INTUSSUSCEPTION, WITH SPECIAL REFERENCE TO ADULTS.*

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THE discussion of changes in peristaltic activity leading to the development of intussusception and the results of observation in physiological laboratories of a symmetrical stimulation of different segments of the intestinal tract have been so fully presented by different writers that further consideration of that part of the subject is unnecessary.

While intussusception in infants and children is carefully and exhaustively described in both text-book and in the current literature, the consideration of the same lesion in adults is almost universally neglected. That intussusception in adults is uncommon cannot be denied, but the fact that it is sufficiently frequent to warrant careful consideration is amply proved by an analysis of the cases admitted to the service of any general hospital in a stated period of time, such as 20 or 25 years. Such a tabulated list of 115 cases from the records of St. Thomas's Hospital in London, from 1875 to 1900, was published by Pitts in the *Brit. Med. Journal* (1901, 2, page 574), and of these about 10 per cent. occurred in adults over fifteen. In a similar series of 59 cases observed in the *Scot. Med. and Surg. Journal,* 1906, xix, during a period of 10 years prior to 1905, reported by McGregor, four were in adults over twenty-one. Codman, in the *Boston Med. and Surg. Journal* for 1908, 158, pages 439–446, states that of 27 cases of intussusception in the Massachusetts General Hospital dur-

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ing the ten years prior to 1908, nine occurred in adults. In this connection the older statistics of Leichtenstern (*Prag. Monat.*, 1874), based upon the study of more than 500 cases and showing a percentage of 45 in adults, must be discarded, for they were evidently gathered from current literature at a time when intussusception in infants was frequently unrecognized or discovered only at autopsy, and similarly the statistics of Gibson published in the *Med. Record* for 1897, in which of 239 cases, 60 occurred in adults over seventeen, are of comparatively little value in demonstrating the relative frequency of intussusception in adults and children.

Of very considerable interest is a comparison of what may be termed the exciting causes in children and in adults. In the former the different kinds of acute intestinal disturbance resulting from improper food preponderate. In infants any inflammation or other pathological change in the vermiform appendix contributes very slightly if at all to the development of intussusception. In young children, however, the writer has collected 18 instances between the years of two and seven in which an inverted appendix was probably the cause of a cæcal intussusception, while only three instances of the same condition could be found in adults.

Trauma is frequently mentioned as a possible cause of intussusception. In infants it obtains only in the sense that the muscular effort of crying and straining unquestionably increases a pre-existing intussusception, and may even be considered responsible for its initial formation. In adults, on the other hand, trauma is infrequent, and even when mentioned as a cause may, by some, be regarded as a mere coincidence. Moreover, it is not always received in the same way. Usually a history of some sudden excessive exertion, as in heavy lifting, is said to have directly preceded the onset of the acute obstruction, while less frequently the intussusception is ascribed to a blow on some part of the anterior abdominal wall. In Case 163, that of an actor in vaudeville, the patient had daily held a number of men on the rigid abdomen. After one of these performances, acute obstruction developed, and

operation disclosed an intussusception due to an inverted Meckel's diverticulum with a subserous lipoma at its apex, an unusual combination of three so-called exciting causes. A lateral anastomosis after resection was done, and on recovery the patient was advised to change his occupation. In a number of instances such as the preceding, trauma might be regarded as a contributing cause, for either benign neoplasm or a Meckel's diverticulum might alone be responsible for an intussusception. This interpretation must obtain in Case 49, in which after a fall on the left side a subserous lipoma was found at the apex of an intussusception. In the three following cases, however, no cause was found either at operation or at autopsy, and the previous history of trauma assumes a correspondingly greater importance. In Case 25 wrestling had preceded an intussusception, which terminated fatally from peritonitis after the discharge of a necrotic intussusceptum from the bowel. A similar case, No. 37, may be cited, in which a slough composed of the transverse colon was discharged from the bowel after an obstruction of a week's duration, preceded by a history of lifting a heavy weight. In Case 193, an enteric intussusception, a history of playing football is mentioned. An analysis of the 300 cases cited in this paper gives 23 instances in which some form of trauma was associated with the intussusception, and a glance at Table I shows that, of all the different forms of trauma, that one in which there is some form of violent muscular exertion is by far the most frequent.

TABLE I.

Trauma, not classified	2
Blow	2
Crush	1
Fall	3
Violent muscular movement, football (1), riding (2)	7
Lifting heavy weight	7
Puerperium	1
Typhoid	5
Dysentery	6
Tuberculosis	5
Simple inflammatory ulcers	3

Tumors of the intestine are a comparatively frequent cause of intussusception in adults, occurring rarely in infants and children. Of the 300 cases here cited, there were 60 instances of benign tumor and 40 instances of the malignant type. Of the former class, the majority had their origin in the inner layers of the intestinal wall, usually by a constricted or pedunculated base, and projected into the lumen, forming by that means a more natural form of irritation than the less frequent growths which were subserous and projected toward the peritoneal cavity. Histologically, polyp, lipoma, myo-adenoma, fibroma, myxofibroma, myofibroma, myxoma, cyst of the ileocæcal valve, and papilloma are all mentioned, the polyp being the most frequent and occasionally multiple. In four instances the benign tumor was associated with a Meckel's diverticulum: in Case 152, a fibrous polyp at its apex; in Case 151 a similar growth in its interior; in Case 163, a subserous lipoma at its apex, and in Case 97 a plum-sized fibrous tumor near its base. In almost every instance, the tumor occupied the apex of the invagination, but in Case 96 it was at its base, a situation in which the question of its being an exciting cause might well be open to argument.

The malignant growths include different varieties of carcinoma, sarcoma, myxosarcoma, melanotic epithelioma, and in Case 111 a sessile polyp in the sigmoid which had become malignant. The location of the growth may be studied in Table II. No part of the alimentary tract seems to be immune, but as is the case with growths of the intestine independent of intussusception, benign varieties are more frequent in the small, while malignant growths more frequently invade the large intestine. Moreover, attention may be directed to the fact that intussusceptions occurring in connection with benign growths in the large intestine are situated in either the sigmoid or rectum.

Ulceration of the intestine other than that associated with malignant growths is a well-recognized cause of intussusception in adults. Ulceration associated with typhoid fever, dysentery, tuberculosis, and simple ulcers possibly of sterco-

raceous origin preponderate. The writer has reported in vol. xxiv of the *Transactions of the American Surgical Society* a case of enteric intussusception associated with the convalescent period of typhoid fever in a young girl of seven. A study of the 300 adult cases here reported shows 5 instances of intussusception due to typhoid ulceration, 6 instances of intussusception in connection with dysenteric ulcers, 5 instances of intussusception associated with tuberculosis, and at least 3 instances of intussusception associated with what are described as simple inflammatory ulcers. In intussusception due to tuberculosis, the lesion may be a tuberculous infiltration of the serosa or subserosa of the intestine without ulceration of its mucous membrane.

TABLE II.

	Benign.	Malignant.
Enteric, not stated	4	3
Duodenum	0	1
Upper jejunum	1	0
Lower jejunum	0	0
Not stated, jejunum	4	2
Upper ileum	0	1
Lower ileum	5	1
Not stated, ileum	5	2
Total	19	10
Ileocæcal valve	13	9
Total	13	9
Colon, not stated	5	2
Ascending colon	0	1
Transverse colon	0	0
Descending colon	2	0
Sigmoid	6	5
Rectum	1	1
Cæcum	3	9
Total	17	18

Meckel's diverticulum is associated with intussusception in both adults and children. In 29 cases of this particular variety, 15 occurred in patients under ten, five between 10 and

20, four between 20 and 30, and four in patients between 30 and 49, and in one the age is not given. In the different varieties of acute obstruction directly due to this appendage without intussusception, a similar age relationship obtains and cases occur even as late as in the sixth decade. The exact nature of the irritation which brings about the initial inversion of a diverticulum in intussusception is rather difficult of explanation. Reference has already been made to the occasional presence of a polyp or other benign growth in this connection. In the majority of cases, however, in irritation or inflammation from inadequate drainage of its secretion lies the probable explanation of this unusual lesion.

Foreign bodies within the alimentary canal, impacted or free, rarely cause intussusception. In Case 33, however, a rusty darning needle and in Case 180 a date stone may have been contributing factors.

Some writers believe that intussusception may be due to the irritation of intestinal parasites such as ascarides or lumbricoides. Whether the presence of such parasites is a mere coincidence or an actual contributing cause is largely conjectural.

Attention is directed to a considerable number of acute, subacute, or chronic cases of intussusception in which no cause is mentioned. That cases occur without discoverable cause must be admitted. On the other hand the lack of mention of a cause is not infrequently due to omissions in the published report of the case.

The uniformity of the clinical picture of intussusception in infants and young children has been emphasized by Clubbe, Codman, and many other writers. In this group of cases the symptoms, both local and constitutional, are so characteristic that a correct diagnosis should be promptly made. On the other hand, that the clinical picture of intussusception in adults varies widely is well illustrated in the histories of the following cases in both of which the cause was a polyp attached to the intestinal wall by a constricted base. As a matter of fact the great contrast presented by these histories suggested

to the writer the desirability of investigating the subject of acute intussusception of adults as a whole, with the object of arranging if possible the different groups into which, in accordance with their varied courses, the cases might justifiably be divided.

CASE I.—Male, aged forty. Referred by Dr. Ferguson.

Ever since childhood and until a short time ago patient has suffered from occasional abdominal cramps; three or four months ago patient was seized by slight cramp-like pains in the left lower quadrant occurring either before or after eating. They were of from 10 to 15 minutes in duration and were relieved by simple measures. Twenty-nine hours ago, patient was seized by a sudden, severe, cramp-like pain in the left lower quadrant, which did not radiate. Shortly after the onset the bowels moved spontaneously, the movement consisting of blackish material. At the same time vomiting occurred and has been repeated at frequent intervals up to the time of admission into the hospital. About eight hours after the invasion, patient felt a hard lump in the right lower quadrant, which shortly afterward moved to the left side. The tumor and its change in position was confirmed by the family physician. In addition there was a history of the frequent passage of mucus and blood from the rectum.

Physical examination on admission to the hospital showed that the abdomen moved with respiration. There was a localized distention in the midumbilical region extending more to the right than to the left side. On palpation, two loops of elastic distended intestine, separated by a groove, could be distinctly felt in the distended area. These loops were movable from side to side and tympanitic on percussion. The overlying abdominal wall was moderately rigid. There was slight dulness in the flanks half way up to the navel. There was no evidence of increased or focal peristalsis. Apart from the presence of blood and mucus in an enema, examination of the rectum was negative. The temperature was 100°, the pulse 92, and respiration 22. The general condition appeared excellent.

Under anæsthesia, an incision was made along the outer border of the right rectus muscle, and on opening the peritoneal cavity a small amount of serous fluid issued from the wound. The distended loops above mentioned proved to be those of an

enteric intussusception, which was about 12 inches long and curved like an enormous sausage upon its mesenteric axis. It was completely irreducible. A resection of what proved to be about four feet of small intestine was then carried out, and the divided ends united by circular suture. The abdomen was closed without drainage. The patient reacted well from the operation and recovered without complication. An examination of the intussusception showed a polyp about the size of an English walnut at the apex of the invagination. The intussuscipiens was in a condition of incipient gangrene and the mesenteric veins were thrombosed.

CASE II.—Female, aged sixty-seven. Referred by Dr. Niesley.

Patient has always enjoyed excellent health until four months ago, when she suffered from several attacks of epigastric pain and vomiting. These quickly subsided, and patient was quite well until several weeks before her admission into the Nassau Hospital, when the epigastric pain recurred and, on abdominal palpation, a mass was found occupying the position of the transverse colon. This mass was doughy, insensitive, and, owing to a long pre-existing constipation, was supposed to be due to a possible fecal impaction. A high enema was given and the mass almost totally disappeared, only a small portion remaining in the right lower quadrant. At the same time the enema brought away only a small amount of ordinary fecal material. From time to time recurrence of the tumor took place, always without pain and without discomfort to the patient, only to disappear with an enema or after abdominal massage. At no time was there even subacute obstruction and operation was delayed merely with the idea of improving the patient's general condition. Rectal examination was negative.

Under ether the peritoneal cavity was opened by a right pararectal incision and the intussusception exposed. It was of the ileocolic variety and extended as far as the splenic flexure. Disinvagination was quickly accomplished until the cæcum was reached, and with a little pressure something was felt to slip through the ileocæcal valve and for a distance of six inches above it. From this point the intussusception, about six inches in length, was totally irreducible and was resected, followed by end-to-end suture. After the removal of the appendix, which was

œdematous and thickened, the abdomen was closed without drainage, the patient making an excellent recovery. Examination of the specimen removed showed a polyp the size of a lemon and attached by a constricted base to the apex of the invagination.

Through the courtesy of the gentlemen mentioned below I am permitted to present notes of five more hitherto unpublished cases.

Cases of Dr. John Gibbon, Philadelphia, Pa.

Case III.—A male, aged fifty-eight, was operated upon in the Presbyterian Hospital July 27, 1900, after a history indicating intestinal obstruction. He was in bad condition when operated upon. Eight to ten inches of the ileum had passed into cæcum and could be withdrawn. Three feet eleven inches of ileum were resected to get above gangrenous portion. The end of small bowel and cæcum opening were sutured in the wound. Drainage. Death on the same day.

Case IV.—A male, aged nineteen, previously in good health, his bowels having moved twice that morning, was seized by sudden severe abdominal pain and vomiting. The pain gradually became worse and several hours later he consulted Dr. Graham, who gave him a hypodermic and could distinguish a mass in the right lower quadrant when the boy became quiet. Seen by Dr. Gibbon shortly afterward, at Dr. Graham's office, patient was pale and without pain. Temperature was subnormal, abdomen was scaphoid and a little rigid. In the right lower quadrant was a distinct, oblong, slightly tender and movable mass. One hour later temperature was subnormal and mass was thought to have changed somewhat. Operation was refused until next day. Enemata had been ineffectual, and vomiting had occurred several times. There had been no tenesmus or rectal bleeding.

Operation 24 hours after onset. Under ether anæsthesia examination showed that mass had moved further up on right side. Through incision, through right rectus sheath, presented a large intussusception. Reduction was impossible. Incision made through ant. long. band of colon, which was filled with bloody exudate and 18 inches of ileum. It was impossible to draw ileum further into lumen of large bowel for purposes of resection. The contained ileum was tied off inside colon near

ileocolic junction, and two rows of sutures applied outside to prevent leakage. Lateral anastomosis between ileum and colon was made, utilizing the slit in the colon. Catgut was used for all inner rows of sutures and linen on the outside. Bowel was washed with saline and iodoform drainage was inserted.

Post-operation, a small quantity of flatus and bloody fecal matter was passed. There was a short post-operative rise of temperature. Feeding was begun immediately and convalescence was uninterrupted.

Cases of Dr. W. J. Mayo, Rochester, Minn.

Case V.—In an adult having colicky symptoms for several months. There was an adenofibroma in the ileum.

Case VI.—Age fourteen, with no previous symptoms; there was a myoma 6 inches above ileum into cæcum and ascending colon. Both cases recovered after resection.

Case of Dr. James E. Moore, Minneapolis, Minn.

Case VII.—Age twenty-five, had repeated attacks of colic through several years, diagnosed appendicitis. Present attack 24 hours. Variety, ileum into colon about 18 inches. Condition, dark color of both outer and inner coats but no gangrene. Operation, reduction and resection of a Meckel's diverticulum. Result, prompt cure. Patient had one attack of colic after the operation.

Returning to the above-mentioned classification, we find that Table A, including cases of intussusception associated with benign tumors, is the largest, comprising one-fifth of all cases here tabulated, and may be divided into four groups as follows:

(*a*) Those in which, as in the first case reported, the onset of the obstruction is acute and without warning, the patient having previously enjoyed perfect health.

(*b*) Those in which the acute onset is preceded by a history of previous attacks of obstruction relieved without operation, or a history of chronic constipation, indigestion, or of both extending over many years, or a history of intermittent attacks of colic with or without vomiting, concurrent with constipation and separated by intervals of complete freedom from all abdominal discomfort.

(*c*) An infrequent group in which the intussusception is essentially chronic, without marked pain, with no vomiting, and with only moderate constipation easily relieved by enema. The second patient herewith reported belongs to this group.

(*d*) An occasional group comprises those patients who give a history simulating some other abdominal lesion, in whom the intussusception is discovered only in the course of an exploratory laparotomy. Thus, in Case 80, symptoms of three years' duration pointed either to cholelithiasis or peptic ulcer, yet on operation an enteric intussusception with a polyp at its apex was discovered and removed.

Of the patients suffering from this form of intussusception, the youngest was fifteen with the exception of Case 52, a male of four reported by Brunner, in which the cause of the intussusception is given, " as an accessory pancreas in the blind end of a diverticulum forming a pedunculated tumor in the lower ileum." The oldest occurred in a patient of eighty-four and it is worthy of note that in four patients over seventy, three polyps presented in the rectum and the fourth in the descending colon.

The fragmentary way in which a number of these cases are reported renders useless the computation of any percentages of individual symptoms, such as abdominal tumor, the frequency of rectal discharges of blood and mucus, the absence of constipation, the frequency of vomiting, etc. In 22 cases the presence of an abdominal tumor is mentioned; in one no tumor could be detected. In the remainder no statement regarding the presence or absence of a tumor is made. In 15 cases note is made of the discharge of either blood or mucus; of the remainder only in one is it mentioned that rectal examination was negative. It is worthy of note in this connection that in at least two cases, Nos. 52 and 67, the discharge of blood from the rectum was sufficiently abundant to constitute actual hemorrhage. Attention should also be directed to the occasional mention of rectal tenesmus. This symptom is evidently most frequently associated with benign growths below the level of the splenic flexure.

