through the remains of which, however, temporary drainage may be easily and safely established, as in my earliest operations published in THE BOSTON MEDICAL AND SURGICAL JOURNAL of April 28, 1892.

(4) The great difficulty of secondary operations upon the biliary passages, especially drainage after cholecystectomy, has been frequently impressed upon me when, after choledochotomy, or hepatic drainage with or without cholecystectomy, symptoms have seemed to demand renewed surgical measures. Considering the small number of operations which I have myself performed, the cases in which I have considered this question are few, and the cases in which I have actually operated still fewer. Natural efforts at cure have been almost invariably successful. All the cases that I have actually reopened have been those of permanent biliary fistula caused by a stone impacted either in the cystic or in the common duct. In one case a third operation was performed, the first being cholecystostomy, in 1894, for acute cholecystitis (colon bacillus); the second, in 1900, for stone in the cystic duct; and the third, in 1901, for stone in the common duct. The number of extirpations has been too small yet for any important or valuable deductions; but three out of the last seventeen have already raised this question. In two patients operated upon by competent surgeons I have been consulted for permanent fistula after extirpation of the gall bladder.

After all, the most important objection to extirpation of the gall bladder, when the cystic duct is ligated, is the loss of those great benefits which follow prolonged drainage of the biliary passages. It is true that drainage may be used in connection with cholecystectomy by putting a tube in the hepatic duct, but in many cases it would add enormously to the difficulty and danger of the operation. Moreover, it is a serious objection to extirpating the gall bladder that drainage in the future will be difficult.

The complications that have arisen after extirpations of the gall bladder in the last year, as in the cases previously mentioned, have been owing to interferences with drainage. I have not deemed it advisable in these cases to seek the hepatic or the common duct to establish drainage, hoping that the obstruction to the bile was owing to swelling of the mucous membrane, to a temporary infection, or to some condition which would of itself subside. In the first two cases the symptoms have, in fact, subsided, and the patients are now perfectly well.

Unless it shall appear that total obliteration of the gall bladder diminishes rather than increases these unpleasant post-operative complications, cholecystectomy must remain an operation of necessity rather than of choice. The greater beauty of the operation, the rapid convalescence, the firm scar, should count but little in comparison with the permanent safety and complete recovery of the patient, even at the expense of a long scar and a ventral hernia.

CHOLECYSTOSTOMY AND CHOLECYSTECTOMY. A STUDY OF A CERTAIN SERIES OF OPERATIONS.¹

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IN the series of sixteen cases here recorded cholecystostomy was done seven times. The gall bladder in each case was attached to the abdominal parietes by suture to the peritoneum. Permanent drainage of the biliary passages was established and drainage of the quadrilateral space (Robson) beneath the gall bladder was provided for by a wick of gauze.

These cases recovered from the operation with one exception. The case which died was No. 4, a woman sixty-six years old, who developed a pneumonia before the gall-bladder fistula had closed and died some few days after the operation.

The general symptoms of these cases of cholecystostomy are here arranged in detail:

CASE I. Attacks of gall-bladder pain. No real colic; jaundice absent.

CASE II. Acute cholecystitis. Gallstones in the cystic duct; jaundice absent.

CASE III. Gallstones; colic; stones in the cystic duct; jaundice absent.

CASE IV. Gallstone attacks. Stones in the gall bladder; jaundice absent.

CASE V. Gallstone attacks. Stones in the gall bladder and the common duct; jaundice present.

CASE VI. Gallstone attacks. Gallstone in the bladder; tarry detritus in the cystic duct; jaundice absent.

CASE VII. Gallstone attacks. Stone in the common duct removed through the gall bladder; jaundice absent.

One case had pain referred to the gall bladder region, without genuine colicky attacks. One case was an acute cholecystitis, an acute infection in the presence of gallstones. Five cases had had genuine attacks of gallstone colic.

The contents of the biliary passages and gall bladder as found at the cholecystostomy are here stated in detail:

CASE I. Clear fluid in the abdomen, small in quantity; glairy, ropy mucus and a granular, pasty sediment in the gall bladder. No stones.

CASE II. A small amount of clear fluid in the abdomen; thick, cloudy mucus and inspissated biliary detritus in the gall bladder. Stones in the cystic duct. The culture from the contents of the gall bladder was sterile.

CASE III. Glairy mucus and a puriform-looking material, with a few stones in the gall bladder. The culture from the gall bladder showed bacilli coli communis.

CASE IV. Many stones in the gall bladder. The culture from the gall bladder showed bacilli coli communis.

¹ Read before the Franklin County Medical Society, Greenfield, Mass., Jan. 12, 1904.

CASE V. A stone in the gall bladder and one in the common duct.

CASE VI. One stone and a thick, tarry biliary detritus in the gall bladder. Culture from the gall bladder, bacilli coli communis.

CASE VII. A stone in the common duct. No stones in the gall bladder.

The stones were in the cystic duct in two cases, in the common duct in one case, in the gall bladder and common duct in one case, in the gall bladder alone in two cases. In one instance there was no stone but a pasty biliary sediment in the gall bladder and in the cystic duct.

Of these seven cholecystostomies one died of pneumonia. Five of the remaining cases have been carefully followed since operation. Only one case is absolutely well and without pain or discomfort referable to the gall-bladder region. In each of the other four cases there is more or less discomfort. The facts with regard to each of these are given in the detailed account.

Cholecystectomy was done in nine of these sixteen cases. The cystic duct was tied off and drainage provided from the stump of the cystic duct to the surface by means of a wick of gauze, which was removed after four or six days. All of these cases recovered from the operation.

The general diagnosis of these cases of cholecystectomy is here arranged in detail:

CASE VIII. Gallstone attacks without jaundice.

CASE IX. Gallstone attacks with temporary jaundice.

CASE X. Gallstone attacks with temporary jaundice.

CASE XI. Gallstone attacks; persistent jaundice.

CASE XII. Acute cholecystitis without jaundice.

CASE XIII. Gallstone attacks without jaundice.

CASE XIV. Biliary fistula.

CASE XV. Acute cholecystitis following cholecystostomy.

CASE XVI. Biliary fistula.

Five of these cases had rather characteristic gallstone colics. In one of these no gallstones were found, but a pasty biliary sediment filled the lower portion of the gall bladder and the cystic duct. Two were cases of acute cholecystitis. Two were cases of biliary fistula. One of these fistulae was spontaneous; the other followed a cholecystostomy. The case of spontaneous biliary fistula had had two explorations of the gall bladder done previous to the cholecystectomy.

