bladder; the hemorrhage seemed to cease almost at once and from that time on there was no further bleeding.

It seemed warranted to assume that the hemorrhage had been controlled by the local application of the serum.

CASE 2.—History.—The patient, a woman aged 45, gave a history of jaundice that had been present for three months; the icterus was not very intense although it had been persistent. Coagulation time of the blood was eight minutes. She had an enlarged gall-bladder with no history of pain.

The diagnosis of carcinoma involving the deeper gall-ducts was made.

Treatment.—The patient might have had a preliminary transfusion but the icterus had not been sufficiently intense and I felt that exploration could be safely performed. The gall-bladder was exposed and about 8 ounces of dark green bile of the consistency of tar was removed; no gall-stones were found. A cholecystenterostomy was to be performed when the gall-bladder began to bleed; there had been no curettage of the viscous wall by a sharp spoon; only a dull spoon had been introduced, as the finger could not reach to the bottom of the gall-bladder. Bleeding became excessive and could not be controlled even after five yards of soft iodoform gauze had been packed into the gall-bladder. The hemorrhage became alarming and the patient was given 20 c.c. of horse-serum hypodermatically without any apparent result. Then a flask of horse-serum was poured into the gall-bladder; coagulation was immediate and there was no question in the opinion of those present but that the local application of the serum stopped the bleeding. The gall-bladder was then repacked and bleeding did not recur.

350 Post Street.

A CASE OF POISONING BY LITHIUM

PRESENTING SOME NEW FEATURES *

S. A. CLEVELAND

CLEVELAND

During an investigation on the action of uric acid under Professor Haskins, I had occasion to take rather large doses of lithium chlorid, and experienced toxic symptoms differing in some respects from the hitherto described phenomena of lithium poisoning.

In the first experiment, 2 gm. of the chlorid were taken in a glass of water after each meal for three meals (about 1 p. m., 9 p. m. and 7 a. m.) and then, after skipping one meal, another dose was taken about 7 p. m., making a total of .8 gm., about 125 grains, in twenty-eight hours. Symptoms showed themselves three or four hours after the first dose, consisting in slight dizziness and fulness in the head. Nothing more was noted after the second dose, which was taken in the evening. Soon after the third dose there was so much blurring of vision that it was impossible to read anything smaller than the largest headlines of a newspaper.

Dizziness and ringing in the ears were quite marked. There were also great general weakness and marked tremors. The fourth dose was taken at night, and the dizziness became so marked that the room seemed to go round all night, and sleep was almost impossible. The next morning the condition approached prostration. The eye symptoms were exaggerated and the dizziness, weakness and tremors were so intense that there was staggering and it was necessary to go to bed. The eye and ear symptoms lasted about a day and a half after the last dose. The weakness and tremors persisted for five days. At no time were there any gastro-intestinal symptoms—there was no abdominal pain, diarrhea or

gastric irritation, and the appetite was very good throughout the whole time.

Several months later the experiment was repeated to make certain that the effects were really due to lithium. Only two doses of 2 gm. each were necessary to bring on the dizziness, ringing in the ears and blurring of vision. The general symptoms were much less marked than before, but there was some weakness for a day or so. Again there were no gastro-intestinal effects.

The notable features of these observations are the marked muscular and general prostration; the occurrence of vertigo and eye and ear symptoms resembling those of cinchonism, and the entire absence of gastro-intestinal symptoms.

According to the literature of lithium poisoning, as quoted by Good,¹ the common symptoms consist in marked prostration and gastro-intestinal irritation. The latter was entirely absent in my case, while the striking cinchonism effects do not appear to have been described by any previous reporters; but the doses taken by me (60 to 90 grains per day) were two or three times greater than those which seem to have been taken in the cases reported in the literature.

2196 East Eighty-Seventh Street.

FECAL IMPACTION IN THE ILEUM FOR FIFTY-THREE DAYS, WITH RECOVERY

ROWLAND H. HARRIS, M.D., F.R.C.S. (Edin.)

Assistant Surgeon to the Battle Creek Sanitarium

BATTLE CREEK, MICH.

The patient, Mr. H. L., whose case (No. 77,911) I report had intestinal obstruction at the age of 60, due to carcinoma of the sigmoid colon, and relieved after seven days by laparotomy and cecostomy; at 62 he had fecal impaction, lasting forty-nine days and relieved by a ride on a jolting lumber-wagon; at 63 he had fecal impaction and accumulation in the ileum, lasting fifty-three days and relieved by lavage of the ileum through the artificial anus; and he died of acute obstruction from prolapse of the cecum through the cecostomy fistula four years after the establishment of the artificial anus.