Table B includes 40 cases of intussusception with malignant tumor, which may be conveniently divided into the following groups:

(*a*) Those in which the onset is acute, occurring without warning in patients who have always enjoyed excellent health. Such cases are uncommon; Case 141, an enteric intussusception due to multiple sarcoma with mesenteric glandular involvement, may be cited as an example. In Case 119, symptoms of acute appendicitis were followed after ten days by those of subacute obstruction in what proved to be an intussusception associated with a sarcoma of the ileum.

(*b*) In this group the development of the intussusception is preceded by a history of a primary growth, usually sarcoma, in some distant part of the body.

(*c*) By far the most frequent are cases belonging to this group, in which the symptoms pointing to an intussusception are preceded by those due to malignant stricture. In cases of this character the obstruction due to the intussusception is essentially chronic, and in its later stages cannot easily be distinguished from the terminal obstruction so frequently seen in malignant stricture of the large intestine. The alternating constipation and diarrhœa, the blood and at times pus in the stool, the presence of focal distention and of visible peristalsis, together with the recurrent attacks of subacute obstruction, relieved by enemata, are all classic symptoms of that condition. It is only by the discovery of the characteristic tumor that the diagnosis of intussusception can be made, and even then the diagnosis may be erroneous, since the tumor may be due to a temporary fecal impaction on the proximal side of the stricture.

Table C comprises those cases of acute intussusception either without discoverable cause or at least without the mention of any cause in the history. They may be conveniently divided into two groups:

(*a*) Cases with acute onset, without warning, in patients previously healthy.

(*b*) Cases with acute onset, preceded by a history, ex-

tending over weeks or months, of some abdominal disturbance. Of this group Case 213 may be cited, in which the patient suffered from intermittent attacks of sharp colicky pain for six months prior to operation for an irreducible enteric intussusception, three feet below the pylorus. The patient, a woman of fifty, died shortly after the resection of the invagination and the suturing of both ends of the divided intestine into the abdominal wound. Case 218 is also of interest. The patient, a male of twenty-two, gave a history of three attacks of acute cramps of short duration, with the formation of a tumor occurring within the three weeks prior to the operation. On each day there was diarrhœa, and at operation an ileocæcal invagination extending to the splenic flexure was found. The patient made an excellent recovery after resection followed by end-to-end suture.

Table D comprises those cases of acute intussusception, exclusive of tumors, in which some other specific cause was found. They may conveniently be divided into two groups:

(*a*) Those with an acute onset preceded only by the symptoms of the actual exciting cause.

(*b*) Those in which the acute onset is preceded by a history of some abdominal disturbance. Of this type Case 190, in which the patient suffered from two attacks of abdominal pain 16 years and 10 weeks prior to the invasion of the intussusception, seems to be the only example. At operation an intussusception was found with a well-defined ulcer at its apex. On the other hand, Group *a* includes cases following various kinds of trauma (which have already been discussed under the etiology), cases occurring in connection with typhoid fever (one on the twenty-fifth, two on the twenty-sixth, one on the fortieth day, and one during convalescence), and a case associated with colitis.

Table E comprises those cases of subacute and chronic intussusception for which no cause is mentioned in the history. In nearly all the cases of this group of which the history is not fragmentary, there is a story of intermittent attacks of colic, with the appearance of a tumor or of a distended loop

of intestine, which in many instances are noted by the patients themselves.

Table F comprises cases of subacute or chronic intussusception, in the histories of which a distinct cause is mentioned, and may conveniently be divided into two groups:

(*a*) Those in which the actual cause is recognized prior to the operation, including cases of chronic intussusception associated with dysentery or persistent typhoid or tubercular ulceration. In this group the symptoms and physical signs of intussusception modify those which are due to the pre-existing lesion.

(*b*) Those in which the actual cause is revealed only by the operation or autopsy. This group includes cases of chronic intussusception associated with subserous tubercular infiltration of the intestine, as well as those due to chronic ulceration of the cæcum or colon which is probably of stercoraceous origin. In this group the history does not differ materially from the history of a case of chronic or subacute intussusception in which the actual cause can never be ascertained.

Table G includes all cases of intussusception, irrespective of the age of the patient, due to Meckel's diverticulum. These may conveniently be divided into two groups:

(*a*) Those in which the invasion is acute without previous history of abdominal trouble.

(*b*) Those in which the invasion of the terminal obstruction is preceded either by one or more attacks of obstruction which have subsided spontaneously, or by some other minor abdominal or digestive disturbance. Thus in Case 170, in a woman aged thirty-nine, there was a history of attacks of subacute obstruction occurring several times in the course of each year for a period of 12 years. In Case 162, on the other hand, there was merely a history of poor digestion with occasional colic, and in Case 145 a history of sudden unexplained hemorrhage from the bowel one month before the symptoms of acute obstruction appeared.

Considerable variation is also observed in the individual symptoms of the acute terminal obstruction in intussusception

due to Meckel's diverticulum. While complete constipation is the rule, either the passage of one or more normal stools or actual diarrhœa is not an infrequent exception. Blood and mucous discharges from the bowel are mentioned in six cases, once with tenesmus. In four instances it is stated that neither blood nor mucus was discharged from the rectum, and in the remaining 13 cases no mention is made of this symptom. The presence of a tumor was almost always observed.

The clinical course is usually exceptionally severe. In fact analysis of the cases of this lesion shows that the inverted Meckel's diverticulum is, with but two exceptions, irreducible, and that gangrene of the intussusception occurs so promptly that early operative interference is urgently demanded.

In all the different forms of intussusception, both acute and chronic, and irrespective of the actual contributing or exciting cause, the presence of an abdominal tumor and its variation in size, position, and consistency, either during or independent of the attacks of colicky pain, are especially characteristic. The clinical picture of a tumor quickly appearing or increasing in size during the attacks of colic, and disappearing or decreasing in size with their cessation, renders the diagnosis of intussusception certain. The writer has referred in a previous paper to the fact that the overlapping of the spleen or liver may conceal an intussusception at the hepatic or splenic flexures of the colon, and also to the fact that an intussusception gravitating or moving into the depths of the pelvis may be especially difficult to palpate. The possibility of such contingencies emphasizes the importance of making a bimanual examination in either ileocostal space as well as through the rectum, by means of which, either with or without the assistance of an anæsthetic, the tumor mass may usually be detected. The writer wishes also to emphasize the increase in the consistency of the mass formed by the intussusception, either with the advent of a cramp or even as the result of the mechanical stimulation in the course of routine palpation. This change in consistency, although it does not always occur, differentiates the tumor of an intussusception from either a neoplasm or a fecal impaction.

The presence of an abdominal tumor, together with the similarity of the symptoms of the two conditions, accounts for the occasional confusion of intussusception with appendicitis. A correct diagnosis is usually possible by noting that the tumor associated with appendicitis is almost invariably fixed and enjoys little if any respiratory movement. Moreover, the associated muscular rigidity is of great importance. In appendicitis it is almost always most marked in the lower right quadrant, while in intussusception the symptom, if present, is generally more marked to one side or the other of the umbilicus, while the intervening abdomen between this area and either inguinal region is either less rigid or entirely free from any rigidity whatever. This proved to be the fact in the first case reported in this paper. Both iliac and both hypochondriac regions were free from rigidity, and although the enteric intussusception was of 28 hours' duration, the abdominal wall over the large tumor was not sufficiently rigid to interfere with its satisfactory palpation.

The course of acute intussusception in adults is more prolonged than in infants or children. The latter quickly succumb to the intestinal toxæmia, the result of obstruction, before the advent of peritonitis. In adults, on the other hand, the course may be so protracted that, the intussuscipiens remaining viable, the obstruction may be relieved by the spontaneous discharge of the necrotic intussusceptum through the rectum. Of the 43 cases of this character included in Table H only three occurred in patients less than four years old. The remainder include cases of intussusception associated with Meckel's diverticulum, with benign tumors, and many others in which the actual cause could not be recognized in the discharged slough.

It is self-evident that, owing to the primary risk, the possibility of relief through the discharge of the necrotic intussusceptum should not encourage conservative measures in the treatment of this condition, and it is emphasized by Raven, as well as shown by a study of the end results in the additional cases reported in Table H that, although temporary relief is usually afforded by nature's method, yet within 18 months and usually much earlier, secondary obstruction develops from cica-

tricial contraction at the point of the original invagination and is rapidly fatal. Such an unfortunate termination appears so common that, after the subsidence of the abdominal symptoms associated with the discharge of the slough in these neglected cases, the writer suggests the advisability of providing against the contingency of subsequent obstruction by establishing a lateral anastomosis between the intestinal canal on either side of the site of the invagination.

The principles which govern the treatment of intussusception in adults do not differ essentially from those in children. The fallacy of palliative measures is just as pronounced in the one as the other, although, owing to their greater resistance, the risk incurred by delay in adults is not as great as in children. It must be admitted that in both a temporary if not a permanent reduction is sometimes effected by rectal injections of either air or water. On the other hand, at the expense of possible repetition, it must be emphasized that experience has amply demonstrated that the disappearance of the tumor as a result of either of these measures of treatment may mean but partial disinvagination and that, after a brief respite, the symptoms of acute obstruction may recur with renewed virulence, the tumor being again palpable through the abdominal wall or rectum, and the general condition of the patient, especially in an infant, less capable of overcoming the shock of inevitable operation.

The earlier the operation in infants the easier and the more quickly accomplished is the disinvagination, and if this takes place within the first 12 or even 24 hours after the onset of obstruction, the total operative time should not exceed from 10 to 15 minutes. Under such favorable conditions the chances of recovery, even in a young infant, are excellent.

With the exposure of the intussusception, disinvagination is to be accomplished by a combination of expression and traction. In the paper already referred to, the writer has called attention to the danger of rupture of the intestine if dependence is placed upon either of these measures alone. Usually in the first stages of reduction, expression only is necessary. In the last part of reduction, however, in which the greatest difficulty

is experienced, a combination of both measures is indicated. With the completion of reduction when that has proved feasible, the cause of the intussusception is to be removed if possible; thus a Meckel's diverticulum or an appendix may be resected, while a benign tumor may be removed through a linear incision of the intestinal wall or even, as is always the case with a malignant growth, by complete resection. The cause having been removed, a recurrence of the intussusception is best prevented by anchoring the affected loop to the lateral parietal peritoneum. This method is more reliable and can be more quickly accomplished than the reefing of the mesentery, than the more radical measure of resection of the affected loop, or the ingenious reefing of the large intestine suggested by Passagi (Case 292), in which two parallel rows of Lembert sutures are placed on either side of its anterior longitudinal band (endoplication of the cæcum).

TABLE III.

	No.	Cured.	Died.	Not stated.
Resection	84	41	34	9
Splitting sheath and resecting intussusceptum from within	9	7	2	
Partial reduction followed by resection	18	11	5	2
Reduction complete, resection of tumor or Meckel's diverticulum	17	6	7	4
Reduction complete, resection for stricture or to prevent recurrence	2	1	1	
Reduction	37	23	7	7
Bimanual reduction (one hand in bowel)	2	2		
Attempted reduction, tear, resection	10	3	7	
Ileocolostomy, entero-enterostomy	13	5	6	2
Enterostomy	4	1	3	
Enterotomy	1	1		
Resection and removal rectally	5	3		2
Incision of constricting band, reduction	3	2	1	
Artificial anus	12	1	8	3
	217	107	81	29

The treatment of irreducible or gangrenous intussusception depends upon the condition of the intussuscipiens and the intussusceptum. If both are necrotic, resection is imperative. In infants of less than a year, such a drastic measure is usually fatal but is without alternative. The subsequent continuity of the intestine must be established in the quickest possible way, for a temporary enterostomy rarely improves the infant's condition. In adults, on the other hand, a temporary enterostomy is frequently of great advantage, if not situated too near the pylorus, the subsequent anastomosis being done after the symptoms of the acute obstruction have subsided.

If the intussuscipiens is viable, the removal of the intussusceptum has been accomplished with considerable success through a linear incision in its wall. Reference to Table III shows nine such operations with seven recoveries and two deaths. The relatively low mortality may be partially accounted for by the fact that all nine cases were reported during the past ten years, and that with two exceptions the intussusception was either of the subacute or chronic variety.

The viability of the intussuscipiens also permits of intussusception being treated by enterostomy or by ileocolostomy. If the intussusceptum is necrotic, the slough is eventually discharged through the bowel. If, as is the case with many subacute or chronic intussusceptions, the intussusceptum is viable, an ileocolostomy relieves the obstruction, and by deflection of the fecal current exerts a beneficial effect upon any benign ulceration that may have been responsible for the intussusception. In such cases secondary resection should follow as soon as the patient's condition permits. Reference to Table III shows 13 operations of this character with five recoveries and six deaths. In the two remaining cases the result is not mentioned.

Of greater value than either of the preceding methods is the treatment of irreducible intussusception in adults by resection. This is the method of choice in all suitable cases in which attempted reduction, carried on for a few minutes, is unsuccessful. How often too energetic or too persistent at-

tempts at reduction result in tearing the intestine need not be stated, but it is quite evident that the results of resection are most satisfactory in the absence of any such additional source of contamination, and that any leakage subsequent to anastomosis is less likely to occur if the intestine is divided at a point where it is free from inflammatory changes. Such a resection must invariably be preceded by as much disinvagination as can easily and quickly be accomplished. Exceptionally, as in the first case reported by the writer, the intussusception is totally irreducible. Usually, however, reduction is possible to such an extent that subsequent resection is limited to a segment of intestine not exceeding 6 to 18 inches in length. After the removal of the affected segment, the risk of intestinal toxæmia should be diminished by evacuating the contents of the intestine above the point of suggested anastomosis. Frequently, however, if the operation is done sufficiently early, the upper intestine is empty and this step of the operation may be omitted. Reference to Table III shows 84 cases treated by resection, with 41 recoveries, 34 deaths, and 9 cases in which the result is not stated. It must be noted, however, that the majority of fatal cases were reported in the literature at a time when the technic of resection had not been perfected and when the operation itself was frequently delayed until peritonitis had developed.

The discussion of the treatment of intussusception in adults is not complete without referring to a series of 19 cases mentioned in Table III which were treated by the method of complete reduction followed by resection with 7 recoveries, 8 deaths, and 4 cases in which the result is not stated. This method seems to have been adopted chiefly in cases of intussusception associated with tumors. In this group of cases partial disinvagination is usually possible until the segment containing the tumor is reached. At this stage, the removal of the growth by enterotomy is sometimes possible, but in all malignant tumors as well as in those benign tumors in which the wall of the intestine is extensively involved, resection is imperative. Resection after reduction in other varieties of intussusception

than those associated with neoplasms is contraindicated, for it means, first, the unnecessary prolonging of the operative time and, second, in the event of a gangrenous intussusceptum, the exposure of the patient to unnecessary risk of peritoneal contamination.

Table III also mentions five cases in which the growth was removed through the rectum, with three recoveries and two cases in which the result is not stated. Although the small number of cases admits of no definite conclusion, the satisfactory results here reported would indicate the application of this method of treatment to all forms of benign neoplasm associated with intussusception in the lower part of the intestinal canal where the tumor presents in the rectum. In some cases of this group the removal of the growth must be followed by immediate laparotomy to establish the continuity of the colon, as well as to prevent leakage into the peritoneal cavity.

Finally, reference to Table III shows four cases of intussusception treated by enterostomy with three deaths and one recovery, and 12 cases in which an artificial anus was established, with one recovery, eight deaths, and three cases in which the result is not stated. Either measure is purely palliative, and it is scarcely necessary to call attention to the fact that the obstruction rather than the operation was the actual cause of the associated high mortality. That relief is frequently afforded by this method of treatment in all forms of both acute and chronic obstruction in which there is no impairment of circulation is well established. On the other hand, it is equally true that no benefit can be expected if gangrene is threatened or has actually taken place.

In the cases given below, a tabulation of the following factors was made: sex; age; prior history; onset, whether acute or chronic, together with its symptoms; the condition of the bowels; objective signs in rectum: blood, mucus, etc.; abdominal signs: tumor, distention, rigidity, etc.; the operation if any, the variety of intussusception, the result and any remarks on pathology, end results, etc.

ABSTRACTS OF REPORTED CASES OF INTUSSUSCEPTION IN ADULTS.

TABLE A.

Due to Traction of Benign Tumors.

Case 44 (Bryant, *Brit. Med. Jour.*, 1894, i, p. 353).—Female, age 84. Operation: Intussusception filling rectum with papilloma attached to orifice. Growth drawn down; ligated. Recovered.

Case 45 (*Ibid.*).—Female, age 50. Similar to Case 44.

Case 46 (Lockwood, *Path. Rep.*, London, 1892).—Female, age 30. Operation: Irreducible invagination; resection; suture end-to-end. Variety: Enteric, 5 inches long. Pathological remarks: Polyp pedunculated 2½ feet from cæcum.

Case 47 (Steiner, *Cent. f. Ch.*, 1896, p. 310).—Female, age 49. Prior history: Frequent attacks of obstruction. Onset: Complete obstruction. Operation: Enterotomy; removal of polyp size of plum. Position: Colon, descending. Recovered. Pathological remarks: Myxoma.

