have been eroded by gall-stones is also better out than in, for similar reasons. It not infrequently happens, however, that a cystic duct which seems entirely closed will open up after drainage of the gall-bladder through the subsidence of inflammatory swelling. When the gall-bladder is of normal thickness and the ducts clear, it is in my judgment better to save it. The risk of cancer developing in such a gall-bladder is certainly small, while the risk of a later obstruction of the common duct from an overlooked or new-formed stone or from cicatricial contraction is probably much greater. Cancer or other tumors of the gall-bladder if found before hopeless involvement of neighboring structures, of course call for radical excision. In the Mayos' statistics of 1800 operations of the gall-bladder or ducts, cancer was present in 4 per cent. and most of them were hopeless cases. Where a cholecystectomy is indicated for benign conditions and the presence of adhesions would render it a difficult or dangerous operation, it is well to remember that excision of the mucous membrane down to the cystic duct, as first advocated by W. J. Mayo, will effect the same result and be found easier of performance. This method also offers a safer means of drainage than a complete cholecystectomy.

Drainage through a stab wound in the loin to one side of the original incision is often advisable and occasionally permits complete closure of the larger wound. In draining the gall-bladder one should endeavor to bring the tube out in such a position that the fundus of the gall-bladder will ultimately be high up, in order to assist natural drainage while the patient is erect.

The mortality of uncomplicated cholecystostomy does not exceed 1 per cent. in skilled hands, while in cholecystectomy it is slightly higher. Undoubtedly with further technical improvements and greater familiarity with the surgery of the gall-bladder, the mortality rate will be lowered.

THE SYMPTOMATOLOGY OF GALL-BLADDER DISEASE.*

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In 1905 I had the pleasure of reading a paper before this Society upon the clinical features of gall-bladder and gall-duct disease. The mass of publication since that time has brought a few new facts and points of view, but no one feature has been as frequently emphasized through many papers as the importance of a careful history of the patient in establishing an early diagnosis of these affections.

Certain general considerations may properly introduce the subject of to-day. Disease of the gall-bladder is common. In the great majority of cases it is due to infection; stones are nearly always the result of a low-grade infection; many of the clinical features are dependent upon recurrent infection. Acute cholecystitis may accompany or follow infections like pneumonia, influenza, tonsillitis. A history of *typhoid* should be given due weight in the interpretation of indefinite digestive disturbances or abdominal pain. Gall-bladder symptoms may occur during the typhoid or soon after, though more commonly there is a latent period of some months or years. A man seen two years ago was positive that dyspepsia followed directly typhoid fever 35 years before. For years there were indefinite stomach symptoms before a typical colic called attention to the gall-bladder. When seen he had dilatation of the stomach with hypochlorydria due to adhesions of the gall-bladder to the duodenum. In a young woman of 20 seen recently attacks of indigestion with marked distress in the upper abdomen had recurred during the past three years. There had been a severe typhoid infection at the age of 15. Operation showed stones in the gall-bladder without adhesions.

Certain associations of cholecystitis should be born in mind.

1. *Appendicitis.*—Ochsner, Moynihan, Dieulafoy, W. H. Mayo, Sherren have emphasized the frequent coincidence of disease of the gall-bladder and appendix. Dieulafoy would have the involvement of the appendix follow primary gall-bladder infection and I have seen two cases which were much like his excellent descriptions of an acute appendicitis following a few days after an acute suppurative cholecystitis. Usually the sequence is the other way and gall-bladder symptoms follow repeated attacks of appendicitis. There can be no longer any doubt that infection of the appendix—even when chronic and of a low grade—is a very frequent cause of other abdominal disease, of colon adhesions, of cholecystitis, and of ulcer of the stomach and duodenum.