The patient was one of a family of thirteen children. He was born in England, came to the United States at the age of 23, and lived in New York State during the last sixteen years of his life. He married at the age of 33 and had two children. His occupation was always that of a farmer, and his out-of-door life would undoubtedly account in large part for his great vitality. The family history is negative, except that the patient's mother died at 48 of carcinoma of the breast. The patient's father died at 72, a paternal uncle at 70, a paternal aunt at 90, the maternal grandfather at 75 and the maternal grandmother at 90 years of age.

The patient was never ill and had never had a physician until he was 60 years of age, except that at 23 he accidentally injured both feet with an ax while chopping wood. He used practically no alcoholics. He smoked about 10 cents' worth of tobacco a week in a pipe, but never used cigars or cigarettes. He drank one cup of coffee a day up to three years before his death, and tea three times a week. He ate meat in small quantity on an average of once a day all his life, and pepper, vinegar, mustard and other condiments in moderation.

Intestinal Obstruction from Carcinoma of the Sigmoid Colon.—At 60 years of age the patient had intestinal obstruction, for which cathartics and enemas were used for seven days without success. The patient's abdomen was distended, and he was in great pain, but vomited little. He had passed blood by rectum three months previously, but had lost little in weight. Dr. Edgar R. McGuire of Buffalo, who was called in consulta-

* From the Medical School of Western Reserve University.

1. Good, C. A.: *Am Jour. Med. Sc.*, February, 1903.

tion by the patient's home physician, advised an exploratory laparotomy, and performed the operation May 19, 1908. On opening the abdomen in the median line, he found a large tumor of the sigmoid which so involved the descending colon as to preclude a left inguinal colostomy. The tumor was without hesitation pronounced malignant; and its persistence with complete occlusion of the colon for four years after the operation would seem to exclude diverticulitis and obstruction from certain other causes.

A cecostomy was performed, the opening in the cecum being placed at the level of the ileocecal valve. The patient was soon able to do his usual work about the farm, and he found little inconvenience with the artificial anus, except that about every two weeks he had diarrhea. He took cathartics and enemas occasionally. The cecum frequently prolapsed through the artificial anus but was easily replaced by the patient. No colostomy plug or cap was worn, merely a simple pad of cloth which was changed from time to time. Practically no fecal matter was passed by rectum during the remaining four years of the patient's life, and only occasionally blood-stained mucus.

Fecal Impaction at the Age of Sixty-Two.—In September and October, 1910, two and a half years after the establishment of his cecostomy, the patient went forty-nine days without having a movement of the bowels, either through the artificial anus or through the rectum. During that time the patient was free from headache and suffered very little from abdominal distention. He was inconvenienced by the accumulation of gas; but as soon as the gas escaped through the artificial anus, he was restored to a comfortable condition. About four weeks after the beginning of the fecal impaction, the urine became dark red and continued so until the patient obtained relief from the impaction.

The patient's bowels began to move after seven weeks, the favorable termination of the obstruction being brought about by the jarring of a ride on a lumber-wagon. The bowels moved intermittently for a week through the artificial anus, the material passed being chocolate brown in color and not offensive in odor.

Judging from the obstruction which took place one year later, it would seem that the determining factor in the production of the impaction was the ingestion of fruit with the seeds, and of imperfectly masticated coarse vegetables, which were abundant at that time of year.

The patient's expulsive power was certainly less efficient than normal by reason of the artificial anus, and he was less solicitous about the initiation of defecation than one would expect; but the principal factor in bringing about the impaction undoubtedly comes under the head of indigestible food residue.¹

Fecal Impaction in the Cecum at the Age of Sixty-Three.—After the relief of his obstruction in 1910, our patient had no further difficulty until Aug. 21, 1911, when his bowels ceased to act through the artificial anus, the exact date being fixed by the patient and by his wife as being one week before the begin-

ning of the county fair. The patient was prevented from attending the fair by the fear that his bowels would begin to move while he was away from home. The patient was not greatly concerned about his condition, and was fairly comfortable until seven weeks had passed. He was in daily expectation that some fortuitous circumstance would bring relief, as had his ride on the lumber-wagon the preceding year.