Case 48 (Greig Smith, *Lancet*, 1896, i, p. 31).—Female, age 31. Prior history: Complete obstruction two years ago with mass in right iliac fossa. Onset: Lately intermittent frequent pain, with constipation. Operation: Partial reduction; resection of remainder, after removal of tumor size of hen's egg; end-to-end with Murphy button. Variety: Iliac into colon. Recovered. Pathological remarks: Fibromyxoma.

Case 49 (Marchand, *Berl. klin. Woch.*, 1896, No. 6).—Male, age 23. Prior history of trauma: Fall on left side, next day dancing. Onset: Acute, pain and vomiting, symptoms of obstruction. Operation: Fifth day; enterostomy for supposed obstruction. Ileocolic into descending colon. Died. Pathological remarks: Subserous lipoma of cæcum.

Case 50 (Sprengel, *Archives Surg.*, Bd. 61, p. 1032).—Female, age 15. Prior history: Periodic attacks of pain with vomiting for eleven years. Onset: Painful period for month. Bowels: Stools always present. Thick transverse tumor above navel. Operation: Disinvagination; resection of 10 cm. large and 6 cm. small intestine; end-to-end with Murphy button. Variety: Ileocæcal. Recovered. Pathological remarks: Cyst of valvula Bauhini.

Case 51 (Brunner, C., *Beitrage*, xxv, p. 344).—Male, age 51. Onset: Six days pain. Bowels: No stool, no flatus. Rectal examination: Rectal tenesmus; tumor within sphincter. Operation: Sphincter dilated and divided posteriorly; tumor removed with invagination. Pathological remarks: Submucous lipoma.

Case 52 (*Ibid.*).—Male, age 4. Onset: Pain and vomiting three days. Bowels: One normal stool, then constipation. Rectal examination: Sharp hemorrhage. Operation: Resection with side implantation. Variety: Ileocæcal. Pathological remarks: Accessory pancreas in blind end of diverticulum had formed pedunculated tumor in lower ileum.

Case 53 (Hiller, *Beitrage*, xxiv, p. 509).—Male, age 51. Onset: Occasional pain and vomiting. Bowels: Little stool. Rectal examination: tenesmus; otherwise negative. Distention: Moderate. Operation: Reduction, tear in process; resection, end-to-end by suture. Iliac invagination. Died. Pathological remarks: Submucous lipoma.

Case 54 (Studsgaard, *Nord. Med. Arkiv.*, 1894).—Female, age 42. Operation: Irreducible; resection. Variety: Jejunal. Death in five days from peritonitis. Pathological remarks: Polyp, lipoma.

Case 55 (Castelain, *Gaz. Hebd.*, 1870, No. 20).—Male, age 43. Prior history: Habitual constipation. Onset: Loss of appetite, nausea. Bowels: Constipation. Rectal examination: Blood and mucus; tenesmus. (Case also made discharge of slough.) Fourth week, discharged large tumor, with thin pedicle. Recovered. Pathological remarks: Lipoma.

Case 56 (Vois, *Norsk. Mag. fur Lageviderl*, 1881).—Operation: Invagination of lipoma into rectum; resection; reduction of intussusception by water injection.

Case 57 (Brohl-Tuffier, see Hiller).—Female, age 43. Prior history: Nine months constipation and pain. Tumor felt per rectum. Operation: Irreducible; artificial anus. Variety: Sigmoid. Died. Pathological remarks: Submucous pedunculated polyp in lower sigmoid.

Case 58 (Clos, *These*, Paris, 1883; see Hiller).—Female, age 45. Onset: Acute obstruction. Operation: Artificial anus. Died. Pathological remarks: Pedunculated lipoma in invaginated sigmoid.

Case 59 (Brohl, *Dissert. Würz.*, 1886).—Female, age 40. Prior history: Fifteen years abdominal pain. Onset: Past year sense of something coming down. Rectal examination: Descent of invaginated lipoma in rectum. Pathological remarks: Lipoma.

Case 60 (Treves, Leipzig, 1888).—Female, age 83. Prior history: One year indigestion, colicky pain. Bowels: Diarrhœa and constipation. Finally discharge of lipomatous polyp. Pathological remarks: Lipoma.

Case 61 (Link, *Wien. k. Woch.*, 1890, No. 13).—Male, age 45. Prior history: For five years attacks of obstruction. Tumor: Elastic, soft tumor size of man's fist in left hypochondrium for one year. Operation: Tumor evacuated with sudden gush of blood through rectum. Recovered. Pathological remarks: Tumor, pedunculated.

Case 62 (Michaux, *Bull. Soc. Chir.*, 1900, p. 734).—Female, age 23. Onset: Sudden pain and vomiting. No distention; tenderness. Operation: Fifth day; invaginated upper jejunum; irreducible; jejunum opened; resection of tumor and intestine. Died. Pathological remarks: Polyp "adenoma" was cause of irreducibility.

Case 63 (*Ibid.*).—Female, age 56. Onset: Five days obstruction. Bowels: No stools. Mass in left lower quadrant. Distention; visible coils. Operation: Irreducible; artificial anus after incision of tumor and discovery of polyp. Variety: Descending colon into sigmoid. Died. Pathological remarks: Resection of polyp.

Case 64 (Pitts, *Brit. Med. Jour.*, 1901, ii, 574).—Male, age 32. Onset: Acute, one day. Operation: Reduction; removal of growth; subsequent fecal fistula. Variety: Enteric. Died. Pathological remarks: Resection of gangrenous bowel; papilloma.

Case 65 (*Ibid.*).—Female, age 32. Prior history: Thirteen weeks' duration. No operation. Chronic ileocæcal. Pathological remarks: Fibroid growth in cæcum.

Case 66 (Maurice, *Lancet*, 1901, i, p. 248).—Female, age 23. Prior

history: Anæmic; vague abdominal pain, vomiting after eating. Onset: Sudden pain. Rigidity: General. Operation: Reduced; polyp removed; excision, circular suture. Variety: Jejunal. Died. Pathological remarks: Intussusception; segment 34 inches from pylorus gangrenous; 10 polypi between it and pylorus.

Case 67 (Jenly, *Wien. k. Woch.*, 1901, p. 1177).—Male, age 70. Onset: Four days' duration, pain. Bowels: Stool scant. Rectal examination: Hemorrhage, repeated. Prolapsing tumor, especially on coughing. Operation: Resection through anus. Variety: Colonic. Recovered. Pathological remarks: Polyp.

Case 68 (Marchand, *L'Inde. Med.*, 1901, p. 86).—Male, age 27. Prior history: Habitual constipation. Onset: Symptoms of appendicitis. Variety: Ileum into ascending colon; ileum into ileum. Pathological remarks: Polypi in ileum.

Case 69 (Bishop, *Med. Chron.*, 1900–01, p. 350).—Male, age 43. Prior history: Lifting, followed by protrusion seven months ago; occasional pain. Rectal examination: Constant mucus and blood; tenesmus; long tubular mass. Operation: Preliminary anastomosis followed by resection of intussusceptum, by Maunsell. Variety: Colonic. Recovered. Pathological remarks: Adenoma.

Case 70 (Ludloff, *Grenz. Gebiet.*, 1898, iii, p. 600).—Female, age 20. Prior history: Typhoid at 12; four years, occasional cramps. Onset: Chronic obstruction, especially loud splashing sounds. Bowels: Pain, followed by diarrhœal stools. Tumor: Size of fist over cæcum. Distention: Vomiting and pain. Operation: Irreducible; resection, end-to-end by suture. Variety: Ileocæcal. Recovered; four years after, well. Pathological remarks: Polyp size of bean in invagination; multiple polypi in cæcum.

Case 71 (Von Eiselsberg, *Arch. f. klin. Chir.*, Bd. 69).—Female, age 19. Prior history: Obstipation for years, especially last eight days; two days severe colic and vomiting. Rectal examination: Blood last twenty-four hours. Tumor: Below navel on right side, long tumor, disappearing later. Distention: Slight. Operation: Tear in attempted reduction; resection; end-to-end suture. Variety: Iliac. Died. Pathological remarks: Polyp.

Case 72 (*Ibid.*).—Male, age 54. Prior history: Six weeks, standing; onset with obstruction, relieved, with colic still persisting. Transverse movable tumor to right of navel. Operation: Reduction; resection of affected segment; end-to-end by suture. Variety: Ileocæcal. Recovered. Pathological remarks: Numerous polypi; one month later patient died from intercurrent disease.

Case 73 (Ray, *Lancet*, 1905, i, 567).—Female, age 30. Prior history: Pain for past six months, chiefly at and after defecation, in left iliac and lumbar; forty-eight hours, severe pain and vomiting. Rectal examination: Protrusion of tumor with enema. Operation: Reduction; removal of growth through enterotomy. Variety: Sigmoid. Recovered. Pathological remarks: Subserous lipoma.

Case 74 (Willard, *Tr. Chicago Path. Soc.*, 1907, 7, p. 174).—Male, age 30. Prior history: Two mild attacks of obstruction twelve and six months ago; one week ago, absolute constipation, increasing pain and tympanitis, vomiting; cathartic only. Bowels: Constipation. Rectal examination: Negative. Distention: Great; visible peristalsis. Operation: Resection; end-to-end suture. Variety: Jejunal. Recovered.

Case 75 (Chassignac, *Bull. de la Soc. Anatomique*, 1859, 2 s, iv, p. 205).—Male, age 39. Onset: Three months; sudden pain. Bowels: Constipation. Operation: Artificial anus. Variety: Ileocolic. Died. Pathological remarks: Polyp at apex.

Case 76 (Hulke, *Lancet*, 1879, vi, 810).—Female, age 16. Prior history: Similar attack two years ago. Onset: Sudden pain and vomiting. Abdominal tumor. Operation: Artificial anus. Variety: Ileocæcal. Died. Pathological remarks: Lipomatous polyp at apex.

Case 77 (Marchand, *Le Progres. Med.*, 1882, No. 11, p. 202).—Female, adult. Onset: Nine months recurrent. Bowels: Constipation becoming absolute. Rectal examination: Tumor 8 cm. from anus. Operation: Artificial anus. Variety: Sigmoidal. Died. Pathological remarks: Lipoma at apex.

Case 78 (Whipham, *Clin. Soc. Trans.*, 1891, xxiv, p. 95).—Female, age 29. Prior history: Many years umbilical pain, indigestion. Onset: Three weeks; pain. Bowels: Constipation. Rectal examination: Blood. Distention. Operation: Reduction of volvulus; jejunal intussusception. Died. Pathological remarks: Autopsy: Axial and jejunal looped volvulus; above this a thumb-sized polyp, about 5 ft. from pylorus.

Case 79 (Nothnagel, *Spezielle, Path. and Chir.*, 17, p. 316).—Male, age 50. Prior history: Fourteen months ago similar attacks lasting four months; one to three days' duration. Onset: Sudden pain and vomiting. Bowels: Increased peristalsis. Tumor: Epigastric. Rigidity: Right lower quadrant. Operation: Resection. Variety: Ileocæcal. Cured. Pathological remarks: Polyp at apex.

Case 80 (Fenger, *Hospitolsted*, 1904, No. 26).—Age 17. Prior history: Three years; diagnosis, peptic ulcer, gall-stones; exploratory operation, negative. Onset: Symptoms of obstruction. Tumor: Intermittent, appearing after previous operation. Operation: Resection. Variety: Enteric. Cured. Pathological remarks: Polyp at apex.

Case 81 (Rydygier, *Deut. Zeit. f. Chir.*, 1895, xlii, 113).—Male, age 32. Onset: Three weeks. Operation: Descending invagination because of walnut-sized fibromyoma; resection; artificial anus. Died. Pathological remarks: Perforative peritonitis.

Case 82 (*Ibid.*).—Male, age 22. Onset: Three years; acute, twenty days ago. Bowels: Constipation. Rectal examination: Bloody stools. Operation: Colic to anus; suture of perforation; artificial anus. Died. Pathological remarks: Polyp at apex.

Case 83 (Delore, *Rev. de Gyn. and Chir. Abdom.*, 1905, 9, 641).—Male, age 42. Onset: Sudden pain. Tumor. Operation: Reduction, resection. Variety: Ileocolic. Cured. Pathological remarks: Fibromyxoma at apex.

Case 84 (Hughes, *Lancet,* 1905, ii, 829).—Male, age 23. Prior history: Four years, typhoid; one year, four days of pain in right lower quadrant. Onset: Sudden, two days of pain and vomiting. Rectal examination: Blood. Tumor: In pelvis by rectal. Distention: Signs of peritonitis. Operation: Peritonitis. Variety: Ileal. Resection. Pathological remarks: Polyp at apex.

Case 85 (Andrews, ANNALS OF SURGERY, xliii, 473).—Male, young adult. Prior history of trauma: Jumped 5 ft. Onset: Immediately, sudden pain. Operation: Gangrenous ileocolic; resection. Died. Pathological remarks: Pedunculated fibropapilloma.

Case 86 (Royster, *N. Albany Med. Herald,* 1905, 24, 258–260).—Male, age 42. Prior history: Six months, occasional indigestion and vomiting. Onset: Four months, recurring attacks abdominal pain. Bowels: Constipation. Rectal examination: Mucus. Tumor: Sigmoid region. Distention. Operation: Reduction; excision of tumor. Variety: Ileal, looking as if tied in knot. Cured. Pathological remarks: Tumor pure fibroma.

Case 87 (Salzer, ANNALS OF SURGERY, 1907, xlv, 730–732).—Female, age 16. Onset: Sudden, four days of pain, vomited during examination. Tumor: Right of umbilicus, size of orange. Rigidity: Right rectus muscle. Operation: Ileocolic, reduced; excision of pedunculated tumor. Pathological remarks: Myoadenoma of ileum.

Case 88 (Lorenz, *Jahr. d. zw. Ch. klinik. Wies.,* 1906–07, 41–44).—Male, aged 58. Onset: Gradual; symptoms of chronic intestinal stenosis. Tumor: Sausage-shaped, transverse, alternately hard and soft; at left extremity hard, egg-shaped tumor. Operation: Ileocæcal invagination; tumor on ileocæcal valve; hard nodes in mesentery; resection of lower ileum, cæcum, ascending colon. Cured. Pathological remarks: Lipoma.

Case 89 (Shetton, *Brit. Med. Jour.,* 1908, i, 190).—Female, age 25. Onset: Acute pain and vomiting. Tumor: Indefinite; right inguinal region. Operation: Enteric, irreducible; resection. Pathological remarks: Sessile polyp at apex.

Case 90 (Leuret, *Bull. et N. Anat.,* 1907, v. 82, p. 652).—Female, age 45. Onset: Acute pain and vomiting. Bowels: No stool or gas passed for four days. Distention. Operation: Ileal, ½ metre above cæcum; reduction; excision of tumor. Died. Pathological remarks: Sessile myxofibroma.

Case 91 (Haeberlin, *Cor. Bl. f. Schw. Aertz.,* 1908, 38, 211, 248).—Female, age 66. Prior history: Two months, diarrhœa and emaciation. Onset: Ten days, pain and vomiting. Bowels: Partial occlusion. Distention. Operation: Enteric, with hard body at apex; attempt to reduce caused tear; resection. Cured. Pathological remarks: Fibroma; fecal fistula twelfth day.

Case 92 (*Ibid.*).—Female, age 58. Prior history: Gall-stones. Onset: Sudden pain and vomiting. Bowels: Constipation. Rectal examination: Blood. Tumor: Firm, kidney-shaped, movable. Distention: Right side.

Operation: Ileocæcal; irreducible; enterostomy. Died. Pathological remarks: Autopsy: Pedunculated hard fibroma in lumen of intestine.

Case 93 (Delore, *Rev. de Chir.*, 1908, vol. 38, 39-67).—Female, age 36. Prior history: Four months, pain in right lower quadrant with tumor; constipation. Onset: Three days, acute. Bowels: Absolute constipation. Rectal examination: Blood. Tumor: Right lower quadrant. Distention. Operation: Ileocæcal; irreducible; end-to-end suture. Died on seventh day. Pathological remarks: Pedunculated myoma at apex.

Case 94 (*Ibid.*).—Male, age 42. Onset: Five months, colic and vomiting. Bowels: Constipation. Rectal examination: Negative. Tumor: Negative. Distention: Negative. Operation: Ileocæcal; incision of colon, through opening resection intussusceptum and tumor at apex. Cured. Pathological remarks: Fibromyoma.

Case 95.—Male, age 39. Onset: Eleven weeks, recurrent pain. Bowels: Tenesmus. Rectal examination: Blood and mucus. Tumor: Left hypochondrium. Operation: Resection. Pathological remarks: Benign, variety not stated.

Case 96 (Haasler, *V. Langenbeck Arch.*, 1902, Bd. 68, p. 817).—Male, age 26. Prior history: Acute abdominal pain; recurred in nine days; continuous vomiting (fecaloid). Onset: Acute pain, hiccough. Bowels: Constipation. Rectal examination: Mucus. Tumor: Left lower quadrant, movable. Operation: Resection; rupture; necrotic bowel. Died. Pathological remarks: Polyp at base of intussusception.

Case 97 (*Ibid.*).—Male, age 35. Prior history: One year, rumbling in abdomen, with occasional sudden onset of constipation, meteorism and pain about umbilicus. Onset: Seven weeks, severe; more frequent pain and vomiting (fecal). Bowels: Diarrhœa. Rectal examination: Hard mass. Distention. Operation: Peritonitis, enteric; reduction; resection Meckel's diverticulum; artificial anus. Died. Pathological remarks: Autopsy showed Meckel's diverticulum 2.18 m. from ileocæcal valve, invaginated; at its base a plum-sized fibrous tumor.

