This pain was relieved by a free action of the bowels, but during the attack it was severe enough to cause vomiting. Since that time he has had four such attacks, each one being associated with vomiting, which gave great relief. During the attack pressure in the left iliac region would give relief, and there was no tenderness. In all the above attacks large enemata of water were used (three quarts being thrown in), and when the whole enema was in the bowels relief came at once. When the enemata came away they usually brought considerable fecal matter with them. On the 19th of May, 1900, in the morning, he had another of these severe attacks of pain. This time the pain was not relieved by enemata, though several were given. Opiates controlled the pain but partially.

I saw him after this condition had persisted for three days. The obstipation was complete.

Figure 4.

Operation was advised and at once accepted. The incision was made a little outside of the left linea semilunaris. The sigmoid flexure was found attached to the parietal pelvic peritoneum, exactly as in the last case, only the adhesion did not extend on to the bladder wall. No sign of inflammation about the appendix was found in this case. The past history of dysenteric symptoms suggested the probability that the adhesions were due to inflammation about the descending colon and sigmoid. This adhesion was separated, and the operation was followed by complete relief and a rapid convalescence.

CASE III. A woman of thirty, who had borne children and had had much pelvic distress, with a strong tendency to retroversion and prolapse of the uterus, had a ventral fixation done for the remedy of this condition. At this operation

the sigmoid flexure was found tied down to the pelvic brim, much in the manner described in the other two cases. The Fallopian tube lay close beneath the adherent sigmoid and was slightly attached to it, indicating the probability that the inflammation which led to the adhesions was a mild grade of salpingitis. A subsequent inquiry elicited the fact that serious and obstinate constipation had troubled her for a long time, and that often the bowels resisted in the most obdurate manner all efforts to bring about a movement.

The form of obstruction in all of these cases was intermittent and incomplete; and in all of them, except Case A, the condition found had the same characteristic relation of a movable portion of the intestine twisted and adherent in a false position just at its entrance into a fixed part of the bowel.

The observations are too few, perhaps, to establish any rule, but their similarity is so striking as to fix the attention and to stimulate further study.

DESCRIPTION OF CUTS.

Figure 1 represents diagrammatically the condition found by the author in a number of cases of chronic appendicitis. The lower end of the ileum is drawn across the lower end of the cecum, covering the appendix.

Figure 2 represents the adhesions of the sigmoid flexure found in Case I. The fingers are represented as pressing down the top of the bladder, to which the sigmoid flexure is attached. The adhesions run along the brim of the pelvis, well out on the side of the abdominal cavity.

Figure 3 represents the adhesion in Case A before it was separated, and Figure 4 represents the same after the appendix was removed and the adhesion dissected off. The rough line crossing the cecum represents approximately the site of the attachment of the adhesion.

CATHARSIS IN ABDOMINAL SURGERY.

BY L. R. G. CRANDON, M.D., BOSTON.

THE comparative effects of different cathartics and enemata, before and after operation, in surgical cases where the abdomen is the part of the body affected, is a study, the practical importance of which no one will question. I give the results of observations made during my service as house officer at the Boston City Hospital, and only regret the study is not a more exhaustive one. All the cases here considered were under the care of Drs. Gavin, Burrell and Monks, and are reported with their kind permission.

As in every clinical experience, so in this one, it is impossible to put a check on results to make conclusions absolute. Conditions cannot be controlled beyond a certain measure, and one is continually hampered by the personal factor of the patient. A record of facts, then, and a reasonable interpretation is all one can hope to give.

It has been proved by a number of studies in normal intestine and by use of purgatives, that peristalsis is almost entirely a reflex action. Direct experimentation as to how far up in the small intestine a wave may be started reflexly by stimulation of the large intestine alone has apparently not been done. The lower half of the ileum has been determined to be the part where the intestinal contents move fastest.¹ It has been found that the vagus nerve, when stimulated reflexly or directly, increases peristalsis, and that moderate stimulation of the splanchnic nerve decreases it. Any decrease, then, in the normal activity of the nerves and nerve centers must result in constipation.

