persist so long; the clinical picture differs quite materially.

Treatment.—If the diagnosis could be made before the patient is too exhausted, and if the growths were limited to the ascending, transverse and descending portions of the colon, it is probable that an intestinal exclusion would be advisable; the excluded portion could be excised at a second operation. Rotter¹⁵ did an intestinal exclusion in his case, but the patient was too exhausted and septic to survive. Margarini¹⁶ made a cecal colostomy, but the patient did not improve; he then removed as many of the rectal tumors as was possible, and closed the colostomy wound; the patient recovered; the polypi did not show malignant changes. Von Black¹⁷ was the first to call attention to the two-stage operations in cancer of the colon. Petermann¹⁸ has recently stated that primary resection of the colon with suture has a mortality of 50 per cent.

In our case an appendicostomy was performed, since we were of the opinion that the patient had chronic ulcerative colitis. Tuttle¹⁹ has recently collected reports of 77 cases in which an appendicostomy, as first recommended by Weir²⁰ in 1902, was performed. The results in chronic ulcerative colitis have been quite satisfactory. It does not seem possible that the operation could be of any great value in carcinomatous polyposis of the colon.

REPORTED CASES

Below will be found synopses of six cases which are somewhat similar to our case; in my opinion, Cases 3 and 5 are to be considered as especially so.

1. **BARDENHEUER'S CASE.**²¹—The patient, a man aged 48, had had pain in the abdomen for one year, and pain on defecation. Examination showed cancer of rectum. The growth was excised. Autopsy showed polypoid growths of various sizes scattered throughout colon. Microscopic sections showed all the growths to be carcinomatous. Bardenheuer questions whether the rectal growth or the polypoid growths were primary.

2. **HANFORD'S CASE.**²²—The patient, a woman aged 34, died of adenocarcinoma of the rectum. Autopsy showed metastases in liver; the colon was studded on its inner surface with polypoid growths of various sizes; about the middle of the transverse colon was a polypus the size of a walnut which had caused a stricture; the mesenteric and lumbar glands were not much enlarged. The polypi showed incipient malignant change. Hanford contended that his case demonstrated the possibility of simple polypi becoming malignant. (The growths were malignant adenomata.)

3. **PETROW'S CASE.**—The patient, a girl aged 20, had symptoms of ileus. Operation showed ileocecal intussusception. Resection was done and the patient died. Autopsy showed two other intussusceptions, one in the jejunum and one in the ileum. Polypoid growths were found in both small and large intestine. The intussusceptions were due to polypi. Microscopic sections of the polypi showed incipient malignant changes. There was neither stricture nor large carcinomatous mass present; metastases were not found.

4. **HAUSER'S CASE.**—The patient, a man aged 33, had had diarrhea and pain in the abdomen for eleven years. Stools were offensive. Examination showed cancer of the rectum. Autopsy showed polypoid growths of various sizes in stomach,

small and large intestine. The polypi were found to be malignant. Hauser contended that his case coincided with that of Bardenheuer. Hauser has cited two cases in which polypi and carcinoma were present in the same patient.

5. **FORSTER'S CASE.**—The patient, aged 23, died from tuberculosis. Autopsy showed circular cancer of colon and multiple polypoid growths in colon. The polypi showed evidences of malignant changes.

6. **DOERING'S CASE.**—The patient was a boy, aged 16, whose mother and uncle had died from a cancer of rectum. The patient had been complaining of painful defecation followed by protrusion of a fleshy mass. Examination showed polypi in the rectum. Doering removed as many of the polypi as was possible; he found that the sigmoid was also the seat of the growths. Microscopic sections of polypi showed them to be simple adenomata. Three years later the patient returned; examination showed cancer of rectum. An artificial anus was made; the patient died. Autopsy revealed carcinoma of rectum and of hepatic flexure; four carcinomatous growths in colon; polypoid growths of various size were also present in colon. Some of the polypoid growths were found to be simple adenomata converted into malignant adenomata; many of the polypoid growths were pure adenomata. In the rectal growth the conversion of simple into malignant adenomata seemed clear.