Case 98 (*Ibid.*).—Male, age 25. Onset: One week, sudden pain and vomiting. Bowels: Diarrhœa. Rectal examination: Pus. Tumor: Left of umbilicus, moving to left. Operation: Colic; resection of mass size of three fists. Pathological remarks: Polyp (lipoma) at apex.

Case 99 (Herbung, *Arch. f. klin. Chir.*, 1902, vol. 68, xliii, p. 1009).—Female, age 52. Prior history: Eleven months, pain, bloody mucus, constipation. Onset: Eleven days, pain and vomiting. Bowels: Constipation absolute. Rectal examination: Rectal tumor. Operation: (1) Incision of rectum (posterior route), artificial anus; (2) resection of tumor. Cured. Pathological remarks: Variety not given.

Case 100 (Don, *Lancet*, 1909, i, 1107).—Female, age 44. Onset: Vomiting, chronic course. Rectal examination: Blood and mucus; prolapse of tumor with movement. Operation: Resection through anus, followed by reduction through laparotomy. Sigmoid. Recovered. Pathological remarks: Papilloma.

Case 101 (Riedel, *Deut. med. Woch.*, 1909, 35, 1654).—Male, age 15. Prior history: Periodic pain from seventh year; frequent vomiting; attacks in morning and of one hour's duration. Bowels: Normal. Tumor: In right abdomen, during cramps only. Operation: Partial reduction; resection of segment containing growth. Iliac. Recovered. Pathological remarks: Character not stated.

Case 102 (*Ibid.*).—Female, age 48. Onset: Acute; fecal vomiting in twelve hours. Rectal examination: Invagination felt. Tumor: size of two fists, in left abdomen. Distention marked. Operation: Artificial anus, followed by resection through rectum. Sigmoid. Recovered. Pathological remarks: Character not stated.

Case 102a (Mayo Bros., personal communication).—Adult. Onset: Several months, colic. Operation: Resection. Iliac. Recovered. Pathological remarks: Adenofibroma.

Case 102b (Mayo Bros., personal communication).—Age, 14. Operation: Resection. Iliac into cæcum and ascending colon. Recovered. Pathological remarks: Myoma.

Case 102c (McWilliams).—Female, age 45. Onset: Four weeks, attacks of abdominal pain at intervals. Bowels: Diarrhœa. Rectal examination. Blood and mucus; tenesmus; rectal mass and tumor in addition on the apex. Tumor: In left lower quadrant. Operation: Attempted reduction; incision of bowel; resection. Sigmoid. Recovered. Pathological remarks: Papilloma, possibly malignant but not invading muscularis.

Table B.

Associated with Malignant Tumors.

Case 103 (Decker, *Bull. de la Soc. med. de la Suisse Romande,* 1880, May, No. 5).—Female, age 58. Onset: Thirteen months, pain (two days ago) and vomiting (three days ago). Tumor: Right upper quadrant. Distention: Visible peristalsis. Operation: Ileocæcal. Died. Pathological remarks: Autopsy, malignant tumor of cæcum.

Case 104 (Czerny, *Arch. f. path. Anat. Virchow,* ci, 48, 1885).—Male, age 52. Onset: Two months, pain and vomiting. Bowels: Diarrhœa. Tumor: Right upper quadrant. Operation: Ileocæcal, reduction; resection of tumor. Cured. Pathological remarks: Malignant tumor at apex, sloughing muscle wall hypertrophied (microscopically).

Case 105 (Koenig, *Arch. f. klin. Chir.,* 1890, xl, 911).—Female, age 18. Prior history: One year ago, sarcoma of lower jaw. Onset: Sudden pain and vomiting. Bowels: Constipation. Tumor. Distention: Asymetrical. Operation: Colic; ulcerating tumor at apex.

Case 106 (Koenig, *Ibid.*).—Prior history: Tuberculous. Onset: sudden pain. Rectal examination: Bloody stools; tumor palpated in rectum, level of internal sphincter. Operation: Rectal, sacral route; excision. Cured, three years. Pathological remarks: Carcinoma.

Case 107 (Rydygier, *Deut. Zeit. f. Chir.,* 1895–6, 42, 113).—Male, age 47. Onset: Nine months. Operation: Carcinoma at apex. Entero-anastomosis. Died.

Case 108.—Age 40. Onset: Six months. Tumor. Operation. Ileocæcal; resection. Cured. Pathological remarks: Adenocarcinoma.

Case 109 (Paetzold, *Deut. med. Woch.*, 1906, 32, 34).—Adult. Onset: Pain. Bowels: Diarrhœa. Tumor. Variety: Ileocæcal. Pathological remarks: Adenocarcinoma, ileocæcal valve.

Case 110 (*Ibid.*).—Adult. Onset: Pain. Bowels: Diarrhœa. Tumor. Variety: Ileocæcal. Pathological remarks: Alveolar sarcoma, ileocæcal valve.

Case 111 (Shetton, *Brit. Med. Jour.*, 1908, i, 190).—Male, age 50. Prior history: Six months, similar attack. Onset: Acute; absolute constipation. Mass in rectum. Reduced by rectal manipulation under ether. One week later rectal tenesmus. Blood and mucus. Ulcerated intussusception protruding from anus. Operation: Reduction and resection of colic variety. Pathological remarks: Malignant sessile polyp in sigmoid.

Case 112 (Haeberlin, *Corr. Bl. f. Schw. Aert.*, 1908, 38, 211–248).—Female, age 56. Prior history: Seventeen years ago, colicky pains; six months, loss of appetite and weight. Onset: Six months. Bowels: Diarrhœa. Tumor: Area of transverse colon. Visible peristalsis. Operation: Cæcal in ascending colon, reduced; resection of tumor. Pathological remarks: Gelatinous carcinoma.

Case 113 (Combs, *Wis. Med. Jour.*, 1907–8, vi, 251–255).—Male, age 68. Prior history: Four years, primary growth in left malar region. Onset: Latterly pain. Bowels: Constipation, alternating with fetid diarrhœa. Rectal examination: Sense of tumor high in rectum. Distention: Slight. Operation: Enteric; reduction; resection of tumor. Cured. Pathological remarks: "Melanotic epithelioma."

Case 114 (*Ibid.*).—Female, adult. Onset: Three months, no vomiting. Bowels: Finally absolute constipation. Rectal examination: Apex of invagination felt in rectum with irregular mass in its centre. Operation: Sigmoid, reducible; resection of tumor. Cured. Pathological remarks: Malignant with glandular enlargement.

Case 115 (Coffey, ANNALS OF SURGERY, 1907, xlv, 38–42).—Male, age 50. Onset: Thirteen days, "condition extreme." Rectal examination: Apex protruded through anus. Operation: Anastomosis. Died. Pathological remarks: Carcinoma of sigmoid.

Case 116 (Riess, *Am. Jour. Med Sc.*, 1907, n. s. 134, 841–849).—Male, age 40. Prior history: Sarcoma of iris removed nine months ago; melanosarcomatosis present. Onset: Sudden pain and vomiting. Bowels: Stools small. Tumor. Variety: Iliac, 1 foot long; marked involvement by sarcoma.

Case 117 (Mayo, ANNALS OF SURGERY, 1896, 733).—Female, age 36. Prior history: Two years, movements difficult and with pain; six months, vomiting. Onset: For few days obstruction pronounced. Bowels: Constipated, occasional blood. Tumor: Size of egg, can be brought into pelvis under anæsthetic; continuing with soft tumor above. Rectal examination: Blood. Distention, tenderness. Operation: Reduced with some difficulty, especially apex; resection; end-to-end with Murphy button.

Iliac, upper, 15 inches in length. Recovered. Pathological remarks: Adenoma, with carcinomatous degeneration.

Case 118 (McBurney, ANNALS OF SURGERY, i, 1896, p. 441).—Female, age 40. Onset: Sharp pain, in almost daily attacks; no vomiting. Bowels: No constipation. Smooth tumor in left pelvis. Rectal examination: Normal. Distention frequent; tenderness. Operation: Reduction; excision; end-to-end with Murphy button. Enteric. Recovered. Pathological remarks: Myxosarcoma.

Case 119 (Meyer, ANNALS OF SURGERY, 1896, i, 443).—Female, age 46. Prior history: Symptoms of subacute appendix for ten days; sudden obstruction shortly after. Operation: Reduced; a second one at end of first also reduced; sessile tumor felt; resection; end-to-end with Murphy button. Iliac. Recovered. Pathological remarks: Fecal fistula for few days; sarcoma.

Case 120 (*Ibid.*).—Boy. Prior history: Chronic obstruction; loud gurgling. Visible peristalsis. Operation: Reduced; resection; end-to-end with Murphy button. Ascending and transverse colon. Recovered. Pathological remarks: Sarcoma, lower end of ascending colon; subsequent death.

Case 121 (Deichert, *Dissert. Gött.*, 1895).—Male, age 46. Prior history: No symptoms. Operation: Several enteric invaginations. Pathological remarks: Metastatic lymphosarcoma in stomach and intestine.

Case 122 (Marchand, *Berl. klin. Woch.*, 1896, No. 6).—Male, old. Prior history: Primary parotid sarcoma. Operation: Jejunal into cæcum. Pathological remarks: Melanosarcoma.

Case 123 (Brunner, C., *Beitrag*, v 25, p. 344).—Male, age 56. Prior history: Digestion disturbed for years; one year ago, bloody diarrhœa. Rectal examination: Tumor advances in straining. Operation: Sacral resection for invaginated carcinoma. Pathological remarks: In part colloid, in part cylindrical.

Case 124 (Fleiner, *Virchow, Arch.*, Bd. 101, p. 484).—Male, age 45. Prior history: Pain, irregular stool, and tumor for one year. Very movable tumor. Rectal examination: Fourteen days, blood. Operation: Partial reduction; resection; circular enterorrhaphy. Ileocæcal. Died. Pathological remarks: Carcinoma of cæcum and ascending colon.

Case 125 (Billroth, *Arch. Ch.*, 1888, Bd. 43).—Male, age 40. Prior history: Eight months, pain and vomiting. Tumor: Variable, hard tumor under umbilicus. Rectal examination: Blood, two months. Operation: Irreducible; torn in attempt; resection; circular suture. Cæcal. Recovered. Pathological remarks: Carcinoma.

Case 126 (Senn, *Jour. Am. Med. Ass.*, 1890, p. 845).—Female, age 53. Prior history: Vomiting for one year. Tumor: Very variable, size of orange, above and to right of navel. Operation: Disinvagination; resection; lateral implantation. Variety: Cæcum into transverse colon. Died. Pathological remarks: Carcinoma, valve of Bauhini.

Case 127 (Billroth, 1890).—Male, age 32. Prior history: Colic three months in navel region. Tumor: Sausage shaped, above and to right of navel. Operation: Partial reduction; resection of ileum and cæcum;

circular suture. Variety: Cæcum into transverse colon. Died. Pathological remarks: Carcinoma of cæcum.

Case 128 (König, *Arch. klin. Chir.*, 1890, Bd. 40).—Female, age 18. Prior history: Primary sarcoma of tonsil; violent colic since. Tumor: Size of fist, above and to left of navel. Rectal examination: Blood and mucus. Operation: Resection of intussusceptum through cut in intussuscipiens. Colon. Died. Pathological remarks: Sarcoma, valve of Bauhini.

Case 129 (Von Baracz, *Arch. klin. Chir.*, 1891).—Male, age 8. Prior history: Painful abdominal crises, thirteen weeks. Tumor: Oval, ventral, movable in upper left hypochondrium. Rectal examination: Blood in stools. Operation: Irreducible, ileocæcal into descending colon; enterostomy. Died. Pathological remarks: Sarcoma, valve of Bauhini.

Case 130 (MacCormac, *Lancet*, 1892, p. 310).—Male, age 36. Prior history: Painful abdominal crises for fifteen months. Tumor: Intermittent, cylindrical, immovable, in right iliac fossa. Operation: Reduced to end of colon; resection; artificial anus, subsequently closed. Ileocæcal. Recovered. Pathological remarks: Carcinoma of valve of Bauhini.

Case 131 (Barton, ANNALS OF SURGERY, 1893, p. 322).—Male, age 27. Prior history: Occasional obstruction for some weeks. Operation: Irreducible; resection; artificial anus. Ileocæcal. Recovered. Pathological remarks: Epithelioma of valve of Bauhini; death in operation for closure of artificial anus.

Case 132 (Körte, *Beitrag Bruns*, Bd. 40, p. 523).—Male, age 49. Prior history: Eighteen months, pain in right hypogastrium with constipation. Tumor: Transverse, sausage shaped, below navel, slightly movable. Operation: Resection without attempt at reduction; end-to-end with Murphy button. Ileocæcal. Recovered. Pathological remarks: Lymphadenoma of valve of Bauhini.

Case 133 (Lowenstein, *Ver. d. Deut. G. Ch.*, 1890, 94-97).—Male, age 56. Prior history: Occasional abdominal pain for three months with emaciation. Bowels: Persistent constipation; occasional diarrhœa. Tumor: In left upper segment, elastic, size of several fists. Rectal examination: Tenesmus. Operation: Resection; end-to-end with suture. Ileum into colon. Recovered. Pathological remarks: Carcinoma, cæcum.

Case 134 (Lejars, *Rev. de Gyn. e. Chir. abd.*, 1897, i, 1029).—Female, age 40. Prior history: Two years, emaciation; six months, colicky attacks of pain; finally obstruction and vomiting. Bowels: First glairy stools, then diarrhœa. Tumor: Firm, very movable to left navel. Visible peristalsis. Operation: Irreducible; resection after division; end-to-end with Murphy button. Ileocæcal to ascending colon. Recovered. Pathological remarks: Lymphadenoma of valve of Bauhini.

Case 135 (Wallenberg, *Berl. klin. Woch.*, 1864, p. 497).—Female, age 21. Prior history: Three days, constipation, followed by vomiting, cramps and diarrhœa. Distention for one week. Operation: Discharge of slough, one foot long, of small intestine without relief. Died. Pathological remarks: Five and one-half weeks after, autopsy showed sarcoma of cæcum.

Case 136 (Pitts, *Brit. Med. Jour.*, 1901, ii, 574).—Male, age 32. Prior

history: Ill four months. Operation: Resection; lateral implantation. Cæcal. Recovered. Pathological remarks: Malignant growth at starting point.

Case 137 (Ludloff, *Grenz. Gebiet.*, 1898, 3, 600).—Male, age 6. Prior history: Five weeks after short attack of pain, subsiding with splashing sound, lately including pain; emaciated. Bowels: Constipation; lately diarrhœa. Tumor: Size of fist, below right border of ribs. Visible peristalsis on rubbing abdomen. Operation: Resection; end-to-end circular suture. Ileocæcal to one-half transverse colon. Recovered. Pathological remarks: Tumor at neck; lymphosarcoma; glandular enlargement; well four and one-half years later.

Case 138 (Von Eiselsberg, *Archiv. klin. Chir.*, Bd. 69, p. 1).—Female, age 40. Prior history: Colic eleven weeks, eleven days constipation. Bowels: Tenesmus, three weeks. Rectal examination: Blood and mucus eleven days, tumor in rectum fourteen days. Some distention. Operation: Resection; end-to-end suture. Sigmoid. Pathological remarks: Carcinoma.

Case 139 (Krecke, *Munch. med. Woch.*, 1900, i, p. 42).—Female, age 63. Prior history: Dysentery sixteen years ago; one year, irregular stools, vomiting, pain in right side in attacks; tender tumor. Tumor: Egg tumor in left lower abdomen, intermittent in appearance. Vaginal and rectal examination negative. Visible peristalsis. Operation: Resection, after preliminary division of colon; end-to-end suture. Ileum into ascending colon. Recovered. Pathological remarks: Carcinoma of cæcum; well one year after operation.

Case 140 (Rowlands, *Med. Press and Circ.*, 1909, 88, p. 348).—Male, middle age. Prior history: Eighteen months, occasional pain and bleeding from anus; acute for past three days; vomiting. Bowels: No stool. Rectal examination: Invagination in rectum. Distention increasing. Operation: Removed through anus, followed by reduction and suture through laparotomy. Sigmoid. Recovered. Pathological remarks: Carcinoma.

Case 141 (Riedel, *Deut. med. Woch.*, 1909, 35, 1654).—Male, age 43. Onset: Acute, vomiting. Bowels: Dark, non-bloody stool with enema. No tumor. Distention marked. Operation: Small multiple tumors felt in intestinal wall. Iliac. Died. Pathological remarks: Invagination 10 inches above ileocæcal valve; multiple sarcoma in Peyer's patches with mesenteric glands involved.

Case 142 (Dujon, *Bull. et mem. Soc. Anat.*, 1909, 84, 515–533).—Male, age 54. Prior history: Chronic obstruction for two months. Operation: Resection; lateral anastomosis with Murphy button. Near cæcum. Died. Pathological remarks: Second invagination at duodenum, both due to annular cancer.

Case 143 (Kammerer, Annals of Surgery, Aug., 1898).—Female, age 50. Prior history: Occasional pain and vomiting. Bowels: Alternately constipation and diarrhœa. Tumor: In pelvis, left side, somewhat changeable. Rectal examination: Tip of rounded mass felt. Operation: Reduced, enterostomy; wide excision of growth. Enteric. Recovered. Pathological remarks: Sarcoma.

