more hopeless disadvantage.

Colostomy should not, however, be looked upon merely as a means of preventing obstruction or of overcoming it when actually present. The operation fulfils other indications, and though not a very dangerous one when done early, the mortality is greatly increased by waiting till obstruction has set in.

Again, delay may cost a patient his life, for the hour when a chronic obstruction will change into a fatal condition can never be foretold, and after chronic obstruction has set in the dangers of colostomy are greatly increased.

The other cases, directly connected with the rectum, in which it may be necessary to create an artificial anus, are those of acute or chronic intestinal obstruction. In the formation of an artificial anus the left groin should be chosen for the site of the operation.

Colostomy.

Against the operation of lumbar colostomy there have always been several serious objections. The ground on which it was advocated, that by it the colon could be reached behind the peritoneum, was often false, for the peritoneum was frequently wounded in the attempt to reach the gut. The anus thus formed is awkwardly placed for the patient, so that he can exercise but little care over it without assistance. The operation of closing the fecal fistula thus formed is a very difficult one.

In children the loin operation presents still greater difficulties, for the undeveloped state of the colon renders it much more difficult to find than in adults, it presents many variations in position, and the relatively large size of the kidney greatly decreases the space in which the operator is obliged to search. In the child, too, the descending colon is almost completely surrounded by peritoneum.

In fact, the lumbar operation owed its popularity entirely to the false dread which so long existed against incising the peritoneum. This dread, and the surgery based upon it, have fortunately become things of the past.

Nevertheless the lumbar operation is applicable to cases of disease of the sigmoid flexure and of the colon in which the inguinal incision would be below the disease, and it is also much easier to perform than the inguinal in cases of great distention from obstruction, and for this reason it will never pass entirely out of practice.

Operation of Lumbar Colostomy.

The guide to the descending colon is the outer border of the quadratus lumborum muscle, and the guide to the outer border of the muscle is a perpendicular from a point half an inch posterior to the middle of the crest of the ilium, or to a point half an inch posterior to the middle of a line drawn from the anterior superior to the posterior superior spinous process. This point should first of all be accurately determined and marked with ink or iodine, for the edge of the muscle cannot easily be felt in many subjects. The descending colon is here sometimes uncovered by peritoneum to a considerable

extent, being behind that membrane and in immediate contact with the transversalis fascia. The patient should be placed upon a hard pillow, so that the loin may be brought into prominence, and the operator should stand at the back of the patient.

The incision should cross the edge of the quadratus obliquely from above downward and from behind forward, beginning at the left of the spine below the last rib, and extending four or five inches.

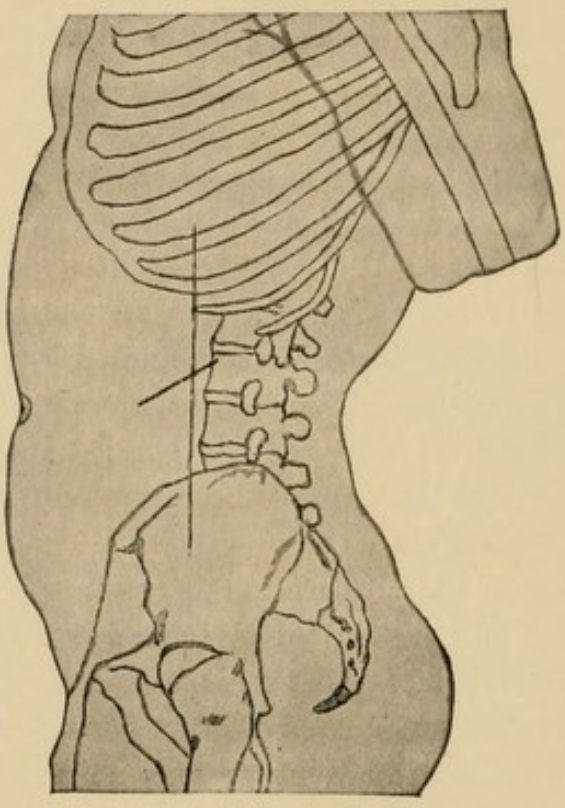


FIG. 167.
Incision for Lumbar Colostomy.

(Fig. 167.) In this way the middle of the outer border of the muscle will correspond to the middle of the incision, and the large branches of the spinal nerves will not be severed.

The incision is then carried carefully down, layer by layer, through the latissimus dorsi, external and internal oblique, and transversalis muscles, till the outer border of the quadratus is recognized; care being taken that as the incision grows deeper it does not also grow shorter, till, when the bowel is reached, the operator finds himself working in the small end of the funnel.

If possible the outer border of the quadratus should be distinctly recognized before the transversalis fascia is divided, under which lies the colon more or less enveloped in fat. This incision should not be more than three inches in length, for by limiting it to this extent the operator is in a manner compelled to come down upon the point required at which the colon is most likely to be reached, and great weakening in the abdominal wall and consequent prolapse are avoided, and considerable sphincteric power may be gained.

Having reached the gut, great care must be used in selecting the piece to be opened, for it is an easy matter to incise the duodenum

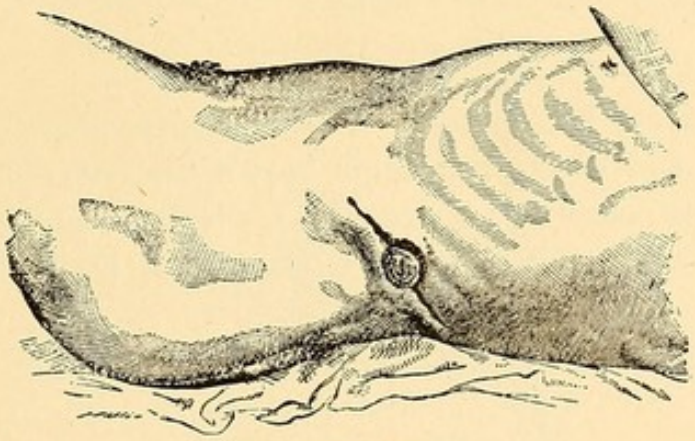


FIG. 168.
Lumbar Colostomy.

instead of the colon. No piece of intestine should be opened until the longitudinal bands in it have been clearly recognized. If this can be done to the operator's satisfaction without wounding the peritoneum, so much the better; but otherwise it is much safer to incise the serous membrane, pass the hand into the abdomen, and make sure that the colon and not the small intestine is being operated upon.

In a certain proportion of cases the ascending and descending colon will be found destitute of mesentery, and hence uncovered by peritoneum for a portion of the posterior wall, as shown in Fig. 169. This proportion is given differently by different investigators. Treves places it at seventy-four in one hundred cases on the right side and sixty-four in one hundred on the left. In other words, in only a

small proportion of all cases can either the ascending or descending colon be opened without first incising the peritoneum. My own preference for the inguinal operation is so strong that I have never taken the trouble to verify these figures.



Fig. 169.
Colon without Mesentery.

In a certain other proportion of cases, represented by Fig. 170, the ascending and descending colon have a short mesentery, or, in other words, are completely covered by peritoneum, so that they can neither be seen nor reached without opening the peritoneal cavity;

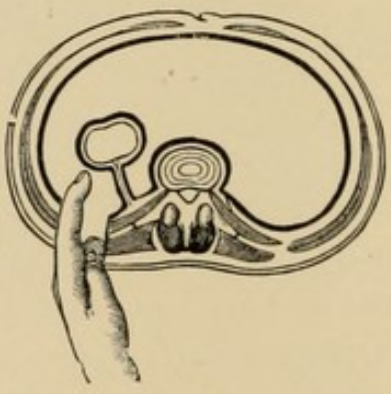


Fig. 170.
Colon with short Mesentery.

and in still others, shown in Fig. 171, there is a long mesentery allowing free motion of the colon.

These cases show how impossible it may be to reach the bowel without incising the peritoneum and introducing the hand into the abdomen.

When the gut has been found it should be stitched to the edge of the skin by sutures passing through the serous and muscular coats

before opening the bowel. These should be about a quarter of an inch apart. It is better to delay opening the bowel for at least forty-eight hours, unless the obstruction is so severe as to render the opposite course necessary.

It is of great importance in this, as in inguinal colostomy, to make so sharp a spur in the posterior wall as to prevent the passage of fæces into the distal end past the artificial anus. If the bowel can be drawn well out of the wound, this may be accomplished by passing a suture underneath it, drawing it tight, and securing it to the edges of the incision. The suture may be passed through the mesentery close under the bowel, if the mesentery can be reached; otherwise it may be passed through the muscular coat of the gut. Failing

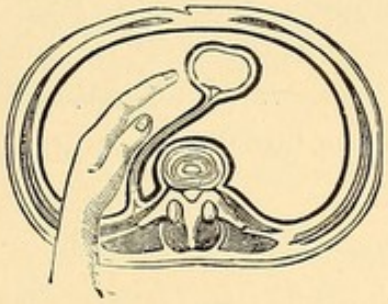


Fig. 171.
Colon with Long Mesentery.

to do this, the bowel should be drawn well out of the wound, so that in the undistended gut at least two-thirds of its calibre shall be outside of the line of sutures. In this way a sharp bend and a good spur are secured.

Inguinal Colostomy.

The operation in the left groin is to be preferred in all cases except those of great abdominal distention. It is attended by no greater danger than the lumbar operation, and in other respects has many advantages. It is easier of performance; the anus is so situated that the patient can better care for it and secure cleanliness; it is more easily closed by a subsequent operation; it allows the terminal portion of the gut to be more easily cleared of any fecal matter which may collect in it.

This operation permits also of considerable choice in the part of the sigmoid flexure to be opened. The opening may be made low down toward the rectum or high up toward the colon—so high that only a few inches of the gut shall intervene between the opening in the groin and the place that would be occupied by one in the loin; and should the descending colon be found diseased, the transverse may be easily drawn over to this incision and opened. This I have done.

Inguinal Colostomy.

The instruments necessary are:

Knife.
Eight pairs of artery forceps.
Blunt-pointed scissors.
Needle-holder.
Medium full-curved Hagedorn needles.
Fine straight Hagedorn intestinal needles.
Fine black silk.
Fine catgut.
Silk-worm gut.
Two perforated shot and shields.
Forceps for squeezing shot.
Two dissecting forceps.

The incision, Fig. 172, should be two and a half inches long, two inches from the anterior superior spine, and across an imaginary line from the anterior superior spine to the umbilicus.

Open the peritoneum between two pairs of forceps in the usual manner. Catch and hold its free cut edge at the lower and upper angles of the incision and at two points between on each side, leaving the six forceps attached. Pass a Hagedorn needle threaded with silk-worm gut and armed with a perforated shot at the end completely through the abdominal wall from without inwards at a point one inch from the free margin of the incision toward the median line and rather nearer the lower than the upper angle of the wound. Bring the needle out of the cut and lay it still threaded on the abdomen. Next find the sigmoid flexure and bring a knuckle of it out of the wound. Hold this piece of gut between the fingers of the left hand

and pass the threaded needle through its mesentery as near as possible to the gut without wounding it. Then carry the needle through the abdominal wall from within outward at a point corresponding to

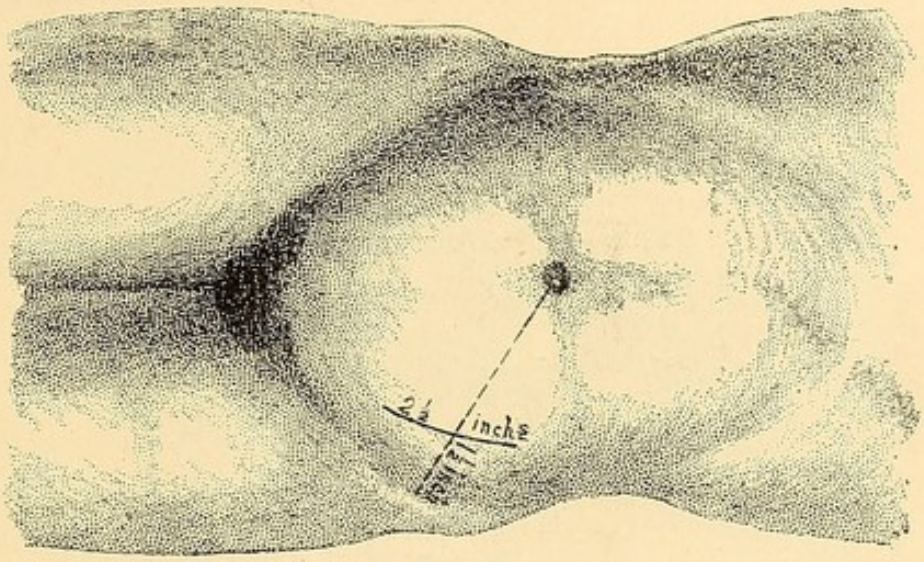


FIG. 172.
Inguinal Colostomy.

the point of entrance, only on the opposite side of the incision, draw it taut and secure it with a perforated shot.

In this way a suture is passed under the gut, which will cause it

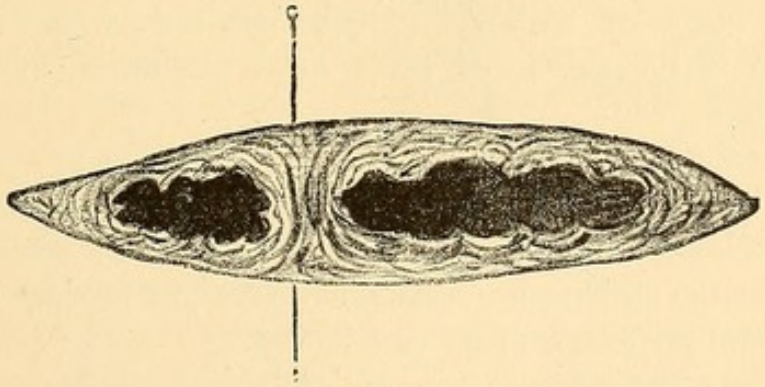


FIG. 173.
Inguinal Colostomy.

to bend sharply, and at the same time the sides of the incision are drawn together and firmly held.

Next suture the gut to the cut edges of the peritoneum of the incision, and both to the margins of the skin incision. The fine

black thread is used for this purpose and the stitch is passed first through the margin of the skin, next through the corresponding margin of the parietal peritoneum, and finally through the peritoneal and muscular wall of the gut. (Fig. 174.) The needle does

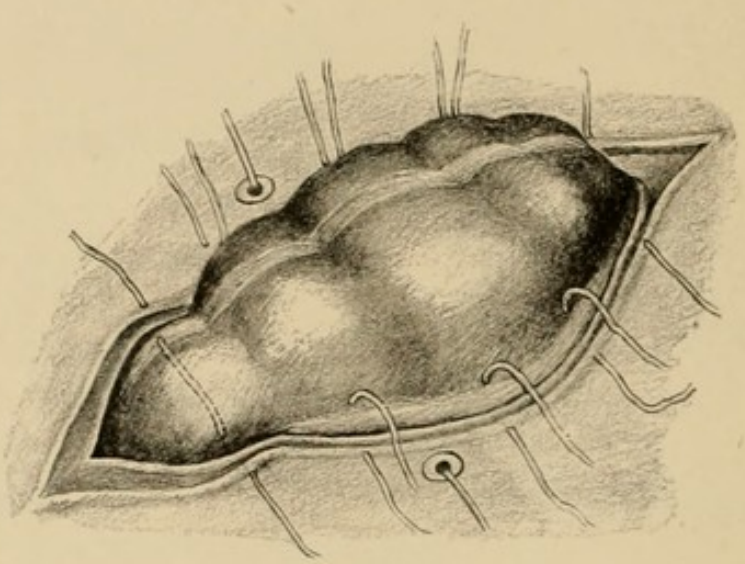


FIG. 174.
Inguinal Colostomy.

not enter the cavity of the gut nor is the muscular layer of the abdomen included in the stitch.

When such a stitch is tied the peritoneum of the gut will be brought into contact with the parietal peritoneum, and both with the margin of the skin; and the general peritoneal cavity will be closed at this point.

About eight such sutures should be passed, one at each end of the cut and three on each side. Whenever possible the stitch should include the longitudinal band of the gut, which can always be plainly seen. As the stitches are secured, the forceps holding the edges of the parietal peritoneum may be removed.

In this way the selected knuckle of intestine drawn well out of the wound is firmly secured with peritoneum against peritoneum, the general peritoneal cavity is closed, and the strain is taken off the fine silk sutures by the silk-worm suture passed through the whole thickness of the abdominal wall and under the intestine. Should any appendices epiploicæ hang free in the wound they may now be tied off and cut away and the gut may be opened. This is best done

with scissors. A small opening is made in the knuckle of intestine near the upper edge of the wound, a finger is passed into this for a guide, and the projecting part of the gut trimmed away down to within a quarter of an inch of the margin of the skin.

When the bowel has been opened the appearance of a double-barrelled gun, shown in Fig. 173, with the lower orifice smaller than the upper, becomes evident.

The silk-worm suture may be removed at the end of the fourth day, when firm adhesions have taken place; the others may be left to find their own way out. The opening is dressed merely with a piece of sheet lint and vaseline, and pad and bandage. By the end of the tenth day the patient is generally up and about, and is convalescent in two or three weeks.

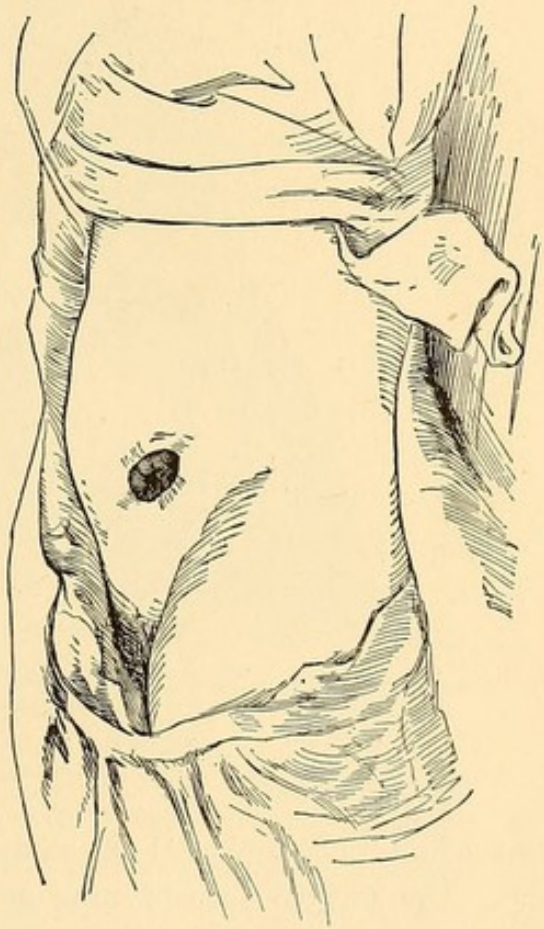


Fig. 175.
Artificial Anus.

It will occasionally happen, no matter how great care be taken in the formation of a spur, that fæces will pass the artificial opening and occupy the diseased rectum. To avoid this, I now, in cases of incurable disease (chiefly cancerous) frequently adopt the plan of completely dividing the gut, invaginating the lower end, and suturing the upper to the skin incision. When this is done it should never be taken for granted that the gut presents in the wound in its natural position and direction. It may easily be reversed and it must be exceedingly awkward to invaginate the proximal end and stitch the distal into the wound, as has happened.

Much greater care is necessary in the technique of this operation

than in that just described. After the peritoneum has been incised and secured with six or eight artery forceps, it should be stitched to the skin all around the incision with a running suture of black silk.

Next, the sigmoid should be found, its direction verified, and the desired loop brought out of the incision. The wound in the abdomen should then be completely closed with gauze to prevent soiling of the

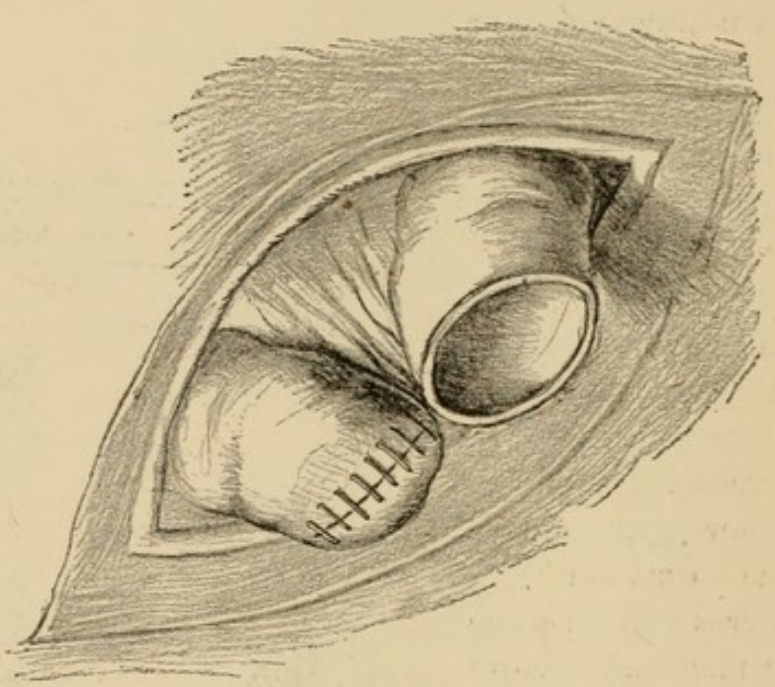


FIG. 176.

Colostomy.

Distal End of Gut Invaginated.

peritoneum, and the bowel cut completely across down to the mesentery. The cut-surfaces of mucous membrane should be carefully wiped with pieces of dry gauze till all traces of fecal matter have been removed. The proximal end is given to an assistant to hold, and the distal is invaginated and closed with a continuous Lembert suture (Fig. 176). The packing is next removed from the wound, the invaginated end reduced to the abdominal cavity, and the operator's left index finger passed into the proximal end as a guide, and held there until the suturing of this end to the margin of the wound is completed (Fig. 177). A continuous suture of silk is best for this

purpose, and the suture includes all the coats of the bowel, the edge of the peritoneum lining the incision, and the skin. A dressing of cotton and a body bandage are all that are necessary.

There is a theoretical objection to this operation in that, should the anal end of the piece of gut which has been invaginated and

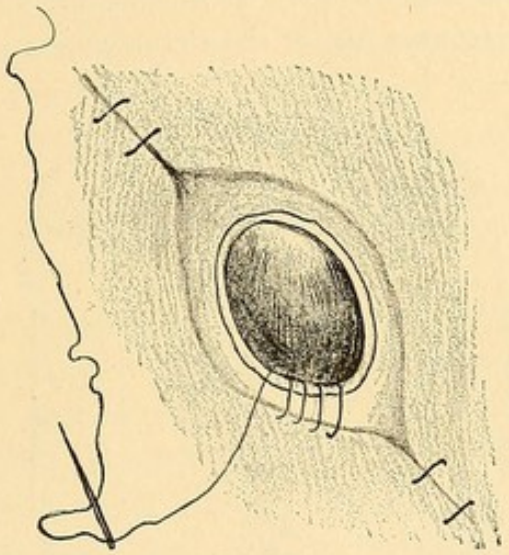


FIG. 177.
Colostomy.

dropped also become entirely closed by the progress of the disease, a closed sac full of foul discharge for which there is no escape might be formed and render necessary a second opening of the abdomen. I do not know that this has ever happened, but it has occurred to me as a possible complication.

Another way of securing a good spur is shown in Fig. 178.

The operation requires a long mesentery, but is then easily accomplished. One row of Lembert sutures is generally sufficient on each side, though many prefer a double row. The approximated surfaces should be at least two inches in length.

In the after-treatment of the opening I have found nothing much better than a dressing of greased sheet lint, a pad of cotton, and a wide elastic bandage. I generally have a truss, exactly similar to the ordinary truss for hernia, with a hard rubber bulb to fit the opening, made for each case; but most of the patients make little use of it, and are perfectly comfortable without the increased pressure it affords.

In non-malignant disease it is well in the operation to preserve as much of the circumference of the gut intact as possible, in case it should in the future be thought advisable to close the artificial anus. The only difference in operating to secure this end is to include less of the circumference of the gut in the row of sutures—making the opening only large enough to give a free outlet, and making the incision in the gut horizontal rather than transverse.

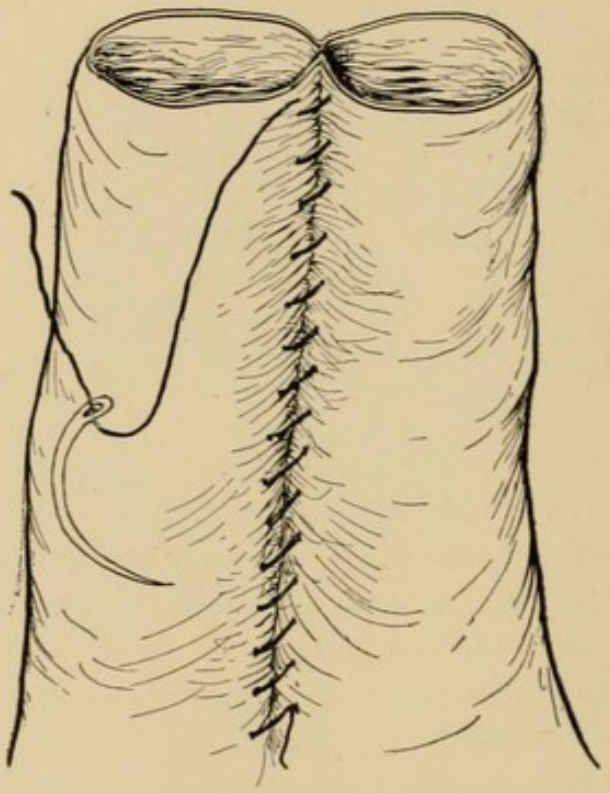


Fig. 178.

Formation of Spur in Colostomy.

After the operation the action of the bowel may be left to nature. Sometimes during the operation scybalous masses may be felt in the sigmoid flexure, and these are an additional indication that the large bowel is under the finger. If possible I always prefer to have these masses above rather than below the point of gut to be opened, for their evacuation is then easy ; and when in the distal portion they cause pain by their presence and may have to be washed down and out with the syringe.

The first evacuation may occur immediately the bowel is opened, or may be delayed several days or even a week. In the latter cases there has probably been chronic dilatation and obstruction, and some time is required for the muscular wall to recover its tone.

With regard to the artificial anus, cases of sphincteric action have been reported, but it is safer not to promise so favorable a condition. In none of my cases have I seen anything that could properly be called voluntary control of the evacuations. This does not, however, imply that these patients are troubled with a constant involuntary evacuation of fæces, for such is not the case. I have one patient, indeed, who never has a movement more than once a week, and only after a laxative.

When the patient has diarrhœa there will be a constant discharge of fluid fæces till the diarrhœa is checked; but under ordinary conditions the bowel can be trained to move at a regular time each day, the patient is easily able to care for the evacuation, and is then comfortable for the balance of the day. Both men and women are able to attend to their duties and enjoy a fair degree of health; and in cancerous disease I have had several patients live beyond four years from the time of operation.

I have had some curious experiences with this operation, which may be of interest. The greatest practical difficulty I have ever met, and that has been met more than once, is to find the sigmoid flexure so bound down into the iliac fossa, either by an absence of the normal mesentery or by old adhesions, as to render it difficult to bring it up into the incision and stitch it there so as to make a good anus.

This difficulty, though detracting from the accuracy and beauty of the performance of the operation, has never but once been insurmountable, except in so far as it interferes with the formation of a spur. In that case sigmoid flexure and mesentery were both so involved in cancerous disease that I preferred to open the transverse colon and stitch it to the incision.

A very untoward accident happened in another case. The only thing noteworthy about the operation was that the gut was very thin from old dilatation and obstruction, and that the intestine was moderately full of gas and solid fæces. When putting in the sutures I remarked on the abnormal thinness of the gut, and, as far as pos-

sible, these were placed in the longitudinal bands, in order to secure as much strength as possible.

Twenty-four hours later my assistant made the usual visit in my place, and was informed by the nurse that about an hour before his arrival there had been a sudden gush of serum which had saturated the dressings. Such an unusual occurrence led him to remove the layer of cotton with which the abdomen was covered, and exposed the fact that about five feet of small bowel were outside of the abdomen and firmly strangulated by the abdominal wound. The gut was cold, but on cutting the silk-worm suture the circulation at once returned and the mass was reduced without great difficulty. On my arrival I found the sigmoid still fastened to the incision as at the time of operation, except where three of the sutures had torn out, and through this unprotected point the protrusion had occurred. Sutures were passed through the entire thickness of the gut on that side, and, when it was once more firmly secured, it was opened to prevent further accident. The man made an uninterruptedly good recovery.

This same accident happened also in one other case, and ended fatally from the gross carelessness of the house physician in the hospital. The evisceration was not discovered till it had been out many hours and the patient was in collapse. Both cases were due to the effort to dispense with as many sutures as possible, and thus shorten the time of the operation. This is my only case in which a fatal result has been due directly to the operation.

Another case was unsuccessful, but from no fault of the operation. The patient was over sixty and much exhausted with the cancerous disease. When the abdomen was opened it was found partially filled with serum; the intestine was greatly congested, and the entire mesentery was infiltrated with cancer. There were no distended coils of gut, both large and small bowel being empty and contracted. It was with great difficulty that a piece of the sigmoid flexure could be stitched into the abdominal incision, so closely was it bound down by cancerous infiltration of the mesentery, and a loop of small intestine which also appeared in the wound was only a trifle more movable. The large intestine was chosen and with difficulty sutured, the muscular layer being very friable. The patient did well for forty

hours, when severe vomiting began and the temperature steadily rose to 105° with signs of collapse.

The wound was examined and found in good shape; the bowel was incised, but there was no escape of gas as is usual, and only a small quantity of fæces was found by introducing the finger into the proximal end. Death followed in a few hours, with all the symptoms of collapse, and on opening the abdomen a complete obstruction with a gangrenous loop was found in the large intestine at the splenic flexure.

The obstruction was due to a band of cancerous mesentery which had caused a sharp flexure in the gut, which flexure was completely obstructed by a small scybalous mass. Although the obstruction had been fatal in less than twelve hours, there was no great distention of the large intestine above the obstructed point; and though I had opened the gut as soon as the vomiting began, under the impression that the symptoms might be due to the complete obstruction caused by the operation, the failure to find any obstruction at the wound, joined to the fact of a temperature of 105°, led me to suppose that the patient was dying of septic peritonitis.

In some cases after the operation an annoying prolapse of mucous membrane will occur. This has seldom been an element of trouble in any of my cases, and I attribute the fact to the drawing down of the upper part of the coil firmly before attaching it to the skin. The prolapse may, however, come from either the proximal or distal portion of the gut or from both, and may reach such a degree as to demand further operative interference.

Under such circumstances, rather than amputate the prolapsed gut, I prefer to reopen the abdomen at the side of the original incision by prolonging it an inch or so at either the upper or lower end, dissect the gut entirely loose from its attachments, divide it across, trim the distal end, invaginate it and drop it into the pelvis; and then, after trimming the proximal end, attach that to the abdominal wall and close the remainder of the abdominal incision. This has worked well in the few cases in which I have been called upon to relieve the condition.

The Closure of Artificial Anus and Fecal Fistula.

An artificial anus is now so frequently made as a temporary measure of safety in the performance of more serious surgical operations upon the alimentary canal, or to tide a patient over the stage of collapse in intestinal obstruction, that its subsequent closure becomes a matter of frequent necessity.

Fecal Fistula.

The distinction between an artificial anus and a fecal fistula is usually considered to be that the former is made intentionally by the surgeon, while the latter is the result of a pathological process which has destroyed a portion of the canal of greater or less extent. Many an attempt to form a useful artificial anus has resulted, however, merely in the production of a fecal fistula which it is very difficult to keep from closing spontaneously.

Fecal fistula may result from many causes, the most frequent of which are traumatism to the intestine in the performance of pelvic surgery, and abscesses in the pelvis or around the appendix.

The abscess may be the primary cause of the trouble resulting in perforation of the gut, in which case the fecal fistula may already exist before the abscess is evacuated by the surgeon; or the perforation of the gut from ulceration or from traumatism in an abdominal or pelvic operation may precede the formation of the abscess.

Other known causes of fecal fistula are:

Strangulation of the gut in hernia.

Foreign bodies.

Gunshot or penetrating wounds.

Cancerous deposits.

Actinomycosis in the intestine.

The complicating condition in the treatment of fecal fistula is the presence of the abscess cavity. Were it not for this a simple plastic operation would cure most of those which do not close spontaneously or are not due to cancerous destruction; and the treatment often divides itself necessarily into two factors, the closure of the fistula and the cure of the abscess.

Many fistulæ of this kind close spontaneously or with stimulating the cutaneous orifice. These are the ones in which nature has fortunately failed to bring the gut close to the skin and line the external orifice with mucous membrane, as it is always the object of the surgeon to do in the formation of an artificial anus.

Treatment is therefore carried out on the following principles:

Before any operation is undertaken time should be given for the fistulous tract to close spontaneously, or as a result of stimulation.

Should the discharge of pus indicate a considerable abscess cavity this should be opened and drained and every effort made to induce it to heal, in the hope that the opening into the gut may also close.

Should these measures fail the fistula must be laid open from the skin to the gut, the abscess cavity cleaned out with as great protection to the general peritoneum as possible, and the opening into the gut freshened and sutured if possible, or else resected.

The presence of the abscess and consequent infection of the general peritoneum is the cause of the high mortality in this procedure, and hence it is not to be recommended till all other methods have failed.

Should the fistula be in the small bowel and free, rapid emaciation may compel operation. In the large bowel, however, the patient may have so little discomfort that radical operation need not be urged.

In doing a colostomy the operator should always have a very definite idea as to whether the opening is to be a permanent one or may be closed at some future time should the case progress favorably, and regulate his work accordingly. If the opening is to be permanent, as in cancer of the rectum which cannot be excised for example, the wall of the bowel may be freely excised or divided transversely and the most effective outlet possible may be aimed at; while should the opening be only provisional, a mere longitudinal incision into the bowel which can easily be sutured by a secondary operation may answer every purpose.

The old operation for closing an artificial anus consisted first in destroying the spur by means of pressure forceps (Figs. 179 and 180), and subsequently drawing two flaps of integument over the outlet, but with the bolder surgery of to-day these older methods have passed into history. The presence of a spur sufficiently large and heavy to be a cause of obstruction would now be overcome by a com-

plete resection of the ends of the gut and the re-establishment of its continuity by some form of suture. This would be much safer and more surgical than to establish a sloughing process within the abdomen in the hope that it might proceed just far enough to destroy the spur and cease before a fatal peritonitis was set up.

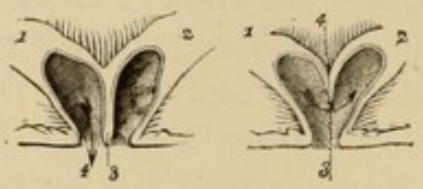


FIG. 179.

Condition of Bowel after Colostomy, showing Septum and course of Fæces.

The closure of the orifice may be accomplished in several ways. If the wall of the bowel has not been sacrificed the edges may be dissected up without passing beyond the adhesions to the abdominal wall, turned into the lumen back to back and the opposing serous surfaces sutured. The edges of the mucous membrane alone may be

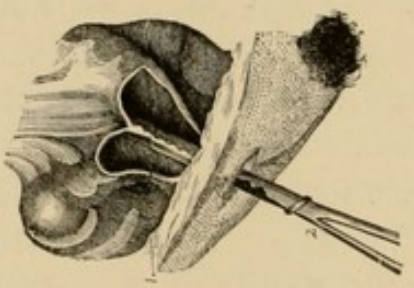


FIG. 180.

Enterotome of Dupuytren in Position.

treated in the same way and may form a sufficient covering when the skin has been dissected up and drawn over them.

Szymanowski's operation for the closure of urethro-perineal fistula may also be applied to the closure of artificial anus. The steps in the operation are as follows:

A single straight incision is made, from A, three-quarters of an inch in front of, to B, three-quarters of an inch behind, the fistula (Fig. 181). This incision passes through skin and superficial fascia, and closely skirts the right side of the fistula. The edge of this in-

cision is raised, and, working with a small blade to the patient's right side, the skin and fascia are undermined until a pocket is formed including the area A C B F, the right edge of the pocket being indicated by the dotted line A C B (Fig. 182).

On the opposite side a curved incision, A D B, is then made, the greatest width of the flap thus marked out being three-quarters of an inch to one inch.

This flap must be generous and should include a good padding of fascia, as when it is lifted the shrinkage is great.

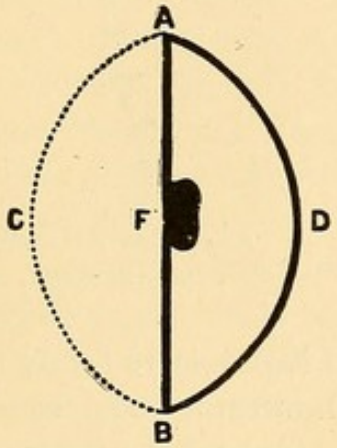


FIG. 181.
Szymanowski's Operation.
First Stage.

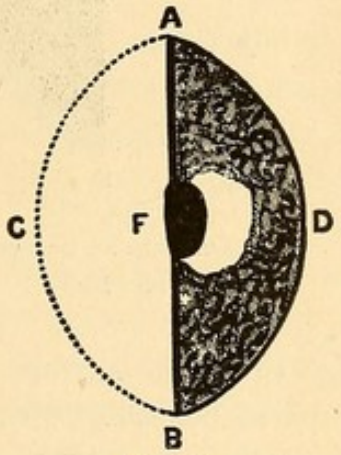


FIG. 182.
Szymanowski's Operation.
Second Stage.

Before lifting the flap a thin layer of skin is removed from its surface. This is best done with small curved scissors, the superficial layer of skin being rapidly chipped off.

The freshening process is carefully extended over the entire area A D B F, excepting over a surface a little larger than the fistula, and immediately next to it.

The flap A D B is then dissected up close to the median line and inverted, its attached edge acting as a hinge and as a medium for blood-supply (Fig. 182).

Five or six fine catgut sutures are passed through the skin at different points a little beyond the dotted line A C B, into the pocket, then through the free edge of the flap, and then back into the pocket

and out through the skin. Five or six loops are thus formed, by drawing upon which the flap is closely drawn down to the bottom of the pocket, and the free ends of the loops are tied. (See Fig. 183.) Two or three sutures of catgut are now passed with a curved needle

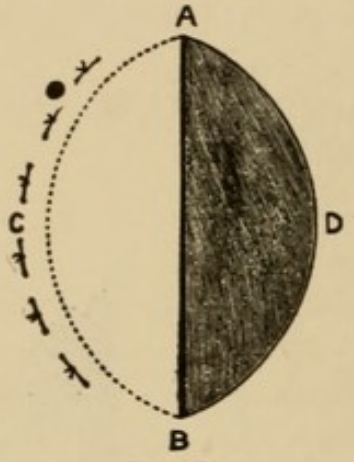


FIG. 183.
Szymanowski's Operation.
Third Stage.

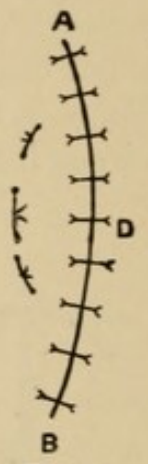


FIG. 184.
Szymanowski's Operation.
Fourth Stage.

through the upper surface of the inverted flap so as to firmly bind it to the parts beneath. Sometimes with interrupted and sometimes with a continuous catgut suture the free edge, A F B, is now securely fastened to the edge A D B.

CHAPTER XIX.

INTESTINAL RESECTION AND ANASTOMOSIS.

ALL methods of anastomosis reduce themselves practically to two —end to end and lateral.

Of each of these there are many varieties. No effort will be made to describe them all, only those being selected which are the simplest and most efficient, and the technique of which should be fully under the control of every man who ventures to open the abdomen for any purpose whatever.

The present tendency of surgical opinion is against the use of mechanical appliances in anastomosis. The best union of all is one made by the needle and without the introduction of a foreign body. The technique of these operations has so far improved that the only argument left in favor of the simplest and best of all the mechanical appliances, the Murphy button, is that by its use time may be saved; and this advantage is more than counterbalanced by the risks inherent in the button itself.

The element of time may be exaggerated. To a rapid and experienced operator the time saved will not be very great. Since, however, the button may be used by those of little experience in intestinal surgery who have no time in an emergency to send for an experienced operator; and since it occasionally serves a good purpose, a description of the method of using it will not be omitted.

Abbe's Anastomosis.

The best of all methods of lateral anastomosis is that devised by Abbe. The instruments necessary besides those ordinarily used in opening the abdomen are:

Six fine cambric needles.
Fine black silk.
Two intestinal clamps.
Thumb forceps.
Artery forceps.
Catgut for ligatures.
Straight scissors.
Flat sponges.

The six needles should each be threaded with the black silk twenty-four inches long. Abbe ties the thread into the needle with a single loop and cuts one end short, to be out of the way.

After applying the clamps and resecting the diseased intestine with what mesentery may be necessary, and attending to the hemorrhage from the cut mesenteric margins, the ends of the gut are invaginated in the usual way.

Even this requires a little skill to do it quickly and neatly. The cut end of the gut should be seized with thumb forceps in one hand while the gut itself is held firmly between the thumb and finger of the other hand about an inch from its extremity. The margin can then generally be turned into the lumen without difficulty, and held there between the thumb and finger until a Lembert suture can be introduced and close permanently the cut end of the bowel.

In Abbe's own words, we next "apply two parallel rows of continuous Lembert suture a quarter of an inch apart and an inch longer than the proposed cut (Fig. 185), leaving each thread with its needle attached at the end of its row. Now open the bowel by scissors, cutting a quarter of an inch from the sutures, both rows of which are to remain on one side of the cut (Fig. 185).

"Make the bowel opening four inches long. Apply clamps temporarily to several bleeding points, pinching the entire thickness of the cut edge without hesitation. Apply no ligatures. Treat the opposing bowel in the same manner. The clamps remaining *in situ* the parts are quickly rinsed with water. Another silk suture is now started at one corner of the openings and unites by a quick overhand, the two cut edges lying next the first rows of sutures. The needle pierces both mucous and serous coats and thus secures the bleeding vessels from which the clamps are removed as the needle

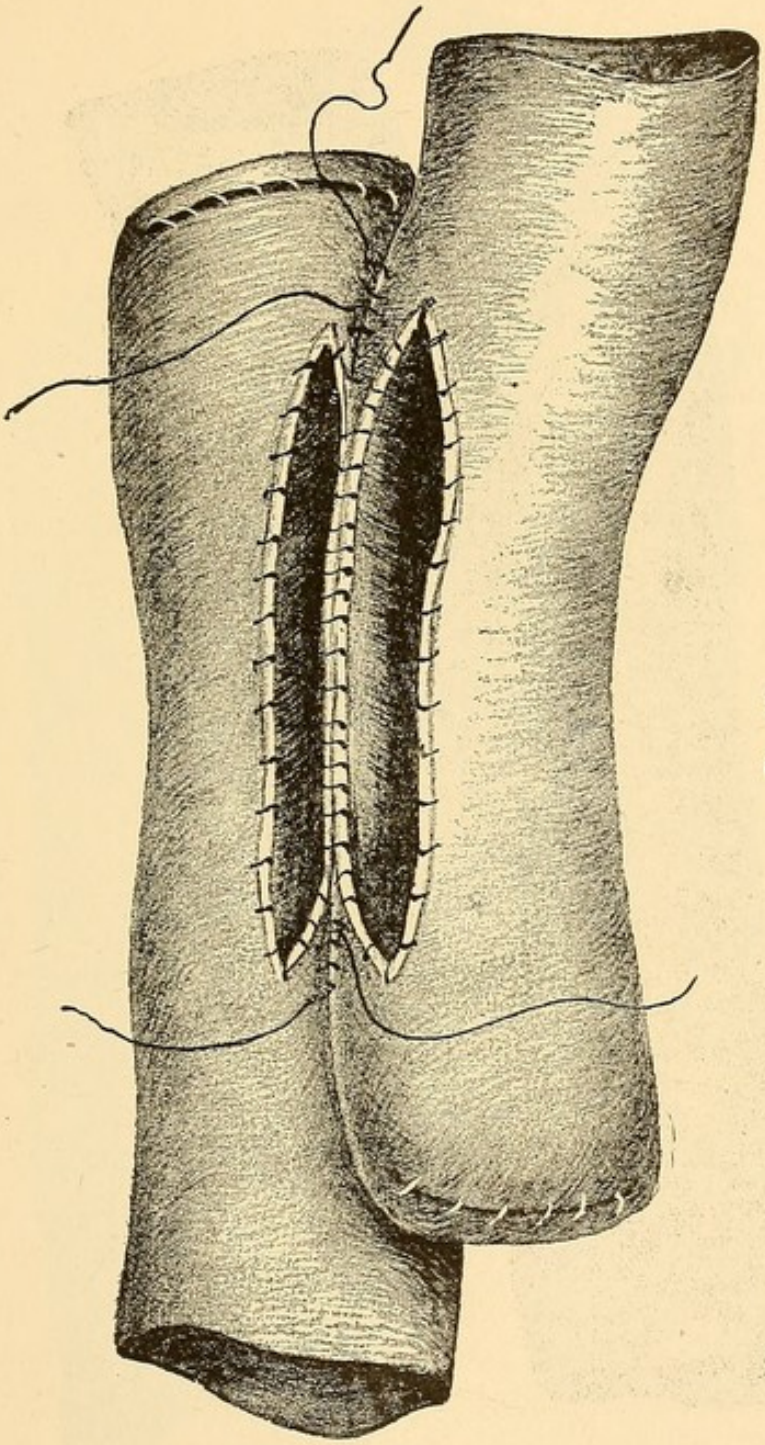


FIG. 185.

Abbe's Lateral Anastomosis. First Step.

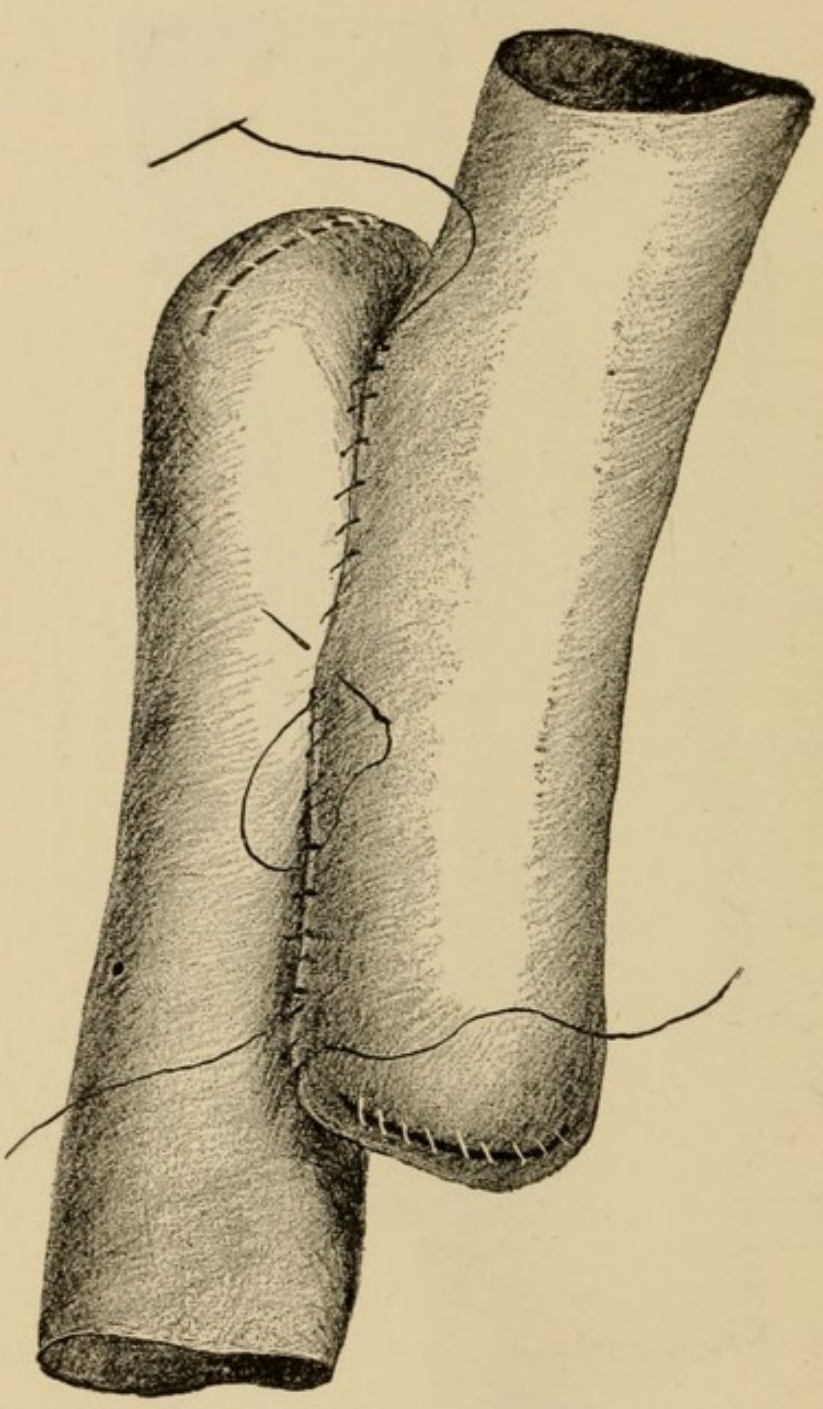


FIG. 186.

Abbe's Lateral Anastomosis. Second Step.

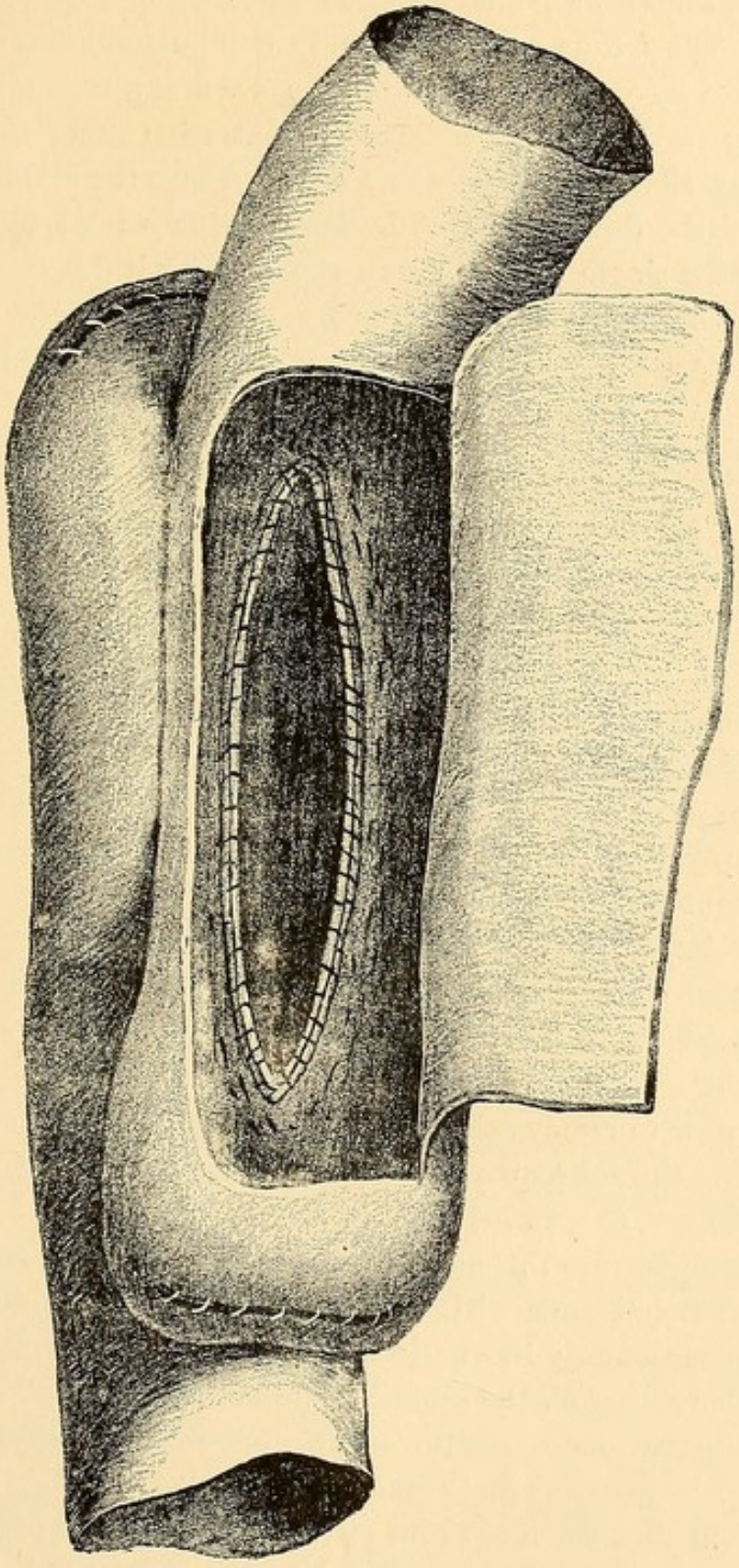


FIG. 187.
Abbe's Lateral Anastomosis.

reaches them. The suturing is then continued round each free edge in turn, and all bleeding points are thus secured more quickly than by ligature. The serous surfaces round these button-holes are then rapidly secured by a continuation of the suture first applied, the same threads being used, the one nearest the cut edge first; the united parts are again rinsed with water and dropped into the abdomen."

Instead of the double row of Lembert sutures used by Abbe I have employed a single row of Lembert sutures with perfect result and I believe a saving of time; for by this method and without hurrying I have completed a gastro-intestinal anastomosis in thirty minutes.

Maunsell's Anastomosis.

This is by far the most satisfactory form of end to end suture, the only objection to it being that it requires considerable mobility in the portion of gut operated upon and hence is not always applicable.

The instruments necessary are the same as in Abbe's operation, except that so many needles are not necessary, and a fine Hagedorn needle answers as well as any other.

Isolate the piece of gut to be operated upon, strip the contents out of it and apply the clamps. Resect the portion necessary and its attached mesentery as before.

Select a point in either the proximal or distal portion of the gut, as may be most convenient, about six inches from its cut end and make a longitudinal incision an inch and a half long in its unattached border (Fig. 188, A).

It is well now to remove the intestinal clamps which are much in the way during the subsequent steps and trust the cut ends of the bowel to assistants to prevent leakage.

Pass a strong suture through the two ends of the gut from within outward at B and from without inward at C, and include the cut edges of the mesentery in the loop. Repeat the operation with another similar suture on the opposite edges.

Pass a long pair of forceps through the opening A, gather the ends of the sutures in its grasp and bring them out through A.

It is evident that when the four strings are drawn taut and pulled upon the cut edges CC will be pulled into the lumen BB, and that

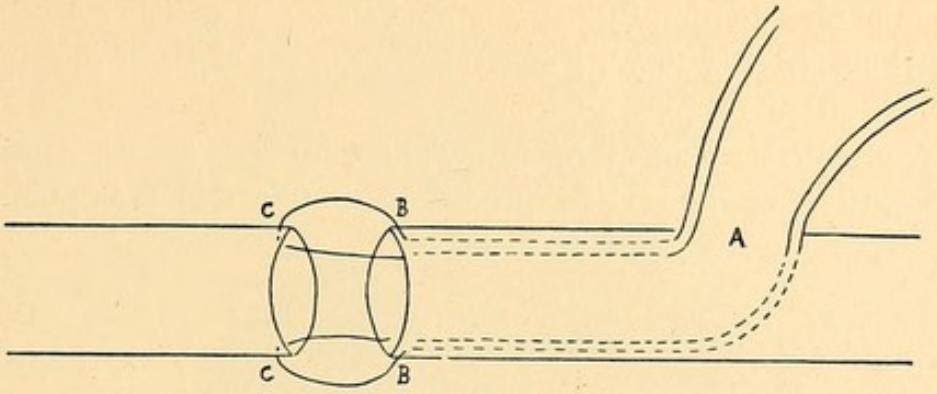


FIG. 188.
Maunsell's Anastomosis.

cut edge BB will also be inverted until both cut edges appear through the opening A with their serous surfaces in contact.