It has been shown by experiments also that the circulation of the blood through the intestines greatly influences peristalsis, and disorders in the blood supply readily bring on intestinal disorder.² "Hepatic torpor," so called, or a diminished flow of bile, has its constipating effect partly in diminishing an irritant which may stimulate peristalsis, partly in diminishing a saponifying agent. Since the work of Pfaff and Balch our chologogues have been apparently reduced to one; namely, bile, human or bovine.³

The most important conditions, then, under which peristalsis may take place along the small intestine are (1) a relatively healthy condition of the whole thickness of the intestinal wall, and (2) the integrity of the reflex arc. In surgical cases the wholeness and irritability of the reflex arc are similar to that of the whole nervous system in the given case, and therefore depend only on the general condition of the patient, and not on the local surgical lesion. The first requirement of peristalsis—that is, the soundness of the intestinal wall—is the more important one, and this study was therefore directed toward the relation between the various forms of local stimulation and the condition of the part stimulated; namely, the gut. It was directed toward the best means of keeping the alimentary contents moving, in each case having in mind, however, a picture of the local condition of both large and small intestine. The object was to obtain the advantages of drainage and depletion which follow catharsis, and at the same time to obtain rest for the parts affected, the least loss of strength and the greatest comfort for the patient.

It may be urged that the comfort of the patient is a small consideration compared with real profit to him that may be incompatible with such comfort; but on further thought, the experience of anyone dealing with acute surgical conditions in the abdomen will tell him that griping pain from cathartics, with its consequent restlessness and loss of sleep, may be just enough in some cases to turn the patient back, to prevent him from starting on that reaction of rest so essential after surgical procedures.

In the series which I wish to present there are

¹ Sabbatani and Fasola; Arch. Ital. de Biologie, 1900, xxxiv, ii, 186.

² Hare: Practical Therapeutics.

³ Journal Experimental Medicine, 1897, ii, 49.

179 abdominal or pelvic cases, which are divided as follows:

	Total.	Lived.	Died.
Peritoneal and pelvic inflammations and ovarian cysts	148	109	39
Tuberculosis.....	8	8	0
Malignant disease	2	0	2
Obstruction (mechanical).....	21	14	7
	179	131	48

There are two principal ways for artificially inducing a movement of the bowels in a patient sick in bed; (1) by drugs by mouth (either in one large dose or in many small doses), and (2) by enemata. The cases in this series are accordingly divided into several classes, each of which, as will be seen, has its special bearing on the question as to the best means of moving the bowels:

(A) Inflammatory conditions of the abdomen before operation.

(B) Diseases of the female pelvis—outside the intestinal tract—before operation.

(C) All abdominal and pelvic affections after operation.

(A) In the first division come acute and recurrent appendicitis, and general peritonitis from perforation of the gut. In a large proportion of these cases before they were brought to the hospital the old rule of Dr. Holmes had been followed. This rule was to "give a cathartic, then go home and read up the case." For example, in 70 cases of appendicitis, 47 had had Epsom salts and 14 some other drug, the compound cathartic pill and calomel being the favorites. Over half of these had perforation of the appendix. Cases of this sort are common. I give two as illustrations.

CASE I. N. S., female, twenty years old. Four days before admission there appeared the first onset of general abdominal pain, nausea and fever. The pain soon became fixed in the right iliac region. There had been no movement for thirty-six hours before the onset. There was some spasm, no tumor. She had then been given calomel, one-half grain every hour for six doses. At the end of twelve hours she had a sudden griping, ripping pain in the appendix region, with considerable relief in half an hour, followed by a loose movement. Examination on admission shows a definite right iliac mass and considerable general spasm. Operation fifteen hours later reveals abscess from perforation of appendix; recovery.

CASE II. F. W., male, thirteen years old, third day of second attack. Forty-eight hours before admission he was given about an ounce of Epsom salts, with a good movement soon after. Examination on admission shows distended spasmodic abdomen, general tenderness, most intense in the right iliac fossa. Operation discovers the proximal half only of a gangrenous appendix, free fluid and feces in the peritoneal cavity—practically no adhesions; fatal result.

One cannot say in cases of this class that perforation is caused by active catharsis, for it may

be that increased movements of cecal contents free the outlet of an obstructed and distended appendix, and so prevent rupture. One may fairly say, however, that in many instances after laxatives by the mouth, symptoms are aggravated. This exacerbation of symptoms may be due to the increased peristalsis causing strain on newly formed adhesions in the iliac fossa, and consequent extension of inflammation. Movements of the wall of the small gut are particularly undesirable at this time. Peristalsis has been inhibited by the neighboring inflammation as a protective measure. Or, the aggravation of symptoms following a cathartic, if not due to the stirring up of an inflamed part, may be caused by increased tension in the appendix or rupture of it. To pour the accumulation of twenty feet of small intestine into the cecum must raise the tension in that organ, especially if it be already distended with feces or gas. All this may be avoided, and the appendix drained if possible at the same time, by emptying the large gut from below by an enema. The liquid contents of the small intestine may then come down naturally, when peristalsis can no longer do harm.