The contents of the biliary passages and gall bladder as found at operation are here stated in detail:

The contents of Case VIII: Cloudy fluid; gallstones; inspissated bile from the gall bladder.

CASE IX. Mucus; pasty, biliary sediment from gall bladder.

CASE X. Gallstones and no fluid.

CASE XI. Gallstones and no fluid.

CASE XII. Clear mucus, cloudy fluid, biliary slime.

CASE XIII. Slimy, granular biliary detritus and a gallstone in the cystic duct.

CASE XIV. Clear bile; no stones.

CASE XV. Clear mucus; no stones. The culture from the gall bladder: staphylococcus pyogenes aureus.

CASE XVI. Clear bile; no stones.

In only one instance was a culture taken and that was in Case XV. The culture showed the staphylococcus pyogenes aureus. This was a case of acute cholecystitis previously operated upon by cholecystostomy. The cholecystostomy wound had been closed some time. This patient convalesced without incident. In none of these cases were stones left unremoved from the common or hepatic ducts.

The end results of these nine cholecystectomies are particularly interesting. All the cases were traced and a report was obtained in each instance. The longest time which had elapsed since the operation was three years; the shortest time, one month. In each instance there has been no recurrence of gallstone colic and no discomfort whatsoever referable to the gall-bladder region. Each case considers herself well.

Of these sixteen cases, eleven showed no jaundice, or about 68%. Ochsner found in his cases that 50% had not had jaundice. One of the cholecystostomies had had jaundice, due to a stone in the common duct. Four of the cholecystectomies had had jaundice, three of which had temporary or fleeting jaundice, and one persistent jaundice.

Winslow has looked up the records of the cholecystectomies done at the Massachusetts General Hospital over a period of ten years. He will report the details of these cases at a subsequent date. A preliminary report made recently is instructive.

He finds that there have been forty-six cholecystectomies. Twenty-four of these cases have been traced and reports of their present condition secured. The results in twenty-two of the twenty-four cases have been perfectly satisfactory and might be termed ideal results. Two of the cases died subsequently,—one ten months after operation, the other two and a half years after the operation,—each with persistent symptoms, showing that they were not suitable cases for the operation of cholecystectomy.

Winslow has looked up the records, also, of the cholecystostomy cases done at the Massachusetts General Hospital during the past ten years. He finds that there have been 183 operations. Twenty-nine of these died within a week of the operation at the hospital, or 15%. Nine of these 29 deaths were malignant cases. Twenty-nine of the 183 cases, or about 18%, came to secondary operation, most of them because of biliary fistulae following the cholecystostomy. Thirty-four cases of cholecystostomy, 13 of which were for malignant disease, have

been traced one year and more after the first operation and have been found to have had recurrent attacks or fistulae persistent. Forty-six cases out of the 161 non-malignant cases gave good results, which might be called ideal results. That is about 28%. These were traced from one year to five years after operation.

It would seem, as some have thought, that the gall bladder and the biliary passages almost equal the appendix as sources of chronic disease and disability in adult life.

The general practitioner should be profoundly impressed by the pathological findings of the surgeon in operations upon the biliary passages and the gall bladder. This living pathology demonstrates that for months, and possibly for years, previous to operation, lesions have been in progress which have been unrecognized. It is possible that in a few of these instances diagnostic symptoms have been absent or concealed. It is far more probable that the attending physician has not recognized the signs of beginning trouble with these parts. It is a fact worthy of consideration that the patients whose cases are here recorded, as well as those mentioned by others in literature, complained of and suffered from what has been called gastritis, dyspepsia, chronic gastritis, indigestion, constipation, bilious headache, sick headache, sour stomach, biliousness, etc. Along with the ordinary symptoms associated with these troubles, enumerated above, occurred chills, loss of flesh, fleeting jaundice, sallowness, nausea, loss of strength, nervous prostration, anorexia, vomiting, pains not particularly localized, — perhaps extending from the general abdomen into the back, — general abdominal discomfort. During these months and years the physician has treated these sufferers expectantly, medically, palliatively, with pills and powders and liquid remedies, with indifferent success, as is now being made apparent by the brilliant success of surgical intervention in certain of these cases of lesions of the biliary passages.

The outspoken classical signs of cholelithiasis — namely, colic, jaundice and tumor in the gall-bladder region — may be absent. It is to-day not only possible but necessary for the physician to make a diagnosis of cholelithiasis and other lesions of the biliary passages, even if all these important classical signs are absent or in the background. It is true that many gall bladders are found at autopsy to contain gallstones, in cases not operated upon. It may be true, as is asserted, that most of these individuals complained during their lifetime of none of the classical symptoms of gallstones. Kehr's statement that only about 5% of those with gallstones in their gall bladders have symptoms seems to me to be rather misleading. Wherever there are gallstones there, there must at sometime have been an infection of a certain virulence. Gallstones represent the result of this infection. It is highly probable that many of the dyspeptic and gastric symptoms hitherto unsatisfactorily treated are symptomatic of beginning distur-

ances in the gall bladder and the biliary passages.

Adhesions about the gall bladder to the duodenum, to the small intestine, to the stomach, to the transverse colon, to the pancreas, and adhesions of the biliary ducts to the parts about, are known to cause great disability, with signs of gastric trouble. Upon the removal of these adhesions and their cause, when possible, the distressing symptoms vanish. This is the tale told now repeatedly of pathological conditions by gall-bladder patients.

The surgeon finds at operation three general groups of cases, definite pathological groups: the inflammatory disturbances, the cholecystitides; the gallstone cases, cholelithiasis; and the cases of carcinoma (Quinke). Brewer has admirably arranged the diseases occurring under the above classification as follows: The inflammatory diseases, —

- (1) Cholecystitis — subacute.
- (2) Cholecystitis — acute (see Case II).
- (3) Cholecystitis — chronic (empyema).
- (4) Cholecystitis in contracted gall bladder (see Case X).

- (5) Cholangitis.

All these diseases are associated more or less closely with signs of fever, local tenderness and pain. The latter disease, cholangitis, is usually, according to writers, associated with stones in the hepatic or common duct, or both, and may be characterized by sepsis of a marked type. Just what the term "cholangitis" means is not altogether apparent. It is used with one meaning by the clinician, be he physician or surgeon, and in an entirely different sense by the textbooks of pathology. That the surgeon should use the term to express a clinical picture which, in the event of the death of the patient, does not present a definite pathological condition is not only unfortunate but inaccurate.

