

Cholecystotomy : with a report of two new cases, a table of all the hitherto reported cases, and remarks / by J.H. Musser and W.W. Keen.

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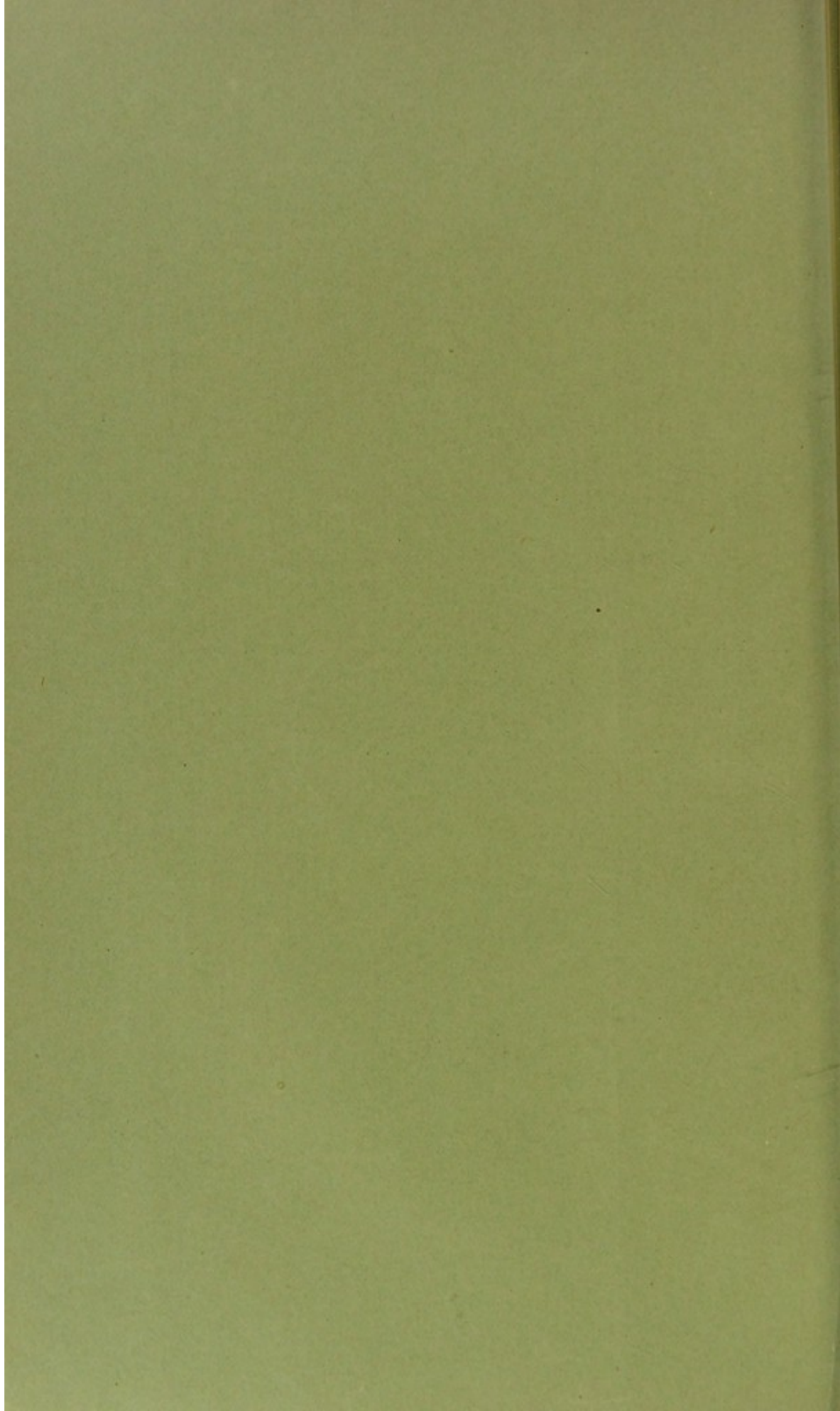
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CHOLECYSTOTOMY; WITH A REPORT OF TWO
NEW CASES, A TABLE OF ALL THE
HITHERTO REPORTED CASES,
AND REMARKS.

By

J. H. MUSSER, M.D.,

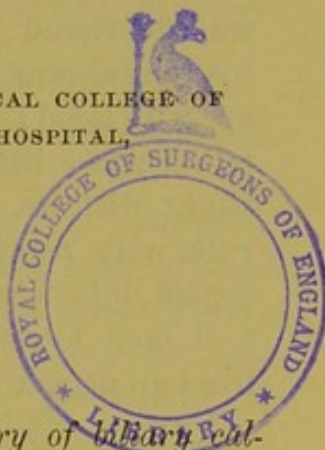
CHIEF OF THE MEDICAL DISPENSARY OF THE HOSPITAL OF THE
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[Read September 3, 1884.]



CASE I. Reported by Dr. Musser. *History of biliary calculi of five years' duration; jaundice for eight months; symptoms of obstruction; attempted cholecystotomy; recovery.*—L. S., æt. 32, male, a native of Germany, and resident of West Philadelphia, a watchmaker by occupation, came under my care in Nov. 1881, for hepatic colic; of bilious temperament and sedentary habits, addicted to the use of malt liquors and tobacco in moderation, he was always healthy until the attacks began, from which his present condition developed. He had never had syphilis or malaria, and there is no evidence of diathetic disease or hepatic trouble in his family history.

The first intimation of hepatic trouble was five years ago (1876). At that time he had a severe attack of biliary colic followed by jaundice. Thenceforth he was always subject

to pain in the right hypochondrium, especially when sitting awhile or stooping; occasionally he had attacks of colic, but jaundice did not recur until the fall of 1881. During the spring and summer of that year he was very "bilious," on account of which he went to Europe. He was there told that he had an enlarged and hardened liver, and an enlarged spleen. In September he returned, and shortly after had a severe attack of biliary colic with jaundice. From that time until his visit in November, he had several attacks, and was continuously more or less jaundiced.