Pull the edges B and C well out through the opening, and, while

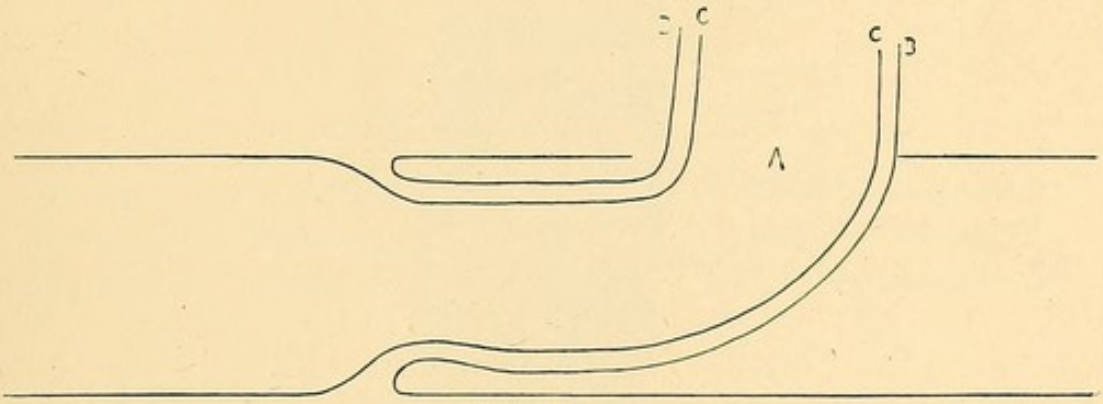


FIG. 189.
Maunsell's Anastomosis. Second Step.

a finger is introduced into the lumen of the bowel at C to keep the parts in relation, run a close overhand silk suture through all the coats of both B and C. Cut away the leading strings, carefully

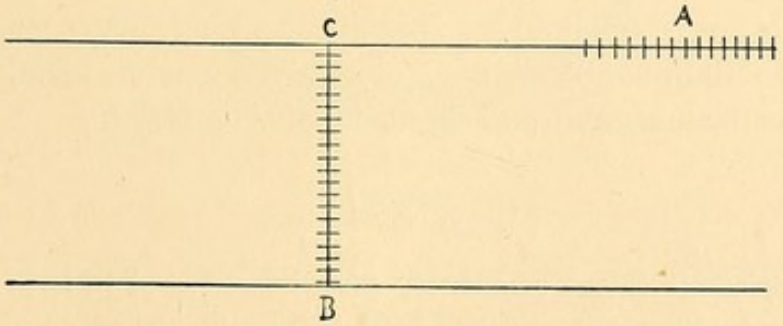


FIG. 190.
Maunsell's Anastomosis Completed

reduce the invagination by traction, and close the opening A with a Lembert suture (Fig 190). Finally unite the cut edges of the mesentery.

It is evident that both these forms of anastomosis require considerable length of free bowel for proper coaptation and manipulation.

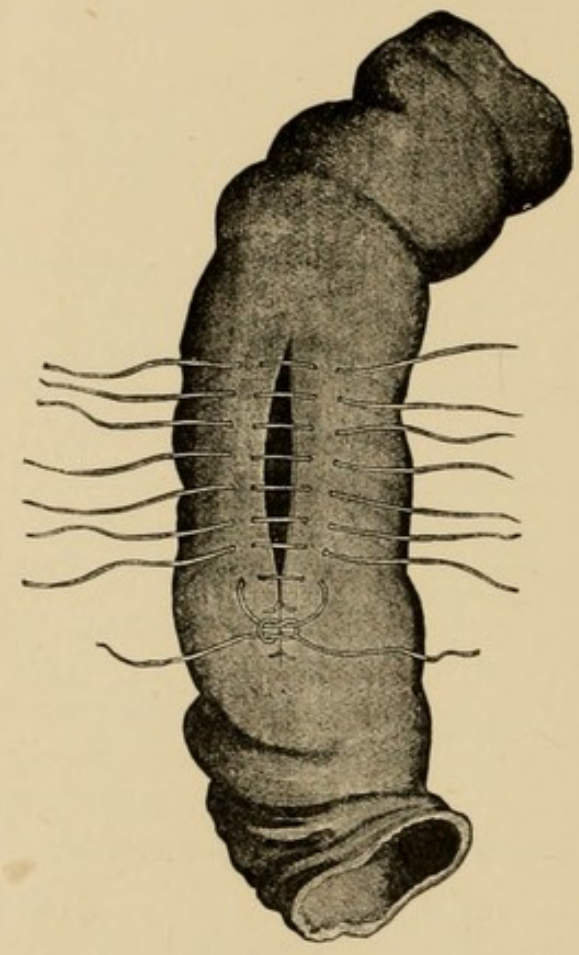


Fig. 191.
Lembert Suture.

Should this not be obtainable a simple end to end suture may be done with two continuous silk sutures, one for the mucous membrane and another for the muscular and serous layers combined.

Forms of Suture.

In practice all forms of sutures may be reduced to two, the Lembert shown in Figs. 191 and 192, which may be either continuous or interrupted, and the combined Czerny and Lembert suture shown in

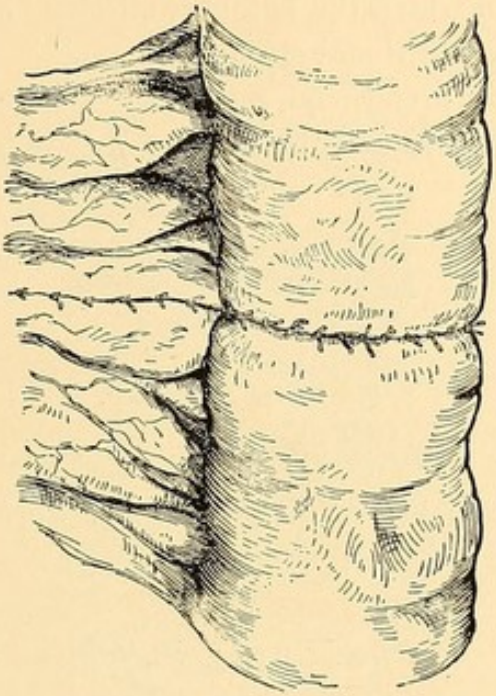


FIG. 192.
Lembert Suture.

Fig. 193. The latter consists of two different sutures, one uniting the mucous membrane, which ulcerates through into the calibre of the gut, and one uniting only the peritoneum, which becomes encysted.

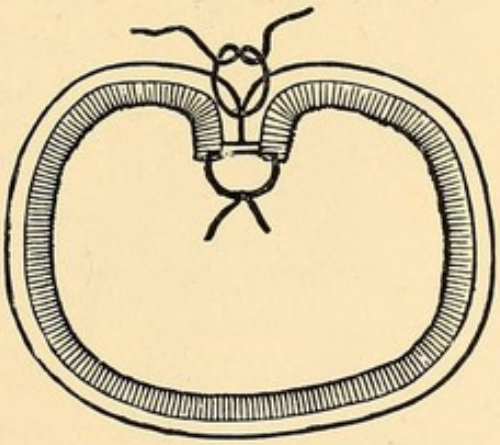


FIG. 193.
Czerny-Lembert Suture.

Many more elaborate forms of suture have been devised, but these two will answer every practical purpose.

The end to end suture shown in Fig. 194 is a modification of the

Czerny-Lembert, in which the Lembert stitch is made to include the muscular layer for additional strength.

If the operator prefer, he may use a number of interrupted sutures for the mucous membrane (about four to the inch) and all



Fig. 194.
End to End Anastomosis.

but the last two or three of these may be tied with their knots in the calibre of the bowel, but results in clinical work have proved that this is not necessary.

The Murphy Button.

This device is shown in Fig. 195, and its method of application in Fig. 196, and Fig. 197, and Fig. 198.

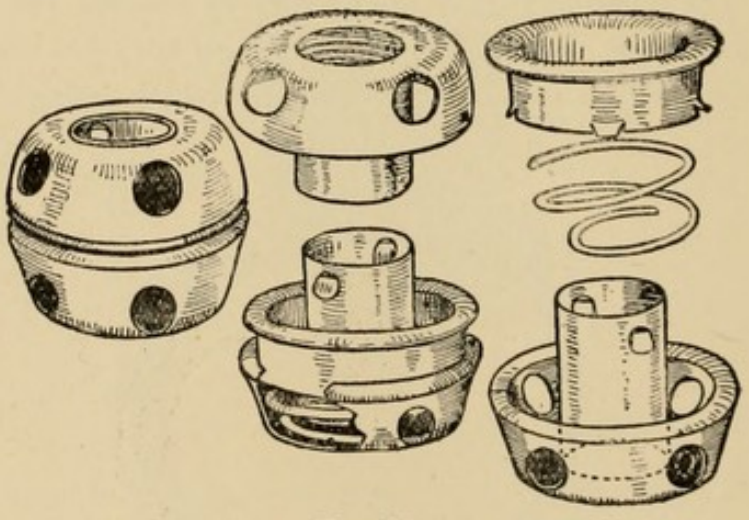


Fig. 195.
The Murphy Button.

It can be used either for end-to-end or lateral anastomosis, but for the latter an oblong button at least an inch and a half in length is much better than a circular one, and in any case the openings made by this mechanical contrivance are apt to contract so as to cause stricture.

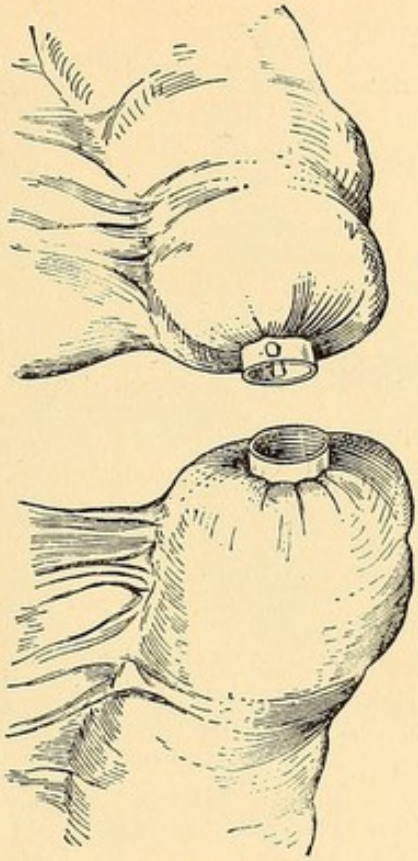


FIG. 196.
Murphy Button in Position, ready for Closure.

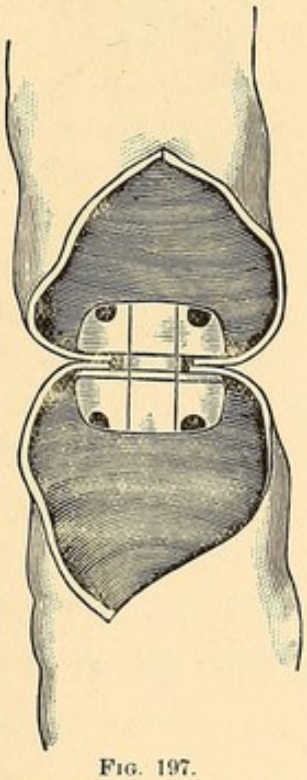


FIG. 197.
Murphy Button Closed.

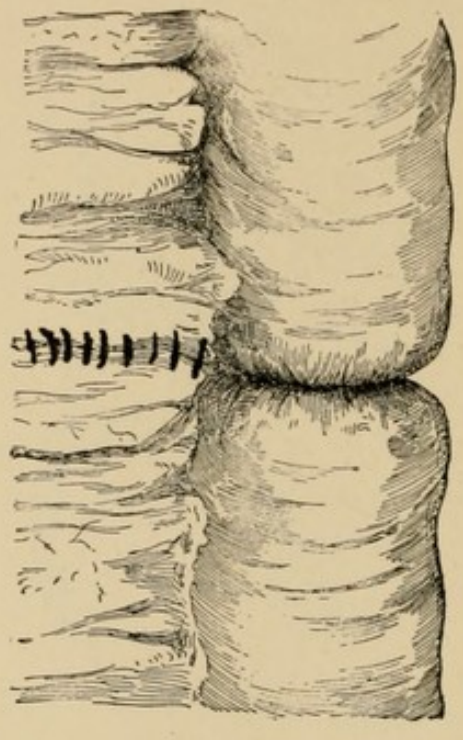


FIG. 198.

Appearance of Gut after Closure of Murphy Button.

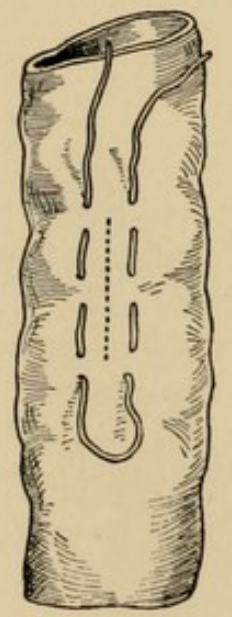


FIG. 199.

Lateral Anastomosis with Murphy Button, showing Incision and Draw-string.

In using the button, care must be taken that no mucous membrane shall protrude between the peritoneal surfaces after the button has been closed, otherwise there will be no union.

In lateral anastomosis a draw-string is first passed as in Fig. 199, and the button slipped into the incision and held with forceps while the string is tightened and tied.

In end-to-end anastomosis the cut edge of the gut is whipped over by a continuous silk suture which, after the insertion of the button, is tightened, and tied around the stem.

Should any mucous membrane protrude after the halves of the button have been closed on each other, they must be carefully buried with additional Lembert sutures. When perfect apposition of the serous surfaces is secured by the button, no additional suturing is necessary.

The number of accidents attendant upon the introduction of this metallic body into the intestine is already very considerable ; and it should only be used in the rare cases of shock where great rapidity becomes the most essential consideration.

Back to Back Suture.

In some cases the loss of tissue in the gut is so great that the operator fears to close the opening by suture, lest stricture should result, and yet hesitates to do a complete resection.

Under such circumstances the suture shown in Figs. 200 and 201 may answer a very useful purpose. By it the calibre is preserved to the greatest possible extent.

This method is especially applicable to ragged ulcers of the intestine, the edges of which must be freshened. The opening in the bowel should be three or four inches long, and the Czerny-Lembert suture is safest, as there may be considerable tension from within the bowel before firm union has had time to occur.

Lateral Implantation.

This is in reality a modification of Maunsell's operation, especially adapted to uniting the small intestine to the large in the neigh-

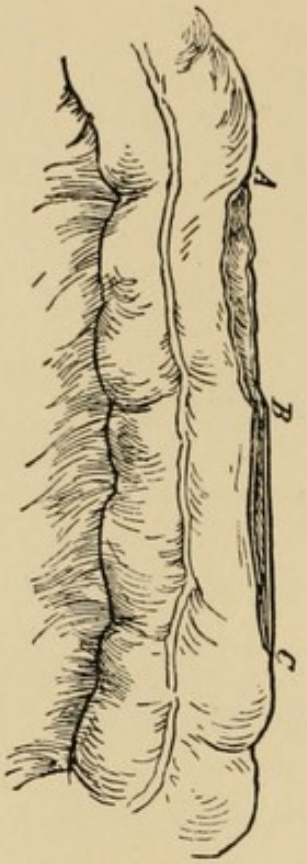


FIG. 200.
Elongated wound in the gut ready to be folded together and sutured.

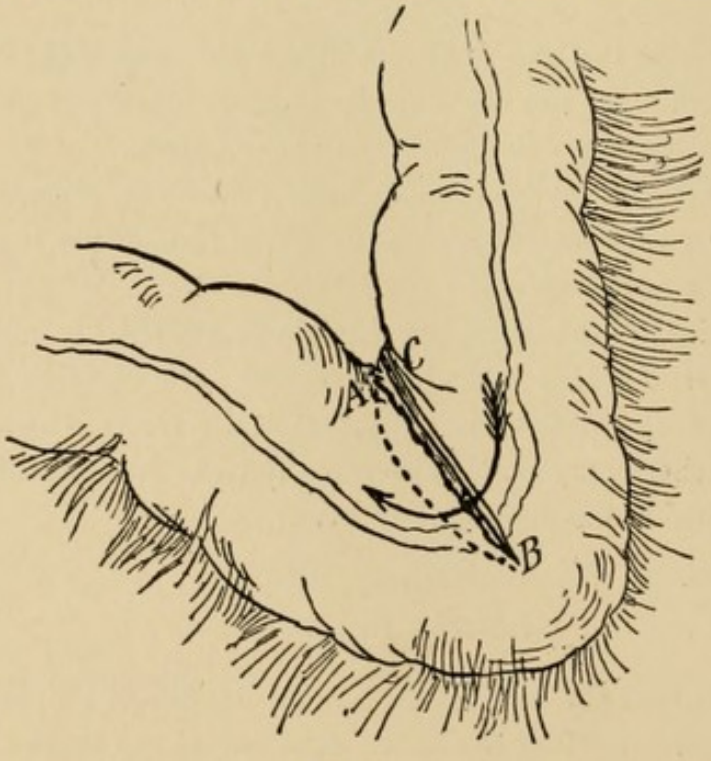


FIG. 201.
Suture Completed.

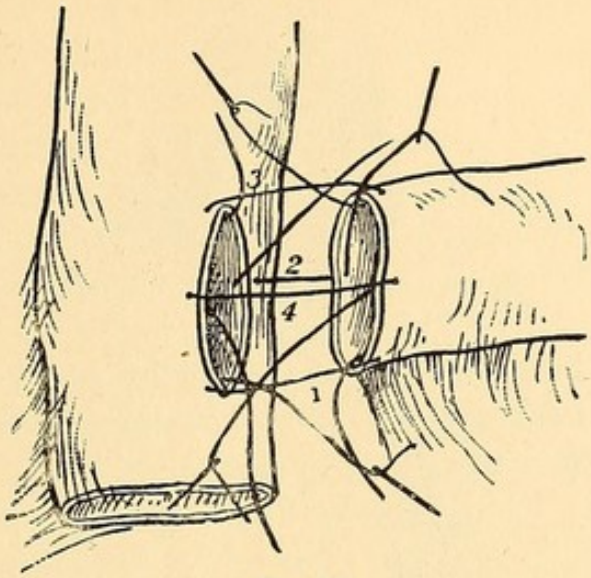


FIG. 202.
Lateral Implantation. First Step.

borhood of the caput coli, after resection of a part or the whole of the latter.

The anastomosis here may be done end to end by cutting the end of the smaller segment obliquely to make it correspond in calibre

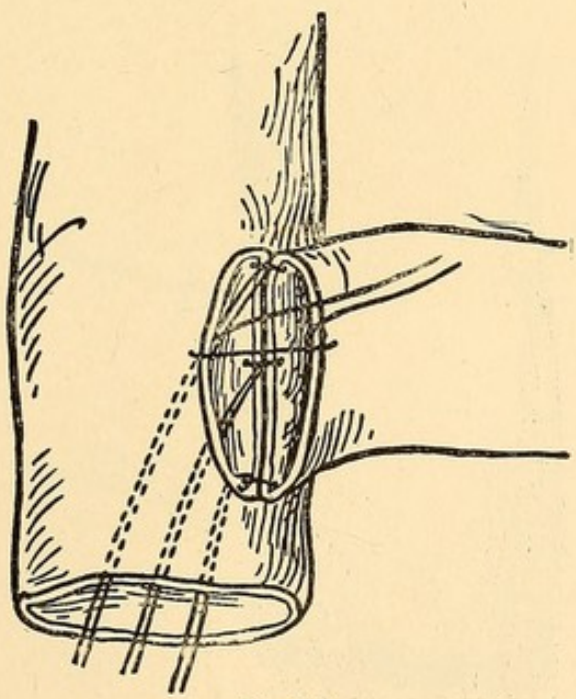


FIG. 203.
Lateral Implantation. Second Step.

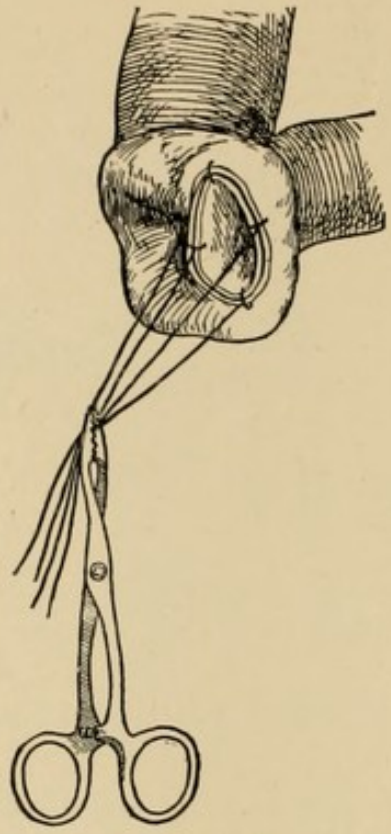


FIG. 204.
Lateral Implantation. Third Step.

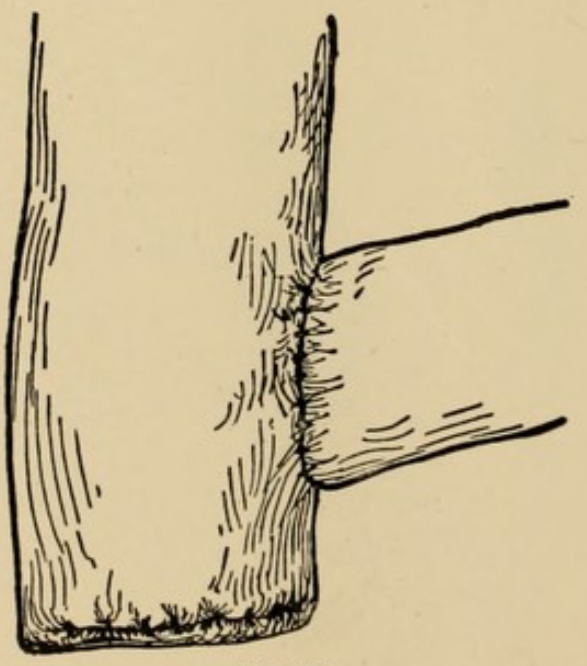


FIG. 205.
Lateral Implantation Completed.

with the larger, as is often of benefit when there is a marked difference in the size of the segments to be united; or it may be done by Abbe's method, which, however, requires more time.

As will be seen by Figures 202, 203, 204 and 205, the technique differs but little from that of Maunsell. Fig. 202 shows the four drawing strings, numbered in the order in which they are to be tied.

The remaining steps are identical with those in Maunsell's operation.

Fig. 203 shows three of the draw-strings tied and passed out of the cut end of the large intestine, while the fourth is about to be tied and then carried into the lumen of the larger bowel between the approximated cut edges with a pair of forceps.

CHAPTER XX.

CONSTIPATION — FECAL IMPACTION — PRURITUS — WOUNDS AND FOREIGN BODIES—NEURALGIA—SPASM OF THE SPHINCTER.

It may be stated as a general rule that a person in health should have one daily evacuation from the bowels. And yet to this rule there are many exceptions; for some people in perfect health go to the closet both night and morning, and others but once in forty-eight hours, three days, or even longer.

Usually at a certain hour in the twenty-four, which in a healthy person is fixed and invariable, there is felt a desire to relieve the bowels, caused by a physiological process carried on without the knowledge or will of the individual.

Simply from the force of a habit which has existed for years, or from the effects of a routine mode of life—such as a morning meal taken at the same hour every day, and composed of the same articles of food—the muscular layers of the bowel begin a rhythmic contraction which forces the solid fecal residue contained in the sigmoid flexure down into the rectum, where its mere presence excites a desire for its removal.

Thus far the process of defecation is purely involuntary; but beyond this it is under the control of the individual, and he may yield to this call of nature or disregard it and pay the penalty. A sensible person, having regard to his health and comfort, will promptly regard the hint that nature is ready to do her part in unloading the economy of its refuse, and will allow no light matter to interfere with the regular, daily morning evacuation of the bowels.

Should the individual resist this hint of nature, and by a voluntary exercise of the will prevent the escape of fæces, the desire soon

passes off; the mass is returned by reverse peristalsis to the sigmoid flexure, there to remain till nature repeats the call, or till a succession of bad symptoms forces the patient to seek relief in medicine.

It is a curious question how long a person may go without any evacuation of the bowels and without seeming to suffer any very severe consequences; and remarkable cases are on record, usually in women in the lower walks of life. Some of the following cases, taken from Johnston, are almost incredible, but those in which the time is reckoned by months may easily be believed.

Thus: In the *American Journal of the Medical Sciences*, 1846, page 260, there is a case reported lasting three months and twenty-two days; in the "Dictionnaire des Sciences médicales," t. vi., page 257, one by Renandin of four months; in the *American Journal of the Medical Sciences*, October, 1874, page 440, one by Strong of eight months and sixteen days; in the *Bulletin des Sciences médicales*, t. x., page 74, one by Valentin of nine months; in the London *Medical Gazette*, 1843, vol. xi., page 245, Staniland reports one of seven months; in the "Dublin Hospital Reports," vol. iv., page 303, there is one of eight months; Inman, in the *Half-Yearly Abstract of Medical Science*, vol. xxxi., page 275, reports one of two years; Devilliers, *Journal de Médecine*, 1756, t. iv., page 257, reports another of two years; Chalmers' *Medical Gazette*, 1843, vol. xxi., page 20, reports one of three years; and, finally, in the reports of the Philadelphia Medical Museum, 1805, vol. i., page 304, there is one reported in which the patient went fourteen years without an evacuation of the bowels.

The causes of constipation are manifold. The first and simplest is the one already hinted at—ignorance and carelessness on the part of the individual. Women suffer more than men, because a false sense of modesty leads them oftener to neglect the call of nature, and because their habits of indoor life and lack of exercise lessen the force of the peristaltic movements of the bowel. Again, the condition of pregnancy leads often to a state of constipation while it lasts; and frequent repetitions of it are apt to render this chronic from a loss of muscular tone in the parts concerned in defecation.

The habits of life and the occupation of the individual are often the cause of his trouble. Brain work at the expense of physical ex-

ercise ; over-eating and physical inertia ; the necessity for sitting long in one posture (tailors, shoemakers, etc.), improper nutrition, or lack of nutrition—anything which lessens the physical powers—may all fairly be put down as causes of this condition.

For the same reason old people and infants are more apt to suffer than the young and middle-aged, because of the general lowering of vitality and the absence of muscular strength.

Another common cause is the habit of using laxatives, and this acts as does the habit of constantly whipping a horse—he soon expects to be whipped before he goes. Many other causes might be dwelt upon at length—the use of drugs, especially opium and perhaps also tea ; the loss of fluids from the body by certain exhaustive diseases ; the lack of sufficient fluid with the food ; and the use of food of too concentrated a quality and containing too little refuse matter.

Constipation is often also a symptom of gastric or intestinal indigestion, both in children and adults. It is also an accompaniment of spinal disease, leading to paralysis, and in this class of cases is often attended by prolapse of the mucous membrane to a marked degree, and can only be relieved by a mechanical emptying of the lower bowel by the nurse with fingers or spoon as often as an accumulation takes place.

Intestinal obstruction from this cause may be the immediate cause of death, as I have seen in my own practice.

A cause of constipation of more especial interest to the surgeon is the existence of any affection of the rectum or anus which renders the act of defecation painful—so painful that an infant will cry when placed on the pan, and will exert all its powers to prevent a passage, and an adult will postpone the act as long as possible.

A physician who was under my care some years ago for fibroid polypi of the rectum, assured me that the act of defecation caused him such acute suffering that he always avoided it as long as he possibly could without being positively sick ; and then, when he could postpone it no longer, was in the habit of administering chloroform to himself on the closet to deaden the pain.

The most common of these affections which tend directly to cause constipation on account of the suffering they give rise to in defeca-

tion are piles, fissures, ulcers, and fistula. One other cause which must never be forgotten in an obstinate case is the possibility that the bowel may be congenitally malformed in such a way as to render easy and complete evacuation impossible. There may be a congenital narrowing of the intestine two or three inches above the anus, which, as life advances, shall make itself more and more apparent in the way of difficult evacuation. There is also a spasmodic contraction of the sphincter muscle which may be due to a congenital narrowness or may be acquired in adult life, and which will render defecation so painful that obstinate constipation is but the natural consequence. This is sometimes the result of fissure, and at others a purely nervous affection without fissure, and as far as my knowledge goes, it constitutes the only sound indication for the now too popular operation of stretching the sphincter.

A painful affection of this kind may very soon establish a vicious circle which it may be difficult to break. First the pain causes a voluntary constipation ; then the passage of hard, large masses of fæces does mechanical injury to the diseased parts and renders them worse ; and in this circle the patient travels till complete loss of health and serious disease is the result.

Constipation is not only a symptom of disease, as in the cases enumerated, but is also attended by its own train of consequences. When long-continued it leads to certain changes in the bowel and adjacent parts. It is thus the most frequent cause of piles, fissures, ulceration, and abscess. Prolapse of the bowel is often caused by this condition, and cases of actual rupture from straining, with fatal consequences, have been reported.

In addition to these results, which, being external, necessarily attract the notice of the sufferer, other changes are often produced internally of which he or she may be entirely unconscious. The natural result of turning the large bowel into a reservoir for solid fæces is to cause dilatation of its calibre and paralysis of its walls. In this way it may assume vast dimensions, filling the entire abdominal cavity and pressing all movable organs out of their natural position. The amount of fecal matter which may accumulate in the large intestine, in cases of chronic constipation, is simply enormous. The whole abdomen may be practically filled with it. In one case fifteen

quarts of semi-solid fæces were removed on autopsy ; and in another the weight of the collection found in the bowel was twenty-six pounds.

The following case from Bristow illustrates not only the changes which constipation may cause in the wall of the bowel, but also the fatal termination from intestinal obstruction.

It was "that of a little girl, eight years old, whom I saw casually only during life, and of whose history I obtained, after her death, some not very perfect details. She had long suffered from tendency to constipation ; and it was stated that she had occasionally gone as long as three weeks without passing an evacuation.

"At the time of her admission into the hospital there had been no relief to the bowels for seven weeks. She was then pale and thin, had a large, tense belly, without pain or tenderness, a clean tongue, and a poor appetite. She had a 'strumous' look, and was supposed, I believe, to be suffering from abdominal tubercle.

"She became gradually more and more emaciated and anxious-looking, while the belly grew larger and more tense. She never had any distinct abdominal tenderness, but suffered at times from colicky pains, and often (especially toward the close of life) complained that she was so full that she felt as if she would burst. During the last week or two the tongue became somewhat foul, and she had frequent vomiting, but never of stercoraceous matter. She passed but little urine, and that was high-colored ; she sank gradually from exhaustion, and died exactly three weeks after admission.

"Amongst other kinds of treatment adopted was the use of purgative medicines and of purgative injections ; and the medical man in attendance on her was led to believe that they had acted. There is no doubt, however, from subsequent inquiries, as well as from what was observed after death, that he was deceived.

"At the post-mortem examination the form of the distended intestines was distinctly impressed on the tense and thin abdominal walls, and on opening the abdomen the enormously enlarged colon was at first alone visible.

"The distention began at the cæcum and extended to within two inches of the anus, where it ceased abruptly. In the greater part of its extent the bowel measured from nine to ten and a half inches in circumference, the greatest amount of distention being manifested in

the sigmoid flexure. The muscular walls were hypertrophied from the ascending colon to the lower end of the sigmoid flexure; and in the latter situation (where the hypertrophy was greatest) they measured one-eighth inch in thickness. The mucous membrane seemed healthy in the greater part of its extent, but it presented some congestion here and there, and at distant intervals large patches in which there were groups of small, circular, shallow ulcers.

"The bowel contained no flatus, but was completely full of thick, semi-solid, olive-green-colored fæces. These were more solid in the rectum than elsewhere, and immediately above the anus formed an indurated, conical lump. The small intestines were also considerably distended."

The treatment of chronic constipation is by no means a simple matter. It may be begun with a purgative, such as three compound cathartic pills, for the sake of opening the way for future treatment; but here the administration of purgatives should end, for their repetition is calculated to do harm rather than good, by substituting an occasional over-action for the daily one which indicates a healthy state of the intestinal tract.

The following suggestions may be found of use in the treatment of this condition, which is one that must be overcome at the commencement of the treatment of any rectal affections with which it may be associated.

Constipation may be due to deficient action of either the small or the large intestine, and this deficient action in either case may be the result either of deficient secretion or deficient nerve power.

Deficient secretion is very apt to be associated with hepatic disturbance, and is marked by dull headache, bad taste in the mouth, viscid secretion from the buccal glands, etc. This is a condition pretty sure to be aggravated by cathartics, for the reason that the temporary increase in secretion which they cause is followed by a corresponding decrease, which serves only to make the patient worse than before.

For the purpose of increasing the natural secretion of the small intestine, the fruits containing citric acid, such as oranges; and other fruits, as figs and apples, when the patient can digest them, all serve a good purpose. Water is also an excellent remedy, and

two tumblerfuls of it taken in the morning will often be very beneficial. To it may be added a slight saline, which decreases its capability for absorption (℥ ss.–O i.) and therefore increases the peristalsis; and the addition of a single grain of quinine is said to greatly increase the effect. This treatment, if patiently persisted in for a few weeks, will generally be followed by a good result.

Deficient innervation will be found in old people, people of sedentary habits, and those who have little exercise. In such cases water will be found only to weaken the digestive power, unless it can be combined with a different mode of life and abundance of out-door exercise. Cold bathing, however, cold against the spine and abdomen, plenty of exercise in the open air, and nux vomica, will generally be found to give relief.

In constipation dependent upon the large intestine, the trouble will generally be found to be due to deficient innervation rather than to any lack in the secretion. It is best treated by keeping the rectum empty, by nux vomica, or belladonna in doses sufficient to cause dryness of the throat, and by electricity. The latter should be in the form of the faradic current, one pole being placed over the spine and the other passed up and down along the track of the colon.

Constipation in Children.

Infantile constipation may be due, as pointed out by Jacobi, to the disproportionate length of the sigmoid flexure. In children it is not unusual to find two, or even three, flexures in the lower part of the colon, in which the fæces may remain until they become hard and friable; and when such an anatomical formation is associated with a deficiency of the intestinal secretion a very obstinate constipation, and even impaction, may result.

The usual causes of constipation in children are:

First. Improper feeding. An excess of starch, or of any article which overtaxes the digestive power, may burden the alimentary canal with a large, undigested residue, and thus set up a costive habit.

By such means a mild catarrh of the intestinal mucous membrane is excited and maintained. There is an excess of mucus, and the

fecal masses, rendered slimy by the secretion, afford no sufficient resistance to the muscular contractions of the bowels, so that this slips ineffectually over their surface.

Second. Dryness of the stools. Even in the youngest infants the evacuations may sometimes be seen to consist of small, hard, round balls, like sheep's dung. This form of costiveness is generally due to insufficiency of fluid taken. The food is made too thick, or the needs of the system in the matter of water are overlooked.

But whether the constipation be due originally to excess of mucus or deficiency of fluid, it cannot continue long without affecting injuriously the peristaltic movement of the bowels. As the colon grows accustomed to being overloaded, the intestinal contents can no longer exert a sufficiently stimulating influence upon the lining membrane, and the muscular contractions begin to flag.

If the infant be badly nourished, this languor of muscular contraction may be aggravated by actual weakness of the muscular walls ; and as, under these conditions, the bowel is apt to be overdistended by accumulation of its fecal contents, the expulsive force at the disposal of the patient is seriously impaired. Constipation due to the above-mentioned causes is often made more serious by the infant's own efforts to delay relief.

A baby whose motions are habitually costive knows well the suffering which undue distention of the sphincter will entail, and often yields to the desire to go to stool only when it is no longer possible to resist. The pain is sometimes aggravated by the formation of little fissures, and the violent action of the sphincter, set up by their presence, forms an additional impediment to free evacuation.

The form of constipation due to mild intestinal catarrh is common enough in young infants. This is owing, no doubt, in great measure to overabundant feeding with starchy matters, or to the giving of cow's milk without taking due precautions to insure a fine division of the curd.

When constipation is due to this cause, our first care must be to protect the child's sensitive body so as to put a stop to the series of catarrhs. To do this it will not be sufficient to swathe the belly in flannel. The legs and thighs must also be covered, for so long as a square inch of surface is left bare the protection of the child is in-

complete. The infant's diet must next be regulated with due regard to its powers of digestion. Excess of starch must be corrected, and it is best to have recourse to one of the malted foods. A certain variety in the diet is of importance in all cases where the digestive power is temporarily impaired.

In addition to the regulation of diet and clothing, the bowels should be regularly stimulated by manipulation. The sluggishness of peristaltic action may be very materially quickened by judiciously applied frictions.

The nurse should be directed to rub the child's belly every morning after the bath. She should use the palm of the hand and ball of the thumb, and, pressing gently down upon the right side of the abdomen, carry the hand slowly round in a circular direction, following the course of the colon. The frictions may be continued for five minutes. In obstinate cases the child may be placed upon the bed, and the bowels gently kneaded with the thumbs placed side by side, the movements following the course of the colon.

In addition to the above-mentioned general treatment, more special measures may be necessary. These may be divided into suppositories and enemata, and medicines given by the mouth. The time-honored piece of castile soap for a suppository is recommended, and the now popular enema of thirty or forty drops of pure glycerin.

Large enemata of soap and water should be used only rarely, as great dilatation of the rectum and permanent loss of muscular tone are very apt to follow their continued use.

Treatment.

For the permanent cure of habitual constipation, remedies given by the mouth are greatly to be preferred. The aim should be to find the smallest dose which will awaken a normal degree of peristalsis, and to give this dose regularly so as to excite a habit of daily evacuation. The daily dose is most efficient when combined with a remedy which tends to give tone to the muscular coat of the bowel. For this purpose a useful draught is composed of half a drop of tincture of nux vomica, combined with ten drops of tincture of belladonna and twenty of infusion of senna, made up to a fluidrachm with infusion

of calumba. This should be given at first three times a day before food, and subsequently reduced to twice and then to once daily. The liquid extract of cascara is useful in many cases, especially when combined with tincture of belladonna. Twenty, thirty, or more drops of cascara extract, with ten of tincture of belladonna, may be given with a few drops of glycerin every night.

When the motions are drier than normal, a saline may be given in addition to the liquid already recommended to be added to the diet. The saline may be combined with small doses of nux vomica and quinine. For a baby of five or six months, five to ten grains of sulphate of sodium may be given with a quarter of a grain of quinine, half a drop of tincture of nux vomica, and a minim of aromatic sulphuric acid, in a teaspoonful of water, three times a day before food. If the remedy has been well chosen, its quantity may soon be diminished, and finally it may be discontinued.

An adult patient should, first of all, be instructed to have a regular time for the daily evacuation, and the best time for this purpose is immediately after breakfast. The time being fixed, the patient is to go to the closet whether the desire for a passage be present or not, and pass a certain time upon the commode. I generally recommend the time immediately after the morning meal for this purpose, because the breakfast itself often acts as a stimulant to this function, especially in those in the habit of taking a morning cup of coffee.

If the patient be a man in the habit of smoking, the first few whiffs of smoke often act in the same way ; and there are many men to whom the morning cigar or cigarette is an essential to the daily evacuation. In such a case it must be a very decided opponent of the weed who would object to its continuance in moderation.

If the plain cold water taken in the morning has no effect, the mineral waters may be tried in its place with great advantage, and the patient may select the one most agreeable to the taste and which most effectually accomplishes the desired end. The morning meal may consist of whatever the patient most desires, but a dish of oatmeal or coarse cracked wheat and milk should always be an essential part of it.

I have almost always found that where perfect regularity in the daily life with regard to eating and exercise can be established, the

function of defecation will also be performed regularly, provided the diet be of the proper quality. To have a copious, well-formed evacuation, it is not at all necessary that the diet should be composed of substances which leave a considerable quantity of waste, such as the coarser grains and vegetables. On the contrary I much prefer the most nutritious food that can be taken and of the best quality, mixed with a free supply of milk.

In women a certain regulated amount of daily out-door exercise should be insisted upon, in spite of all excuses and professions of disability. If necessary, this may be small at first, and gradually increased ; and in a woman who has lost the habit and perhaps almost the power of walking, considerable tact and firmness on the part of the physician may be required to carry out this part of the treatment, but it will be found to be care well spent.

In addition to these dietetic and hygienic rules, certain medication may and often will be found necessary. This should be of the mildest possible kind which will accomplish the object. A pill which I have found to act very effectually and pleasantly under these circumstances is made after the following formula :

℞ Pulv. aloes soc..... gr. iss.
Ext. nucis vom ..... gr. ss.
Ext. belladonnæ ..... gr. $\frac{1}{8}$
M.

One of these should be taken at bedtime, and will generally be followed by an easy passage on the following morning. If this does not work satisfactorily, various other remedies may be substituted, amongst the best of which is the compound licorice powder, the rhubarb and soda mixture, or the dinner pill ; the object being to find one among the many laxative preparations which, without causing pain or diarrhœa, will give an easy and natural evacuation of the bowels once every day.

The use of enemata for chronic constipation should not be commenced till all other means have failed, for the reason that when once the bowel has become accustomed to this form of stimulus it will be found very difficult to discontinue its use. In some cases, however, their employment may be a necessity, and they are always

much less harmful than purgatives. Instead of the ordinary enema of soap and water, the introduction of a harmless foreign body into the rectum will sometimes excite peristalsis. Small fragments of soap or of candles are preferred by many for this purpose to fluid injections.

Much evil is being done by the practice now quite common among the laity of washing out the lower bowel with large quantities of hot water daily.

Impaction of Fæces.

The impaction of fæces may be due to several causes, but is most generally a symptom either of intestinal atony in old people, or of some paralytic affection, such as locomotor ataxia. It not infrequently occurs in women as a result of the entire neglect of the function of defecation, for which they are perhaps unjustly celebrated; and it may follow a partial paralysis of the rectum from the long-continued use of large enemata, or the pressure of the fœtal head in childbirth.

It may also result as a consequence of a painful affection, such as a fissure, which renders each act of defecation an agony to be avoided by every possible means. The disease is generally one of old people, of hysterical girls, and of careless women; but it has been seen in children, and, as a result of improper diet, may occasionally be encountered in young and healthy men.

Intestinal concretions may be composed entirely of hardened and stratified or clayey masses of fæces, or they may contain within them as a nucleus a biliary calculus, or indigestible substances which have been hastily swallowed, such as peach pits, cherry stones, etc. Mollière calls attention to the presence of magnesia, which favors the aggregation of fæcal matters, and which also may act as the nucleus of a scybalum; and the frequency of impaction during the famine in Ireland in 1846, when potatoes, and those of a very poor quality, were the only article of diet, is a well-known historical fact.

In Scotland, where oatmeal is a favorite article of diet, fecal accumulations are said to be of frequent occurrence. Certain other drugs besides magnesia, such as chalk, sulphur, and powdered cubebs, have been blamed as the cause of intestinal concretions. In-

testinal calculi have been seen which were composed of pure cholesterin, or of a biliary calculus coated with cholesterin.

The usual location of a mass of impacted fæces is the rectal pouch, but it may be situated anywhere between the cæcum and this point. The symptoms to which it gives rise are generally sufficiently well marked to enable the practitioner to reach a correct diagnosis if he be on his guard. The pains which it causes will generally be obscure and may be located anywhere in the abdomen or in the lower extremities; and the signs of disturbance in digestion are not in themselves sufficiently marked for diagnosis, but the one symptom which is characteristic is diarrhœa.

Just as the practitioner has to learn that incontinence of urine may be a sign of a distended and not an empty bladder, so he may have to learn by a disagreeable error in diagnosis that a diarrhœa is sometimes a result of an overfilled and obstructed rectum.

This diarrhœa is peculiarly fetid in character, and the matters discharged may be entirely free from fæces and consist entirely of mucus. In some cases there may be an approach to a daily natural evacuation. The act of defecation is always attended by straining and pain as the fecal ball is pressed down against the perineum and rises again when the muscular effort ceases. Besides this we see coldness and swelling of the feet from pressure on the pelvic and abdominal veins; varicose veins in the legs; varicocele; shooting pains in the legs, groins, and loins from pressure on the sacral nerves; seminal emissions, jaundice, and albuminuria from pressure. One of my curious cases was that of a fine, healthy boy of eleven years, brought to me for incontinence of fæces. There was no trouble with the bladder, but at any time, in school or in bed, the boy was apt to have an involuntary passage from the bowels. Making a digital examination to test the contractile power of the sphincter, I found it to be perfect, and not until I had found a large, old fecal impaction did the cause of the overflow become clear. An enema and a purgative cured him.

Of course errors in diagnosis are easy in such a condition as this, and a mass of fæces in the colon may be mistaken for any and every sort of tumor in the pelvis or abdomen. Liver, spleen, stomach, uterus, and ovaries have again and again been supposed diseased

in these cases, when a simple digital examination of the rectum, or, in women, even of the vagina, could not fail to make the diagnosis clear.

Unfortunately for diagnosis, the general practitioner is not fond of making rectal examinations, and these cases are not infrequently treated with bismuth and opium as a consequence.

Treatment of Impaction.

The treatment of impaction is simple, and consists first of all in the entire removal of the mass. In cases of paralysis, where the accumulation has not been allowed to reach any very great amount, and the scybala are small and not very hard, this may sometimes be accomplished by the use of injections with a long tube and the assistance of the finger of the operator.

In women very effectual aid may be rendered under similar conditions by pressure from the vagina, by which small masses may be extruded one after another, each with a certain amount of pain, but without laceration of the mucous membrane at the anus. This plan of treatment will often constitute one of the regular duties of the attendant upon a case of paralysis—a disagreeable duty which must be attended to at certain regular intervals.

In cases of longer standing, however, these means may be entirely inadequate, and all injections, no matter what their supposed solvent virtues, will be of no avail even if they are not at once ejected. In such cases the operation of breaking up and removing the mass must be begun by the administration of ether and dilatation of the sphincter. This accomplished, the mass may be attacked with the fingers, an iron spoon, a pair of lithotomy forceps, or scoop, and removed piece by piece. When this has been done, an injection may be administered through the long tube and more matter will generally come down from the sigmoid flexure. The impacted mass is often as large as the fist, and sometimes as a fœtal head, and the amount in the sigmoid flexure and colon may be much greater, though not as hard, so that at a single sitting an enormous amount may be removed.

After such an operation as this the patient must be treated by

injections and a daily laxative, as described in speaking of constipation, till the overdistended rectum has recovered its tone. This may require a considerable time.

Pruritus.

Pruritus ani—itching at the anus—is generally a symptom of some other disease, such as hemorrhoids or eczema, but it is often present in a marked degree when no cause for its existence can be discovered. It is an exceedingly painful and annoying affection, and one which will often tax the powers of the surgeon to the utmost for its cure.

It is met with in both men and women, and seems to be dependent upon no particular general state, being found in rich and poor, the overfed and underfed, the professional man of nervous constitution and the laborer alike.

The disease is marked by an itching at the anus which is more or less constant, but is generally worse after the sufferer has become warm in bed at night. The itching causes an attempt at relief by scratching, and the scratching, though it may be controlled during the day, is generally practised unconsciously during sleep to an extent which causes laceration of the skin. The itching in bad cases, even when constant, is marked by exacerbations and remissions, and may cause an amount of suffering which is simply unbearable.

The disease is attended by certain changes in the appearance of the parts. The skin becomes thickened and parchment-like (Fig. 206), or else eczematous and moist from exudation. It may be red from the scratching, or there may be quite a characteristic loss of the natural pigment of the anus. In the latter case the skin becomes of a dull whitish color, and this will oftener be noticed where the disease is of long standing and severe.

The exudation may be very marked where the itching is slight, and may be attributed by the patient to trouble within the rectum instead of to its real source. Associated with the changes in the skin it is not at all uncommon to find one or several fissures.

Causes.

The cause of pruritus may sometimes be easily discoverable, and in such cases a cure rapidly follows its removal. For example, pruritus is often a symptom of internal hemorrhoids, and is easily and effectually cured by their removal. Again, it is often a symptom of complication of a fistula with a small external opening, such as may easily be overlooked in a cursory examination, and is cured by the ordinary operation and the consequent cessation of the discharge upon which it depends.

It is often dependent upon the presence of the *oxyuris vermicularis* in the rectum, and in every case these should be carefully looked for. If they are present they may generally be seen like small pieces of white thread between the radiating folds at the margin of the anus, especially at night when the itching begins. They may generally be eradicated by certain simple measures, the best

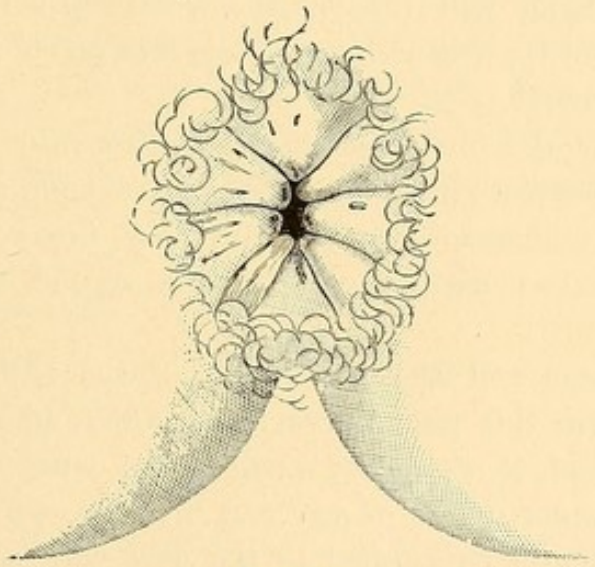


Fig. 206.

Thickened Condition of the Skin in Pruritus.

known of which is an enema of lime water, or of carbolic acid, ʒ i. ; glycerin, ℥ i. ; and water, ℥ vij., injected after each passage. Turpentine and tincture of iron may be used for the same purpose, and are both very effectual ; but the parasites are much more easily removed in children than in adults, and I have had one case which

was exceedingly intractable, and in which I have never been able to keep the worms from returning for any great length of time. A single examination should never be considered as proof of the absence of this parasite in an obstinate case of pruritus.

Instead of a parasite located within the rectum, pruritis is occasionally easily accounted for by the presence of pediculi. In such a case the diagnosis and cure are alike easy.

Again, the parasite may be vegetable instead of animal, and the itching may be due to the disease known as *eczema marginatum*. In this case the diagnosis will rest upon the finding of the spores, under the microscope, in the epidermis scraped from the edge of the affected spot and moistened with glycerin.

The most effectual remedy for this condition is a wash of equal parts of sulphurous acid and water, frequently applied with a soft cloth, and gradually increased in strength, if necessary, up to the pure acid, which latter is, however, generally a painful application, and one which will readily blister. The acid, even when diluted to a considerable extent, will blister if covered with a cloth. Strong tincture of iodine applied with a brush is also an effectual remedy in eradicating the plant.

Pruritus may also be dependent upon other skin diseases, among which chronic eczema is perhaps the most common, and this is to be treated exactly here as elsewhere in the body, first by general measures directed to the constitutional state, and second by local application.

The congestion and the thickening of the skin must first be remedied, and for this purpose very hot water, compound tincture of green soap, and, if necessary, a solution of caustic potash may be applied. The water, to be of any use, must be as hot as the fingers can bear, and should be applied to the part with a soft cloth and held there till it begins to cool. This may be repeated half a dozen times, but all rubbing should be carefully avoided both during the application and in drying the parts after it.

This is a favorite remedy with most dermatologists; it should be used just before going to bed, and is often in itself sufficient to insure a good night's sleep.

If there be thickening of the skin from effusion, a stronger appli-

cation than hot water will be necessary; and for this the compound tincture of green soap is a good remedy, or the solution of potash (gr. v. – ʒ i.) or liquor potassæ may be resorted to with caution. The formula for the compound tincture of green soap is the following:

℞ Saponis viridis,
Olei cadini,
Alcohol ..... āā ʒ i.
M.

It is a much stronger preparation than the simple green soap, and also a much more disagreeable one, but it is very effectual, and should be well rubbed into the part once a day. These remedies should be followed at once by soothing ointments or lotions. A good ointment is the ordinary oxide of zinc made soft and applied gently, and one which is pretty certain to allay itching is that made of chloroform (ʒ i. – ʒ i.). This soon loses its power by the evaporation of the chloroform, and should on this account be kept in a wide-mouthed glass bottle, tightly corked, and should be frequently renewed. Another favorite application, and one which is very generally effectual, consists in a lotion of carbolic acid. The formula is:

℞ Acid. carbolici ..... ʒ ss.
Glycerinæ ..... ʒ i.
Aquæ ..... ʒ iij.
M.

This may be applied at night, and if found to be too strong may be diluted by the patient. In a more dilute form it may also be continued for a considerable time after all symptoms have ceased.

For the sake of those who have never encountered an obstinate case of this disease, but who are pretty sure at some time to have both knowledge and ingenuity taxed to the utmost, I will give one or two more formulæ which have been found reliable:

℞ Sodæ biboratis..... ʒ ij.
Morph. hydrochlor..... gr. xvi.
Acidi hydrocyanici dil..... ℥ ss.
Glycerinæ..... ℥ ij.
Aquæ..... ad ℥ viij.
M.

This should be applied to the part four or five times in the twenty-four hours. Dr. Bulkley has also recommended the following as being useful, and I have often found it so:

℞ Ungt. picis..... ʒ iij.
" bellad..... ʒ ij.
Tr. aconit. rad..... ʒ ss.
Zinci oxidi..... ʒ i.
Ungt. aquæ ros..... ʒ iij.
M.

The following prescription has also been very efficient in my hands. I am indebted for it to Dr. Salisbury:

℞ Menthol..... ʒ i.
Simple cerate..... ℥ ij.
Oil sweet almonds..... ℥ i.
Carbolic acid..... ʒ i.
Pulv. zinci ox..... ʒ ij.
M. Apply morning, noon, and night, after cleansing the parts.

An ointment of chloral and camphor, a drachm of each to the ounce, is also at times effectual in allaying itching.

There are two other skin diseases, either of which may be the cause of pruritus—herpes and erythema. Herpes at the margin of the anus is the same as when seen on the lips. In the latter case it heals spontaneously, in the former a dressing may be necessary.

This may consist simply of a dry powder such as zinc or bismuth, or of one of the lotions already mentioned. Erythema will be found chiefly in fat people, where it is due to contact of the opposing cu-

taneous surfaces. It also is best treated by the application of dry powders, and by separating the opposed surfaces by a layer of dry sheet lint or old muslin.

These are the most palpable, and perhaps also the most common, causes of pruritus, but there are many cases in which the cause is not so easily discoverable, because it is a constitutional and not a local one. Where no local cause can be detected, a careful inquiry must be instituted with regard to the patient's general health and habits. If chronic constipation be present, this must first of all be overcome, for this is in itself an efficient cause for the disease.

Another not infrequent cause of pruritus is derangement in the function of the liver. This may or may not be associated with constipation. It must be treated by general dietetic measures, the dilute mineral acids, occasionally by doses of podophyllin, active out-of-door exercise, and cold and friction applied to the hepatic region.

In women uterine disorders must be looked for and cured before very much will be accomplished in the treatment of pruritus; and the urine must be examined for sugar in obstinate cases, for diabetes will sometimes give rise to incurable pruritus.

In case none of these causes can be found to account for the itching, errors of diet must be searched for, and corrected when found. Anything like excess in smoking or in alcoholic drinks will keep up the disease, and in men these habits must be carefully regulated, if indulged in at all.

The disease will sometimes be encountered in stout, full-blooded persons who live well and perhaps incline to the gout, and who show no other signs of disorder. In such, active exercise and plainer living, with cold bathing of the part at night and morning, and the use of a lotion of carbolic acid, will often effect a speedy cure.

On the other hand, the disease may be present in exactly the opposite class of persons, the overworked and worried professional or business man, and it is in this class of cases alone, where the itching seems to be purely a nervous symptom, that arsenic is indicated. It may be combined with quinine and cod-liver oil, and carried up to its full physiological effect.

In old cases, which resist milder measures, I have worked many cures by putting the patient under ether and applying the Paquelin

cautery lightly to the whole affected surface. Where there is much induration, a few stripes may be made entirely through the derma; where the cause is an old eczema without much infiltration, the entire surface may be lightly brushed over with the white hot cautery. When the burns thus made have healed, the patient will generally be cured.

In this way, then, the physician must undertake the cure of a case of pruritus ani; and not by the administration of any single lotion or ointment to allay the itching, which is but the symptom of some local or general condition. In every case the cause must be found and removed if success in the treatment is to be gained.

I know of no disease of the rectum or anus in which there is a better chance for the practitioner to show his general knowledge and skill. If a case be undertaken in this way, and the treatment be intelligently followed by both doctor and patient, a cure may generally be effected; sometimes in a very few days, but at others only after prolonged effort and many discouragements. The prognosis should, therefore, be guarded at the outset, lest the patient be led to expect a too speedy relief; and in some cases, in spite of the best of care, the disease will frequently return, and the patient can scarcely at any time consider himself as perfectly cured.

Wounds and Foreign Bodies.

Wounds of the rectum may be either contused and lacerated, or incised. The latter most frequently result from surgical operations, and may be intentionally inflicted, as in the operations for fistula or for the removal of tumors; or the result of accident, as in the operation for stone.

Contused and lacerated wounds are generally the result of accident, and perhaps the most frequent cause of such an injury is the perforation of the bowel with an enema tube, a bougie, or a urethral sound.

The gravity of this accident will depend upon two factors—whether the perforation of the bowel is above the peritoneum, and whether the enema has been deposited in the perirectal tissues. The

latter complication will be followed by abscess and peritonitis, and will result either in death or in stricture and fistula. If the wound be uncomplicated by the injection, the mere puncture may heal spontaneously. It is oblique from below upward, and this greatly favors spontaneous healing without fecal extravasation.

Dr. Achilles Nordmann, of Basel, has published a description of twenty-five bowel lesions due to the administration of enemata. They include three complete perforations, and ulcers and wounds of various depths and sizes. The causes of these wounds seem to have been the use of defective instruments, ignorance of the anatomy of the rectum, catching the transverse folds on the end of the tube, extreme irritation of the mucous membrane of the bowel, and obstructions caused by such conditions as a fœtal head, an enlarged prostate, or a misplaced uterus.