In cases of cholelithiasis the surgeon finds various combinations of conditions, arranged by Brewer in somewhat this fashion:

- (1) Stones in the healthy gall bladder, ducts free.
- (2) Stones in the healthy gall bladder, cystic duct temporarily obstructed by inflammatory swelling or slime (see Case VI).
- (3) Stone or granular detritus impacted in the cystic duct (see Case III).
- (4) Stone in the hepatic duct.
- (5) Stone in the common duct, acute obstruction.
- (6) Stone in the common duct, movable chronic obstruction (see Case V).
- (7) Stone in the common duct, impacted, chronic.

The symptoms of importance in this group of cases will be those of pain, fever, vomiting and jaundice.

The carcinoma cases according to Brewer may be classified as follows: Tumor of —

- (1) The gall bladder.
- (2) The cystic duct.
- (3) The hepatic or common duct.

(4) The neighboring viscera pressing upon the common bile duct.

The symptoms associated with this group of malignant diseases usually are signs of jaundice, tumor, ascites and cachexia.

It is important that one should have a definite conception of the pathological lesions which may exist in any individual case of disease of the gall bladder and biliary passages. Diagnosis will then be far more likely to be correct and treatment intelligent. It is necessary that a careful analysis of each symptom should be made in order to properly interpret its relative and absolute importance.

The surgeon having, during the past few years, made clear the living pathology of gallstone and biliary passage diseases, and having to these former medical cases brought some measure of relief, the question very naturally arises, What does the surgeon suggest for the treatment of these cases, especially of chronic gall-bladder and biliary passage trouble? There are two generally accepted procedures which the surgeon has found to be of value, namely, cholecystostomy and cholecystectomy. By cholecystostomy the gall bladder may be drained of its abnormal or normal contents, and if the cystic duct is patent, drainage at the same time may be established of the deep biliary ducts, and if the pancreatic duct opens advantageously it likewise may secure drainage through the outlet in the incised gall bladder.

The advantages of a cholecystostomy are that ordinarily it is a simple procedure, may be readily accomplished, and that the mortality is not great and the deep ducts are drained if they are patent. Obviously, in cases of cholangitis, so called, or chronic pancreatitis this procedure is of importance. I think there is, however, a mistaken impression on the part of most surgeons and medical men as to the end results of cholecystostomy. In general, cholecystostomy is supposed to afford satisfactory results. The group of cases here reported in detail, although small, confirms the returns which Winslow makes from a larger group of cases operated upon at the Massachusetts General Hospital, and the finding is that in cases of cholecystostomy persistent biliary fistulae exist in a number of cases; that the deeper ducts are often not easily explored through the opened gall bladder and adherent parts, consequently stones are left in the deep ducts to be heard from later; that a dragging pain is present in many cases, due to the adhesions between the gall bladder and the abdominal wall, necessitated by the old technique of the cholecystostomy.

With regard to the procedure of cholecystectomy, there are certain cases in which the presence of dense adhesions about the gall bladder, cystic and common duct preclude the possibility, without subjecting the patient to a somewhat prolonged operation, of removal of the gall bladder. Obviously, in such cases cholecystectomy would be unwise. These cases, however, should be fewer and fewer as the surgeon becomes

familiar with the anatomy of this region and with the technique necessary to overcome what seem at first insurmountable difficulties.

It is important before cholecystectomy is undertaken that the surgeon be sure that the deep ducts are patent and that there are no stones in the common and hepatic ducts. Should a cholecystectomy be done when stones exist in the deeper ducts these stones will certainly cause trouble, and the termination of such a case may be most unhappy. It seems to me that the exploration of the deeper ducts is rendered comparatively easy by the splitting of the gall bladder upon its under surface and of the cystic duct down to its termination. Coupled with this procedure the deep exploration is facilitated by the arching of the back as suggested by Robson, by means of a hard cushion placed under the lumbar spines, by upward lifting of the liver and traction downward upon the duodenum.

Cholecystectomy is certainly a wise procedure in cases of cholecystitis and its resulting acute conditions of gangrene and empyema of the gall bladder. These conditions are often entirely limited to the region of the gall bladder, the deeper ducts not being involved. In the absence of the involvement of the deep ducts the gall bladder should be treated as an isolated sac and removed.

Wherever gallstones exist in the gall bladder there may be a latent infection, ready to break out at any time; a re-infection may occur from the usual source, the duodenum; so that these two facts are to be given consideration in deciding whether or not the gall bladder should be removed.

It is a fact that carcinoma of the gall bladder is found in about 14% of the operated cases of gall-bladder trouble. In 15% of the secondary carcinomas of the gall bladder there are no gallstones found in the gall bladder itself. On the other hand, in 80% of cases of primary carcinoma of the gall bladder gallstones are present. It is a fair conclusion, therefore, to suppose that the presence of gallstones is an important etiological factor in the production of carcinoma, so that the leaving of the gall bladder as in a cholecystostomy affords the opportunity for the development of carcinoma.

There have been few instances of the formation of gallstones after a cholecystostomy; Hohns reported one case. Kehr has reported two cases. It is more than likely that in many of the cases in which the formation of gallstones is said to have occurred after a cholecystostomy, the gallstones found at the second operation were already present in the gall bladder but unremoved at the time of the primary operation, so that the leaving of the gall bladder *in situ* does not involve a very strong probability of the formation of more gallstones.

The doing of a cholecystectomy does not preclude the possibility of drainage of the deeper parts, either by the procedure of Mayo, in dissecting out the mucous membrane of the gall bladder and leaving its peritoneal and fibrous

coat to serve as a trough from the deeper ducts to the surface, or the procedure of Kehr, of drainage of the deep ducts directly through a rubber tube.

The mortality of cholecystectomy is low. Kehr, in 100 cases, shows a mortality of 3%. In the small series here presented there was no mortality. The mortality following the hospital cases quoted by Winslow must be studied carefully before making it count against cholecystectomy. Examination of the group of deaths in Winslow's cases does not make the mortality tell against cholecystectomy.

The operation is simple and ordinarily not difficult; the after results are most brilliant there are fewer adhesions, consequently there is less complaint of pain in the side; there are no persistent fistulae. In other words, in ideal cases -- that is, in cases which conform to the requirements of the conditions above -- cholecystectomy may be regarded as a curative procedure, whereas cholecystostomy cannot be so regarded -- it is a curative procedure in some cases but not in all. The position that the gall bladder should receive exactly the same treatment as the appendix is hardly tenable. There are, however, several points of analogy in the two organs.