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PARALYTIC ILEUS

WITH REPORT OF TWO CASES SUCCESSFULLY TREATED BY OPERATION

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Every operator of much experience in abdominal surgery has met with the distressing postoperative condition of abdominal distention the degree of which may range anywhere from a mere accumulation of gas in the intestine, causing only slight distress, to a well-developed condition of ileus, with impending death. During the past eighteen months two patients with such conditions have presented themselves for operation on my service at St. Joseph's Hospital.

Before entering into a discussion of the two cases under consideration it may be well to make a few remarks regarding the general subject of ileus. A review of the literature on this subject shows that volumes have been written, and that the term used without qualification leads to endless confusion, since it designates only a syndrome and describes no definite morbid condition. It will be well, therefore, in using the term to qualify it with some term which will, in a measure, at least, indicate the specific pathology. This paper deals with paralytic ileus, which may be divided into dynamic and adynamic forms. Paralytic ileus of both types is an interference with peristalsis caused by a disturbed innervation of the intestine, as opposed to mechanical ileus, which is a form of intestinal distention brought about primarily by some actual physical obstruction of the bowel.

Experimental investigation into the influences of the innervation on intestinal movements have proved uncertain, but Pflüger established, by a series of investigations, the following facts: The vagus nerve innervates the entire small intestine and the irritation of its fibers either causes movements throughout the small intestine or increases peristalsis. Irritation of the splanchnic nerve, on the other hand, tends to inhibit movements of this portion of the intestinal tract and also causes

15. Rotter: Arch. f. klin. Chir., 1898, lviii, 357.
16. Margarini: Clinici Chir., 1903; Refer. Hildebrandt's Jahresbericht, 1903, p. 556.
17. Von Black; Cited in Petermann: Arch. f. klin. Chir., 1908, lxxxvi, 52.
18. Petermann: Arch. f. klin. Chir., 1908 lxxxvi, 52.
19. Tuttle: THE JOURNAL A. M. A., 1906, xlvii, 426.
20. Weir: Med. Rec., 1902, lxii, 201.
21. Bardenheuer: Arch. f. klin. Chir., 1890-1, xli, 887.
22. Hanford: Tr. Path. Soc., Lond., 1890, xli, 133.

anemia of its blood vessels, while the division of these same nerves causes a hyperemia.

It would be interesting—in fact, of vital importance to surgeons and clinicians alike—to establish by a series of experimental investigations the relation between the effects produced on the central and sympathetic nervous systems by autointoxication following certain abdominal operations, on the one hand, and the pathologic conditions which occur in the intestinal wall, on the other.

The question whether paralytic ileus is caused by a disturbance in the anterior cornual cells and their corresponding sympathetic ganglia giving origin to the fibers of the splanchnic nerves, or whether the disturbance takes place in the sympathetic plexuses of Auerbach, Meisner and Billroth in the intestinal wall will furnish an interesting and important field of investigation.

I hope to throw some light on this subject by reporting at a later date the results of some experiments which are under consideration at the present time.

moderately inflamed appendix bound down by a few adhesions was found. In the folds of the mesenterium of the appendix was found a large mass of fat resembling a true lipoma, which is mentioned here because the operator had never before met with that condition. As the operation did not take more than thirty minutes, the hernia was repaired, the entire operation requiring not more than one and one-half hours. The patient was returned to her bed in good condition.

