by the best authorities with great doubt. Spasmodic contraction or stricture of the external sphincter muscle is not an unusual condition, but spasmodic contraction of the canal above that point has always been a matter of belief and of assertion rather than of demonstration. It is perhaps too much to say that spasmodic stricture never exists; but a well-marked contraction within reach of the finger, which can be plainly detected by an ordinary digital examination, and which disappears under anæsthesia, is rarely seen.

Among the inflammatory strictures may be classed the dysenteric and the traumatic. Dysenteric ulceration has already been spoken of, and strictures due to this cause are often very extensive and not infrequently multiple. Proctitis, whether acute or chronic, when sufficiently severe and attended by sufficient changes in the coats of the bowel, causes stricture and *is the most frequent cause of the condition*, and a simple traumatism may lead to this result, either by causing ulceration and cicatrization or by exciting a chronic inflammation in the submucous connective tissue. Among these traumatisms may be enumerated, surgical operations, foreign bodies, kicks, and falls, and the injury produced by the head of the fœtus at birth.

A stricture of the rectum of venereal origin is rather a matter of surmise and supposed analogy with what is observed in other parts of the body than of actual demonstration. The venereal ulcerations which, by subsequent cicatrization, are supposed to be capable of producing stricture have already been referred to. They are the chancroid and the later syphilitic ulcers. As for the old time-honored "syphilitic stricture of the rectum," modern pathology teaches that it is a simple chronic hypertrophic proctitis entirely independent of syphilis and due to any one of the various causes which may excite a simple inflammation in the wall of the bowel. The process usually begins in the submucosa, the ulceration and hypertrophy being the natural sequences.

The first step toward establishing the diagnosis of stricture of the rectum is to make an examination with the finger, and, as the great majority of strictures are confined to the lower part of the rectum, this is in itself generally sufficient. It is the best, safest, and least painful of all the means of diagnosis when properly executed, and yet it may be the immediate cause of death when roughly practised. Where the seat of the disease is within reach of the finger, all can be learned in this way, as a rule, that can be learned in any other, and nothing is to be gained by a painful speculum examination or by the use of a bougie.

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 when any other method of examining is employed. The search for a stricture in this locality must always be made with the greatest gentleness, and the result will often be negative. The attempt to decide the question by the use of bougies is altogether unsatisfactory, and by no means free from danger.

In certain cases information may be gained by the use of a long, cylindrical speculum, while the patient bends over a chair and strains to bring the parts into view; and it is worth remembering that a full inch may be gained in a digital examination by having the patient stand erect and strain down upon the finger. Fortunately, however, we are not limited to these means alone for a diagnosis. Most strictures in this part of the bowel are cancerous, their presence can be pretty accurately surmised from the general symptoms, and after a time they can be felt through the abdominal wall by careful palpation. If the diagnosis cannot be made in this way, and the symptoms justify it, there is but one means left, viz., to make a bimanual pelvic examination, the patient being under the influence of an anæsthetic. I know of no other way than this by which a stricture of the sigmoid flexure which cannot be felt by external manipulation can be certainly recognized.

The treatment of stricture of the rectum is both constitutional and local. The first question to be answered is as to the advisability of antisyphilitic treatment, and this may generally be answered in the negative. The practitioner who considers the great majority of strictures as syphilitic, and indiscriminately uses mercury and iodide of potassium, will be mistaken about as often as he who looks upon most of his cases as being cancerous, and, therefore, incurable.

There are various means by which the comfort of these patients may be increased without recourse to operative treatment. The most effectual of them will be found to be a careful regulation of the diet and rest in the horizontal attitude. The diet should be mostly fluid, and preferably milk. The bowels should move daily without straining. Should any medication be necessary to effect this, the mineral waters, Rochelle or Glauber's salts, or the compound licorice powder, will be amply sufficient. The general strength must be carefully supported, and in most cases in which it is well borne, cod-liver oil will serve a good purpose. When obstruction actually exists, much may be done in the way of general treatment before resorting to operation. Food should be almost absolutely suspended; opium should be given in large doses to allay peristalsis; and large poultices covering the abdomen will give great relief to suffering.