It is interesting in the histories of patients to trace the variations of symptoms dependent upon the development of new foci of abdominal infection. In a man of 50 operated upon recently in hospital, attacks of abdominal pain with vomiting recurred throughout boyhood. We know that the recurrent stomachaches of children most often mean appendix disease though they may occur also as associates of acidosis or migraine. After typhoid at 30 more severe attacks of abdominal pain recurred once or twice a year and were accompanied by chills and fever for several days. Gradually during recent years there developed symptoms of stomach dilatation and retention and the usual signs of this condition were found on examination—operation showed a large gall-bladder enclosing stones and adherent to the liver and duodenum and so kinking and narrowing the duodenum as to cause great dilatation of the stomach. A man 55 seen

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two weeks since had till the age of 30 recurrent severe abdominal pain with chief localization in the lower right quadrant. At 30 a particularly severe attack was followed by fever for two or three weeks and a desperate illness. Since then there have been no such seizures but soon after stomach symptoms began and in the last years there have been several typical gall-bladder colics. There is tenderness under the right rib-border and an X-ray bismuth plate shows the high position of the stomach and the high pylorus far over to the right so often indicative of gall-bladder and pyloric adhesions. It is interesting to note how frequently acute symptoms of gall-bladder disease develop after appendix operations. A nurse seen three years ago had her appendix removed six years before on account of chronic indigestion and abdominal pain localized chiefly about the cecum. She was considerably relieved by operation, but within six months began to have distinct upper abdominal symptoms followed in a year by typical colic. Operation showed a contracted and adherent gall-bladder full of stones. A patient now under observation was operated upon two years ago to relieve severe attacks of abdominal pain which were referred by the surgeon to a diseased appendix. This was removed but the attacks have persisted, unmodified. There was a history of a long typhoid in childhood, of migraine and there is tenderness in the gall-bladder region with a suggestive X-ray plate. The necessity of a thorough exploration of the abdomen at operations aiming to relieve chronic symptoms when history and examination suggest several localizations of disease—the investigation of gall-bladder, appendix, Mickel's diverticulum, colon, kidneys and the pelvic organs in women—should need no special emphasis in light of the surgical views of the day.

2. *Chronic Pelvic Disease and Enteroptosis* in women. Kinking of the gall-bladder, infection favored by stasis, gall-stones, are not infrequent complications of enteroptosis. I have notes of a number of cases similar to those of Kehr in which unequivocal symptoms of gall-bladder disease followed shortly after an operation for fibroids or disease of the ovaries or tubes. In many instances, as shown by a proper history, the gall-bladder was affected before the operation, the latter merely serving as a provocation. In a few instances, however, the operation has seemed a more direct cause of the gall-bladder infection—a hint worth remembering in light of recent publications concerning the occurrence of ulcer of the stomach and duodenum after operations, abdominal or of the neck and extremities. (Rössle Das runde Geschwür des Magens und des Zwölffingerdarmes als "zweite Krankheit" Mittheilungen aus den Grenzgebieten der Medizin und Chirurgie Bd. 25 s. 766.)

3. *Migraine, Pregnancy, Obesity.*—The recent work of Aschoff and his pupils concerning the etiology of cholelithiasis may be mentioned in this connection. Aschoff holds that stones may result from stasis alone as well as from stasis plus infection. The radicular crystalline cholesterin stones occur without the presence of micro-organisms. They may result from the impoverishment of the bile in neutral fats which have been absorbed by epithelial cells and lymphocytes and the consequent precipitation of cholesterin. Cholesterin is therefore not necessarily a product of the epithelial cells of the gall-bladder. Kehr, in a recent article (Welche Indikationen fur die internc und chirurgische Therapie des Gallensteinleidens mussen wir auf Grund der Untersuchungen des Pathologen Aschoff aufstellen? Berliner klinische Wochenschrift No. 24, 1912), lays much stress upon the work of Aschoff in its clinical applications. There may be such a thing as a cholestrin diathesis and the bile content in cholesterin may not, as Naunyn holds, be independent of metabolic processes. It may be increased in physiological processes, in obesity, in pregnancy. "Die von Aschoff angenonmmene Cholesterindiathese wurde dann die immer wieder beobachtete Erblichkeit des Leidens zwanglos erklaren." The greater frequency of gall-bladder disease in women, the influence of pregnancy (90% of married women with stones have had children. W. H. Mayo), the influence of menstruation in precipitating attacks are important facts to remember which would substantiate the theory of Schell that there may be changes in metabolism connected with the sexual function that favor stone formation. W. H. Mayo writes in relation to the frequency of gall-bladder disease in women, "that there is some cause for the phenomenon which relates to sex and which cannot be explained by habits, diet, mode of living, etc., seems assured."