During the time of the fecal impaction, the patient passed only gas through the artificial anus and nothing by rectum except a small quantity of blood-stained mucus. During the entire time he went about his work on the farm, and ate three meals a day, his appetite beginning to fail only a day or two before he presented himself for treatment.

The following list of foods eaten at approximately 159 meals during the time of the impaction is interesting from the point of view of the fecal residue to be expected: grapes, tomatoes, raspberries, strawberries, elderberries, apples, pears, peaches, prunes, cherries and melons; potatoes, beets, carrots, turnips, cucumbers, squash, pumpkin, string beans, lima beans, corn and peas; eggs, milk, cream and butter; bread and oatmeal; beef, bacon, chicken, mutton, salmon and sardines; pies of various kinds; cereal coffee, tea and condiments.

Oct. 12, 1911, fifty-three days after his last bowel movement, the patient presented himself for treatment, having been referred to the hospital by his home physician. The patient had taken cathartics for four weeks and had used enemas by rectum three and four times a day for two weeks, naturally without result. Enemas of a pint of water at a time had been easily passed into the cecum through the artificial anus twice a day for a week, but only a few drams of water returned each time, the rest of the water being absorbed. This indicated that the obstruction was not at the cecostomy opening.

Condition of Patient on Fifty-Third Day of Impaction.—At this time the patient had few symptoms. He was uncomfortable from the abdominal distention and said that his abdomen felt numb. He was able to expel gas through the artificial anus. The appetite was beginning to wane, and the patient had eructations of gas. He was walking about and was not in the least nervous or apprehensive about his condition. He had none of the symptoms that might possibly have been expected—headache, vertigo, pain, dyspnea, palpitation, nausea, vomiting, abdominal rigidity or difficulty in urination. For several weeks the urine had been red.

The patient had a slight rise of temperature on arrival, the temperature being 100 F. and the pulse 88. Within two hours, however, the temperature became 98.4 F. and the pulse 69, and continued normal thereafter. The systolic blood-pressure was 84 mm. for the brachial artery.

The patient had lost in weight, this being most noticeable in the arms and legs. The skin was dry but not more than normally pigmented. The pupils were equal and normal in size. The tongue was somewhat coated. The patient had twenty-six teeth, all but one of them being sound.

The heart and lungs were found normal, and points of special interest were found only in the examination of the abdomen. The abdomen showed the scars of the incisions made at the time of establishing the artificial anus. The cecostomy opening was surrounded by an area of unirritated though slightly pigmented skin. The opening was circular and only large enough to admit the little finger with difficulty. By depressing the abdominal wall, the finger in the artificial anus could be made to palpate across the cecum a mass which gave the impression of an accumulation of fruit seeds.

There was practically no tenderness in the abdomen, except on pressure over the tumor in the left lumbar region. The abdomen was distended, the principal distention being due to a mass which lay to the left of the median line from the pubes to the costal arch, and which could be moved slightly from side to side by pressure over the abdominal wall. The left lumbar region was easily compressible, and there was no evidence of peritoneal effusion. There was resonance in the epigastrium and dulness in the right lumbar region. (A subsequent skiagram showed the liver rotated to the right by the abdominal distention.)

1. Many cases are recorded in which impaction and intestinal obstruction have been caused by fruit-seeds eaten with the fruit, and by imperfectly masticated nuts and grains. Cherry-seeds seem to have been particularly potent in this regard. Impaction in the rectum has been caused by raisin-skins and seeds in a boy 9 years of age (Lesage, L. A.: *Jour. de méd., chir., pharm., etc.*, 1812, xxv, 56); by grape-skins and seeds in a man 25 years of age (Thornton, J. B.: *Boston Med. and Surg. Jour.*, 1890, cxxxv, 339); by water-melon-seeds in an adult negro (Holliday, W. Z.: *Med. Rec.*, New York, 1888, xxxiv, 508); by cherry-stones and prune-stones in a man 27 years of age (Hommans, J.: *Boston Med. and Surg. Jour.*, 1895, cxxxiii, 164); by imperfectly masticated whole wheat in a man 45 years of age (Somers, G. B.: *Occidental Med. Times*, Sacramento, 1894, viii, 601); by chips of cinnamon bark eaten by a boy 11 years of age (Guy's Hosp. Gaz., 1893, vii, 245); and by tiger-nuts eaten by a 12-year-old boy (Iboston, E. C. B.: *Lancet*, London, 1905, i, 1197). J. E. Moore (*Internat. Clin.*, 1911, 215, ii, 155) reports a case in which obstruction in the cecum and ascending colon was caused by chestnuts eaten daily for some time. Fatal cases of impaction at the ileocecal valve have been caused by plum-stones in an adult (Mannell, S. E.: *Indian Med. Jour.*, Allahabad, 1885, iv, 126), and by unripe, unmasticated blackberries in a 5-year-old child (Gornall, J. G.: *Brit. Med. Jour.*, 1890, ii, 1035). E. C. Evans (*St. Louis Med. and Surg. Jour.*, 1854, xii, 308) has reported two fatal cases of obstruction caused by husks of parched corn, one in the jejunum 5 inches below the duodenum in a girl of 18, and one in the duodenum in a boy 10 years of age.