Nov. 7, 1881. At this date his skin was of an intensely lemon-yellow hue, his conjunctiva and the mucous membranes discolored. He suffered much from itching, and was depressed in spirits. His pulse was slow and feeble; his tongue was heavily coated with a yellow-white fur; his appetite good; his digestion slow and painful. The epigastrium was a little tender on pressure, and always the seat of slight distress. Flatulence was marked, constipation the rule, with passages hard and pipe-clay colored. Urine contained bile-pigment. Ordered ac. nitro-mur. dil. gtt. xv, t. d. and Carlsbad water, fasting. He had just recovered from an attack of colic.

Further study of the notes from this time until the 23d of March, 1882, reveals, among other things, that his attacks of colic recurred, but at longer intervals, that his jaundice and dyspeptic symptoms improved, but never fully abated, that on account thereof he lost flesh. It appears that the only drug that gave him relief was the chloride of ammonium in large doses.

It was noted on March 23, that S. had had daily attacks of colic for the past two weeks, that the jaundice grew deeper, the body rapidly emaciated, and the gastro-duodenal symptoms recurred. During the past three days the pain was severe, lancinating, in the upper half of the abdomen, almost constant, associated with tenderness in the epigastrium and right hypochondrium, with enlargement of the gall-bladder.

The tumor was observed one inch below the margin of the ribs in the right hypochondrium, dull on percussion, hard, tender, and not fluctuating; on palpation, about the size of an egg.

March 26. Chill in the morning and a rise of temperature to 102° in the evening. Jaundice deeper; pain relieved; great local tenderness and marked induration in the epigastric area. Stools light and offensive; flatulence.

27th. Chill 11 P. M. 4 P. M. temperature 103° . Night sweats. Pain relieved until 8 P. M.; then very severe, with vomiting, great exhaustion following.

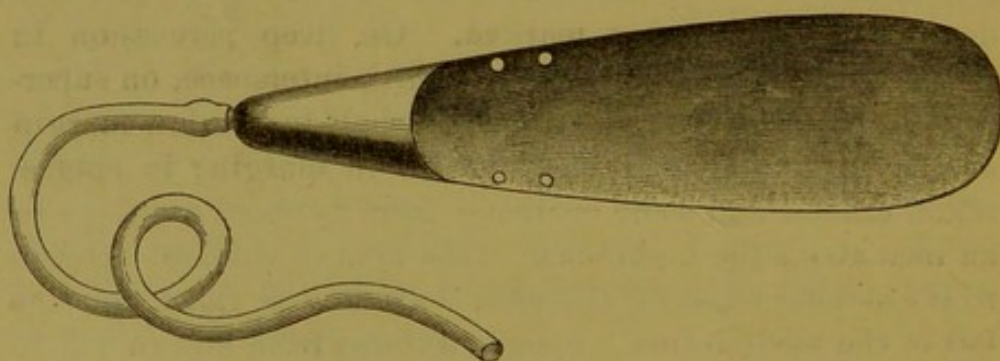
28th. Pain better; passages thin and more bilious; flatulence excessive; epigastric tenderness relieved; urinates very freely.

30th. No pain or fever. Dr. Pepper, in consultation, confirmed diagnosis of biliary colic, with probable impaction of calculus.

May 1. Dr. Keen was called in consultation. Bronzed yellow hue of face, lemon-yellow of trunk and limbs; emaciated, very weak; gastro-intestinal symptoms about same; nausea and vomiting marked; feces darker; epigastric tenderness; flatulence not marked. On deep percussion in nipple line, liver dulness begins in fifth interspace, on superficial at sixth rib, and extends to one-half inch below margin of ribs; in axilla, from eleventh rib to margin; in epigastrium dulness and some resiliency from xyphoid cartilage to an inch above the umbilicus. This area of dulness extends to the sloping edges of the ribs, both to the right and the left of the median line. Splenic dulness from eighth rib to lower border of ribs. Pulse 64, small and not strong; respirations 22. Chill at 1 P. M. 7.30 P. M., temperature 100.5° ; pulse 96; bowels opened, feces darker; urine, sp. gr. 1028, the color of porter, free from albumen or sugar, urea about normal amount. On standing a large deposit settled, which proved to be phosphates in excess, and amorphous matter. Bile acids and bile pigment found in abundance.

2*d.* Condition about as previously noted, though free from fever or pain. In good spirits.

3*d.* Cholecystotomy attempted. Ether given by Dr. Shepard, taken well. Strict antiseptic precautions observed, including the spray (carbolic acid). An incision three inches long was made from near the linea alba, parallel to the border of the ribs, one and one-half inches below them, to the right. In penetrating to the abdominal cavity the only large vessel cut was the superior epigastric artery, but five others were controlled temporarily by forceps, and tied before the belly was opened, at which time all bleeding had ceased. Two fingers being introduced and the exploration not being satisfactory, for but little could be learned, the incision was extended until it was $5\frac{1}{2}$ inches long, of which 2 inches were to the left of the linea alba. A large nickle-plated tongue spatula made a capital retractor, holding ribs and liver both out of the way. The intestines were best held out of the way by an instrument Dr. Keen had had made. It was of German silver, and in shape not unlike a cricket-bat, the blade of which was slightly curved from



side to side, and the handle was hollow, with a rubber tube slipped over its end. The idea Dr. Keen had in mind was to depress the intestine with it and at the same time slip it under the gall-bladder, where it would serve as a conduit to carry off its contents and prevent their escaping into the abdominal cavity. Its length was 9 inches, and the blade $2\frac{1}{4}$ inches wide.

The liver was dark in color, not enlarged, and not softened to any extent save in the left lobe, which was both enlarged and softened, so that at first Dr. Keen almost thought there was an abscess in it. The colon was completely defined, and found to be adherent to the liver. On further and deeper exploration a hard mass, as large as the fist, was discovered attached to the liver, the colon, and the small intestine. The gall-bladder was included in this inflammatory mass, it was believed, as it could not be found at any other point. No gall-stone could be felt in the mass. At first, indeed, we were almost inclined to believe it a malignant growth. The diagnosis being so obscure it was decided to close the wound, especially as his circulation and respiration had both been very threatening more than once during the operation, so that a number of hypodermic injections of brandy had to be given. His pulse responded very quickly to each one of them. Ten wire sutures, including the peritoneum, were introduced. The operation lasted forty-five minutes. Drs. Pepper, Musser, and Roberts also examined the interior of the abdomen, their hands being first carbolized.