I would then formulate my feeling with regard to the two procedures mentioned above in somewhat this fashion: Cholecystostomy should be done in those cases of gall-bladder and biliary duct surgery in which quick drainage is needed for the deeper ducts and in which the surgeon is not absolutely sure that the deeper ducts are entirely free. Cholecystectomy should be done in cases of acute cholecystitis, in cases of cholecystitis resulting in gangrene and empyema of the gall bladder, in small contracted (infected) gall bladders which are functionally useless and which will not be of service in facilitating drainage, and in all cases in which the surgeon is morally sure that the deeper ducts are free from obstruction.

During an acute attack of gallstone colic it is wise to postpone operative interference. It seems to me that any patient having definite signs of gallstones or an inflammatory process about the gall bladder should be operated upon, and, in general, the earlier operative interference is instituted, other things being equal, the easier will be the operation from a purely technical point of view and the less will be the risk to the patient of the complications and sequelae of gallstones.

The technique of cholecystostomy is facilitated by not suturing, in certain cases, the gall bladder to the parietal peritoneum, but by so securely fastening the drainage tube within the gall bladder that no leakage of bile takes place about it. The few adhesions arising from the gauze left beneath the gall bladder and tube serve to wall off the general abdominal cavity and cause little if any disturbance subsequently.

I. A. D., woman, forty-six years old, married. Patient of Dr. John Torrey of Andover, Mass. *Chole-*

cystitis. Acute attack just over. No jaundice. Cholecystostomy, drainage of the gall bladder. Recurrence of symptoms after two years. Freedom from symptoms referable to the gall bladder now for another year.

General health excellent. Six years ago was the first attack attracting attention to the region of the gall bladder. This attack was characterized by pain of moderate severity, referred to the left hypochondrium and then to the right hypochondrium, where it remained. The pain was relieved by hot water applications. It was attended by nausea. Each succeeding year up to the present time she has had a similar attack. The attack one year ago was more severe than any preceding; the pain not only was felt in the right hypochondrium but extended through to the right shoulder blade. During this past year these attacks have increased in frequency and severity, occurring every three months. These later attacks have been attended by severe vomiting. Both morphia and ether have been used to control the pain. After each attack soreness has been present under the right costal arch over the region of the gall bladder. The patient was seen just after one of these attacks. There was no jaundice.

Examination. A moderately stout, well-looking woman. She complained of pain beneath the right shoulder blade and gave evidences of tenderness over the gall bladder. Muscular spasm was present over the region of tenderness.

Operation. Peritoneum opened through the right linear semilunaris. A small amount of clear fluid in the abdomen. The gall bladder presented slightly enlarged, tense, its walls thickened but not friable. It contained a glairy, thick, ropy mucus. A granular sediment removed from the depths of the gall bladder and from the cystic duct, which was obstructed by this material. No stones were felt in any of the ducts. The gall bladder was fastened to the peritoneum, a rubber drainage tube was introduced into the gall bladder, and permanent drainage established. After some hours bile appeared in the drainage tube. The tube was removed after about ten days. The fistulus opening gradually closed and the patient made an uneventful recovery.

Subsequent history. For two years after operation the patient was perfectly well. Then she had an attack of pain and vomiting somewhat similar to the original attacks. The pain radiated to the right shoulder blade. Stools were normal. There was no fever. Pain was controlled by morphia. Now for one year she has been well, having a little mild distress at times in the right side. Her general health has been better than before operation. A thorough exploration of the biliary passages would be wise in this instance, and in the absence of calculi in the common and hepatic duct cholecystectomy would be indicated.

H. J. T., a man sixty-four years old, married. A patient of Dr. Cogswell, Cambridge, Mass. *Cholecystitis. Acute attack. No jaundice. Cholecystostomy. Persistent gall-bladder fistula. Second cholecystostomy and removal of stone in gall bladder and closure of fistula.*

Excepting for chills and fever and protracted diarrhea during the Civil War the patient has been well all his life. A little over forty-eight hours ago he was seized with a sudden, sharp, cutting pain across the upper abdomen. This pain was attended by vomiting. After the pain had first subsided he felt as if there were a tight constriction or band around his waist over the costal arch. He took castor oil, and a little later his bowels moved. The following day the

bowels moved again. He had severe pain throughout the greater part of the day and vomited once. Upon the third day there was a little less abdominal pain, but in the right hypochondrium, where the pain had been most intense, there was marked tenderness corresponding to the region of the gall bladder. Jaundice was absent.

Examination. The abdomen was slightly but uniformly distended and tympanitic all over and in both the flanks. To the right of the umbilicus and extending upward to the costal border a mass was felt which was tender. The liver was not enlarged. Rectal examination showed nothing of importance.

Operation. Under ether the mass felt in the abdomen was found to be continuous with the liver and moved upward slightly with inspiration. The peritoneum was opened through an incision to the outer border of the rectus. Considerable free clear fluid was found in the abdomen, and the culture from this fluid proved it to be sterile. There was found a gall bladder much enlarged, extending nearly to the umbilicus. It was covered with fresh fibrin and was slightly adherent to the surrounding parts, the ascending colon and the lateral abdominal wall. The gall bladder was attached to the peritoneum at the upper end of the incision, walling off gauze placed beneath it, a suture introduced into the fundus of the gall bladder for traction, and the gall bladder aspirated. Three ounces of thick, cloudy mucus was evacuated. The gall bladder was incised and inspissated bile was found in the depths of the gall bladder and cystic duct. Cultures made from the contents of the gall bladder were found sterile. The hand introduced into the abdomen found stones in the cystic duct. These were pushed upward into the gall bladder and removed; seven or eight of them faceted, the size of raspberries. No stones were found in the common duct. The gall bladder was drained by rubber drainage. The tube was removed in eight days. The patient was home in eighteen days, with a small fistula.

The following year, the sinus having remained open and there having been no pain nor jaundice, and the bowels having been regular, an operation for the closure of the fistulous opening was made by another surgeon and a small pocket near the fundus of the gall bladder, containing a slight amount of puriform material and three gallstones, was emptied. The gall bladder was again drained, the tube being removed after two days, there being a free flow of bile. The patient was discharged after two weeks with a small sinus.

After the first operation the flow of bile was very limited.

Subsequent history. One year after the last operation he is in perfect health. There has been no recurrence of the gall-bladder trouble. Fistula has closed. After working hard he feels pain or a pulling sensation at the site of the operation, but it amounts to comparatively little. A cholecystectomy might have been done very properly at either operation after the removal of all stones.