Digital examination of the rectum gave no information of immediate value, beyond the fact that intra-abdominal pressure was increased.

Treatment of the Impaction.—Lavage through the artificial anus was commenced at 8 o'clock in the evening of the day the patient presented himself for treatment, and was continued uninterruptedly for seven hours, during which the patient fell asleep a number of times and experienced no inconvenience except for painful cramps in his left leg.

That the treatment was not altogether without danger was recognized. Great care was exercised in inserting the tube, always well lubricated with petrolatum, and in conducting the lavage so far as possible with the lavage tube *in situ*, lest the bowel should be separated from its attachment to the abdominal wall by any undue violence.

The ileum was greatly dilated by the prolonged fecal accumulation, and its walls undoubtedly weakened by stercoral ulceration. The quantity of water introduced at any one time and the pressure over the abdomen in encouraging the outflow through the tube were carefully regulated.

The lavage of the intestine through the artificial anus was carried out with the patient in the dorsal position, near the right side of the bed and on a Kelly pad. Water was readily passed into the bowel, but could not at first be withdrawn on account of the tube having entered a mass of feces. Many times during the lavage, the tube became clogged with hard fecal masses—seeds of grapes, berries and apples, and undigested portions of string beans. At times it was necessary to remove the tube, although a large-sized colon tube was used, and to strip along it the obstructing masses which it was impossible to dislodge with water under considerable pressure. As the lavage progressed, the tube could be freely passed 10 or 12 inches through the ileocecal orifice into the greatly dilated ileum, the water distending the bowel in advance of the tube. The outflow was often interrupted but usually could readily be restored by withdrawing the tube for a few inches. When the tube was passed directly downward parallel to the median line of the body, it was arrested by the cecum at a depth of about 4 inches.

As the distention was relieved, it was observed that the abdomen was being emptied along a curved line sweeping from the artificial anus into the pelvis, and upward toward the left hypochondrium. Careful pressure along this line accelerated the outflow through the tube, especially when combined with pressure over the dilated cecum and ascending colon. When the abdomen was flaccid and the intestine comparatively empty, the stomach was still distended and was more prominent than at the beginning of treatment. In view of the fact that the stomach would probably empty its contents into the small intestine without difficulty, it was not thought advisable to subject the patient to gastric lavage.

Nearly 60 liters (63 quarts) of warm water were used in the lavage. The washings resulting from the first 18 or 20 liters (19 or 21 quarts) were about as thick as pea purée, of a dark chocolate-brown color and not offensive in odor. The last 40 liters of washings were of the consistency of pea soup. The washings acquired a fecal odor in a few hours of exposure to the air.

The patient was given a full tub bath, and although his night had been so fully occupied, he insisted on dressing himself at his usual hour of 5:30 in the morning, and waited somewhat impatiently for his breakfast. The distention of the abdomen had been so much reduced by the treatment that the patient's vest, the lower part of which could not be buttoned the night before, now hung loosely when buttoned. The patient's appetite improved rapidly, so that by the fifth day he was eating more than 2,000 calories a day.

The Fecal Accumulation.—The mixed washings obtained by lavage of the bowel measured more than 61 (61.750) liters (65 quarts), and weighed more than 62 (62.493) kg. (138 pounds). They therefore had a specific gravity of 1.012, from which the average daily fecal residue might be roughly estimated at 32 gm. (1½ ounces) of dry material. A more accurate estimation was reached by drying an average sample, the dry residue being 3 per cent. by weight of the washings. Three

per cent. of the total weight of the washings gives 1,874 gm. (4¼ pounds) of dried fecal residue as the accumulation of fifty-three days. The average daily fecal residue was therefore 35.38 gm. Calculated in the proportion of four parts of moist feces to one part of dried residue (Landois), the fecal accumulation for which the patient sought relief approximated more than 16 pounds. The fecal accumulation might have been expected to be about 7,155 gm., since Voit gives 135 gm. as the average amount of moist feces eliminated daily by a normal man on a mixed diet.