1.45 P. M. Put in bed in profound shock; hot bottles applied; hypodermics of brandy every ten or fifteen minutes; one eighth gr. morphia by mouth.

7.30 P. M. Since 3 P. M. considerable pain; flatulence; morphia by mouth and hypodermically; pulse 84; respiration 24; temperature 95°.

4th. Reacted well and slept some in night. Wound in good condition. 10.30 P. M. Hemorrhage of 3ij, due to capillary oozing.

5th. Chill at 6.30 P. M. One hour and a half later temperature 103.5°. Quinia in large doses with morph. Slight oozing of blood.

6th. Took 20 grs. quinia. Temp., 6 P. M., 100.8°; urinated well; takes food well.

7th. Sudamina marked. Hemorrhage—3ij to 3iij—from

pouting subcutaneous tissue between sutures and from suture points.

These hemorrhages were marked during the progress of the case. Thus they occurred daily until the 21st of the month, then every third or fourth day until June 1st. Any point of puncture, the removal or insertion of a suture, the opening of any abscess or the removal of any support from granulations—these and other most trivial things were sufficient to excite the flow of blood. At times they amounted only to oozings, again to free flowings—one so profuse as to cause collapse, others of 3ij and 3iv . Pressure and Monsel's solution generally controlled them. One was so profuse from a hidden point in an abscess pocket that opening of the wound was seriously considered.

From the 6th to the 8th of May the temperature did not rise above norm. The latter day it was 102° , and on the 9th it was found to be due to a small abscess in the wound, caused by disintegrating blood. When opened, this blood and some pus (3vj) were discharged. A probe passed into this cavity directly backwards into an apparently localized pocket within the belly cavity, for it was deeper than the thickness of the abdominal walls. The discharges, however, were always sweet. The temperature did not rise again until the 17th, although the abscess pocket discharged pus, and there was breaking down from nearly all the old stitches from the 8th. The afternoon rise of the 17th, 18th, 19th, and 20th (102°) was no doubt due to an inflammation of the lymphatics. On the latter day two red lines were traced from the pus pocket in the wound to an enlarged and tender gland in the right axilla. The lymphatic vessels, enlarged to the size of the little finger, were very hard, red, and painful at first. They finally softened, suppuration took place, and they were opened June 1st at the border of the axilla, discharging abundant thick pus. They continued to discharge until the latter part of the month. The last four days of the month the temperature again ran up to $101\frac{1}{2}$ – 102° in the evenings, on account of the lymphatic trouble

and the formation of small abscesses in the skin and cicatrix. Sinuses formed from the latter, but were well drained by horse-hair. The temperature was always kept in control by quinia.

The wound apparently united by first intention, but the development of the numerous abscesses broke down any line of union, and several pockets had to heal by granulation. The first suture was removed May 9th, three on the 10th, and others at different days, the last being on the 16th. On the 10th a piece of rubber tubing was introduced into the large cavity above noted.

The wound was dressed daily, and often twice or thrice daily, antiseptically, until May 25th, twenty-one days after operation. Thereafter zinc ointment was applied. Mercurial ointment at first, and afterwards poultices, were used on the inflamed lymphatics.

Forty-five days after the operation the patient was out of bed, and on the sixtieth day he was out driving. During all this time, in addition to the surgical treatment, tonics were exhibited freely, and a most liberal and stimulating, but easily digested, dietary allowed. No attention was paid to the treatment of hepatic symptoms, and, in fact, they remain about *in statu quo*, although the feces darkened somewhat, the complexion partly cleared up, and the urine became clearer. Of course, the general strength improved, as did also the appetite and digestion. It is important to note that there was never any evidence of general peritonitis.

The above notes, appertaining chiefly to the surgical treatment of the patient, end July 1, there being one small granulating surface on the wound at that time. In recurring to the medical condition it may be said that, although the jaundice and the symptoms thereof remained stationary, yet there never was any paroxysmal pain since forty-eight hours prior to the operation. At this date (July 1, 1882) the color of the skin of S. was certainly lighter; the liver dulness on physical examination was found to extend from the fifth rib to the margin of the ribs in the nipple line, and to measure

five inches in the axillary and five and one-half in the scapular line. The indurated area extended four inches vertically from the xyphoid cartilage, was dull on percussion and tender on palpation; the appetite was good; flatulence great; the bowels regular. Along with tonics he has been taking an anti-fermentative pill after meals, and ammon. mur. gr. v, four times daily. One week ago put on succinate of soda at the suggestion of Dr. Bruen.

July 17. Condition about the same. Bowels inclined to be constipated; feces were more yellow. The succinate of soda acted so freely on the bowels that the amount had to be reduced to one pill daily, and finally the drug had to be discontinued. Natural costiveness was then relieved by Hunyadi water. This water, S. said, relieved him of a constant sense of fulness and weight of pain in the right hypochondrium.

27th. Five days ago took considerable exercise, followed the next day by pain, swelling, and tenderness in the epigastrium. With rest and counter-irritation it was relieved in seventy-two hours, but since then a dull pain has remained.

Aug. Since operation treatment quite unsatisfactory. For some ten days past has taken three grains potass. iodid. before breakfast, in a pint of water. His general condition, his appetite, and his digestion improved, but the jaundice remained, the skin, the urine, and the feces bearing evidence of it. The itching of his skin, however, had ceased entirely. He went to Saratoga toward the end of August.