As a rule, these lesions are to be found on the anterior wall from one to seven centimetres from the anus. They are not always easy to diagnosticate, as other foreign bodies or caustics may produce similar appearances. Tubercular or hemorrhoidal ulcers may be mistaken for them. A perforating wound generally results in serious periproctitis, which may end fatally, or in stricture.

Esmarch has met with four cases of this injury, none of which were fatal, though attended by much local trouble. Velpeau describes eight cases, six of which ended fatally. Passavant observed five cases, one fatal. Chomel has had two fatal results. There are two preparations in St. Bartholomew's Hospital showing the results of this accident, one in a man, the other in a child ten years of age (Esmarch).

Besides these most common injuries, many others may be enumerated. The person may fall upon a sharp body, as the point of an umbrella (Bushe), may be caught upon the horn of an animal (Gundrum, Ashton), or may be impaled upon a spike (Esmarch).

Thompson describes the case of a man, aged eighteen, who stated that he had fallen about four feet, in a sitting posture, on to the end of the upright shaft of a smith's hammer, which he described as having entered his seat for a considerable but unknown distance, and requiring some amount of force in its removal, which was accomplished by a fellow-workman. He had very little pain at the time of

the accident, and walked about a mile to the infirmary without much trouble.

On examination only some slight bruising was found around the anus, with a little blood-stained mucus. *Per rectum* nothing was detected. The abdominal walls were quite flaccid. Examinations caused no pain. He complained, however, of a slight, continuous, aching pain just above the pubes. Soon after admission he passed both urine and fæces, the former normal, the latter soft and streaked with blood. Some hours later he passed another motion, with a considerable quantity of clotted blood; the suprapubic pain also became more intense, but the abdominal walls still remained flaccid, the face was very pale, the pulse rather weak, and the extremities cold; but the patient appeared to be in good spirits, answered questions readily, and did not feel unwell. He remained in this condition until midnight, when the abdominal pain became more severe. Symptoms of collapse gradually came on, and he died at 8 A.M.

At the necropsy, on the same morning, the peritoneum was everywhere found intensely injected, and in part presented a thin layer of lymph. There was a marked laceration in the recto-vesical pouch a little to the right of the middle line, which led into a triangular opening in the wall of the rectum about three inches from the anus; this aperture was triangular, its base measuring one inch and a half, its sides an inch each. At the brim of the pelvis, on the right side, was a laceration of the peritoneum covering the psoas, with bruising of the subjacent muscle. The mesenteric glands were enlarged and inflamed. The abdominal cavity contained a small quantity of hard fæces; there was also found a piece of cloth corduroy two inches long and one inch and a half in breadth, corresponding in texture to the patient's trousers and to an aperture in their seat.

In such cases the accident may be immediately fatal from collapse, and the wound in the rectum may be complicated by a wound of the peritoneum or of any of the adjacent organs. The body which has done the injury may also be so firmly implanted as to require great force and an anæsthetic for its removal.

The rectum is not infrequently lacerated in childbirth; and although such wounds are generally of slight extent, Bushe relates a case in which the child's head was passed through the anus.

It has also happened that in a violent effort to expel a mass of hard fæces the rectal wall has given way. Mayo relates one such case in a woman of forty, in whom the rupture was in the recto-vaginal septum, about two inches within the bowel. Ashton reports a similar case, and Bushe another. Such a rupture may be either vertical or transverse, will be marked by a sharp pain at the moment of the accident, and will be followed by a discharge of blood. It is doubtful whether it ever occurs without previous disease of the wall of the bowel. (See Rectal Hernia.)

The consideration of gunshot wounds comes more properly within the scope of military surgery. They are always complicated with injuries of other parts, and are generally fatal from extravasation of urine or fæces.

The complications which may attend a wound of the rectum have already been hinted at. They are hemorrhage, either primary or secondary; fecal infiltration; purulent infiltration; peritonitis; emphysema; hernia; invagination; and later, stricture and fistula.

When fæces are forced out of the rectum into the adjacent tissue, diffuse inflammation and gangrene will probably result, and the condition must at once be met by free incisions and free drainage, as has been described in the chapter on abscess. The danger of fecal infiltration may be lessened by a diet which shall prevent fluid passages, and by the free use of opium. A dilatation or a free division of the sphincter is also to be recommended, so that a free outlet may be accorded to the contents of the bowel.

Emphysema, as a result of a perforation, is generally confined to the perineum, but may be diffuse. It is very apt to be fatal from diffuse inflammation and septicæmia, due to the putrid nature of the gas, and is to be met by free incisions.

Wounds of the bladder or urethra communicating with the rectum are to be met by providing for the free issue of the urine. This may be done by catheterism, by aspiration, or by free division of the sphincter.

Where none of these complications exist, a fresh wound of the rectum may close by first intention, and an effort should always be made to secure this by rest in bed, by emptying the bowel, and keeping it empty by frequent washings with water, and by the use of

opium. Healing by granulation will, however, be the rule. In some cases—such, for example, as laceration in childbirth—sutures may be at once applied.

As Ball points out, the proper method of treatment for punctured wounds low down in the rectum is free incision through the sphincter up to the wound to allow of drainage.

Of gunshot wounds of the rectum during the Civil War, Otis collected 103 cases, with a mortality of 42.7 per cent.; in 34 of these the bladder also was wounded, with a mortality of 41.17 per cent.

Foreign Bodies which have been Swallowed.

Medical literature is full of curious cases in which foreign bodies have been swallowed, either accidentally or by design, and have in some cases passed the full length of the alimentary canal and been safely voided with fæces, or in others have become entangled in the mucous membrane and given rise to much trouble.

Every practitioner is familiar with cases of peach-stones and coins which have been accidentally swallowed, and knows how generally such substances take care of themselves and cause no symptoms after once passing the œsophagus. Much larger substances, such as whole or partial sets of false teeth, and the various things with which performers in travelling shows entertain an audience, may also be passed in safety.

To show what nature is capable of in this line, it may be well to enumerate the substances which were swallowed and safely voided by a certain lunatic, now become famous.

The patient stated that she had been swallowing nails, etc., and a dose of castor oil brought away two pieces of faïence one or two centimetres long and about the same breadth, two nails, and a pebble. During the following six weeks she passed nineteen large pointed nails, a screw seven centimetres long, numerous fragments of glass and china, a piece of a needle, two knitting needles, fragments of whalebone, etc., amounting in all to three hundred grammes. During all this time the patient ate and drank as usual, and seemed in ordinary health.

Professor Agnew "saw in the dissecting room of the Philadelphia

School of Anatomy a female subject, afterward learned to have been insane, in whose intestinal canal from jejunum to rectum were found three spools of cotton, partially unwound; two roller bandages, one of them two and a half inches wide and one inch thick, the other was partially unrolled, one end being in the ileum, the other in the rectum; a number of skeins of thread, a quantity being packed tightly in the cæcum; and, finally, a pair of suspenders."

Professor Gross records the "case of a man who swallowed a bar of lead, ten inches long, upward of six lines in diameter, and one pound in weight, whilst performing some tricks of legerdemain," which was removed by gastrotomy, and the patient recovered in two weeks. He also mentioned another case in which a teaspoon was swallowed whilst the patient was in a paroxysm of delirium, which was removed from the ileum by enterotomy, recovery taking place in a few weeks.

It would be beyond the scope of a work such as this to attempt to deal with the whole question of foreign bodies in the alimentary canal, and the accidents which may attend them. In a general way, the prognosis is good unless the foreign body be a very ragged one, or a large, sharp one, like a fork; and the treatment consists in giving a diet, like bread and fruit, which will cause copious stools, with little drink, and the avoidance of exercise such as walking.

If complications arise, they must be treated on general surgical principles; and at the present day no patient would be allowed to die from the effects of a foreign substance in the stomach or intestines without a surgical operation for its removal, provided only the diagnosis were clear.

The complications which may attend the detention of such substances in the rectal pouch just above the internal sphincter are ulceration with perforation, hemorrhage, and abscess. Ulceration may be caused by the pressure of a large body, and may cover a considerable space; or it may be caused by the pressure of the sharp ends of a smaller body, in which case the spots of ulceration will be smaller, and may be located at two opposite points in the rectum. As a result of ulceration there will be more or less pain, purulent discharge, and perhaps also a sharp hemorrhage from the erosion of a vessel. When perforation of the wall of the bowel has occurred,

inflammatory action is almost sure to be excited in the surrounding parts, and this may vary greatly in its extent and gravity.

If the injury be above the point of reflexion of the peritoneum, it may cause either a localized or a general peritonitis. A general peritonitis caused in this way will be fatal, as it is also generally accompanied by more or less extravasation of fæces. A circumscribed peritonitis with formation of an abscess is a less fatal complication.

Under these circumstances the usual signs of pelvic abscess will be present—fever, pain on pressure, tympanites, painful defecation and urination—and by careful examination a tumor may be discovered, either through the rectum or at the bottom of the iliac fossa. Such cases, when the tumor is on the right side, are often mistaken for cases of appendicitis, but the tumor is not in the same location; it is deeper and nearer the median line.

Such an inflammation may terminate in resolution, provided the cause be discovered and removed; but the usual termination is in suppuration, and the pus, if not removed by the surgeon, may find its way into the general peritoneal cavity or into the bladder or rectum. Abscesses of the superior pelvi-rectal space have already been described, and those which are due to foreign bodies in the bowel do not differ from them in general character.

When the focus of inflammation is located below the reflexion of the peritoneum, the prognosis is less grave. Phlegmonous abscess may form in the ischio-rectal fossa, and must be treated according to the rules already laid down; but here the difficulty is well within the reach of the surgeon, and a cure may confidently be looked for by proper care.

Foreign Bodies Introduced per Anum.

A classification of these cases is useless. The foreign bodies may be introduced through traumatism; by the patient in an honest endeavor to relieve himself of piles or prolapse; by the surgeon for the purpose of relieving rectal disease. They are often introduced in a spirit of revenge or of trickery; and most often of all they are lost in the practice of an unnatural vice. Edward II. is said to have met his death by having a red-hot iron thrust into the rectum. "We

seized the king," said one of the murderers, "and threw him forcibly upon the couch, and, whilst I kept him there by the assistance of a table, with a pillow on his face, Gurney inserted through a horn-tube a red-hot iron into his bowels."

A punishment for adultery among the Greeks is said to have been the introduction into the rectum of a peeled radish covered with hot ashes; and cases in which patients have fallen upon sharp and fragile objects, such as the wooden pickets of a fence, which have broken off and remained in the rectum, are on record.

The list of foreign bodies which have been lost in the rectum by ignorant persons, in attempts to check a diarrhœa or to prevent the descent of piles or prolapse, is a very long one, and includes such substances as bottles, sticks of wood, and round stones, some of them of a size relatively enormous; and the use of the rectal pouch by criminals for the purposes of concealment is well known to the police.

In the Museum of Anatomy and Pathology at Copenhagen is a longish, oval, flat stone, about six and three-quarter inches long, two and a half inches wide, one and a half inches thick, and weighing nearly two pounds, which a patient in Bornholm introduced into his rectum to prevent prolapse, from which he had for a long time suffered. The stone was extracted by a surgeon, Frantz Dyhr, in 1756.

A little case, with very ingenious housebreaking and other thieves' instruments, was found by Dr. Closmadeuc at the necropsy of a man in the prison at Vannes. The man had died of acute peritonitis, from which he had suffered seven days. During his illness a hard, rather large body was felt in the left side of the hypogastrium; he said that it was a piece of wood containing money, which he had introduced into the rectum; this, on exploration in the meantime, was found empty.

On section, the case, which was cylindro-conical in form, lay in the transverse colon, with its apex directed toward the cæcum; it was of iron, and was wrapped in a piece of lamb's mesentery; it weighed about twenty-three ounces, was about six and a third inches long and five and a half in circumference, and contained thirteen tools and some coins.

A depraved sexual appetite has been mentioned as accounting for the presence of many foreign bodies. It is known that sexual orgasm may be excited by stimulating the reflex power of the rectum, and it is probable that at the moment when the orgasm is at its height the body used to produce it is allowed to escape from the hand and is lost within the bowel. This is a habit which will never be acknowledged by its victims, but which may often be assumed to exist by the surgeon in depraved patients.

The bodies used for this purpose are generally smooth, long, and round, such as glass bottles and pieces of wood.

It would be interesting to enumerate the foreign bodies which have been removed from this part of the body, and the list would be startling from the strangeness of the different articles; but enough has been said to indicate that almost anything, from a conical stone to a club or a coffee-cup, may be encountered by the surgeon, and to indicate the size of the body which the sphincter will allow to pass. Among them may be mentioned beer glasses, mushroom bottles, wooden pepper boxes, wine bottles of all kinds, lamp chimneys, and a part of the wooden handle of a baker's shovel twenty-two centimetres in length.

A foreign substance may remain in the rectum for a considerable time and finally be expelled spontaneously, as in the following case reported by Weigand.

"A farmer, aged sixty-eight years, of a robust constitution, but somewhat stupid, introduced into the anus a cylindrical piece of wood for the purpose of relieving his obstinate constipation. However, he performed the manipulation so unskilfully that the piece of wood broke and remained partially within the rectum. All attempts made to remove the foreign body failed; two days later he suffered from abdominal and lumbar pains, dysuria, and constipation. Weigand, being consulted by the physician, recognized the symptoms of enteritis. As the introduction of a finger into the rectum did not demonstrate the presence of a foreign body, he restricted himself to combating the inflammatory symptoms and pain (calomel, enemata, narcotics, leeches).

"On the eleventh day a purulent, sanguinolent, fetid fluid was evacuated, after which the patient felt remarkably relieved; but it

was impossible to discover any trace of the piece of wood. Weigand then expressed serious doubts as to whether a foreign body was really contained in the rectum; but as the patient resolutely maintained that he continued to feel the piece of wood, renewed search was made, until the finger, being introduced far in, encountered a rough, hard object which it was impossible to seize for want of proper instruments.

"As circumstances did not indicate a necessity for more active treatment, Weigand contented himself with giving the patient from time to time two or three spoonfuls of castor oil, which always produced the discharge of a small amount of muco-sanguinolent fæces. At this time the lumbar and abdominal pains again appeared more frequently, and, on the other hand, the patient's former appetite being gradually restored, he walked about and attended to light domestic duties. On the thirty-first day after the accident, after having taken three spoonfuls of castor oil, he stated that he had an intense desire to go to stool, when, in addition to blood and pus, the piece of wood made its appearance, 0.1357 m. long, 0.027 thick, cylindrical, serrated at the broken end, and roughened at the cylindrical surface; in fact, it was the end of a pole with which bean vines are propped. The patient recovered entirely without having been subjected to any further treatment" (Poulet).

Prognosis.

The prognosis in cases of foreign bodies will depend greatly upon their size and nature. A long body like a piece of wood may go so far up the bowel as to do fatal damage before its removal; and a fragile body like glass may cause fatal injury in the attempt to remove it. Again, the prognosis depends in a great measure upon the surgical ability of the one in charge of the case. A little bungling in the treatment may at any moment change a case which promises well into a fatal one.

Finally, much will depend upon the length of time during which the body has remained in the rectum; and it is not very uncommon for patients who have met with an accident in the practice of this secret vice to conceal the real nature of the trouble, which they

well understand, till they are forced by suffering to confess. In this way a week's valuable time may be lost and a fatal amount of injury be done.

Treatment.

Each case of foreign body must be treated by itself, and, besides a few general principles which apply equally to all cases, the surgeon will be left entirely to his own ingenuity. The one guiding principle should be to avoid doing fresh injury in the attempt at removal. Only the smaller and least friable of bodies can be removed without a previous dilatation of the sphincter under ether, and in most cases it will be advisable to incise the anus in the median line down to the tip of the coccyx as a preparatory measure to all treatment. This step will sometimes render a body movable which before was absolutely immovable, and thus open the way for its extraction.

Having opened the way to the body, it may sometimes be removed by passing the whole hand into the rectum and seizing it. At other times forceps may be used with advantage, and these may be of any shape which seems best to answer the purpose intended, including the obstetric forceps, which have been found useful in many cases. If a bottle has been introduced with the mouth downward, a string may be secured around the neck for the purpose of traction; but, unfortunately, in almost all cases the position will be reversed. In cases of long bodies the lower end is not infrequently firmly wedged in the hollow of the sacrum—so firmly as to resist all efforts at dislodgement. Under such circumstances fatal injury may easily be done by the operator by persistence in the attempt.

Above all things the surgeon must avoid breaking such a substance as a cup, for experience has proved that, after this has happened, removal without causing great injury is almost impossible.

Certain complications may at any time arise in the treatment of these cases, one of which is recorded by Desault. A man, aged forty-seven, entered the Hôtel Dieu on April 17, 1762, in order to have a crockery vessel extracted from his rectum, which he had introduced a week previously in order to overcome, as he said, his obstinate constipation. This vessel was a preserve jar, the handle of which was broken and the bottom detached. It was conical in

shape and three inches long; it had been introduced by the smaller end, which was two inches in diameter.

When the patient presented himself at the hospital he had already made efforts to extract the foreign body, but an escape of blood and the excessive pains had compelled him to suspend his efforts. The upper part of the rectum was infolded and invaginated in the vessel, and formed a very hard tumor which filled it completely. The surrounding parts were inflamed, and this fact rendered the extraction more difficult.

Desault made the patient lie upon the side, and then, separating the intestine from the walls of the vessel, he succeeded in seizing the latter with a strong extractor, which he pushed up as far as possible, and which was held by an assistant.

By means of this point of support, and with another extractor introduced in the same manner, he succeeded in breaking the vessel and in extracting it in small pieces without wounding the rectum. The operation was neither long nor painful, though it was necessary to introduce the extractors a large number of times. After all the pieces had been removed, Desault pushed back the inverted portion of the rectum by means of a charpie tampon six inches long and two and a half in diameter, which he pushed in altogether after having covered it with cerate. Below this were placed a large amount of charpie, several compresses, and a triangular bandage which supported the whole dressing. The dressing was renewed twice a day on account of the relaxation, which did not cease till the sixth day. Then the intestine no longer protruded when the patient went to stool, and such large tampons were not required. They were discontinued entirely after the tenth day, when the ruptures had cicatrized, and the man left the hospital entirely cured two weeks after the operation.

In cases where a long body has become firmly wedged into the lower end in the hollow of the sacrum, the proper treatment consists in opening the abdomen, and this should be done after an attempt to remove it *per anum* has been continued a reasonable time, and before injury has been done in such an attempt.

The incision may be made either in the median line or in the groin. In the "Surgical History of the War of the Rebellion," vol. ii.,

page 322, there is a history of one such operation performed upon a sailor who had introduced a stone five and a quarter inches long by three wide. The colon had been perforated, and the stone was removed from the peritoneal cavity by an incision near the umbilicus. The man recovered.

The oldest known case was reported by Réalli in the *Bulletin de Société Médich.* and *Gazette Médicale*, July, 1851, and, being the one which has served as a guide for all subsequent ones, we give it in full:

"On December 18, 1848, a peasant was brought to the hospital of Orvieto in a condition of extreme weakness. Nine days previously, having hit upon the ingenious idea that if he prevented the discharge of food he could limit the quantity to be swallowed, he introduced a piece of wood into the rectum; all his attempts at removal only served to push it in still farther. The finger could only touch the end of the object, and it was firmly fixed in such a manner as not to yield to any tractions which could be made upon it with such a slight purchase.

"After the failure of all attempts at removal, the foreign body completely obliterating the intestinal cavity, and the patient being threatened with death from his atrocious sufferings, Réalli decided to operate. After having cut the abdominal walls on the left side, he could distinctly feel the stake in the descending colon. He desired to push it down to the anus, but the attempts proved unsuccessful and he was compelled to incise the intestine. Only after this was done could he remove the body, which was ten centimetres long and more than three centimetres in diameter at the base. The point was rounded and very soft. No fæces were retained above the plug, but the mucous membrane was blackish, the peritoneal coat strongly injected, and the thickness of the intestinal wall markedly increased.

"The wound in the intestine was united by a suture, which was applied according to Jobert's plan. The lips of the wound in the abdomen were united by means of an interrupted suture. Cold, and then iced applications were made over the operated region. Two doses of castor oil were administered. There was a purulent discharge from the anus. During the first few days the tumefaction of the walls of the intestines prevented the advance of fæces and caused

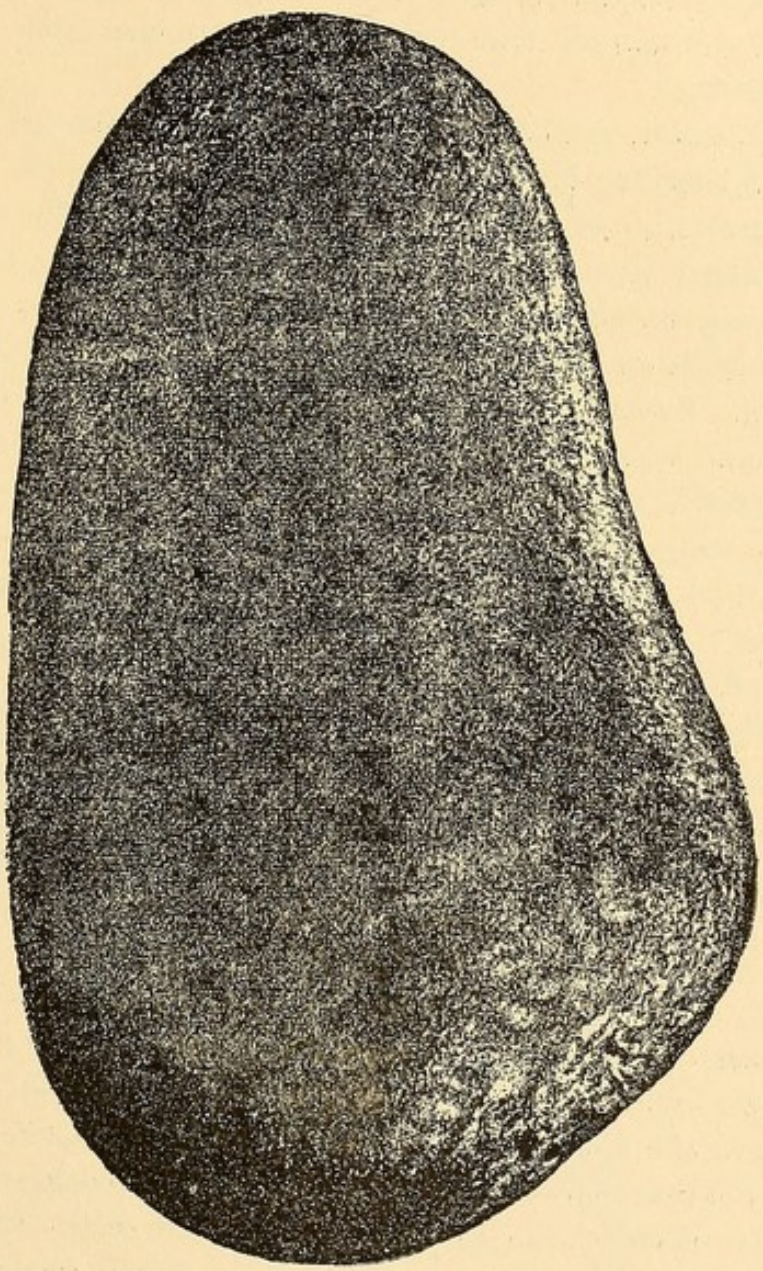


FIG. 207.
Stone Removed from Peritoneal Cavity. Natural Size.

meteorism and vomiting. Three bleedings, two applications of leeches, and a few doses of castor oil put an end to these symptoms, which had acquired an alarming character. The evacuations from the bowels were again passed on the fifth day. Toward the fourteenth day the wounds had cicatrized. Two years later the health remained perfect."

John S., sailor, aged forty-one, had been in the habit of crowding either a belaying pin or an eight-ounce bottle into the rectum to relieve a retention of urine which was of a spasmodic nature and which recurred frequently. June 13, 1870, not having any bottle, he obtained a pebble, five inches long by three in width, and weighing two pounds, and, having greased it, he applied it to the anus and sat upon it. Suddenly the stone slipped into the rectum above the sphincter, and although the patient could touch he could not remove it. A physician was called, who endeavored to pull it out with wire loops, but the more he tried the farther the stone receded from the anus. A final effort was made by causing the captain's boy to pass in his hand "up to the shoulder;" he could reach the pebble, but could not draw it down. The patient was then brought to Boston, and Dr. Thorndike called, June 15th. He found him suffering from peritonitis, indicated by tympanites, pain, high pulse and temperature, vomiting, and brown tongue. The patient having been etherized, Dr. T. passed his hand into the rectum; he could feel the stone high up in the abdominal cavity, but his hand and arm were so cramped by the want of space that it was impossible to seize the foreign body. An incision, five inches long, was then made, parallel with the outer border of the left rectus muscle, extending upward to a point two inches above the umbilicus; the peritoneal cavity was opened, and the stone found lying among the intestines just below the stomach (Fig. 207). The bowels were highly congested, but not adherent to each other. The aperture through which the stone escaped from the intestine was about eight inches above the anus. The external wound was closed with six silk sutures.

"The patient had a thin, yellow dejection three days after the operation. No blood ever came from the rectum. The vomiting, hiccough, tympanites, and pain gradually subsided, and he got out of bed in twelve days."

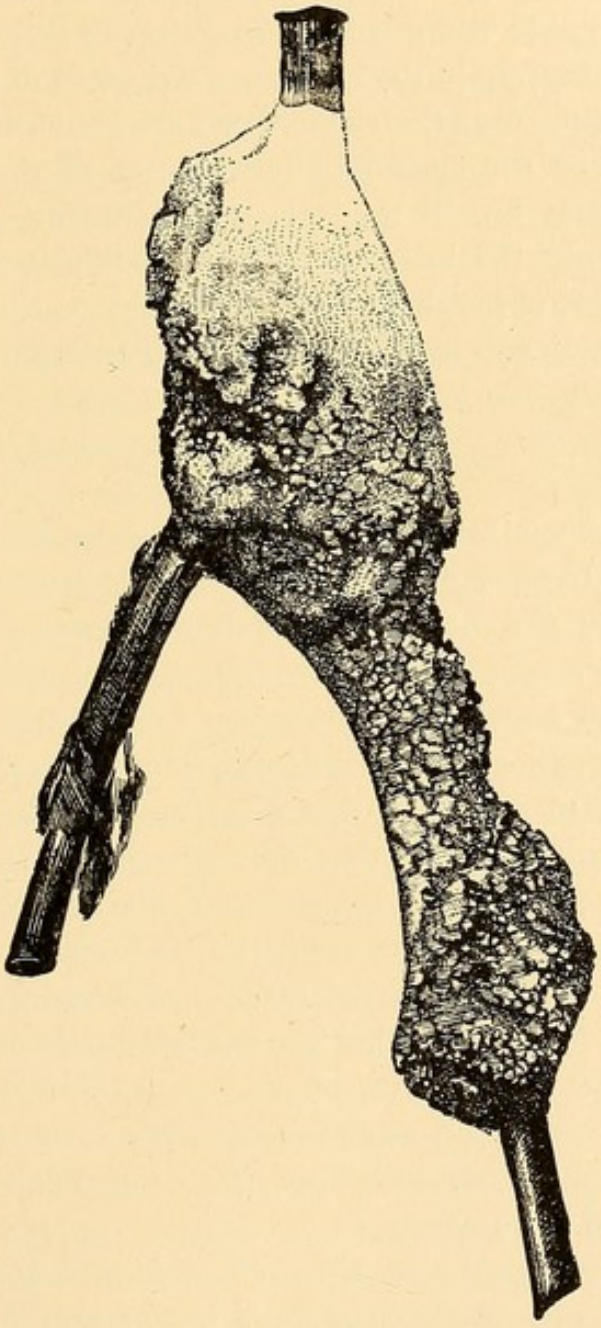


FIG. 208.
Stick Removed from Rectum. Natural Size.

Fig. 208 represents a willow stick introduced by the patient five years before "to relieve constipation." A recto-vesical fistula had been formed, and the stick had become encrusted with phosphates.

These cases indicate with sufficient clearness the general rules which should guide the practitioner. The operation is applicable only to bodies high up in the rectum. The point of incision may be in the median line, over the sigmoid flexure in the left loin, or over what seems to be the most prominent point of the foreign body, wherever that may be. If the intestine is healthy it may be closed and returned into the body; if not, an artificial anus should be made at the point of incision.

It is worthy of note that all of the cases thus far recorded have ended in recovery.

Spasm of the Sphincter.

Spasm of the sphincter without the presence of any other rectal affection is undoubtedly rare. Its general character may perhaps best be shown by the citation of the following cases.

CASE.—*Spasm of the Sphincter.*—Physician, aged twenty-eight. The patient was a man decidedly given to thinking about his own health, and, though generally well, not at all robust. He came to me complaining of a sense of discomfort about the rectum, accompanied by difficulty in defecation. The discomfort seldom amounted to actual pain, and he had noticed that when he was away on his summer vacations he was always better and in fact perfectly well. Nevertheless the trouble in defecation had increased so markedly during the past few months that he was fully convinced that he was suffering from actual stricture.

An attempt at digital examination caused the most exquisite suffering, forcing the patient to cry out in agony, and yet there was entire absence of any lesion.

The treatment was based upon the fact which he had himself noted, that when his general condition was improved the local trouble ceased; and the patient was cured by purely general measures looking toward the building-up of the system.

CASE.—*Spasm of the Sphincter.*—Professional man, aged thirty. In this case also the only symptom complained of was pain on defe-

cation, sometimes severe, sometimes slight. The history given pointed so strongly toward the existence of a fissure that I etherized the patient, fully expecting to cure him by stretching the sphincter. He was entirely cured by stretching the muscle, but, to my surprise, a most careful examination revealed no disease; and, being dubious myself about the existence of spasm without fissure, the examination was a very thorough one. This patient was also a man of sedentary habits and of rather a nervous character.

The following case is taken from Syme, and is characterized by him as a remarkable instance of the affection: "I was asked to see a gentleman, about sixty years of age, who stated that a few weeks before, after sitting out a long debate in the House of Commons, he had felt extreme difficulty in evacuating the bowels, having previously for several years experienced more or less uneasiness from this source; that he had consulted a physician and surgeon in London, who prescribed laxatives without affording relief; and that his complaint had continued so as at length to confine him to bed. I proposed an enema, which was at once objected to on the ground that the anus would not admit the smallest-sized tube.

"Suspicion being thus excited, the anus was examined and found to present the characteristic features of spasmodic stricture. Having explained my views of the case, I gently insinuated the narrow sheath of a *bistoury caché* which I happened to have with me, and then, expanding the blade, withdrew it so as to make an incision on one side of the orifice. A copious stool immediately followed, and the patient was at once completely relieved from his complaint."

With regard to this much-disputed affection, a citation of authorities may be useful. Syme believed that spasm existed as an independent condition without morbid change; that, though there could be no doubt that spasm and fissure frequently existed together, it was not reconcilable with the facts met with in practice, that spasmodic stricture was always of secondary origin and dependent upon the fissure. He says: "In a considerable number of cases I have found the sphincter firmly contracted without any perceptible fissure or abrasion of the surface."

Mayo describes spasm of the sphincter as a kind of cramp which often comes on suddenly, sometimes at night during sleep. The

paroxysms may occur daily or two or three times a year; and the attack may come on gradually and cause uneasiness for two or three days, and then pass away, or its coming and going may be sudden. He says: "There are cases in which the disease produces long-continued and permanent suffering; in which the anus becomes permanently contracted and hardened, constituting, therefore, a permanent stricture, and generally combining both permanent and spasmodic contraction. The motions are passed with an effort and with pain, and all the common symptoms of stricture of the rectum are present."

Allingham says: "Spasm of the sphincter has been said to be the cause of impaction, but I have more often thought the reverse was the case, and the impaction the cause of the spasm. I must, however, acknowledge that spasm is often the cause of the constipation which is the forerunner of impaction. In impaction, spasm of the sphincter always exists, in some instances to such a degree that, when the patient strained, I have observed the anus protruded like a nipple, and an injection returned in a fine stream as if coming out of a squirt. I have certainly met with cases of idiopathic spasm of the sphincter, usually in elderly, nervous single women, and though no impaction was present, costiveness was."

Quain concludes that "where pain, brought on by fecal evacuations and continuing after them, happens to be present, the fault —the morbid condition—is not in the sphincter, but in the skin or mucous membrane covering it, and that the division of the muscle is not required in order to remove the patient's suffering." In other words, that spasm is always dependent upon fissure. Boyer treats of "constriction with fissure" and "constriction without fissure."

Dupuytren says: "The gravity of this affection (fissure) depends chiefly on the painful spasm of the sphincters; the fissure is only an accident, as is proved by the existence of painful spasm without fissure, which, according to well-known surgical authorities, is found in proportion to the other of one to four." And, "the spasmodic constriction is the true lesion, and the fissure only an epiphenomenon." Sir B. Brodie held the same views.

Symptoms.

The symptoms of spasm of the sphincter are pain on defecation and for a time after; more or less uneasiness about the anus, especially when sitting; fulness in the perineum; often more or less trouble with the bladder, as shown by frequent micturition, sometimes attended by smarting in the urethra and constipation. The disease is generally attended by exacerbations and remissions. A digital examination of the anus is always painful, and the contraction may be so great as to leave hardly a trace of the anal orifice. Any anxiety or distress of mind, a generally irritable, nervous condition, and everything which has a tendency to irritate the rectum or the parts around, will aggravate the complaint. It may easily be confounded with the affection next to be described, neuralgia, but is generally distinguishable from it by the marked dependence of the pain upon the act of defecation, which is not seen in neuralgia without spasm.

The treatment consists in attention to the general health of the patient, in allaying any nervous excitement, in the administration of a cathartic to empty the bowel when the spasm is present, and in anodyne injections, such as, for example, twenty drops of laudanum in an ounce of water. Suppositories may cause renewed irritation. Even in the more aggravated form the disease will often yield to such measures as this, but if it does not a cure may always be effected by forcible dilatation of the sphincter under ether. If the patient will not submit to this, the next best thing will be found to be the introduction and retention of a bougie.

Neuralgia.

Neuralgia of the rectum is generally met with in nervous people, especially females, such as are subject to neuralgia in other parts of the body.

In some persons it will cause the same suffering as the most intense neuralgia elsewhere. The pain is apt to be paroxysmal, but may be continuous, and is independent of the act of defecation.

In cases of well-marked periodicity a malarial element should be

looked for, and the disease may be a manifestation of the gouty diathesis. In the former case quinine, and in the latter colchicum, may be of the greatest service. In all other cases the treatment will often be found unsatisfactory, and is to be conducted on general principles. The first care should be for the general health, the second for the regularity of the bowels, and, after this, local applications of cold water, ointment of belladonna (ʒ i.–ʒ i.), and blistering over the sacrum may be tried. Besides this local treatment the case must be managed exactly as would be a case of neuralgia in any other part.

The diagnosis from coccygodynia and from spasm must both be made with care.

I have come to be very cautious as to the diagnosis of pure neuralgia of the rectum without first making a careful examination under ether, so many are the lesions which, though difficult to detect and slight in themselves, may cause pain. Those most frequently found will be erosions of the mucous membrane, and small internal fistulæ.

CHAPTER XXI.

SALPINGECTOMY AND OOPHORECTOMY BY ABDOMINAL INCISION.

It is not too much to say that the mortality of these operations will depend as much upon the technique of the operation itself as upon the character of the cases operated upon.

In simple cases without pus the mortality depends almost entirely upon the technique. Pus cases will *occasionally* be fatal, in spite of every precaution, from rupture of pus-tubes or ovaries, or from rupture of extra-peritoneal collections of pus ; but they will *generally* be fatal in the hands of one who has not devoted especial study to the technique of pelvic surgery.

The surgeon may be forced to operate in the most unpromising case to save life, and may have no time for the preparation of his patient ; and in such cases the mortality will be great. But little value is therefore to be attached to statistics of mortality made up without regard to the character of the cases operated upon. Given a certain class of simple cases and a clean operator, and the mortality may easily not reach over two or three *per cent.*, whereas in pus cases, and patients in bad condition, no such rate can be expected or hoped for.

Diagnosis.

Perfect accuracy in diagnosis in diseases of the tubes and ovaries is often impossible before opening the abdomen, and death may result from rough or repeated attempts to secure it.

Given the history of chronic invalidism from pelvic pain, and the presence of a tumor in the pelvis be made out by conjoined manipulation, an operation is indicated, whether an exact diagnosis between

an ovarian and tubal abscess can be made or not. Many cases will be doubtful, even with the tumor in the hand after the abdomen has been opened.

Greater judgment may be shown in knowing that an operation is required for something in a woman's pelvis, even without knowing exactly what that something is, than in having half a dozen different men examine a doubtful case before operation, at the imminent risk of rupturing a pus-sac or an ectopic pregnancy.

The most perfect accuracy in diagnosis should of course be the life-long study of the operator, and the man who approaches most nearly to it is the better surgeon, but certainly will never be reached, nor to save life is it always necessary, while the attempt to reach it may end fatally.

Preparation of the Patient.

At least three or four days should be allowed for preparation for an abdominal section. If the patient be placed in a hospital this is none too much time for her to become used to her strange surroundings, and it may be well spent in clearing the alimentary canal.

The bowels should be moved freely for three days before operation by laxatives given each night. Three compound cathartic pills are not too much for the first dose, and these may be followed by licorice powder each succeeding evening, and an enema of soap and water a few hours before the operation.

Although nothing but milk and fluid diet, with eggs, should be given for two days preceding the operation, the amount of nourishment should not be restricted. It is not wise to starve the patient before going through so great a physical trial, and personally I prefer that my patient should be fed in the way mentioned up to six hours before being placed upon the table.

The urine should be drawn or passed just before going to the operating-room.

It is not advisable in patients of delicate nervous susceptibilities to spend the three days preparatory to the operation in impressing upon them the exact point at which they are to be cut open by constantly scrubbing and poulticing it. Cheerfulness should be culti-

vated, and this can hardly be cheerful, nor is it necessary. All final arrangements can be made while the patient is being etherized, and without any great loss of time.

The nervous condition of the patient is always worthy of attention before an operation, and the securing of sleep is very important, even by resort to hypnotics when necessary. In many of these cases the action of the heart must be carefully watched and a hypodermic of morphia a few hours before being placed upon the table will greatly strengthen the pulse and lessen the nervous shock of the ordeal.

Operating Table.

This should be preferably with a glass top, so made as to allow of the draining away of all water used in washing the patient ; and the Trendelenberg posture may be indispensable in any case, even though the operator may begin without the intention of using it. Although most operating-tables are now made for the express purpose of allowing the free use of water without soaking the patient's back, it is astonishing how often this provision is neglected.

The glass top is usually covered with a sheet folded into layers upon which the patient is placed before she is washed and scrubbed, and upon which she remains until the operation is completed. In an operation, one of the great dangers of which is shock, this should be avoided.

Either the washing should be done with no cloth under the patient, or better, a dry warm sheet should be substituted for the cold wet one after the washing is finished. This may seem a little matter, but nothing which tends to protect the patient is without its influence in a cœliotomy.

The assistants necessary for comfortable work are the instrument tender, the etherizer, one to directly assist at the wound, one to change sponges, and one to handle basins, pitchers, etc.

For directions as to scrubbing the patient, preparing instruments, and the antiseptic details of the operation, the reader is referred to the chapter devoted to these subjects.

The instruments which should be at hand for every cœliotomy are :

Knife.
Artery forceps.
Dissecting forceps.
Scissors (straight and curved).
Hagedorn needles (curved).
Needle-holder.
Sponge-holders.
Sponges.
Small volsellum.
Needles for intestinal work.
Fine silk.
Aspirator.

Other essentials, such as gauze, bandages, adhesive plaster, towels, stimulants, hypodermic, etc., are supposed to be always in readiness.

The sponges should be of two sizes, small ones for placing in holders and using deep in the abdomen, and large ones, six or eight inches square, for pressing back the intestines and protecting the abdomen, and these should be carefully counted, and the number recorded, before the operation begins. They should be in the care of one special assistant, and should always be accounted for before closing the abdomen.

It is an awkward thing to have the nurse assert that a sponge is lost just as the final dressings are being put on, and such a statement may cost the patient her life, be it true or false. If it is true, the abdomen must be reopened and it must be searched. If it is false, a still longer time will be spent searching in the abdomen for it, and the search may just turn the scale against the patient. I have ventured to doubt the positive statement of a nurse at this critical moment, and refused to reopen an abdomen in which I knew no sponge was concealed, although one was missing; but the mistake should not occur, and will not if the sponges are taken from their jar by one nurse, counted one by one as they are handed to another, and the number written down.

A safer way than all others, however, is for the operator never to put a sponge into the abdomen without leaving a pair of forceps

attached to it hanging out of the wound. The little additional trouble will be more than compensated for.

In cases of suspected pus-tubes or extra-uterine pregnancy curetting the uterus before opening the abdomen is positively contra-indicated, and may be fatal from rupture.

When all is ready, the incision is made in the median line, or to one side, as is preferred.

There is an idea that a stronger cicatrix will result if the incision is made through the belly of the rectus than if made in the median line and the fibres of the muscle separated without cutting.

The incision should be about three inches long, and reach to within one inch of the symphysis through the fat and the fascia of the abdomen. When this fascia has been divided the knife should be turned in the hand, and the handle used to separate the recti and expose the peritoneum.

The peritoneum should be grasped between two pairs of dissecting forceps, and not artery forceps, for the preliminary incision into it. Artery forceps grasp too much and hold what they grasp too firmly. Dissecting forceps are more delicate, have finer points, and are less liable to grasp the intestine. It is an easy thing to seize both peritoneum and intestine in a pair of artery forceps and hold them firmly, and the intestine may be wounded in this way in the attempt to enter the peritoneum.

The incision through the peritoneum should be with the knife, and the moment air has entered the cavity the intestine will fall away from the incision unless it is adherent at that point. The incision may now be enlarged, with two fingers in the abdomen for a guide, either with knife or scissors, and should be carried down as near the symphysis as possible without wounding the bladder, for room is needed at the lower, and not at the upper end of the incision, for working in the pelvis, and an inch at the symphysis is worth several at the umbilicus.

The next step is the careful and thorough exploration of the pelvis with two fingers in the incision.

Often an indistinguishable mass will be encountered, made up of uterus, tubes, ovaries, pus-sacs, and adhesions; or the disease may be comparatively slight and the organs may rest in their proper re-

lations. In the latter case the operator should proceed with method and deliberation.

The fundus uteri is the first thing to be sought for, and from this he may work both ways, following first one tube out to its ovary and then the other, bringing the parts up into the wound and examining them with care.

Should an ovary be found cystic, it may be brought out of the incision, which is then closed by slipping a sponge into it under the ovary and the cyst if small may be punctured with a needle, its contents expressed, and the ovary returned. Should a tube be in comparatively good condition, a probe may be passed into its fimbriated extremity down to the uterine cornu to test its permeability, and it may be returned. Then the same procedure may be practised on the opposite side.

In cases of slight disease, disease which has rendered the woman miserable but does not justify castration, the rule is to save the ovaries whenever possible, and to save a part of one ovary even when the rest has to be sacrificed. Conservative surgery means more here perhaps than in any other part of the body, and yet it may be carried too far. For with an ovary removed the corresponding tube is only a possible focus for serious disease, and with both ovaries removed, or both tubes diseased, the uterus is reduced to about the same condition.

Should it be deemed necessary to remove a tube or ovary, or both, it is well to bear in mind the fact that to accomplish this safely it is not at all necessary to surround about half of the corresponding broad ligament with a heavy silk ligature to prevent a fatal hemorrhage. The ovarian artery is not as large as the radial, and yet from the amount of violence done and the amount of force used to secure any possible branch from it before cutting, one might imagine such to be the case.

Taking the broad ligament between the thumb and fingers of one hand to prevent its slipping back into the abdomen, the ovary and tube may be delicately dissected away from it down to the cornu of the uterus, without more hemorrhage, in many cases, than comes from the skin incision, or more than can be controlled with a single pair of artery forceps. But a small bleeding point here is very important from the fact that the stump is about to be dropped into the

abdomen, and a single bleeding vessel, even though small, may cost the patient her life.

Therefore, great care should be used in operating by this method, bleeding points should be secured with fine catgut, and the cut edge of the broad ligament should be stitched over with a continuous suture of the same.

The advantage of this method of operating is, that besides being more surgical in that it is better adapted to the desired end, it leaves no large raw stump-surface to be subsequently cared for by nature after the abdomen is closed.

Another is that a diseased tube may be dissected out close up to the cornu and removed in its entirety, even followed a little into the substance of the uterus, and the wound in the uterus closed over by a few stitches.

It is believed that the subsequent pain and liability to adhesions is much less by this method of removing the tubes and ovaries than by ligaturing a large mass of tissue, and it seems only probable that such should be the case.

In these cases of slight disease the only question which may arise is as to what should be removed and what allowed to remain, and this actually hinges upon the question whether the organs are sufficiently diseased so that they can no longer be anything but a source of suffering and possible danger; and whether pregnancy is apt to occur after the tapping and cleaning out of a small cyst of the ovary.

Although few go so far as to recommend the aspiration of a hydrosalpinx and leaving the tube, or even excision of a cyst of the tube and stitching what remains to the ovary, in the hope of a future pregnancy, it certainly seems that in many cases cysts may be removed from the ovary, the peritoneum closed over the wound, and the patient left in much better condition than were the entire ovary sacrificed. Moreover it would seem probable that such conservative surgery might bring great relief to symptoms.

In these cases there need be very little toilet of the peritoneum after operation. All of the work may often be done outside of the abdomen with the organs in the hand, and the incision closed with a sponge. When the organs have been returned to their place, a small sponge held in a sponge-holder should be passed into Douglas's

pouch, to take up any serum that may have collected there, and the abdomen may be closed.

All unnecessary manipulation within the abdomen should be scrupulously avoided, as adding to the shock of the operation. In the majority of cases it will not be necessary at any time to introduce more than two fingers into the wound in order to hook up the ovary and bring it out of the incision, with its corresponding tube, even when numerous but slight adhesions exist. In this way there is but little disturbance of the intestines, they are not twisted or bruised, and the danger of consequent kinking, volvulus, and paralysis are reduced to a minimum.

There should be no irrigation of the abdomen after such an operation, as there is nothing to be washed out.

In cases where, on account of soiling the peritoneum by fluids which have escaped from the tubes or ovaries during the operation, it is necessary to take every precaution against septic peritonitis, a question will often arise as to whether the abdomen should be irrigated, or drained without irrigation, or whether both should be used.

If irrigation be employed it should unquestionably be very free, and it should never be done in the Trendelenberg posture. If pus is to be washed out in this way, it need not be allowed to flow by gravity up to the diaphragm, and it should be diluted as much as possible.

The best material for irrigation is hot sterilized water. No chemical antiseptic should be used. Hot saline solution may also be used if the operator prefers. Two fingers should press the uterus toward the symphysis and hold it there so that the fluid may flow readily into Douglas's pouch and escape, and a considerable quantity may be left in the abdomen with advantage after the irrigation is completed. It is quickly absorbed after the wound is closed, and it may have an effect in diminishing the thirst which always follows an abdominal section, as well as in preventing adhesions of the intestines.

In cases where there has been pelvic inflammation and in which all of the organs are matted together by plastic exudation, or in which the intestine or omentum is bound to the uterus or adnexa by adhesions more or less firm, the operation becomes a very difficult one.

From the time the peritoneum is first nicked the operator may

find himself in trouble. Omentum may completely conceal the site of the operation, and this must first be torn loose and pressed up into the abdomen. Hemorrhage from the omental vessels must be carefully guarded against, and too much omentum must not be included in a single ligature lest secondary bleeding occur. Where much omentum is to be tied off, the chain ligature is the best form.

Adherent intestine is more difficult to manage than omentum, as force cannot be used to tear it loose, and unless the adhesions yield easily to pressure of the end of the finger a tedious dissection is necessary. This may generally be done with the handle of the knife, but occasionally a little cutting with the scissors will save the gut from being torn, and a good view of the pelvis is absolutely essential.

Retractors here come into use, and the best, because they take up no room, are two strong ligatures passed through the fascia of the abdomen, one on each side of the incision.

When intestine is injured beyond the peritoneal coat in this dissection it must be repaired with Lembert's sutures before the operation is continued, and the means for doing so should always be among the instruments provided for the operation. Should actual rupture of the gut be caused which is beyond the reach of repair by a back-to-back approximation of the rent, an intestinal anastomosis must be done; and this should be preferably by some variety of suture (Abbe's, Maunsell's, or end to end) rather than by the Murphy button.

Having freed omentum, intestine, and bladder from the pelvic mass, the operator may proceed with the enucleation, having now nothing to fear except the large vessels and the ureters, both of which have been ruptured, the latter many times.

The secret of safety and rapidity in enucleating such a mass will be found in working with the fingers as near to the mass as possible, and in first finding some weak point between it and the sacrum which may be taken advantage of for a commencement, and from which progress may be made in all directions.

The most essential point at this stage of the operation is to avoid in every possible way the rupture of pus-sacs. This may be done by gentleness in many cases, but not in all. Pus may be encountered at any moment before either tube or ovary has been sufficiently

loosened from the general mass to be recognized. When such is the case, the only safeguard possible for the patient is to have the parts well protected by sponges, and to wipe up the pus as it escapes as rapidly as possible with pieces of dry gauze, which are thrown away as used. It is well to remember that the presence of pus may mean the death of the patient from septic peritonitis, and act with corresponding caution.

Masses containing fluid in such cases may often be aspirated with advantage before any force is used in enucleating them, and an aspirator should also always be in readiness. After pus has been drawn off, the aspirator puncture may be closed by a stitch or two through the wall of the sac, and the danger of subsequent rupture by manipulation will be much lessened by the relief of tension.

As soon as the fundus uteri has been recognized, a great point has been gained in that the operator has a sure guide to the tubes and thence to the ovaries. First one ovary may be gently worked up from behind the broad ligament and then the other. It will not be possible as a general rule to bring one tube and ovary outside the abdomen while the other is still bound down ; but one side may be tied off within the pelvis before the other is attacked, and where pus is suspected in the liberated side, this is a good rule to follow.

Many forms of ligatures and knots are in use, but none is better than a double interlocked ligature of strong catgut, passed through the broad ligament with a Cleveland ligature carrier, or with a large curved needle. The ligature should be at least one metre long before it is divided after being passed, so that when cut in two each half will be long enough for the operator to secure a good hold in tying. The two ligatures are then twisted together so that when one is tied around one side of the mass to be removed, the middle of the other is in its grasp. The second is then also tied around the other half of the pedicle, and a figure-of-eight loop is the result.

Before tying the final ligature, tension upon the broad ligament should be relaxed in order that there may be less retraction of the stump after the mass has been cut away, as this retraction when the tension has been great may cause the stump to escape from its ligature. If the round ligament is included in the ligature there will be less danger of slipping.

Medium strong catgut answers every purpose for the ligature, and unnecessarily heavy gut or silk is often used. When once a surgeon is convinced of the reliability of his own catgut, as prepared by himself, he will seldom use any other material in an abdominal operation.

The stump will contain the cut end of the Fallopian tube, and as this cut surface is in all probability septic, it should be cauterized with pure carbolic acid on a piece of cotton held in forceps before being dropped into the pelvis. The entire tube, close to the cornu of the uterus, should be removed.

Having removed the tube and ovary on one side, the other may be enucleated in the same way, and the question as to whether the uterus should be saved or removed may be considered.

In some cases the uterus will be so manifestly diseased, and the presence of pus in its substance in small foci so palpable, that complete hysterectomy offers the only chance for curing the patient. Generally, however, future curettage may be counted upon to cure the disease of the uterine mucosa.

A more delicate question to decide is, what to do with a healthy tube on one side when the other is purulent, but the consensus of opinion is in favor of giving the patient a chance of pregnancy, trusting to future curettage, even should a second opening of the abdomen be necessary.

Should the uterus prove a source of trouble after both adnexa have been removed, and resist treatment, a vaginal hysterectomy can be done with greater ease than an abdominal one at the time of the removal of the tubes and ovaries.

The toilet of the peritoneum should next be considered, and should pus have escaped during the operation this is a matter of the greatest importance. As much fluid as possible should be removed with sponges, as in this way it is not scattered over the intestines. The table should next be lowered from the Trendelenberg position and hot water freely used for irrigation. After this drainage should never be neglected, and this should preferably be with two strips of gauze, one passing into the pouch of Douglas from the incision, and the other from the pouch into the vagina.

The best way to accomplish this is to lay a long strip of gauze in

Douglas's pouch and then close the abdomen, after providing a second independent gauze drainage through the abdominal incision. After the abdomen is closed the position of the patient is changed, the vagina is opened posteriorly, the strip of gauze left in Douglas's pouch is seized with dressing forceps, and pulled out through the vulva.

Another method is the same, with the exception of the vaginal incision and drainage into that canal. A large square piece of gauze may be placed in Douglas's pouch in the form of a bag, with the edges brought out at the abdominal incision, and into this several strips of gauze may be packed, with one end left protruding from the mouth of the bag. These may be removed one by one, and the bag itself will come out easily after the strips have been removed.

A good drain is made by wrapping a roll of gauze in a layer of rubber tissue, cutting off the ends to the desired length, and cutting fenestra in the sides. It drains as well as a glass tube, is less dangerous to the intestines, and is more easily removed than gauze, because it does not so firmly unite to the intestines by adhesions. A large-sized rubber drainage-tube with side fenestra also answers every purpose.

In cysts containing pus, where the condition of the patient will not permit of completing the operation of removal of the cyst after the evacuation of its contents, the cyst wall should be stitched in the lower end of the abdominal incision and drained. Fig. 209 represents a very large suppurating dermoid cyst which was ruptured very early in the operation for removal, flooding the abdomen with pus while in the Trendelenburg posture. The patient being in very poor condition before being placed on the table, no attempt was made at enucleation. The abdomen was flushed with warm saline, and the cyst itself was cleaned of its solid contents with the hand, and also thoroughly washed. A gauze drain was left in the peritoneum, the cyst was packed with gauze, stitched to the abdominal incision, and a separate piece of gauze introduced into the sac through this incision. Posterior colpotomy was then performed, and the gauze from the peritoneum and that contained in the sac both pulled into the vagina. The patient escaped all septic poisoning, and made a good recovery.

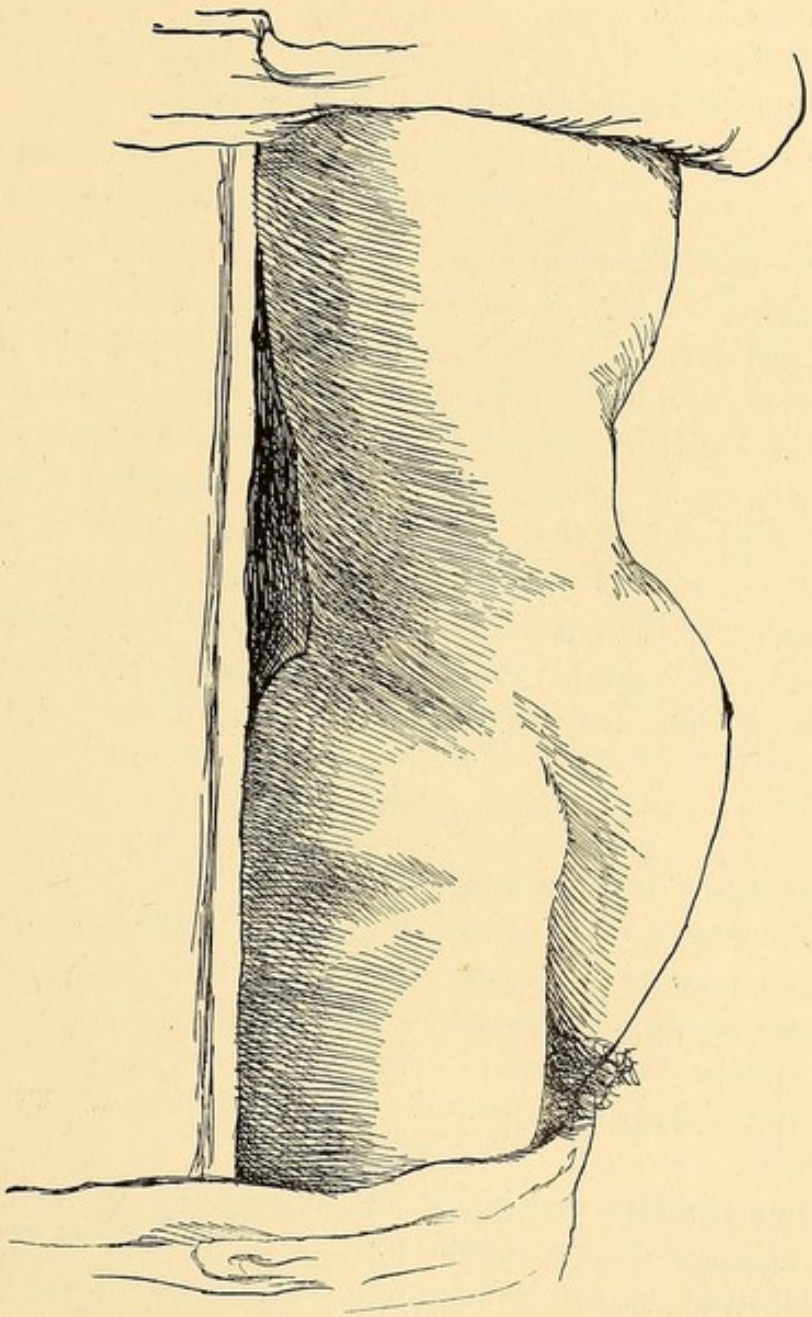


FIG. 209.
Large Suppurating Dermoid Cyst. (Personal.)