The relations of migraine and cholelithiasis have interested me for many years. Gall-stones are common in migraine families and Kehr notes the frequency of migraine with cholelithiasis and says he has repeatedly known the attacks to cease after operation. The same nervous or dietary influences may precipitate an attack of migraine or hepatic colic; in women attacks of either affection frequently accompany menstruation. In my experience both classes of patients often cannot take sugar, milk or eggs with impunity and both classes often feel unusually well and unusually hungry just before attacks.

The symptomatology of gall-bladder disease will vary with the acuity or chronicity of the process; it will depend, in the presence of stones, upon the location of these in the gall-bladder or cystic or common ducts; it will depend also upon complicating peritonitis, upon adhesions to the different abdominal organs. It is in the interpretation of the different kinds of cholecystitis and of the widely differing symptoms brought about by the complicating stones and adhesions that a good history is so indispensable. A good clinical history is a very difficult thing to get. In the first place students are not thoroughly enough drilled in taking it and physicians do not attach sufficient importance to it. Patients forget with exasperating frequency the most important facts and elaborate without end trifling details. Patience and repetition are absolutely necessary and a complete story can only be obtained after several interviews. If the family physician would only keep full records even of trifling ailments, if parents could be taught

to put down clinical phenomena in children other than the first tooth and the first word tremendous forward steps could be taken in semeiology of disease. The importance of early or inaugural symptoms has been insisted upon by Moyinhan, W. H. Mayo, Deaver, Sherren, Mayo Robson, Kehr, Cotte, Verbrycke, Kelly, Coleman and many others. We realize to-day that "latent" cholecystitis, especially when combined with cholelithiasis, rarely exists and we recognize the affection at a much earlier age than formerly and before late complications like colic and jaundice occur. The patient with gall-bladder disease complains most often of vague upper abdominal sensations and gastric disturbances. Flatulence is extremely common and a persistent complaint of gas in a stout woman who has had children should rouse the suspicion of gall-bladder disease. There is frequent sudden distension after eating, often painful and requiring loosening of corset or clothing. This weight and pressure are relieved by belching. If persistent they may amount to actual pain. A sense of constriction and interference with deep breathing may be noted. A sudden "catch" may be felt on the right side when a deep breath is attempted. There may be a sensation of heaviness or dragging in the right hypochondrium, at times a feeling as if gas or stomach content were forced against an obstruction at this site, a sense of relief and relaxation when gas is felt to pass through this obstructed place or "lump." These symptoms usually come suddenly. They may be brought about by errors in diet or alcohol, may be caused by overtiring, by mild infections, may be precipitated by menstruation, by anger, excitement or worry. Frequently, however, they cannot be referred to indiscretions of diet, nor do they have any relation to the time of taking food. They appear without rhyme or reason; they often occur at night. Mild general symptoms may accompany this recurrent "dyspepsia." There may be dullness, drowsiness, lassitude, aching in the back and extremities, occasional chilliness or even a brief chill. Labial herpes is frequent. There may be an ephemeral rise of a degree or two in temperature, rarely there is a slight persistent afternoon temperature extending over weeks or months. Hyperacidity often marks this gall-bladder dyspepsia. Many patients complain of burning in the upper abdomen, of distress and pain from pylorospasm. Constipation is common as is also a sudden distension of the abdomen from intestinal relaxation. Mucous colitis is not usual unless there be adhesions of gall-bladder and colon.

Certain symptoms such as actual pain and tenderness in the upper abdomen, though later in developing, must be considered in detail as they call attention more directly to the gall-bladder disease.