Examination of Feces.—A sample of the washings, carefully examined in the laboratory, contained the fruit-seeds and undigested food remnants already mentioned, and many large crystals of triple phosphate which had the appearance macroscopically of sand. Besides phosphates no other crystals were found. Traces of blood were found, which may have resulted from the ingested meat, but probably originated in stercoral ulcers in the bowel. Gram stains and counts of bacteria in samples from each of the ten jars in which the washings were

ANALYSES OF URINE

	Samples			
	1	2	3	4
Quantity (c.c.)	400	500	900	1,200
Color	Red.	Yellow.	Amber.	Reddish-yellow.
Specific gravity	1.020	1.002	1.003	1.013
Total solids (gm.) . .	18.64	2.33	6.29	36.34
Acidity (c.c. tenth-normal acid) . .	71	10	65	110
Urea	10.00	1.50	3.60	16.80
Ammonia (gm. NH ₃) . .	.212	.075	.205	.212
Chlorids (gm. NaCl) . .	2.80	.10	.00	10.32
Sugar	0	0	0	0
Albumin	0	0	0	0
Bile	0	0	0	0
Blood	0	0	0	0
Indican (Folin scale) . .	4	0	0	0
Indolacetic acid . . .	Abundant.	Trace.	Trace.	0
<i>Microscopic Findings:</i>				
Crystals	0	0	0	Many calcium oxalates.
Epithelia	Few.	Few.	Few.	Few.
Casts (No. in field) . .	0-1 Hyaline.	0	0	0

collected gave an average of 17.5 per cent. of Gram-positive and 82.5 per cent of Gram-negative bacteria present. The reaction was strongly alkaline. There were digestive enzymes present, and the material did not give the biuret test, which would indicate complete digestion or bacterial decomposition of the protein.

An examination of feces twenty-four days later gave the following result:

Amount of moist sample, 21 gm.; amount of dried residue, 3.37 gm.; color, brown; odor, normal; form, semiliquid; food remnants present; mucus normal in amount; reaction slightly acid; enzymes present; biuret reaction given; blood detected by chemical tests; no crystals present except crystals of fatty acid; some fat globules present; no other microscopic findings of note; bacteriologic examination showed 18 per cent. of Gram-positive and 82 per cent. of Gram-negative bacteria.

Blood Examination.—The patient's hemoglobin was 79 per cent. of normal; red cells 4,750,000 per c.mm., or 95 per cent.; white cells 8,200 per c.mm., or 109 per cent., normal being taken to be 7,500 per c.mm. The red cells were normal in size and shape. Differential count of 270 leukocytes gave 18.5 per cent.

of small lymphocytes, 5.1 per cent. of large lymphocytes and 76.3 per cent. of polymorphonuclear neutrophils.

Urinary Examination.—At the beginning of the lavage of the intestine through the artificial anus, the patient passed red urine (Sample No. 1), two hours later light yellow urine (Sample No. 2), and in the morning amber urine (Sample No. 3). For comparison the analyses of these three specimens are tabulated, with an analysis (Sample No. 4) made twenty-four days later.

RELATION OF URINARY AND FECAL FINDINGS TO SYMPTOMS

The color of normal urine is due principally to the yellow pigment, urochrome. The pronounced red color of the patient's urine was undoubtedly due to the reddish pigment urobilin, which is derived from bile pigments (Maly) and from hematin (Hoppe-Seyler) by reduction. Bile pigments, none of which left the intes-

The occurrence of indican in small amount in this case is in marked contrast to the large amounts of indican found in acute obstruction of the small intestine. Nothnagel states that in occlusion of the small intestine there is a large, and occasionally enormous, increase of indican in the urine; in occlusion of the colon, on the contrary, the indican is increased only when this lasts a long time and when there is stagnation of intestinal contents above the ileocecal valve.

The great number of crystals of triple phosphate in the feces is a further indication that there had been putrefaction in the intestine. The absence of toxic and reflex symptoms was probably due in large part to the following facts:

1. The intestinal gases were able to find exit by eructation from the stomach and by passage from the artificial anus, as well as by elimination in the expired air.