Such an operation involves the subsequent removal of the cyst, if the case requires it, after the patient has improved sufficiently in general condition.

The drainage should be kept up till the patient's temperature shows her to be out of danger of septic poisoning.

Hemorrhage.

The most troublesome source of bleeding is apt to be from firm and old adhesions which have been torn loose in the operation. Often when the operator is ready to close the abdomen he will be afraid to do so because fresh blood is constantly oozing and filling Douglas's pouch. It is true that such bleeding will often cease spontaneously after the abdomen is closed, but it may not, and the wound may have to be reopened on that account.

In such a case, unless a stitch can be passed under the bleeding point to secure it, there is nothing to be done but pack the abdomen at the site of the oozing. This should be done with a single long strip of gauze, which may be removed at the end of forty-eight hours.

Closure of the Wound.

The strongest possible method of suture of an abdominal wound is a matter about which there are many different opinions, some preferring a number of interrupted sutures of silk-worm gut passed through the whole thickness of the abdominal wall; others, several rows of continuous sutures of catgut by which homologous structures are united layer by layer; and others still, a combination of the two methods.

The great desideratum is that muscle should be brought into apposition with muscle, and fascia with fascia, and there would seem little doubt that this can be more accurately accomplished by special rows of sutures than by a single interrupted one, no matter how strong it may be in itself, by which all the layers are brought into contact *en masse*.

Much will depend upon the surgeon's confidence in his own catgut. If he is using gut which has been chromicized to last and resist absorption for three or six weeks, and if the gut has been prepared

and tested by himself, he will have no fear of failing to secure a hard, firm cicatrix. Such gut need not be large to be safe.

A continuous suture of rather small gut should be used for the peritoneum, and after running from the top to the bottom of the incision, the same may be used to return in the muscular layer from bottom to top without interruption. In this way one knot is avoided and as few knots should be concealed in the wound as possible. A stronger suture should then be used to bring together the fascia, and this being heavier than is needed for the skin, should be tied and cut. A third suture of fine gut finally unites the skin margins.

The avoidance of an unsightly scar is always a desideratum, and fine needles, fine gut, and accurate coaptation of the skin are all essential. Before tying the skin suture, all air and fluids should be pressed out of the incision.

A very pretty way of giving a light linear skin cicatrix is not to perforate the skin at any point with the needle, but to keep the suture entirely within the substance of the skin margin. This may be easily done by commencing at one end and passing the suture through about half an inch of the cut margin of the skin of one flap, then crossing to the other flap, and taking half an inch of that, then back to the first for another stitch, and so back and forth till the other end is reached. No knot has been made, and when the two ends of the running suture are pulled upon a very accurate coaptation will result, with the suture entirely buried in the skin itself. This is maintained by simply tying the two ends, one from the upper and the other from the lower angle together, and the resulting scar will be a mere line.

Dressings.

The incision should be covered with sterilized gauze in two or three layers. The first layer simply covers the incision, the others are larger and cover the abdomen. These are retained by broad bands of adhesive plaster.

If the patient does well this dressing should not be removed for a week. At the end of that time it should be removed, the wound examined for stitch abscesses, and if found in good condition a similar dressing should be applied and left on for another week.

Some operators prefer to dust the incision with aristol or iodoform before applying the dressing, but this is a matter of individual taste, and not a requisite to primary union.

Effects of Removing the Ovaries.

On this point the operator must be prepared to answer many questions and combat many popular ideas, such as that the operation will cause the patient to grow fat, or to develop a beard; that sexual appetite will be entirely lost, and the voice become masculine.

The effect of the operation is twofold: first, to cure the patient of her disease and to restore her to health; second, to bring about the change of life; and the changes in the woman will be such as naturally follow these two things in any woman.

The menopause in itself coming on naturally seems to make no change in the sexual appetite, and the same is true of the results of an operation. The patient may therefore be assured that she will be exactly like all other women who have passed the change of life, plus the fact that she will have some chance of being cured of a disease which is rendering her life miserable, and which can be cured in no other way.

There is almost invariably a menstrual flow immediately after the operation, and in quite a percentage of cases (ten) menstruation goes on after the operation as before.

Unfortunately, too much immediate relief from pain must not be promised, for this is the exception. In time perfect health may be restored, but generally not till after many months. Every such operation may be followed by adhesions which will give trouble, and in many, although pus-tubes and ovaries have been successfully removed, there will still remain sufficient inflammatory trouble to be a cause of suffering.

After-treatment of Laparotomies.

In the after-treatment of abdominal sections there are some general rules to be followed in all cases, and some which apply chiefly to intestinal work.

In other words, the rules for the management of the bowels after

a laparotomy for disease of the uterus or adnexa are not in all respects the same as those which apply to a case of intestinal anastomosis. In the one case the bowel is a perfect canal which need only be forced to do its work; in the other it is a wounded and enfeebled organ which needs especial care.

It thus happens that in some cases where it is most desirable that the bowel should be made to act, we are restrained from the administration of purgatives for several days.

The complications most to be dreaded after laparotomy for any cause are:

Hemorrhage.

Shock.

Vomiting.

Intestinal paralysis.

Volvulus.

Sepsis.

Hemorrhage is shown by a gradually failing pulse, beginning some time after the patient has been put to bed. Should the shock have been so great as to leave the patient almost pulseless when the operation is completed, a subsequent hemorrhage added to the shock may be indistinguishable from the shock of the operation. So closely do the symptoms resemble each other that the only way of distinguishing between them may be by the time of their appearance.

On the other hand, should the patient have rallied nicely from the operation and have a fairly strong pulse for some hours, and should the pulse then begin gradually to fail, hemorrhage may be counted upon as the cause of the condition, and the only treatment is to open the wound and secure the bleeding point.

Shock.

This attends all laparotomies to a greater or less degree, and may be shown by coldness of the extremities, clammy sweat, and feeble pulse at the completion of the operation. It is to be met by hot applications to the body (hot sheets and bottles), injections of strychnia, gr. $\frac{1}{30}$, every hour or half hour, and brandy with ammonia by the mouth.

Vomiting.

Having carried the patient safely through the complications of shock and hemorrhage, the condition of the stomach and bowels is to be carefully noted and treated.

Some vomiting from the ether is to be expected, but this should not last longer than twelve hours. During this time food should be absolutely abstained from, the dryness of the mouth is to be overcome by washing the lips, teeth, and tongue with a cloth wrung out in hot water, and the thirst is to be treated by teaspoonful doses of hot water every hour. If after twelve hours the stomach has become quiet, the administration of food may be begun, and this should vary according to the operation.

Should the alimentary canal be uninjured, small doses either of milk or beef-soup may be given—an ounce every two hours. On the other hand, should the operation have been upon the alimentary canal, milk should not be given, and the food should be limited to beef-soup. Milk causes large passages, which are contra-indicated in operations on the intestines, and also in some patients flatulence.

In all cases in which milk is given, it should either be predigested or mixed with lime-water in the proportion of three to one.

Nourishment is of the greatest possible importance, and, unless the lower bowel has been operated upon or injured, nutritive enemata should never be neglected where the stomach rejects food.

Intestinal Paralysis.

This will show itself first by flatulence and consequent distention of the abdomen. It is always a bad sign and must be overcome if the patient is to be saved. When it appears to any marked extent, no matter whether on the first, second, or third day, purgatives should at once be given by the mouth, if the stomach is in condition to bear them, or by enema with the long tube if the stomach be not in condition to act.

Should administration by the mouth be chosen, small doses of calomel, frequently repeated and given dry upon the tongue, are the most reliable, as they cannot be vomited. Enemata with the long

tube (given by one who can introduce a long tube) are of great value, and the enema should be medicinal as well as mechanical. A good formula is half an ounce of epsom salts, half an ounce of turpentine, and a quart of water.

The use of the long tube merely as a mechanical outlet for gas is to my mind a useless torture of the patient. Unless the bowel can be stimulated to peristaltic action, neither a tube in the rectum nor an enterostomy will do more than evacuate the gas in its immediate vicinity.

The passage of a long tube, eighteen or twenty-four inches, into the descending colon requires more skill than the average nurse possesses. It can seldom be done without the aid of fluid to distend the upper rectum and sigmoid.

The patient should be placed on the side, preferably the left, and brought well to the edge of the bed. The tube, a soft one, should be well oiled its entire length, and inserted into the anus. After it has been passed about six inches it will almost invariably be stopped by the promontory of the sacrum or by a fold of mucous membrane, and the nurse, unable to insert it farther, proceeds with the injection which never reaches above the rectal pouch.

The secret of success lies in repeating the effort to introduce the tube higher while the first four or six ounces of fluid are being injected. The fluid distends the rectum, smooths out the folds of mucous membrane, and gentle pressure on the tube will do the rest. In this way a tube can generally be passed eighteen inches without disturbing the patient, and the balance of the enema may then be injected.

Volvulus.

Obstruction of the intestine from paralysis may be indistinguishable from volvulus or kinking, but if the latter is diagnosticated the abdomen must be reopened and search made for it. This adds greatly to the patient's risk, it is true, but there is nothing else to be done.

The fact that a small amount of fecal matter has been passed by the aid of enemata does not prove that volvulus may not be present, for such an amount of fæces may simply be washed out of the

rectum. The only reliable sign of intestinal obstruction is distention of the abdomen, and unless this can be reduced by the evacuation of wind, and fecal matter induced by catharsis and enemata, reopening the incision is justifiable.

Sepsis.

After laparotomy, sepsis may show itself in several ways. Paralysis of the intestine, just spoken of, may be one. Steady rise of pulse and temperature is another; vomiting, profuse sweating, and delirium are others.

To combat this condition the surgeon is comparatively powerless, the only reliable means in his power being the free administration of purgatives. If the bowels can be induced to act (and every effort should be used even to the administration of croton oil), the patient may be saved; for experience has proved that free catharsis is the greatest safeguard against sepsis after laparotomy. But should the administration of cathartics be ineffectual, the patient's end is near.

A slight degree of septic poisoning may be overcome by purgation. A septic inflammation of the peritoneum is invariably fatal.

In operations upon the alimentary canal, should the patient be doing well as regards food and sepsis, a movement of the bowels should be delayed as long as possible, and then soft movements should be encouraged by the administration of salines, and once established should be kept up from day to day. In this way the bowel is given a chance to heal soundly after the operation.

The fashion of the day is entirely against the use of opium after laparotomies, and in favor of free catharsis as soon as possible. How long that fashion will last remains to be seen. The amount of comfort to the patient which an occasional hypodermic of morphia will give, the strengthening effect upon the pulse which it will exercise, and its value as a substitute for food, are all well known, and not long ago were gladly taken advantage of.

CHAPTER XXII.

OPERATIONS ON THE VAGINA.

Laceration of the Sphincters and Proctocele.

ALTHOUGH the rectum may be torn by direct injury, the introduction of foreign bodies, etc., by far the most frequent cause of laceration is parturition.

Such lacerations may be slight, involving only the floor of the vagina and the perineum, or they may extend completely through the sphincters and the whole length of the recto-vaginal septum, so that rectum and vagina are converted into one common cavity.

When left to their natural consequences they produce a train of anatomical changes in the parts, and consequent symptoms, which are only curable by surgical methods.

The changes which follow naturally upon a laceration of the perineum are proctocele, cystocele, and prolapsus of the uterus. The symptoms complained of by these patients may be leucorrhœa, pain in the back, dragging sensations in the pelvis, and a feeling of protrusion and dropping of the pelvic organs; in which case they will generally consult a gynæcologist; or, on the other hand, the rectal symptoms may entirely overshadow the others and they may complain of nothing but an obstinate and incurable difficulty in defecation or of loss of control over the sphincters.

In describing the difficulty in defecation they will explain that the more they strain the worse they are (and, indeed, such is the case, as the straining tends very directly to aggravate the condition); and will describe how the fæces bulge into the vagina as though they would escape through the vulva, or how the rectum is absolutely closed in the act of defecation by the descent of the uterus.

Some will say that it is only possible to empty the rectum by placing two fingers into the vagina and pressing the fecal mass backwards and out of the rectum. This is because the vaginal outlet and the recto-vaginal septum have become so relaxed as to permit bulging of the rectal wall into the vagina; or proctocele, the sphincter ani

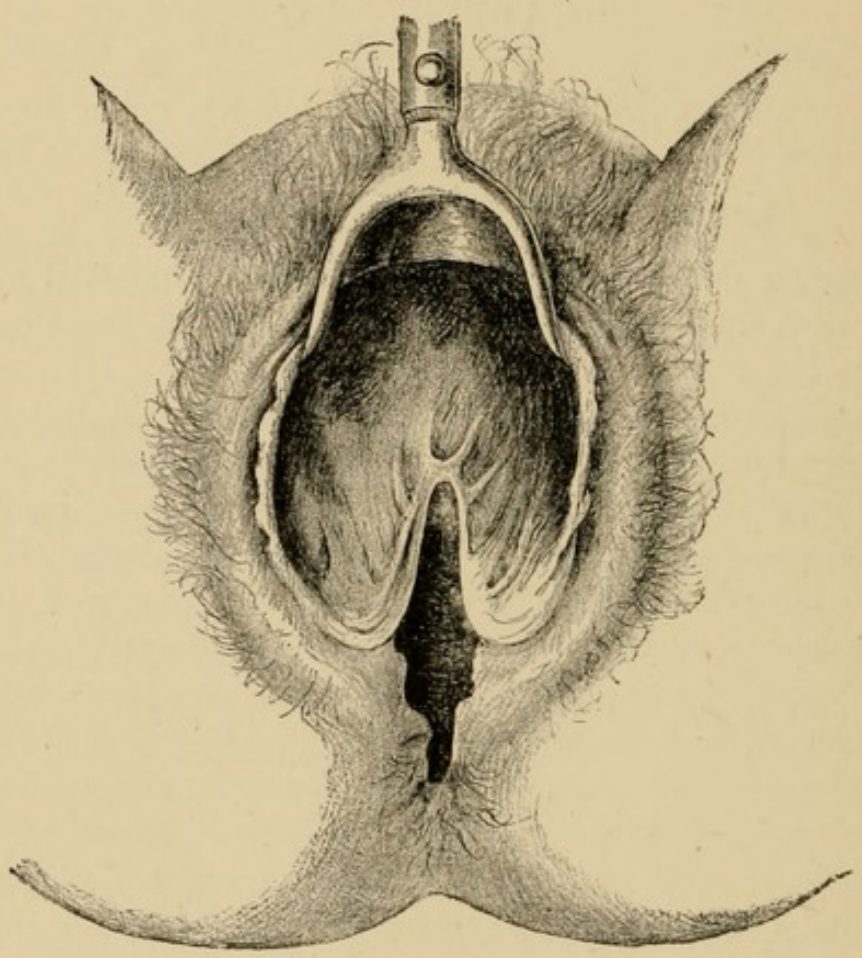


Fig. 210.

Complete Laceration.

still retaining its power, while that of the levator, whose function it is to close the vagina and thus counteract the sphincter, is lost from rupture of its fibres.

Following the formation of a proctocele the anterior vaginal wall will begin to give way under the greatly increased daily straining at stool, and with it the attachment of the bladder to the symphysis, till cystocele is superadded (Fig. 211).

In addition to the symptoms already enumerated the patient will now complain of frequency of urination, and the usual results of inability to empty the bladder will show themselves. There will be cystitis and urethritis, and these in their turn by causing increased straining will aggravate the condition.

Meanwhile the uterus has become retro-flexed from traction, and

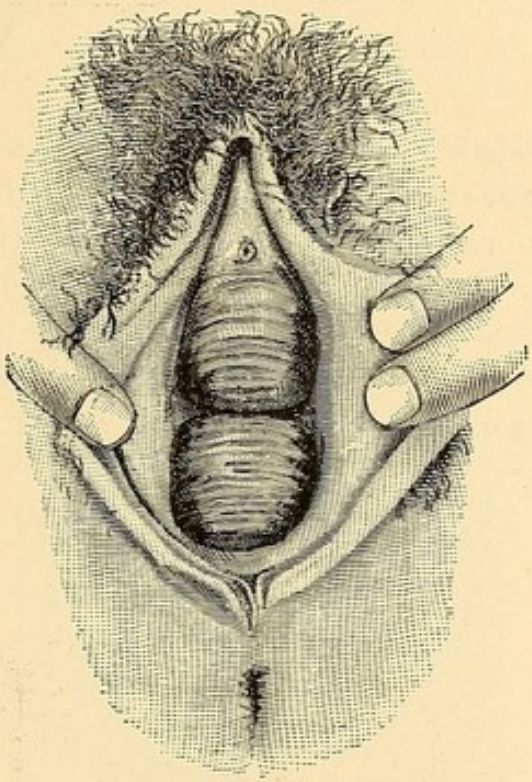


Fig. 211.

Protocele and Cystocele.

has begun to descend. Intra-abdominal pressure in this position will account for the remaining changes, which may result in complete prolapsus uteri.

When the sphincter ani has been lacerated, an additional train of symptoms will be added, varying, according to the extent of the laceration, from partial loss of control over flatus to complete incontinence of wind and fæces.

The cure of these conditions is only by operation, and as they are not apt to exist without endometritis and are often accompanied by laceration of the cervix, if the surgeon wishes really to cure his

patient and relieve her of her leucorrhœa and backache, as well as of her constipation and incontinence of fæces, he must be prepared to go through a considerable range of gynæcology, which in any case may

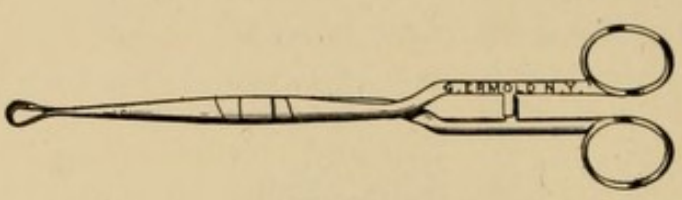


Fig. 212.

involve not only repair of the perineum and proctocele, but also curettage, the repair or amputation of the cervix, cystocele, and replacement and fixation or removal of a prolapsed uterus.

For the general rules regarding antisepsis, preparation of the patient, etc., for these operations, the reader is referred to Chapter IV. In all, the method of cleansing the vagina and external parts is the same, and consists in scrubbing thoroughly with green soap and a

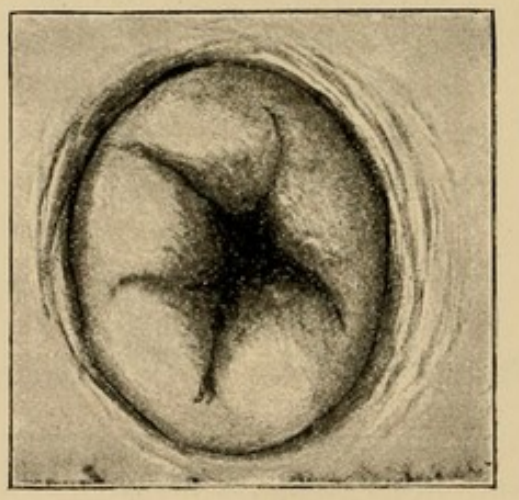


Fig. 213.

Stellate Laceration of Cervix.

long-handled brush, after the skin has been shaved. After scrubbing, the parts should be washed with bichloride, 1 to 2,500.

The most convenient speculum is the one with the loaded handle (Fig. 50), and the most convenient needles are the Hagedorn, held in the special holder made for them. As many operations begun upon

the vagina end in abdominal section, the patient should always be upon a table which can be thrown into the Trendelenberg position without trouble.

Operation for Lacerated Cervix.

Either the dorsal or lateral position may be used, as the operator prefers. With the dorsal position introduce the loaded speculum or perineal retractor, and seize the cervix firmly with the double tenaculum (Fig. 212).

Either with a knife or strong sharp-pointed scissors first deepen the laceration to be repaired by making an incision through the

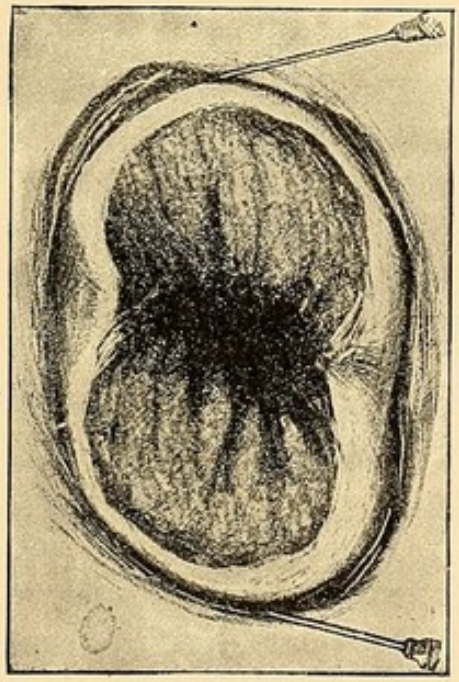


FIG. 214.

Bilateral Laceration of Cervix.

cicatricial tissue in the angle of the laceration down into healthy uterine tissue. Next denude thoroughly both lips of the old laceration (Fig. 214), till all cicatricial tissue is removed and healthy muscle exposed.

Figs. 215 and 216 show a proper and improper denudation of the lips of the laceration.

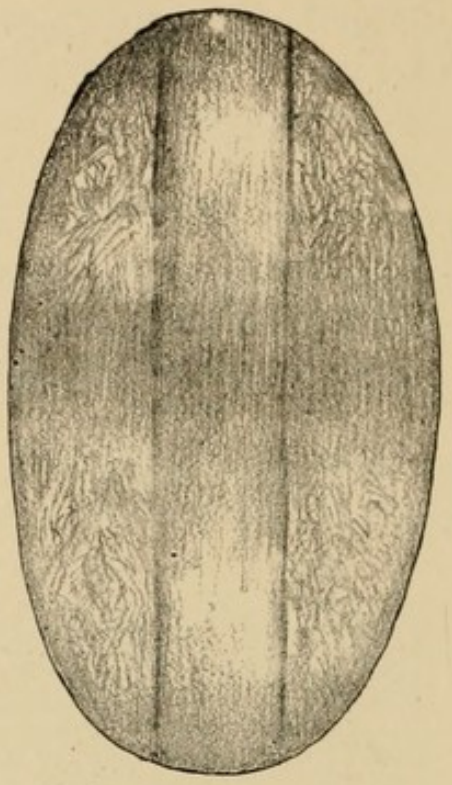


FIG. 215.

Denudation in Lacerated Cervix.

A strip of undenuded mucosa must be left on both lips of the cervix to form a cervical canal after the suturing is completed, otherwise complete stenosis will result (Fig. 215).

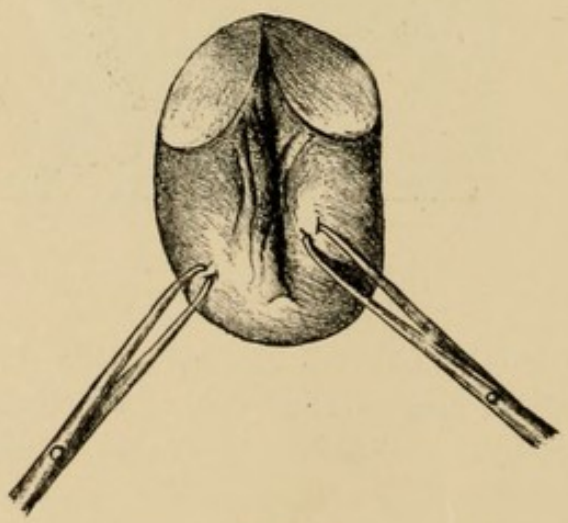


FIG. 216.

Incomplete Denudation in Lacerated Cervix.

After both lips of the laceration have been vivified, sutures are introduced as follows. A small, full-curved Hagedorn needle should be used and silk-worm gut is the best material.

The first suture should be passed at the angle of the laceration. Enter the needle in the vaginal mucosa just above the angle, carry it through into the cervical canal, seize it again and enter it at the corresponding opposite point in the canal, and bring out on the

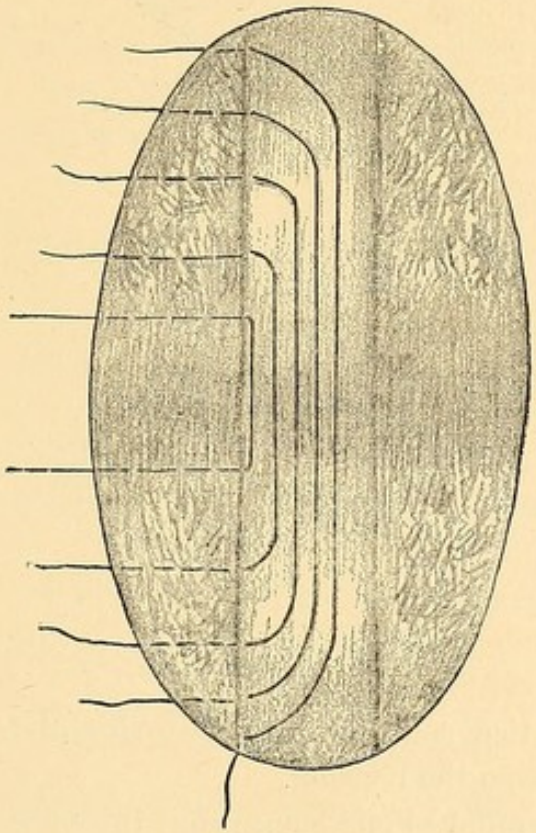


FIG. 217.
Sutures in Lacerated Cervix.

vaginal surface at a point corresponding to the point of entrance. About four such sutures should be passed on each side of the cervical canal.

The ends of each suture as passed should be seized with a pair of artery forceps to keep them from becoming entangled.

After all sutures have been inserted, each may be tied or passed through a perforated shot and clamped. In either case the ends should be left at least an inch long to facilitate removal. While the

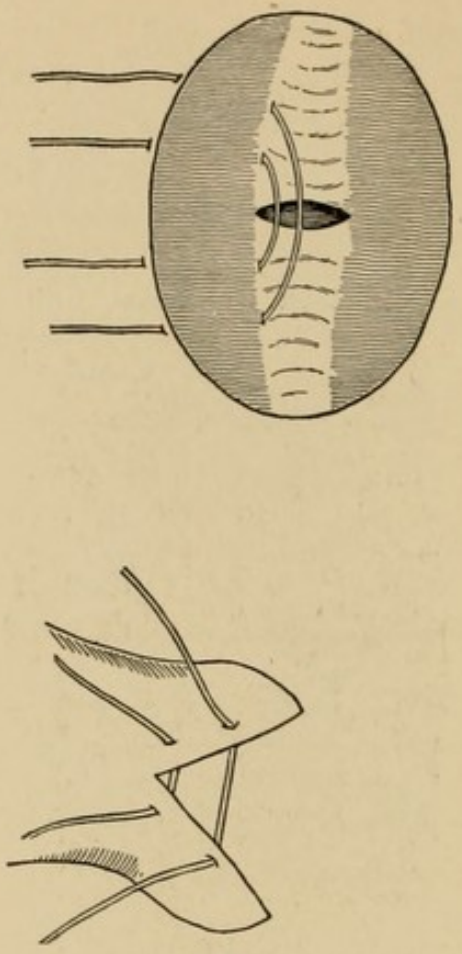


Fig. 218.

Sutures in Lacerated Cervix.

sutures are being tied constant irrigation should be kept up to remove blood-clots from the incision.

Pass a uterine sound to make sure that the cervical canal has not been closed by sutures, and place a light tampon of iodoform gauze in the vagina. The sutures may, with advantage, be left *in situ* till

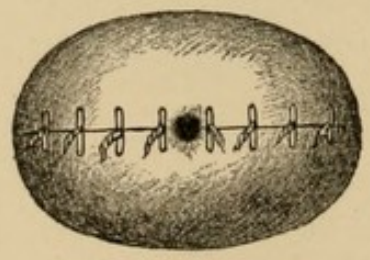


Fig. 219.

Cervix after Repair of Laceration.

after the first menstrual period, as union of the cervical tissue is always slow; and in cases associated with repair of the perineum they may be left even longer to avoid pain and stretching of the



FIG. 220.

Forceps for Removing Stitches from the Cervix.

parts in their removal. They are then best removed in the lateral position with a Sims speculum and long forceps (Fig. 220), and curved sharp-pointed scissors (Fig. 221).



FIG. 221.

Scissors for Removing Stitches from the Cervix.

The iodoform gauze should be removed from the uterus in forty-eight hours, and warm antiseptic douches should be used daily thereafter.

The patient should be confined to the bed for ten days, and to the house a week longer.

Amputation of the Cervix.

Removal of a portion or the entire cervix may be indicated in:

Carcinoma.

Prolapsus uteri.

Infra-vaginal elongation.

Supra-vaginal elongation.

Chronic metritis.

Elongation due to laceration.

General cystic degeneration.

The operation may be done below the vaginal junction, as in commencing carcinoma and the usual forms of elongation; or, amputation above the vaginal junction may be necessary, as in supra-vaginal elongation and more advanced malignant disease.

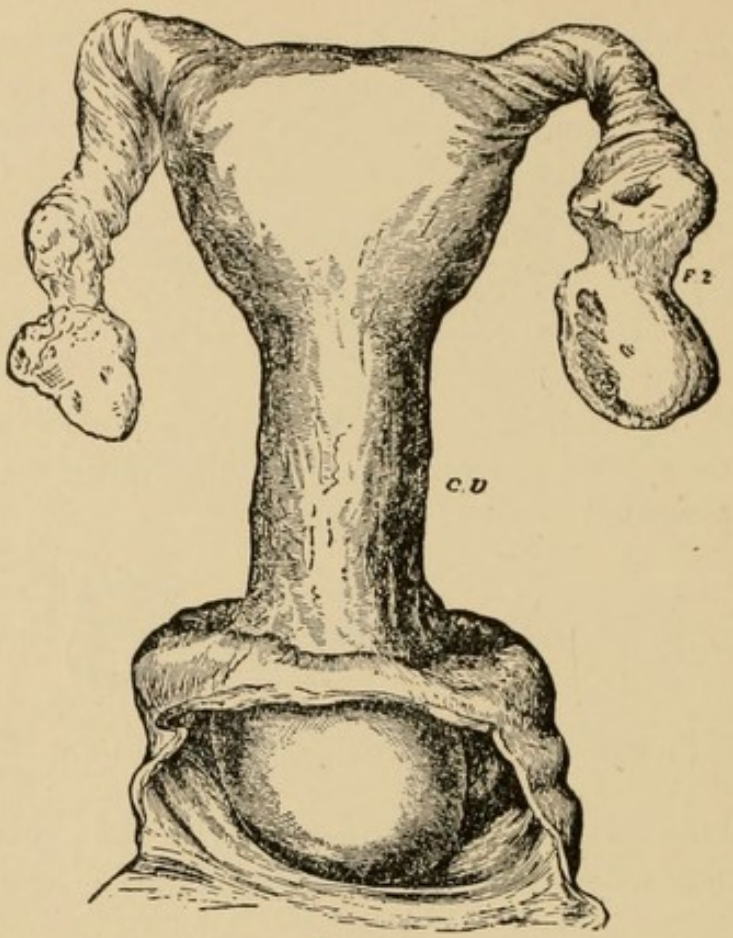


FIG. 222.
Hypertrophy of Supra-Vaginal Portion of the Cervix.

High Amputation of the Cervix.

This is performed in its first steps as a vaginal hysterectomy with ligatures would be.

The instruments necessary are :

Knife.
Volsellum.
Scissors.
Artery forceps.
Strong catgut.
Curved Hagedorn needles.
Needle-holder.
Uterine sound.
Speculum.
Cleveland ligature carrier.

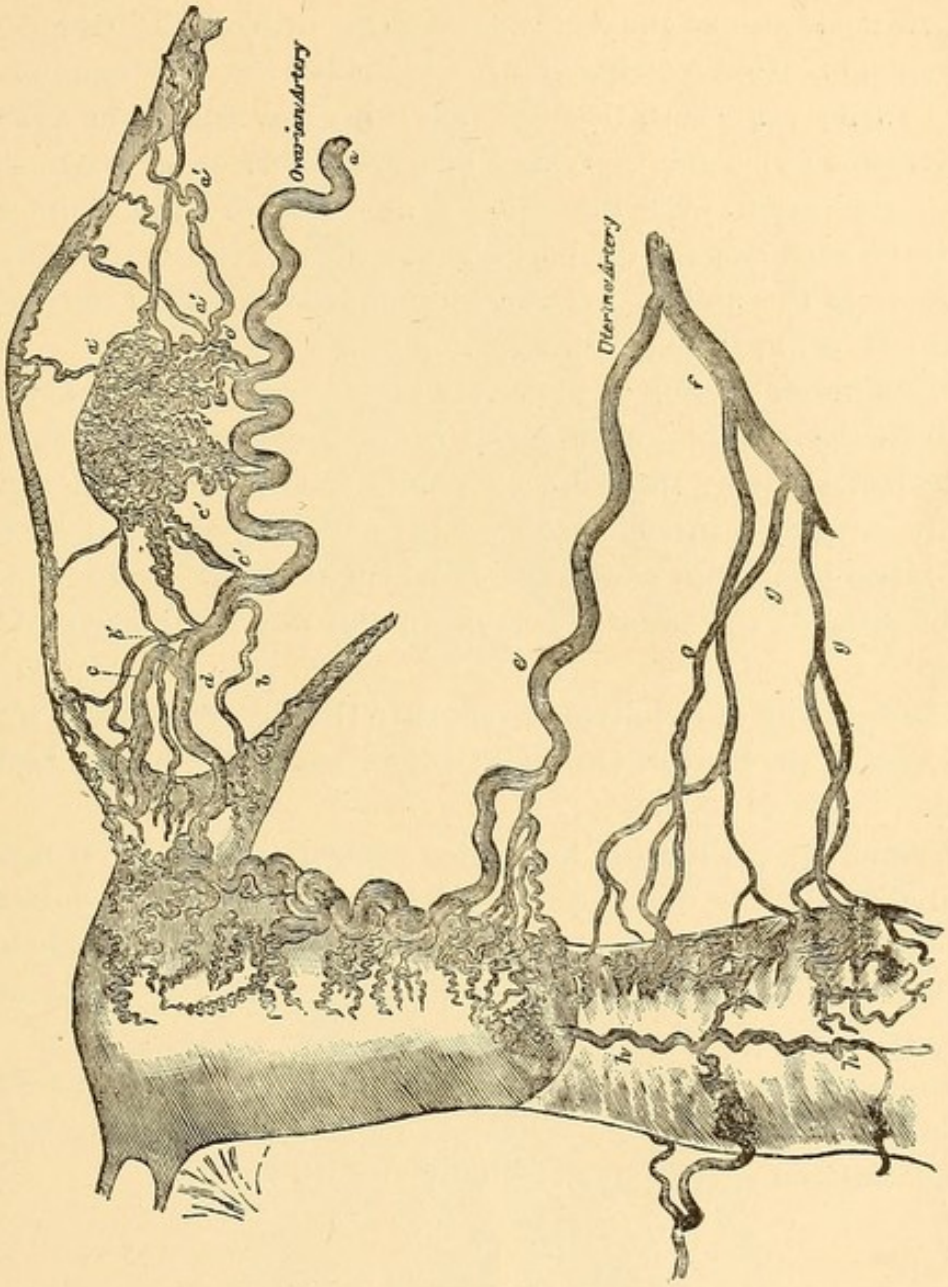


FIG. 223.

Ovarian, Uterine and Vaginal Arteries.

a, Ovarian artery.
a' b', Branches to tubes.
b, Branch to round ligament.
c, Uterine artery.
c', Branches to ovary.
g, Vaginal artery.
h, Azygos vaginæ.

Having introduced the speculum and pulled down the cervix, an incision is made around the cervix, taking care to avoid the bladder, and the vaginal mucosa is stripped up by blunt and sharp dissection. The uterine arteries are then tied on each side (Fig. 222) as in hysterectomy, using either the Cleveland ligature carrier or a curved needle and heavy catgut. The dissection is next carried upward along the cervix on each side till the portion contained in the ligatures is separated from the uterus. If the uterine arteries have been secured there will be but little hemorrhage.

The anterior portion of the cervix is then cut across transversely down to the canal. Should this cause free hemorrhage the best method of securing the bleeding points is not with artery forceps, but by carrying a curved needle, armed with fine catgut, under them, and tying them with the tissue in which they lie. After stopping the bleeding of the anterior portion in this way the posterior is cut across.

The suturing of the divided vagina to the uterine mucosa is done with catgut, the ligatures around the uterine arteries having been cut short.

Should the peritoneum have been opened posteriorly, it must be sutured separately with fine catgut. The suture which unites the vagina to the uterine mucosa passes first through the cut edge of the vagina, next through the stump of the cervix, and is brought out in the cervical canal and tied.

Should it be found impossible to reach satisfactorily above the disease in carcinoma the attempt at high amputation may be abandoned and vaginal hysterectomy substituted.

Wedge-shaped Amputation of the Cervix.

The operation usually performed in cases of infra-vaginal elongation is the removal of a wedge-shaped piece from each lip and the formation of double flaps.

The cervix is brought down into view, as in the former operation, and with a strong pair of straight scissors, one blade of which is passed into the canal, both sides are split open as far down as the



FIG. 224.
Flaps Formed in Amputation of Cervix.

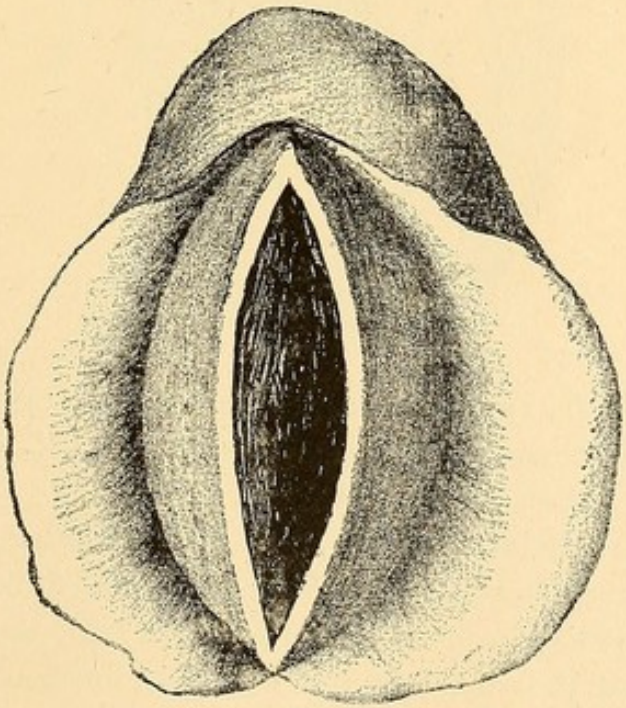


FIG. 225.
Appearance of Stump after Amputation of Cervix.

junction with the vagina. A wedge is then removed from each lip of the shape shown in Fig. 224.

The resulting appearance is shown in Fig. 225.

Sutures of silk-worm or chromicized gut may be used, and the

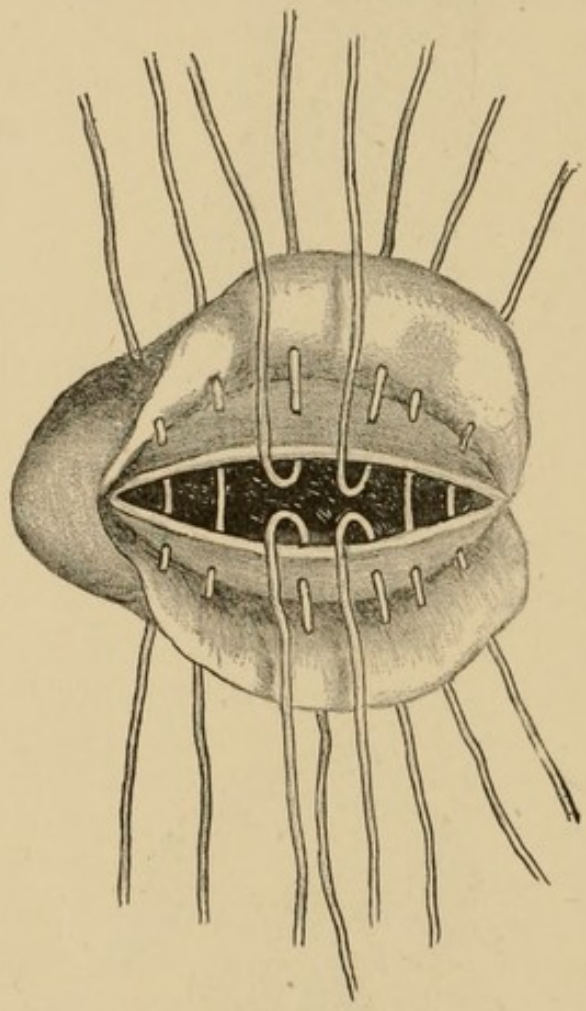


FIG. 226.

Sutures in Amputation of Cervix.

first two on each flap are so introduced as to draw open the cervical canal. The others pass through all four flaps, as shown in Fig. 226. The result being shown in Fig. 227.

The stitches may be tied after all have been inserted, or each one may be tied as it is inserted. If there is free bleeding it is best controlled by immediately inserting a stitch through that part of the stump and tying it. In this way no separate ligation of vessels will be necessary.

A strip of gauze should be inserted into the uterus, the vagina lightly tamponed with iodoform gauze, and the case treated as in the operation for laceration.

Operation for Lacerated Perineum.

The operative procedures vary according as the laceration is complete or incomplete, old or recent.

All lacerations should be repaired within twenty-four hours of their occurrence if the patient is in condition to bear the operation, as under these circumstances no denudation is necessary, and the suturing can easily be done under cocaine. None but the slighter

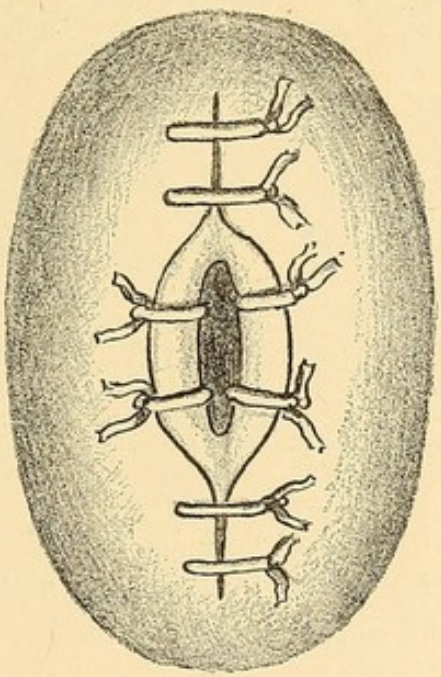


FIG. 227.

Cervix after Amputation.

tears extending only through the mucous membrane of the vagina should be left to close by granulation, for though perfect union may occur, it is rare. The operation for recent rupture, either partial or complete, will readily be understood after description of the technique in old cases.

Old Incomplete Laceration.

The extent of the denudation will vary according to the condition of the parts. Should there be no proctocele or cystocele, the denudation need cover only the part torn and united by cicatrix, and need not extend into the vagina as shown in Fig. 228.

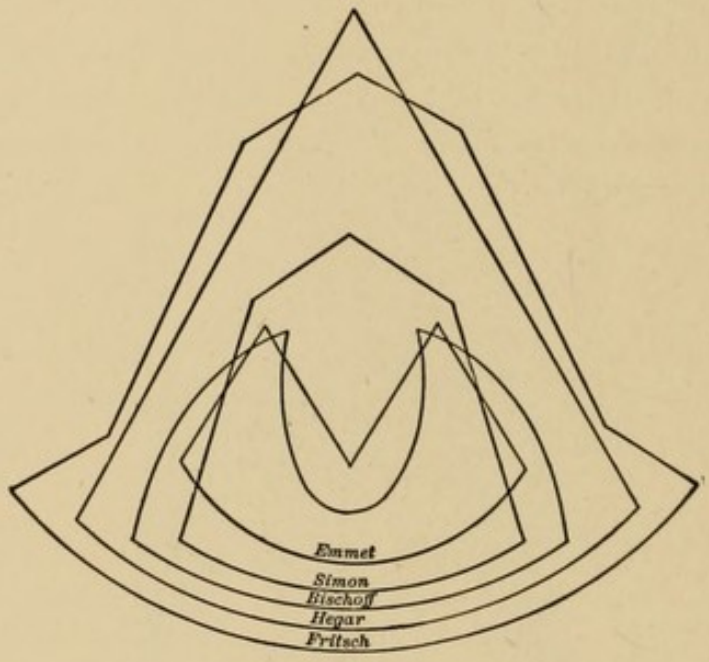


FIG. 228.
Incisions for Repair of Lacerated Perineum.

On the other hand, should there be a proctocele the denudation must be carried as far as its highest point. The proctocele is in reality a hernia of the anterior wall of the rectum into the vagina, caused by the laceration and separation of the fibres of the levator ani and the pelvic fascia, and for its cure these separated fibres must be united by sutures for their entire extent.

To do this, and to close the vaginal entrance, a triangular denudation is necessary, with its base at the skin of the perineum and its apex at the highest point of the proctocele within the vagina (Fig. 230).

The three angles of the triangle should first be marked by snipping out small pieces of the mucous membrane. One of the lower

angles is on each of the labia, and the base of the triangle corresponds to the fourchette, and should be, in moderate cases, about two inches long. The apex of the triangle should be marked upon the uppermost point of the proctocele, or even a little above this, nearer

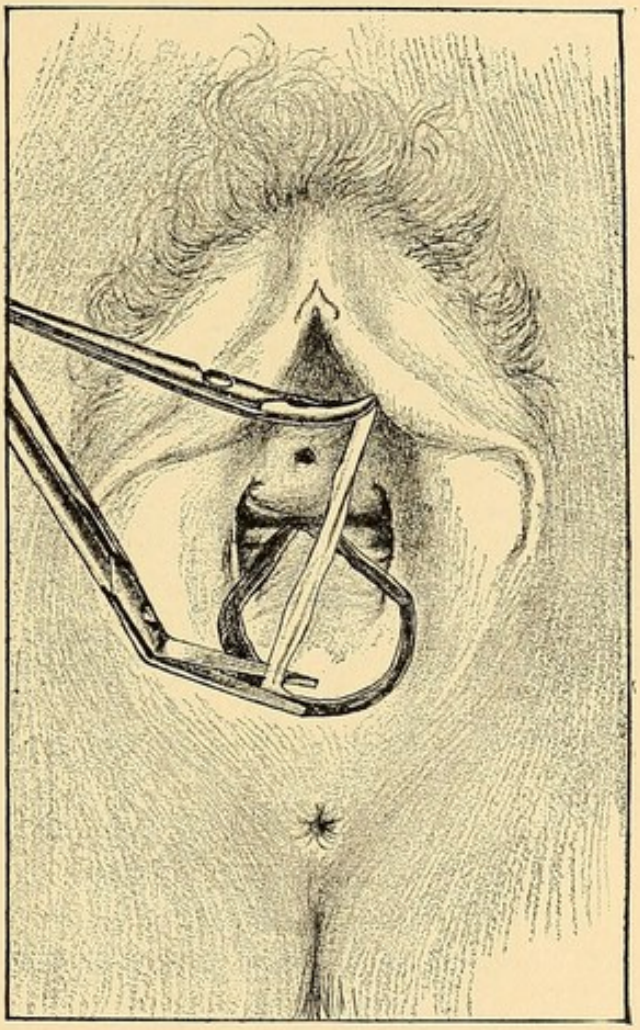


FIG. 229.

Denudation in Slight Laceration.

the cervix ; and these three points should be connected by lines cut with a knife through the mucous membrane for guides in denuding.

The outlining incisions in the form of a triangle should extend completely through the mucous membrane at all points to enable the operator to remove the contained portion of mucous membrane easily and rapidly.

The denudation may be made either with scissors in successive

strips, or with the knife in one piece, and in either case the whole thickness of the mucous membrane should be removed.

If the knife is used the apex of the triangle is seized with forceps

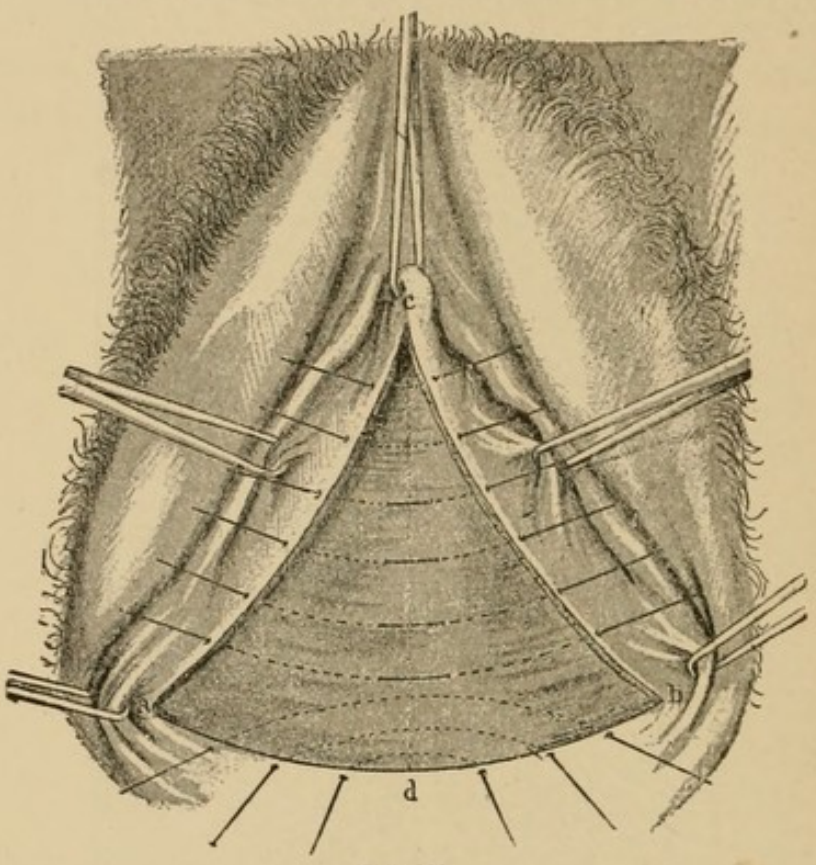


Fig. 230.

Hegar's Colpo-Perineorrhaphy.

and dissected loose till a firm hold upon it can be secured with the fingers, when the whole piece can be rapidly stripped down with the aid of a few strokes of the knife.

With scissors the denudation is begun at the base and carried

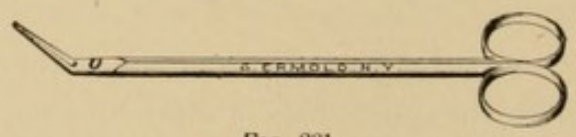


Fig. 231.

Angular Scissors for Denudation of Perineum.

from one side to the other and back again (Fig. 229) in successive strips, each of which is shorter than the preceding. To do this nicely requires considerable practice, and the scissors shown in Fig. 231.

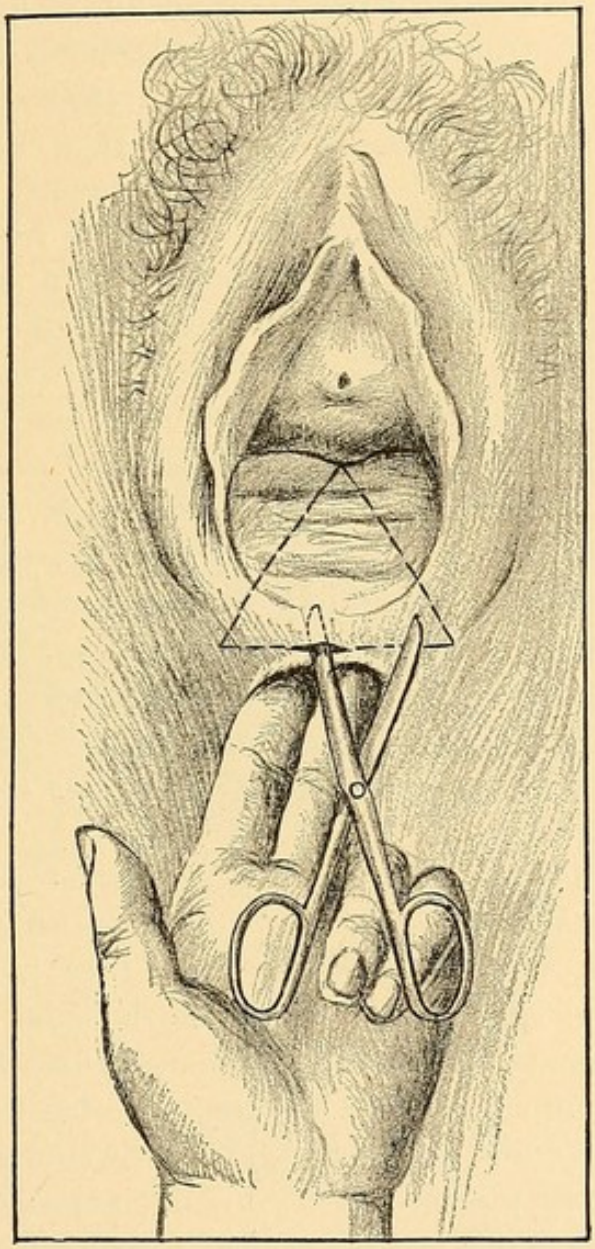


FIG. 232.

Denudation in Perineorrhaphy.

Another way of denuding is to cut a hole through the thickness of the mucous membrane at the middle of the base of the triangle, insert the blades of a pair of blunt-pointed scissors under the mucous membrane, and push them upward till the apex is reached. By opening and closing them, and working them backward and forward in blunt dissection, the whole triangle may easily be stripped up from the submucous connective tissue and then cut away.

The objection to this method is that to accomplish it safely without perforating the rectum two fingers need to be inserted into that canal, and these fingers at some subsequent step in the suturing are more than likely to come in contact either with the wound or the sutures (Fig. 232) without being resterilized.

When by any of these methods the denudation has been completed, the edges of the wound made straight and even, and all bits of mucous membrane which may have escaped in the denudation carefully removed, the raw surface should be irrigated, marked bleeding checked by hot water, torsion, or even a fine ligature, and the suturing begun.

This should be continuous, with medium catgut, and begin at the apex. The suture should not pass across the raw surface from one edge to the other, but be buried in the submucous tissue under the denuded surface.

If the denudation has been large and wide in the vagina it will be best to draw its sides together by a row of buried sutures before attempting to close the mucous membrane over it, otherwise the tension on the cut edges of the membrane is liable to cause the sutures to cut out, and failure to get primary union will result.

When by a continuous suture the proctocele has been closed, the suture may be tied and cut, and two or three stronger sutures, or sutures of silk-worm gut, may be used in the perineum to close that portion of the denudation and the vaginal outlet (Fig. 230).

A simple and efficient suture is that of Cleveland, shown in Fig. 233. It can be introduced while the fingers are still in the rectum if denudation has been done by the method shown in Fig. 232 and finished very rapidly. A strong piece of catgut should be used, and a long straight needle, which is entered at 1, brought out at 2, entered again at 2, and brought out at 3, carried over to 4 and passed to 5,

entered again at 5 and brought out at 6, and tied after it has been tightened sufficiently to draw the denuded surfaces together.

The best after-dressing is a pad of iodoform gauze over the sutures, and another of plain gauze over the vulva, held in place by a bandage. Care should be exercised to keep the vulva clean after urination.