At Saratoga, S. drank of the Hathorn spring-water, four to eight glasses daily, and followed a regulated diet. During his sojourn he gained in flesh and strength; the bile staining was entirely removed from the tissues; the gastro-intestinal and hepatic functions regained their normal power; the urine cleared up; his liver diminished in size; the mass in the epigastrium was not changed. He has been under observation ever since then, and has been in perfect health, save a slight attack of his old pain, followed by slight jaundice, in the spring of 1883. Otherwise he has had no com-

plaint save inconvenience, at times pain, on account of the induration. It especially annoyed him when working in a sitting posture.

Before closing this record there are two other facts worthy of mention. S. observed that, three or four hours before the attacks of pain began, he became quite deaf, with a subjective, dull sensation, and at times ringing in the ear, especially the left—a condition which only ceased some hours after the attack. He noticed also that over-indulgence in food, or the eating of too rich food, generally produced an attack. Exposure to cold and dampness was also an exciting cause.

Remarks.—From the first it was evident that the jaundice was of an obstructive nature, and that it was due probably to a calculus, which time and again advanced and receded, and finally probably became impacted in the ducts. The age, the sex, and the habits of the patient, the absence of a cause for such jaundice, the slight change in the size of the liver, the intense itching, the long continuance of the discoloration, and the intermittence in its intensity, all opposed the diagnosis of so-called jaundice from suppression; while the duration, the variability of the symptoms, notably the jaundice, the character of these symptoms, the enlarged gall-bladder discovered by physical examination, along with his sedentary occupation, and his temperament, supported the idea that the obstruction was due to a gall-stone. With these particulars, and the absence of emaciation until shortly before the operation, of cachexia, and of ascites, carcinoma, either of the liver or any other abdominal organ, was excluded. Catarrhal jaundice alone was weighed, with some degree of hesitancy, before eliminating it in the diagnosis.

It may be asked if all this trouble were from a stone, what became of it? how did a cure take place? what is the present enlargement in the epigastrium due to? The stone either was passed per anum unnoticed, in spite of the fact not mentioned in the notes, that for two weeks before and six weeks after the operation each passage was critically examined with a sieve and water; or, becoming impacted, the bile escaped around it, or it ulcerated into and now is imbedded in plastic matter. In either case the course of waters aided in resolving the accompanying catarrh of the ducts. The epigastric tumor is due to the collection of inflammatory material matted with the upper abdominal contents.

CASE II. *Acute Gastro-Intestinal Catarrh followed by Jaundice both becoming chronic; symptoms of Internal Suppuration; enlarged Gall-Bladder; Cholecystotomy; temporary relief; Death; Autopsy.* Reported by Dr. Musser.—F. R. D., æt. 31, white, male, native and resident of Philadelphia. A man of exemplary habits, but on account of his occupation, travelling salesman, he was compelled to eat irregularly and hurriedly. Family history good. Previous health, save fevers of childhood, unusually good. No malaria or syphilitic history.

History of Illness prior to Examination.—From July to October, 1882, D. suffered from dyspepsia. Early in October of that year he was seized with a severe attack of acute gastro-intestinal catarrh characterized by vomiting and purging, with severe epigastric and abdominal pains, and with high fever. With the decline of the disease on the sixth day jaundice began. At first light-colored, it rapidly increased in intensity, so that in ten days he was almost of the present appearance. During the winter he attended to his business. The jaundice continued and was persistent in degree. He lost but little flesh, was of rather gloomy spirits, but not depressed in physical strength. His appetite

was good, voracious indeed, his stomachic digestion unimpaired. In addition to the jaundice and its symptoms, it is important to carefully note two symptoms: 1st, the occurrence of intestinal dyspepsia and a chronic diarrhœa; and 2d, of a constant source of pain or distension in the upper abdomen.

Regarding the first, the passages were uniformly loose, painless, putty-colored, and from six to ten daily. Of the second it may be noted that the pain was not influenced by exertion, but was worse when in the recumbent posture.

Condition at time of Examination.—April 23, 1883, countenance drawn, conjunctivæ deep yellow, skin of face of an olive hue; skin of trunk and extremities of a deep yellow, mucous membrane of mouth under tongue stained yellow, body not much wasted (loss estimated at 10 lbs.). On trunk and extremities numerous scratch marks, itching being very great. Complains also of flushes of heat, at times intolerable.

Alimentary Tract.—Tongue coated white, heavy yellow coating in the mornings; bitter taste in the mouth; good appetite; no marked dyspeptic symptoms; intestinal flatulence; colicky pains; diarrhœa; six to ten loose, putty-colored passages daily. Liver dulness from fifth interspace to one-half inch below margin in nipple line; left lobe not enlarged; tenderness on pressure along the hepatic margin; abdomen not distended; abdominal veins slightly enlarged; spleen normal size; no ascites.

Lungs and Heart.—Both normal: 1st sound of heart weak; pulse slow and rather feeble. In fourth interspaces a systolic retraction of chest wall noted.

Urine.—Normal amount, porter-colored, acid, sp. gr. 1024; no albumen or sugar, bile acids and pigment in abundance.

Mental faculties and special senses normal; no yellow vision. On account of pain and itching, sleep disturbed; very despondent. Placed on treatment without improvement.

May 10. Same, diarrhœa worse. Above umbilicus and to the right a soft swelling two inches in diameter. Between the hepatic dulness and the dulness of this mass, a space of resonance two inches broad. Œdema of feet.

The patient, his condition not having changed, gave up treatment, and was not seen until June 9th. Note of that day: Had been feeling unusually well for two weeks past. Had, however, on the 8th, a severe rigor at noon followed by high fever, and with both a severe headache. There was no pain in the afternoon; the following night he suffered from severe, lancinating pain in the abdomen, especially the upper half. Now (7 P. M. 9th) temperature 104° ; pulse 120; extreme tenderness in epigastrium; to the right and above the umbilicus a large, round soft tumor tender on pressure. Liver and spleen enlarged.

June 10. Fever continued since yesterday; severe headache; constant pain in the epigastrium and left shoulder; after a severe paroxysm of pain had an epileptiform (?) seizure.