III. M. A., twenty-eight years old, a woman, married. *Gallstones, acute attack. No jaundice. Cholecystostomy, drainage. Small contracted gall bladder, many adhesions.*

She has two children, and has always been in good health. Five days ago she had an attack of severe pain in her "stomach," but did her work about the house. Two days ago pain of a similar character localized itself in the right side of the abdomen under the costal border, extending to the right shoulder blade. She vomited many times. There was no jaundice. The bowels moved naturally.

Examination. The abdomen was uniformly distended; the right half of the abdomen was rigid; there was marked tenderness in the right hypochondrium and to the level of the umbilicus upon the right side. No tumor could be felt. Vaginal examination discovered the uterus retroverted and lying a little to the right.

Operation. The peritoneum was exposed through an incision at the outer border of the right rectus muscle. The small intestine was found adherent to the anterior abdominal wall. The gall bladder was discovered beneath these adhesions as a rounded, hard, tense tumor extending to the level of the umbilicus. The gall bladder was incised, after protecting the parts about with gauze. The walls of the gall bladder were one-half inch thick, a glairy mucus was evacuated, and from the depths of the gall bladder came a puriform-looking material, and finally many small gallstones and two large stones. The culture from the contents of the gall bladder was the "bacillus coli communis." The gall bladder was attached to the peritoneum, a gauze wick below the bladder, rubber drainage of the gall bladder. Only a slight discharge of bile came from the gall bladder, and it was found that the tube was plugged by a few small stones, upon the removal of which the discharge became greater.

An uneventful convalescence; three weeks after leaving the hospital the fistulus opening closed.

Subsequent history. Cannot be found. The culture of the colon bacillus from the contents of a gall bladder shut off from the biliary circulation in the absence of jaundice need not preclude the doing of a cholecystectomy. Drainage in this case, however, proved apparently satisfactory.

IV. W. F., a woman sixty-six years old. Patient of Dr. Malcolm Storer, Boston, Mass. *Gallstone attacks. No jaundice. Cholecystostomy. Death from pneumonia.*

Twenty-five years ago she is said to have had typhoid fever; many years ago attacks of what was called gall-bladder colic. During the past two years and a half she has had many attacks. These attacks were associated with pain in the right hypochondrium, severe enough to double her up, attended by vomiting.

Examination. An old woman with moderately distended abdomen; an indefinable mass upon the right side under the costal arch, which was slightly tender. Jaundice was absent.

Operation. The gall bladder was found adherent to the anterior abdominal wall and to the transverse colon. The gall bladder was moderately enlarged. Upon opening it fifty stones were removed. The cultures from the gall bladder showed colon bacillus. The gall bladder was drained; bile appeared in twelve hours. On the second day the patient showed signs of a pneumonia,—the abdomen appeared normal,—and from this pneumonia the patient died.

V. C. A., a woman fifty-three years old, married. *Acute attack of gallstones. Jaundice. Choledochotomy. Cholecystostomy. Drainage. Recovery.*

For ten or twelve years she has had some stomach trouble, "dyspepsia." The bowels have been constipated. For one year she has been troubled each month by "bilious headache." These attacks have been attended by vomiting and jaundice, and she has noticed the stools have been clay-colored. She has never been severely jaundiced. Three days ago she had a sharp attack of pain in the right hypochondrium which she says resembled the bilious attacks which she has had during the past year.

Examination. The abdomen slightly distended;

no tumor felt. No especial tenderness over the region of the gall bladder, but at the mid-point of the abdomen, over the ensiform cartilage, there was marked tenderness. Incision at outer border of the rectus discovered a slightly contracted gall bladder adherent to the parts about. A small stone was found in this contracted gall bladder, and a large stone, larger than the end of the thumb, was found in the second part of the common duct, and was removed by incision through common duct, suture of duct. Drainage of gall bladder by rubber tube, gauze wick to common duct. Gradual closure of fistula. Uneventful recovery.

Subsequent history. One year following the operation the report is that she has not been so well for years.

VI. N. G., a woman thirty-eight years old, married. A patient of Dr. Simpson of Boston. *Sub-acute attack of gallstones. No jaundice. Cholecystostomy. Recovery.*

Five months ago was the first attack, with pain in the region of the gall bladder. The pain radiated to the right shoulder. Since that time there have been frequent attacks lasting from two to nine hours. These attacks were attended by nausea and vomiting. At no time has there been jaundice.

Examination. The abdomen was generally soft, full and tympanitic. There was no unusual sensitiveness excepting over the gall-bladder region, where there was tenderness. No mass was felt.

Operation. Through the right semilunaris incision the gall bladder was found slightly distended, with some adhesions about it. No stone was felt in the ducts. The gall bladder upon being opened was found to contain thick, tarry biliary detritus and one small stone. Rubber drainage was used. The culture from the interior of the gall bladder showed many colonies of the bacillus coli communis. The color of the stools subsequent to the operation did not return to a normal condition immediately, but rather more slowly than usual. During convalescence there was some pain about the gall bladder and the costal border. The patient went home with a very slight sinus.

Subsequent history. After a few months the wound has closed. Has some pain at times referable to the right hypochondrium. Has had no acute attacks of gallstone pain similar to the attacks previous to the operation.

VII. C. B., a woman seventy-six years old, married. A patient of Dr. Mead of Winchester, Mass. *Acute attacks of gall-bladder pain. No jaundice. Cholecystostomy. Drainage. Recovery.*

Two months ago she had an attack of pain in the back of the neck and between the shoulders, and finally extending to the right hypochondrium, requiring morphia to relieve it. This pain was sharp and shooting in character. It doubled her up. She was somewhat chilly and hot, and distended, at the time of these attacks. She has had several each week since the first attack. The last attack was yesterday.

Examination. She was very thin, almost emaciated. The liver was not enlarged. There was no jaundice. There was slight tenderness and a little spasm over the gall-bladder region.

Operation. Incision at the outer border of the right rectus. No stone was felt in the gall bladder. A small stone was felt in the common duct. The gall bladder was opened and found to be very much thickened, contracted, and the stone felt in the common duct was pushed back and removed through the gall bladder. There were a few adhesions of the gall bladder to the neighboring parts. Drainage by rub-

ber tube was used. A small amount of bile appeared, after a few hours, from the tube. Drainage was omitted and gradually the sinus was closed. The patient has had attacks of colicky pain in the bowels — "wind colic" — not like the previous pain. There has been no jaundice.