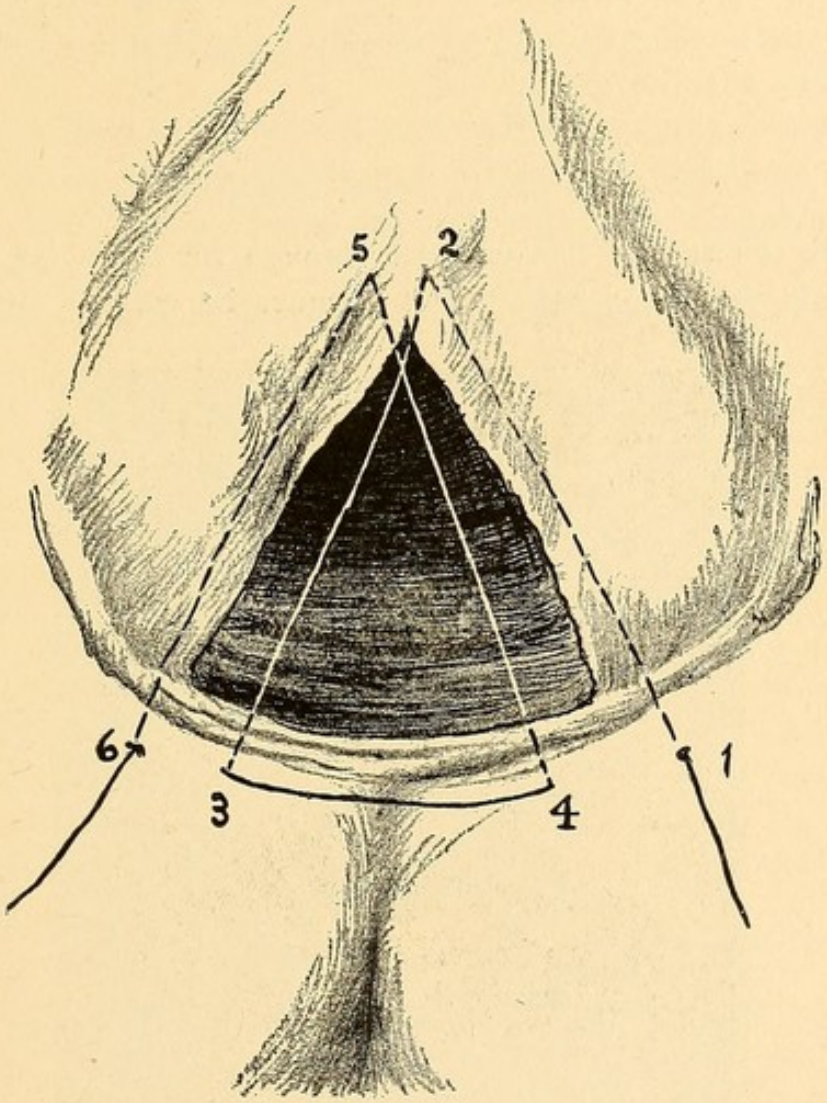


FIG. 233.
Cleveland Suture.

The catheter should be used for the first three days, and a douche of bichloride employed after its use and after subsequent voluntary micturition. The bowels should not be confined more than forty-eight hours and a saline should then be given. When the patient feels that the saline is about to have its effect an enema of simple

warm water should be administered to give an easy passage without straining.

The patient should be confined to the bed for two weeks, and in the house at least a week longer.

If by any fault failure to get union by first intention is encountered, a second operation may be necessary, though in some of the slighter cases, unattended by prolapsus of the uterus, a good result may follow union by granulation.

Old Laceration through the Sphincter.

When the rupture has extended through the sphincter, the denudation is the same, except that it must be carried far enough

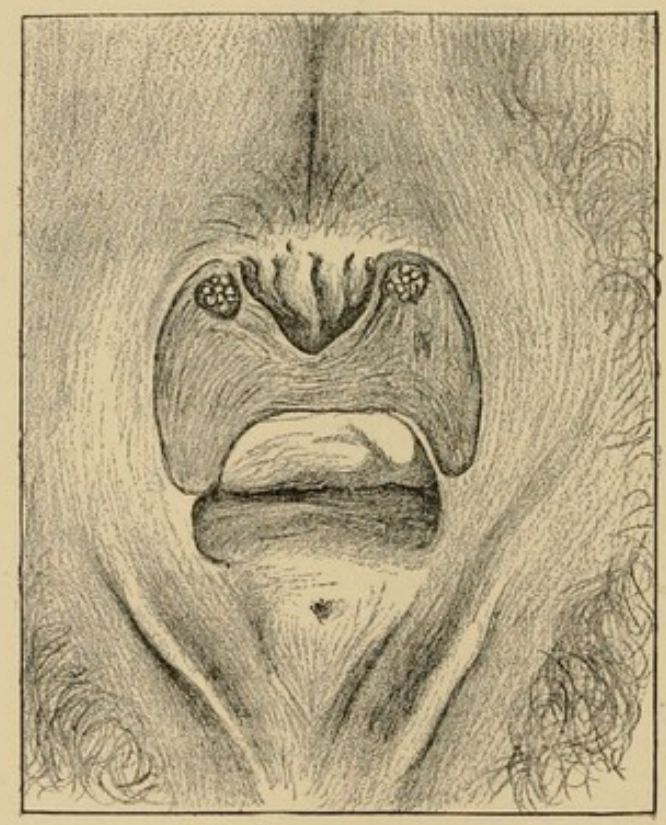


FIG. 234.

Denudation in Laceration through the Sphincter.

downward to expose the separated ends of the muscle, which can generally be made out with a little care (Fig. 234).

The sutures may be applied as in the last case, except that the

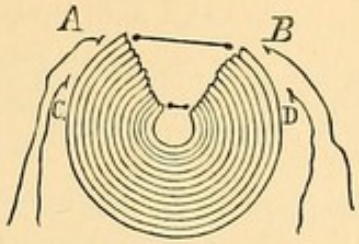


FIG. 235.
Sutures in Laceration through the Sphincters.

lowest ones must be so inserted as to approximate the ends of the muscle. To do this the needle must be inserted and brought out on the cutaneous surface below, and not above the divided ends, as shown in Fig. 235.

Another method is to reduce a complete laceration through the

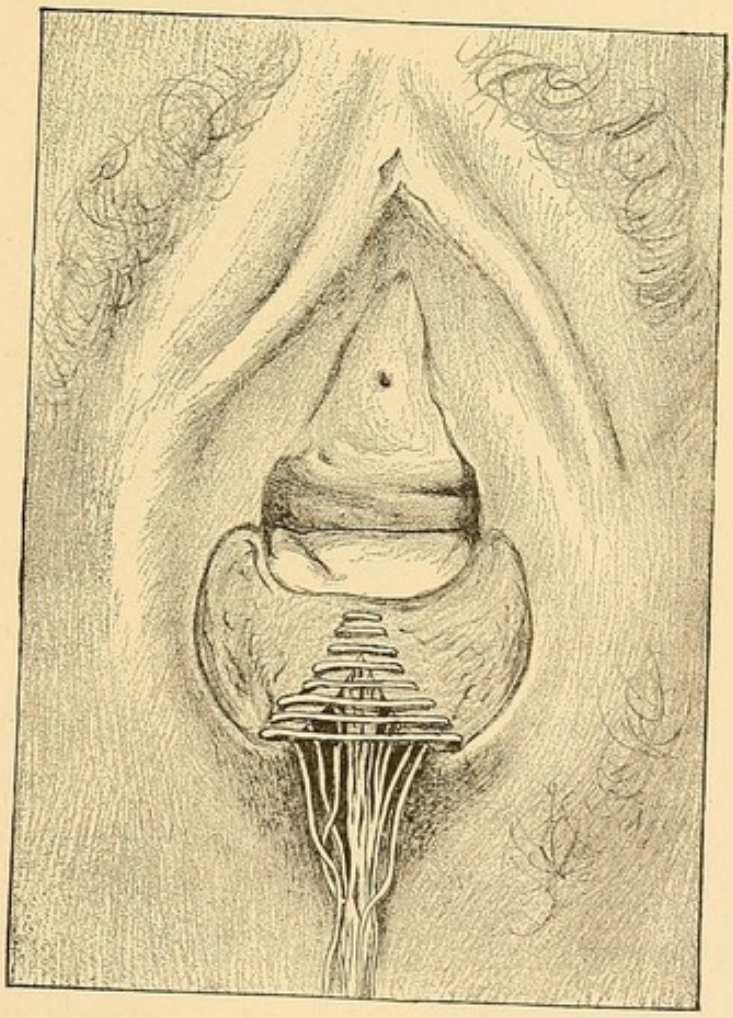


FIG. 236.
Rectal Sutures in Complete Laceration.

sphincters and septum to a partial one, involving only the vaginal mucosa and the superficial perineum, by introducing first a row of rectal sutures, as shown in Fig. 236, and second a row of vaginal ones, as shown in Fig. 237.

The sutures may be interrupted, as shown in the cuts, or continuous, as the operator prefers, and should be of medium catgut.

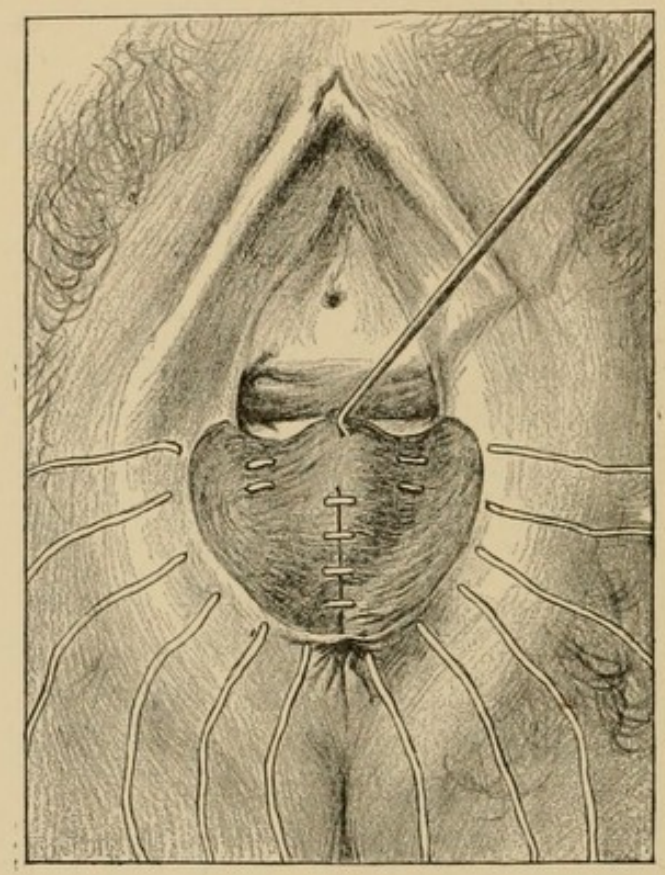


FIG. 237.

Vaginal Sutures in Complete Laceration.

The dressings are the same as in partial laceration, and the bowels should be moved by laxatives and enema, not later than the third day. The diet for the first two or three days, however, should be of beef-tea and animal food, exclusive of milk, in order that the first passages may be as small as possible.

In lacerations through the recto-vaginal septum, the denudation should always be carried far enough above the highest point of the laceration to secure union without the formation of a recto-vaginal fistula.

Laceration of the Septum without Laceration of the Sphincters.

In cases of laceration of the septum without laceration of the sphincter, after the laceration has been closed by a flap-splitting operation, such as is described under recto-vaginal fistula, or by a continuous suture from the rectal or vaginal surfaces, the sphincter should be completely paralyzed by stretching, and the bowels should be confined for three days to allow of union. The diet should be exclusively of meat and beef-tea.

Great care should be used to secure soft movements from the

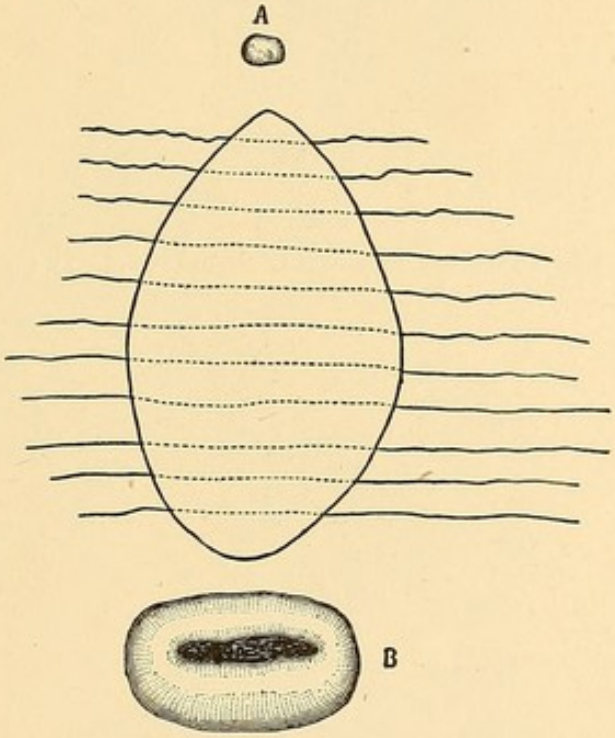


Fig. 238.

Emmet's Operation for Cystocele.

first ; and this is best accomplished by a restricted diet and by frequent small doses of some saline cathartic after the third day, to be followed by an enema when the bowels are about to act. Milk should be avoided during the first week on account of its tendency to produce large solid motions.

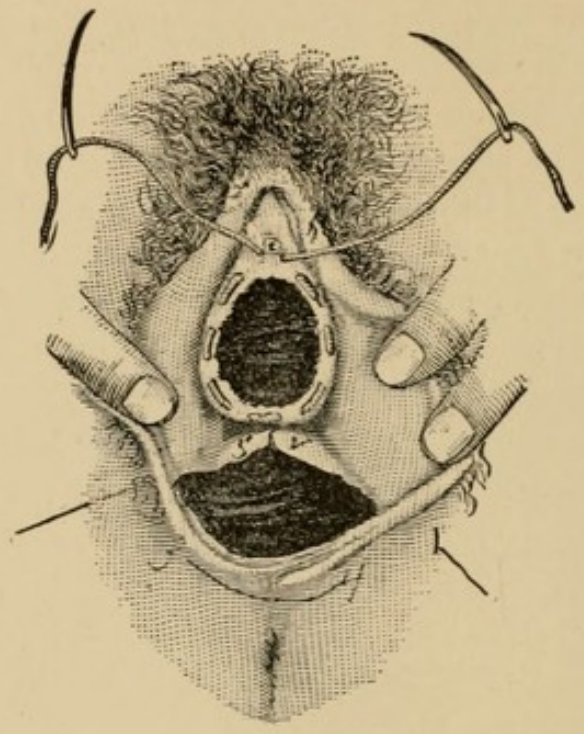


FIG. 239.

Stoltz's Operation for Cystocele Combined with Perineorrhaphy by Cleveland Suture.

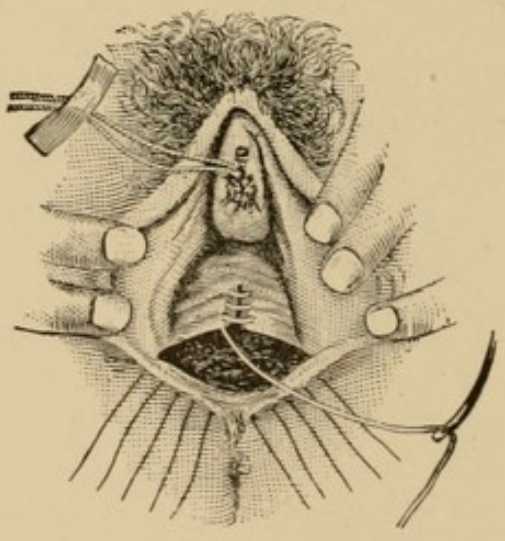


FIG. 240.

Combined Stoltz and Hegar Operation.

Operation for Cystocele.

Emmet's operation is as shown in Fig. 238. The denudation is now usually closed with a continuous catgut suture from behind forward. The catheter should be used frequently until complete

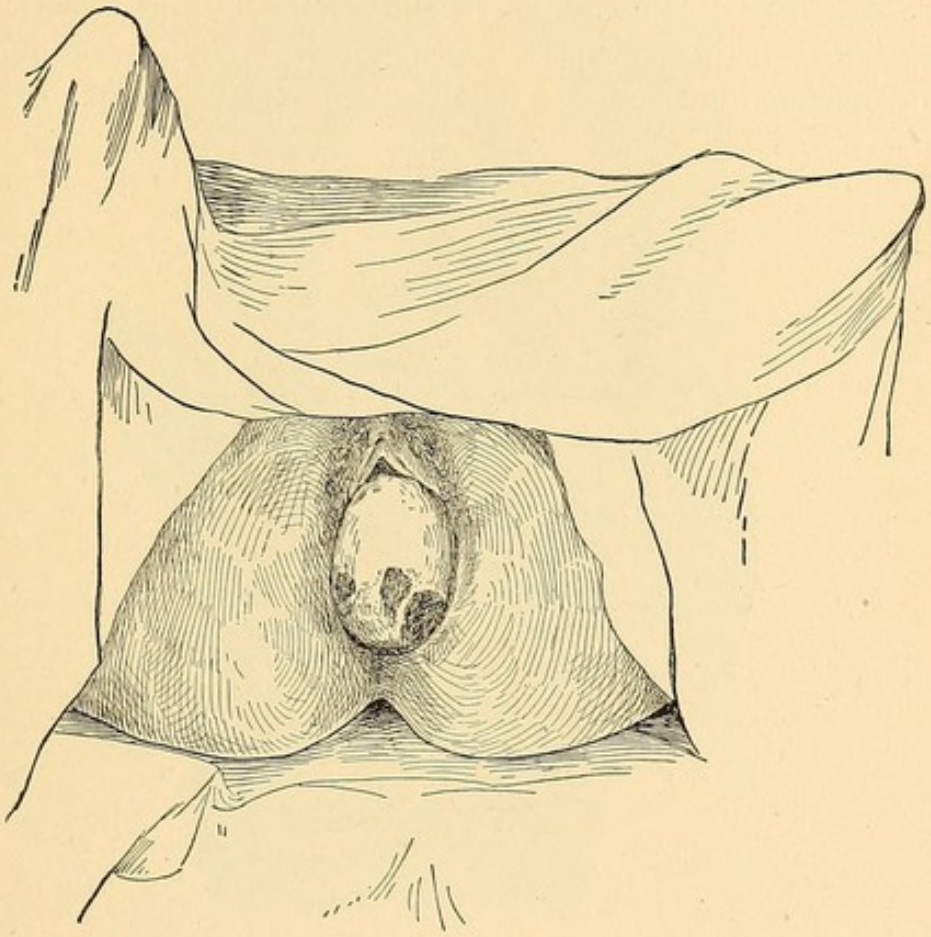


FIG. 241.
Complete Prolapse with Ulceration (Personal).

union has had time to take place. The combined Stoltz's operation for cystocele with colpo-perineorrhaphy are shown in Figs. 239 and 240.

Prolapse of the Uterus.

The operative treatment of prolapse of the uterus must depend upon its degree. In the mild cases in which the cervix is still within the vagina the plastic operations already described may be sufficient to

retain it at least from further descent. They should be performed in the following order. The uterus should be first curetted and then, if the cervix is enlarged, as it usually will be, it should be amputated. Plastic operations upon the vagina and perineum are next in order, and of these several may be performed on the same patient. For example, a lateral colporrhaphy may be done on each side, then an anterior, and finally colpo-perineorrhaphy. Or Le Fort's method of closing the vagina by uniting a large denuded surface on the anterior wall to one on the posterior may be done (Figs. 242, 243). Or the

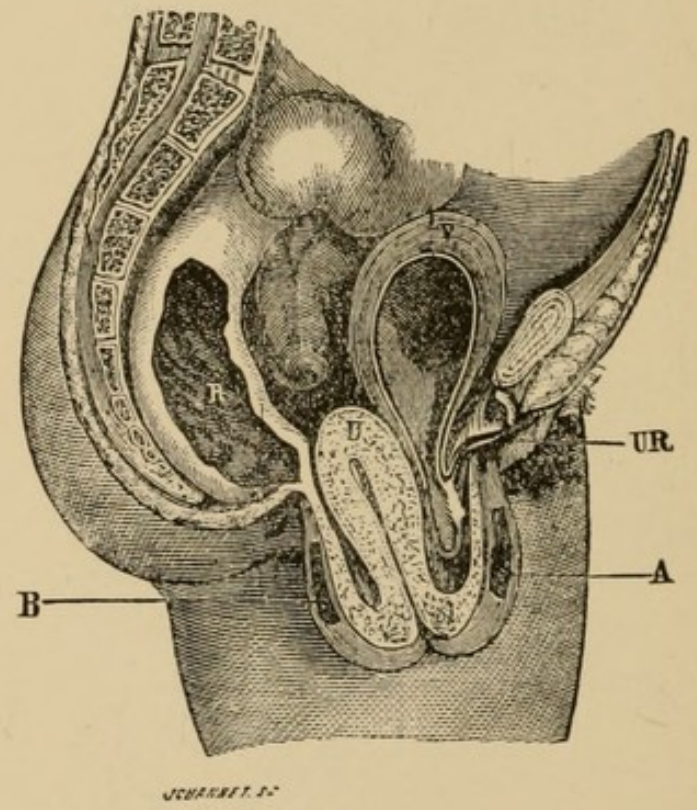


FIG. 242.

Le Fort's Operation for Closure of the Vagina.

A. Anterior Denudation.
B. Posterior Denudation.
UR. Urethra.

vagina may be greatly contracted by passing circular sutures around it at intervals of an inch under the mucous membrane, and drawing them so tightly as to leave only a small canal for the escape of secretions.

Such an operation is only applicable to cases in women who have passed the menopause, and in whom there is no expectation of future sexual intercourse.

In the more severe cases, in addition to the plastic work, either an Alexander's operation of shortening the round ligaments or a ventral

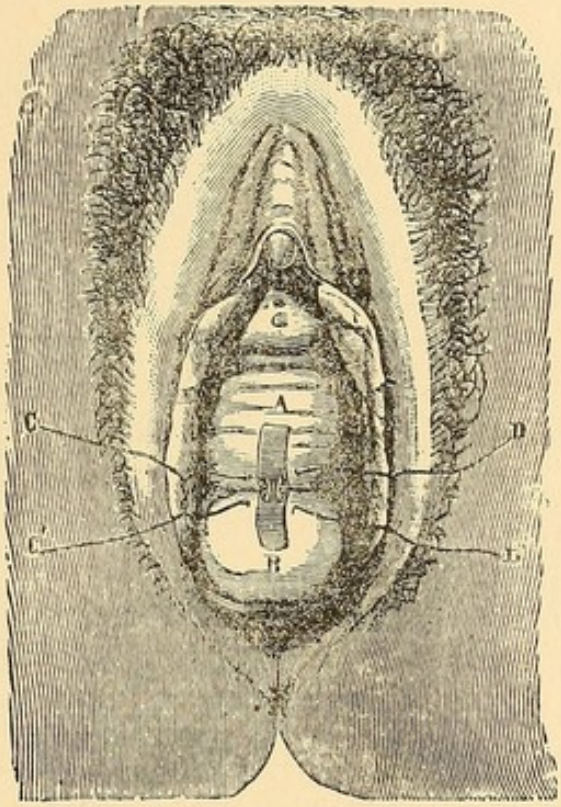


FIG. 243.

Le Fort's Operation for Closure of Vagina.

Denuded surfaces A and B brought into Apposition.
C C¹. Suture introduced ready to tie.

fixation may be added. If the former be employed it should be done thoroughly and radically, as described under that head.

In the still more advanced cases of complete prolapsus vaginal hysterectomy may be the only cure. In women past the menopause it may be only a waste of time to try any other milder procedure. In younger women, who are still liable to have children, the milder operations should first be tried, and Alexander's operation should have preference over abdominal fixation on account of the fact that it leaves the organ in a much safer position for future pregnancy, although it is not as certain in its results in this form of disease.

Exploration of the Pelvis through the Vagina.

The vagina may be opened either in front or behind the uterus for exploration and for such operative procedures as exploration may prove to be necessary.

Anterior Colpotomy.

A transverse incision is made across the cervix low enough down to escape the vesical fold, the cervix being held well down with the volsellum. This incision may be made either with knife or cautery iron. The latter will sometimes save hemorrhage, but any bleeding caused by the former is easily controlled by whipping over the cut edge of the vagina with a running catgut suture.

With the fingers or handle of the scalpel the incision is next deepened till the bladder is separated from the uterus and the peritoneum laid open. The peritoneum is sometimes quite heavy and strong, and may require knife or scissors to open it nicely, without too much tearing.

When the peritoneum is opened one or two fingers are passed into the opening and the anterior surface of the uterus, with the broad ligaments, tubes, and ovaries, palpated. Any adhesions may be broken up, and where the disease is not too extensive and has not matted the organs too firmly together, the uterus may first be rotated so that its fundus shall appear in the vagina through the incision, and the tubes and ovaries, first on one side and then on the other, may be brought out after it.

In this position minor work on the ovaries, such as puncturing of cysts, may easily be done, or an ovary may be tied off and removed. The tubes may be treated in the same way. Should there be hydrosalpinx or pyosalpinx the tube should be aspirated as it is held in the incision before attempting to bring it out, and a very large ovary should be treated in the same way.

Posterior Colpotomy.

Here the incision may be transverse or vertical, according to the taste of the operator. The vertical will give less hemorrhage; the transverse is thought by many to give easier access to the parts.

Through this incision all the work done by the anterior route can be done as well, and the choice of the two operations is in great measure a matter of practice and familiarity with different operators. The posterior operation is, however, to be chosen in all cases of pelvic abscess which the surgeon desires to evacuate through the vagina.

The ease with which an exploratory colpotomy, either anterior or posterior, may be turned into a complete hysterectomy, should the adnexa be found to demand it, is apparent. In such a case it is possible to remove uterus, both tubes and both ovaries in one piece, but it will generally be better and easier to finish first with the uterus, clamping the tubes at the cornua for a guide as they are divided, and then returning to them and enucleating each with the corresponding ovary in turn.

When pus is found, unless the organ containing it can be removed before the sac is ruptured, the vaginal incision should be left open, with a gauze drain inserted. In non-septic cases the wound in the vagina and the one in the peritoneum may both be closed with fine catgut.

Vaginal Verus Abdominal Section.

In deciding whether to operate in any particular case by the vaginal or abdominal route, the following indications laid down by Polk are of interest as showing his personal preference, based upon the results of his own experience:

"Vaginal Section.	*Abdominal Section.*
1. A shallow and wide pelvis in a thin woman.	1. A narrow and deep pelvis, especially if deformed.
2. Explorations of the pelvis.	2. Explorations above the true pelvis.
3. Visceral adhesions in true pelvis.	3. Visceral adhesions in false pelvis or above.
4. Displaced and adherent uterus.	4. Large ovarian cysts, especially multilocular, with colloid contents.
5. Smaller ovarian cysts, especially the intraligamentous and parovarian.	5. Large fibroids, especially the firm and hard.

Vaginal Section.	*Abdominal Section.*
6. Smaller fibroids, especially the soft.	6. Extra-uterine pregnancy at time of rupture and at term.
7. Extra-uterine pregnancy, up to seventh month, and after death of fœtus.	7. Extra-uterine pregnancy, with tumor wholly above brim of pelvis, and not in relation with uterus.
8. Pelvic hæmatocele.	8. Pelvic abscess pointing upward.
9. Puerperal hysterectomy.	9. Conservative operations under conditions unfavorable to vaginal section, such as a narrow and deep, or a deformed pelvis, that is contracted.
10. Acute inflammation of appendages, with peritonitis involving cul-de-sac.	
11. Inflammatory destructive diseases of the appendages, including tubercular disease.	
12. Pelvic abscess pointing downward.	
13. Conservative operations on appendages that lie in true pelvis."	

He believes that seventy-five per cent. of all cases are best treated by the vaginal route.

Urethrocele.

The differential diagnosis between cystocele and urethrocele can generally only be made by passing a bent probe into the tumor from the meatus. In urethrocele the posterior wall of the urethra will be found much longer than the anterior, and the probe will drop into a pouch just within the meatus, and from this can be passed into the bladder. The wall of the urethrocele may be either thicker or thinner than natural. The tumor will not generally be larger than the end of the thumb.

The symptoms of this affection do not in any way distinguish it from a general cystitis, being frequent micturition, with pain and spasm, incontinence of urine, and pus, either mixed with the urine or in old cases escaping by itself from the meatus.

The cause of the urethritis is mechanical, and local applications

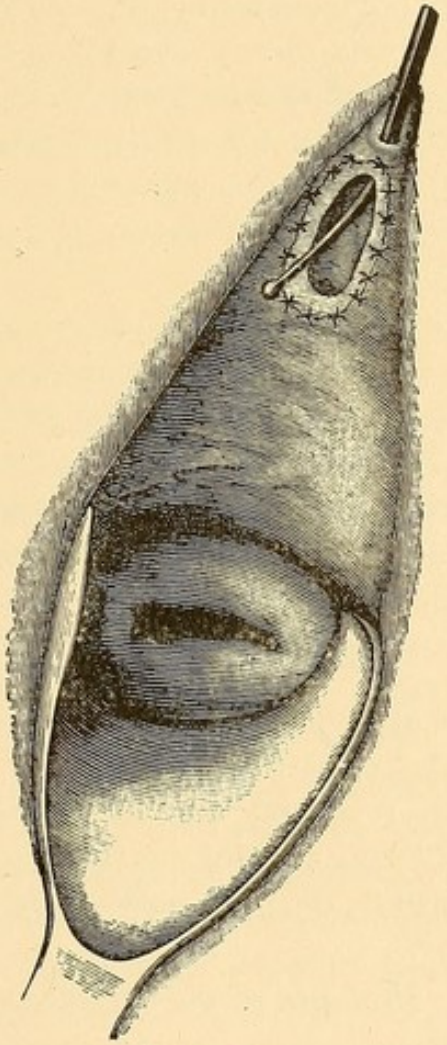


FIG. 244.

Emmet's Buttonhole Operation for Cystocele.

to the distended pouch will generally give but little relief as long as the decomposing urine is allowed to remain in the sac.

The proper treatment consists in draining the sac through the vagina by establishing a permanent urethro-vaginal fistula, as shown in Fig. 244.

After such an opening has been established the treatment of the urethritis becomes an easy matter.

The operation is in itself simple, the point to be guarded against being injury to the neck of the bladder and meatus by too long an incision.

The patient may be in either the dorsal or Sims position, preferably the former, and the incision into the sac should be made upon the end of a uterine sound, firmly held by an assistant. As soon as the sound is reached it should be pushed through into the vagina and be retained in that position until the mucosa has been stitched. The incision into the sac should be about half an inch in length.

The mucous membrane of the vagina is stitched to that of the urethrocele with fine black silk.

By this operation not only is the patient greatly relieved of all the worst symptoms at once, for there is no incontinence of urine, but the way is opened to the direct treatment of the diseased mucous membrane.

After a time the urethra will regain its normal condition, and the fistula may be closed as any vesico-vaginal fistula would be.

Caruncle of the Urethra.

Smaller caruncles at the meatus urinarius may be cured by applications of nitric acid, but they are very apt to grow again, and the better plan is to resect them and suture the healthy mucosa over the incision. In cases of larger growths, involving a considerable portion of the meatus, this will be the only satisfactory treatment.

Prolapse of the Urethra.

Prolapse of the urethra is very similar to prolapse of the rectum, and all of the methods of treating the latter have been applied to the former. Cauterization in stripes may be efficient; amputation and suture after pulling the mucosa as far down as possible seem to be more radical.

Emmet has modified the buttonhole operation to apply to these cases, and through the incision shown in the figure, draws out and amputates the prolapsing mucosa. The incision may be closed at

once or may be left open for a time for treatment of the mucous membrane should it be indicated.

In performing this operation a sound should previously be passed into the bladder, and allowed to remain till the operation is completed. This smooths out the mucosa and reduces the prolapse.

Cystotomy in Women.

Cystotomy in the female may be indicated for many of the same conditions as in men, viz. :

Cystitis.

Calculus.

Neoplasms.

Foreign bodies.

Wounds.

Usually, an operation through the vagina will be all that is required, but occasionally, as in the case of a very large calculus or a rent in the bladder-wall, the supra-pubic incision may be indicated either alone or in connection with the vaginal.

The supra-pubic operation in women is the same as in men, and to that the reader is referred for the description.

The operation through the vagina is as follows :

With the patient in the dorsal position and the feet in upright supports, an ordinary uterine probe or Van Buren's sound of medium size is passed into the bladder and made to press with its tip upon the bladder-wall in the median line, and midway between the cervix and the neck of the bladder. This serves for a guide for the incision, which should at first be only large enough to allow the escape of the tip of the sound into the vagina.

After the edges of this incision have been secured with fine forceps, so that the relation between the vesical mucous membrane and that of the vagina cannot be changed, the incision may be enlarged to half an inch with scissors.

The points to be guarded against are :

Sliding of the mucous membrane of the bladder away from the primary incision so that the openings into the vagina and into the bladder are not in apposition.

Injury to the ureters, which is best avoided by making the incision exactly in the median line.

The after-treatment must depend entirely upon the conditions found when the bladder is opened.

If these be such as to justify an immediate closure, as in cases of stone or foreign bodies, with very little attendant cystitis, the incision may at once be sutured with fine silk, and a catheter left in till healing is complete.

On the other hand, should permanent drainage be necessary, the incision is kept open by suturing the mucous membrane of the bladder to that of the vagina, as in the buttonhole operation for cystocele.

Should it be intended by the operator to establish drainage for a considerable time some arrangement should be made at the time of the operation for the future comfort of the patient. This is best done by inserting into the bladder a bent glass tube, with a flange at the end, and tightly suturing the edges of the incision around it. A rubber tube attached to this and carried to a rubber bag worn upon the thigh, from which the urine may be drawn off at will, provides all that is possible in the way of comfort.

CHAPTER XXIII.

FIXATION OF THE UTERUS AND SHORTENING THE ROUND LIGAMENTS.

Vaginal Fixation.

THIS is in reality an anterior colpotomy, with suture of the fundus of the uterus to the anterior wall of the vagina at the point of incision.

The incision is made vertical instead of around the neck of the uterus, as is usual in anterior colpotomy, and the peritoneum is opened. The fundus of the uterus is next seized with a volsellum and brought to the incision. Two sutures are passed through its substance, as in a ventral fixation, and the ends brought out on each side of the incision. After closing the vaginal wound, the fixation sutures are tied.

The operation is not regarded as justifiable in women liable to become pregnant, on account of the distortion it causes in the position of the uterus.

Ventral Fixation of the Uterus.

This is the operation of choice in cases of prolapsus in which plastic work upon the uterus and vagina fail to effect a cure.

When done for retro-displacements, the operation presupposes the freeing of the organ from all adhesions.

A two-inch incision, as close to the symphysis as possible without wounding the bladder, is generally sufficient, and only two fingers need be placed in the pelvis to break up adhesions and bring the fundus to the incision where it is grasped and held with a volsellum.

A space on the anterior surface of the fundus the size of a silver half dollar is then deprived of its peritoneal covering by scraping with a knife.

The form of suturing will vary with the operator.

Two silk-worm gut sutures may be passed through the whole

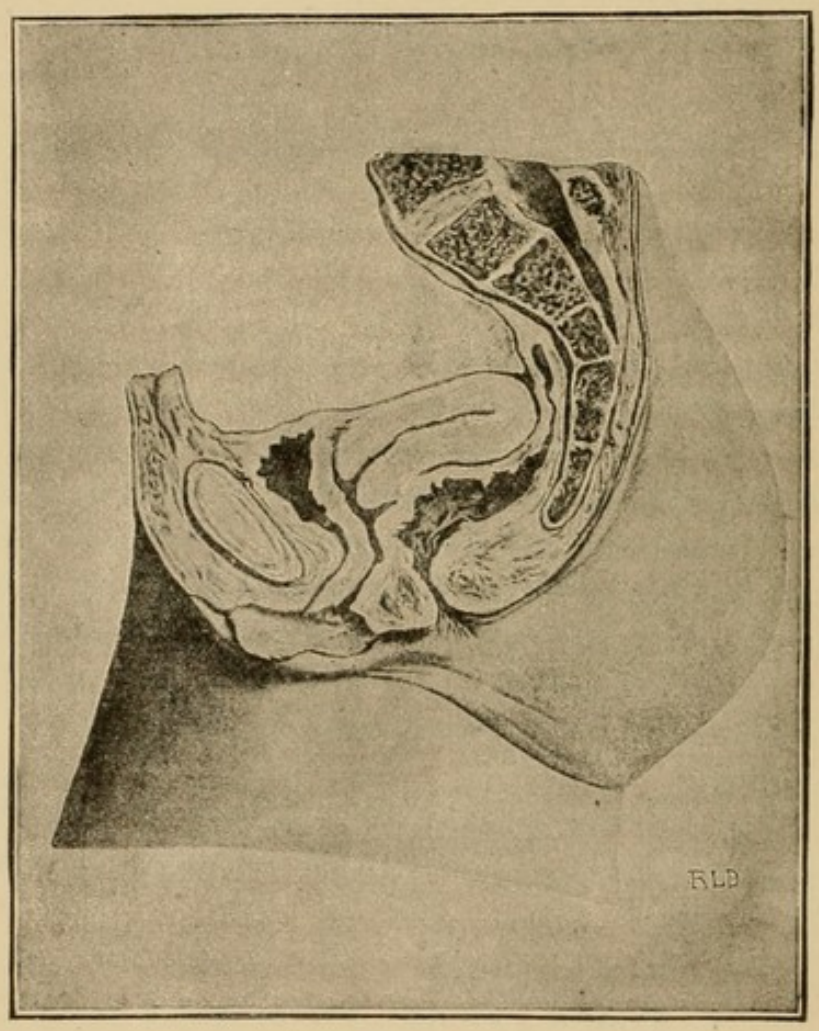


Fig. 245.

Retroverted Uterus Pressing upon Rectum.

thickness of the abdominal wall and the uterine tissue under the denuded spot, avoiding the uterine cavity, and after the abdominal incision has been closed, these may be used to draw the uterus firmly against the abdominal wall and then tied.

The essential point of Czerny's method, as distinguished from others, is that the sutures holding the uterus to the abdominal wall

do not pass through the skin. This plan may be still further modified by using one continuous suture of heavy chromicized catgut for closing the muscular layer and the fascia of the wound, as well as for supporting the uterus (Fig. 246).

Edebohls gives the following as the indications for the operation of ventral fixation. He believes that on account of the liability of

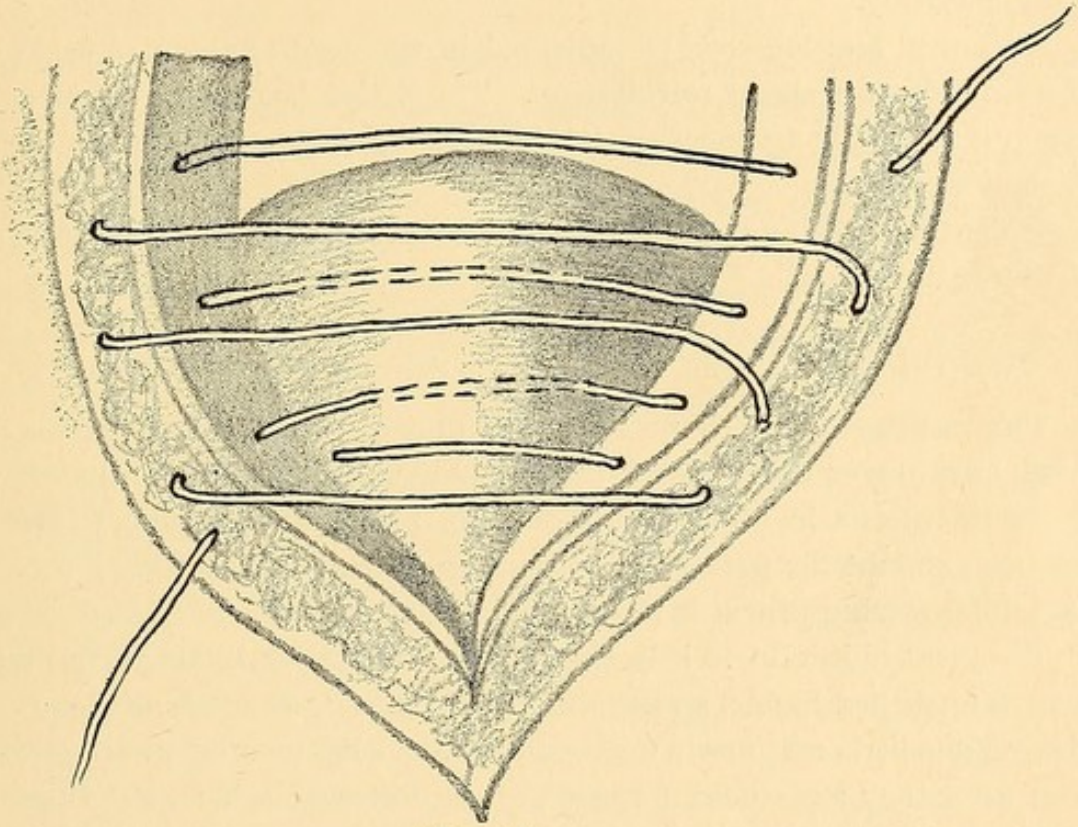


FIG. 246.

Ventral Fixation of Uterus.

the operation to cause subsequent difficult labors in child-bearing women the operation of shortening the round ligament should always be preferred when possible.

"The indications for ventral fixation of the uterus should be limited to the utmost degree in women liable to subsequent pregnancy.

"Ventral fixation is never indicated in uncomplicated retroversion of the uterus.

"Inability of an operator to perform shortening of the round ligaments *may* be an indication for ventral fixation, but not in the case of one claiming to be a specialist in gynæcology.

"Ventral fixation is indicated, *as an adjuvant*, in the performance of combined operations for prolapsus uteri et vaginæ.

"Ventral fixation is indicated as a closing step in all cœliotomies in which the adnexa are removed and the uterus is left.

"Ventral fixation *may* be indicated, *under exceptional conditions*, in cases of adherent retroversion, with tubes and ovaries in good condition.

"Ventral fixation *may* be indicated in the most aggravated cases of uncomplicated sharp retroflexion. The writer has not met such a case not amenable to successful treatment by shortening the round ligaments.

"Ventral fixation is indicated, under certain conditions, in cases of uterus unicornis."

Shortening the Round Ligaments. Alexander's Operation.

This much-discussed procedure is one of great value, having many advantages over ventral fixation, the chief of which is that it leaves the uterus in much better position for future pregnancy and delivery, should the patient be one whose circumstances render further child-bearing probable or possible.

The great objection to it is the technical difficulty in its performance in unskilled hands, and the further fact that, as frequently performed, but little real use is made of the round ligaments for support, even after they have been exposed at the external abdominal ring. At this point they are weak, often difficult to discover, and, in fact, in some patients they are not found at all, the ligament ending at the internal ring and spreading out upon the fascia till lost.

When such is the case the inguinal canal should be freely divided, as in Bassini's operation for hernia, and the round ligament searched for within the canal or at the internal ring, where it is easily found.

Edebohls's Operation.

Edebohls* has given so much attention to this operation, and his technique is so much more efficient than that usually practised that we will quote his own description.

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* American Gynæcological and Obstetrical Journal, December, 1896.

"Just prior to shortening the round ligaments the uterus is always curetted, and whatever plastic work upon cervix, vagina, and perineum the conditions presenting in each case call for is performed.

"If adhesions of the uterus and adnexa exist, and the operator prefers to sever these adhesions by anterior or posterior colpotomy rather than by an incision from above, this is the proper time to do so. At all events the operator must satisfy himself that the uterus can be well anteverted by bimanual manipulation before proceeding with the operation of shortening the round ligaments.

"The uterus is then allowed to assume any position it may please, generally dropping backward, to be brought into position at a later stage of the operation by traction on the round ligaments. A little iodoform gauze is loosely placed in the vagina, not to sustain the uterus, but as an antiseptic precaution in view of the preceding curettage.

"The field of operation is lathered and scrubbed with more ten per cent. creolin-mollin, rinsed clean with sublimate solution (1 to 3,000); and the patient is ready for operation.

"In shortening the round ligaments I prefer to have the pelvis slightly elevated and to stand at the right side of my patient, beginning the operation upon the left ligament.

"An incision five to six centimetres long, and nearly parallel to Poupart's ligament, is carried from the site of the internal inguinal ring downward and inward, terminating just within the spine of the pubis. Careful location of the pubic spines, from the time of beginning the operation until the anterior wall of the inguinal canal is opened, is absolutely essential to success.

"The subcutaneous fat is divided until the glistening aponeurosis of the external oblique muscle is exposed. The superficial epigastric artery is frequently divided, and if so, should be ligated at this stage of the operation. The external inguinal ring is now either exposed to view or located by the touch.

"A grooved director is inserted through the external ring and passed along the inguinal canal, directly behind the aponeurosis of the external oblique, until its point is over the site of the internal ring. Cutting upon the director exactly in the direction of the fibres of the external oblique aponeurosis, one sweep of the knife lays open

the anterior wall of the inguinal canal along its whole length (Fig. 247).

"It is very desirable that all hemorrhage should be controlled before opening the inguinal canal, otherwise the flow of blood into the latter may render differentiation of the round ligament from the other contents of the canal exceedingly difficult. An assistant exposes the contents of the canal by drawing apart the lips of the in-

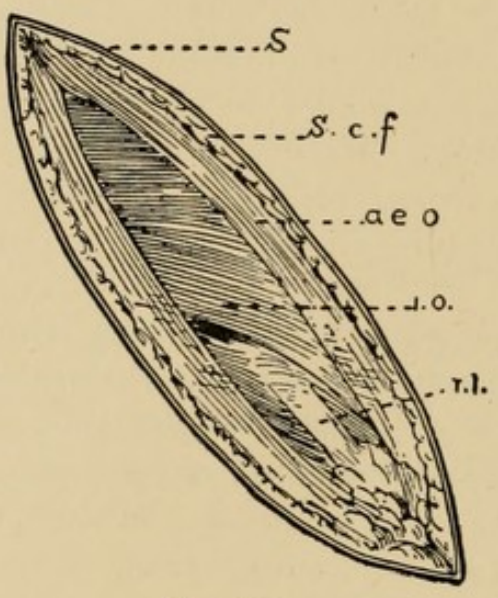


FIG. 247.

Incision, 5 centimetres long, through aponeurosis of external oblique, laying open inguinal canal from external to internal ring and exposing internal oblique muscle and round ligament. The ligament is more or less concealed, according to greater or less development of internal oblique.

S., skin.
s. c. f., subcutaneous fat.
a. e. o., aponeurosis of external oblique.
i. o., internal oblique.
r. l., round ligament.

cision through the external oblique aponeurosis, with the aid of tenacula, blunt hooks, or clamp forceps. The low fibres of the internal oblique muscle are seen crossing the upper half of the canal, filling it more or less, according to the greater or less muscular development of the individual.

"In a fair proportion of cases the lower end of the round ligament is at once exposed to view, emerging from beneath the lower border of the internal oblique; more generally, the round ligament is well

covered and entirely hidden from view by the internal oblique muscle and an investment of fatty, areolar, and fibrous tissue.

"Quite frequently some of the fibres of the round ligament are so closely interlaced with those of the internal oblique muscle that differentiation and separation of the ligament from bundles of muscular fibre become difficult. It is this part of the operation which generally trips the beginner; he fails to find the ligament, and cannot, of course, proceed. Experience has taught me that the best method

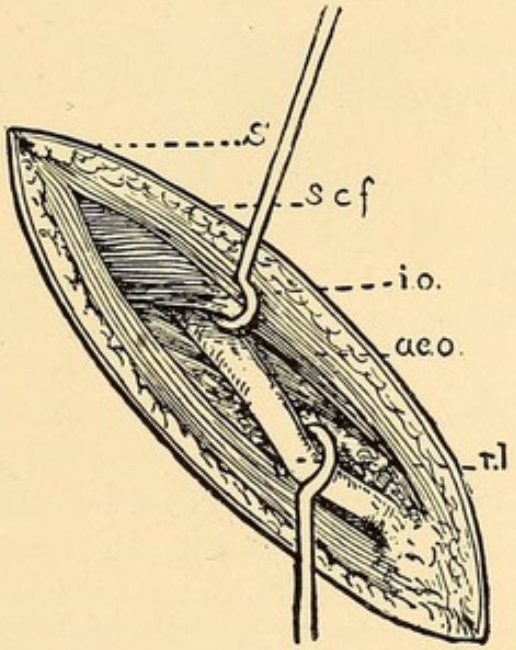


FIG. 248.

Isolating Round Ligament from its Attachments in Inguinal Canal.
S., skin.
s. c. f., subcutaneous fat.
i. o., internal oblique.
a. e. o., aponeurosis of external oblique.
r. l., round ligament.

of procedure at this stage, if the ligaments are not at once exposed to view and recognized, is to search for them in the following manner (Fig. 248):

"Retract the internal oblique muscle upward and inward by a blunt hook passed beneath the lowermost fibres, and hand this hook to your assistant. Take two small blunt hooks, one in either hand, and sweep one of them, point downward and outward, along the

posterior and outer walls of the canal from the depths of the wound skinward, hooking up the entire contents of the canal. By tearing these contents apart, more or less, as required, by means of the two blunt hooks, the round ligament, surrounded by fat and muscular and tendinous fibres from the internal oblique, and accompanied by

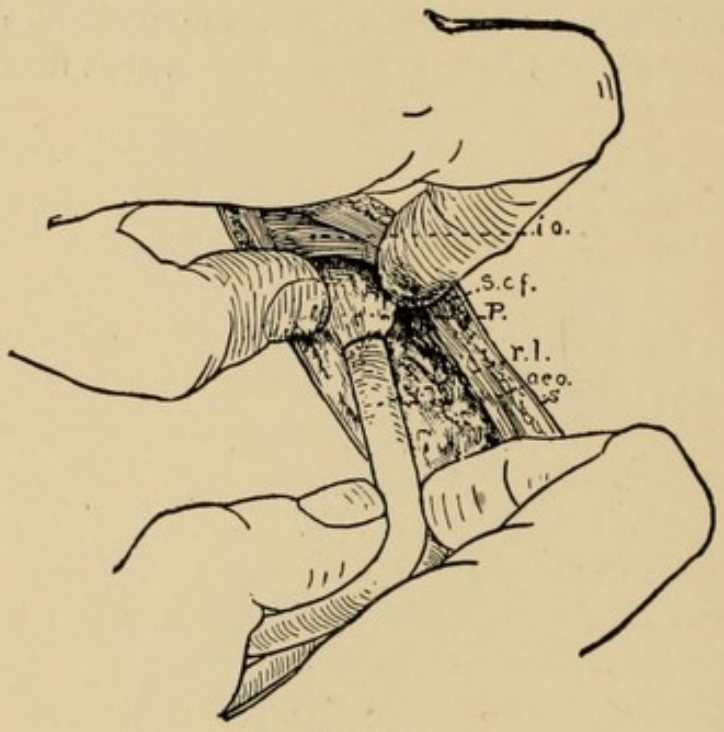


FIG. 249.

Drawing Round Ligament out of Abdomen and stripping back Investing Peritoneum of Broad Ligament.

i. o., internal oblique.
s. c. f., subcutaneous fat.
P., peritoneum.
r. l., round ligament.
a. e. o., aponeurosis of external oblique.
S., skin.

the ilio-inguinal nerve, will soon be recognized, and can be followed along the canal to the internal ring. There the round ligament is always strong, however weak, thin, and frayed-out it may have been found lower down in the canal or at the external ring.

"The ligament is next separated from its investments in the canal, leaving, however, the pubic end attached for the present. In this part of the operation great care should be exercised not to divide or tear the ilio-inguinal nerve which accompanies the ligament, and

division of which is the cause of the various dysæthesiæ in the vicinity of the scar sometimes complained of by patients after operation.

"In the canal itself the ilio-inguinal nerve, and the round ligament are very intimately connected; at the upper end of the canal they diverge, the nerve to pass between the muscular layers and the ligament to enter the internal ring.

"The ligament, freed from its surroundings in the canal, is next grasped by the thumb and forefinger of the right hand and cautiously drawn out at the internal ring (Fig. 249). The line of traction should be more or less perpendicular to the surface of the abdomen at that point, approximately in the direction of the intra-abdominal portion of the ligament.

"As the round ligament emerges at the internal ring it is seen to carry with it, in the form of an inverted cone, the investing peritoneum of the broad ligament, the point of reflection of the latter being marked by a distinct white line surrounding the round ligament.

"With the thumb and forefinger of the left hand the investing peritoneum is stripped or milked back into the abdomen as the round ligament emerges farther and farther from the internal ring. Occasionally the peritoneum tears in stripping it back; this is a matter of no consequence, provided the asepsis is all it should be.

"Should the ligament not run freely out of the abdomen, it will be wise, before employing the limit of safe traction force, to ascertain the cause by incising the peritoneum at the internal ring, bluntly dilating the latter, and passing a finger into the abdomen.

"If posterior adhesions prevent the uterus, tubes, and ovaries from coming freely forward, these may be separated by a finger or two hooked behind the broad ligament; or if the infundibulo-pelvic ligament, as obtained in one of the writer's cases, be shortened and thickened as the result of previous inflammation, this ligament may be stretched.

"The round ligaments will then be found to run freely, and the process of stripping back the peritoneum is continued until the index finger, passed down to the bottom of the wound, recognizes the impact of the cornu uteri at the internal ring when traction is made

upon the round ligament. This constitutes the writer's index to the proper amount of shortening, which, expressed in figures, will average about ten centimetres.

"The opposite round ligament is now sought, isolated, and drawn out in the same way. Thus far the ligaments have remained attached

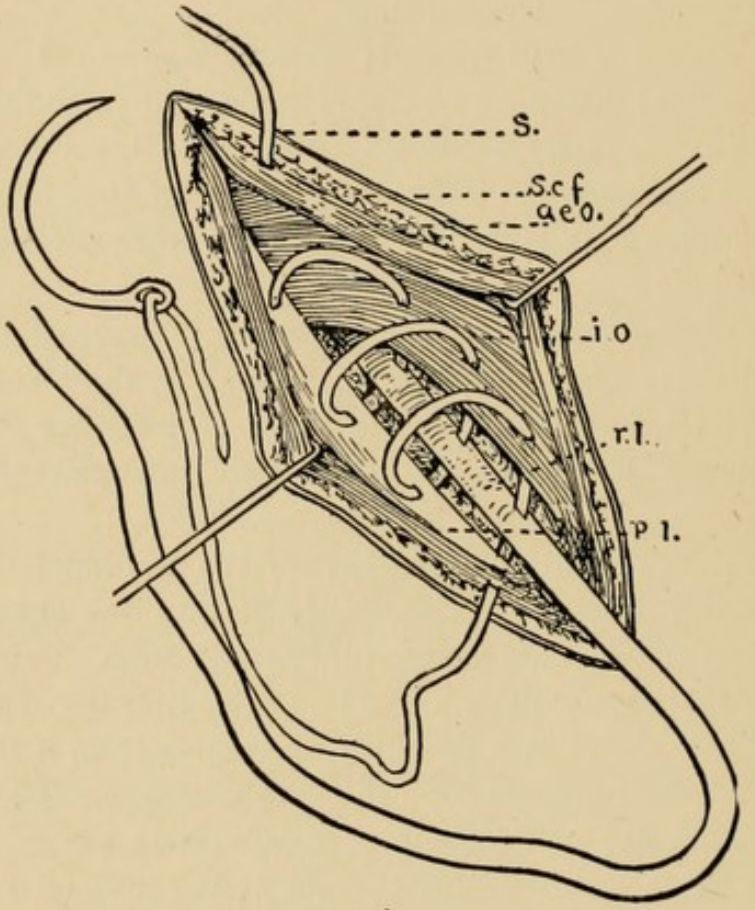


FIG. 250.

Deep Tier of buried running Suture of forty-day Catgut embracing Internal Oblique and Transversalis Muscles, Round Ligament and Poupart's Ligament. Deep part of uppermost loop of suture (not showing in cut) passes at level of and embraces margins of internal ring.

S., skin.
s. c. f., subcutaneous fat.
a. e. o., aponeurosis of external oblique.
i. o., internal oblique.
r. l., round ligament.
P. l., Poupart's ligament.

at the outer or pubic ends. These attachments are now cut for convenience in further manipulation, without, however, amputating any part of the ligament at present. After securing the desired position

of the uterus by traction upon the round ligaments, and adjusting the latter nicely along the bottom of the canal, suture of the wound is in order.

"The suture material for the deep parts consists of catgut, No. 0,

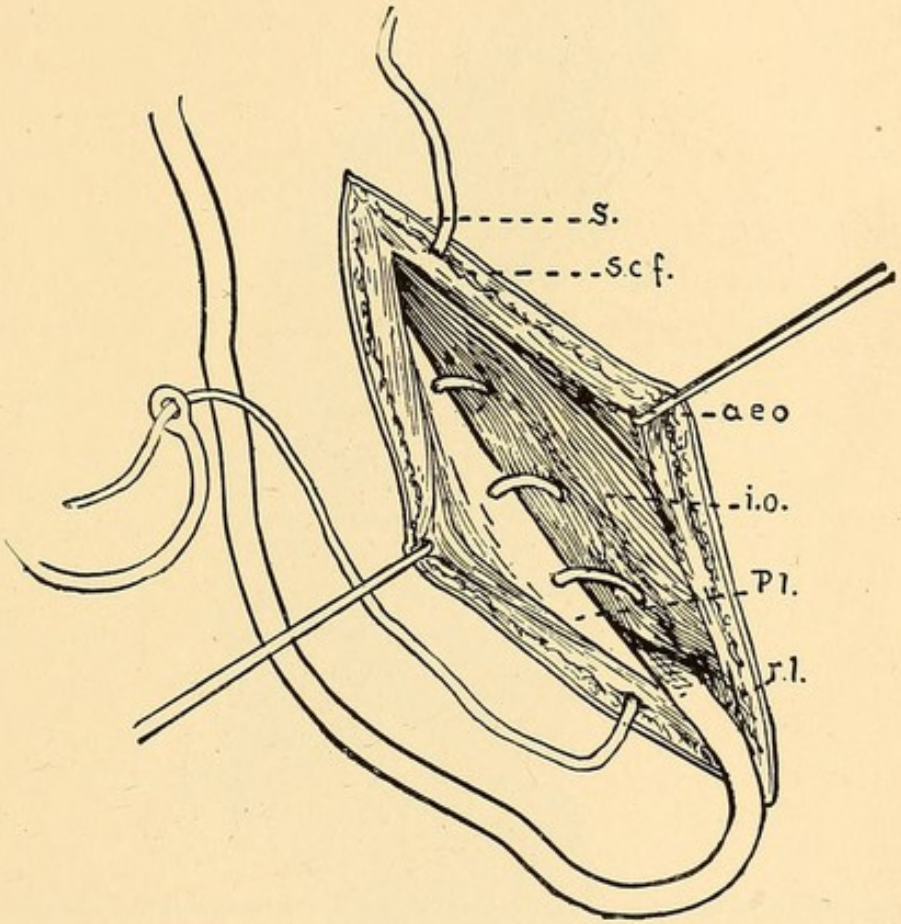


FIG. 251.