1. *Pain.*—This may be of many kinds and from many causes. It may depend upon spasm of the pylorus, cardia or entire stomach, may be a result of gall-bladder distension, of distension and contraction of the cystic or common ducts, may be caused by involvement of the peritoneum acutely or from dragging or kinking of adhesions; may be reflected from spinal segments long irritated by the chronic peritoneal or visceral disease. In early stages there may be sharp evanescent pain in the epigastrium or stabbing needle-like pains about the gall-bladder. Later there is complaint of dragging deep pain under the right ribs and the patient begins to have decidedly acute pain in epigastrium, hypochondrium or back after one of the above described "dyspeptic" attacks or after exertion, alcohol or excitement. At this stage also various radiations of pain become apparent. Discomfort and pain are felt up along the sternum, around the lower ribs on the right to the back. There may be decided subscapular pain, usually worse on the right. An aching, dragging sensation extends downward toward the appendix, inward toward the umbilicus. There may be queer distant pains —upward into the right side of the neck from phrenic irritation, in the wrists, in the lower extremities. In several women I have seen the pain along the outer side of the right upper arm upon which Mackenzie dwells.

Severe attacks of colicky pain are as a rule among the later symptoms of gall-bladder disease. Hepatic colic, as is well known, may occur in perfectly typical way in the absence of stones. The weight of opinion still refers biliary colic to increased tension in the gall-bladder or ducts due to inflammation and not to cramp of the ducts due to irritation of a stone or other foreign body within. Severe recurrent pain in the upper abdomen nearly always means gall-bladder disease. If proper attention is given to the history and the patient is carefully examined biliary colic can hardly be confounded with the pain of acute pericarditis, diaphragmatic pleurisy, pneumonia, tabetic crises or angina. Biliary colic rarely radiates into the lower abdomen. It may radiate across the upper abdomen in the left hypochondrium or may extend backward under the left scapula. Usually the radiation is around the right lower ribs into the back and under the right shoulder blade. The pain of appendicitis is nearly always at a lower abdominal level, except in the initial epigastric pain that ushers in many attacks and the pain of pylorospasm in chronic cases. Stomach or duodenal ulcer is in my experience not often marked by severe gastralgia unless there are adhesions to the liver, pancreas or omentum. The pain of nephrolithiasis may occasionally be referred wholly to the epigastrium or hypochondrium. In a case of right-sided perinephritic abscess seen last year there was a history of jaundice a year before and slight jaundice was noted during the early days of the last illness. There was tenderness in the right hypochondrium and over the Boas area in the back. Pain was referred to the right lumbar and subscapular regions. There were no signs in the urine and yet the characteristic psoas spasm was sufficient to divert attention from the gall-bladder. The nerve-root pains of spinal syphilis, of tubercular spondylitis, of osteoarthritis of the spine, may be felt in the gall-bladder radiations but both history and examination will readily differentiate.

2. *Tenderness and Zones of Hyperesthesia.*—

When cholecystitis is well established tenderness can usually be elicited by deep pressure in the gall-bladder region. If the fingers are hooked over the right rib-margin with the patient standing or sitting and he be asked to take a deep breath, if there be irritation about the gall-bladder the right half of the diaphragm suddenly stops descending as the liver is forced against the hand, and there is complaint of pain and tenderness. This is the well-known Murphy's sign. Boas has drawn particular attention to the value of tender points in the back in the diagnosis of stomach and gall-bladder disease. In gastric ulcer the tender point is most frequently found just to the left of the eleventh dorsal spine. In gall-bladder affections the tenderness is over the posterior surface of the liver from the tenth dorsal to the first lumbar vertebrae, and from the posterior axillary line to within 2 c.m. of the spinal column. Usually in many cases the maximum tenderness has been about 4 c.m. to the right of the eleventh dorsal vertebra. It is a valuable sign when present. I am less enthusiastic now than formerly about the value of the hyperesthetic zones of Head in the diagnosis of abdominal disease. Head thinks that the eighth dorsal segment has closest relation to the gall-bladder.