Fig. 1.—The stomach filled with bismuth suspension. The upper marker is placed over the navel, the lower marker at the cecostomy opening. The fine flaky shadows represent bismuth which has just passed out of the stomach and is en route to the small intestine. Note the width of the stomach shadow, indicating the true dilatation.

Fig. 2.—The colon injected by rectum. The bismuth column has filled the colon as high as the crest of the ilium, locating the obstruction at this point, beyond which it does not pass. The density of the upper right abdomen represents the liver, which is rotated so that none of it lies in the epigastrium.

tine in feces during the impaction, and blood, which may have resulted from stercoral ulceration, or have been derived from the meat ingested, were without doubt the source of the urobilin in the patient's urine.

Indigo-red, also called uro-rubin, has been found in the urine in intestinal obstruction, originating from indoxyl-sulphate, (indican). This substance might possibly have been found in the urine in this case. No investigation was made to determine its presence.

There was no bilirubin in the urine, from which fact, and from the absence of jaundice, we may safely conclude that the intestinal stasis did not cause biliary obstruction, catarrhal or otherwise.

Indolacetic acid was present in large amount in the urine, but the indican was only slightly increased. The products of putrefaction in the intestine were thus rendered inert by combination with organic acids as well as with sulphates.

2. The stasis of food in the small intestine was favorable to complete digestion and absorption of the protein, leaving little for putrefaction.

3. The bacteria of the small intestine were protective in producing substances, such as lactic acid, to inhibit the activity of putrefactive organisms.

4. A more or less constant balance was maintained between production and absorption of toxic substances, and their elimination.

Fluoroscopic and Skiagraphic Examination.—On the day following his arrival, and after his fecal impaction had been relieved, the patient spent the afternoon in the x-ray laboratory, where his stomach and small intestine were examined after a bismuth meal, and his colon after bismuth enema by rectum and after bismuth enema through the artificial anus.

The examination of the patient was conducted by Dr. A. J. Read, acting roentgenologist in the absence of Dr. J. T. Case. His findings made clear the changes brought about in the

gastro-intestinal tract by the prolonged impaction and confirmed the diagnosis of tumor in the sigmoid colon. The fluoroscopic report will first be given, and then a description of the accompanying illustrations made from the skiagrams.

The heart and lungs were incidentally examined with the screen and were found radiologically normal.

The patient was given his first bismuth meal, consisting of $2\frac{1}{2}$ drams of bismuth oxychlorid in 8 ounces of oriental clotted milk. The bismuth meal entered the stomach in a normal manner, and passed at once to the lower pole, which was about an inch below the level of the umbilicus. The stomach was enormously dilated but was completely empty within four hours.

The fluoroscopic examination was repeated two days later, a larger bismuth meal being given so as to obtain more accurate information in regard to the dilated stomach and small intestine. The meal consisted of $7\frac{1}{2}$ drams of bismuth oxychlorid in 24 ounces of buttermilk. The observations of the previous examination were confirmed, and the lower pole of the stomach was found considerably displaced to the right, the pylorus being

Fig. 3.—The colon is shown injected by rectum and through the cecostomy opening. Note the enlargement of the cecum.

about 4 inches to the right of the median line and 3 inches above the level of the umbilicus. The pylorus was found close under the liver, which was rotated into the right lumbar region, the left lobe being in the right hypochondriac region with none of the liver in the epigastrium. Food began passing almost immediately into the small intestine, the loops of which gave a very broad shadow. The food had nearly all passed out of the stomach at the end of seven hours, and a portion of the meal was entering the cecum. There was thus little delay in the passage of the meal to the cecum, in spite of the long overdistention and the greatly dilated condition of the small intestine.

The patient was given a bismuth suspension by rectum, which passed unobstructed through the rectum and sigmoid colon to a point 2 inches below the left iliac crest. At this point its progress was completely interrupted (by the tumor).

Injection of a bismuth enema through the artificial anus showed the cecum and first part of the colon, but the bismuth did not pass beyond the hepatic flexure. The artificial anus was shown by a metal marker to be in the cecum at the level of the ileocecal valve. The cecum, which extended 4 inches

lower than the ileocecal junction, and the ascending colon were found greatly dilated.