Deep Tier of Suture drawn home, obliterating Inguinal Canal.

S., skin.
s. c. f., subcutaneous fat.
a. e. o., aponeurosis of external oblique.
i. o., internal oblique.
P. l., Poupart's ligament.

chromicized by the writer's method to resist absorption for about six weeks.

"A half metre length of this forty-day catgut is threaded upon a full-curved Hagedorn needle of medium size or under. An assistant, with two tenacula, holds wide open the lips of the incision through

the aponeurosis of the external oblique, so as to clearly expose the deep parts of the canal, and especially the clean-cut projecting shelf of Poupart's ligament.

"The parts are brought together after the principle of Bassini's operation for the radical cure of inguinal hernia, with the exception

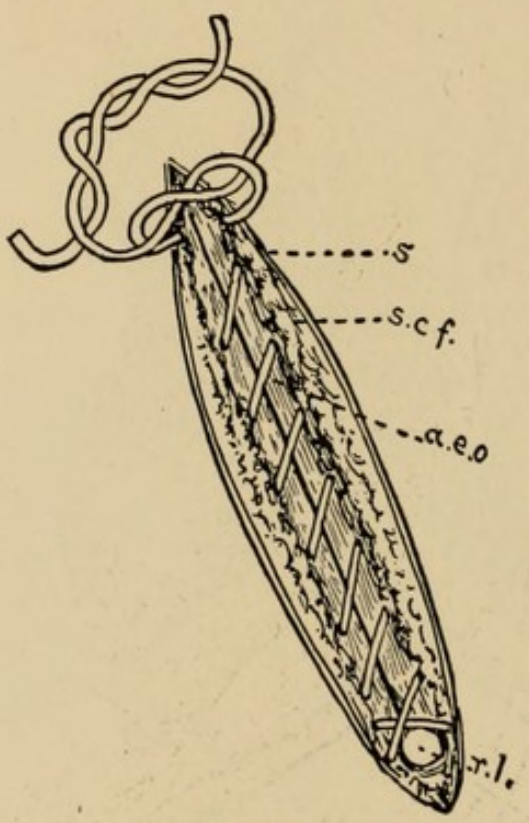


FIG. 252.

Superficial Tier of Buried Suture of forty-day Catgut closing Incision through Aponeurosis of External Oblique, restoring Anterior Wall of Canal. The excess of round ligament has been cut away just outside of external ring. The part protruding through ring, together with pillars of external ring pierced by lowest loop of superficial suture. Loose knot at upper end shows proper way of tying buried catgut knot to prevent slipping. Skin and fat to be closed over all by subcutaneous catgut suture.

that, instead of the interrupted suture, the buried running suture of forty-day catgut, applied according to the following technics, is used.

"Beginning at the upper angle and inner side of the right wound, the first sweep of the needle pierces the aponeurosis of the external oblique, the underlying internal oblique and transversalis muscles, the margins of the internal ring, the round ligament as it emerges between them, and the projecting shelf of Poupart's ligament. The succeeding loops of the deep tier of sutures, three or four in number,

pierce the internal oblique and transversalis muscles, the round ligament, and Poupart's ligament. The last loop, in addition, penetrates the outer pillar of the external ring, and emerges upon the outer sur-

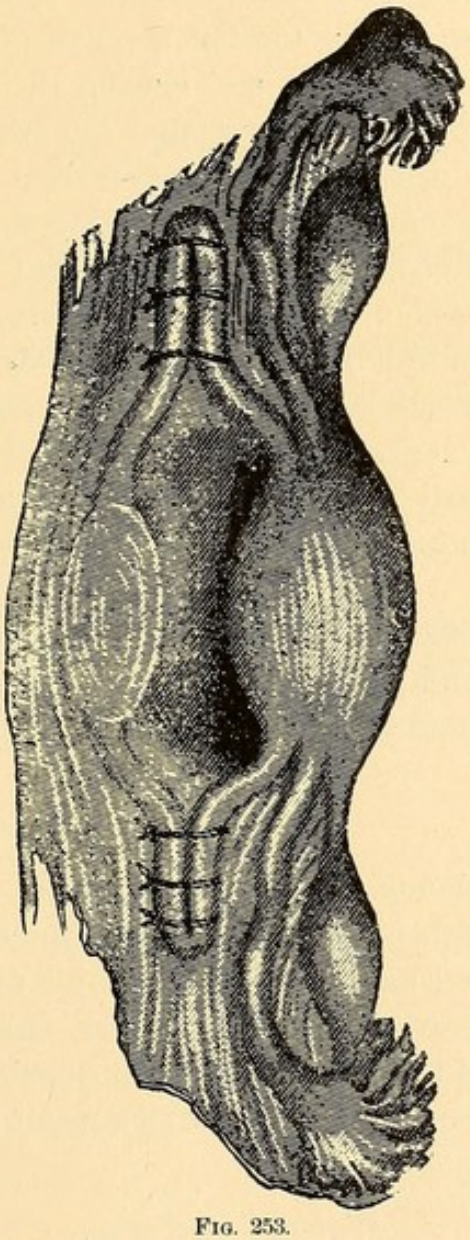


FIG. 253.

Wylie's Operation for Shortening the Round Ligaments.

face of the external oblique aponeurosis at the lower end and outer side of the fascial wound (Figs. 250 and 251). A stitch is then taken, with still the same strand of catgut, piercing the internal pillar of the external ring, round ligament and external pillar. The excess of

round ligament is now cut away just outside of the external ring, leaving the stump to plug the ring (Fig. 251).

"After thus obliterating the inguinal canal and closing both internal and external rings, the same strand of catgut is continued upward as a running suture, uniting the lips of the incision in the external oblique aponeurosis, and closing the anterior wall of the canal. At the upper end of the wound the two free ends of catgut emerging upon the aponeurosis of the external oblique are tied together, forming the only buried knot. This knot, if carefully and *tightly* tied after the manner depicted in the cut—a single turn in the first half and a double turn in the second half of the knot—can be depended upon not to slip. The skin is nicely approximated over all by a subcutaneous suture of ordinary catgut and the wound closed without drainage.

"Sterilized dressing applied over the wounds, and held in place by adhesive plaster and a double spica bandage, complete the operation."

Performed in this way there will be no uncertainty as to the effect of the operation upon the position of the uterus or the power of the ligaments to retain it.

Accidents.

In a few of Edebohls's reported cases one of the round ligaments has been broken either in its length or at the cornu of the uterus. When broken in its length, if enough remains attached in the uterus to complete the operation, no harm is done. Otherwise the operation should be abandoned and ventral fixation substituted.

He also reports one case of hernia as a result of the operation.

Wylie's Operation.

This method consists in folding the ligaments upon themselves as shown in Fig. 253, and suturing them in that position after freshening the approximated surfaces by scraping off the peritoneal covering with a knife.

CHAPTER XXIV.

THE RADICAL CURE OF HERNIA.

Before describing the technique of the operations upon the different varieties of hernia, a few words should be given to general considerations relating to the operation.

Indications for and against Operation.

Young children should not be operated upon until after a truss has been tried and failed to effect a cure. Most herniæ in children are curable by the proper use of a truss.

Age.

Old age and large size of the hernia are contra-indications to operation, but very good results have followed operations upon old men with very large herniæ. Bull and Coley place the limits within which operation is indicated at four years and fifty; but four years certainly seems too young to operate, as a rule, and fifty not too old to give a patient the benefits of an operation provided he is otherwise strong and well.

Irreducibility.

Irreducibility is one of the strongest indications for radical operation, after proper efforts have been made at reduction and have failed, except in old and debilitated subjects; but the operation is liable to be much more difficult than in reducible hernia, on account

of the adhesions which render it irreducible. The general condition of the patient, the absence of visceral disease, and the ability to bear a long operation must therefore be taken into consideration.

Obstructed and Inflamed Hernia.

In these cases the obstruction and inflammation are first to be overcome, if possible. Obstruction is to be treated by gentle and conservative efforts to move the bowels. These consist in fluid diet and voluminous high enemata, with position of the hernia itself to prevent venous congestion. Should an evacuation be secured by the long tube, gentle purgation may be undertaken with salines, and if this be effective, the pain, tenderness, distention, and signs of obstruction will rapidly subside.

Inflammation is shown by heat, swelling, and pain in the hernia. It is to be treated in much the same way as obstruction, except that cold local applications may be made to the part. In both cases opium should not be given, if for no other reason than that it masks all symptoms.

In both obstructed and inflamed herniæ, as soon as it is evident that efforts to relieve the condition are of no avail, herniotomy should be performed, and after the reduction of the hernia the radical operation for cure follows.

Mortality.

The mortality after operations for radical cure in selected cases will be very slight with good operators—less than one and a half per cent. in 5,000 cases, collected by Bull and Coley.

Results.

The majority of cases remain cured for a number of years, and the majority of relapses occur within the first year. In these statistics only the results of operators with some experience should be considered.

Suture Material.

It should be a rule that no non-absorbable material be used in the operation, and hence neither silk, silk-worm gut, nor silver wire. All

such substances are liable to cause suppurating sinuses, which not only interfere with the result of the operation, but may confine the patient to his bed until the offending body is cut for and found.

The best of all material is that which is strongest and will resist absorption the longest, and that, as far as at present known, is kangaroo tendon. Strong catgut may be so chromicized as to resist absorption as long as kangaroo tendon, but it must be very accurately prepared. Kangaroo tendon is usually to be counted upon to hold for eight or ten weeks. It is expensive, as put up and sold in New York, as the supply is limited, and it is brought from Australia. It is reliably prepared by one or two firms in New York City, but the surgeon will have difficulty in obtaining it for his own preparation. Strands of even size and moderate thickness should be selected, and it need only be used in the deep suturing.

Although the rules given in the chapter on general rules regarding operations for chromicizing catgut will be found sufficient, the following by Edebohls are more accurate, and catgut thus prepared has been tested by him and found to resist absorption for forty days.

"Buy the raw material, catgut Nos. 0 and 00, in coils five metres long, of an importer of jewellers' supplies. Avoid the fine, white, smooth, alluring catgut sold for surgical use. The smoothness and finish are obtained at the expense of strength of material, the sand-papering process thinning and weakening the catgut in spots, and the chain is no stronger than its weakest link. Cut and remove the small pieces of catgut tied around each coil to keep it in shape.

"Place the catgut in ether to extract fat. It may be left in ether any length of time—days and weeks—until convenient to proceed with the further steps of preparation.

"Remove the catgut from the ether, and allow it to dry thoroughly.

"To chromicize to the desired degree, place the catgut for thirty hours in the following solution: Bichromate of potash, 1.5 grammes; carbolic acid, 10 grammes; glycerin, 10 grammes; water, 480 grammes. Dissolve the bichromate of potash in the water, then add the carbolic acid and glycerin.

"Before placing the coils in the solution arrange them upon a central core or cylinder, of nearly the diameter of the interior of the coil, to prevent entangling and snarling of the catgut as it swells and becomes twisted in the solution.

"After thirty hours remove the catgut *with and upon the core* from the bichromate of potash solution, and immediately wind it upon a frame, stretching it pretty taut. I use a wooden frame, resembling a curtain-stretching frame in miniature, one metre in length, which is the length I find it convenient to have catgut sutures. The catgut is stretched upon the frame for the twofold purpose of convenience in drying, and to prevent the curling and kinking which obtain when catgut has been soaked in water and dried without stretching.

"The drying must be done at a temperature not exceeding 40° to 45° C. If higher temperatures are risked, the moist catgut may gelatinize; it then becomes so brittle as to be absolutely worthless. The drying should be thorough, and the process should extend over a space of time of several days. If the least moisture remains in the interior of the catgut, it will surely gelatinize and render brittle and worthless the catgut when raised to high temperatures in the process of sterilization to follow. This thorough drying after chromicizing is, I repeat, *absolutely essential* to obtain a useful product.

"In chromicizing catgut, bear in mind that nothing is easier than to over-chromicize so as to make it practically non-absorbable. The difficulty lies in chromicizing it to last just the required time, and the method just detailed is the result of much and somewhat costly experimentation. Catgut No. 0, chromicized as above, will resist absorption for about six weeks.

"The chromicized gut is now ready for the process of sterilization.

"Various methods of sterilization are at our disposal, of which the writer has tried only two—dry sterilization at a temperature up to 280° F., and sterilization by boiling in absolute alcohol under pressure. Of the two he prefers the latter, as having yielded him stronger and more satisfactory material, without thereby meaning to impugn the value of dry or of other forms of moist sterilization.

"After the chromicized gut is *thoroughly* dry it is cut into pieces one metre in length. These pieces are rolled on a finger into small coils, which need not be tied, and which are packed nicely into one-

ounce glycerine jelly jars, about twenty coils to the jar. Absolute alcohol (Squibb's 99.8 per cent.) is poured over the catgut in each jar until full, a properly fitting rubber washer is placed inside the metal cap, and the latter is screwed down fluid-tight. The glycerine jelly jars are then placed, standing, in a large anatomical jar containing from two to four ounces of absolute alcohol.

"Two, or even three, layers of the glycerin jelly jars may be placed on top of each other in the anatomical jar. The cover of the latter is now also screwed down air and fluid tight, and the whole is ready for the sterilizer. I have always used an Arnold sterilizer, in which the large anatomical jar, filled and sealed as above, is placed, and the sterilizer started.

"The boiling-point of alcohol is 78° C. The atmosphere of steam is 100° C., and the firm closure of the small jars, as well as of the large anatomical jar, secures the boiling of the catgut in absolute alcohol under pressure. The arrangement probably diminishes the danger of explosion and of ignition of the alcohol vapors. The catgut is boiled in absolute alcohol under pressure for five hours, when the cover of the Arnold sterilizer is removed, and the anatomical jar with its contents allowed to cool gradually. The alcohol, of course, will keep on boiling till the temperature falls below 78° C. Readjustment of some of the rubber washers, and filling some of the jars with absolute alcohol, to replace that lost in the process, and your catgut is ready for use.

"Chromicized catgut prepared in this way does not decompose or change in absolute alcohol, but remains strong, sterile, and unimpaired for years."

The Omentum.

It is not safe to tie off large pieces of omentum *en masse*. Most of the tissue in the grasp of the ligature will be fat, and this may break down so quickly that the ligature ceases to have any effect before the ends of the blood-vessel have had time to close.

It should therefore be tied off when irreducible in small sections, and not too near to the gut, lest sloughing of the gut itself should result.

After-Treatment.

A truss should be worn when the patient is on his feet or at work for some months after the operation. The patient may leave his bed, when primary union has been obtained, in about two weeks.

Accidents.

The accidents which may attend the radical operation are:
Injury to the vas deferens from handling or constriction.
Hemorrhage from improper care of the mesentery.
Sloughing of intestine from interference with its mesentery.
Localized peritonitis from operation.
Shock.
Injury to the contents of the sac in opening the sac.
Injury to gut or omentum in ligaturing the neck of the sac.
Suppuration of the wound.

Bassini's Operation for Inguinal Hernia.

Reduce the hernial contents, if possible, and locate carefully the external abdominal ring.

Then make an incision, at most three inches long, beginning at the spine of the pubes and running upward and outward parallel with Poupart's ligament.

Carry the incision downward till the fascia of the external oblique is uncovered and the external ring exposed.

With finger or grooved director passed into the ring for a guide, incise the fascia of the external oblique for two inches, thus laying open the inguinal canal. Care should be taken when the finger or director is passed through the ring and along the canal for a guide, that the hernial sac be not invaginated and carried with it, and thus laid open with the canal.

Seize the two cut edges of the fascia with catch forceps, and with finger or handle of knife separate their under surfaces from the contents of the canal, till the reflexion of Poupart's ligament can be distinctly seen. Leave forceps attached for a guide.

Pass a finger under all the contents of the inguinal canal and raise them out of their bed. They will consist of the elements of the spermatic cord ; more or less fat, often considerable ; the hernial sac, and perhaps its contents, whether intestine or omentum.

Separate the cord with cremaster muscles, veins, and vas defer-

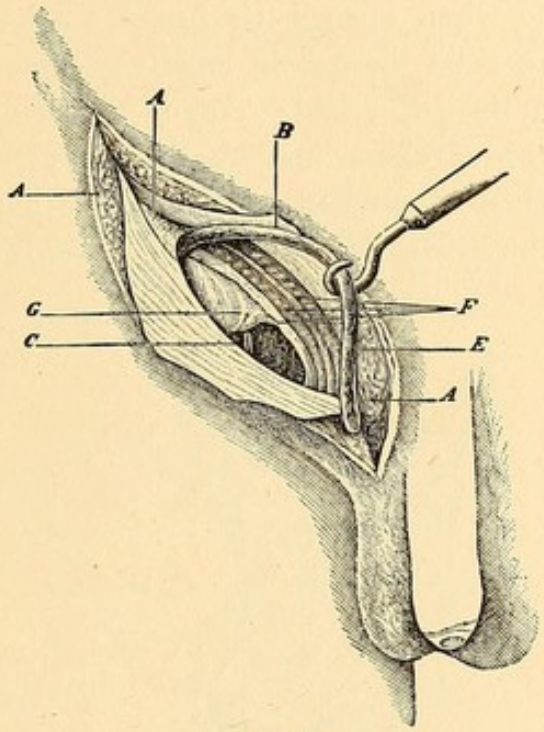


FIG. 254.

Bassini's Operation for Inguinal Hernia.

A, *A*, *A*, subcutaneous fatty tissue.
B, upper portion of the divided aponeurosis dissected from the underlying structures.
C, under portion of the aponeurosis of the external oblique.
E, cord.
F, internal oblique muscle ; transversalis ; and Cooper's fascia.

ens in one hand, from the hernial sac in the other, by gentle pulling with the fingers.

Open the hernial sac with all the care that would be used in opening peritoneum anywhere with a liability of wounding the intestine.

If the sac be empty, pass one finger into it down to its neck, and encircle this point with a catgut ligature which is to be cut short.

The best way to avoid tying gut, in this ligature as well as the sac, is to have an assistant tie the ligature at first around the last phalanx of the finger held in the sac, then as the ligature is tightened

the finger is withdrawn, and the ligature slips between the end of the finger and any bowel which may be in contact with it.

Amputate the sac beyond the ligature, leaving a good stump to prevent slipping of the ligature from intra-abdominal pressure.

Should the operator prefer, the opening into the sac may be closed by a continuous catgut suture.

Should the sac when opened be found to contain irreducible omentum, this must be ligated in small sections and amputated before the neck of the sac is tied. The omentum should be unfolded and a set of running chain-ligatures applied across the part to be amputated, each suture including not more than a couple of inches of omentum. If the ligature include a considerable mass of the fat

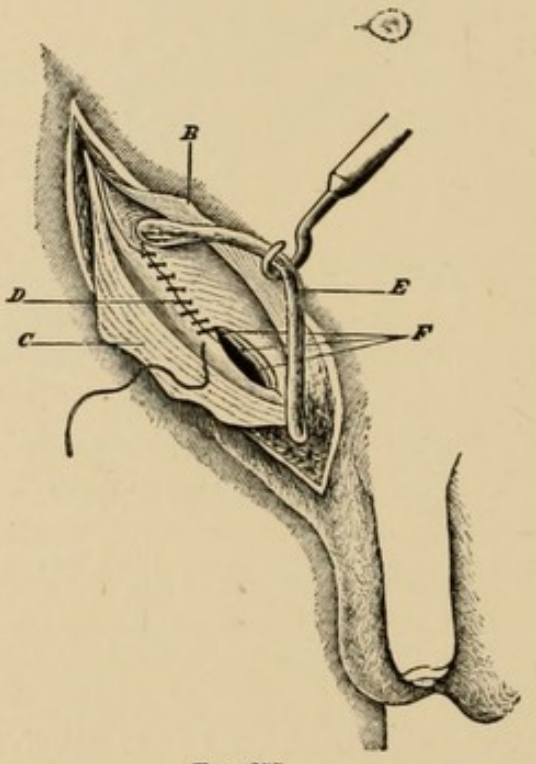


FIG. 255.

Bassini's Operation for Inguinal Hernia.

The cord has been transplanted and the musculo-aponeurotic structures on the inner side have been sutured to Poupart's ligament (*D*) on the outer side.

and vessels when the fat breaks down, as it does very quickly under the pressure of the string, the ligature is liable to slip, and fatal bleeding may result. The stump of the mesentery is then reduced into the abdomen, after being washed, and the neck of the sac ligatured.

Should the sac be found to contain adherent intestine, this must be liberated by blunt or even sharp dissection. Wounds of the intestine must be closed by Lembert's sutures.

Saline solution or simple sterilized water should be used for washing throughout the operation (Fig. 254).

The next step is so to close the inguinal canal as to prevent the recurrence of hernia. With the cut edges of the external oblique

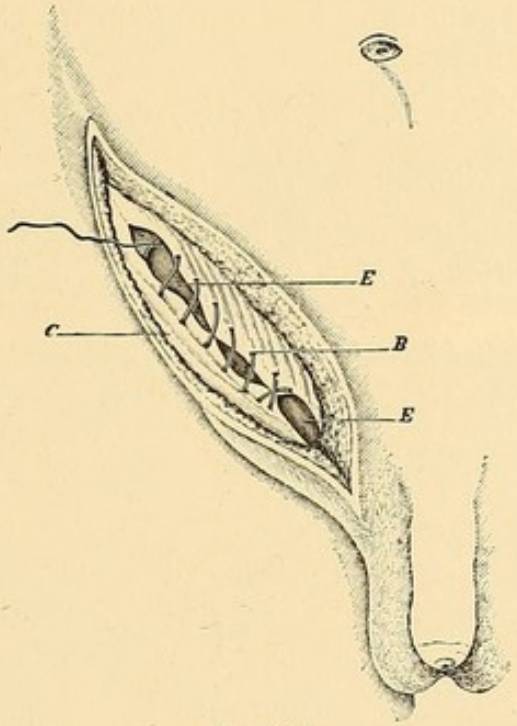


FIG. 256.

Bassini's Operation for Inguinal Hernia.

Suture of the Divided Aponeurosis over the Cord.

tendon held well open, a suture of kangaroo tendon is passed as close to the internal abdominal ring as is possible without pressing upon and constricting the cord as it passes through it (Fig. 255).

The suture is passed first through the edge of the muscular fibres of the internal oblique and transversalis which are plainly exposed in the wound, and next through the reflected portion of Poupart's ligament and firmly tied. Five or six such sutures passed at distances of a third of an inch will form a complete and firm floor to the inguinal canal, and while they are being placed the cord is to be held out of the way by an assistant.

The cord is now dropped into its place upon the floor thus made, and the incision in the tendon of the external oblique is sutured to form the top of the inguinal canal (Fig. 256).

This should be done in the same way as the floor, beginning at the upper end of the incision and carrying the suturing downward till only an external abdominal ring remains of sufficient size to permit the passage of the cord without pressure or strangulation. Finally close the skin incision with continuous or interrupted fine catgut. Dress with pad of gauze and firm spica bandage.

Halstead's Operation.

Halstead's operation differs from this in several particulars. Not only the aponeurosis of the external oblique, but the muscular fibres of the internal oblique and transversalis are divided in laying open

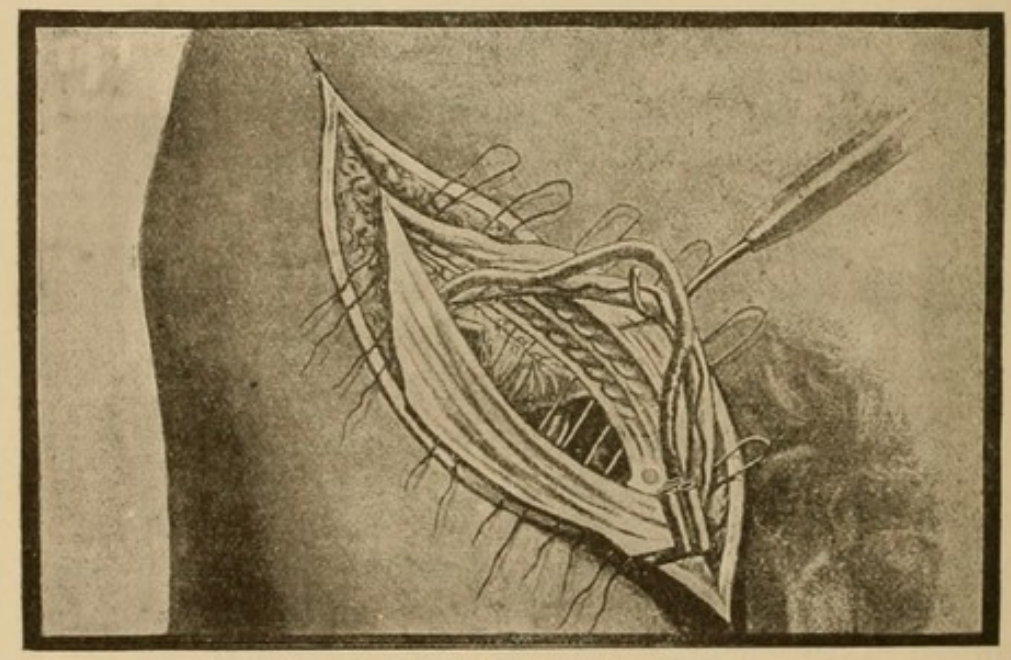


FIG. 257.

Halstead's Operation for Inguinal Hernia. First Step.

the canal (Fig. 257). After isolating the cord—most of the veins are tied and are resected—and after removing the hernial sac, as in Bassini's operation, a new canal is formed by closing all of the structures of the ring under the cord which is left between the skin and the aponeurosis of the external oblique (Figs. 258 and 259).

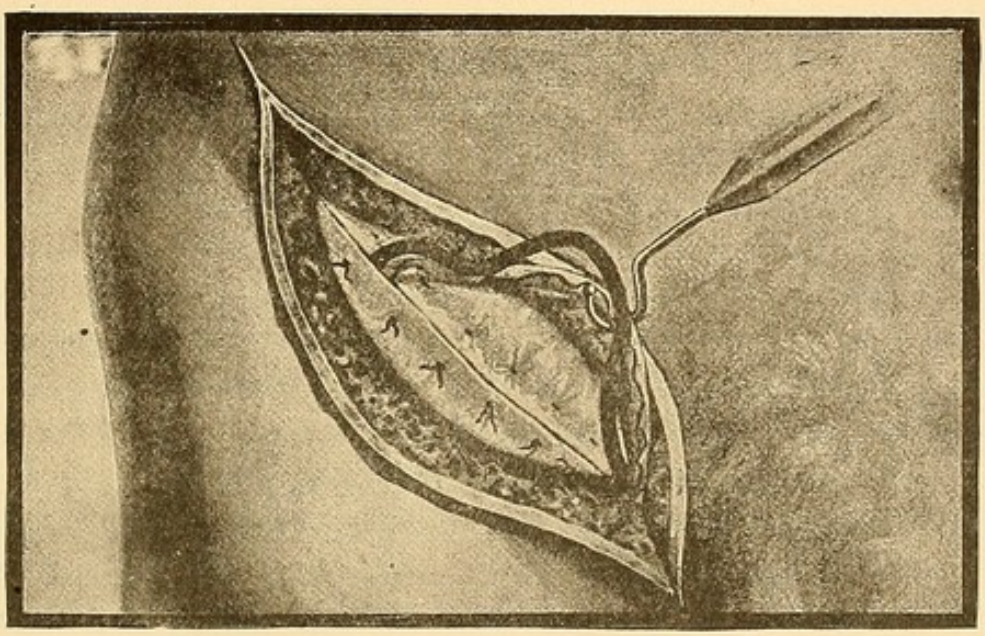


FIG. 258.

Halstead's Operation for Inguinal Hernia. Second Step.

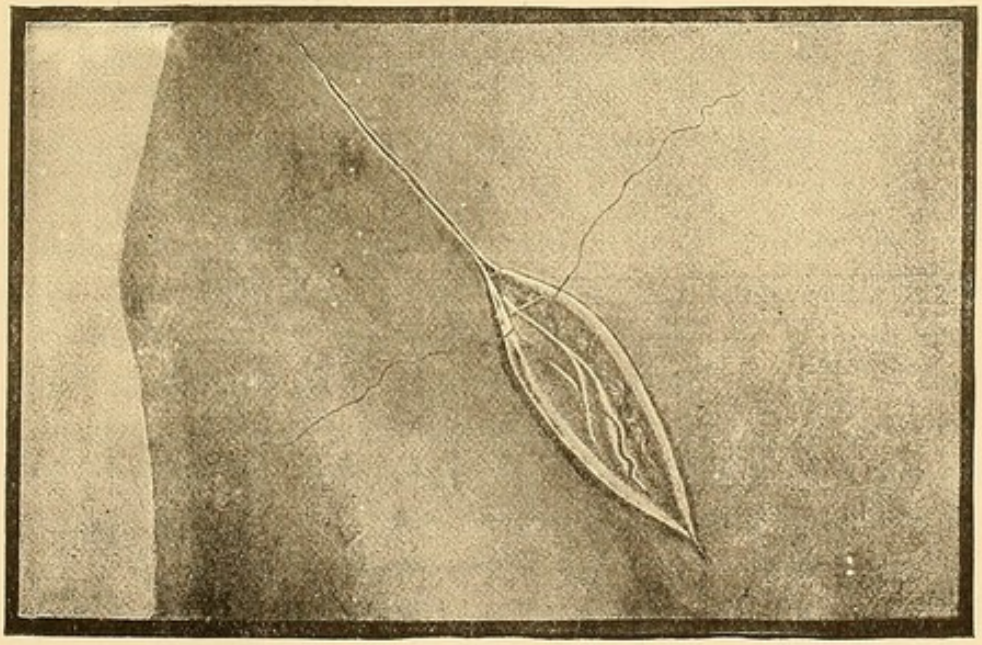


FIG. 259.

Halstead's Operation for Inguinal Hernia. Third Step.

The operation does not seem to possess any special advantages as to results.

We give the description in his own words:

"Bassini's operation and my own are so nearly identical that I might quote his results in support of my own operation. Instead of trying to repair the old canal and the internal abdominal ring, I make a new canal and a new ring. The latter should fit the cord as snugly as possible, and the cord should be as small as possible.

"The skin excision extends from a point about five centimetres above and external to the internal abdominal ring to the spine of the pubes.

"The subcutaneous tissues are divided so as to expose clearly the aponeurosis of the external oblique muscle and the external abdominal ring.

"The aponeurosis of the external oblique muscle, the internal oblique and transversalis muscles, and the transversalis are cut through from the external abdominal ring to a point about two centimetres above and external to the internal abdominal ring.

"The vas deferens and the blood-vessels of the cord are isolated.

"All but one or two of the veins of the cord are excised.

"The sac is carefully isolated and opened, and its contents replaced.

"A piece of gauze is usually employed to replace and retain the intestines.

"With the division of the abdominal muscles and the transversalis fascia the so-called neck of the sac vanishes. There is no longer a constriction of the sac. The communication between the sac and the abdominal cavity is sometimes large enough to admit one's hand.

"The sac having been completely isolated and its contents replaced, the peritoneal cavity is closed by a few fine silk mattress-sutures, sometimes by a continuous suture.

"The sac is cut away close to the sutures.

"The cord in its reduced form is raised on a hook out of the wound to facilitate the introduction of the six or eight deep mattress sutures which pass through the aponeurosis of the external oblique, and through the internal oblique, and transversalis muscles and transversalis fascia on the one side, and through the transver-

salis fascia and Poupart's ligament and fibres of the aponeurosis of the external oblique muscle on the other.

"The two outermost of these deep mattress-sutures pass through muscular tissues and the same tissues on both sides of the wound.

"They are the most important stitches, for the transplanted cord passes out between them. If placed too close together, the circulation of the cord might be imperilled, and if too far apart, the hernia might recur. They should, however, be near enough to each other to grip the cord.

"The precise point out to which the cord is transplanted depends upon the condition of the muscles at the internal abdominal ring. If in this situation they are thick and firm, and present broad, raw surfaces, the cord may be brought out here. But if the muscles are attenuated at this point and present thin, cut edges, the cord is transplanted farther out.

"The skin wound is brought together by buried skin sutures of fine silk.

"The transplanted cord lies on the aponeurosis of the external oblique muscle and is covered by skin only."

Bassini's Operation for Femoral Hernia.

The incision may be made either parallel with Poupart's ligament, or vertical over the femoral ring, and should be three inches long.

Expose the neck of the sac by careful blunt dissection, remembering the relation of the femoral vein.

After reducing the hernial contents and ligaturing the sac as in inguinal hernia, the femoral opening is to be closed by three or four sutures of kangaroo tendon passed side by side at short distances from each other so as to draw Poupart's ligament downward to the pectineal line, and thus occlude the femoral canal.

Each suture is passed from above downward with a curved needle, entering in Poupart's ligament, passing directly down through muscle to bone, and emerging from the muscle about an inch below its entrance.

These sutures draw Poupart's ligament backward to the pectineal

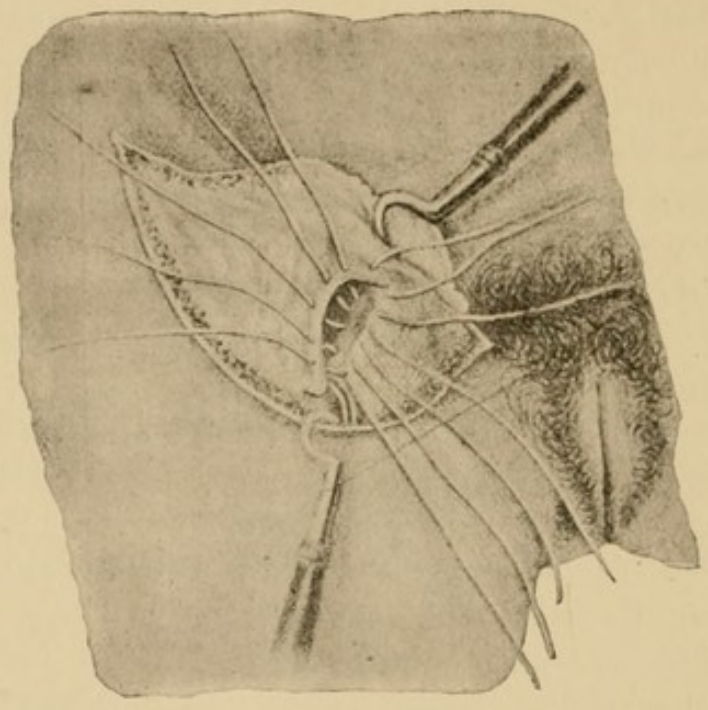


FIG. 260.

Bassini's Operation for Femoral Hernia.

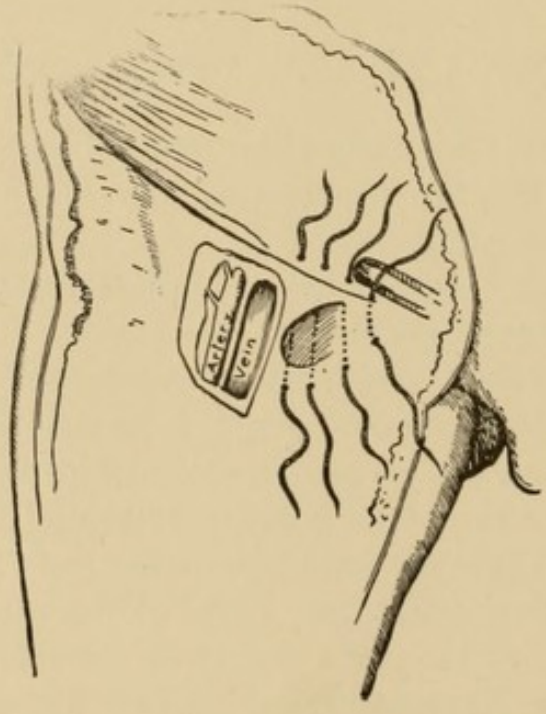


FIG. 261.

Operation for Femoral Hernia.

line, the first being placed near the spine of the pubes, the third one centimetre from the femoral vein, and the second between the two.

Another set of sutures may be used, three or four in number, to bring together the anterior and posterior walls of the canal. These are passed first through the falciform fascia, and next the pectineal fascia, the lower one just clearing the saphenous vein.

If the two sets are used all should be inserted before the first set is tied.

Finally, the skin wound is closed, as in the inguinal operation.

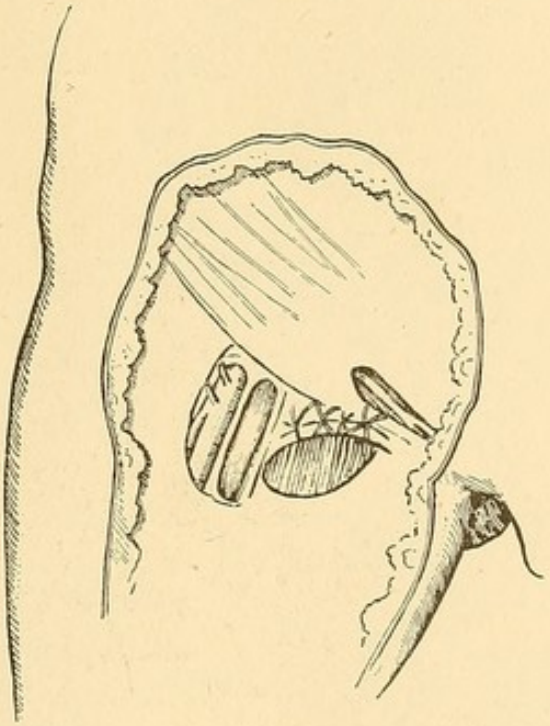


FIG. 262.

Operation for Femoral Hernia—Completed.

A modification of this operation, but simpler in technique, is shown in Figs. 261 and 262.

In it an incision is made in the fascia below the femoral opening, so that it can be drawn up to close the opening.

Ventral Hernia.

A hernia through the abdominal wall, at some point other than the inguinal rings, may be due to a congenital defect, or to a wound.



FIG. 263.

Ventral Hernia between Recti Muscles (Personal).

The large majority follow abdominal section or a punctured wound through the parietes. Fig. 263 shows a very large one, due to separation of the recti muscles for their entire length, due to child-birth, and Fig. 264, one due to an incision to evacuate pus in appendicitis nearly twenty years before.

An old ventral hernia may be so large as to be incurable, and death may result from the attempt.

First, then, the operator should decide whether the sides of the opening, through which the hernia has passed, can be drawn together. Should such be the case, operation is justifiable, and may be successful; but should it not be the case, after the abdomen has been opened and the hernia reduced, the wound can only be closed by skin, which will either slough and allow evisceration and cause death, or leave the patient much worse than before.

The abdomen should be opened over the most prominent part of the tumor. Great care is necessary in this preliminary incision, as the gut may be adherent directly to the skin, and this may be much thinned. It may even be necessary to turn back a skin flap in two or three places by careful dissection, and make successive efforts to enter the free peritoneal cavity before being successful. When once the free peritoneal cavity has been reached, the most delicate part of the operation will generally have been accomplished.

The incision should next be enlarged to at least the full length of the opening in the abdominal fascia, through which the hernia has escaped, and even an inch or so more at each end. In an old case an incision from the ensiform cartilage to the symphysis may be none too long.

The next step consists in freeing adhesions of omentum and intestine from the hernial sac, and in effecting reduction of the hernial contents within the abdomen. This may be a long and difficult procedure. Much omentum may require excision, and even a considerable piece of intestine may need to be resected, and an anastomosis performed.

The operator is now ready to turn his attention to the opening in the abdominal fascia and prepare it for suturing.

Its margins should be distinctly marked out and freed from all fat and peritoneal covering. The muscular tissue above the fascia

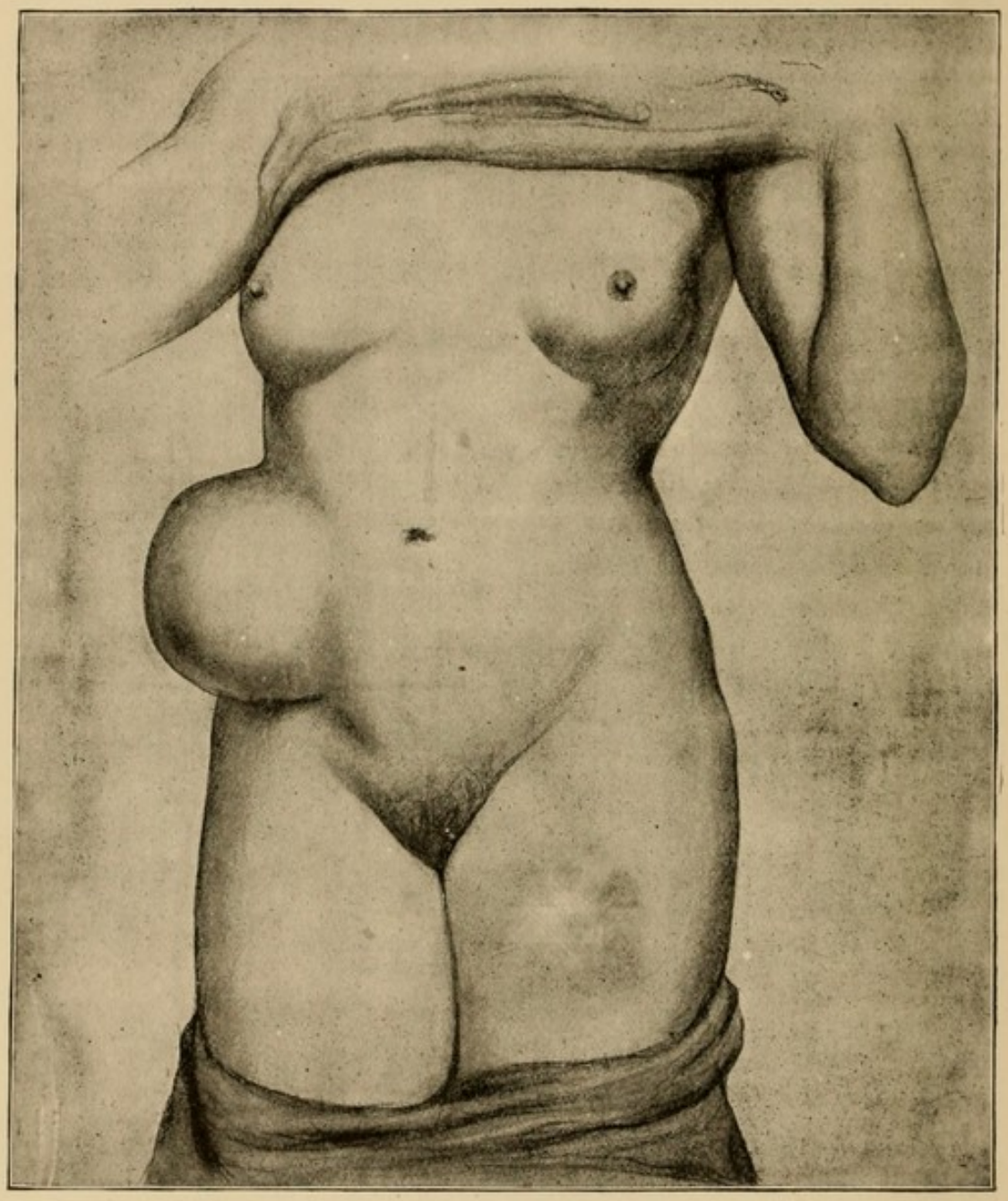


FIG. 264.

Ventral Hernia After Operation for Appendicitis (Personal).

should also be clearly exposed all around the opening, so that the abdominal walls may be approximated, fascia to fascia and muscle to muscle, without the interference of any fat or peritoneum.

The opening may then be closed in the usual way with two rows of sutures, one for fascia and one for muscle, the former including the peritoneum. Should much traction be necessary to approximate the lips of the opening, additional sutures of silk-worm gut or silver may be used through the whole thickness of the abdominal wall, but these will seldom be necessary, and if introduced they are not yet ready to be tied.

After the muscular layer and the fascia have been united, the excess of skin and all traces of the hernial sac are to be removed. Sometimes a considerable ellipse of skin on each side of the incision may be removed with advantage, and the old hernial sac, which will appear as pouches and sacculi of dense tissue, is to be carefully dissected out. As these pockets sometimes extend to a considerable extent laterally under the skin, drainage may be necessary from the bottom of more than one. The drainage should be through the skin on the sides of the abdomen, away from and not through the median cutaneous incision.

In many of these cases, advantage may be taken of the two layers of fascia, one above and one below the belly of the rectus muscle. By uniting these separately a very strong cicatrix may be secured.

Where there is any tension on the suture line, it must be relieved by several interrupted sutures of silk-worm gut passed through the whole thickness of the abdominal wall, otherwise failure to get union may be anticipated.

The skin incision may then be closed in the usual way, and if deep wire or silk-worm gut sutures have been inserted they may be fastened. The first dressing should not require removal till union is complete.

Many elaborate operations have been devised for curing this condition, but the secret of rapid and successful work is to open the sac and get the hand into the peritoneal cavity as the first step in the operation. Once this is accomplished, the course of the surgeon is plain.

Too much time may be spent and too much injury may be done in

an attempt to free a section of bowel of adhesions. An intestinal resection with lateral anastomosis may be much quicker and leave the gut in better condition.

Umbilical Hernia.

This is generally a hernia through the umbilical ring, due to intra-abdominal pressure, as child-bearing, or ascites. The hernia is often composed of omentum alone or of omentum with large intestine; and as adhesions are very apt to occur, this form of protrusion is more often irreducible than reducible.

The operative technique is the same as in ventral hernia.

CHAPTER XXV.

OPERATIONS ON THE MALE GENITO-URINARY ORGANS.

Hypospadias and Epispadias.

Just as the anus and the rectal pouch are developed separately and a failure to join one another results in imperforate anus, or abnormal situation of the anal opening, so are the glans penis and spongy urethra developed separately, and failure in union results in the congenital deformities known as hypospadias or epispadias, or in simple imperforate urethra.

In both conditions the termination of the urethra is behind the junction of the glans with the spongy portion of the urethra. In epispadias the outlet is on the roof of the penis and the condition is usually associated with exstrophy of the bladder.

Hypospadias is much the more frequent deformity of the two. In it the abnormal meatus may be located anywhere on the under surface of the urethra between the scrotum and the glans, though the groove of the urethra usually extends as far forward as the glans.

The separation of the scrotum into two lateral portions, which always attends hypospadias when the opening is far back in the urethra, gives rise to the peculiar appearance of the genitalia in the male so often mistaken for true hermaphroditism. The only cases in which the sex of the individual may be really difficult or impossible to determine before puberty are those of extensive hypospadias associated with retained abdominal testicles.

Treatment.

As the penis is usually bent, twisted, or deformed in hypospadias, the first step in relieving the condition usually consists in

incising the ridge which holds the deflected glans to the corpus spongiosum. This often requires several operations at intervals, time being allowed to watch the effect of each.

After the glans has been liberated the groove on its under surface is to be closed and a proper meatus constructed by plastic operation. This is done by freshening the edges of the groove, and possibly also by incising it on its upper surface, so that room can be gained for suture of the edges over a soft rubber catheter, which is to be retained for some weeks.

Next, having secured a meatus and urethra in the glans, the remainder of the canal in the corpus spongiosum is to be formed by a flap operation.

This is done by two parallel incisions about a third of an inch apart, extending from the canal already formed in the glans backward to the abnormal opening. The skin on the sides of the penis is dissected up sufficiently to be drawn together over the canal and sutured over a soft rubber catheter, which is to be retained until healing is complete.

Finally the abnormal meatus is to be vivified and closed.

The operations described are done in four separate stages, each may have to be repeated more than once, and many months will be required.

In epispadias the operations are essentially the same, except when associated with exstrophy. Here the attention will be devoted to the main deformity and the probability of being able to form a perfect urethra is not great.

Circumcision.

The foreskin should be drawn gently forward with the fingers or with two pairs of forceps, and the glans pressed backward while the prepuce is severed with scissors just in front of the glans. No clamp to hold the prepuce during the cutting is necessary.

As soon as the parts are released the skin will retract and the mucous membrane will be found too long.

This must be slit down to the corona and trimmed off to within a quarter of an inch of its attachment all around to the frænum. If

adhesions exist between it and the glans they must be dissected loose or broken by blunt dissection.

The operation is completed by stitching the cut edge of the skin to the cut edge of the mucous membrane with fine catgut interrupted sutures, about four to the inch, and dusting the wound with aristol.

Park recommends a very neat dressing. "A rubber condom (the narrow neck of which is split to avoid constriction) is drawn over the hole. The tip of this condom is then cut off and the edges fastened to the surface of the gland with collodion, to prevent leakage of urine into the dressing."

Amputation of the Penis.

About the only indication which ever arises for amputation of the penis is the presence of epithelioma. Should there be sufficient room behind the growth (one half or three-quarters of an inch) either a circular or a flap operation may be done. In other cases the organ must be completely extirpated.

The circular amputation consists in making a skin incision completely around the organ, and then dividing the corpus spongiosum and the corpora cavernosa at different levels, the former being left enough longer than the latter so that the urethra may be stitched to the edges of the skin incision.

The flap operation is rather more elaborate, and consists in making a dorsal and lateral skin flaps down to the tunica albuginea. The skin is first made tense by traction on the prepuce so that it will retract slightly after being cut. The knife is then passed between the corpus spongiosum and the corpora cavernosa, and the former is cut across by an incision slanting forward. The corpora cavernosa are then divided on a level with the skin flaps, and dissected away from the spongiosum and urethra. The end of the urethra should be enough longer than the corpora cavernosa so that it can be turned upward and brought out through an incision in the dorsal flap.

After suturing the skin incisions, the urethra is slit open and its edges sutured to the edges of the incision in the skin flap.

Bleeding may be prevented by the use of an elastic bandage

around the base of the organ during the operation; and a soft rubber catheter should be left in the bladder for the first few days.

Extirpation of the Penis.

In cases in which the malignant disease has involved so much of the organ that amputation is no longer possible, the whole penis may be extirpated.

With the patient in the dorsal position an incision is made around the base of the penis, extending down the whole length of the scrotum.

The scrotum is next divided into its two halves by blunt dissection down to the corpus spongiosum.

The urethra is next to be cut across behind the bulb. This is best done by passing a sound down to the triangular ligament, and passing the knife between the corpora cavernosa and the corpus spongiosum with the sound for a guide. When the sound is withdrawn, the urethra is cut across and dissected out as far back as the triangular ligament.

The penis is then dissected out as far back as the attachments of the crura to the pubic arch with a knife, and the attachments to the bone are torn away, partly with the knife and partly by blunt dissection.

The edges of the skin incision are then united, the end of the urethra being stitched to the incision at about the middle of the scrotum.

A catheter should be left in the bladder.

Laceration of the Urethra.

The symptoms upon which the diagnosis of this injury must depend are:

Pain.

Bloody urine.

Retention of urine.

Extravasation.

When the laceration is in front of the triangular ligament, the extravasation will manifest itself in the perineum and scrotum.

When the laceration is behind the ligament, the extravasation may also appear in the perineum, but is also apt to invade the pelvic cellular tissue and may first appear over the symphysis.

Treatment.

Laceration with an external wound allowing the escape of urine should be sutured over a catheter. The wound may be enlarged for this purpose and the suturing done with fine catgut.

If a catheter cannot be passed into the torn proximal end, and if there is extravasation of urine into the tissues around the wound, external perineal urethrotomy should be performed.

Retrograde catheterism is then possible, and the proximal end of the urethra can be found.

The treatment, when there is no external wound, will depend upon the presence or absence of extravasation.

If a catheter can be passed and retained, or even if the water be drawn at frequent intervals, operative interference may be unnecessary. At the first sign of extravasation a free incision must be provided for the escape of urine.

When the wound is in the penilė urethra, the inability to pass a sound beyond it, or the swelling caused by the escape of urine around it, may indicate its location; and it may be converted into an open wound, and treated as such with suture.

In wounds of the deep urethra with extravasation, external perineal urethrotomy is the first desideratum, the laceration being subsequently sutured if possible.

Misplaced Testicle.

One or both testicles may be arrested anywhere in the course of their descent from the lower edge of the kidney to the internal abdominal ring; or, having reached the internal ring, may be retained within the canal or may lie in some abnormal position outside of it, never reaching their proper place in the scrotum.

The former condition is known as cryptorchidism, the latter as ectopia.

When retained in the abdomen the organ may occupy almost any position and may be freely movable. No surgical interference is necessary.

When retained in the inguinal canal, or misplaced outside of it, the organ is especially subject to frequent attacks of inflammation, is always liable to injury, and is, moreover, liable to cancerous degeneration. Such patients are in addition generally sterile when both organs are affected, although normal desire and erection may remain. The sterility is developed gradually as age advances, the organ becoming fibrous and ceasing to secrete healthy spermatozoa.

Retention may be inguinal or scrotal; displacement femoral, pubic, or perineal. In all cases the organ should be transplanted to the scrotum if possible, or else removed, to prevent injury and degeneration.

In retention within the inguinal canal, an incision is made over the external ring and downward into the scrotum.

The testicle is grasped by the fingers and freed from all attachments except the spermatic cord.

Should the vaginal pouch of peritoneum exist and communicate with the general peritoneal cavity, it should be cut across and sutured as in the radical operation for hernia.

The fibres of the cremaster will require division to allow of the descent of the testicle and prevent its reascent after being fastened below.

Having freed the organ from its attachments till it reaches easily and without tension to its natural position, it is sutured to the bottom of the scrotal incision by fine catgut passing through the tunica albuginea.

The external abdominal ring and the inguinal canal should then be closed by sutures, allowing only sufficient room for the cord and preventing both future hernia and retraction of the testicle to its abnormal position.

The wound should be aseptic and no drainage necessary. Subsequent retraction as far as the external ring is very apt to render the operation of little practical benefit.

Perineal Malposition is the most troublesome of all the varieties, especially in these days of the wheel.

The testicle should be pushed as far forward as possible without force, and an incision made between it and the scrotum while held in this position.

The fibrous attachments which prevent further descent are then to be cut and the organ sutured as before.

A long scrotal incision may be avoided by invaginating the bottom of the scrotum through a short incision in its upper part and doing the suturing while the invagination is maintained. Reduction of the invagination draws the testicle into its proper place in the scrotum.

Pubic ectopia is rare, and is treated in the same way.

Femoral ectopia is the most difficult to replace. An effort may first be made to reduce the organ to the abdominal cavity and retain it there by closure of the femoral opening, as in the operation for hernia. Failure in this, or subsequent attacks of inflammation in the organ, should lead to its removal.

Castration.

The incision should begin fully an inch below the external abdominal ring and be long enough to allow of enucleation of the testicle or tumor for which the operation is performed.

When the testicle alone is to be removed it is easily turned out of its bed; when a tumor and adhesions are present some dissection may be necessary.

The cord and its vessels may safely be ligated *en masse* and cut across sufficiently far below the ligature so that the latter will not slip. As the mucosa of the vas deferens may be septic, the stump should be cauterized with pure carbolic acid.

Should there be sinuses running from the testicle to the skin these should be excised, and the cutaneous incision, which in such cases may be elliptical and include a considerable section of the scrotum, should be closed with fine catgut.

Whether or not drainage be employed must depend upon whether the operation has been aseptic or the wound been fouled with the contents of the tumor.

Hydrocele.

There are three recognized methods of treatment:

Incision.

Excision.

Injection.

The incision should be free and the edges of the sac should be stitched to the skin to keep it open and prevent infiltration of the scrotal layers. The sac should be packed with iodoform gauze.

In excision the sac is peeled out of its bed. This can generally be done completely without evacuating its contents, and the incision may be closed immediately, with slight drainage to allow of the escape of blood. This is the only method of treatment by which a radical cure can be promised.

When injection is used the fluid may be either strong carbolic acid or tincture of iodine. Neither is reliable and both are dangerous, because the amount of inflammation excited either may not be sufficient to effect a cure or may be so great as to cause sloughing.

The main point in technique is to be sure that the carbolic acid (95 per cent.) is placed within the sac of the hydrocele, and that the cannula has not slipped out of the sac into the tissue of the scrotum.

The sac should first be emptied of its contents through a large hypodermic needle and cannula. Twenty drops of the carbolic acid, or a drachm of tincture of iodine, is a sufficient quantity, and this should be thoroughly spread around the sac with the fingers.

There will be some swelling as a result of the application, but this in a few days should subside. While it remains the patient should wear a suspensory bandage and keep comparatively quiet.