11th. 8 A. M. slow feeble pulse; respirations 20, irregular; a short, feeble inspiration and expiration, then a full, long, gasping inspiration and a prolonged sighing expiration. Abdomen is tympanitic and tender all over. Bladder empty; no urine passed in twenty-four hours. Though conscious, recognizing persons and being affected by emotion, was unable to talk or to swallow.

4 P. M. The above condition continued about eight hours. Vomited three times this P. M.; ejecta acid, dark-colored coffee ground, due to blood, as shown by microscopical examination; bowels opened; urinated.

12th. A. M., temperature $103\frac{1}{2}^{\circ}$; pulse 120; respiration hurried; skin dry; delirious; tongue dry; eats readily; bowels not opened; liver dulness in nipple line from fourth rib to two inches below margin; slight epigastric pain, marked tenderness.

13th. By 3 A. M. fever subsided. 8 A. M., severe rigor half an hour's duration followed by fever; urine clear; pulse

70; temperature 102° ; respiration jerking; urine scanty, passed with difficulty. Bowels opened by purgation five times, feces light-colored.

15th. Temperature 101° ; pulse 96; urine more free, same chemical characters as before noticed with phosphates in addition; bowels opened, light-colored.

17th. Dr. Keen was called in consultation. Yesterday chill followed by fever and a profuse sweat. A few days ago he had a profuse hemorrhage from the nose; since then three small ones, and a constant tendency thereto. Physical examination shows liver dulness to be in the nipple line five and a half inches in extent vertically. The lower border is defined by a uniform curved line extending from a point an inch and a half above the right iliac spine to the ensiform cartilage. At the middle of its border a tumor projects towards the navel two and a half inches each way in diameter. It is round, soft, elastic, slightly tender, well defined to the finger, and semi-dull on percussion. It was tapped with a very short hypodermic needle, and $\frac{3}{4}$ j of limpid viscid serum drawn off.

Dr. Leffmann, to whom the fluid was handed, reported that "chemical and microscopical examination gave no indication of bile constituents. Nitric acid gives a very faint green tinge, but is too indefinite to constitute a basis for supposing the presence of the bile color. The reaction is neutral, the liquid contains albumen, and the sediment shows many nucleated corpuscles much like those of pus." No hydatid hooklets were found.

19th. In accordance with the earnest request of the patient, cholecystotomy was done by Dr. Keen. Abdomen so tympanitic that no evidence remained of the roundish tumor felt and percussed on the 17th. Incision five inches long, one-half way between umbilicus and ribs, parallel with the latter, inner end just reaching the right rectus muscle. Slight bleeding; two vessels tied in the abdominal wall. Great trouble in keeping the distended bowels out of the

way. The special scoop (see Case I.) was invaluable, and both kept the bowels back and carried off the contents of the cyst. The pear-shaped gall bladder was at once seen as soon as the intestines were pushed away. It was tapped by a small trocar, and twenty ounces of the same fluid as on the 17th withdrawn. Opening then enlarged to admit two fingers, followed by a discharge of a few ounces of pus mixed with bile. Walls of gall-bladder one-fourth inch thick; bled but little. The finger felt nothing inside, and neither then nor before the opening could any gall-stone be found. A bullet probe, a Nélaton probe, and a stoneforceps were each tried, both to find the stone, or, failing in that, to discover the aperture of the cystic duct. They all entered seven inches and moved freely in a large cavity. With probe in gall-bladder, and hand in abdomen guiding it, the probe could not detect the cystic duct. The liver, aorta, and presumably the pancreas were all felt, but no cause of obstruction was evident. The cystic duct both of us thought we felt, and found thickened, but further nothing. The gall-bladder on being opened was kept under control, after emptying, by a wire ligature passed through the edges of the opening. Ether was used, and entire antiseptic precautions including the spray (carbolic acid).

The wound was closed by twelve sutures, six being used to attach the opening in the gall-bladder to the one in the abdominal wall, thus creating a biliary fistula. Antiseptic dressings with carbolized sponges under them, to catch the discharge, were used; a rubber fenestrated drainage tube inserted in the gall-bladder; borated cotton and muslin bandage outside. Exhausted by operation, but recovered nicely before evening. Passed water, dark as before. At first milk, lime-water, and brandy every half hour, later every two hours. 8 P. M., temp. 99.4°. Comfortable. One-eighth grain of morph. sulph. used once for pain. Dressings just saturated by discharge. Redressed; milk, etc., every two hours.

20th. Passed a fair night; temp. 99° ; morphia, one-eighth grain once; but little pain. Dressings green with bilious discharge in moderate quantity; wound looks well; no pus, no inflammation; two drachms of blood from two stitches at one point on edge of wound. Redressed.

21st. Pulse good strength; dressings moderately saturated with bile, yellow in centre, green at edges. General condition not affected by operation; bowels tympanitic and confined; nose bled slightly; vomited blood afterwards.

22d. Quite comfortable except some hiccough; tympany still marked; dressing moderately wet with green and yellow bile; no pus; lower edge of wound found exposed by dressing being disarranged, but it was dry and apparently firmly united; no fever, temp. 99.2° . As bowels still confined, ordered ol. ricini by enema, and small doses of calomel every two hours. Redressed.

23d. No fever; temp. 99.2° ; pulse 90, strong. Very uncomfortable from tympany; a small passage from enema lessened it slightly. Has vomited considerably when he takes food; hiccough occasionally; skin lighter color; biliary discharge more profuse; dressings saturated, yellow-brown in centre, green at edges. Wound looks well; no inflammatory redness; edges dry, except from biliary discharge mixed with some probably disintegrating blood, etc., from interior of gall-bladder; drainage tube free, but bladder somewhat filled with blood. Ordered to stop food by mouth and to take milk and brandy by rectum; 10 grains calomel and a pill of ext. colocynth, aloes, and ext. hyoscyamus by mouth, and a little iced champagne.

24th. Removed tubing for a few minutes and probed five inches into the gall-bladder. It seemed to be very much contracted in diameter, as compared with its size at time of operation. No stone found. His color is lighter; bowels slightly moved once; tympany very great. To take ox-gall and the purgative pills, and a high injection with turpentine and assafoetida. Had not vomited for twenty-four

hours, and hence to be fed by mouth frequently in small quantities.