Table C.

Acute Cases without Cause.

Case 195 (Elliot, *Tr. Am. Surg. Ass.*, 1905, 23, 295).—Male, age 38. Onset: Two weeks, vomiting. Bowels: Diarrhœa. Tumor: Left lower quadrant, movable. Distention and rigidity. Operation: (1) Incised colon to relieve constriction; two attempts to close artificial anus. Cured.

Case 196 (Hall, *St. L. Clinic*, 1906, 19, 39–47).—Female, age 52. Prior history: Indigestion, occasional nausea and vomiting. Onset: Two hours, pain and vomiting. Tumor: Right lower quadrant. Operation: Ileocæcal; reduction. Cured.

Case 197 (Raley, *Den. M. Times*, 1905–6, 25, 447–451).—Female, age 35. Prior history: Ten years, neuralgia of stomach. Onset: Sudden pain. Tumor: Felt under anæsthesia. Operation: Ileal, reduced. Cured. Following operation, good health but for hyperchlorhydria. One year after first attack, same symptoms, with vomiting. Tumor: Not found. Distention: Extreme peristalsis. Operation: Ileal, higher up, reduced. Cured.

Case 198 (Third, *Queen's M. Quart.*, 1905–6, 10, 70–73).—Female, age 52. Prior history: Recurring attacks July, 1903, to Nov., 1905, with progressively worse symptoms. Onset: Last attack sudden, pain and vomiting. Bowels: Diarrhœa and constipation, irregular. Rectal examination: Large tumor; blood. Tumor: Left lower quadrant. Distention: marked peristalsis. Died. Pathological remarks: Autopsy: remainder of colon and all but 8 ft. of small bowel in descending colon, sigmoid, rectum and protruding.

Case 199 (Sherran, *Clin. J. Lond.*, 27, 184–187).—Female, 49. Prior history: Umbilical hernia. Onset: One day, sudden pain and vomiting. (Hernia swollen, easily reduced.) Rectal examination: Blood. Tumor: Hernia (umbilical). Operation: Free fluid; relief of strangulated hernia. Cured. Pathological remarks: Nine days after operation passed section of intestine 3½ inches long; eighteen months later, signs of obstruction; operation, mass of adhesions at transverse colon; ileocolostomy.

Case 200 (Ware, *Lancet*, 1906, ii, 1721).—Female, age 27. Onset: Sudden pain. Bowels: Constipation. Tumor: Ill-defined, right lower quadrant. No distention. Operation: Iliac, irreducible; resection; suture. Cured. Pathological remarks: Twenty-two months later, symptoms of acute obstruction; rigid abdomen; operation; gangrenous lump, composed of small intestine twisted on itself; resection with Murphy button; cured.

Case 201 (Thompson, *Brit. Med. Jour.*, 1907, i, 1867).—Male, age 52. Onset: Sudden, five days, vomiting. Bowels: Constipation. Operation: Lower iliac; reduced. Died same evening.

Case 202 (Combs, *Wis. Med. Jour.*, 1907–08, 6, 251–255).—Female, age 54. Onset: Acute, pain and vomiting relieved by enemas; recurred in two days with fecal vomiting. Tumor: Right pelvis. Operation: Iliac, 9 inches above ileocæcal valve; attempt at reduction, tear; resection. Cured.

Case 203 (Riess, *Am. Jour. Med Sc.*, 1907, n. s 134, 841).—Male, age 27. Onset: Acute, forty-eight hours, pain and vomiting. Operation: Ileocolic, irreducible; ileocolostomy. Died.

Case 204 (Codman, *Bost. Med. and Surg. Journ.*, 1908, 158, 439-446). —Male, age 43. Onset: Acute, five days, pain and vomiting. Rectal examination: Blood. Tenderness in right lower quadrant. Operation: Ileocæcal, irreducible; Mixter tube in ileum, neck of mass left in wound after ligation of mesocolon; ten days later, attempt at enterocolostomy; second attempt caused death.

Case 205 (*Ibid.*).—Male age 24. Onset: Sudden, vomiting three days. Bowels: Moved. Rectal examination: Tenderness in whole pelvis, especially in right. Tumor: Right lower quadrant. Distention: Tenderness in right lower quadrant. Operation: Colic; resection. Cured.

Case 206 (*Ibid.*).—Male, age 38. Onset: Two weeks, vomiting and pain. Bowels: Diarrhœa, seven to twenty stools a day. Oval tumor in left side, doughy, firm. Rigidity, considerable. Distention, moderate. Operation: Colic, intussusceptum removed through long slit in colon; Mixter tube in same opening. Cured.

Case 207 (Elgart, *Wien. klin. Woch.*, 1903, p. 923).—Female, age 31. Prior history: Ten days ago, bloody stool. Onset: Acute, pain and vomiting. Bowels: Stool at beginning. Tumor: Oblique in right hypochondrium. Rectal examination: Blood. Operation: Reduction to 5 cm. above ileocæcal valve; then resection with end-to-end by Murphy button. Ileocolic half way up ascending colon. Recovered. Pathological remarks: No tumor or ulcer.

Case 208 (Chirat, *La Prov. Med.*, 1896, p. 604).—Female, age 19. Prior history: Peritonitis five years ago. Onset: Acute, pain and vomiting for thirty-six hours. Bowels: No stool or gas. Rectal examination: Blood from second day on. Distention moderate. Death seven days after onset without operation. Pathological remarks: Enteric invagination, upper jejunum and ileum, easily reduced; no cause.

Case 209 (Knotz, *Prag. med. Woch.*, 1896, 779).—Female, age 29. Prior history: Round worms. Onset: Acute, paroxysms of pain and vomiting. Bowels: No flatus. Tumor: Sausage-shaped, left side, not movable. Rectal examination: Mucus and blood; apex felt per rectum. Distention, beginning in right side. Operation: Complete reduction by injection of water.

Case 210 (Brunner, C., *Beitrag*, 25, p. 344).—Male, age 20. Onset: Acute pain and vomiting. Tumor: Cylindrical, in right lower quadrant. Operation: Reduction only after incision of neck of invagination; resection; end-to-end with suture. Ileocæcal. Died. Pathological remarks: No special cause.

Case 211 (Michaux, *Bull. Soc. Chir.*, 1900, p. 734).—Male, age 29. Onset: Acute pain and vomiting. Tumor: Sense of tumefaction. Rectal examination: No blood or mucus. Distention moderate; rigidity. Operation: Reduced. Enteric. Recovered. Pathological remarks: No cause.

Case 212 (*Ibid.*).—Female, age 28. Onset: Acute pain and vomiting. Tumor: Mobile tumor in right lower quadrant, intermittent with pain.

Tenderness and rigidity in right lower quadrant. Operation: Thirteen days after onset, irreducible; resection; lateral implantation. Ileocæcal.

Case 213 (Pringle, *Brist. Med. Chir. Jour.*, Dec., 1899).—Female, age 50. Prior history: Sharp colicky pain, intermittent, six months' duration. Tumor: Firm mass below navel, during pain. Distention. Operation: Irreducible; resection; end-to-end into abdominal wall. Enteric. Died. Pathological remarks: Intussusception 3 feet from pylorus.

Case 214 (Helbring, *Cent. f. Ch.*, 1901, 672).—Female, age 39. Onset: Acute pain and vomiting. Tumor: Movable, felt per vaginam. No distention. Operation: Irreducible; resection; lateral implantation. Ileocolic. Recovered. Pathological remarks: No mention of cause.

Case 215 (Pitts, *Brit. Med. Jour.*, 1901, ii, 574).—Male, age 31. Onset: Acute, eight days' duration. Operation: Resection; enterostomy. Enteric. Died. Pathological remarks: Death from peritonitis.

Case 216 (Jenly, *Wien. klin. Woch.*, 1901, p. 1177).—Male, age 28. Onset: Acute, vomiting and hiccough. Bowels: No stool, no flatus. Abdomen retracted. Operation: Resection; lateral implantation Iliac, gangrenous. Recovered. Pathological remarks: No special cause.

Case 217 (*Ibid.*).—Female, age 27. Onset: Acute, six days pain and vomiting. Bowels: Daily stool. Tumor: Above and to left of navel, hard tumor, sausage shaped. Rectal examination: No blood, no mucus; rectum negative. Distention: Moderate. Operation: Ileocolostomy, followed by subsequent resection. Ileocolic to splenic flexure. Recovered. Pathological remarks: Œdematous condition of ileocæcal valve.

Case 218 (Ludloff, *Grenz. Gebiet.*, 1898, iii, p. 600).—Male, age 22. Prior history: Three attacks in three weeks with acute cramps of short duration, and tumor. Bowels: Daily diarrhœal stool. Tumor: Sausage-shape, above navel. Distention: Slight. Operation: Complete resection with end-to-end by suture. Ileocæcal to splenic flexure. Recovered. Pathological remarks: No cause.

Case 219 (Roberts, *Kentucky Med. Jour.*, 1909, viii, p. 1212).—Female, age 25. Prior history: Constipation and indigestion for months. Onset: Acute, colicky pain; no vomiting at first. Bowels: No stools. Oblong tumor below umbilicus. Rectal examination: Tenesmus. Rigidity: Slight. Operation: Gangrenous; resection with end-to-end suture. Iliac. Died. Pathological remarks: Death from peritonitis.

Case 220 (Poitan, *Pedriat., Lille*, 1909, vii, 63–66).—Male, age 18. Onset: Acute, pain and vomiting, subsiding. Symptoms of peritonitis on sixteenth day. Bowels: No stool or flatus. Distention and rigidity: Slight, right side. Operation: Five feet above ileocæcal valve; resection; end-to-end by suture. Iliac. Recovered. Pathological remarks: No cause.

Case 221 (Sherran, ANNALS OF SURGERY, 1909, i, 875–878).—Male, age 30. Onset: Acute, pain and vomiting. Bowels: Two loose stools followed by complete constipation. Rectal examination: Blood? Distention: "Rectovesical pouch filled with fluid." Operation: Reduced with difficulty. Ileocolic. Recovered. Pathological remarks: No cause.

Case 222 (Gibbon, personal communication).—Male, age 19. Prior history: Previous good health. Onset: Sudden pain and vomiting.

Bowels: Constipation. Tumor: Right lower quadrant. Rectal examination: Negative. Rigidity. Operation: Split colon; resection of intussusceptum; lateral ileocolic anastomosis. Ileocolic. Recovered.

Case 222a (*Ibid.*).—Male, age 58. Onset: History indicating intestinal obstruction. Operation: Resection; ileostomy; colostomy. Ileocæcal. Died. Pathological remarks: Patient in bad condition; bowels gangrenous.

Case 223 (Kersten, *Deut. Zeit. f. Chir.*, 1849, Bd. 51, Hft. 56).—Male, age 30. Prior history: Two months ago, following lifting heavy weight, abdominal pain and constipation. Onset: Four days, pain. Tumor: Left side. Distention. Operation: Ileocolic, split intussuscipiens; resection of intussusceptum, including perforation. Recovered. Pathological remarks: Intussusceptum gangrenous; bloody purulent abdominal fluid; perforation.

Case 224 (Wilson, *Transylvania Jour. Med.*, 1835, viii, 486).—Male, age 18. Onset: Seventeen days. Bowels: Intestinal obstruction symptoms one hundred and eighty-one days. Cured. Pathological remarks: Gangrenous bowel.

Case 225 (Howse, *Med. Chi. Trans.*, 1876, lix, 85).—Male, age 33. Onset: Eighteen days. Operation: Mass taken outside abdomen and reduced, replaced. Cured.

Case 226 (Bellamy, *Brit. Med. Jour.*, 1879).—Female, age 34. Onset: Pain and vomiting (fecal). Rectal examination: Ileum and colon protruding. Abdominal tumor. Operation: Ileocæcal; bimanual reduction. Cured.

Case 227 (Kleberg, *Arch. f. klin. Chir.*, 1879, xxiv, 387).—Male, age 40. Prior history: Hernia one year before; intestinal obstruction; operation, cure. Onset: Few hours. Variety: Double, from above down and from below up, in a common intussuscipiens.

Case 228 (Mikulicz, Braun, *l. c.*, 690, No. 188).—Adult. Prior history: Constipation. Onset: Pain. Bowels: Constipation, followed by bloody stool. Tumor: Right lower quadrant, moved to epigastrium then to left lower quadrant. Operation: Colic into sigmoid.

Case 229 (Braun, *Verh. d. Deut. Gesell. f. Chir.*, 1885, 501).—Female, age 36. Prior history: Slight pain in right lower quadrant. Onset: Eight days, pain and vomiting. Distention. Operation: Ileocæcal; resection; suture of perforation. Died. Pathological remarks: Autopsy: General peritonitis, gangrenous bowel.

Case 230 (Kuster, *Verh. d. Deut. Gesell. f. Chir.*, 1879, i, 81).—Male, age 42. Onset: Six days, pain and vomiting (fecal). Rectal examination: Blood. Operation: Ileocæcal; resection. Died. Pathological remarks: Gangrenous bowel, peritonitis.

Case 231 (Wahl, Braun, *l. c.*).—Age, 44. Onset: Gradual for nine days, vomiting. Bowels: Constipation. Rectal examination: Prolapse from anus, size of child's head on ninth day. Rigidity: At localized spot, inferred to be tumor. Operation: Artificial anus; ileocæcal. Died. Pathological remarks: 29 cm. ileum, ascending colon, and transverse colon in descending colon; ileocæcal valve at anus.

Case 232 (Winniwarter, *Mitt. auf. d. XIV Cong. d. Deut. Gesell. f. Chir. Brieflich. Notiz.*).—Male, age 60. Onset: Sudden, while at stool, pain. Bowels: Constipation absolute. Tumor: Left lower quadrant. Operation: Artificial anus. Pathological remarks: Bloody serum in abdomen.

Case 233 (Carrier, *Gaz. med. de Lyon,* 1866, No. 4).—Male, age 23. Onset: Sudden. Tumor: Right lower quadrant. Operation: Artificial anus. Ileocæcal. Died.

Case 234 (Braun, *Verh. d. Deut. Gesell. f. Chir.,* 1885, 501).—Male, age 63. Onset: Sudden pain and vomiting (fecal). Tumor: Parallel to Poupart's left lower quadrant. Distention. Operation: Resection, ileocæcal. Died. Pathological remarks: Necrosis, peritonitis.

Case 235 (Pilgrim, *Indian Med. Gazette,* 29, 1894, 297).—Male, age 29. Onset: Sudden pain and vomiting. Rectal examination: Rectal prolapse. Operation. Cured.

Case 236 (Rydygier, *Deut. Zeit. f. Chir.,* 1895, 6, xlii, 113).—Male, age 31. Onset: Five days. Operation: Ileocæcal into rectum; attempt at reduction, rupture; resection; entero-anastomosis. Died.

Case 237 (*Ibid.*).—Male, age 20. Onset: Sixty hours. Operation: Ileal; resection. Cured.

Case 238 (*Ibid.*).—Female, age 43. Onset: Eight days. Operation: (1) Artificial anus; (2) resection; (3) closure of artificial anus; separate operations. Cured. Pathological remarks: One year later, 50 cm. piece of bowel passed.

Case 239 (*Ibid.*).—Male, age 26. Onset: Ten days. Operation: Cæcal; resection. Died. Pathological remarks: Gangrenous bowel.

Case 240 (*Ibid.*).—Male, age 43. Onset: Fourteen days. Operation: Reduced. Variety not stated. Died. Pathological remarks: Pseudo-diphtheria.

Case 241 (*Ibid.*).—Male, age 60. Onset: Ten days. Operation: Ileocæcal; artificial anus.

Case 242 (*Ibid.*).—Male, age 68. Onset: Three days. Operation: Colic; reduction.

Case 243 (*Ibid.*).—Female, age 56. Onset: Eight days. Operation: Ileocæcal; resection; removal of mass per anum because of difficulty of bringing it up into abdomen. Died.

Case 244 (Bell, *Montr. Med. Jour.,* 1905, 34, 619).—Male, age 18. Onset: Sudden pain and vomiting. Bowels: Absolute constipation. Operation: Ileal; resection. Died.

Table D.

Acute Cases With Known Cause.

Case 174 (Burckhardt, *Bericht ü. d. Chir. Abteil. d. Ludwig's Spitalis Charlottenhilfe im Jaarh,* 1884, p. 23).—Male, age 24. Prior history: Swallowed nail four months ago. Onset: Sudden pain. Operation: Ileocæcal; reduction. Cured.

Case 175 (Saltzmann, *Leichenstern Prag. Monat.,* 1874).—Male, age

29. Prior history of trauma: Directly after lifting heavy weight. Onset: Sudden pain and vomiting (fecal). Tumor: Right lower quadrant, size of fetal head. Distention. Operation: Artificial anus, after attempt at reduction with resulting rupture. Died.

Case 176 (Alglave, *Bull. et mem. Anat.*, 82, 445–452).—Male, age 40. Onset: Acute, three days pain and vomiting. Bowels: Constipation and tenesmus. Rectal examination: Blood. Distention. Operation: Ileocæcal, irreducible; ileosigmoidostomy. Died. Pathological remarks: Autopsy, large ulcer at apex of invagination.

Case 177 (Reiss, *Am. Jour. Med. Sc.*, 1907, n. s. 134, 841–849).—Male, age 17. Prior history: Twenty-sixth day of typhoid. Onset: Acute (diagnosis, perforation). Operation: Jejunal, 3 inches below duodenum; reduced. Cured.