Should suppuration or sloughing occur it must be met by free incisions.

It is needless to say that all of these procedures should be done with full antiseptic details.

Varicocele.

Two operations are recognized, one subcutaneous, the other open. The former is usually done with a sharp pointed ligature-carrier, although a strong straight needle will answer every purpose.

Subcutaneous Operation.

Separate with care the vas deferens from the enlarged veins and hold the former firmly between the thumb and finger of the left hand.

Transfix the scrotum between the vas deferens and the veins from before backward with the ligature-carrier or needle, armed with stout silk, and draw the silk through the puncture and leave it.

Withdraw the ligature-carrier and transfix the scrotum again exactly as before and through the same openings, with the carrier unarmed; only passing this time on the other side of the veins. Fit the ligature into the carrier a second time and withdraw the needle.

In this way the veins to be tied will have been encircled by the ligature, which will enter and return through the same opening in the front of the scrotum.

The same procedure should be used at two points, one near the testicle and another higher up, nearer the cord, at least an inch distant from the first one.

Tie both ligatures securely and the operation is completed. Dress antiseptically, and wait till the ligatures separate and can be pulled away.

Open Method.

With an assistant holding the testicle down on the affected side so as to put the scrotum on the stretch, make a longitudinal incision about two inches long over the veins to be removed. Dissect down till the veins are exposed, and grasp the mass between the thumb and finger.

With the fingers gently separate the vas deferens from the mass of enlarged veins and tie the latter in two places about an inch and a half apart.

Cut one end of each ligature close to the knot, and tie the other ends together. In this way the cut stumps of the veins are brought into contact and the corresponding testicle is well raised. Cut the ends of knot short and close the cutaneous incision with fine gut.

Injury to the vas deferens in these operations will cause impotence on the injured side.

Ligation of the spermatic artery may cause gangrene of the testicle.

If the veins are tied only high up in the scrotum they will still fill from below, and the patient will experience but little relief.

Not all of the veins should be tied, lest atrophy of the testicle should result.

Internal Urethrotomy.

The old operations of internal urethrotomy for strictures deep in the urethra have been very nearly abandoned on account of the danger of septic infection and hemorrhage inherent in them. The most conservative operators now only use the operation upon strictures within half an inch of the meatus, and prolong the incision through the meatus itself, thus providing for free drainage. Such an operation needs no special urethrotomy, a blunt-pointed straight bistoury answering every purpose.

In strictures deeper in the penile urethra an external perineal urethrotomy should first be performed, after which the stricture tissue is freely divided with a bistoury if it can be reached, or with a urethrotome if it cannot. In this way infection of the urethral incision is prevented by the free drainage through the perineum.

External Perineal Urethrotomy.

The most frequent indications for this operation are:

Stricture of the urethra.

Drainage of the bladder.

Vesical calculus.

Dilatation of the neck of the bladder.

Retention, or extravasation of urine.

The operation is done preferably with a grooved staff in the urethra. In cases of impassable stricture, the operation, however, must be done without a guide, and becomes much more difficult and delicate.

Operation with a Staff.

The patient is placed in the dorsal position, with legs well elevated and held either in Edebohls's supports or by assistants. A sand-bag

should be placed under the back to bring the perineum well up off from the table.

The grooved staff is passed into the bladder and held up closely under the arch of the pubes by a special assistant.

A long delicate knife with thin blade is used to make an incision through the skin in the raphé of the perineum, which is carried down till the staff is reached in the membranous portion of the urethra.

The incision in the urethra should not exceed three-quarters of an inch in length. The finger follows the withdrawal of the knife and is pushed steadily along the staff till it enters the neck of the bladder.

The staff is then withdrawn and the neck of the bladder dilated with the finger to the extent thought necessary.

In old cases of spasm of the neck of the bladder, the dilatation should be thorough. In cases of stone, too much anxiety should not be felt to get a perfect specimen through the incision without crushing.

The points to be avoided in this incision are the bulb of the urethra and the rectum ; the former in front, and the latter behind, and a very pretty *tour de main* is to enter the knife in the skin at the proper point in the perineum, with the finger in the rectum as a guide, and by a single puncture, without a staff or any dissection, evacuate urine ; then enlarge the incision through the apex of the prostate and the membranous urethra as the blade is withdrawn, and introduce the finger for dilatation.

In cases where the channel, through an impassable stricture, cannot be found even by dissection, this feat may still be possible, and reverse catheterism through this incision may be made to take the place of a supra-pubic cystotomy.

External Urethrotomy without a Guide.

A staff or ordinary sound is passed down to the stricture and held in contact with it by an assistant who also draws the scrotum upward out of the way, and who should have nothing else to do.

The end of the staff is then cut down upon and exposed in the

wound, and two sutures of fine silk are introduced; one into the mucous membrane of the urethra on each side of the incision for guides and retractors.

The face of the stricture is thus exposed by laying open the urethra at a point just in front of it, and the staff may be discarded as being of no further use.

A long and careful dissection to get through the stricture may next be necessary.

The point most to be avoided is cutting through the urethra at a point opposite the first incision, and carrying the dissection upward, farther and farther away from the opening through the stricture.

There always is an opening through the stricture, and sometimes a very fine silver probe will detect it. At others, pressure upon the bladder will force out a drop of urine, which will be a sufficient indication.

Irrigation with very hot water will sometimes clear the field of operation by showing the difference between the stricture tissue and the healthy urethra in front of it.

Delicate and careful dissection will seldom fail to be successful. Nevertheless, this has occurred to good surgeons. In such cases reverse catheterization by means of a supra-pubic incision is the way out of the difficulty. A sound is thus brought down to the perineal incision from the opposite side of the stricture, and with such aid, the channel may be re-established, if in no other way, at least by resection of the entire stricture tissue.

Drainage.

A short rubber tube may be passed into the bladder and fastened with a safety-pin to the incision, a catheter may be passed from the meatus and tied in, or the operator may trust to keeping the wound open by the occasional introduction of a finger into the bladder.

On the whole, this is preferable as causing the least pain, but in cases of urethral fever or of purulent cystitis, the catheter may be necessary, simply as affording a channel for frequent medication of the bladder with some one of the remedies for this condition.

Acute Prostatitis.

This is generally the result of gonorrhœa or one of its complications, although it may result from traumatism, as with a sound, or from excessive sexual indulgence. The inflammation may be confined to the follicles or invade the entire parenchyma, in which latter case it usually proceeds to suppuration.

Symptoms.—One of the first and most pronounced symptoms of the condition is pain in the rectum and perineum. With this there is pain in the loins, rectal and vesical tenesmus, a sense of fulness in the bowel, as though some foreign substance were there, with heat and throbbing in the part. In some cases there may be complete retention of urine, with fever and constitutional disturbance.

Digital examination by the rectum shows at once the increased size of the organ, which is extremely sensitive to pressure, and projects far enough into the bowel to form an obstacle to the finger.

The inflammation may subside in the course of one or two weeks under proper local and constitutional treatment. If pus is formed it will usually evacuate itself, if left to nature, by the rectum, bladder, or perineum, although it may take an upward course into the pelvis. After spontaneous rupture there is an immediate relief of all symptoms.

Treatment.—The treatment should be rest in bed, hot fomentations over the perineum and bladder, alkalies by the mouth, and sufficient anodynes to allay the constant desire to urinate and defecate. When pus can be made out in the body of the organ by rectal examination it should at once be evacuated by incision through the perineum, and not by puncture through the rectum, after which the abscess cavity, unless very large, will usually granulate rapidly.

Periprostatic Abscess.

In this form of disease the suppuration extends from the prostate to the surrounding cellular tissue, and may involve any part of the pelvic connective tissue. In such cases, although the symptoms may be less intense, the possible injury to the pelvis is much greater, and the pus should be evacuated by free incision as soon as its pres-

ence is suspected, otherwise great damage may be done in the pelvis and life be endangered.

The prognosis is grave in all cases, for although early incision may prevent serious consequences, these are the cases that end in recto-vesical fistula, stricture of the urethra and rectum, and prolonged suppuration with discharge of pus by the rectum or bladder.

In these cases also every effort should be made to evacuate the pus through a median perineal incision; but when it is pointing into the rectum it should be quickly evacuated there, unless reached by the perineal route, to prevent further damage to the pelvic connective tissue, and possible rupture into the bladder.

As far as possible all sloughing tissue should be broken down with the finger and drainage established. After which the abscess cavity should be irrigated frequently with 1 to 5,000 bichloride.

Chronic Prostatitis.

This is due to the same causes as the acute process. It may be a sequel of the acute form of the disease, or may be chronic from the start. It may result from a chronic urethritis or cystitis, or from prostatic calculi, or from any cause which keeps up an habitual congestion of the parts. It is not to be confounded with enlargement or hypertrophy of the organ.

Symptoms.—These, although of the same general character as in acute cases, are less marked. There is dull pain in the rectum and over the bladder; a sense of fulness in the rectum and perineum; pain in the glans penis, back, and sacrum, and inability to sit with comfort because of pressure on the perineum.

In addition to this there is disturbance of the sexual function. Desire may be lost, or ejaculation may be premature, and on this account the patient is often hypochondriacal.

The examination of the organ by the rectum will reveal its enlarged and sensitive condition.

Treatment consists in removal of the cause if it can be discovered, as in gonorrhœa, stricture of the urethra, or sexual excess. In addition to this the use of large cold sounds and the stripping of the

organ with the finger will give great relief. Counter irritation by blistering the perineum is valuable.

The disease is often associated with hemorrhoids, and the removal of these may effect a cure. More frequently the disease is mistaken for some affection of the rectum, and the treatment is devoted entirely to the wrong channel.

Enlargement or Hypertrophy of the Prostate.

These terms, although generally used to express the same condition, are not synonymous.

The enlargement is always diffuse; the hypertrophy always localized.

It is probable that the diffuse enlargement is, at least in most cases, the result of a previous chronic inflammation. The localized

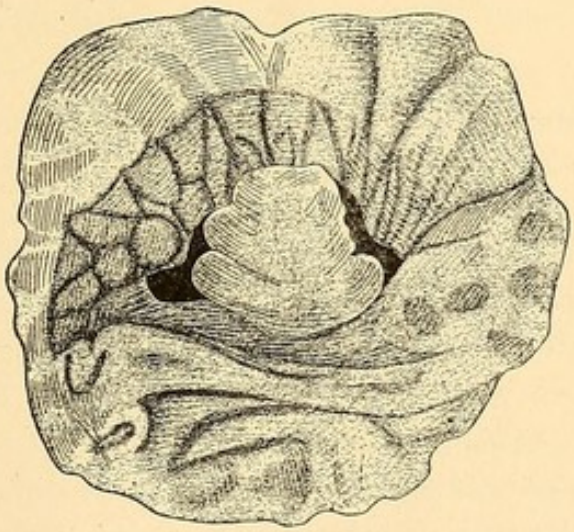


FIG. 265.
Hypertrophy of Prostate.

hypertrophies may result from the diffuse enlargement or may partake of the character of distinct tumors.

The disease is a very gradual one, and its seriousness is due solely to its interference with urination, thus causing retention, cystitis, dilatation of the bladder and ureters, suppurative disease of the pelvis of the kidney, degeneration of the wall of the bladder; and finally septic poisoning.

Symptoms.—These are first an increased frequency in micturition, especially at night, with feeble expulsive power, and difficulty in starting the stream. To these are sooner or later added those due to catarrh of the bladder, and finally those due to retention of urine.

The diagnosis is made by rectal examination for increased, painless enlargement of the organ, and by the use of the catheter to detect residual urine. The differential diagnosis will lie between cancer tuberculosis, and vesical or prostatic calculus.

Treatment is directed either to relieving the retention and the chronic cystitis, and preventing septic poisoning, or to the radical cure of the disease by supra-pubic cystotomy, perineal urethrotomy with prolonged drainage, prostatectomy, or castration.

Operation is always indicated when the patient cannot endure catheter-life, when it is impossible for him to pass the catheter himself and wash out the bladder, and when cystitis is threatened or actually exists.

Prostatectomy.

Exactly the same method is employed as described under supra-pubic cystotomy up to the point where the bladder has been opened.

The operator then, after feeling for the prostate and localizing the hypertrophies to be removed, introduces a strong pair of scissors and divides the organ in the median line or over the hypertrophy, and rapidly enucleates the mass or masses with his finger.

Bleeding may be considerable, but may usually be checked with very hot water. Perineal urethrotomy should next be performed for safety and drainage, and should the bleeding be sufficient to demand it, the bladder may then be packed with gauze. Drainage should be established through both wounds with large rubber tubes.

Castration for Hypertrophied Prostate.

Castration for enlarged prostate will reduce the size of the organ and may greatly relieve the symptoms, although in some cases its effect seems to be entirely negative, as in one of my own cases, in which the organ was removed six weeks after the operation (death being due to another cause), and the most careful microscopic examination failed

to detect any signs of atrophy or degeneration. Ligation of the vasa deferentia in the cases which have been reported seems to do as well, and is a less serious operation, besides having a much less depressing mental effect upon the patient.

Cancer of the Prostate.

Primary cancer of the prostate is rare. More usually the disease is secondary to cancer of the rectum or bladder, and due to direct extension, or to metastasis. It occurs chiefly in young children and old men.

The diagnosis is to be made by examination of the enlarged and stony organ through the rectum, by the pain, the cachexia, and the enlarged lymphatics in the groin and Scarpa's triangle.

The treatment is the same as that for enlargement of the prostate. Extirpation, although it may be successful as far as the immediate result is concerned, holds out little hope of any lengthened relief from the disease.

Removal of the Seminal Vesicles.

Chronic inflammation of the seminal vesicles is a condition so rebellious to treatment and so serious for the patient, that the surgeon is often driven to adopt any treatment, however radical, which holds out a prospect of relief.

Symptoms.

These are often very obscure and chronic, and the patient will often have been under treatment for years for rectal, bladder, or urethral disease. They consist briefly in :

Pain.

Tenderness.

Functional disturbance.

Neuroses.

Urethral discharge.

Pain is both local and reflex. It is persistent, and subject to ex-

acerbations due to defecation, urination, or sexual excitement. It may be referred to the rectum, the neck of the bladder, glans penis, pubes, or to the loins, scrotum, and thighs. The tenderness is best appreciated by local examination with the finger in the rectum, although deep pressure in the perineum or over the pubes will easily elicit it.

Sexual disturbance may be of every kind. Desire may be morbidly increased, but in chronic cases is apt to be almost entirely absent.

The neuroses are also of almost every possible kind. The patients are generally subject to great mental depression and wander from one surgeon to another, willing to submit to any operation and begging for relief. They will consume hours in describing uneasy and painful sensations in every part of the pelvis and adjacent parts. With this there is loss of flesh, strength, appetite, and sleep.

Urethral discharges may or may not be present, and are rather a symptom of the acute than the chronic form of the disease.

Diagnosis.

This is made only by rectal touch and by discovering with the finger a tender, hard mass behind the prostate in the location of the vesicles.

The operation is difficult, has seldom been performed, and yet seems to hold out the only prospect of relief in old cases. Fuller has done it twice, Weir once, Gay once for primary cancer of the vesicle, and the author twice, in this country, and there are a few other cases. In one of my own cases I was fortunate enough to come down upon a nest of calculi, varying in size from the head of a pin to a small pea, and this man was greatly relieved.

Before operating, a sound should be tied into the bladder for a guide. This will be of the greatest assistance—greater than distending the bladder with fluid.

I have operated both by a transverse incision across the perineum, between the rectum and urethra, and by a median posterior incision, and much prefer the latter, or some extension of it.

The perineal incision is very deep, necessarily funnel-shaped, and

closed at the bottom by the prostate, behind which are the vesicles still to be reached.

Van Dittel's incision, as shown in Fig. 266, has great advantages in giving room, and is the one to be preferred. The ordinary Kraske, no matter how long above, does not give the same access to the parts as when supplemented by a curved incision around one side of the anus, which allows the anus as well as the rectal pouch to be turned to the opposite side and held out of the way. The removal

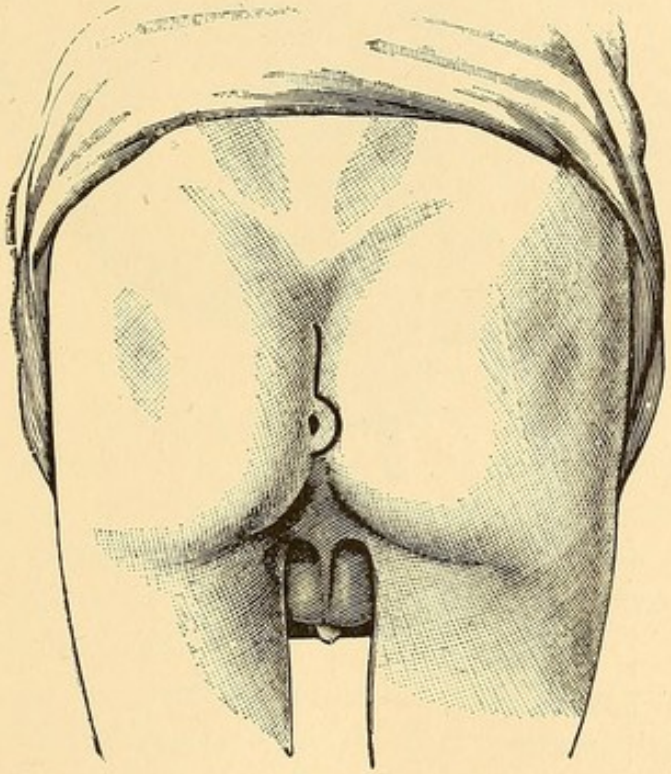


FIG. 266.

Van Dittel's Incision for Removal of the Seminal Vesicles.

of the last sacral vertebra, together with the coccyx, will usually give sufficient room above. The levator-ani on one side should be freely divided and the operator is down upon the prostate.

The difficulties of the operation really begin when the search for the vesicles is commenced in the bottom of this incision. They must not be expected to show as they do in anatomical drawings, but in any case in which their removal is indicated, they will generally be so concealed in a mass of inflammatory deposit as to be scarcely recognizable.

It is this plastic deposit at which the operator must work, tearing it away with the finger or sharp curette, and removing it in pieces with the forceps, till finally the vesicles are liberated and scraped out.

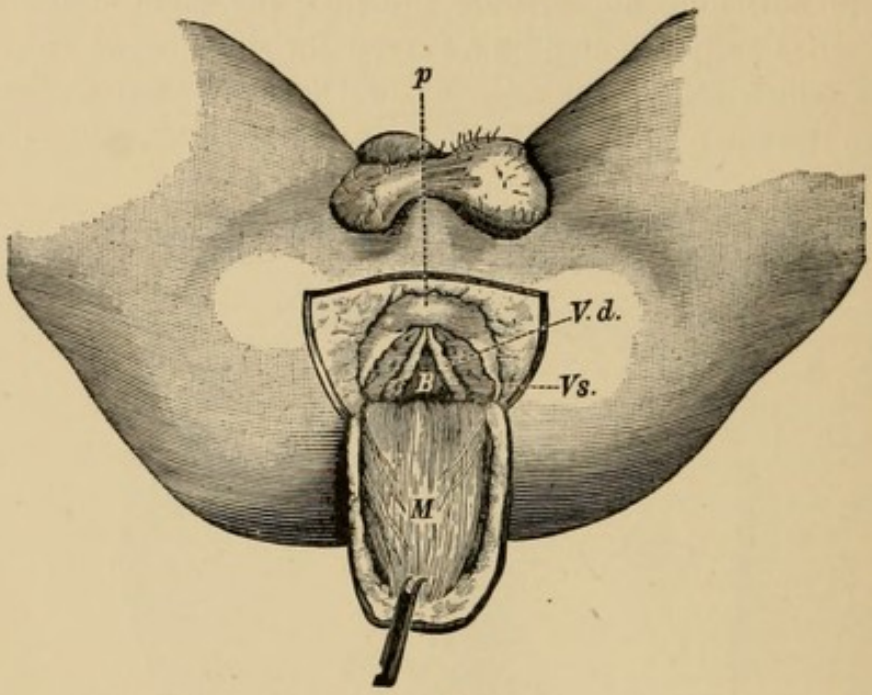


FIG. 267.

Zuckerkandl's Incision for Removal of Seminal Vesicles.

P., prostate.
V. d., vas deferens.
V. S., seminal vesicle.
B., bladder.
M., rectum.

The peritoneum should not be opened, and if opened should be sutured. Wound of the bladder calls for free drainage of the incision.

Operation through the Rectum.

Belfield has removed the seminal vesicles in two cases by the rectum. In one of these cases he also found and removed two small calculi.

The patient is laid upon the affected side, the sphincters stretched, and the rectum cleansed and plugged high up with iodoform gauze.

With retractors the rectum is held open and a longitudinal incision, half an inch long, is made over the lower end of the distended vesicle. The vesicle is then drawn through this incision with an aneurism needle and incised or excised as may seem necessary.

The operation is named by him, spermato-cystotomy. (Park.)

Rupture of the Bladder.

This may be due to external violence, or internal pressure from distention, but much more frequently from the former than the latter.

That the bladder may occasionally rupture from retention of urine, due to stricture of the urethra, is a fact not very infrequently illustrated in our hospitals. Death may, however, occur from congestion of the kidneys, due to pressure in such a case, before the bladder-wall gives way.

Rupture from external violence in civil practice is most frequently caused by severe falls which result in fracture of the pelvis, or severe contusions of the abdomen occurring when the bladder is full. When the bladder is empty it is so well shielded by the pelvic bones as to be safe from any ordinary contusion, although not safe from wounds due to fracture of the pelvis.

In military service, gun-shot and bayonet-wounds of the bladder are not at all infrequent.

Ruptures of the bladder divide themselves very naturally into intra-peritoneal and extra-peritoneal, and the symptoms and physical signs of the two varieties differ very markedly.

Symptoms.

The history is of great importance. In rupture from over-distention caused by stricture, this will be that of long-continued difficulty in passing water, and finally of total inability to urinate, and also of entire loss of desire to do so.

In other cases there will be the history of a fall or injury. Frequent and painful micturition may be complained of, with the passage of only a few drops of bloody urine, and catheterization will reveal

an empty bladder. There may be an external wound through which the urine escapes.

In cases of extra-peritoneal rupture, the signs of urinary infiltration will soon show themselves, and a boggy, œdematous reddish swelling will appear either above the symphysis, or in the perineum, or scrotum.

In intra-peritoneal rupture there may be no local symptoms, but a condition of collapse with empty bladder.

In any doubtful case the bladder should at once be tested by injecting a saline solution through a catheter. If the bladder distends and the well-known pear-shaped tumor appears over the symphysis there is no rupture. If a measured quantity is injected and only a part of it can be withdrawn, the diagnosis is clear.

In rare cases there may be rupture without escape of urine. The rent may be valvular, preventing the sudden egress of any large amount of urine, or it may be plugged by a loop of intestine which it grasps firmly ; or the rupture may be sub-peritoneal and only partial, in which case extravasation may be very slow, and all symptoms be masked for several days.

Treatment.

This depends entirely upon whether the rupture be intra- or extra-peritoneal, and in any doubtful case an exploratory supra-pubic incision should be made to decide this point. When the space of Retzius has been opened by the ordinary incision for supra-pubic cystotomy, most extra-peritoneal ruptures will be apparent by the urinary infiltration ; although there exists a class of cases in which extra-peritoneal rupture has occurred behind the prostate, and in which the infiltration, though extensive, may be deep in the pelvis.

Should the rupture prove to be intra-peritoneal the abdominal cavity is opened by continuing the same incision upward.

When the rent in the bladder-wall is found, its treatment must in a measure depend upon its character. Should it be clean-cut and without much laceration it should be carefully closed by interrupted sutures of fine black silk. These should be in one layer, including the peritoneal and muscular coats, and should be so carefully applied that no leakage is possible.

On the other hand, should the edges of the rent be ragged and torn, so that perfect coaptation is difficult or impossible without trimming them away to a considerable extent, suture may be abandoned, the abdomen well flushed with sterilized water, and the wound in the abdominal wall drained.

In any case, whether the wound has or has not been sutured, perineal urethrotomy and drainage will add greatly to the safety of the patient.

When the rupture is found to be extra-peritoneal it may be either sutured, or drained, or stitched to the abdominal incision, depending upon its character and extent. Suture will be found difficult as the bladder tends to conceal itself behind the symphysis.

Here also perineal drainage may be of great value, and the supra-pubic skin incision should be drained and not sutured, even though the bladder wound may have been closed.

Extravasated urine may require special treatment, and this is only by free incisions to relieve all tension. A very long incision when the scrotum is infiltrated with urine and enlarged to the size of a child's head looks very much smaller the next day. The object of the incisions being to allow of free escape of urine from the cellular tissue, and prevent sloughing by relieving tension, they should also be multiple.

Vesical Calculus.

Stone may be removed from the bladder by supra-pubic incision, by perineal incision, or by a combined crushing and washing operation known as litholapaxy.

Into the relative advantages of the median, lateral, bilateral, and medio-bilateral incisions in the perineum, it is hardly worth while at the present day to enter.

The median incision seems to have all the advantages that are possessed by either of the others, and any stone which cannot be removed through it after dilatation of the neck of the bladder with the finger, without lacerating the prostate, should be crushed and removed in fragments.

The incision and technique, until the stone is reached, is the same

as in external urethrotomy with a guide. If the stone be large a blunt-pointed bistoury may be passed along the staff, and the neck of the bladder divided slightly in a downward direction to allow of easier escape of the stone.

When the stone has been felt, the forceps for seizing it may be passed along the finger as a guide till it is grasped, or the finger may be removed and the forceps passed without it. By gentle traction, combined with a side-to-side motion, a stone of considerable size may be brought through the neck of the bladder without undue violence.

In the lateral operation the superficial incision begins at the left of the raphe and extends about three inches downward and outward into the ischio-rectal fossa. The neck of the bladder and prostate also, instead of being divided in the median line, are incised through the left lobe of the prostate.

In the bilateral operation the incision is crescentic across the raphe three-fourths of an inch in front of the anus, and extends downward into the ischio-rectal fossa on each side. After the urethra is opened a double bistoury *caché* is passed into the bladder, turned so that the knives will cut downward and outward, set to the desired size, and withdrawn, making an incision into each lateral lobe of the prostate.

After removal of the stone by any of these incisions, and after careful search for a second and third stone till the operator is convinced that the bladder is empty, the bladder should be thoroughly irrigated with hot water and the incision dilated with dressing forceps to facilitate the escape of fragments. A drainage-tube of rubber may then be employed for a few days, although this can generally be dispensed with, with increase to the comfort of the patient.

If subsequent washing of the bladder be found necessary, it can be done very easily by introducing a rubber catheter into the bladder through the incision whenever necessary.

Supra-pubic cystotomy for stone differs in no way from the same operation for other conditions, and the reader is referred to the description of that operation.

Litholapaxy.

For the performance of this operation special instruments, perfected by Bigelow, are essential. They consist in a set of lithotrites for first crushing the stone, and in a powerful and very perfect evacuator for removing the fragments by suction.

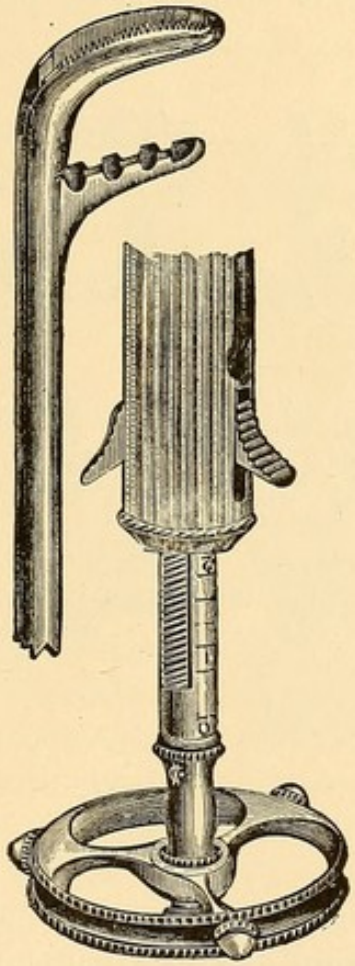


FIG. 268.
Bigelow's Lithotrite.

The lithotrite (Fig. 268) is passed as an ordinary sound would be, except that the rule to let it find its own way, after the membranous urethra has been reached, is to be strictly enforced. It is so heavy that it can be safely counted upon to do this. When the instrument is in the bladder, a certain method should be followed in trying to grasp the stone.

The blades are first pressed gently onward until the fundus of the bladder is reached, and while the female blade remains at this point, the male blade is gently withdrawn as far as the neck of the bladder and closed again to see if the stone has fallen into the grasp of the instrument, as it generally will.

If this attempt fails it should be repeated in the same way with the instrument turned first to the right and then to the left, the female blade remaining immovable at the posterior wall of the bladder, and the male being gently opened and closed. Finally the beak may be turned backward and an attempt made to grasp the stone behind the prostate.

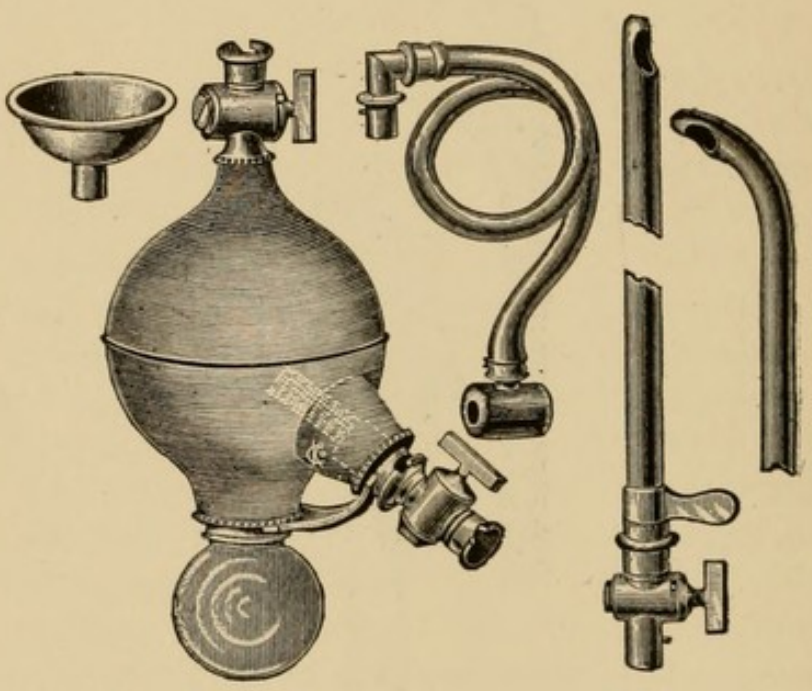


FIG. 269.
Bigelow's Evacuator.

When the stone is felt it must be secured before any attempt is made to crush it, and this is done by gently but firmly closing the instrument, and if the stone does not escape, locking it before the crushing force is applied with the screw.

The operation of crushing should be repeated as long as any fragments can be grasped, and the lithotrite is then withdrawn and an evacuating tube substituted.

The bulb, filled with warm sterilized water, is then connected with the tube and the bladder filled with fluid. After a moment's delay the pressure upon the bulb is relaxed, the water returns, carrying the fragments of stone with it, which fall into the glass receiver, and this is repeated until the water returns clear (Fig. 269).

There are several contra-indications to Bigelow's operation.

In old cases of stone, attended by severe chronic cystitis, no provision is made for drainage of the bladder.

A stricture of the urethra may prevent the passage of the instruments.

The stone may be so encysted as to be beyond the reach of the lithotrite.

The stone may be known to have a nucleus which, on account of its softness, cannot be crushed, as, for example, a broken end of a catheter, and which will remain in spite of the operation to form a new calculus.

Enlargement of the prostate may render section of the bladder absolutely necessary.

In all such cases, except the latter, a combined operation of external urethrotomy with lithotrity, if found necessary to remove the stone, is to be recommended. Reginald Harrison has experimented with crushing forceps, which are powerful enough for all purposes, and his instruments and evacuating tubes require no more room than the index finger. His conclusions in favor of the operation are:

"It enables the operator to crush and evacuate large stones in a short space of time.

"It is attended with a very small risk of life as compared with other operations where any cutting is done, such as lateral or suprapubic lithotomy, and is well adapted to old and feeble subjects.

"It permits the operator to wash out the bladder and any pouches connected with it more effectually than by the urethra, as the route is shorter and the evacuating catheters employed of much larger calibre.

"The surgeon can usually ascertain, either by exploration with the finger or the introduction of forceps into the bladder, that the viscus is cleared of all débris.

"It enables the surgeon to deal with certain forms of prostatic

outgrowth complicated with atony of the bladder in such a way as to secure not only the removal of the stone, but the restoration of the function of micturition.

"By the subsequent introduction and temporary retention of a soft rubber drainage-tube, states of cystitis due to the retention of urine in pouches and depressions in the bladder wall are either entirely cured or are permanently improved. To lock up unhealthy ammoniacal urine in a bladder that cannot properly empty itself after a lithotrity is to court the formation or recurrence of a phosphatic stone. Hence it is well suited to some cases of recurrent calculus.

"It is well adapted for some cases of stone in the bladder, complicated with stricture of the deep urethra, as it enables the surgeon to deal with both at the same time. Nor does it expose the patient to the risk which may be attendant where lithotrity is performed with a weakened or permanently damaged urethra."

Supra-pubic Cystotomy.

The bladder, in its undistended state, lies well behind the pubes and cannot be reached from above without cutting through the peritoneum. When, however, the organ is moderately distended it rises above the symphysis, carrying the peritoneum with it and an incision through the abdominal wall may easily reach its upper portion without opening the peritoneum.

The prevesical space of Retzius is shown in Fig. 270, and before the operation this must be increased as much as possible by injecting the bladder.

A soft catheter is therefore passed whenever possible, and after the urine is drawn the bladder is distended with saline solution till it can be distinctly marked out by percussion above the symphysis.

A good syringe for this purpose is shown in Fig. 271.

Another method of raising the bladder is by distending the rectum. Both methods are not necessary, but in any case in which, owing to the presence of a stricture, a catheter cannot be passed for injection, the bladder should be raised by this means. A soft rubber bag, known as a rectal colpeurynter, is passed empty into the rectal

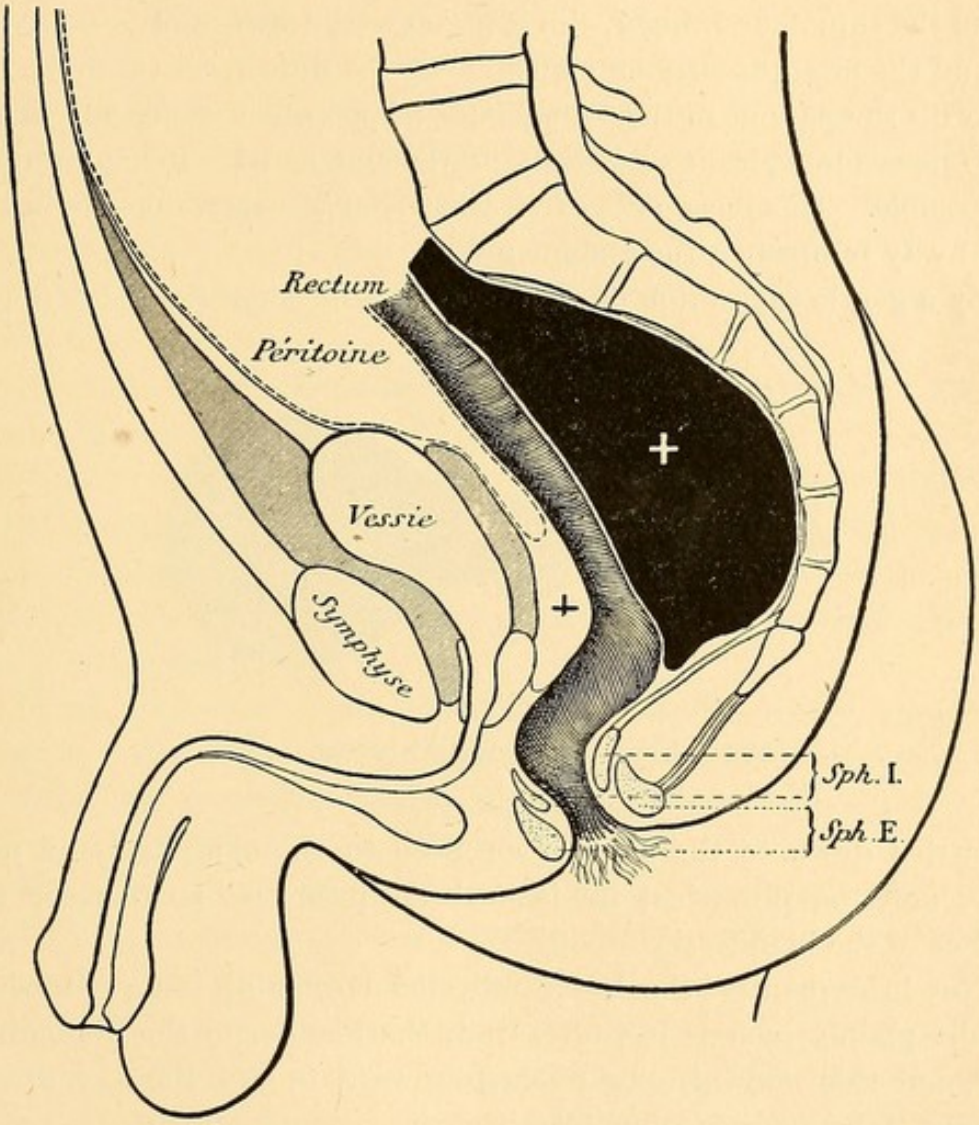


FIG. 270.

Section of Pelvis.

Space of Retzius, shaded in front.
† Post-rectal Connective Tissue.

pouch above the sphincter, and then distended by injecting water. Twelve ounces of water in the rectum and the same amount in the bladder mark the limit of safety.

When the bladder has been filled the penis is grasped tightly between the thumb and finger, the catheter withdrawn and a tape tied around the organ tightly enough to keep the fluid from escaping.

With the patient in the Trendelenberg posture, a median incision, three inches long, is made with its lower end as near the symphysis as possible. This incision is carried between the recti muscles in the usual way in opening the abdomen.

By a gentle separation of the lips of the incision, the index finger

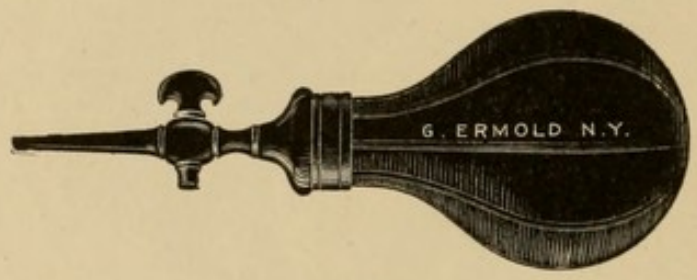


FIG. 271.
Syringe for Injecting the Bladder.

is carried down to the bladder as close to the symphysis as possible, and the prevesical fat is pushed upward so as to clear the surface of the bladder.

Not infrequently the lower reflected border of the peritoneum can be plainly seen as it passes from the bladder to the abdominal wall, and this may also be pushed upward out of the way of the incision to be made into the bladder.

With a medium-sized Hagedorn needle, two loops of catgut are next carried through the wall of the bladder, one on each side of the point at which the incision is to be made, and intrusted to an assistant to hold the cut edges of the incision after the bladder has been opened. It is well to select for the incision a part which is not crossed by any large vein. A straight bistoury is next passed into the bladder between the two guiding loops and the incision enlarged to the extent of an inch.

The operation may be done in two stages, as recommended by Senn.

In any case of old cystitis there is liability, if the operation is performed as described above, of setting up an inflammation of the prevesical pelvic tissue from the escape of foul urine. This will not only prevent healing but may reach an extent dangerous to life.

To avoid this complication, Senn proposes, after the site of the incision into the bladder has been exposed, to pack the wound with iodoform gauze, cover it with an external dressing, and leave it for about five days, until the cellular plains have become closed by granulation. The incision into the bladder can then be made with cocaine.

Having opened the bladder the subsequent treatment of the wound must depend upon its condition.

Where the operation has been done for stone or tumor, and there is no cystitis, and no danger of hemorrhage, the wound may be closed by Lembert's sutures. These should be accurately applied, and it is well to test the seam by again moderately distending the organ by injection.

In all other cases the sides of the bladder incision should be stitched to the abdominal fascia with a few sutures to close as far as possible the prevesical space, and prevent not only the slipping away of the organ, but the infiltration of urine.

The most efficient drainage can be secured by a large rubber tube stitched by a safety-pin to the margin of the wound. The tube is removed when the urine becomes clear.

In cases of profuse hemorrhage, as in operations for the removal of tumors, or of pieces of hypertrophied prostate, where hot irrigation fails to check the bleeding, the whole bladder may be safely packed for a time with sterilized (not iodoform) gauze; and a perineal section may with advantage sometimes be added to the supra-pubic incision for drainage.

Irrigation of the Bladder.

The instruments necessary are a soft-rubber catheter and the syringe shown in Fig. 271.

When performed by the patient himself the fountain syringe, with two-way stopcock, shown in Fig. 272, will be more convenient and safer.

The temperature of the fluid as it enters the bladder should be that of the body. When the fountain syringe is used it should be slightly warmer, to allow for cooling. When the bladder is full the stop-cock is turned and the fluid evacuated. The irrigation should be repeated till the returned fluid is clear.

The great danger of this simple surgical procedure is the setting up of a cystitis which may be extremely serious.

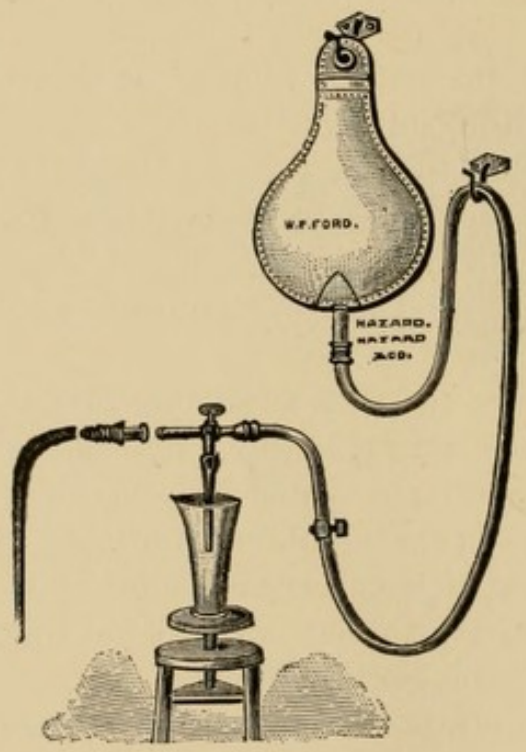


Fig. 272.

Apparatus for Irrigating the Bladder.

To avoid this the most careful antisepsis should constantly be practised. The catheter should be boiled before using, and should be kept in a solution of bichloride, 1 to 2,500, when not in use.

The syringe and all tubing, no matter what form of instrument is used, should be sterilized by boiling each time they are used.

Sterilized olive oil should be used as a lubricant.

The meatus and glans should be washed in 1 to 2,500 bichloride

before the catheter is inserted; and as it is slowly carried onward into the bladder a steady stream of 1 to 5,000 bichloride should be kept up to flush the urethra.

Every surgeon has his own preference for solutions to be used in washing out the bladder. Perhaps nothing is better, in case cystitis does not already exist, as in cases of commencing catheterism for prostatic enlargement, than simple saline solution, a tablespoonful to the quart. When cystitis actually exists, there are many formulæ which have been found serviceable in overcoming it. Nitrate of silver, 1 to 1,000, and bichloride of mercury, 1 to 10,000, to be followed by simple saline, are both favorites. A solution of salicylic acid is easily prepared, and is very efficient. The formu'a is:

Salicylic acid	grs. viii.
Alcohol	℥ i.

One ounce of this solution added to a pint of hot water gives a solution of one-half a grain to the ounce, which is ready for use.

Thiersch's solution is:

Salicylic acid	ʒ ss.
Pulv. boric acid	ʒ iii. ss.
Hot water	1 quart.

This may be used in full strength or, as is more usual in mild cases, diluted one-half.

If astringents are preferred, acetate of lead (half a grain to the ounce), sulphate of zinc (one grain to the ounce), and nitrate of silver (grains 1 to 10 to the ounce), are all reliable and not too strong to be safe.

Genito-Urinary Tuberculosis.

Tubercular inflection of the prostate and bladder is generally associated with the same process in the epididymis or kidney, or both, and is perhaps usually derived from some distant organ, as the lungs or cervical glands. As in all infections of the genito-urinary organs the soil must first be prepared for the bacillus, and this is usually done by a pre-existing cystitis.

Direct inoculation from one tubercular patient to another in coition is only a supposition lacking evidence. Direct inoculation from the kidney to the bladder is more than probable.

The symptoms are those of a chronic cystitis associated with tumor in the epididymis, prostate, or kidney.

The diagnosis may for a long time be doubtful unless the swellings appear or the bacillus be examined for in the urine.

Pain is usually an early symptom, and may be very constant and severe. Pus in the urine is a result of the cystitis, and is a late rather than an early symptom. Ulceration shows itself by an increase in intensity of all the symptoms and occasionally by hemorrhage. The ulceration may go on to destruction of the neck of the bladder and incontinence of urine.

Treatment.

The only surgical treatment possible in tuberculosis of the prostate or bladder is supra-pubic cystotomy for the relief of symptoms. All other treatment is purely general.

In tuberculosis of the epididymis or of the kidney, however, before the bladder or prostate show any signs of infection, the propriety of castration and nephrectomy on the side affected should be seriously considered. It is possible that either an ascending or a descending infection may be prevented by this means.

Exstrophy of the Bladder.

Congenital absence of the anterior abdominal wall and anterior wall of the bladder is generally associated with separation of the pubic bones at the symphysis, and with epispadias involving the deep urethra.

Although the condition is not absolutely incompatible with considerable length of life, the condition of the patient is very miserable. The posterior wall of the bladder, which bulges into the gap left in the abdominal wall, becomes excoriated, the urine becomes ammoniacal, and no urinal or apparatus has as yet been found which will prevent constant escape of urine.

The cure is only by some sort of plastic operation, and every surgeon may exercise his ingenuity in this regard. Many have been reported, some in their different stages, extending over many years, but the most that has ever been accomplished is to force the urine out of some one small abnormal opening, so that it could be collected by a urinal instead of leaking all over the parts.

Wood's operation, which is the simplest of the many which have been practised, also gives the best results. By it, three flaps are made, one from above, and one from each side, and turned down and over to cover the gap.

The upper flap is oblong and made of the skin of the abdomen as far up as the umbilicus. It is left attached by a broad base at the upper margin of the deformity and turned over without twisting, so that the skin surface furnishes an anterior wall for the bladder. A raw surface is prepared at the pubes for its attachment, and to this it is sutured.

The raw surface of this flap is next covered by two lateral skin-flaps, one from each inguinal region, which are twisted on their attached border and brought together in the median line, skin surface upwards. The raw surfaces left by dissecting up the flaps are closed as far as possible by sutures.

Persistent Urachus.

A congenital urinary fistula at the umbilicus means an unclosed urachus.

The condition is generally curable by perineal cystotomy in the male or dilatation of the urethra in the female to prevent the bladder becoming filled. Combined with these, cauterization of the umbilical opening should be tried.

In case of failure of these methods, the abdomen may be opened and the vesical entrance to the urachus closed by sutures after being freshened.

Nephrorrhaphy.

The indication for fixation of the kidney by sutures is not alone its mobility, but the fact that its mobility is a cause of symptoms.

It is unquestionable that a kidney may be freely movable without causing the least disturbance, intestinal, nervous, or otherwise, to the bearer.

On the other hand, intense pain may be caused by obstruction of the ureter from malposition of the kidney, and more common symptoms are obscure paroxysmal pain in the lumbar region, dyspepsia, intestinal catarrh, dilatation of the stomach, and neuroses of various kinds.

The incision for nephrorrhaphy is shown in Fig. 273.

Usually an incision from the last rib to the crest of the ileum will be enough for a skilful operator, but should it be necessary, this may easily and safely be prolonged to any required degree by extending it along the crest of the ileum, as shown by the dotted line.

The patient should lie on the abdomen, or with the affected side slightly raised from the table, with a hard sand-bag or a rubber cushion under the loin to bring the site of the incision as prominently into view as possible.

The cushion must be small enough to lie between the thorax and the pelvis, so that the patient is sharply bent over it and the pressure it exerts is directly upon the soft parts. By this means, the kidney to be operated upon is most completely forced upward to the skin incision.

The incision should begin at the lower border of the last rib, just outside of the tip of the transverse process of the first lumbar vertebra, and extend downward and slightly outward to the crest of the ileum. In this way it will reach the outer border of the erector-spinæ muscle, which is the point desired.

The full length of the skin incision must be maintained as the deep muscles are divided, and the incision must be carried vertically downward till the kidney is reached, for if it be shortened as the depth increases, it will be too short to work in when the kidney is reached; and if it be bevelled outward the peritoneum will be opened.

When the fatty capsule has been reached, and the kidney exposed, it should be gently brought outside of the body through this incision.

At this point, perhaps, the experience of the operator will be most manifest, for a very large kidney may be brought outside

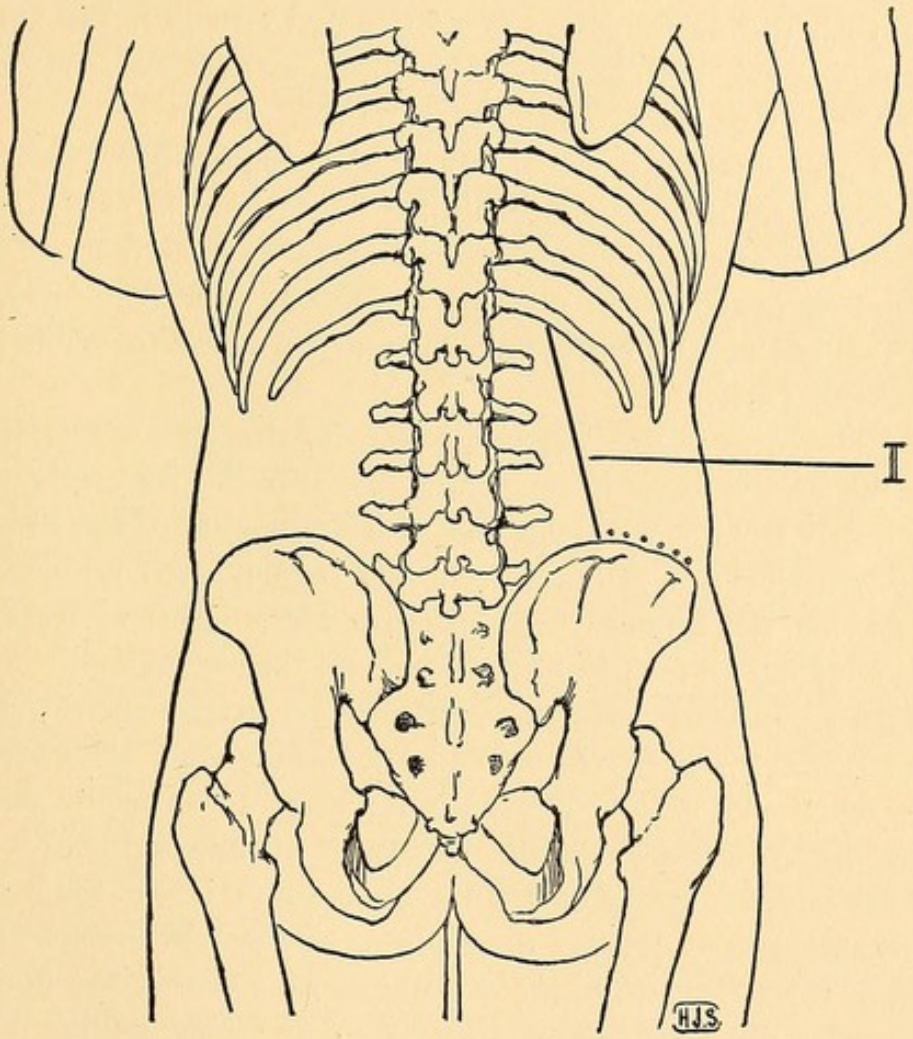


FIG. 273.

Incision for Nephrorrhaphy.

the body through this incision without laceration or rupture by gentle traction, and in cases of nephrorrhaphy it will very rarely be necessary to extend the incision along the crest of the ileum. Should, however, the organ prove to be much enlarged or distended with pus, it is better to lengthen the incision than rupture it.

The kidney should be separated from its fatty capsule by dissection with the finger before any attempt to bring it through the incision is made, and it should be tilted so that one end is first delivered and then the other.

With the organ grasped firmly in the fingers, great assistance may be given by making traction upon the feet of the patient, while the shoulders are held immovable. In this way the incision is decidedly lengthened. The greatest assistance of all, however, will come from having the incision reach from rib above to pelvis below in its deeper parts.

After bringing the kidney out of the incision, the next step is to incise the fibrous capsule longitudinally over the convexity of the organ nearly from end to end, and with the handle of the knife dissect it free from the kidney tissue and turn it back for nearly an inch, leaving the kidney tissue exposed for a space at least three inches long and an inch and a half wide on the convexity.

Three suspensory sutures of chromicized catgut should next be passed through the kidney at equal distances from each other, in order, when the kidney has been replaced, to bring its denuded surface up into contact with the muscles of the loin and hold it there.

These sutures are passed completely through the kidney from side to side, and to prevent their tearing out should include the two layers of the reflected fibrous capsule on each side of the dorsal incision. The reflected capsule thus acts in giving additional support to the suspensory sutures, and is, in addition, pinned back so that it cannot prevent the contact of the denuded kidney tissue with the muscles, and thus prevent union of the two. (Edebohls.)

When the three suspensory sutures have been passed and the ends secured with six forceps, which are dropped out of the way on each side, the kidney is replaced by an inverse process to that used in bringing it out of the body, and the wound is closed.

First the superfluous fat of the fatty capsule should be removed

so that it may not prevent union of the incision, and of the kidney to the incision.

Next the three suspensory sutures are to be brought through the muscular lips of the incision on each side by threading each end to a needle, which passes through the muscular tissue from within toward the skin.

These sutures are to remain buried after the skin wound is closed, and after the ends have thus been passed through the muscle on each side of the incision, they are again marked by forceps and dropped out of the way.

Next close the muscular layers of the incision with catgut, after having inserted a silk-worm gut drain between the raw surface of the kidney and the muscles.

Then tie the suspensory sutures, making gentle traction upon each to see that the kidney is brought firmly against the muscles, but taking care not to use sufficient force to tear out the sutures.

Finally close the skin incision, and dress the wound with gauze after pressing out all air and fluids. The drain may be removed at the first change in the dressings at the end of three or four days.

Should the peritoneum be opened by accident in this operation it should be sutured. A wound of the pleura will be marked by the sound of the rush of air, and by the immediate effect upon the respiration, and this also should, at once, be sutured. Rupture of the kidney need not occur to a skilful operator.

A wound of the pleura is said to have been immediately fatal, but in the only case in which I have seen it occur the effect was rather surprisingly slight.

Albumen and blood in slight quantities will usually be noticeable in the urine for a few days after the operation.

Nephrotomy.

With the kidney exposed and drawn out of the body, as described, its exploration becomes easy.

Incision into the kidney substance is usually done to facilitate the exploration for calculus, and the incision may be made either on one side of the organ near the pelvis, or on the convex border, or

through the pelvis proper. The incision should be large enough to admit the index finger to the pelvis.

Both metal sound and finger may be used for exploration of the pelvis and mouth of the ureter, but both with gentleness, as the pelvis may easily be punctured with a sound.

When a stone is found it is to be gently withdrawn with dressing forceps, and the incision, if in the pelvis, may be sutured. If in the cortex it should be left to close without suturing. The hemorrhage will generally cease spontaneously when the kidney is replaced in its bed. A urinary fistula will, however, remain when the incision has been made in the kidney substance until the wound has closed, and on this account the external wound must be drained and left open.

Such a fistula may be permanent, and in the end call for extirpation of the organ.

Renal Calculus.

The diagnosis of renal calculus is by no means always an easy matter. It is usually made from the attacks of pain, and the presence of blood and pus in the urine, and anything which causes severe pain in the region of one kidney is liable to be mistaken for stone.

Perhaps the most frequent cause of error will be found in pyelitis arising from any other cause than the presence of a calculus. The symptoms will be pain, with pus, and perhaps blood, in the urine—exactly those of calculus.

Neuralgia of the kidney may exist without physical changes in the organ, and the paroxysmal pain may strongly resemble that of stone ; but the urine will be clear unless there be cystitis.

Pain, with slight cystitis, and without enlargement of the kidney, form a most perplexing combination, and if the pain be severe enough so that the patient demands it, they justify an exploratory incision through the loin.

Another condition justifying exploration for stone is malignant disease of the organ. The symptoms may be indistinguishable from those of calculus, and the same may be said of tuberculosis of the kidney.

White calls attention to the point in differential diagnosis that

the bleeding in calculus is seldom severe; in malignant disease it is apt to be much more severe; while in tuberculosis there is likely to be much more pus than blood.