Subsequent history. During the past two or three months she has had more or less grumbling pain in the gall-bladder region, and a few weeks ago had quite a severe attack of pain resembling very much the passage of a gallstone. For several months now there has been no difficulty at all with the right side.

VIII. H., a woman fifty-four years old, married. She has had several children. *Cholecystitis. Sub-acute attack. No jaundice. Cholecystectomy. Recovery.*

She is said to have had "brain fever," pneumonia and at different times "pelvic abscesses." Two months ago she had a "bilious attack" accompanied by chills, backache and vomiting and pain, which extended from the right hypochondrium to the back and right shoulder blade. The present attack is of two weeks' duration and resembled the attack of two months ago. This attack was attended by much tympanites, nausea and needle-like pains extending from the navel through to the back and down to the right hip. During the past year she has had three attacks similar to this present one.

Examination. The abdomen was uniformly distended. In the right hypochondrium was a tumor which extended to beyond the median line and was continuous with the liver dullness. The tumor was movable, smooth and slightly tender.

Operation. Cholecystectomy. Drainage tube out upon the seventh day. An uneventful recovery. The contents of the gall bladder consisted of cloudy fluid, a few gallstones and inspissated bile.

Subsequent history. Three years after operation the patient has had no disturbance in the right side. She has, however, malignant disease, probably carcinoma, of the uterus, from which she is dying.

IX. I. C., woman thirty-nine years old, married. Patient of Drs. Abbott and Torrey, Andover, Mass. *Gallstone attacks. Temporary jaundice. Cholecystectomy. Recovery.*

She has no children and has had no miscarriages. Two years ago she had an attack of bilious colic. Every few weeks since that time she has had attacks of severe pain in the right hypochondrium attended by vomiting and temporary jaundice. She had lost some flesh during this period and was constipated.

Examination. A very stout woman with full abdomen presenting tenderness over the gall-bladder region. Conjunctiva was slightly yellow.

Operation. Peritoneum was exposed by an incision through the middle of the rectus. No stone was felt in the common duct. A white, round, solitary stone was removed from the cystic duct. The gall bladder was small, thickened and edematous. There were many firm adhesions about the cystic duct. The contents of the gall bladder were mucus and a pasty bile sediment. No puriform material was found. The gall bladder was removed. A bit of omentum was placed over the stump of the cystic duct. Gauze drainage. Recovery.

Subsequent history. She has been perfectly well since the operation, now several months. Her general health has been better than for some years previous to operation.

X. A man thirty-five years old, married. Patient of Dr. Boucher, Watertown, Mass. *Gallstone at-*

tacks. Temporary jaundice. Contracted gall bladder. Cholecystectomy. Recovery.

For five or six years he has had attacks of abdominal pain. Lately this pain has been limited to the right side of the abdomen below the ribs, radiating to the umbilicus. These attacks have been attended by vomiting and slight temporary jaundice. The bowels are constipated. The attacks have increased in frequency and severity. The present attack has been a week in its duration. The pain has been very acute, necessitating morphia for its relief, localized in the right hypochondrium and attended by nausea, vomiting and chilly sensations.

Examination. Abdomen markedly distended; no tumor could be felt. There was tenderness on deep pressure over the region of the gall bladder. There was a slight yellowishness of the conjunctiva.

Operation. Peritoneum was exposed from the belly of the rectus. The gall bladder was with difficulty found buried in omental adhesions. A few stones were discovered just outside the gall bladder in a pocket within the omentum. The gall bladder was markedly contracted upon many stones. Cholecystectomy. Gauze and tube drainage. Recovery.

Subsequent history. Seven months following operation he is in perfect health. He has had no recurrence of former attacks and has no digestive disturbance. The scar is firm and there are no signs of hernia.

XI. G. F., a woman forty-nine years old, married. A patient of Dr. Leitch of Andover, Mass. *Persistent jaundice. Gallstone attacks. Contracted gall bladder. Cholecystectomy. Recovery.*

She has three children. Six months ago she is said to have had a severe attack of "dysentery"; otherwise she has been well. One year ago she was seized with a severe pain under the right shoulder extending down the side and around into the right hypochondrium. This attack was preceded by nausea. At no time has there been vomiting. During this past year attacks of a similar sort have occurred as often as each two weeks. These attacks have required morphia to relieve the pain. Occasionally she has had chills with these attacks. During the past few weeks she has lost some flesh, during this present attack her best weight being 198 pounds.

Examination found a stout woman with a large abdomen, rather flabby, not particularly distended. Slight tenderness was felt over the region of the gall bladder. Very little, if any, muscular spasm. Conjunctivæ and skin yellow; urine containing bile.

Operation. Peritoneum opened in the right linear semilunaris. A contracted gall bladder found. Stones in lower part of gall bladder and cystic duct and all deeper ducts free. Gall bladder removed. Drainage by gauze. An uninterrupted recovery.

Subsequent history. The operation was eleven months ago. She has gained over fifty pounds in weight since the operation. She says she is in fine condition, and has no trouble with her side excepting a tiny bit of tenderness in the situation of the scar.

XII. O. T., a woman twenty-five years old, married. A patient of Dr. G. G. Bailey of Ipswich, Mass. *Acute cholecystitis. No jaundice. Cholecystectomy. Recovery.*

A normal confinement four weeks previous to present trouble. Always has had some indigestion; otherwise well. Five days ago was seized with sudden pain in the right hypochondrium. Vomiting; some fever. Considerable morphia was administered to relieve the pain. Pain was at the edge of the

ribs on the right and then moved a little lower toward the umbilicus. No jaundice.

Examination. A nervous, rather thin, but not ill-appearing woman. Tongue coated. Moved herself rather easily in the bed. The abdomen was not distended. There was a muscular spasm on the whole right side of the abdomen. A distinct tumor was felt projecting below the right hypochondrium to the level of the umbilicus. This tumor did not move freely with respiration. The tumor was tender to pressure.

Operation. Peritoneum was opened to the right linear semilunaris. The tumor felt externally was found to be the distended gall bladder filled with clear mucus-like fluid. A yellow, sandy slime was found in the depths of the gall bladder and in the cystic duct. There were no old adhesions about the gall bladder. The foramen of Winslow was patent. There were no gallstones to be felt in the common duct. The gall bladder was removed. Tube and gauze drainage. Uninterrupted recovery. Pathological report: "Acute ulcerative cholecystitis. W. F. Whitney."

Subsequent history. Six months following operation there has been no difficulty with the right side and she is in good health: "My general health has not been so good for years as it is at the present time."