Case 178 (*Ibid.*).—Female, age 19. Prior history: Fortieth day of typhoid. Onset: Pain and vomiting. Bowels: Tenesmus. Rectal examination: Blood and mucus. Operation: Ileocolic, reduced. Cured.

Case 179 (*Ibid.*).—Male, age 36. Prior history of trauma: Struck just above crest of ileum by heavy beam; shock twenty-four hours, then pain and vomiting. Pelvic examination: 12 ounces bloody urine. Rigidity. Operation: Small intestine contracted in many places as if ligatured, at one point enteric invagination for 2 inches; reduction. Died. Pathological remarks: Shock.

Case 180 (Haasler, V. Langenbeck *Arch.*, Bd. 68, p. 817).—Female, age 26. Onset: Seven days, pain and vomiting. Bowels: Constipation absolute at first; bowels moved later. Distention. Variety: Ileal. Pathological remarks: Tuberculosis of intestine.

Case 181 (Ash, *Brit. Med. Jour.*, 1902, May 3).—Male, age 25. Prior history: Twenty-fifth day, normal temperature following typhoid; relapse fortieth to fifty-seventh day. Onset: Ninth day of relapse; sudden pain and vomiting; collapse. Rigidity: Right lower quadrant. Operation: Ileocolic; reduction. Cured.

Case 182 (Ross, ANNALS OF SURGERY, 1904, xxxix, p. 604).—Male age 17. Prior history: Typhoid; on twenty-first and twenty-fifth days, hemorrhages. Onset: Twenty-sixth day, sudden pain. Operation: 3 feet from duodenojejunal juncture 3 inches of intussusception; reduction. Cured. Pathological remarks: Diagnosis, perforation.

Case 183 (Watkins-Pitchford, *Brit. Med. Jour.*, Sept. 6, 1902).—Male, age 29. Prior history: Convalescent from typhoid. Onset: Sudden pain and vomiting (blood); collapse. Rectal examination: Black stools. Signs of peritoneal irritation. Intussusceptions in small intestine. Pathological remarks: Mucosa injected.

Case 184 (Fuschius, *Hufeland Jour.*, Bd. lx, 42).—Male, age 28. Prior history of trauma: While on a walking trip suddenly bent and recovered. Onset: Immediate, of pain, vomiting becoming fecaloid; eighteen days, acute symptoms with eructations. Tumor: Upper umbilical region. Distention: Appeared late. Operation: Laparotomy, ileocolic or colic; incised colon; reduction bimanually (in and outside colon); suture of opening; sutured ends carried out of abdomen and removed thirteen days

after operation. Cured. Pathological remarks: Stool four days after operation; complete recovery in thirteen days.

Case 185 (Pridmore, *Cent. f. Med.*, xviii, p. 890).—Male, age 40. Prior history: Dysentery. Onset: Peritonitis, fever. Bowels: Pus in stools. Rectal examination: Blood. Tumor: Soft, under right hypochondrium. Died. Pathological remarks: Gangrenous ileo-cæcal invagination; dysenteric ulcer in large intestine.

Case 186 (Stretton, *Lancet*, 1894, ii, 797).—Male, age 20. Prior history of heavy lifting. Onset: Acute pain and vomiting. Bowels: Natural movement; flatus at intervals. Rigidity; no distention; tenderness. Operation: Forty-eighth hour; invagination of lower ileum; reduced with difficulty. Recovered.

Case 187 (Michaux, *Kor. Bl. Schw. Aert.*, 1896, No. 26, p. 148).—Male, age 8. Prior history: Fell 12 feet, and walked home bent over. Onset: Twenty-four hours after, signs of peritonitis. (At end of week, prolapse of intestine, with signs of obstruction; death on eighteenth day.) Operation: Showed retroperitoneal hæmatoma. Died. Pathological remarks: Autopsy showed enteric invagination with ascarides above.

Case 188 (Steiner, *Cent. f. Chir.*, 1896, 310).—Female, age 21. Onset: Acute, six days' duration. Rigidity and tenderness in iliac region. Operation: Enteric, lower ileum, gangrenous; resection; end-to-end suture with Murphy button. Recovered. Pathological remarks: Date stone found in specimen.

Case 189 (Batul, *Prov. Med.*, 1901, p. 317).—Male adult. Prior history of trauma: Strenuous ride. Onset: Acute, pain and vomiting. Bowels: No gas or stools for two days. Rigidity and tenderness over spleen; no visible peristalsis. Operation: Tubercular ileum. Died. Pathological remarks: Multiple ulcers in end of jejunum; tuberculous ulcer at apex of invagination; small cavity in lung.

Case 190 (Ludloff, *Grenz. Gebiet.*, 1898, iii, p. 600).—Female, age 47. Prior history: First attack sixteen years ago. Onset: Pain ten weeks ago, becoming more frequent and ending in acute attack three days ago; vomiting. Rectal examination: Once blood; nothing per rectum. Tumor: Sausage-shaped, intermittent, with pain. Visible peristalsis; distention general; tenderness. Operation: Ileocæcal into lower sigmoid, ulcer at apex; ileum and sigmoid anastomosis. Died. Pathological remarks: Secondary obstruction on eighteenth day from extension of invagination; perforation; peritonitis.

Case 191 (Von Eiselsberg, *Archives*, 69).—Female, age 48. Prior history: Two weeks colic, more frequent of late. Onset: Past two days fecal vomiting. Bowels: Constipation. Distention very great; visible peristalsis. Operation: Ileocæcal into middle descending colon; reduction; resection of circular stricture of ileum; end-to-end by suture. Death from cardiac complication after wound was nearly healed.

Case 192 (Vignard, *Lyon. Med.*, 1905, i, 215).—Female, age 23. Prior history: Abdominal trauma fifteen days ago. Onset: One attack six weeks ago with tumor subsiding; no vomiting; after ten days, recurrence.

Bowels: Serous, not bloody diarrhœa. Tumor: Irregular, sausage-shaped, in right upper quadrant; tumor on left with recurrence. Operation: Partially reduced ileocæcal; lateral implantation after resection. Died. Pathological remarks: No leakage had occurred.

Case 193 (Ainsley, *Brit. Med. Jour.*, 1897, ii, p. 82).—Male, age 15. While playing football, sudden pain and vomiting on kicking the ball. Bowels: Constipation; always acted to enema. Rectal examination. Mucus and blood after three days. No tumor. Operation: Gangrenous; resection by Maunsell's method. Cured. Enteric, 3 inches long. Remarks: In perfect health fifteen months after.

Case 194 (Clubbe, *Brit. Med. Jour.*, 1897, ii).—Male, age 10. Prior history of trauma: After pulling cart. Onset: Pain and vomiting, three days' duration. Bowels: Constipation after action. Tumor: Elongated, below navel. Operation: Reduction easy. Cæcum into descending colon. Recovered.

TABLE E.

Chronic Cases without Cause.

Case 264 (Braun, Hanff, *Verh. der Deut. Gesellsch. f. Chir.*, 1885, 501). —Adult. Onset: Seven months, recurrent colic. Rectal examination: Mass in anus; foul mucoid discharges. Operation: Artificial anus. Died. Remarks: Type not given.

Case 265 (Besnier, *Etud. s. l. diagn. et s. l. Trait. de l'Intestin dans la cavite de l'abdomen,* Paris, 1857, p. 62).—Age 23. Onset: Two months, sudden pain; three days, vomiting (fecal). Bowels: Constipation followed by bloody stools. Rectal examination: Blood. Variety: Ascending, sigmoid into colon. Died.

Case 266 (Vergely).—Female, age 19. Prior history: Digestive disturbances one year. Onset: One year pain, vomiting two weeks. Bowels: One year constipation. Rectal examination: Blood; fetid mucus. Operation: Sigmoidorectal, reducible. Pathological remarks: Gangrenous perforation.

Case 267 (Riedel, *Mitt. a. d. Grenz. Geb.*, xiv, 1, 2).—Female, age 50. Onset: Beginning ten days after last child; fourteen years, recurrent attacks; acute onset; pain and vomiting sudden, three days' duration. Bowels: Diarrhœa, constipation absolute. Rectal examination: Blood. Tumor: Epigastric, varying in size. Distention. Operation: Ileo-ileocæcal; resection. Died. Pathological remarks: Venous thrombosis; pneumonia.

Case 268 (Rydygier, *Deut. Zeit. f. Chir.*, 1895-6, xlii, 113).—Female, age 47. Onset: Eight weeks. Operation: Resection; ileocæcal. Cured.

Case 269 (*Ibid.*).—Female, age 25. Onset: Five weeks. Operation: Resection; ileocæcal. Cured.

Case 270 (*Ibid.*).—Male, age 33. Onset: Four weeks. Operation: Ileocæcal; entero-anastomosis. Cured.

Case 271 (*Ibid.*).—Female, age 22. Onset: Six months. Operation: Ileocæcal; reduction. Cured. Pathological remarks: 20 cm. long.

Case 272 (*Ibid.*).—Female, age 38. Attacks: Twenty-one days ago,

eight days ago. Operation: Colic; artificial anus. Died. Pathological remarks: Peritonitis at operation.

Case 273 (*Ibid.*).—Male, age 26. Onset: Thirty-five days. Operation: Ileocæcal; reduction. Died. Pathological remarks: Suspicious spot in bowel at operation.

Case 274 (*Ibid.*).—Male, age 30. Onset: Six weeks. Operation: Ileocæcal; reduction; anchorage of bowel to abdominal wall. Cured.

Case 275 (Delore, *Rev. de Gyn. et Chir. Abd.*, 1905, 9, 641–658).—Male, age 20. Onset: Two to three years, pain and vomiting. Bowels: Diarrhœa. Rectal examination: Blood. Tumor: Left lower quadrant. Operation: Cut intussuscipiens; resection of intussusceptum from inside; ileocæcal. Cured.

Case 276 (Kronbach, *Deut. med. Woch.*, 1905, i, 1782).—Age 41. Onset: Seven weeks, sudden onset of pain and vomiting. Rectal examination: Blood. Operation: Ileocæcal; reduction; resection.

Case 277 (Hartmann, *Bull. M. Soc. Chir.*, 1908, 34, 563–566).—Male, age 18. Onset: Four months, pain. Bowels: Gurgling. Rectal examination: Blood, gross and microscopically. Tumor: Mobile, felt bimanually. Rigidity: Right upper quadrant. Operation: Ileal; resection.

Case 278 (Batchelor, *N. Orl. M. & S. J.*, i, 1905, 58, 570).—Male, age 54. Onset: Sixty days, pain and vomiting. Tumor: Fluctuating mass above umbilicus. Operation: Abandoned; ileocæcal. Died. Pathological remarks: Gangrenous bowel.

Case 279 (Miller, *Am. Jour. Obst.*, N. Y., 1906, 54, 869).—Female, age 26. Prior history: Four years, attacks. Onset: Pain and vomiting. Bowels: Diarrhœa. Tumor: Size small kidney, right lower quadrant, firm, tender, freely movable. Operation: Ileocolic to splenic flexure; irreducible; ileocolostomy.

Case 280 (Jahonlay, *Lyon Med.*, 1907, 108, 1714).—Male, age 52. Onset: Two to three months, pain. Bowels: Constipation. Tumor: Hard, slightly movable, right lower quadrant. Operation: Ileocæcal, with supposed cancer; lateral anastomosis; excision. Died. Pathological remarks: Pneumonia; autopsy showed no tumor.

Case 281 (Poisson, *Gaz. med. d. Nantes*, 1908, ii, 26, 336–338).—Female, age 13. Prior history: Forty days ago occasional vomiting with bloody stools; tumor felt below and to left of umbilicus. Onset: Present attack, continuous vomiting. Rectal examination: Forty-five days ago passed slough of small intestine. Distention and visible peristalsis in present attack. Operation: Jejunal, 1. m. below pylorus; below this intestine contracted; intestine at site of former invagination makes angle.

Case 283 (Haasler, V. Langenbeck's *Arch.*, 1902, Bd. 68, 817).—Female, age 32. Onset: Three months, pain becoming severe. Bowels: Eight weeks constipation followed by diarrhœa, some flatus. Rectal examination: Protrusion from anus easily removed by knife. Tumor: Fourteen days. Distention: Asymetrical. Variety: Ileocæcal; cæcum and appendix at anus. Died.

Case 284 (Hofmeister, *Zentbl. f. Chir.*, No. 48).—Male, age 32.

Onset: Ten weeks, typical invagination symptoms. Rectal examination: 25 cm. mass protruded from anus. Operation: Resection 140 cm. Cured.

Case 285 (Majewski).—Female, age 56. Prior history: Several years hard, tender swelling in cæcal region; six months ago sudden pain, vomiting, and diarrhœa; subsidence of acute symptoms with increase in size of tumor. Operation: Reduction. Ileum into cæcum and ascending colon. Recovered.

Case 286 (Elgart, *Wien. klin. Woch.*, 1903, p. 923).—Female, age 33. Prior history: Four months tumor in abdomen, gradual increase in size; pain in abdomen and back. Bowels: Normal. Tumor: Sausage-shaped tumor in left flank, smooth, movable. Operation: Reduced with difficulty; cæcum anchored. Ileocæcal. Recovered. Pathological remarks: No ulcer or tumor.

Case 287 (Stead, *Brit. Med. Jour.*, 1901, ii, 1458).—Female, age 72. Prior history: Chronic constipation with several attacks of colic and flatulence. Rectal examination: Protrusion of "tumor" from anus. Operation: Sphincter divided; reduction. Colon. Recovered. Pathological remarks: No mention of tumor.

Case 288 (Von Eiselsberg, *Archive*, Bd. 69).—Male, age 31. History: Eighteen days colic, followed by diarrhœa; vomiting after eating. Rectal examination: Blood for two days. Tumor: Long, hard, movable tumor in right side. Distention: Moderate. Operation: Irreducible; ileocæcal to hepatic flexure; end-to-end by suture. Recovered. Remarks: Three years after, occasional pain, stools normal.

Case 289 (*Ibid.*).—Male, age 35. Prior history: Three years, two years and six weeks ago, severe colic disappearing with enema. Bowels: Stools and gas, scant. Tumor: Sausage-shaped transverse, in upper abdomen. Operation: Reduction; resection to prevent recurrence. Ileocolic. Recovered. Pathological remarks: Three years later in excellent health.

Case 290 (*Ibid.*).—Male, age 36. Prior history: Three months, short colicky attacks; two and a half weeks ago, noticed distended loop. Bowels: Movement to enema for two and a half weeks. Distention: Two and a half weeks. Operation: Reduction; resection with end-to-end anastomosis by suture. Enteric. Recovered. Pathological remarks: Swelling, probably inflammatory, above a stricture of unknown character.

Case 291 (Baracz, *Cent. f. Chir.*, 1894, p. 622).—Male, age 19. Prior history: Three attacks of pain and vomiting, with constipation in past twenty-nine months; diarrhœa after last attack. Hard tumor in cæcal region for past year. Operation: Ileocolostomy with resection and end-to-end circular suture. Ileocæcal, irreducible. Recovered. Pathological remarks: Swelling only inflammatory.

Case 292 (Passagi, *Il Policlinico*, 1905, p. 10).—Male, age 30. Prior history: Intermittent colic, with variable tumor, vomiting over a period of nine months. Bowels: Constipation. Rectal examination: Mucus but no blood. Tumor: Right upper quadrant. Operation: Reduction; endoplication of cæcum by two parallel rows on either side anterior longitudinal band. Ileocæcal. Recovered.

Case 293 (Battle, *Med. Presse*, 1897).—Male, age 50. Prior history: Constipation, vomiting for fourteen days. Rectal examination: Blood. Tumor: sausage-shaped, in left lower quadrant. Operation: Irreducible; cæcum anastomosed to colon. Colonic.

Case 294 (Schiller, *Beitrag*, v, 17, p. 635).—Female, age 49. Prior history: For fifteen weeks daily attacks of pain, with no stool or gas lasting fifteen minutes, followed by normal stool. Tumor: Sausage-shaped, elastic, slightly movable. Visible peristalsis. Operation: Reduced. Ileum into colon. Recovered.

TABLE F.

Chronic Cases With Known Cause.

CASE 245 (Müller, *Arch. f. klin. Chir.*, 1879, xxiv, 183).—Male, age 33. Prior history: Dysentery four months. Onset: Three months, pain and vomiting. Bowels: Irregular, with constipation, becoming absolute. Rectal examination: Blood and mucus. Tumor: Left lower quadrant. Variety: Ileocæcal to rectum. Died.

CASE 246 (Durante, *Bull. de la Soc. Anat.*, 1879).—Male, age 29. Prior history of trauma: Crushed between two wagons. Onset: Sudden, immediate; vomiting. Bowels: Diarrhœa. Rectal examination: Blood. Tumor: Left lower quadrant. Variety: Ileocæcal.

CASE 247 (Rydygier, *Deutsche Zeitschrift f. Chir.*, 1895, xlii, 113).—Female, age 18. Prior history: Ten years ago appendicitis. Onset: Chronic. Operation: Ileocæcal; enterocolic anastomosis. Pathological remarks: Inflammatory stricture of cæcum.

CASE 247a (*Ibid.*).—Male, age 23. Onset: Two months. Operation: Ileocæcal, resection. Died. Pathological remarks. General tuberculosis; invagination began at tuberculous ulcerated stricture.