In exploring for stone it should not be forgotten that a calculus may exist in the kidney substance which cannot be reached by exploration of the pelvis. The whole substance of the kidney when out of the body in this operation should therefore be carefully palpated for any point of increased hardness.

Should the condition of the corresponding ureter be suspected, it has been suggested that it may be injected from the pelvis with some colored fluid, or with milk, and the bladder then catheterized to test its permeability.

Nephrectomy.

The most frequent indications for the removal of a kidney are:

Tumor.

Movable kidney which cannot be held by nephrorrhaphy.

Urinary fistula.

Wounds of the kidney.

Wounds of the ureter.

Pyelitis.

Pyelonephritis.

Hydronephrosis.

Perinephritic abscess.

Before removing one kidney the presence and condition of the other must be determined.

This may be done by catheterization of the opposite ureter as described under the surgery of the ureter; but very few men are able to accomplish this feat in the male subject, and generally the only way to assure one's self on this point is by direct examination with the hand in the abdomen.

Although, therefore, a very large kidney may be removed through the lumbar incision, this incision will, in most cases, be better adapted for nephrotomy and for cases of urinary fistulæ, and an anterior transperitoneal incision will be safer for extirpation in cases of tumor and suppurative disease.

This should be made either in the linea semilunaris, or over the tumor.

As soon as the condition of the opposite organ is found to justify the completion of the operation the intestines are drawn to one side and the peritoneum over the kidney to be removed is incised.

If the organ be found in the condition of a mere pus-sac, the free edge of the incision into the peritoneum of the mesocolon may be stitched to the edge of the parietal peritoneum and the general peritoneal cavity thus closed off.

In pus cases, moreover, it is justifiable to abandon the anterior exploratory incision after being satisfied with the condition of the opposite kidney, and proceed with the extirpation through a new lumbar incision.

An incision may easily be made parallel with the free margin of the ribs and well back in the loin which shall combine these two incisions. In its first part it opens the peritoneum and allows access to the other kidney. This being satisfactory, the peritoneal cavity is closed by suture, and the incision continued backward into the loin till the kidney is reached behind the peritoneum.

In ligaturing the vessels entering the pelvis of the organ, the rule is to tie the blood-vessels and the ureter separately, as far away from the kidney as possible. When room can be obtained for a double ligature and division of the ureter between the two, this should be adopted to prevent soiling the wound with urine or pus when the ureter is cut.

When the kidney has been removed by a transperitoneal incision, the cut edges of the mesocolon, if not already stitched to the parietal peritoneum, should be united by suturing, after the wound has been drained posteriorly through a puncture made in the loin.

Whether drainage should or should not be employed must, as in all other cases, depend upon whether the wound has been kept aseptic, or not.

After nephrectomy the condition of the other kidney may be a source of danger, even although it seemed to be in good condition before the operation. On this point Meyer says: "There evidently occurs an excessive hyperæmia in the remaining kidney immediately after nephrectomy. Its presence is demonstrated by the sudden

change in the transparency of the urine if the remaining kidney had already been slightly affected.

"It has been observed by many who have done several nephrotomies that in a number of cases, immediately after the one unhealthy kidney has been removed, the urine which descends from its probably only slightly affected fellow, and which has formerly been found comparatively clear with the help of cystoscopy, or after nephrotomy on the other side had been done, suddenly becomes very turbid and presents an unusually heavy deposit after short standing. As I have seen, it may take weeks or months before this turbidity lessens, or disappears. In the majority of cases it does so, however, but slowly and gradually."

His suggestions for the treatment of this condition are as follows:

"1. Before nephrectomy, cystoscopy should, if possible, be performed to prove the presence of an active opposite kidney.

"2. This will be generally unnecessary if a renal fistula exists on the diseased side, and the urine, voided *per urethram*, is clear and sufficient in quantity. But even in these cases cystoscopy will be a desirable procedure for making a more definite prognosis.

"If the cystoscope has demonstrated the presence of an active opposite kidney, and if then absolute anuria suddenly sets in some time after nephrectomy and a period of uninterrupted recovery, with the secretion of a satisfactory amount of urine, the cause must be a mechanical one. Nephrotomy on the remaining side is then indicated as the only means to save the patient's life.

"3. Immediately after nephrectomy there is, in all probability, an acute hyperæmia of the opposite kidney. This hyperæmia also frequently occurs in the female sex, especially in the left kidney, at the time of the menstrual period, but probably to a much less extent.

"4. Such hyperæmia may suddenly increase an incipient or hitherto entirely latent disease in this remaining kidney. It may even cause the perforation into the pelvis of the kidney of an abscess previously encapsulated in one of the pyramids.

"5. Such an aggravation of disease in the remaining kidney may be repeated at a number of menstruations, but is, in the majority of cases, of a passing, not of a permanent character. After such attacks the remaining kidney often shows an improved condition."

Suppurative Disease of the Kidney.

This is due to infection by one of the pyogenic bacteria or by the tubercle bacillus, and as the genito-urinary tract in a healthy state generally resists infection very successfully, such infection presupposes either traumatism or lowered vitality, which has prepared the soil for their growth.

Any injury to the kidney or a simple congestion may do this, but most frequently the injury and the infection come to it from the urethra or the bladder. Any cause which prevents the free escape of the urine from the bladder, as stricture of the urethra, enlarged prostate, or anything causing injury to the mucous membrane, as calculus or operation, prepares the way for the entrance of the pyogenic germ, which may be introduced by the surgeon's instruments, or may be transmitted through unbroken tissues, as the bacterium cœli commune from the alimentary canal.

Once having gained access to the urethra or bladder the infection may rapidly extend by direct continuity of tissue to the ureter and kidney.

Keyes has given this subject careful study and writes: "As early as 1873, Fels and Ritter, by inoculating the bladders of dogs, produced ammoniacal urine and cystitis, but only on condition of ligating the urethra. Upon loosening this ligature the bladder promptly resumed its condition of health. So Guyon, Albarran, Guirad, and many others, introducing pure cultures of micro-organisms into the healthy bladders of animals, fail to set up cystitis unless to the microbic germ there be added other factors, such as ligating the urethra to produce forced retention, or wounding the bladder.

"Certain micro-organisms have proved themselves more virulent than others, just as certain subjects are exceptionally susceptible; and Schnitzler claims that with the 'urobacillus liquefaciens septicus' he can produce cystitis without tying the urethra.

"But Guyon, Peterson, Albarran, and many others have repeatedly proved that retention, ligating the urethra, trauma—not one of these causes alone will produce cystitis, and that any one plus the proper germ will do it. Straus and Germont clearly proved that

simple ligature of the ureter, aseptically performed, does not occasion inflammation of the kidney, but produces dilatation and atrophy; while Charcot and Gombault, with equal clearness, have demonstrated that septic ligation of the ureter does produce the suppurating kidney.

"That trauma prepares a soil for microbic infection is beautifully illustrated by Albarran. He showed that the blood might be a channel of infection by inoculating one ureter and ligating it below, then finding both kidneys implicated, as being spots 'minoris resistentia'—the ligated side because of congestion and direct infection, the other on account of its hyperactivity from having had double work to do. Then Albarran injected his bacterium pyogenes directly into a blood-vessel in a number of animals, and got plenty of embolic abscesses in every instance, but found the kidneys free in all save one.

"To study the effect of injury plus germs, he therefore contused one kidney in a rabbit and injected a pure bouillon culture of bacterium pyogenes into its ear. The next day this kidney was already in commencing suppuration."

Suppurative disease of the kidney may involve only the pelvis (pyelitis), or the pelvis and the kidney substance (pyelonephritis). It may involve the substance of the organ without implication of either the pelvis or ureter, in which case there is true renal abscess, or suppurative nephritis; or it may be located in the cellular tissue around the kidney (perinephritic abscess). Hydronephrosis and pyonephrosis are in general due to an obstruction in the ureter by which the escape of fluid is prevented. The pelvis becomes distended with urine or pus, and disintegration of the renal structure follows rapidly.

It will often be impossible to differentiate between these affections without exploratory incision, and although a simple hydronephrosis may be relieved by aspiration or incision, it usually recurs, owing to the persistence of its cause, and nephrectomy is the final sole cure for all of this class of diseases.

Wounds of the Kidney.

The indications for nephrectomy in cases of wounds of the kidney are:

Severe hemorrhage.

Tumor in the region of the kidney.

Severe cystitis.

Traumatic peritonitis.

Pyonephrosis or hydronephrosis from obstruction of the ureter by blood-clot.

The hemorrhage may be constant or intermittent, may come on suddenly immediately after the injury or be delayed several days, and may reach an extent endangering life.

As a consequence of the hemorrhage, a cystitis may be established from retained blood-clots which shall threaten the integrity of the remaining kidney by direct extension of the inflammation through the ureter.

Tumor in the region of the wounded kidney may mean extravasated blood around the organ, pyonephrosis, hydronephrosis, or perinephritic abscess, and traumatic peritonitis may result from direct laceration of the peritoneum.

In the latter case, the incision should be through the abdomen to allow of cleaning out the peritoneum. In all others, the operator has the choice of anterior or posterior incision.

CHAPTER XXVI.

THE SURGERY OF THE URETERS.

The ureter passes under the peritoneum from the kidney to the bladder, having an average length of about thirteen inches.

Like all other mucous canals it varies in diameter in different parts. Its normal calibre is from three to five millimetres, but it is narrowed at the point where it enters the wall of the bladder, at a short distance below the exit from the pelvis of the kidney, and at the point of crossing the iliac artery.

In the male, the ureter crosses the vas deferens on the posterior wall of the bladder; in women it partially crosses the vagina on its anterior wall below the cervix and enters the bladder, after running nearly three-fourths of an inch in its substance, at a point midway between the meatus and the cervix a little to one side of the median line (Fig. 274).

Methods of Examination.

Cabot has pointed out a ready method of finding the ureter in its course in the abdomen, from the fact that it always adheres to the peritoneum when the latter is stripped up from the parts behind it, and that "the relation of the ureter to that part of the peritoneum which becomes adherent to the spine is, within a slight range of variation, pretty constant, the ureter lying just outside the line of adhesion; so that if the surgeon has stripped up the peritoneum and come down to the point where it refuses to strip readily from the spinal column, he will find the ureter upon the stripped-up peritoneum at a short distance outside this point."

"On the left side, the distance from the adherent point to the

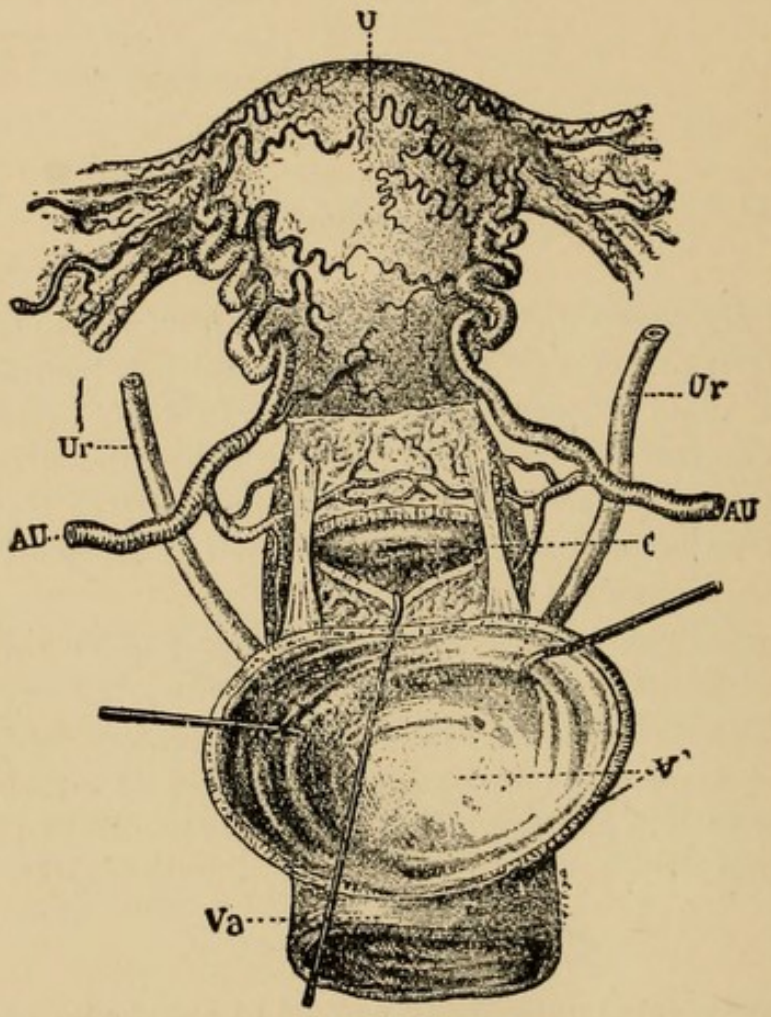


FIG. 274.

Relation of Ureters to the Cervix Uteri.

Ur, ureter.

A U, uterine artery.

C, cervix.

V, bladder laid open.

Va, vagina laid open above to show cervix.

ureter is from half an inch to an inch, while on the right side it is somewhat greater, owing to the ureter being displaced to the outside by the interposition of the vena cava between it and the spine."

The ureter in the female may be palpated in its lower part by the finger either in the vagina or rectum. From the trigone of the bladder to the side of the pelvis it can be felt as a distinct cord by passing the examining finger downward and inward over the anterior wall of the vagina. It may be followed under the broad ligament as far as the brim of the pelvis by the finger in the rectum.

The position of the intra-vesical portions can also be seen from the vagina by depressing the posterior wall and expanding the anterior. Their position is marked by divergent folds starting just back of the neck of the bladder and passing backward and laterally toward the cervix.

For examination by palpation Kelly gives the following directions: "The finger is passed into the vagina behind the internal orifice of the urethra, at the end of the rugose promontory on the anterior vaginal wall, and carried with some exertion upward toward the brim of the pelvis, displacing the vaginal wall upward and outward until the pulp of the finger reaches the highest point it can touch, often as high as the brim, but varying according to the greater or less laxity of the tissues and their fixation by pelvic pathological processes. It is then carried downward, stroking the pelvic wall, carefully estimating the character of the structures felt rolling under it.

"As soon as the observer thinks he has felt a ureter, he catches the cord again with the hooked finger and pulls it down a little, and then slides the finger first toward the bladder, where the ureter is felt to lose itself in the trigone, and then backward, where it loses itself sweeping around the cervix. I have found that in a certain number of cases the ureter can be felt most distinctly in this position just in advance of the cervix, by placing the patient on her left or right side, when the vagina balloons out and applies itself closely to that side of the pelvic wall which lies undermost. Here the ureter can, by a slight effort displacing the vaginal vault upward, be hooked and brought down under the finger, felt with the utmost distinctness, and compressed."

The ureter in either sex can be distinctly felt as it passes down over the brim of the pelvis just to the side of the promontory of the sacrum. It is slightly sensitive to firm pressure, and on this account is not infrequently, on the right side, mistaken for the appendix.

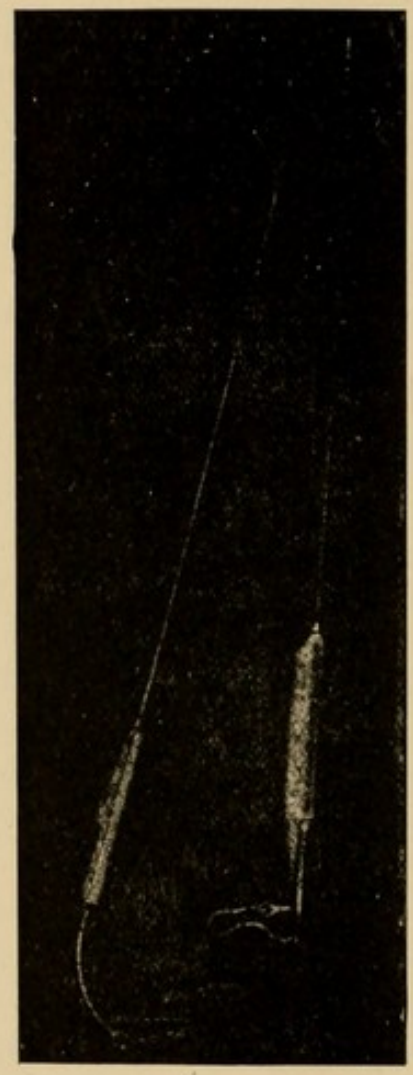


FIG. 275.

Kelly's Ureteral Catheters.

The upper four inches of the ureter may be reached and explored extraperitoneally by the lumbar incision for nephrectomy shown in Fig. 273, and by prolonging this incision the ureter may be traced down to the point where it crosses the pelvic brim. This is the method of choice for surgical exploration. When the peritoneum is

reached it should be stripped up without being opened, and the ureter will be found adherent to its underside.

Israel's line of incision for reaching the abdominal portion of the ureter "starts at a point on the anterior edge of the sacro-lumbar

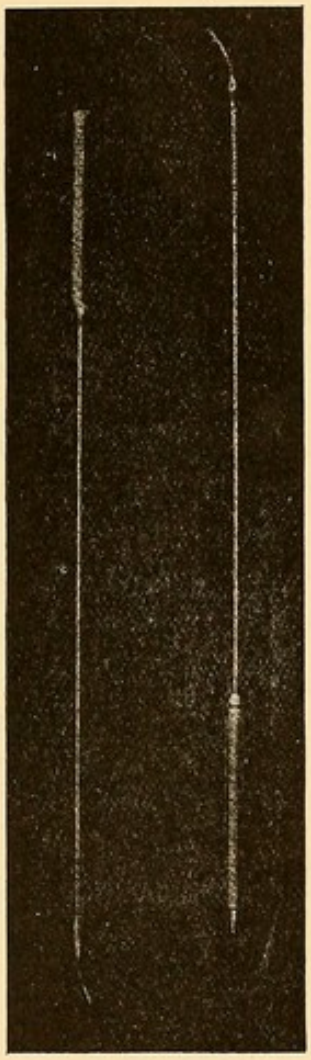


FIG. 276.

Kelly's Ureteral Sounds.

mass of muscles a finger's length below the fifth rib, is carried parallel to the rib as far as its tip, then turns down toward the middle of Poupart's ligament till the line of the usual incision for tying the iliac artery is reached, then again turns toward the middle line, and ends on the external border of the rectus muscle."

Catheterization of the Ureters in the Female.

This may be done by the sense of touch alone, or by direct vision. The former is, or was, Pawlik's method, and the latter Kelly's. The instruments used are shown in Figs. 275 and 276, and are a modification of Pawlik's by Kelly.

The orifice of the ureter is normally about an inch from the neck of the bladder and from half to three-fourths of an inch from the median line on each side. This point must be felt for with the end of the catheter, the movements of which within the bladder can be seen on the anterior wall of the vagina, with the patient in the dorsal position and a speculum introduced to hold back the posterior wall. When once engaged, the instrument readily follows the course of the ureter.

Kelly's method is much more certain, having, as he does, the entrance to the ureter directly in the field of vision. The patient is placed in the same position and the speculum introduced, the pelvis being well elevated. The urethra is next dilated sufficiently to admit a cylindrical speculum, twelve to fifteen millimetres in diameter.

The interior of the bladder is next illuminated with a forehead-mirror and electric light, and the speculum turned toward the anatomical point of the entrance of either ureter. It is marked by a slight depression, and by a darker color of the mucous membrane. The probes shown in Fig. 276 may be used for sounding for stone in the ureter, and the catheters for collecting the urine.

On the left side in Fig. 277 the sound is shown in the pelvis of the kidney; on the right still in the ureter. Both project from the meatus.

For collecting the urine from each kidney separately, to tell which one is diseased, Kelly uses the method shown in Fig. 278.

The catheter in the right ureter should have some distinguishing mark, to avoid errors as the urine is collected. As the urine is collected in the two glasses, any difference in quantity or quality becomes manifest. One side may be clear and abundant, the other bloody, purulent, and scant. The catheters are 2, 2¼, and 2½ mm. in diameter, and 30 ctm. in length, constructed of woven silk, coated with many layers of shellac, and with a highly polished outer sur-

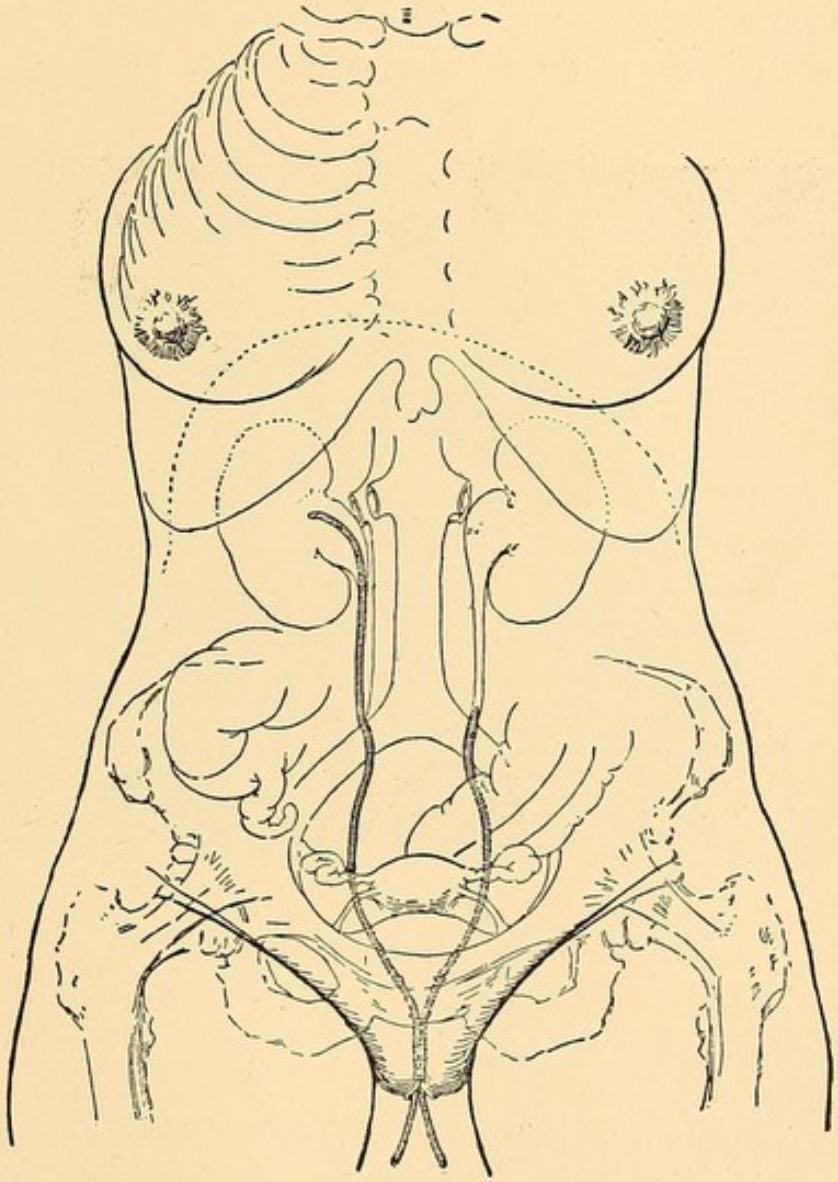


FIG. 277.

Sounding the Pelvis of the Kidney.

face. The end is blunt and conical, and has a large oval eye, 2 ctm. from the end. As they are very flexible, they are stiffened with a wire stylet.

Not only is the presence of pus in one or both kidneys thus made out with certainty, but the amount of urea in the urine which does not contain pus shows the working efficiency of the other kidney,

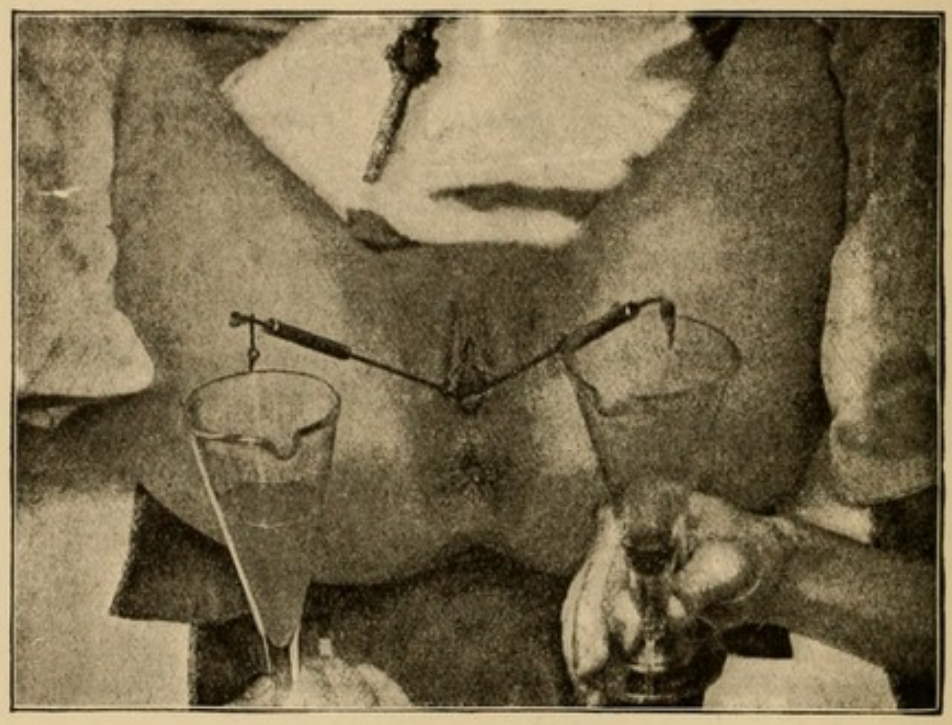


Fig. 278.

Catheterization of both Ureters.

and indicates something of the risk incurred in a removal of the diseased organ.

The possibility of treating pyelitis through the ureter has been demonstrated by Kelly.* The case was one of gonorrhœa of the ureter and pelvis of the kidney, with stricture of the ureter at its vesical end. There was an extensive collection of pus in the ureter, extending up into the pelvis of the kidney.

The stricture was first dilated with his catheters up to 5 mm., the purulent fluid evacuated, and the pelvis of the kidney irrigated with

* Bulletin of the Johns Hopkins Hospital, February, 1895.

medicated solutions. The purulent character of the secretion and all traces of gonococci disappeared. He believes that this case proves:

That stricture of the ureter can be diagnosticated by the cystoscope, and the use of his urethral bougies without cutting into the bladder.

That stricture of the ureter is capable of dilatation by the same methods.

That a stricture which has been dilated daily for weeks up to 5 mm. will still hold back the urine if the walls above have lost their muscular contractility.

That pyo-ureter and hydro-ureter can be diagnosticated by drawing off in a few minutes a larger quantity of fluid than would generally be secreted in the same length of time.

That pyo-ureter and pyelitis can be cured by irrigation in the manner described in his case.

In the diagnosis of renal calculi Kelly has, however, in one case, reached the point of absolute certainty.*

For the purpose of this examination he uses renal catheters and renal bougies. "The renal catheters vary in diameter from $1\frac{3}{4}$ to $2\frac{1}{2}$ mm., and are 50 ctm. (20 in.) long. In all other respects they are like the ureteral catheters already spoken of. The catheter is used in the following way: The ureteral orifice is exposed and the catheter introduced, say No. 2 or $2\frac{1}{4}$, and pushed gradually on upward until resistance to further advance is felt. In general about from 13 to 17 ctm. (6 to 7 in.) of the catheter is left projecting from the urethra. Then taking an air-tight syringe with a tapering metallic point, and connecting it by means of a piece of fine rubber tubing with the end of the catheter, strong suction is exercised. If there is any pus present, this is often brought at once down into the syringe, and begins to flow long before it would naturally without suction. The suction is continued until the renal pelvis is emptied, and the fluid obtained is placed in a conical graduate for careful examination."

In three cases he has been able to diagnosticate the presence of renal calculi by discovering in this fluid a minute, dark-brownish or

* Medical News, November 30, 1885.

blackish sediment, consisting of little pieces of material about a half-millimeter or less in diameter. On placing these under the microscope and testing them they were found to be composed of uric acid. Their appearance on the surface was mammillated, looking like an aggregation of little masses of rounded stone. On pressing them with a



FIG. 279.

Stone Caught in eye of Catheter in the Pelvis of the Kidney.

needle-point they were found to be quite coherent, each separate particle bending and breaking under pressure.

Instead of a catheter he proposes the use of bougies coated with dental wax, the surface of which will scratch upon contact with any calculous matter in the pelvis of the kidney.

Should immediate exploration of the ureters be necessary in any



FIG. 280.

Same Stone Magnified Eighteen Times, showing Broken Surface.

case and the surgeon have not sufficient skill in this method of examination to succeed with it, their orifices in the trigone of the bladder may always be exposed by an incision through the anterior wall of the vagina. Through such an incision they can be plainly seen and sounded or catheterized, and the incision may be closed when the examination is finished without harm.

Catheterism in the Male.

The following description is taken from Meyer : *

"1. The shank of the cystoscope carries a straight groove, which can be transformed into a canal with the help of a movable lid (Li.) with a handle (H). It is to receive the ureter catheter (U. C.). The outer end of this canal (O. E.) projects over a semi-circular hard-rubber plate (Pl.), which forms a convenient handle, and being situated about an inch and a half away from the ocular end of the telescope (O.), can easily be reached by the operator's hands. The vesical end, about six millimeters in front of the prism (Pr.), is worked out in such a way that the ureter catheter, emerging into the bladder, when pushed from the outside, forms with the shank of the cystoscope an angle of forty-five degrees. By this means we are enabled to enter the ureteral orifice with great ease, as the vesical end of the ureter and the fundus of the bladder form an angle of about the same size. But the angle of forty-five degrees between the catheter and shank is produced only if the lid be pushed in as tightly as possible. The canal is situated on the concave side of the cystoscope, the one which carries prism and lamp (La.). This is a very wise arrangement and decidedly distinguishes Casper's cystoscope from Brenner's and Boisseau du Rocher's. Both the latter carry the straight tube on the convex side, and, having no prism, force the cystoscopist to inspect the ureteral opening through a simple straight telescope. In order to do this the handle naturally has to be raised until it is almost vertical. For obvious reasons the result thus generally was very unsatisfactory. But in let-

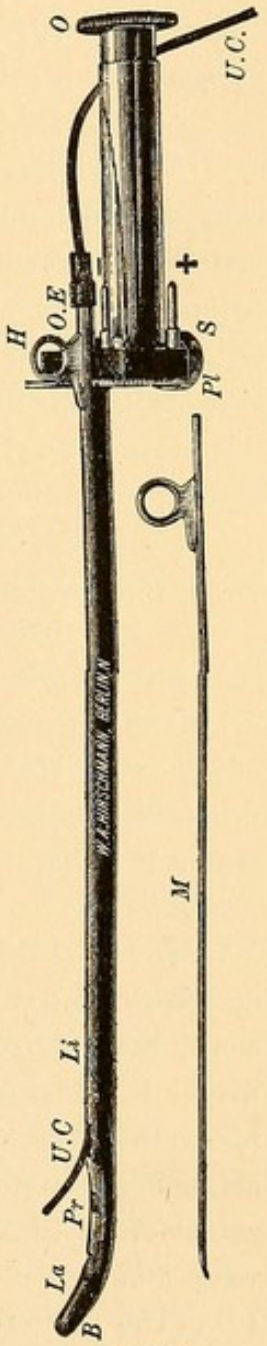


FIG. 281.
Casper's Ureter Cystoscope.

* New York Medical Journal, March 21, 1896.

ting the catheter pass out right in front of the prism, its tip, somewhat magnified, always remains under the control of our eyes, and we handle the instrument just as we always use Nitze's cystoscope for the inspection of the fundus of the bladder.

"2. The lamp is situated behind the prism in the longitudinal axis of the instrument—Lohnstein's modification (see figure). The other cystoscopes carry the lamp in the tip of the beak. Lohnstein alleges for his modification the following special advantages over Nitze's original instrument:

"(*a*) Foreign bodies in the bladder, larger stones, and tumors, that often have the tendency to fill out the concavity of the beak of Nitze's cystoscope, and will then not be seen on account of not being illuminated, can be nicely observed.

"(*b*) Tumors situated at the side and above the internal urethral orifice will not escape the inspecting eye. These will generally not come into view by performing cystoscopy with Nitze's instrument No. 1.

"(*c*) Beaks of different shape and length can be made and screwed on the instrument.

"3. The beak of the instrument (B.) is made in one piece with that portion which carries the lamp.

"The arrangements as described under Nos. 2 and 3 permit of shaping the beak according to necessity (hypertrophy of the prostate, etc.). Patients will thus more rarely experience the slight burning sensation if the tip of the beak should touch the fundus.

"4. If the lid that covers the canal be pulled out, a straight metal mandrel (M.) can be inserted into the groove. By doing this the small catheter which had been pushed through the canal into the ureter is lifted out of the groove and thus liberated. Now the cystoscope can be withdrawn, while the catheter remains *in situ*. The latter is an English web catheter of No. 4 French gauge. It is sixty centimetres (twenty-three inches and a half) long. A long, thin wire mandrel obstructs its lumen up to about two inches from its tip. The catheter is flexible, yet has sufficient stiffness to enter the vesicle end of the ureters, and to pass upward to the pelvis of the kidney if gently pushed from the outside.

"5. The ocular lens of the telescope is not in the same axis as the other lenses. It is moved to a place two centimetres below the canal described above under No. 1. This is done to enable the cystoscopist to handle the lid of the canal and the steel mandrel with convenience and ease, and to push forward the ureter catheter or its substitutes in a straight line. The picture is reflected to the ocular lens with the help of a double prism. The view of the interior of the bladder is nevertheless just as brilliant and satisfactory as when it is seen through the other cystoscopes.

"The shape of the shank is oval, not round; its size, No. 24 French gauge. It passes a urethra of this dimension without difficulty. The electric current is conveyed to the instrument by slipping a double perforated semi-circular hard-rubber plate over the two projecting wires, which are fastened on the hard-rubber handle of the instrument (+ and —). A screw (S.) makes and breaks the current.

"The directions for using the instrument given by Meyer are as follows:

"1. Wash and cocainize the bladder according to well-known rules.

"2. Fill the bladder with from five to seven ounces of clear fluid. It is necessary to inject a little more than the usual average amount for a cystoscopic examination—viz., five ounces—because there is some continuous leakage alongside the ureter catheter. Of course the latter cannot fit in the canal as snugly as a mandrel does; it has to remain freely movable. Consequently there must be leakage, as the intravesical pressure is greater than the atmospheric. The fluid in the bladder is therefore slowly ebbing away. By placing the patient in Trendelenburg's posture of about twenty-five degrees during the examination, we can reduce this leakage a good deal; also by slipping over the external entrance to the canal a short rubber tube of very small calibre, just large enough to permit of moving the ureter catheter. Until the ureteral openings have been found this tube should be well pressed against the catheter. A simple sling of a thread will also suffice. On the other hand, it is not wise to fill the bladder with too much fluid. Six ounces should be the average amount. A beginner may probably do well, in order to save time

and to succeed, first to use the ordinary cystoscope for ascertaining the situation of the mouth of the ureters and then to introduce the ureter cystoscope.

"3. Push the ureter catheter down to the internal opening of the canal, the lid of the latter being well in place; introduce the instrument.

"4. As soon as the interior of the bladder has been satisfactorily inspected and the ureteral openings have come into view, approach one of them. A trained cystoscopist knows how to do this. He slightly raises the handle of the instrument and carries it over to the opposite side of the patient, at the same time pushing it in a little or pulling it out until the orifice is in the focus. By bringing the prism as near to it as possible, we greatly magnify the tiny hole, and can observe, in a beautifully clear manner, how the catheter becomes engaged in the opening, and, if pushed from outside, passes on and on.

"I have found it practicable to pull out the lid a little, say a quarter of an inch, before pushing the catheter out of the canal into the bladder. Its rather delicate tip is thus better preserved, and not roughened by the borders of the narrow hole.

"The lid must then *at once* be pushed back into place. As mentioned above, this is absolutely necessary in order to let the catheter emerge at an angle of forty-five degrees. If this rule is not adhered to the catheter will not enter the ureter, no matter how we may turn or push or pull the cystoscope.

"5. Catheterism of the ureter having been successful, the wire mandrel is withdrawn from the catheter. Urine generally at once begins to flow, drop by drop, at intervals. I should strongly advise always to withdraw the mandrel as soon as the catheter has entered the lower end of the ureter for about one to two inches: this to find out, as long as the cystoscope is in the bladder, whether the lumen of the catheter is not obstructed. As soon as the urine flows, one glance through the instrument will tell us whether the catheter is in its proper place. If we push the catheter farther up toward the pelvis of the kidney and lift it out of the canal, pull out the cystoscope and *then* withdraw the mandrel, our entire procedure may prove to be a failure."

As in the case of women, so in men the ureters may be catheterized

through a supra-pubic incision into the bladder, and the risks of such instrumentation will not be great when the operation is performed with care.

Wounds and Lacerations of the Ureter.

Direct injury to the ureter alone by external violence is so rare an occurrence that its clinical history has never been written with any completeness. Several cases of extra-peritoneal puncture and laceration have been reported, however, and the rules for treatment are fairly well determined.

The diagnosis can usually only be made by the escape of urine from the ureter into the cellular tissue and the formation of a tumor. This may require a number of days.

Incision into such a tumor might allow of suture of the ureter, but it would probably be found in such a condition as to militate against such an attempt, and the operative interference would end by the establishment of a urinary fistula in the loin, with suture of the ureter to the skin, if possible; or in extirpation of the kidney were the opposite one in sound condition.

When the loss of substance in the ureter is too great to admit of closure of the wound, the end should be implanted in the skin incision, or into the bladder. Implantation into the bowel leads naturally to suppurative disease of the kidney by infection. Implantation into the skin may be found such an annoyance that subsequent nephrectomy will be preferred after the condition of the opposite kidney has been determined, and the existence of the urinary fistula renders this easy.

Injury to the Ureters in Pelvic Operations.

Some of the most brilliant work of the present day is being done in the repair of these by no means uncommon injuries, which were formerly supposed to be relievable only by extirpation of the kidney. The operations are long and difficult, the secondary ones much more so than the primary, and therefore if an injury to the ureter is discovered at the time it is made it should be remedied at once.

Van Hook's operation consists in ligating the lower end, making a longitudinal incision below the ligature and implanting the upper end laterally as in a lateral implantation of the intestine, fastening the parts with fine silk sutures. Longitudinal tears are sutured with fine silk.

When the injury has been so extensive that suturing is impossible the lower end should be tied and the upper transplanted into the bladder through a slight incision and sutured there. A long pair of delicate forceps passed into the bladder through the urethra may be serviceable in holding the ureter within the incision in the bladder wall while the suturing is being done.

Secondary operations are the same as the primary ones, but much more difficult from the fact that the ureter may be lost in pelvic adhesions and cicatrices from which it must be dissected out before suturing is possible.

When no communication can be established with the bladder the best disposition to be made is to suture the end of the ureter to the abdominal incision.

Ureteritis.

The diagnosis of an inflammation of the ureter rests upon localized pain, enlargement and hardening of the organ as shown on palpation, frequent micturition, and pus in the urine. Although the condition may be amenable to local treatment by Kelly's method, when it reaches the point of causing hydronephrosis the usual treatment has been the establishment of a urinary fistula from the pelvis of the affected kidney.

Ureteral Stricture.

This may be due either to exudation caused by ureteritis, to traumatism, the pressure of a pelvic tumor, or to calculus. It may be diagnosticated by the use of the bougies or catheters already described, and the collection of a considerable quantity of urine more rapidly than it is naturally secreted as soon as the catheter has passed the stricture; or by the hydronephrosis which results. The cases

due to thickening or slight traumatism may be curable by gradual dilatation.

The diagnosis of the exact point at which the stricture is located will be impossible, except by catheterization, without exploratory incision. The preferable incision for this purpose is the lumbar one, as by it the pelvis of the kidney is exposed and catheterization may be practised from above downward. The normal ureter will admit a bougie of number 9 to 12 French.

The treatment consists in:

Dilatation.

Incision and Suture.

Resection.

Dilatation may be from below by Kelly's instruments (the preferable method) or from above at the time of exploration.

The operation by incision and suture is the same as that practised in stricture of the pylorus, the incision being longitudinal and the suturing transverse.

When the stricture is located near the pelvis of the kidney, as proved by the sound, the part may be resected and the end of the ureter transplanted to the pelvis. This has been successfully done.

When the obstruction is found farther away from the kidney, the ureter should be opened and probed both upward and downward to test its permeability in other parts, and suture or implantation practised after the stricture has been excised.

When the obstruction is near the bladder and dilatation ineffectual, it may be excised by a transperitoneal incision and the ureter transplanted into the bladder-wall, as is the usual procedure, then the ureter is injured in pelvic operations.

Ureteral Calculus.

The favorite sites of impaction for ureteral calculus are either near the pelvis of the kidney or near the vesical opening. When in the latter position, it can be removed either through the urethra after dilatation, or by an incision into the bladder through the vagina. When it is located near the kidney, the usual incision for

reaching that organ is preferable, as by it the ureter can easily be followed for a considerable distance.

If a stone be impacted in the upper part of the ureter it can generally be felt through this incision. If it be impacted in the pelvic portion, it cannot, as a rule, be reached through an extra-peritoneal incision, unless it be through the vagina and bladder.

When the stone is located, it should be removed by longitudinal incision and the ureter closed by a Lembert suture, as is so often done in calculi in the hepatic ducts. Suturing is more necessary by an intra-peritoneal incision than in the extra-peritoneal operation. In the latter case the urinary fistula which remains will generally close spontaneously.

CHAPTER XXVII.

APPENDICITIS.

THE intelligent surgical treatment of appendicitis consists much more in knowing when to operate than in opening the abdomen ; and to know this implies a knowledge of the pathology and symptomatology of the disease in its various forms and stages.

The question of operation is easily solved if one believes with Morris, that "the best surgical operations for prompt removal of an infected appendix are now less to be dreaded than a mild attack of appendicitis." And this may be true. Certainly the man who operates in every case, as soon as a diagnosis is made, will save more lives than he who postpones his operations too long. But neither the medical nor surgical world is as yet ready to accept this easy solution of the question when to operate, and for the present we must be guided in our surgical interference by the character and degree of appendicitis, and not by the bare fact that some form of appendicitis exists.

In every case of appendicitis there is a combined morbid process, consisting first of a catarrhal inflammation of the mucous membrane and second of a bacterial invasion. The septic germ most commonly found is the bacterium cœli communis, which is always present in the alimentary canal, but which seems powerless to set up a septic process in the canal itself without the previous existence of some lesion which forms a bed for its attack and culture.

Leaving out of consideration the cases of appendicitis which may be due to typhoid fever, syphilis, tuberculosis, and actinomycosis, each of which may result in perforation of the appendix with peri-

tonitis and septic poisoning, the cause of the primary catarrhal inflammation may be difficult and even impossible to detect. The fact that the appendix is a rudimentary and very poorly nourished organ may have influence; as may also the fact that its mesentery is very short and liable by being twisted to interfere with the slight nourishment it normally receives.

There is also little doubt but that any catarrhal inflammation originating in the caput coli, as from the presence of scybala, may be propagated to the appendix by direct continuity of tissue.

Traumatism from violent exertion, excess in eating, and exposure to cold have each been called upon to account for its proportion of cases.

More definitely, however, we have as active and palpable causes the presence of fecal concretions which have found their way into the appendix, and, being unable to escape, have increased in size till their pressure caused the necessary traumatism; the presence of foreign bodies; mechanical obstruction or entire obliteration of the lumen of the organ by bending or adhesions; and smallness of the cæcal orifice preventing the escape of secretions.

Clinically, however, the most active of all causes is the occurrence of a previous attack.

In acute cases the original catarrhal inflammation plus the bacterial invasion causes ulceration of the mucous, submucous, and adenoid layers of the appendix up to, or through, the peritoneal coat. When the process is arrested at the peritoneal covering the latter will show the signs of slight inflammation—roughening, and slight adhesions, sufficient to attach it to anything with which it may be in contact, but generally easily broken down. Such a process is capable of resolution, or may result in the chronic form of the disease.

When, on the other hand, the peritoneum is invaded in the original process, there will result either a localized surrounding inflammation, or perforation with septic peritoneal infection, or fecal extravasation.

The size and location of the perforation will vary with the exciting cause of the process and its intensity. The rapidity and amount of the extravasation will depend upon the site of the perforation, its extent, and the size of the lumen of the appendix. The entire organ

with its mesentery may be gangrenous, and may separate close to the cæcal attachment. Even the cæcum itself may be involved.

In chronic cases of infection without perforation of the peritoneal layer the appendix becomes thickened, hard, erect, and friable. It is increased in size so that it may usually be detected by abdominal palpation. In some cases old and very dense adhesions may exist between it and neighboring organs. Cicatricial stenosis may also occur at one or more points, and may involve the entire lumen, causing the club-shaped and cystic appendices occasionally seen.

Clinically, the surgeon is called upon to distinguish between four different forms or stages of the disease by the symptomatology. These are :

Acute appendicitis without perforation.

Chronic (recurrent) appendicitis.

Acute appendicitis with perforation and localized peritonitis.

Acute appendicitis with extravasation and general septic peritonitis.

If this diagnosis could always be made the questions when not to operate and when to operate would be easily answered in any special case.

Symptoms.

All symptoms may be so light as to be unrecognized until the peritoneum is attacked and a localized or general peritonitis manifests itself. This is not, however, the usual course.

Generally the first symptoms will be pain, vomiting, tenderness on pressure over the appendix, rigidity of the muscular wall, and fever. In non-perforating cases these symptoms will gradually subside without the formation of tumor.

In perforating cases the signs of peritonitis will follow those of inflammation of the appendix, and these will vary according to the degree and character of the peritonitis.

When the peritonitis is localized, and there is a formation of pus, tumor will appear on the third or fourth day in the iliac fossa if the pus is near the surface, otherwise no tumor may be distinguishable, or it may only be found by rectal examination.

In general peritonitis from perforation or extravasation the pain rapidly extends from the site of the appendix over the entire abdomen, and the signs of profound septic poisoning rapidly develop. These are vomiting (perhaps with fecal odor); obstinate constipation from intestinal paralysis; albuminuria and suppression of urine; high and feeble pulse; anxious countenance; normal, slightly raised, or subnormal temperature; swollen abdomen with infiltration of the walls; and hiccough. Generally death follows in three or four days.

It will often be impossible to decide by the most careful study of the symptoms whether the morbid process has or has not involved the peritoneum, and as it is upon this factor that the question, for or against operation, rests, the difficulty is manifest. All of the symptoms which indicate perforation, such as high pulse and temperature, board-like hardness of the abdominal wall, pain, and vomiting, may be present in the non-perforative form of disease; and they may all be less marked, or some of them may be absent, after pus has already formed in the peritoneum.

Perhaps the best working guide in practice will be the general condition of the patient at the end of the first thirty-six hours after the onset of the attack. At that time a simple catarrhal appendicitis should begin to improve and the symptoms should subside. Should they not do so an operation is justified without waiting for them to become more severe.

Diagnosis.

General or localized peritonitis, even in men, is not always due to appendicitis. In women the possibility of rupture of pus tubes, or ovaries, or of an extra-uterine pregnancy, should never be lost sight of, and in men it is possible that the infectious process may have started from some other organ or some other part of the alimentary canal. In one of my own cases a cancerous perforation of the stomach with general peritonitis could not, I believe, have been distinguished from appendicitis before the incision, so board-like were the abdominal muscles and so severe the onset of the disease.

In another case the tumor formed by an ectopic pregnancy was only distinguishable from appendicitis after abdominal section.

Operative Treatment.

There are a few general principles which are of great value in deciding the question of operation.

Tumor in the neighborhood of the appendix, with the symptoms of an acute attack, always calls for immediate operation, and pus, though it may be in small quantity, will almost invariably be found when tumor is present.

Collections of pus, which cannot be felt through the abdominal wall in the neighborhood of the appendix, may sometimes be felt through the rectum or vagina and not infrequently evacuate themselves through these channels.

Great pain and tenderness over the cæcum, with muscular rigidity of the abdominal wall, are signs of peritonitis, as well as of appendicitis, and call for operation.

In doubtful cases high pulse is a more reliable indication of septic poisoning than high temperature.

Constant vomiting, with or without fecal odor, is an indication for operation.

After complete recovery without operation from a first attack, the commencement of a second attack may be awaited before operating.

When after recovery from a first attack either a swollen appendix or a tumor remains, operation should be advised, without waiting for a second attack.

In recurrent appendicitis, operation is always indicated between the attacks, and also at the beginning of every fresh attack.

Operation is called for when symptoms persist after an operation in which pus has simply been evacuated, but the appendix has not been removed. In such cases the appendix frequently acts as a source of recurrent trouble, and the rule for treatment is the same as in that of recurrent appendicitis, in which pus does not happen to have once been evacuated.

The real contra-indications to operating are that in many of the non-perforating cases operation is proved to be unnecessary by the recovery of the patient; and that when the case has progressed to the point where adhesions have walled off the septic process from the

general peritoneal cavity, it is exceedingly dangerous to break down this bearer by surgical interference.

The variety of operation differs according to the character of the case. Simple catarrhal appendicitis, whether a first attack or recurrent, requires one technique, circumscribed abscess another, and diffuse peritonitis a third.

Considering the simpler variety first, the incision should be about two inches in length and should cross a line from the anterior superior spinous process to the umbilicus at a point about an inch and a half from the bone. In this way the sheath of the rectus muscle will not be opened.

When the peritoneum has been opened one finger is introduced through the wound to search for the appendix. Should this not be adherent it may be brought out of the incision and the latter closed with a sponge. Should it be impossible to discover it a systematic search should be made by bringing the ascending colon to the incision and following the longitudinal band on its unattached border. This band leads directly to the base of the appendix.

Should the appendix be firmly adherent it may be best and indeed necessary to enlarge the opening so that the operation may be aided by sight as well as touch, for adhesions should not be broken without due caution as to both bleeding and perforation.

When the appendix has been delivered through the incision its mesentery is to be tied as in resection of any piece of gut. This may be done with one or more ligatures before cutting it loose, or the mesentery may be separated from the appendix with scissors close to the latter, and bleeding points secured as they show themselves.

The next step depends upon whether the appendix is to be ligatured and amputated, or amputated and the stump invaginated within the colon. Either course may be followed, as the operator chooses.

In the former case a circular flap of peritoneum should be dissected down after an incision has been made around the appendix about one-third of an inch from the colon. When the peritoneum has been dissected downward for about a quarter of an inch the appendix should be ligatured with fine strong catgut and cut away, the stump being treated with pure carbolic acid. The flap of peri-

toneum is then drawn up over the stump and sutured with three or four Lembert sutures of fine silk.

When the stump of the appendix is to be invaginated it should be amputated within half an inch of its attachment, every precaution being taken to protect the general peritoneum. Holding the colon firmly between the thumb and finger of the left hand, the edge of the stump is seized with dissecting forceps and turned into the lumen of the appendix. This is not generally difficult after a little experience, but should it be found so, the forceps may be inserted into the lumen of the stump and carried as far as the insertion of the appendix, and gentle dilatation practised. After one or two trials the stump may be invaginated and the cæcum closed over it by three or four Lembert sutures.

Dawbarn's method is the same, except that he surrounds the base of the appendix with a purse-string suture in the caput coli before inverting the stump. After inversion as above a tightening of the purse-string accomplishes the same end as the Lembert sutures.

The advantage of invagination consists in the absence of any sloughing stump left in the general peritoneal cavity, which may form painful and dangerous adhesions to adjacent coils of intestine.

The ligation of the stump without inversion, or covering with a peritoneal layer, has been followed by subsequent fatal peritonitis from sloughing at the point of ligation. In such cases it is not sufficient to disinfect the end of the stump, but the calibre of the appendix should also be cauterized. Inversion is, however, the operation of choice, and is almost always practicable if the orifice of the appendix be previously dilated by the introduction of a pair of artery forceps.

This operation being aseptic, the wound is to be carefully sutured to prevent hernia, which is very liable to occur after incisions in this part of the abdomen, and no drainage is necessary. The mortality of such an operation by experienced men is not over one or two per cent., which goes to strengthen the position taken by Morris, that such an operation is less dangerous than any attack of appendicitis.

To avoid the damage to the abdominal wall, which is caused by this incision, McBurney has devised the following:

"A skin-incision about three inches long is made, beginning at a

point one inch above the line drawn from the anterior iliac spinous process to the umbilicus, passing obliquely downward, crossing that line at a point one and one-half inches internal to the spinous process, and corresponding as accurately as possible in direction to that of the fibres of the external oblique muscle and aponeurosis. The section of the external oblique should really be a separation of the fibres of this structure in a line corresponding to the skin-incision, great care being taken *not to cut any fibres across.*

"When the edges of the wounds in the external oblique are now pulled apart with retractors, a considerable expanse of the internal oblique muscle is seen, the fibres of which cross somewhat obliquely the opening formed by these retractors. With a blunt instrument, such as the handle of a knife or closed scissors, the fibres of the internal oblique and transversalis muscles can now be *separated*, without cutting more than an occasional fibre, in a line parallel with their course—that is, nearly at right angles to the incision in the external oblique aponeurosis. Blunt retractors should now be introduced into this interval and the edges separated. The fascia transversalis is thus well exposed and is then divided in the same line. Last of all the section of the peritoneum is made.

"Two sets of retractors may be in use, one holding open the superficial wound from side to side, the other separating the edges of the deeper wound from above downward. A considerable opening is thus formed, through which, in suitable cases, the caput coli can be easily handled and the appendix removed. The appendix having been taken away, the wound in the peritoneum, which is transverse, is then closed by suture ; the similar wound in the fascia transversalis is also sutured. The fibres of the internal oblique and transversalis fall together as soon as the retractors are withdrawn, and with a couple of fine catgut stitches the closure can be made more complete. The wound in the external oblique aponeurosis is sewed with catgut from end to end. When the operation is completed it will be seen that the gridiron-like arrangement of the muscular and tendinous fibres to which the abdominal wall largely owes its strength is restored almost as completely as if no operation had been done."

The incision in perforative cases should be made over the outer side of the tumor when such exists near enough to the anterior ab-

dominal wall to be felt. It may be of the same kind as last described, but should be fully three inches long in its deeper parts. Care must be taken in opening the peritoneum lest gut be injured, as all the parts are likely to be matted together. Care must also be exercised in protecting the general peritoneum from infection by the use of sponges or strips of gauze packed into the wound at the inner, upper, and lower portions.

When no pus is encountered in the breaking up of adhesions and separating the appendix, the operation is the same as in the last variety, and the stump may be treated in the same way—either tied and covered with peritoneum or inverted.

When pus is encountered in small quantity it should be wiped out with sponges, and peroxide of hydrogen injected into the cavity from which it flows with a syringe. This in turn is washed away by frequent injections of saline solution. In this way pus which is confined by adhesions may be removed and rendered harmless without breaking down the partition between it and the general peritoneum, and this is the object of the operator.

Whether or not the appendix should be removed in such cases must depend upon whether it can be found and treated without danger of general infection. It may be that this will be easy, or the organ may be so imbedded as not to be found at all without tedious dissection in the wall of the abscess. Often only the stump of the appendix remains between the colon and the gangrenous process which has divided it. The appendix should certainly be removed whenever possible to avoid the formation of a sinus, a fecal fistula, or a subsequent attack, but it is better to leave the diseased organ than to excite a general peritonitis by removing it.

In all this class of abscess cases a search should be made for concretions lying loose in the abscess cavity, lest the wound refuse to heal. Future operation to close the sinus remaining from such a cause will be both difficult and dangerous, and is to be guided by the general rules for the treatment of fecal fistula.

In this, as in all other cases, the treatment of the wound will depend upon the question of infection. Some wounds may be closed, when no pus has been encountered, all others should be drained with gauze.

It will occasionally happen that a secondary abscess will form in these cases at a point not far removed from the original, and due to failure to clean out and remove some septic focus. This will be shown by a rise of temperature coming on after a longer or shorter period of convalescence. No connection with the original focus may be discoverable.

When such rise of temperature occurs the wound should be re-opened, and search made for the new abscess.

Finally, there remains to be considered the class of cases in which the septic peritonitis is diffuse and not localized. These will be quickly recognized when the peritoneum is incised by the escape of pus and serum, with, perhaps, gas and fæces.

The wound should first be enlarged sufficiently to allow free access of the hand to all parts of the peritoneum. The patient should be turned on the side and all fluid allowed to flow out that will do so. Next localized collections of pus are to be searched for with the hand and evacuated. The appendix is to be removed or its stump properly treated. The whole peritoneal cavity should then be flooded again and again with hot saline solution till all flocculi are washed away, and Douglas' pouch is finally wiped dry with sponges in holders. The drainage should be as thorough as possible, and different strips of gauze should reach to different parts of the abdomen. In women, a posterior colpotomy is often advisable to allow of escape of fluids into the vagina. The incision should be left open for at least three or four inches, and the gauze should be loosened at the end of the first twelve hours to see that there is no obstruction to the flow of fluid.

These cases, although generally fatal, are not necessarily so, and operation should never be refused, unless the patient be *in articulo mortis*. There are many cases of recovery even from this desperate condition as a result of proper surgical treatment.

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