25th. Wound appears in healthy condition. Dressing stained with blood and saturated in places with bile; no evidence of suppuration; abdomen still tympanitic. No sutures removed. Rise in temperature, last night 101° , to-day 12 M. 102° . Localized tenderness on pressure over lower abdomen not so marked as yesterday.

26th. Slight hemorrhage from wound during night; wound looked healthy this A. M. Patient has been sinking steadily since last night. Died at 12.30 P. M. of exhaustion.

Post-mortem by Dr. William E. Hughes (present, Dr. Musser, Dr. Hamill, and Mr. Dock), six hours after death. Rigor mortis well marked; tissues all bile-stained; subcutaneous fat lost to a great extent; internal organs partially undergoing decomposition. Brain not examined. *Thorax*: Heart muscle stained with bile pigment, soft, and had the appearance of fatty degeneration. Lungs oedematous posteriorly; a few adhesions between pericardium and lung, and pleuritic adhesions on right side behind. Glands in lower anterior part of thorax enlarged. *Abdominal cavity*: Intestine distended with gas; dark-colored; a small amount of ascitic fluid in peritoneal cavity; perfect adhesion of gall-bladder to abdominal wall, and perfect union of wound; some slight traces of lymph on transverse colon; about two ounces of recently-clotted blood in folds of gastro-colic omentum, red in centre, dark on periphery, and firm. Liver: Firmly adherent to diaphragm all over right and partly over left lobe; one and a half times natural size, occupying the position defined in life; color dark bottle-green. Gall-bladder about as large as the fist, with thickened walls and inflamed mucous coat, and containing bile. Ducts: Cystic dilated, almost thickness of lead pencil; at junction with gall bladder there seemed to be a honeycombed projection of the mucous membrane, thereby occluding the duct. Common duct enlarged, walls thickened, calibre increased enough to

admit forefinger at cystic duct, and at duodenum the thumb; walls thickened, mucous membrane inflamed; orifice impervious to blowpipe and to liquid; a small probe was forced through with some difficulty from the duodenum; the mouth of this, in common with the pancreatic duct, presented a knob-like projection a little larger than a split pea, on the mucous membrane of the duodenum, the walls of which were thickened; there was no evidence of ulceration or cicatrix. The hepatic ducts were dilated and inflamed in their ramifications through the liver, some terminating in blind pouches. In the periphery of the left lobe of the liver there were several retention cysts, the size of a filbert, filled with pus and bile; the tissue of the liver was very soft, olive-green colour, and had the appearance of disintegration; glands in fissure not enlarged; pancreas was normal, ducts dilated, and containing pancreatic fluid. The dilatation of the pancreatic duct was remarkable. The main duct was larger than the forefinger, while its subdivisions far into the gland were also enlarged. Stomach: Dilated, mucous membrane mammillated, and covered in some places with mucus; contents were blood and the liquids which had been administered. Duodenum: Mucous membrane thickened, swollen, appeared as if inflamed, although the rapid post-mortem changes made it difficult to discern ecchymosis or congestions. This appearance of the duodenum explained perfectly the reason of the obstruction at the mouth of the ducts. Kidneys: Enlarged, capsule readily removed; on section presented a slightly granular and mottled appearance. Spleen slightly enlarged. Microscopical examination of the liver tissue impossible, as decomposition had advanced too far.

Remarks.—When the patient first presented himself for treatment at the Medical Dispensary of the University Hospital the diagnosis of chronic catarrhal jaundice was made, based on the following reasons

given to the dispensary class. In the first place gallstones were excluded on account of the age, sex, and habits of the patient, the absence of a tendency in the family to biliary colic, the absence of attacks of jaundice previous to this decided attack, the absence of true biliary colic, and the persistence of the jaundice. For almost similar reasons the presence of any other foreign body in the ducts was eliminated. Next, all causes of jaundice from pressure on the exterior of the ducts, as, for example, by carcinoma of the liver and other organs, were excluded on account of the absence of any physical signs of such disease, of any alterations in the function of these organs, and of any pressure symptoms produced thereby. Finally, in considering the causes of jaundice from disease of the duct walls, an adhesive inflammation of the mucous surfaces, the contraction of the cicatrix of a healed ulcer or of the adhesions of a peri-hepatitis, were excluded especially because there was nothing in the history to show that there had ever been such a pathological occurrence. It was obvious that the jaundice was due to inflammatory swelling of the duodenum or of the duct, because of the age and the habits of the man, his frequent exposure, his hurried, irregular, and enormous meals; the acute attack primarily; the continuance of gastro-intestinal dyspepsia; the persistence of the jaundice; the comparatively little emaciation; the slight and uniform enlargement of the liver; the heaviness and tightness in the epigastrium without pain, and the slight tenderness. The only symptom that did not make the diagnosis absolute was the occurrence of the diarrhœa.

It was remarked at the time that this complaint (diarrhœa) might be due to pancreatic disease—possibly malignant, with pressure on the biliary ducts. The autopsy proved, in part, the truthfulness of the supposition—the pancreas was affected from obstruction of its duct. The stools were not examined for fat.

The second time the patient was under observation, the anomalous symptoms of hectic and the severe pain rather made the first diagnosis uncertain. It was feared that there might be an impacted calculus setting up ulcerative inflammation of the ducts. No absolute cause could be fixed upon, and it was only definitely known that we had to deal with a case of obstruction, causing jaundice and enlargement of the gall-bladder; that on account of these three conditions, rigors and fevers, hemorrhages, and extreme exhaustion were produced; that all medical treatment was futile and that operative measures were justifiable.