CASE 248 (Haasler, V. Langenbeck *Arch.*, 1902 Bd. 68, 817).—Female, age 42. Prior history of trauma: Six weeks ago fell from electric car; concussion of brain. Onset: Few days later vomiting (constant), and pain in right lower quadrant. Bowels: Constipation. Tumor: Three weeks; right lower quadrant. Distention. Variety: Ileocolic.

CASE 249 (V. Braman, *Münch. M. Woch.*, 1900, p. 1712).—Male, age 25. Prior history: Family and personal history, tubercular. Onset: First attack ten months ago; colicky pain; attacks more frequent last 3 months; vomiting. Bowels: Diarrhœa. Distention slight; visible peristalsis; tenderness excessive. Operation: Irreducible; coils firmly bound together; resection; enteric. Recovered. Pathological remarks: Probably tubercular.

CASE 250 (Cavaillon, *La Prov. Med.*, 1901, No. 24).—Male, age 46. Prior history with onset: Three weeks; occasional severe pain after eating. Bowels: Alternating diarrhœa and constipation. Rectal examination: No blood. Tumor: In cæcal region, extending into epigastrium. No rigidity; visible peristalsis. Operation: Reduction; ileocæcal to splenic flexure. Pathological remarks: Serosa of cæcum studded with miliary tubercles.

CASE 251 (Quadflieg, *Münch. med. Woch.*, 1901, p. 1093).—Male, age 28. Prior history with onset: Occasional cramps followed by intermittent attacks of acute obstruction for two and a half months, with pain and vomiting. Bowels: stools normal; occasional constipation. Rectal examination: No blood or mucus. Tumor: Size of fist; changeable position, according to pain. Operation: Partial reduction; resection with lateral implantation; ileocæcal to transverse colon. Recovery. Pathological remarks: Broad, deep, circular ulcer in cæcum; cause unknown.

CASE 252.—Male, age 36. Prior history with onset: Typhoid fever one year ago; one attack mild, followed by free interval of six months; latterly constant attacks with vomiting. Bowels: Alternating constipation and diarrhœa. Rectal examination: Mucus; rectum negative. Tumor: Movable, size of fist, to right of navel; disappears with cessation of pain Abdomen: Distention; tenderness. Operation: Complete resection; ileum to colon by suture. Variety: Ileocæcal to middle of transverse colon. Recovery. Pathological remarks: Ulcer on invagination.

CASE 253 (Maxwell, *St. Barth. Hosp. Rep.*, 1908–1909, 44, 153, 160).—Male, age 28. Prior history: Dysentery for two months. Rectal examination: Mucus and blood. Tumor absent. Retracted abdomen; tenderness over ascending colon. Operation: Irreducible in ascending colon; resection, end-to-end by suture; ileocæcal. Died promptly.

CASE 254 (*Ibid.*).—Male, age 56. Prior history: Dysentery for one month. Rectal examination: Mucus and blood. Tumor absent. Operation: Partially reducible; lateral anastomosis by Murphy button; ileocæcal. Death. Pathological remarks: Seventy-two hours; no tendency to repair.

CASE 255 (*Ibid.*).—Male, age 19. Prior history with onset: Trauma, followed in five days by dysentery. Attack, one month duration; pain severe over tumor. Tumor: Sausage-shaped over curve of colon. Operation: Reduced to size of small orange; then lateral anastomosis by suture. Recovery.

CASE 256 (*Ibid.*).—Male, age 29. Prior history with onset: Four months ago, lump in right upper quadrant, followed by severe pain; no vomiting. Rectal examination: Blood three months ago on two occasions. Tumor: Sausage-shaped over hepatic flexure, could be seen crossing abdomen from right to left with paroxysms of pain. Operation: Irreducible; covered over surface with miliary tubercles; lateral anastomosis; ileocæcal. Recovery. Pathological remarks: Tubercular.

CASE 257 (*Ibid.*).—Male, age 14. Prior history with onset: One month stools small with little blood; eleven days ago pain on right side; vomiting. Bowels: Constipation. Tumor: Indefinite lump over hepatic flexure. Operation: Reduced; lateral anastomosis with suture; ileocæcal. Recovery. Pathological remarks: Miliary tubercles on outside.

CASE 258 (*Ibid.*).—Female, age 13. Prior history with onset: Dysentery for two months; very emaciated. Tumor: Sausage-shaped over transverse colon, with paroxysmal pain. Operation: Reduced with great difficulty, revealing lump in cæcum; excision with lateral implantation;

ileocæcal. Died in four days from peritonitis. Pathological remarks: lump probably tubercular.

CASE 259 (Brin, *Bull. et Mem. Soc. de Chir.*, 1908, 34, 1257-1279).—Male, age 34. Prior history with onset: Three attacks in seven weeks of obstruction with pain and vomiting. Bowels: Bloody diarrhœa. Tumor: In right upper quadrant, disappearing with subsidence of pain. Operation: Reduced; ileocæcal to transverse colon. Recovery. Pathological remarks: Cæcal tuberculosis.

CASE 260 (Schiller, *Beitrag*, xvii, p. 635).—Female, age 35. Prior history with onset: Short, severe attacks of vomiting and colic for nine weeks; between attacks normal. Bowels: Diarrhœa; frequent tenesmus. Rectal examination: Blood and mucus. Sausage-shaped tumor over transverse colon. Operation: Irreducible; resection, with ileocolostomy; ileocæcal. Recovery. Pathological remarks: Ulcer in cæcum.

CASE 261 (Pridmore, *Brit. Med. Jour.*, 1897).—Male, age 40. Prior history with onset: Supposed malaria, then dysentery with abdominal pains. Bowels: Watery and blood-stained stools. Rectal examination: Offensive stools, with blood and pus before death. Sausage-shaped tumor shifting in position; tender. Variety: Ileocæcal. Death. Pathological remarks: Intestine in places gangrenous with old dysenteric ulcers.

CASE 262 (Boyce-Barrow, *Lancet*, 1897, i, 1411).—Male, age 11. Prior history with onset: Attacks of abdominal pain for two months; often vomiting solid food. Bowels: No diarrhœa. Rectal examination: blood and mucus past week. Tumor: Size of hen's egg in right upper quadrant; movable; changeable with pain. Operation: Irreducible; resection, end-to-end with Murphy button; ileocæcal. Recovery. Pathological remarks: Tubercular ulcer at apex of intussusception.

CASE 263 (Orton, *Brit. Med. Jour.*, 1898, i, 489).—Male, age 58. Prior history with onset: For six months pain with offensive stools. Tumor: Soft, doughy mass in right lower quadrant, thought to be feces; diminished by enema. Variety: Jejunum into rectum. Death from exhaustion three and a half years after onset. Pathological remarks: Intussusception irreducible; cæcal segment occupied by ulcerating mass, size of small egg, thought to be inflammatory.

TABLE G.

Meckel's Diverticulum.

CASE 144 (Struthers, *Lancet*, 1906, ii, 1345).—Female, age 5. Onset: Two months abdominal pain; two days repeated vomiting. Rectal examination: Prolapse two months, having at apex (reappearing two days ago) a polypoid mass (appendix, one and a half inches long, inverted). Tumor: Left lower quadrant. Distention. Operation: Ileocæcal reduced; appendix removed through incision in cæcum.

CASE 145 (Bridwell, *Lancet*, 1907, ii, 682-684).—Male, age three and a half. Prior history: Four months before, acute onset with hemorrhage from bowel without known cause. Onset: Five weeks pain and vomiting at intervals. Bowels: Complete constipation. Hard tumor in right

lumbar region and hypochondrium. R'gidity. Operation: Ileocolic from six inches above ileocæcal valve to middle of colon; reduced. Recurrence of pain after one week and two months later. Tumor in umbilical region. At operation an enteric invagination with Meckel's diverticulum at apex. Resection.

CASE 146 (Van Mandach, *Corr. Bl. f. Schw. Aertz*, 1907, 37, 729–732). —Male, age two and a half. Onset: Sudden vomiting. Bowels: Diarrhœa. Tumor in umbilical region. Distention. Operation: Ileocolic reduced; inverted diverticulum reduced itself spontaneously. With reduction several purse string sutures about Meckel's diverticulum to occlude lumen. Cured.

CASE 147 (Kothe, *Deut. m. Woch.*, 1908, 34, 2409).—Male, age 23. Prior history: Six months ago abdominal pain. Onset: Three days acute obstruction; pain and vomiting. Operation: Ileocæcal; partial reduction; resection; end-to-end by Murphy button. Pathological remarks: Meckel's diverticulum inverted at apex.

CASE 148 (Binnie, *Anat. Med. Gaz.*, 1908, 27, 356–358).—Female, age two. Onset: Colic one week, followed by acute obstruction. Tumor: Sausage-shaped; disappeared under anæsthesia. Operation: Transverse colon; resection. Cured. Pathological remarks: Appendix inverted; felt through cæcal wall.

CASE 149 (Delore, *Rev. d. Chir.*, 1908, 38, 39–62).—Male, age six. Prior history: Three or four previous attacks. Onset: Three days, acute. Tumor: Right lower quadrant. Visible coils. Operation: Enteric; irreducible; resection. Death. Pathological remarks: Inverted Meckel's diverticulum.

CASE 150 (Coffey, ANNALS OF SURGERY, 1907, xlv, p. 42–48).—Male, age seven. Prior history: At two years severe cramps with vomiting monthly, with bloody stool; at four years similar attack and jaundice. Onset of present attack, acute; pain and vomiting. Bowels: Tenderness of bowel. Rectal examination: Blackberry seeds and later black stool. Tumor: Large in right side. Operation: Ileocæcal; irreducible; resection after opening sheath. Cured. Pathological remarks: Inverted Meckel's diverticulum.

CASE 151 (Moroni, *Virchow. Hirsch. Jahres Bericht.*, 21, 1898, 289).—Male, age 26. Prior history: Operation for ileus; axial torsion. Onset: Recurrent obstruction. Death. Pathological remarks: Complete enteric invagination caused by turning inside out of Meckel's diverticulum, caused by cherry-sized fibrous polyp in Meckel's diverticulum.

CASE 152 (Ryan, *Intercolonial M. J. Austral.*, 1907, xii, 459–461).—Male, age 9. Onset: Acute; pain and vomiting. Operation: Lower iliac (6 inches from ileocæcal valve); resected 12 inches gangrenous gut; ends sutured in wound. Death. Pathological remarks: Starting of intussusception was firm polyp at apex.

CASE 153 (Cheyne, ANNALS OF SURGERY, xl, 1904, p. 796).—Male, age 19. Prior history: Two years indefinite abdominal pain. Onset: Nine months acute; vomiting recurrent. Operation: Triple: two reduced; third resected, showed Meckel's diverticulum as cause. Pathological remarks: Mucous membrane greatly prolapsed and hypertrophied.

CASE 154 (Cowardine, *Lancet*, 1904, Feb. 20).—Age fourteen months. Onset: Collapsed. Operation: Double ileal with Meckel's diverticulum. Death. Pathological remarks: Gangrene.

CASE 156 (Robinson, *B. M. J.*, 1899, ii, 1417).—Male, age 5. Onset: Pain and vomiting. Bowels: One stool. Distention; no rigidity; no tenderness; no tumor. Rectal examination: Blood with enema; lump in Douglas's pouch on bimanual examination. Operation: Reduced to inverted Meckel's diverticulum; excision; Lembert suture; enteric four inches long. Death.

CASE 157 (Eve, *B. M. J.*, 1901, ii, 582).—Refers to a case of inverted Meckel's diverticulum without clinical notes.

CASE 158 (Von Stubenrauch, *Cent. f. Ch.*, 1898, No. 26, p. 137).—Female, age 5½. Onset: Acute for five days; vomiting. Tumor: Moderate distention on fifth day; tenderness; sausage-shaped tumor in midline between anterior superior spines. Rectal examination: Blood and mucus; otherwise negative. Operation: Tear during attempted reduction; resection; circular suture; enteric. Death. Pathological remarks: Inverted Meckel's diverticulum at apex of invagination, in gangrenous condition.

CASE 159 (Erdmann, *Annals*, 1900, p. 186).—Male, age 9. Onset: Acute; pain and vomiting. Distention and tenderness; tumor from right iliac fossa to costal margin. Rectal examination: Blood and mucus; tenesmus. Operation: Operation fifty-eight hours after onset; irreducible and gangrenous; resection; end-to-end with Murphy button; enteric to within six inches of cæcum. Death. Pathological remarks: Inverted Meckel's diverticulum at apex.

CASE 160 (Adams, *Tr. Path. Soc.*, London, 1892, p. 75).—Male, age 42. Prior history: Three weeks' duration; obstruction first week; subsidence. Onset: Recurrence with vomiting. Tumor: None; fulness in right lower quadrant. Rectal examination: Blood once with enema. Operation: Ileocolic; gangrenous. Death. Pathological remarks: Inverted Meckel's diverticulum at apex.

CASE 161 (Küttner, *Beitrag*, No. 21, p. 289).—Female, age 49. Prior history: Acute attack eight weeks ago, lasting five days. Onset: Similar attack three days' duration. Operation: Anastomosis between distended and collapsed intestine. Death. Pathological remarks: Meckel's diverticulum intussusception, with three small perforations at base.

CASE 162 (Strauch, *Zeit. f. klin. Med.*, 38, p. 465).—Female, age 6. Prior history: Poor digestion; colic from time to time. Onset: Acute, vomiting. Bowels: Diarrhœa, followed by constipation. Tumor: Hard and elastic, below navel; tenderness. Operation: Reduction partial, then resection; circular suture; enteric. Death. Pathological remarks: Invaginated Meckel's diverticulum.

CASE 163 (Zum Busch, *Cent. f. Chir.*, 1903, p. 733).—Male, age 21. Prior history: Fourteen months dull pain about navel, with alternating constipation and diarrhœa; patient being an athlete, accustomed to holding many men on abdomen. Onset: Acute vomiting. Bowels: Several fluid stools with great tenesmus. Tumor and rigidity in right lower quadrant. Rectal examination: Frequently blood. Operation: Reduction

difficult; gangrenous; resection, side-to-side; "tumor" in intussusception; ileocolic. Recovery. Pathological remarks: Tumor proved an inverted Meckel's diverticulum, with subserous lipoma at apex; abscess in abdominal wall.

CASE 164 (Hohlbeck, *Archives Chir.*, Bd. 61, p. 1).—Male, age 18. Onset: Acute pain and vomiting. Bowels: No gas or stool. Tumor: Sausage-shaped, under anæsthesia in right lower quadrant. Rectal examination: No blood. Operation: Third day; reduction, showing Meckel's diverticulum at apex; resection of Meckel's diverticulum; ileocolic. Died.

CASE 165 (Travers, *Lancet*, 1902, ii, 146).—Male, age 10. Onset: Acute; vomiting. Bowels: Moved; slight tenesmus. Tumor: Over appendix, firm, tender and dull; no tumor in rectum. Rectal examination: No blood, mucus or flatus since primary attack. Operation: Reduction, except Meckel's diverticulum, which was partially reduced, so as not to obstruct gut; ileocolic into ascending colon. Recovery.

CASE 166 (Pitts, *B. M. J.*, 1901, ii, p. 578).—Male, age 15. Prior history: Had eaten pint of cherries. Onset: Pain and vomiting, becoming worse on fifth day. Tumor: None; distention great on fifth day. Rectal examination: No blood or mucus. Operation: Enterostomy; evacuation gas and contents; suture; reduction to inverted Meckel's diverticulum, removed by enterotomy; ileocolic to hepatic flexure. Recovery.

CASE 167 (Dobson, *Lancet*, 1903, i, 1161).—Male, age 4½. Onset: Pain and vomiting. Tumor: In right iliac fossa; soft; mobile. Rectal examination: Blood and mucus. Operation: Reduced to apex, where inverted Meckel's diverticulum projected into gut; resection of Meckel's diverticulum segment, not including mesentery; ileocolic. Recovery. Pathological remarks: No fecal fistula.

CASE 168 (Wainwright, ANNALS OF SURGERY, 1902, i).—Male, age 17. Gradual onset of six days; pain and vomiting twenty-four hours. Bowels: Constipation obstinate. No tumor; abdomen retracted; tenderness below. Rectal examination negative. Operation: Thirty-six hours after acute onset; complete reduction, including an inverted Meckel's diverticulum which was removed; enteric, three inches long. Recovery.

CASE 169 (Weil and Frankel, *Soc. Anat.*, 1896, p. 918).—Female, age 4½. Onset: Acute; pain and vomiting thirty-six hours. Bowels: Constipation. Cylindrical, tender tumor over appendix. Rectal examination: Blood. Operation: Reduction; gangrenous; resection; circular suture; ileocolic. Died. Pathological remarks: Meckel's diverticulum at apex.

CASE 170 (Brin, *Bull. Mem. Soc. d. Chir.*, 1908, 34, p. 1267–1279).—Female, age 39. Prior history: Attacks two to three times yearly for twelve years. Onset: During past year, tenderness between attacks. Pelvic tumor, thought to be salpingitis. Operation: Supravaginal hysterectomy; acute obstruction eight days later; reduced; evagination and resection of Meckel's diverticulum; iliac. Recovery. Pathological remarks: Inverted Meckel's diverticulum.

CASE 171 (Riedel, *Deut. Med. W.*, 1909, 1654).—Female, age 25. Onset: Acute pain. Bowels: Constipation; no stool or flatus. No tumor; tenderness over navel; distention slight. Operation: Resection; enteric.

Died. Pathological remarks: Meckel's diverticulum inverted and gangrenous.