3. *Jaundice.*—We are much indebted to the surgical teaching of the last ten years, that jaundice is a comparatively rare symptom in gall-bladder disease. Kehr writes that in 80% of all cases of cholelithiasis jaundice is absent. If we remember that in the big majority of gall-bladder affections pain is due not to the passage of a stone down the ducts but to distention and inflammation of the gall-bladder, the absence of icterus is readily explained. A certain degree of inflammation of the ducts may occur with cholecystitis, and jaundice may result. Even if jaundice occur, therefore, after biliary colic it is no sign that stones are present or, if present, that a stone has passed. Even with a stone or stones in the choledochus there is frequently no jaundice. It is a most important fact to remember that ball-valve calculi in the common duct may for months or years give rise to intermittent fever and yet not cause jaundice. When it occurs jaundice may help greatly in the diagnosis of gall-bladder disease and its complications, but it may also at times render this diagnosis decidedly more difficult. It must be remembered that a stone may lodge in the choledochus without previous definite warning. The jaundice of cholelithiasis and cholangitis is frequently variable in intensity and bile may appear intermittently in the stools and urobilin in the urine. The jaundice of cholangitis grows more intense frequently after a paroxysm of fever. The jaundice of malignant disease is as a rule persistent. Attention to the law of Courvoisier, to the history, to a palpable Virchow gland will in many cases help in the diagnosis when jaundice is present. Itching of the skin may be marked without jaundice in some cases of cholecystitis and cholangitis. In many cases after an attack of flatulence, dragging pain in epigastrium, hypochondrium or under the right scapula, slight chilliness and possibly fever there will be an increased sallowness or muddiness of the skin and a yellowish hue to the conjuctivae. Occasionally here blood serum tests will show the presence of bile pigment when urine tests are negative. In an interesting case with great prostration and irregular temperature lasting for months a number of nevi and spider angiomata appeared in various parts of the body. Operation showed gall-stones in gall-bladder and choledochus.

4. *General Symptoms, Prostration, Collapse, Fever and Chills.*—In acute phlegmonous cholecystitis profound prostration and the severe nervous symptoms of a general infection may overshadow local manifestations. There may be general abdominal distention, vomiting, symptoms of ileus. Fever may be high and continuous or intermittent or may be wholly wanting. In less fulminating cholecystitis general symptoms may be little marked. In empyema of the gall-bladder due to the small number of lymphatics and lymph-glands draining the territory there may be very little fever and slight general reaction. If there be intermittent discharge of purulent material through the cystic duct there may be intermittent high temperature and chills. The remarkable intermittent hepatic fever of Charcot has often been described; it is most often associated with ball-valve calculi in the choledochus and steep curves may be seen on the chart for weeks or months without meaning pus. With the frequent mild attacks of cholecystitis in the course of cholelithiasis there may be moderate fever for a few days and occasionally with chronic cholecystitis there may be a slight afternoon rise of temperature, 99.5° to 100.5° for months at a time. A woman operated upon four years before for fibroid tumors of the uterus was ill for four months with temperature ranging from 100° to 102°. There was great prostration and marked cardiac weakness with a peculiar "gone" faint feeling in the epigastrium. There was very slight tenderness in the gall-bladder region, and complete recovery took place after removing a number of gall-stones and foul fluid from the gall-bladder. Another woman who had a history of previous acute upper abdominal pain was ill for over a year with fever from 99° to 100.5°. She lost a great deal in weight, was tired, languid, had no appetite and occasionally had attacks of dull pain under the right ribs and over the liver in the back. At operation the gall-bladder was small, thickened and contained pus and stones.

When complications occur, either from pericholecystitis and adhesions or from the passage of stones into the ducts or from extension of suppuration into the liver or the neighborhood, the symptomatology of gall-bladder disease may be much modified and obscured. Stomach symptoms may be more persistent and severe. The dyspepsia and transient pylorospasm of the early stages are replaced by vomiting during painful seizures, at times by persistent vomiting. Bile is more often vomited in the painful attacks of gall-bladder origin than in the vomiting from stomach ulcer or appendicitis. The vomiting of ulcer is more definitely dependent upon the taking of food. Persistent hyperchlorhydria may be due to gall-bladder disease and re-