XIII. N. C., a woman thirty-two years old, married. A patient of Dr. G. G. Bailey, Ipswich, Mass. *Gallstones. Acute attacks. Contracted gall bladder. No jaundice. Cholecystectomy. Recovery.*

She had eight children. Ten years ago, she is said to have had typhoid fever. Over a period of two years, at intervals of about three months, she has had continuous pain in the right hypochondrium, colicky in character, extending to the middle of the back, lasting from a few hours to a day. This pain has been relieved by the taking of a cathartic. She has never been obliged to take morphia until recently. These attacks have increased in frequency and severity. The last attack was two weeks ago. The pain was very sharp, colicky, taking away her breath for the time. There was nausea, some vomiting and slight jaundice. Urine dark in color. Had lost some weight recently. Her best weight was 208 pounds.

Examination. A large, well-developed woman presenting a large abdomen with a tender area in the region of the gall bladder and a similar tender area in the back to the right of the vertebræ. There was no muscular spasm. No tumor was felt. The liver was not enlarged.

Operation. An incision through the right rectus discovered the gall bladder much contracted and bound by dense adhesions to the liver, to the large intestine and to the duodenum. The gall bladder was found full of slimy granular material; the cystic duct was dilated and plugged with a gallstone; the common duct was patent. The gall bladder was removed and cystic duct tied and gauze drainage used. All wicks were removed at the end of six days. The patient went home at the end of three weeks.

A gall bladder about 6 cm. in its greatest diameter, outer surface rough and covered with an old fibrinous exudate. The walls were thin and fibrous and the cavity contained several small gallstones. The mucosa was almost entirely necrotic. Cholelithiasis.

Subsequent history. A few months following operation there has been no recurrence of the difficulty. She is in good health.

XIV. E. D., a woman fifty-four years old, married. A patient of Dr. Bump, Somerville, Mass. *Spontaneous biliary fistula. Cholecystostomy. Closure*

A SERIES OF CERTAIN GALL BLADDER AND BILIARY DUCT OPERATIONS.

No.	Sex and Age.	Operation.	Immediate Result.	Pathological Findings.	Symptoms and Signs.	Duration of symptoms referable to gall bladder, although some signs were obscure.	Previous Diseases.	Remote Result.
I.	Woman 46 yrs.	Cholecystostomy	Recovery	No stones, glairy mucus, pasty sediment.	No colic, gall-bladder pain, no jaundice.	6 years		For 2 yrs. no attacks of colic, then 1 attack
II.	Man 64 yrs.	Cholecystostomy	Recovery	Stones in cystic duct, thick mucus, inspissated detritus, culture sterile.	Acute cholecystitis, no jaundice.	48 hours	Diarrhea protracted (Civil War).	Past 10 mos. immunity; general health good; no further attacks; feels some pulling at wound after work.
III.	Woman 28 yrs.	Cholecystostomy	Recovery	Few stones, mucus, puriform material, culture colon communis.	Gallstone colic, no jaundice.	5 days		Not found.
IV.	Woman 66 yrs.	Cholecystostomy	Died	Many stones, culture colon bacillus.	Gallstone colic, no jaundice.	Many years	Typhoid fever 25 years ago.	Died—pneumonia.
V.	Woman 53 yrs.	Cholecystostomy	Recovery	Stone gall bladder and common duct.	Gallstone colic, jaundice.	10 years		Well, no trouble one year after.
VI.	Woman 38 yrs.	Cholecystostomy	Recovery	Stone, thick tarry biliary detritus, culture colon bacillus.	Gallstone colic, no jaundice.	5 months		After few months no attacks; some discomfort in right side.
VII.	Woman 76 yrs.	Cholecystostomy	Recovery	Stone common duct.	Gallstone colic, no jaundice.	2 months		Grumbling right side mild attack.
VIII.	Woman 54 yrs.	Cholecystectomy	Recovery	Stones, cloudy fluid, inspissated bile.	Gallstone colic, no jaundice.	2 months		Well, no trouble for 3 years.
IX.	Woman 39 yrs.	Cholecystectomy	Recovery	No stones, mucus, pasty biliary sediment.	Gallstone colic, temporary jaundice.	2 years		Well, no trouble for several months.
X.	Man 35 yrs.	Cholecystectomy	Recovery	Stones, no fluid.	Gallstone colic, temporary jaundice.	5 years		Well, no trouble for 7 months.
XI.	Woman 49 yrs.	Cholecystectomy	Recovery	Stones, no fluid.	Gallstone colic, persistent jaundice.	1 year		Well, no trouble for 11 months.
XII.	Woman 25 yrs.	Cholecystectomy	Recovery	No stones, mucus, cloudy fluid, biliary slime.	Acute cholecystitis, no jaundice.	5 days		Well, no trouble for 1 year.
XIII.	Woman 32 yrs.	Cholecystectomy	Recovery	Stone cystic duct, slimy biliary detritus.	Gallstone colic, no jaundice.	2 years	Typhoid fever 10 years ago.	Well, no trouble for few months.
XIV.	Woman 54 yrs.	Cholecystectomy	Recovery	No stones, clear bile.	Biliary fistula, no jaundice.	18 months		Well, no trouble for four months.
XV.	Woman 26 yrs.	Cholecystectomy	Recovery	No stones, clear mucus, culture staphylococcus.	Acute cholecystitis, no jaundice.	4 days		Well, no trouble for few months.
XVI.	Woman 40 yrs.	Cholecystectomy	Recovery	No stones, clear bile.	Biliary fistula, no jaundice.	Many years		Well, no trouble for a month.

of wound. Gall-bladder pain. Temporary jaundice. Cholecystectomy. Recovery.

Eighteen months ago a biliary fistula established itself without operation, and one year ago an operation was done exploring this fistula. The fistula was dilated and it was found to connect with the cavity of the gall bladder, from which a stone the size of an English walnut was extracted. The gall bladder was attached to the skin and drained through a glass tube. Drainage was removed in eleven days. Three weeks later the wound closed. She was practically well up to three months ago, when she began to have cramp-like pain in the right side of the abdomen extending up to the nipple. This pain doubled her up, the paroxysm lasting some twenty-four hours. She has become recently jaundiced. The pain is attended by vomiting and nausea. She has lost some 30 lbs. in weight.

Examination. The abdomen is rather flat, tympanitic, with a slight dullness over the region of the lower border of the liver on the right side. There is marked muscular spasm and great tenderness over the gall-bladder region. There is a tender spot in the back. White count 19,000.