Second Operation.—The patient received the ordinary after-treatment for laparotomies; yet she continued in a tympanitic condition for the following thirty-six hours, at which time her symptoms became so alarming (her pulse going to 162 and her temperature to 103 degrees, with respirations at 46, and the beginning of stercoraceous vomiting) that it was very evident that she could live not more than a few hours unless the distention could be immediately relieved. After a hurried consultation with my brother I decided to operate at once. After a short preparation the old incision was opened, no anesthetic being given until the peritoneum was reached, when gas was administered followed by a few whiffs of chloroform. The peritoneum was quickly incised and the first loop of the intestine that presented itself was picked up. There were no signs of peristalsis, consequently only a small amount of gas

Fig. 1.—Loop of intestine clamped off and the four anchor sutures to the fascia in place.

Fig. 2.—Cut edge of the skin approximated to the bowel by means of a row of Lembert sutures.

Fig. 3.—Two rectal tubes introduced into the bowel, the upper into the proximal portion, and the lower into the distal.

REPORT OF CASES

CASE 1.—Patient.—Mrs. R., a short plethoric individual, aged 49. The physical examination revealed the following condition: The abdomen markedly distended and as tense as a drum; there was a decided tenderness at McBurney's point; pulse was 110; temperature, 100 F. The abdomen showed a small ventral hernia which stood out very prominently in this tympanitic condition. There was a history of two distinct attacks of appendicitis, at which times the patient was seen by a competent surgeon who made that diagnosis. The patient was sent to the hospital with instructions that a movement of the bowels should be secured, if possible, before operation. At the hospital that night the patient was given a cathartic and an enema, and at 12:30 a. m. passed considerable gas as a result of the latter.

First Operation.—The following morning the patient was in better condition and it was decided to operate that day. This was done at 10 a. m. When the abdomen was opened in the median line below the ventral hernia and the field inspected, a

escaped when the bowel was opened. The technic of this operation follows later in the paper. Irrigation with salt solution directly into the bowel was begun immediately and was continued for thirty minutes. It was noted that gas and fecal matter continued to escape with the irrigation, consequently this treatment was repeated at intervals of two hours. The patient was returned to her bed and given the ordinary postoperative treatment.

Forty-eight hours passed before the bowel gained its normal peristalsis, then the patient made a very good recovery.

CASE 2.—Patient.—Miss G., entered the medical service of St. Joseph's Hospital, Nov. 5, 1908, with a history of gallstone colic, one attack having occurred two and a half years previously. The patient had been suffering from the present attack for eight days, and presented the following conditions on physical examination: marked jaundice; extreme tenderness over the gall bladder region; pain shooting to the back and radiating to the right shoulder; vomiting; temperature 103 degrees, and pulse 120. There was a marked leucocytosis.

First Operation.—It was apparent that an operation was imperative. Consequently the patient was sent to the operating room and no time was lost in opening the abdomen and exploring the gall bladder, which was found to be markedly distended, with walls considerably thickened. On account of the inflammatory adhesions between the gall bladder and the surrounding viscera some time was consumed in controlling the hemorrhage. This complication necessitated concluding the operation hurriedly as the patient was in a very weak condition. The gall bladder was opened in the ordinary way, no time being taken to explore the interior; and a large tube was inserted after the Mayo plan. The patient was then dressed and returned to her room in a fair condition.

Postoperative History.—She made a good recovery and continued in a good condition, the temperature and pulse being normal and the bowels moving every day for the following five days. Dr. Alice Hamilton, of the Memorial Institute for Infectious Diseases, Chicago, who is investigating the subject of typhoid carriers with special reference to the gall bladder infections, examined this patient on the fifth day after the operation and found the paratyphoid organism in pure culture in the blood. On the evening of the fifth day after the operation the patient had two chills with a rapid rise in temperature and pulse so that on the following morning she presented the picture of profound collapse. In this condition she remained until the evening of that day, during which time the abdomen gradually became markedly distended. Repeated attempts to move the bowels both by catharsis and enemas proved futile. At 6 o'clock that evening the patient seemed in a dying condition. Dr. Arthur A. Small was called in consultation and, after a hurried examination, approved the proposed procedure for the relief of the ileus. The clinical chart at this time showed the pulse to be 156 and the temperature 103.5. There was also stercoraceous vomiting. The patient was sent to the operating room and the operation was performed under cocaine anesthesia. The patient had an uneventful recovery, save the irritation occasioned by the fecal material passing out on the abdomen.