Indications Against Surgical Operation.—The question of removal of the tumor in the sigmoid colon after relief of the impaction was considered, but it was decided that the patient's condition would not permit of safe recovery from any surgical operation extensive enough to eradicate the tumor and involved tissues. It was believed that there were metastatic growths, although positive evidence was lacking. It was thought that with proper care of the bowels, and management of the artificial anus, the patient would live comfortably.

Subsequent History.—The following history was obtained from the patient's family. On his return to his home in New York State in November, 1911, the patient felt fairly well and was able to walk about the neighborhood; but he was soon confined to the house by the cold weather and by pain in his left thigh. There was weakness and wasting of the muscles of the left thigh; and the pain, which was worse at night, was associated with anesthesia, paresthesia and coldness of the limb. No neurologic examination was made to determine whether the symptoms were due to metastatic growth in the spine or to direct involvement of the lumbar plexus in the tumor mass.

Prolapse of the Cecum Through the Artificial Anus.—The patient was reasonably comfortable until April, 1912, the bowels being easily managed by enemias through the cecostomy opening. April 20 the patient ate a little more than usual, and during the night the cecum prolapsed for about 5 inches through the artificial anus. The prolapsed bowel was caught in the grasp of the tightly contracted cecostomy, and it was found impossible to effect reduction, although I am informed that the examining finger could be passed through the apex of the presenting bowel down to the constricting ring. The artificial anus was completely obstructed and the patient suffered with the symptoms of acute intestinal obstruction—distention with gas and accumulated intestinal contents, intolerable pain, which was with difficulty controlled by opiates, and at the last fecal vomiting. The surgeons of the nearest town, who were called in consultation, decided that the patient was too feeble to undergo the necessary surgical interference and the patient was made as comfortable as possible till his death, April 27, 1912, one week after the prolapse of the cecum and almost four years after the establishment of the artificial anus. No post-mortem examination was made.

CONCLUSIONS

1. Cecostomy may be complicated (a) by contraction of the opening, requiring dilatation from time to time, (b) by fecal impaction, necessitating irrigation through the artificial anus, and (c) by prolapse of the cecum through the cecostomy fistula.

2. Fecal impaction in the ileum in the case herewith reported was due principally to the ingestion of fruit-seeds and imperfectly masticated vegetables such as string beans, which became impacted at the ileocecal orifice.

3. Mere fecal accumulation does not cause urgent symptoms as long as the intestinal gases have opportunity of exit. The distention may produce displacement of the liver and stomach without marked interference with their functions.

4. The urine became dark red from the elimination of bile pigments and hematin reduced to urobilin in the intestine; and the urine contained a few hyaline casts, but no albumin.

5. Roentgen-ray examination of the digestive tract after bismuth meals and bismuth enemias was valuable in estimating the extent of the changes which resulted from the impaction, and in confirming the exact location of the tumor.

6. Treatment to be effective must be persevering and should be conducted with full knowledge of the probable

existence of stercoral ulceration in a greatly distended intestine, and of the possibility of separating the bowel from the colostomy opening by any undue violence.

7. Prolapse of the cecum through the artificial anus may prove fatal unless skilful surgical attention is promptly available.

TREATMENT OF ACUTE DACRYOCYSTITIS *

F. H. VERHOEFF, A.M., M.D.

BOSTON

The purpose of this paper is chiefly to call attention to a procedure in the treatment of acute dacryocystitis which, although first advocated by Agnew over forty years ago,¹ has been generally overlooked or forgotten. About three years ago I devised the same procedure, unaware at the time that Agnew had preceded me, and ever since have made use of it with increasing satisfaction.²

The methods of treating acute dacryocystitis most widely followed are undoubtedly those set forth by Fuchs in his text-book, viz:

If the inflammation has passed the initial stage, it is idle to endeavor to prevent the formation of an abscess; besides, the methods of syringing, expression and compression, given above, could not be employed on account of the swelling and painfulness of the parts. The only thing to do now is to hasten the formation of the abscess, an object which is best attained by the use of moist and warm compresses. As soon as fluctuation makes itself apparent, we incise the anterior wall of the lacrimal sac, or that portion of skin beneath which the presence of pus can be made out. A lacrimal fistula is thus artificially produced, through which the contents of the abscess and of the lacrimal sac itself are discharged externally. This is kept open by the introduction of a strip of iodoform gauze every day, until all inflammatory symptoms have disappeared and the secretion that exudes has lost its purulent character.