(B) In the second class are included pelvic diseases before operation; that is, cases of pelvic peritonitis through tubal infection, salpingitis, ovaritis and acute endometritis. There are 44 in the list. Most of these cases had had cathartics by mouth before coming to the hospital, and all had an enema on admission. It was only rarely that symptoms did not abate in twelve hours; there were free movements, an appreciable drop in temperature, and a disappearance of pain, spasm and tenderness. Here, then, the alimentary tract being so little affected, we are at liberty to empty the large intestine by enema, and at the same time to empty the upper bowel by drugs given by the mouth, thus getting the benefits of depletion and drainage by increased peristalsis in the upper part of the intestinal tract.

When the uterus, or tubes, or pelvic tumors have been removed, that is to say, in noninflammatory pelvic cases, it is unquestionably better, for fear of mechanically disturbing the adjacent wounds, not to distend the rectum with enemata, but rather to induce peristalsis from above. A small oil enema, however, in these cases prevents straining.

(C) It is the third class, namely, all abdominal cases after operation, upon which most interest and importance hang. Amongst these are included 132 celiotomies, 10 of which are for disease of the internal female genitals. In about one-fourth, or 30 cases, calomel was given after operation in two ways: either one-tenth grain every hour to 10 or 20 doses, immediately after recovery from the anesthetic, or one-half grain every three hours to 5 doses at the end of the second day. Of the 30, six complained of "gripping cramp-like pain," 5 of these having had the larger and less frequent doses; 3 had movements as result of small doses, 12 as result of the larger doses; 15 had no movements; 18 had abdominal

discomfort described as "rumbling," "feeling blown-up," "all-gone feeling," etc. Two had sore mouths (in these cases powdered calomel was placed upon the tongue, but no water was allowed on account of persistent vomiting, the patient being obliged to swallow the calomel as best he might with the help of saliva). Twenty-seven had dirty, bad-tasting tongue, with consequent aggravation of thirst. In only one case did it seem that there might be a connection suggested between free use of calomel and an untoward result.

CASE III. Male, fifty-four years old; subacute appendicitis; operated; no pus; one-tenth grain calomel every hour to 20 doses; after thirty hours a profuse diarrhea started and persisted in spite of most strenuous therapeutic efforts, till his death at the end of four days. No general peritonitis.

In 51 cases after operation absolutely no cathartic was given by mouth till at least ten days after operation, and in many not till late in the third week. The bowels were moved solely by enemata. Seldom earlier than twenty-four hours after operation, but usually then, an enema was given through a No. 30 French soft rubber catheter, passed along the finger high into the rectum and into the sigmoid, if possible. The enema was made up of:

R

Epsom salts (50% sol.).
Turpentine.
Glycerine,
Water,

aa $\frac{3}{4}$ ij.
3 vj.

This enema, which is in constant use in the hospital, is held as long as possible by the patient, and usually produces a good movement of soft feces and gas, with no tenesmus. The sacrum and buttocks should be well oiled before this enema, to protect the skin from blistering, if it gets wet from the turpentine. The enema is repeated, as a rule, possibly three or four times on consecutive days, and after that movements are readily induced by an enema of suds and glycerine—a pint to two ounces. In the turpentine enema the proportions above given seem to produce a maximum result with minimum discomfort.

The remaining 51 cases were treated usually by enemata alone, occasionally combined with calomel, a saline, or with other cathartics, and present varying results, the patient's comfort being, on the whole, proportionate to the number of movements by enema alone.

Figures as to the effect on temperature of either method of inducing a movement, from above or below, can have no value, because so many elements serve to determine each patient's condition at a given time. It may be said, however, that a defecation by enema will lower a temperature $\frac{1}{2}^{\circ}$ to 1° within two hours, and coincidentally produce subjective relief where drugs by mouth take three to twelve hours.

In the entire list given is one case of general peritonitis that recovered, and there are many, of course, where there was beginning inflammatory

reaction, as shown by the general spasm before operation, and the fibrinous flakes discovered during it. In all these after operation the bowel was emptied by stimulation from below; that is, by enemata, rather than by irritation of the many feet of small intestine above. There are 5 instances of appendix so thoroughly gangrenous that there was no stump to be tied off or invaginated. In these the inflamed bowel was kept empty by enemata, and yet given surgical rest. In none of these did a fecal fistula appear.