TECHNIC OF THE OPERATION

The choice of an incision depends somewhat on the site of the incision of the original operation. Under most circumstances the first incision may be used for entrance into the abdomen, thus lessening the pain and the shock to the patient. The location of choice, however, is in the median line midway between the umbilicus and the symphysis pubis, for in this region a loop of the intestine near the lower end of the jejunum or the beginning of the ileum can be most readily picked up.

In other words, the operator attempts hurriedly to select a point in the small intestine approximately midway between the pyloric end of the stomach and the ileocecal valve. The distended loop of bowel is brought up through the abdominal wall and the distention reduced by stripping the intestine either way and applying a rubber-mounted intestinal clamp at the upper and lower angles of the wound, thereby collapsing the intervening portion of the bowel and reducing it to a condition so that sutures may be affixed without perforation.

Experience in handling these two cases has demonstrated, contrary to the teachings of many text-books on surgery, that but little gas escapes when the bowel is opened. Consequently great stress is placed on the introduction of long tubes into the intestine, as by this arrangement the irrigating solution performs a double rôle. First, the solution by entering the bowel at a considerable distance from the opening mechanically forces the gas and fecal matter to escape. Second, the introduction of the saline solution into this portion of the intestine with its rich supply of lymphatics acts as an immediate and powerful stimulant.

The after-treatment in such cases consists in sustaining the patient by rectal feeding for one week, at which time this feeding is supplemented by liquid diet by mouth, and this form of treatment is continued for a period of several weeks until the patient has regained sufficient strength to undergo an operation for the closure of the intestinal fistula. The feeding by mouth is discontinued for a week previous to the operation and the intestine carefully irrigated with an antiseptic solution.

The operation for the closure of the fistula consists in the resecting of five or six inches of the intestine and bringing the bowel together by means of a lateral anastomosis.

The treatment of paralytic ileus accompanying typhoid fever by this method has been suggested because of the parallelism of that disease and Case 2 in this paper. From the bacteriologic investigation of cholecystitis it would seem logical to conclude that the paratyphoid organism isolated from the blood of this patient by Dr. Hamilton may have remained latent in the gall bladder from the time of this patient's first attack until the date of this operation, at which time the disturbance set up in the gall bladder by the operation caused the organism to invade the blood, producing paratyphoid septicemia which in turn, just as in typhoid fever, may have been responsible for the paralyzed condition of the bowels in this case.

CONCLUSION

This mode of treatment, *per se*, is attended with grave danger and should be resorted to only after every effort by medicinal means has proven futile, but is apparently indicated in extreme cases in which death seems impending as sometimes occurs in the following conditions: (a) paralytic ileus following operations; (b) abdominal distention caused by suppurative peritonitis; (c) extreme paralytic ileus accompanying typhoid fever; (d) injuries to, and diseased conditions of, the spinal column producing a paralyzed condition of the intestines.

100 State Street.

THE POLLUTION OF STREAMS BY DISTILLERY WASTE

WITH SPECIAL REFERENCE TO *LEPTOMITUS LACTEUS* *

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The pollution of streams by distillery waste is, in the United States, a comparatively recent problem. Changes in the condition of the liquor trade have brought about the concentration of distilleries around cities and thickly settled communities, where they give rise to nuisances, the character and severity of which are governed mainly by the process employed and by the size of the stream into which the waste is emptied. The pollution of water courses in one way or another is certainly one of the most serious and important problems with which the health authorities have to deal. This is probably the only sanitary problem in which public opinion and the law have kept pace with scientific progress. The riparian rights of owners have been jealously guarded by the common law for several centuries and

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