It will be seen that this treatment is based on the assumption that a lacrimal abscess is analogous to any ordinary abscess. This, however, is not the case. In the earliest stage of an ordinary abscess a central cavity is lacking, owing to the fact that the purulent infiltration in the center has not become sufficiently dense to break down the tissue. While the abscess cavity is forming, a reaction is taking place around it, which walls it off and tends to prevent extension of the infection to the surrounding tissues. In the case of a lacrimal abscess, on the other hand, there is a preformed cavity which is already walled off from the surrounding parts by epithelium and connective tissue. As the inflammatory process increases, the cavity becomes more and more distended, and the infection penetrates the wall and forms one or more secondary abscesses in the tissues without, which ultimately open into the lacrimal sac and through the skin. From these considerations it is obvious that, while in the case of an ordinary abscess delay of operation may be advantageous, in the case of a lacrimal abscess it unnecessarily prolongs the process and increases the danger of extension to the surrounding tissues and of the formation of a fistula.

Admitting, then, that the usual temporizing methods in the treatment of acute dacryocystitis are improper,

and that the pus should be evacuated as soon as possible, how should this be accomplished? In the very early stages an attempt may be made to press out or wash out the contents of the sac through the canaliculi, but this is seldom successful. This failing, the sac should not be incised through the skin under any circumstances. Objections to the skin incision are that owing to its depth it gives imperfect drainage, that it requires to be "wicked" or frequently reopened, and that it insures a fistula which too often is almost impossible to heal and which interferes with extirpation of the sac later. The Bowman operation of slitting the canaliculus is less objectionable, but it also does not give good drainage, involves unnecessary mutilation, and is difficult to do under the inflammatory conditions prevailing. Superior to either of these procedures is the incision of Agnew. This is made through the conjunctiva between the caruncle and inner commissure of the eyelids. It involves cutting through the least possible depth of tissue, and not only gives adequate drainage but insures constant irrigation of the lacrimal sac by the tears.

The following quotation gives Agnew's views on the treatment of acute dacryocystitis and the description of his incision:

The common practice is to order leeches and hot poultices over the sac. This is a serious mistake. The first and imperative indication is to make an opening and let the contents out of the sac. . . . If the matter is already showing itself as a yellow or bloody mark beneath the cuticle, your course is simple; cut through the skin at the most depending part of the fluctuating tumor. . . . You have [otherwise] the choice of two other methods: either to slit up the lower canaliculus from punctum to sac and thus evacuate the matter; or, if that be prevented by excessive swelling, to make an incision behind the commissure of the eyelids between it and the caruncle, where you can reach the cavity of the sac with great ease, and do nothing to embarrass you in the after-treatment of the case. . . . You may then empty the sac without difficulty and avoid an external wound; nor does your procedure injure the canaliculi, or damage any appendage of the eye or interfere with after-treatment.

Agnew used a Beer's knife in making the incision. I found this unsatisfactory, because in giving it the desired direction, that is, directly inward toward the nose, the blade is almost sure to come in contact with the cornea and thus render the latter liable to infection. While planning a special instrument for this purpose, Dr. W. Liebman, my assistant in many of these operations, suggested the use of a small angular keratome, and this has proved perfectly satisfactory. General anesthesia with ether has been employed in all my cases. An assistant holds the lids apart with two small lid elevators. The angular keratome is then made to enter just in front of the caruncle, is plunged through the sac to the bone, and the incision enlarged by cutting upward and downward. There is always free hemorrhage, but pus does not always gush out until after a probe is introduced. I always immediately probe the lacrimal duct through the incision, using in adults first a No. 12 Theobald probe, then always a No. 14, and finally, if possible, a No. 16. The large probe is left in until the patient begins to regain consciousness, in order, as far as possible, to prevent bleeding from the duct.

For the after-treatment I direct the patient to press on the sac from time to time and keep the conjunctival sac free from pus with a lotion of boric acid. I have never irrigated the sac, even immediately after the operation, and my results show that this is unnecessary, the tears no doubt serving this purpose. Cold or hot

* From the Massachusetts Charitable Eye and Ear Infirmary.

1. Agnew, C. R.: Practical Suggestions for the Treatment of Lacrimal Disease, *Am. Pract.*, January, 1871, p. 1.

2. For the reference to Agnew's paper I am indebted to Dr. J. E. Weeks, who in his text-book makes brief mention of Agnew's incision.