The case merits two more remarks: First, from the occurrence of the diarrhœa and intestinal indigestion, as shown by flatulence and colicky pains several hours after eating, could we not localize the lesion in the hepatic duct? If they had been absent, then the lesion was in the duct beyond or internal to the junction of the common and pancreatic duct. Then, it is of importance to call attention to the results of blood-cell counting, aside from physiological or pathological reasons. No note is made in the clinical history of the case. The count made with a Mallassez instrument showed there were 4,350,000 red and

200,000 white cells to a cubic millimetre, or 1 white to 22 red. An increase in the white cells is thus noted, while the red corpuscles were small, crenated, and shrivelled. This is the all-potent factor in the causation of the hemorrhages, and a resort to a numerical estimate of the richness of the blood and to the size of the cells, might prevent an operation, which, if resorted to, might be fatal in all probability from hemorrhage.

Finally, the diverse character of the fluids evacuated is worthy of notice. Rokitansky says that in dilatation of the biliary passages and enlargement of the gall-bladder, a marked twist of the cystic duct takes place so that an acute angle is formed. On account of this, communication between the gall-bladder and the common duct is cut off, hence it was that the viscid serum of the former was not mingled with the bile and pus from the latter.

The following tables are made to include two classes of cases, viz: First, those in which the abdominal cavity alone was opened in order to relieve biliary obstruction; second, those in which cholecystotomy, properly so called, was done. Cases are not included in which the tumor, due to obstruction, was treated as an ordinary abscess, by cataplasms and free incision, with or without previous provocation of adhesions. Nor are any of the many reported cases of aspiration of the gall-bladder included in the analysis. The purpose of the table is to show the nature of the diseases and the results of treatment when abdominal section was systematically performed.

M. Morand, a contemporary of Petit, reports two

cases of tumor of the gall-bladder treated by opening of the abdominal wall.¹ He believes the proper mode of treatment is, to incise the belly wall and then allow the evacuation of the tumor to nature, encouraging it by poultices. Such cases are not included in the table. They are mentioned to show the difference between his method and the more common one, that is to open the tumor by free incisions which include the abdominal wall and gall-bladder. There are very many such cases on record, some of which will be referred to by Dr. Keen. Of such nature are those of Burke (*N. Y. Med. Rec.*, Nov. 10, 1883), reported as cases of cholecystotomy.

¹ Observations sur des Tumeurs à la vesicle du fiel. Par M. Morand, Mémoires de l'Académie Royale de Chir. Paris, 1758, iii.

TABLE I.—*Cases in which the abdominal*

No.	Date.	Reporter.	Source.	Sex	Age	Remote cause.	Condition at time of operation. General and special.	Duration. Present disease
1	June 29, 1870	Hughes,	Cin. Lancet and Clinic, 1879-80, N. S., iii. 147.	F.	47	Gall-stones; duration only 2½ mos., to acute pain accom- panying menses, not explicit.	Tumor, "hard and painful, reaching far down below float- ing ribs;" "feeling like en- largement and induration of liver." (No jaundice.)	7 weeks.
2	Jan. 22, 1878	Brown,	Brit. Med. Journ., 1878, ii. 916.	F.	45	Gall stones; "Angular gall- stones in cystic duct;" history for 6 years of hepatic colic.	Tumor in right hypochondri- um, not lessened in size by drawing off f3vi bloody pos. General condition very bad; falling for 3 months; no jaun- dice; bile in stools all the time.	1 year; tumor slowly in- creasing in size.
3	Feb. 4, 1878	Blodgett,	Homœopath. Times, N. Y., 1879-80, vii. 83.	M.	?	"Cancerous disease of pan- creas involving gall-duct."	Cholemic intoxication-coma at time of operation.	Under ob- servation 2 months.
4	May 3, 1882	Musser and Keen,	Amer. Journ. Med. Sci., Oct. 1884, p. 333, and Trans. Coll. Phys., Phila. 1884.	M.	34	Gall-stones; subject to at- tacks for 5 yrs.	No perceptible tumor of gall- bladder. Dulness from xiphoid to level of 9th rib. Gall-bladder and colon had become imbed- ded in a mass of inflam. materi- al. Patient deeply jaundiced and much emaciated—danger- ously so.	Jaundice 9 months.

TABLE II.—*Cases of*

No.	Date.	Reporter.	Source.	Sex	Age	Remote cause.	Condition at time of operation. General and special.	Duration. Present disease.
5	June 15, 1867	Bobbs,	Tr. Ind. State Med. Soc., 1868, p. 63-73.	F.	30	Gall-stone in cystic duct; his- tory 4 years' du- ration.	Tumor on right side 4 years; growing rapidly for 6 months; "anæmic and sallow" (no jaundice).	4 years.
6	Apr. 18, 1878	Sims,	Brit. Med. Journ., 1878, i. 811.	F.	45	Gall-stones. For 1 year prior to last illness felt pain in hep. region on stoop- ing.	Tumor in right hypochondrium. Jaundice. On March 17 aspira- ted and drew off 32 oz. dark, brown fluid, but no bile. April 19 same size. Emaciated, feeble, unable to eat or sleep.	Jaundice 6 months; tumor 4 months.
7	June, 1878	Kocher,	Cor-Bl. fur Schweiz. Aerzte, Basle, 1879, viii. 577-583.	F.	30	Gall-stones.	Supposed to have an ovarian cyst. The suspected tumor distended abdomen on right side, moved with respiration; movable on palpation, and smooth. Hepatic colic, two at- tacks. On aspiration a fluid color of pus, but only detritus and fat shown with microscope.	.....

Cavity, but not the Gall-bladder, was opened.