Another class of cases to which much of this reasoning applies are those which are operated for radical cure of inguinal hernia. An effective enema avoids straining at stool, and prevents the pull on the newly sutured muscles. In no case was there apparently developed a dependence on enemata after convalescence. In the third week cascara was given occasionally, and later natural movements were soon established.

This method—that is, using enemata alone after operation and before operation in all cases where the alimentary tract is involved—combines the best in both the so-called medical and surgical treatment: peristalsis is checked, quiet for the diseased part is obtained, and drainage by the shortest way is assured. In the line of treatment by enemata the fecal receptacle—the large intestine—is kept empty; distention with gas, most of which is formed in the colon, is never considerable; inspissated rectal contents cannot remain, and so block the exit of feces or gas from above; straining at stool, with consequent pull on the abdominal wound or new adhesions, never occurs; the rectal tube for the further relief of gas, if necessary, does not get plugged, and such nourishment as the stomach and intestine have been induced to accept is not unduly hurried along at a time when the patient needs all the strength he possesses.

The conclusions which seem to me warranted are that: (1) In acute pelvic peritonitis both enemata and drugs by mouth should be used to produce catharsis before operation; drugs by mouth and oil enemata after operation. (2) In all acute inflammatory conditions of the abdomen where the alimentary tract is involved, the bowels should be moved by enemata alone, before and after operation, the enema of salts, turpentine and glycerine being the best.

Clinical Department.

A CASE OF MEASLES COMPLICATED BY APPENDICITIS.¹

BY HAROLD WILLIAMS, M.D., BOSTON.

M. P., aged twelve years, first complained of feeling ill on March 31st. He was never a strong boy, and had frequently suffered from attacks of gastro-intestinal disturbance. He had had measles some years previous. The symptoms of present

attack consisted of nausea and general malaise. Temperature 100°. He was put to bed and dieted.

April 1st. He was less comfortable, though no new symptoms appeared. Temperature 101°.

April 2d. Patient complained of slight sore throat and vomited once. Temperature 102°.

April 3d, I first saw him. Patient not so comfortable as upon days previous. Temperature 103.4°. Had vomited once or twice; complained of abdominal pain; cough, weak eyes and sore throat. Inspection: Conjunctivæ slightly injected; mouth red, with striking congestion of alveolar processes; congested appearance of posterior pharynx and a catarrhal inflammation of right tonsil to which uvula was adherent. Koplic sign not present. Careful examination of the abdomen showed some tenderness in different places; always fleeting and never localized.

April 4th. Well marked eruption of measles on face and behind ears. Eruption confluent; conjunctivitis more marked; cough still slight; abdominal symptoms as before. Temperature 104°.

April 5th. Eruption well marked and extending over neck and trunk. Temperature 104.4°. Early in the morning patient had complained of pain in right side. This pain had steadily increased in severity. At 10 A.M., when I saw him, it was exactly located at a point an inch above Ponpart's ligament; it was increased on the slightest pressure, and the locality was indicated by patient with one finger. There was neither dullness nor induration. The diagnosis of an acute inflammation of the appendix was made. Dr. Arthur T. Cabot was called, and the case was placed in his charge. It was also thought advisable that Dr. J. H. McCollom should give us the benefit of his wide experience in measles, the association of which disease with a fulminating appendicitis in a boy of delicate physique seemed a matter of some gravity. Dr. Cabot, in view of the probable rapidly advancing process, decided upon immediate operation, in which decision Dr. McCollom and I concurred. The operation was performed by Dr. Cabot two hours later, with the assistance of Dr. Hugh Cabot.

April 6th. Temperature fell to 99° during night, and remained at this point throughout a remarkably satisfactory convalescence.

Pathological examination of the appendix by Professor Mallory is as follows:

April 8, 1901. Appendix; gross examination: Appendix 4.5 cm. long, varied from .6–.8 cm. in diameter. Somewhat swollen in middle two-thirds. Serous coat injected, especially at tip; fresh fibrin adherent in places, forming irregular yellow areas. Mesentery injected. Split open nearly to tip; contains a fecal concretion size of small bean. Proximal end of mucosa swollen, lumen quite small and partly filled with creamy, tenacious, purulent material; beyond this is a definite enlargement of the lumen, in which the concretion closely fits; the mucosa here is dark red to greenish, and is evidently becoming gangrenous; beyond this dilatation the mucosa is thickened, and there is some mucopurulent secretion.

Anatomical diagnosis.—Acute appendicitis.

Microscopic examination of a longitudinal section shows an acute exudative process, most marked on the

¹ Read before the American Pediatric Association, Niagara Falls, May 23, 1901.