markably persistent pylorospasm may be noted in some cases. At times cardiospasm may be a feature or the entire stomach may contract abnormally and give peculiar outlines on the X-Ray screen or plate (literature given by Buttner, Intermittirender Spasmus der beiden Magenporten als Reflexneurose bei Cholelithiasis Arch. fur Verdauungs krankheiten XVI Heft. 2. Emmo Schlesinger, Totaler Gastrospasmus, rontgenologisch nachgewiesen bei Cholecystitis und cholelithiasis Berliner klin. Woch. 1912 No. 26). There may be gastric atony instead of spasm and hypochlorhydria instead of hyperacidity. Dilatation may follow stenosis of the pylorus or duodenum due to adhesions between gall-bladder and stomach or intestine. Vomiting and retention characteristic of such stenosis and disturbed motility will now direct attention from the original disease unless a good history traces the order of successive symptoms. Free hydrochloric acid is frequently absent in such cases and I have notes of five patients in whom the stomach-content gave the tests usually present in carcinoma, absent free HCl, absent ferments, lactic acid and Boas Oppler bacilli present. In three cases there was a Gram positive intestinal flora. In one of these patients, a man, hematemesis occurred on two occasions, and yet the history, a good appetite and a clean tongue spoke strongly against stomach carcinoma. The operation showed a gall bladder filled with stones adherent to the duodenum. In a stout woman seen recently in the course of a very severe biliary colic of two days' duration—so severe as to suggest a pancreatic complication—the attack was attended with the passage of a considerable amount of dark blood from the bowel. A nurse, aged 35, who had had typhoid at 25 had symptoms of gall-bladder disease for eight years. At first there was dyspepsia with occasional epigastric pain, later pain in the right hypochondrium with the appearance of a distinct tumor during severe attacks. During the last two years of illness there had been continued stomach distress with frequent vomiting and evidence of retention. Attacks of tetany had occurred in the last year. Operation disclosed a a large gall-bladder with stones and adhesions to the duodenum and stomach dilatation.

Involvement of the pancreas is much more common in connection with bile-duct than with gall-bladder disease. Glycosuria is occasionally seen in gall-bladder affections without pancreatic complications. Extreme pain, collapse, cyanosis, symptoms of ileus are more common when acute pancreatitis complicates gall-bladder or gall-duct disease. Chronic pancreatitis may lead to emaciation, persistent jaundice and a palpable abdominal tumor.

In a few patients cardiac insufficiency seems directly referable to chronic gall-bladder infection; Babcock of Chicago has written of the frequent connection. Riesman has noted the frequency of mitral systolic murmurs in biliary colic and has suggested that the sign may help in the differentiation from renal colic or appendix pain.

CHOLELITHIASIS WITH A SHORT REVIEW OF ONE HUNDRED NECROPSIES.*

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Cholelithiasis is a very common disease. Our one hundred cases occurred among 1648 necropsies or expressed in percentage in 6% of all necropsies including infants, children, men and women. Higher percentages up to 15% have been reported from other places.

Our material also shows a relative preponderance of the disease in women, although the actual number of cases observed among men is larger, but this is due to the fact that many more males were examined than females.

We did not find one instance of cholelithiasis in a person below 30 years of age and the largest number of cases occurred between 40 and 60 years of age, which corresponds well with statistics published elsewhere. It is a well known fact that gall stones are very rare in children, although a few cases have been reported in childhood and even in early infancy. Still,[1] for instance, found eleven bilirubin stones in an infant of nine months and three calculi in another infant eight months of age. On account of the frequently long period of latency of the disease and on account of the large preponderance of old people who come to autopsy it would seem probable that as a rule gall stones develop rather earlier in life than would appear from such statistics.

It is impossible to enter into a minute description of the various forms of gall stones. Their appearance is familiar to all of you. They vary from just visible to stones of the size of a hen's egg and larger, and in consistence they may be all the way from soft, either pasty or grumous, to hard calcareous masses, which are difficult to cut with the knife.

It is more important to distinguish different varieties of gall stones, although it must be confessed that the classification of them is by no means easy and obvious in all cases. Roughly we can distinguish between cholestearin stones on the one hand and bilirubin stones on the other, although cholestearin stones usually contain some bilirubin, and vice versa.

The bilirubin is never precipitated as such but always with a certain amount of calcareous material, the amount of which, however, varies considerably, causing the precipitations to be either soft and pasty or of stony hardness. On this account such concretions are also frequently spoken of as pigment lime stones. They are usually small stones of about the size of a birdseed which, according to Boysen,[2] show a very peculiar and characteristic structure in sections produced by grinding, from which the coloring matter has

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1 Still. Gall stones in children. Pathol. Society of London, 1899.

2 Boysen. Über die Struktur und die Pathogenese der Gallensteine. Berlin, S. Karger, 1909. The Danish original appeared in 1900.