The various means of local treatment may be included under the four general heads of dilatation, division, colostomy, and extirpation. Dilatation may be either gradual or sudden, partial or complete. The use of bougies for gradual dilatation is an example of good practice originating in false ideas. The bougie is intended by its presence merely to excite absorption of organizable matter, and if the pressure be too great, too long-continued, or too frequently applied, it will cause more than sufficient irritation for this purpose, and will induce again the very condition it is intended to overcome. The rules which should guide the surgeon in this plan of treatment are now well understood and generally admitted. The dilatation should be intermittent and not constant. Attempts at constant dilatation by means of a bougie of any sort which shall remain permanently in place, generally result either in failure or in actual disaster. The dilatation should never be forced. A bougie should be chosen which will readily pass the stricture without stretching it, and if there be any doubt in the operator's mind about the proper size of the instrument to be used, one should be selected which is too small rather than too large. The instrument should never be passed oftener than on every alternate day, and twice a week may be better still. Little is gained by allowing it to remain for any length of time within the grasp of the stricture. In cases associated with much ulceration, dilatation by bougies is very apt to make matters worse instead of better; and, if they are used at all, they should be introduced with the greatest gentleness. As to the kind of bougie to be used, the softer and more flexible the better. When the stricture is within reach of the finger I invariably use my finger instead of a bougie. The patient may be greatly relieved by this method of dilatation. It must, however, always be continued indefinitely, for it does not cure the disease. A rectum which has once been the seat of an old stricture can never be made as it was before the disease by this or any other treatment. But though the measure may not be curative, it is perhaps as valuable a palliative as is at the command of the surgeon, and by it in suitable cases a patient may be kept in comfort for a period of years. It is applicable to all benign strictures, which are within reach from the anus; but when the disease is high up the procedure is not entirely free from danger.

The unsatisfactory results of dilatation, and the natural objection on the part of both patient and surgeon to the operation of colostomy, have given rise to another method of treatment which within a few years has assumed, deservedly, considerable prominence. This is the operation of proctotomy, or complete division of the stricture by a single deep incision. The operation may consist either in dividing the stricture alone, or the stricture and all

the tissues below, including the sphincter. The latter is the safer as it provides free drainage and minimizes the danger of cellulitis.

It should be remembered that this operation is put forward as a good and sufficient substitute for colostomy, that it is applicable to nearly all of the cases to which the latter is applicable, and that in certain respects it is preferable to colostomy. The results sought for by colostomy are the formation of a new outlet for the fecal matter and the relief of pain; in proctotomy, the aim is to effect the reestablishment of the old outlet and the relief of pain. There are certain cases beyond the reach of proctotomy, cases of stricture too high up for its safe performance, and cases of such extensive ulceration and fistulous burrowing that the powers of the patient are unequal to healing the wounds which an attempt to restore the natural passage would render necessary.

The last resort of the surgeon in the treatment of ulceration and stricture of the rectum is colostomy. In the former disease the operation may be curative; in the latter it is only palliative. As the results of total extirpation of the rectum are constantly becoming more favorable, and the mortality is decreasing, this operation has to a great degree taken the place of colostomy in the treatment of non-malignant as well as cancerous strictures.

Cancer.—Cancer of the rectum, like cancer elsewhere in the body, generally occurs in middle life or old age, but it has been seen in a child of six years. Its favorite site is the rectal pouch, three or four inches from the anus; next to this it is most frequently seen just above the internal sphincter; and after this the junction of the rectum and sigmoid flexure will be found to be its favorite starting point. Here it seems to run a more rapid course than elsewhere, or at all events accomplishes its fatal work more quickly from the increased liability to obstruction which the anatomical conditions favor.

A cancer of the rectum may, and often does, begin so insidiously that its existence is not suspected for months by either patient or physician. Slight wandering pains, occasional diarrhœa, and perhaps an occasional mixture of blood with the passages, often lead to a diagnosis of ulceration, and the usual treatment of this condition is followed without effect. After a time the pain becomes a more marked symptom; the diarrhœa and discharges of mucus and blood become more frequent; there is emaciation and cachexia; a rectal examination is finally made, and if the disease is within reach of the finger the diagnosis is at once apparent. The presence of steady, severe pain either localized at one point in the pelvis or shooting from one point into the loins, the testicles, or the thighs, is a symptom of great importance. It is often the only one of which the patient will complain, its severity causing the diarrhœa to sink into insignificance. I have more than once made the diagnosis from these two symptoms alone, in cancer too high up to be felt or seen; for the diarrhœa is diagnostic of ulceration, and the pain (dull, steady, exhausting, never intermitting) generally means the presence of a new growth. The hemorrhage is seldom profuse enough to be dangerous, but it is generally constant, and is an element in the wasting which the disease causes. The symptoms directly referable to contraction are often slight, and differ in no way from those caused by the simple fibrous stricture already described. It is often astonishing to find an advanced case of scirrhus in which the calibre of the bowel is so nearly occluded as scarcely to admit the end of the index finger, and yet in which the patient has never had any symptoms of obstruction. When the cancerous mass once begins to break down and ulcerate its extension is limited by no tissues of the body. The bladder may be opened and a permanent fistula result, causing more pain than the cancer itself. The prostate and seminal vesicles in the male, and the recto-vaginal septum in the female may each be destroyed, and any part near the focus of disease may be involved. The lymphatics from the anus to the groin, and those from the rectum to the hollow of the sacrum, may each become involved, and should both be examined.