CASE 172 (De Quervain, *Cent. f. Ch.*, 1898).—Male, age 16. Onset: Acute; pain and vomiting. Bowels: Several movements; one black stool. No tumor; distention moderate. Rectal examination: Negative. Operation: Resection; fixation of ends in wound; iliac. Died. Pathological remarks: Meckel's diverticulum; inner layers gangrenous.

CASE 173 (Ewald, *Berl. K. W.*, 1897, p. 169).—Female, age 42. Prior history: Repeated attacks of obstruction in seven months. Visible peristalsis. Death sudden, without operation. Pathological remarks: Intussusception of Meckel's diverticulum, with stricture of small intestine and perforation.

CASE 173a (Moore, Per. communication).—Twenty-five. Prior history: Several years abdominal colic; diagnosis, appendicitis. Onset: Twenty-four hours; acute. Operation: Reduction; resection of diverticulum; ileocolic. Recovery. Pathological remarks: Bowel dark but not gangrenous; one slight attack of colic since operation.

TABLE H.

Discharge of Necrotic Intussusceptum Per Rectum.

CASE 1 (Catterina, *Clin. Chir.*, 1898).—Female, age 47. Onset: Acute; strangulation. Tumor: Round, oval, size of fist, slightly movable; paraumbilical. Operation: Irreducible invagination; anastomosis with Murphy button. Subsequent discharge of slough.

CASE 2 (Pozza, *Clinica Ch.*, 1901).—Female, age 37. Onset: Sudden; pain right side; vomiting, at length fecal. Rectal examination: Bloody mucus fourth day. Tenderness. Operation: Sixth day; entero-anastomosis, Murphy button. Discharged slough thirteenth day, 60 cm. long. Recovery. Slough consisted of ileum, cæcum and ascending colon; no vermiform appendix.

CASE 3 (Wechsberg, *Cent. f. All. Path.*, etc., 1900, p. 193).—Age, eighteen. Prior history: Acute gastritis; round worms. Onset: signs of peritonitis and fever. Bowels: Discharge of worms not followed by relief. Tumor: Variable position: (a) above navel; (b) right iliac fossa. Tenderness. Operation refused; discharge of slough, composed of cæcum and small intestine in second week. Recovery. End result: Fourteen months later, after several attacks of pain, acute obstruction; death; autopsy showed small intestine terminating in colon below hepatic flexure, with stricture and scars in ascending colon and splenic flexure.

CASE 4 (Schridde, *Münch. Med. Woch.*, Bd. 50).—Female, age 60. Prior history: Tubercular; signs of late stage. Onset: Pain lower right side; vomiting. Bowels: Stool at onset, afterward constipation. Rectal examination: First stool fifth day. Tenderness and distention; visible peristalsis. Discharge of slough on twelfth day; three months later death from acute pulmonary process. Recovery. End result: Autopsy showed annular stricture 36½ cm. above ileocæcal valve; visceral lesions.

CASE 5 (Hallmann, *St. Peter's Med. Wo.*, Bd. 28, 1903).—Male, age 49. Three months ago onset; pain and vomiting, followed by loss of appetite. Bowels: Very fluid stools. Rectal examination: Mucus and blood. Tumor: In left iliac region, disappearing on inflation. Discharge of slough at end of third month. Recovery. Slough consisted of ileum, cæcum and large intestine, with tape-worm still attached.

CASE 6 (Polya, *Owosi Hetilap*, 1905).—Male, age 44. Onset: Sudden; incomplete obstruction. Rectal examination: Tumor protruded from anus. Tumor: Beneath right border ribs. Slough 42 cm. long. Recovery. Cæcum, appendix and ileum. End result: Occasional recurrence of meteorism suddenly relieving itself.

CASE 7 (Hermes, *D. Zeit. für Chir.*, Bd. 77).—Male, age 23. Onset: Sudden; colic; pain on micturition; eight days duration. Distention and tenderness over bladder. Discharge of slough fourteenth day; secondary stricture of rectum cured by artificial anus and subsequent dilation. Recovery.

CASE 8 (Camhours, *Bull. Soc. Anat.*, 1906).—Female, age 23. Prior history: Tubercular family and personal history. Onset: Acute; pain. Bowels: Stools for five days. Rectal examination: Blood. Discharge of slough fifteenth day, consisting of portion of jejunum. Recovery. End result: Persistent distention with painful puffiness one month after discharge of slough.

CASE 9 (Haedke, *Med. Klinik.*, 1906).—Age 3½ months. Onset: Acute; vomiting five days' duration. Bowels: Constipation. Rectal examination: Blood; irreducible prolapse. Operation refused; stools recurred; death two days later. End result: "Autopsy showed nature healing as in strangulated hernia."

CASE 10 (Kolbe, *Deut. Med. Woch.*, No. 21).—Male, age 40. Prior history: Dyspepsia, distention, obstipation and hemorrhoids fifteen years. Onset: Three days colic; vomiting. Bowels: Profuse diarrhœa. Rectal examination: Blood and mucus; pus. No rigidity; borborygmi. Discharge of slough 20 cm. long. Recovery. End result: Marked improvement after slough was discharged.

CASE 11 (Solberg, *Norsk. Mag. for Layrrid*, 1898).—Female, age 30. Onset: Acute obstruction. Discharge of slough fourteenth day. Recovery. End result: Eight weeks later death from second obstruction; no autopsy.

CASE 12 (Segal, *Jeshenéde Vrick*, 1898).—Male, age 56. Prior history: Constipation. Onset: Chronic; pain and frequency of urination. Thirteen days after admission discharge of slough, and two days later a second larger slough. End result: Improvement, followed by opening of abdominal abscess into bladder; persistence of pyuria and granular casts.

CASE 13 (Raven, *l. c.*).—Age 9. Onset: Acute; pain and vomiting. Bowels: Obstipation after primary stool. Distention, tenderness and rigidity. Operation; gangrenous loop; enterostomy; ten days later discharge through fistula of slough. Recovery. End result: Intermittent closure of fecal fistula; death four years later from neglected acute obstruction; autopsy showed almost complete stenosis two feet above valve.

Case 14 (Chodkiewicz, *Kiel. Inaug. Dissert.*, 1878).—Male, age 20. Prior history with onset: Abdominal pain of long standing. Bowels: Diarrhœa. Rectal examination: Blood and mucus; intermittent. End result: Death after five and a half months; autopsy showed small intestine opening into transverse colon; the discharge of slough was unnoticed.

Case 15 (O'Connor, *B. Med. J.*, 1894, p. 123).—Male, age 13. Onset: Three days after severe wetting; symptoms of obstruction and peritonitis. Discharge of slough of small intestine, with Meckel's diverticulum on about twelfth day. Recovery. End result: Twelve months after attack patient was well.

Case 16 (Sutcliffe, *B. Med. J.*, 1894, p. 124).—Male, age 17. Onset: Acute, with symptoms of obstruction and peritonitis for twelve days. Discharge of slough of large intestine on seventeenth day. Recovery. End result: One week after discharge of slough recurrence of symptoms for five days; dysenteric stools persisted forty days.

Case 17 (Slesser, *Lancet*, 1879, vol. ii, 909).—Age seven months, Onset: Pain. Rectal examination: Blood; dark gray membrane protruding. Tumor: Hardness lower part body. Twelfth day, passed cæcum, part of colon and appendix. Remarks: Well sixteen months; last heard.

Case 18 (Schmidt, *D. Zeitsch. f. Chir.*, 1898, Bd. 48, p. 83).—Female, age 48. Prior history: Operation (Jan. 3) for carcinoma of stomach; pylorectomy. Onset: January 8; pain and vomiting. Bowels: Diarrhœa; thin, foul mucus. January 27 expelled six-inch section of colon; invaginated. Abscess appeared in upper angle of wound; death February 28; at autopsy stricture in middle of the transverse colon; specimen passed showed that intussusceptum was composed of that part of colon which was freed during the pylorectomy.

Case 19 (Krabbel, *D. Med. Woch.*, 1879, No. 41, p. 525).—Female, age 44. Prior history: Child bed. Onset: Ninth day sudden pain and vomiting (fecal); collapse. Bowels: Constipation; thin diarrhœa. Tumor: Right side. Distention upper part of abdomen; visible peristalsis. Following calomel sudden improvement; bowels moved; later 48 cm. ileum in fair condition passed. Recovery. Pathological remarks: Death later of tuberculosis. Autopsy: 15 cm. above valve Bauhini a strong scar (circular) narrowing lumen of gut but not obstructing it; bowel somewhat dilated above.

Case 20 (Kofmann, *Centralblatt f. Chirurgie*, 1895, 22, p. 941).—Female, age 22. Onset: Pain and vomiting; sudden. Bowels: Constipation; stool normal in three weeks (following tearing pain in right side), then diarrhœa. Tumor in left side; proved to be abscess; drained. Distention. Eight weeks after onset passed ¼ m. bowel. Recovered. Remarks: Recurrence of obstruction symptoms; operation; search of small bowel caused rupture, just below it a stricture (complete) of jejunum thought to be site of intussusception.

Case 21 (Hampelu, *St. Petersburg Med. Woch.*, 1883, Bd. 8, p. 161).—Female, age 43. Prior history: After lifting heavy burden, sudden pain and vomiting. Rectal examination: Blood; rectal mass. Tumor:

Left lower quadrant, movable. Tumor reduced bimanually; hand up to splenic flexure by rectum. Discharge and character of slough: Twenty-second day; 15 cm. bowel passed; ileocæcal with appendix, cæcum and part of ascending colon. Recovery.

CASE 22 (Phelan, *Gaz. d. Hop.*, 1840, 14).—Age 18. Prior history of trauma: Severe blow. Onset: Pain and vomiting for fourteen days. Bowels: Constipation. Tumor: In right lower quadrant.

CASE 23 (Kriz, *Wien. Med. Press,* 1896, 49).—Female, age 38. Prior history: Three days constipation, then normal stool. Onset: Pain and vomiting. Rectal examination: Blood and mucus. No rigidity. Tumor: Smooth, sausage-shape, between hepatic and splenic flexures. Operation: Reduction by massage; recurrence after two weeks; operation refused; slough discharged seventeenth day. Recovery. Remarks: Stools feculant, fluid and foul.

CASE 24 (Parker, *B. M. J.*, 1896, ii, 840).—Male, age 27. Prior history: Colic and constipation; no vomiting. Onset: Gradual increasing pain; one month's duration. Bowels: Alternating diarrhœa. Rectal examination: Blood and mucus. Some distention. Discharge of slough ten to twelve inches long. Recovery. Remarks: After three years of good health death from obstruction in six weeks; invagination in lower descending colon.

CASE 25 (Marchand, *Berl. klin. Woch.*, 1896, 6).—Male, age 14. History of wrestling. Rectal examination: Intermittent blood. Operation: Spontaneous discharge of enteric slough. Death from peritonitis.

CASE 26 (Castelain, *Gaz. Hebd.*, 1870, No. 20).—Male, age 43. Prior history: Habitual constipation. Onset: Loss of appetite; nausea. Bowels: Constipation. Rectal examination: Blood and mucus; tenesmus. Distention and rigidity: Case mentioned under benign tumor. Fourth week; discharge of large tumor with thin pedicle. Recovery. Pathological remarks: Lipoma.

CASE 27 (Ninans, *Verein d. Aert. in Steiermark,* 1871).—Male, age 32. Prior history: Intermittent attacks of pain for months. Onset: Acute; pain and vomiting for eight days. Bowels: Constipation. Rectal examination: Blood on eighth day. Operation: Twenty-sixth day; discharge of slough. Recovery. Pathological remarks: Intestinal segment has lipomatous polyp; mild obstruction symptom one year afterward; never well since.

CASE 28 (Albrecht, *Peters. M. Woch.*, 1880, No. 9).—Male, age 51. Onset: Pain, followed by diarrhœa. Rectal examination: Mucus and blood. Sixth week; discharge of pedunculated lipoma from large intestine.

CASE 29 (Wallenberg, *Berl. klin. Woch.*, 1864, 437).—Female, age 21. Prior history: History given under malignant growth. Discharge of lower ileum in connection with sarcoma of cæcum.

CASE 30 (Ludlöff, *Grenz. Gebiet.*, 1898, 3, p. 600).—Male, age 29. Prior history: Severe colicky pains. Bowels: No stool; no flatus. Rectal examination: Prolapse; invagination at rectum. Distention and tenderness persistent. In a few days discharge of slough, with temporary relief followed by local abscess, which was opened. Recovery.

CASE 31 (Balskow, *Monat. f. Unfall.*, 1905, p. 56).—Male, age 21. Prior history of trauma: Heavy lifting. Onset: Acute; pain and vomiting of six days' duration. Bowels: Constipation. Rectal examination: Mucus; blood on twelfth day. Rigidity and retracted abdomen; tenderness. Operation: Slough discharged on twenty-sixth day, consisting of ileum; cæcum; ascending colon. Recovery.

CASE 32 (Müller, *Strass. Med. Zeit.*, 1909, vi, 45-47).—Male, age 36. Onset: Sudden pain in right lower quadrant; diagnosis, appendix. Bowels: Constipation. Rectal tenesmus. Distention moderate; tenderness general. Discharge of slough with Meckel's diverticulum on it, twenty-first day; probably ileocolic. Died two weeks later from perforative peritonitis.

CASE 33 (Sohlern, *Mitth. aus d. Hamb. Staats,* Bd. x, No. ii).—Male, age 35. Prior history: Varicose veins five years ago, with operation. Onset: Acute; pain and vomiting. Bowels: After four days no stool or flatus. Rectal examination: Blood and mucus after tenth day, with foul stools. Tenderness general; no visible peristalsis. No tumor. Discharge of slough, twenty-ninth day, containing rusty darning needle; enteric. Recovery. Remarks: Obstruction one month later; operation; stricture near duodenum; death after resection.

CASE 34 (Marnach, *Scot. M. and S. Trans.*, 1906, p. 176-184).—Male, age 3. Onset: Pain. Rectal examination: Blood and mucus; tenesmus. Tumor: In left lower quadrant. Slough passed tenth day. Recovery. Remarks: Well four years after.

CASE 35 (Sohlern, *Mitth. aus d. Hamb. Staats,* Bd. x, No. ii).—Male, age 18. Prior history: Passage of eighteen round worms failed to relieve pain. Onset: Pain. Tumor: Size of fist in and over centre of abdomen. Slough passed; 4 cm. enteric; 8 cm. colon. Recovery. Pathological remarks: Fifteen months after, death from obstruction, autopsy showing scars in cæcum, splenic flexure and small intestine terminating by narrow orifice in ascending colon 16 cm. above cæcum.

CASE 36 (Kirchner, *Berl. k. W.*, 1886, No. 24).—Infant. After discharge of slough, subsequent complete obliteration developed.

CASE 37 (Wilson, *B. M. J.*, 1910, i, 375).—Male, age 45. Prior history of trauma: Lifting heavy weight; constipation. Onset: Acute; pain and vomiting. Bowels: Diarrhœa and then normal stool. Rectal examination: Blood and mucus after twenty-four hours; rectum negative. Abdomen retracted; tenderness general. Tumor: None. Discharge of transverse colon one week after onset. Recovery.

CASE 38 (Poisson, *Gaz. Med. de Nantes,* 1908, 25, 26, 336).—Female, age 23. Onset: Acute; vomiting and pains forty days ago. Rectal examination: Blood. Tumor: Below and to left of umbilicus. Discharge of slough on fifteenth day. Recovery. Pathological remarks: Early recurrence of obstruction; invagination three feet below pylorus; former invaginated segment makes angle with surface of mesentery; anastomosis between distended and collapsed coils. Recovery.

CASE 39 (Kummer, *Strasb. Med. Zeit.*, 1908, v, p. 180).—Female, age 38. Onset: Acute obstructive symptoms. Bowels: Thin, watery stools,

followed by complete obstruction for two weeks. (Original diagnosis of gallstones.) Discharge of slough on eighteenth day; enteric. Recovery. End result not stated.

CASE 40 (Parker, *Surg. Gyn. and Obst.*, 1908, vii, 358).—Male, age 44. Prior history and onset: Six months continuous pain and vomiting, when he passed 12 inches of small intestine; relief for few weeks, followed by recurrence of symptoms. Operation: Irreducible; resection; lateral implantation; ileocæcal. Recovery. Pathological remarks: Numerous polypi in intestine and a large one at apex of invagination.

CASE 41 (Pullin, *B. M. J.*, 1896, i, 11).—Male, 79. Onset: Attacks of great abdominal pain with distention. Bowels: No flatus with enema. Tumor: To left of umbilicus. Slough passed thirteenth day. Recovery.

CASE 42 (Laurent and Paley, *Bull. Anat.*, 1897, p. 488).—Female, age 33. Onset: Acute; pain and vomiting. Bowels: Constipation. Distention, rigidity and tenderness. Tumor in right lower quadrant. Slough of cæcum and intestine passed on fifteenth day. Recovery. Recurrence of obstruction and death two weeks later.

CASE 43 (Pedrazzini, *Gaz. d. Osp.*, 1897, No. 136).—Male, age 12. Onset: Complete obstruction for eight days. Operation: Passage of slough of small intestine eighth day; enteric. Recovery.

The first 21 cases are described by Raven (*Mitt. aus den Hamb. Staatskr,* Bd. x, Hft. 1). Other cases, also mentioned by Raven, and credited by him to Braun, Steinmeyer, Sandberg, Hirschsprung, Ayer and Cipriano (vide Bibliography under Raven), could not be traced by the writer and are therefore not included in this paper.