Operation. An incision through the belly of the right rectus. The omentum was found adherent to the abdominal wall and about the gall bladder. Gall bladder also adherent to the intestine and to the duodenum and to the upper end of the old incision. It was difficult to separate it from its adhesions. The gall bladder was very much elongated and looked and felt something like thickened intestine. It was opened and clear bile evacuated. No stones were seen. There were no stones in the ducts. The gall bladder was removed and a plastic of peritoneum placed over the stump. Two wicks for drainage. After operation there was considerable discomfort. The stomach was washed out with great relief.

The patient went home in about three weeks with a very slight watery discharge from a small fistulous opening.

Subsequent history. After four months this patient is perfectly well and comfortable. There is no difficulty with the right hypochondriac region. The wound is entirely closed.

XV. A. J., woman twenty-six years old, married.

Patient of Dr. Dow of Reading, Mass. *Acute cholecystitis following two cholecystostomies. Enlarged gall bladder. No jaundice. Cholecystectomy. Recovery.*

She had four children. Four days ago she was seized with a sudden pain over the gall-bladder region and vomited once. The following day the pain increased and she vomited again. Upon the third day of the attack there was less pain and no vomiting. Yesterday, the fourth day of the attack, there was no pain, but there was soreness in the right side upon moving in bed. The bowels moved after taking salts. There was no jaundice. There were no clay-colored stools and there was no dark urine. One year ago a cholecystostomy was done, and six months ago a second operation was done. At both operations gallstones were removed from the gall bladder.

Examination. A stout woman presenting a tympanitic abdomen somewhat distended and a mass the size of the fist in the region of the gall bladder, which moved with respiration. Underneath a cicatrix of the former operations. The abdominal wall was attached to this underlying mass. There was tenderness and muscular spasm over this mass.

Operation. An incision in the right semilunaris discovered a very much thickened and enlarged gall bladder filled with clear mucoid fluid. The deep ducts were free from stones. The gall bladder was removed; the cicatrix excised at the same time. Gauze drainage. Culture fluid from the gall bladder showed staphylococci. Patient went home after about four weeks having a small discharging sinus.

Subsequent history. The sinus has closed. After a few months has had no recurrence of difficulty. General health is good.

XVI. C. H., woman forty years old, married. *Symptoms of gallstones. Cholecystostomy. Stone in cystic duct removed, flow of bile. Drainage. Persistent biliary fistula. Cholecystectomy. Recovery.*

She has had attacks of epigastric pain for many years, at intervals of about five months. Severe cramp-like pain accompanied these attacks. She has never been jaundiced all these years. Laid up at these times three or four days. The last attack was four weeks ago. She has lost some weight, but not rapidly. Ten days ago she had dull epigastric pain, at first intermittently, but for seven days it has been continuous, in median line, two inches below ensiform cartilage, never colicky or cramp-like. No chill. Vomited greenish material several times. She has never vomited blood. For one week her skin and conjunctivæ have been yellow. The urine has been dark. Stools have been green. Now the pain extends from the median line out to the region of the gall bladder and back to between the shoulders.

Examination. Poorly nourished. Abdomen not distended, tympanitic excepting at ninth costal cartilage, where there is a limited dullness and corresponding muscular spasm. The edge of the liver is not to be felt.

In May cholecystostomy. Stone removed from the cystic duct. Bile then came from deep passages. No stone in the common duct. Small gall bladder. Coagulation time,—four minutes. Wound solid in June.

Operation in September for persistent biliary fistula.

Incision through right rectus. Adhesions between omentum, intestine and abdominal wall. Gall bladder found attached to the abdominal wall. Cholecystectomy. One wick to stump of the cystic duct. A slight biliary fistula existed for a few weeks.

One month after operation biliary fistula closed. Wound granulating and nearly closed. Never better health for years.

Clinical Department.

A CASE OF PYLORIC STENOSIS IN AN INFANT.

BY CHARLES W. TOWNSEND, M.D., BOSTON.

ALTHOUGH this affection has been reported more frequently of late years, the difficulties in the way of an early diagnosis make it desirable to throw as much light as possible on the subject by the report of cases.

The following case was seen frequently in consultation with Dr. A. E. Rogers. We had also the advice of Drs. C. P. Putnam, J. L. Morse, Rotch, Ladd, A. Thorndike and J. C. Munro.

A. B., male, born Aug. 22, 1903, weighed seven pounds. After ten days on the breast, the supply failing he was placed on modified cow's milk and progressed well until Sept. 12, at which time he weighed eight and one-half pounds. During this time he was having three or four stools daily and there was no vomiting. On Sept. 12, at the age of three weeks, he began to vomit occasionally at first, but with increasing frequency, so that on the 22d of September he was vomiting every fifteen minutes whether food was given or not. Early in October it was evident that by careful feeding it was possible for the baby to retain its food for several hours, but at the end of that time, the stomach contents would be forcibly ejected, sometimes to a distance of several feet. At times he would continue for several days with practically no vomiting, as was the case from the 16th to the 19th of October, on barley water containing a few drops of cream gradually increased in strength. In fact nearly every change succeeded for a while, but the vomiting always recurred eventually. Various weak formulas of cow's milk and whey modified with water, barley water or dextrinized barley were used, as well as the milk of a wet nurse, sucked by the infant from the breast, or pumped out and diluted with water or barley water. Barley water alone, albumen water and meat juices and broths were all tried, but with all the vomiting was sure to return. Bicarbonate of soda in grain doses every hour was given by the mouth, apparently with good effect at times. Bismuth and pepsin had no effect. Bromide by the rectum and bicarbonate of soda in large doses were also used without avail. Lavage also proved useless. When much reduced, salt water infusions under the skin helped to make up the deficiency of fluid in the blood.

After the first it was found impossible to nourish the child or even give medicines by the rectum, as any manipulation in that region brought on vomiting. During most of the illness, especially when vomiting was most severe, there was some tetany, as shown by the drawing in rigidity of the thumbs to the palms of the hands. The vomitus during the first few days contained bile, but never after this. At no time was there mucus or evidence of indigestion, the food sometimes coming up exactly as it went down, at other times showing the effect of acid digestion. The stools, although scanty and far between, as might be supposed from the small amount of food passed beyond the stomach, showed perfect digestion.

From the 27th of October to Nov. 5 the baby did excellently on top milk modified by dextrinized gruel. The stools were large and well digested, and although vomiting never entirely ceased he began to lose his pinched and atrophied appearance. His spirits were