The treatment of malignant disease of the rectum is designed to be either curative or palliative. In a small number of selected cases a cure is possible; at all events the disease may be removed and its return delayed for so many years as to give rise to the hope of permanent cure. This, of course, can be effected only by excision, and this operation may be performed in several ways. When dealing with a growth at the margin of the anus the operation is simple, and the chief aim of the operator should be to cut wide of the disease in all directions. These cases give the most satisfactory results as to cure.

Excision of the Rectum.—The operation of complete excision of the rectum may be described as follows:

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 to be 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. As the operator is obliged, during the progress of the operation, to introduce his finger into the rectum, and then is likely, at some later moment, to bring it in contact with the cut surfaces, it will readily be appreciated how important a matter it is that the interior of the bowel should first be thoroughly disinfected. 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 to right (the operator stands on the left) at the level of the incision to be made across that bone, and is worked down as far as 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. Usually this triangular piece of bone should consist of the last two sacral vertebræ and the coccyx.

Rydygier's osteoplastic resection is shown in Fig. 231. By it the sacrum is turned to the right like a trap door and replaced after the operation. It certainly diminishes

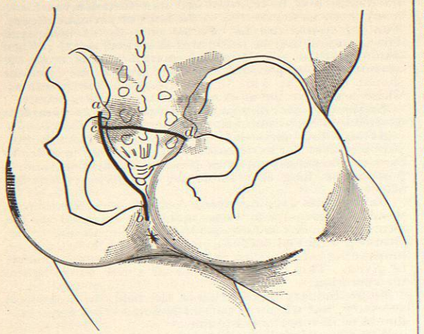

FIG. 231.—Rydygier's Osteoplastic Resection. *a b*, Skin incision; *c d*, skin and sacral incision.

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 preliminary incisions, which are shown in the accompanying illustration, should be completed in a very short time. Until after the end of the sacrum has been removed no attention need be given to hemorrhage, except such as an assistant can give by making pressure with 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 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, to a certain extent, be found movable in its bed; 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 meso-rectum. 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 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 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 diseased part will depend entirely upon vessels belonging to the

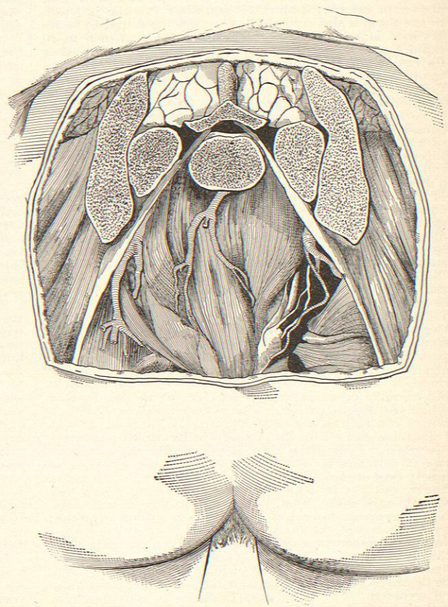

FIG. 232.—Posterior View of Rectum in Male.

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. In the case of 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 entrusted to an assistant who, by covering it with gauze and holding it out of the way, will keep it 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 step will be found necessary, and the attachments of the levator on both sides will have to be cut by scissors or knife. Bold and rapid dissection at this stage will save much bleeding.

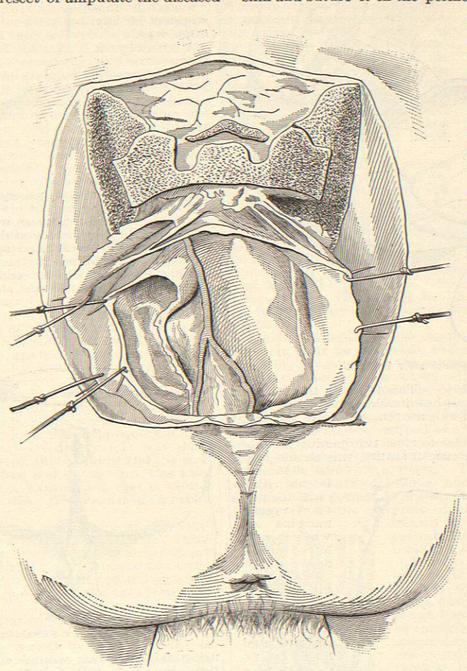

FIG. 233.—Posterior View of Rectum in Woman, Peritoneum Opened.

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 the 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 now find that he has the whole pelvic cavity at his command. In women the tubes, ovaries, and uterus can be plainly seen and palpated.

The next point to be decided is what is to be done 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 difficult matter to decide, 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 separated 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 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, in which 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. 235). But in cases of non-malignant stricture and in ulcers demanding excision the subsequent functional condition of the parts will prove a matter of more consequence. The surgeon