Diagnosis.	Condition shown by operation, etc.	Operative procedure.	Result.	Cause of death.	Remarks.
Tumor became so soft he thought it had suppurated, and explored with hypodermic needle.	Suppurative inflammation of gall-bladder; probable closure of cystic duct.	After exploring with needle opened with abscess lancet, and evacuated vi. oz. of pus, and in 2-3 days a gall-stone.	Pus was discharged for a few days, and wound closed; opened July 6, and spontaneously in Sept. Ultimate recovery.	.....	Adhesions of gall-bladder to abdominal wall.
Not positive, but in favor of enlarged gall-bladder.	Distension of gall-bladder from closure of cystic duct caused by impacted stone; "pericystic abscess" which was aspirated Jan. 6.	Incision through abd. walls; found tumor to left of umbilicus, that aspirated being from an abscess in omentum; became alarmed and sewed up wound. Next day "something burst, and 1 pint of bilious fluid escaped."	Walked out in 1 mo. but 1 wk. later the tumor formed again, and opened externally. Well in 3 months.		
Distension of gall-bladder from causes named.	No information as to gall-bladder (see "Remote Cause") except that aspiration evacuated "iv. oz. thick, brown fluid."	Having aspirated twice, cut down, emptied gall-bladder without incising it, and fastened to abdominal walls; some union.	Death on 3d day.	Exhaustion and cholæmia.	Very imperfectly reported.
Impacted calculus.	Gall-bladder could not be found, but thought to be included in a mass of inflam. material between colon and liver; no gall-stone could be found.	Abdomen opened, but the condition being as described in preceding columns, it was closed up. Hemorrhage marked all the time, and threatening death sometimes.	Recovery after two months of slow and uncertain convalescence	.....	Repeated hemorrhages.

Cholecystotomy, properly so called.

Diagnosis.	Condition shown by operation, etc.	Operative procedure.	Result.	Cause of death.	Remarks.
None. The operation was largely exploratory, and at desire of patient.	Cystic duct closed by a stone. Gall-bladder distended with pellucid fluid and containing 50 small, round, polished stones.	Incision through abd. wall, and then opening sac. Wound in gall-bladder closed by a stitch and not attached to abdom. wall.	Recovery. Out in 4 weeks; in 10 mos. no return of tumor, but pain noted sometimes.		Gall-bladder adherent to omentum.
In favor of distended gall-bladder.	"Much enlarged and walls thickened; 24 oz. fluid and 66 stones removed at operation. 16 stones after death; sacculated ducts all dilated, common open."	Cholecystotomy. After cutting off part of gall-bladder sewed it to abd. walls forming a fistula. Hemorrhagic tendency extreme.	Death on 9th day.	Exhaustion and hemorrhage.	First case of intentional cholecystotomy.
At first ovarian cysts or floating kidney. After aspiration "empyema of gall bladder."	Gall-bladder dilated size of man's head, wall 1 cm. thick. Contained pus and 32 stones. Supposed that cystic duct was closed.	Cholecystotomy. Formation of fistula, was dilated, more stones removed, and closed. No bile at any time.	Recovery in 5 weeks.	.....	First successful case.

TABLE II.—

No.	Date.	Reporter.	Source.	Sex	Age	Remote cause.	Condition at time of operation. General and special.	Duration. Pre-ent disease.
8	Nov. 4, 1878	Keen,	Am. Journ. Med. Sci., Jan. and April, 1879.	F.	60	Mechanical oc- clusion of com- mon duct.	Tumor 5½ in. in diam., filling its half of belly. Jaundice. Emaciated, anorexia, vomiting, constipation, itching, xanthop- sia.	Dull pain 7 months; Jaundice 4½ mos.; tumor 2 weeks.
9	Aug. 23, 1879	Tait,	Lancet, 1879, ii. 730, and Med. Chir. Trans., xliii. p. 17, 1880.	F.	40	Gall-stones. History 1 year.	Heart-shaped, movable, firm, elastic tumor, without fluctu- ation; tender. Emaciated, feeble; anorexia, headache, cachectic appearance.	Pain in right side 1 year; tumor 11 mos.
10	May 3, 1883	Ransohoff,	Med. Rec., N. Y., 1882; xxii. 258.	M.	76	Gall-stone. No history of it, except vague pain 5 years before.	Tumor of gall-bladder, size of fst, movable. Patient weak, defected, has no appetite, lost 50 lbs. Jaundice 6 months.	Jaundice 6 months.
11	?	Tait,	Brit. Med. Journ., May, 3, 1884.	..	..	.....	.....	.....
12	June 15, 1882	Tait,	Brit. Med. Journ., Nov. 18, 1882, p. 990.	F.	28	Gall-stones. History since puberty.	Tumor in right hypochon. for more than 2 yrs. No jaundice. "Patient very much reduced."	2 years.
13	July 15, 1882	Langenbuch,	Berlin. klin. Woch., 1882, xix. 725.	M.	43	Gall-stones.	Subject to biliary colic for 6 yrs. with icterus and sometimes a tumor; for last 9 mos. attacks every day. Lost ½ of body weight; depressed; failing rap- idly. Jaundice.	6 years.
14	1882	Winiwarter,	Prag. med. Woch., No. 21, 1882.	M.	34	Closure of cystic duct caused by what was supposed to be perityphilitis.	Tumor occupying right half of abd. cavity. Patient slightly jaundiced, fair appetite, lost flesh.	.....
15	Oct. 13, 1882	Tait,	Brit. Med. Journ., Feb. 17, 1883.	F.	37	Gall-stones. Intermittent at- tacks of colic. (No note as to duration.)	Tumor in position of gall-blad- der.	"Some weeks."
16	Apr. 20, 1883	S. W. Gross,	Med. News, Phila., June 9, 1883.	F.	59	Gall-stones.	Nothing abnormal detected un- til at an operation for nephrec- tomy on account of sarcoma.	.....
17	June 19, 1883	Musser and Keen,	Amer. Journ. Med. Sci., Oct. 1884, p. 333, and Trans. Coll. Phys., Phila., 1884.	M.	31	Gastro-duode- nal catarrh for 8 months.	Tumor in region of gall-blad- der. Patient weak, emaciated, icterus intense, tympanitic ab- domen.	8 months; tumor 5 weeks.
18	Oct. 31, 1883	Gardner and colleagues,	Austr. Med. Journ., 1884, N. S., vi.	F.	38	Gall-stones during 3½ mos.	Pain, tenderness, tumor right iliac, first third lumbar and hypogastric region, emaciat'n, anæmia, dragging pain in tu- mor, fluctuation; on aspira- tion, pus. No jaundice; saffron urine and pipe-clay stools.	3½ mos. (?)

Continued.

Diagnosis.	Condition shown by operation, etc.	Operative procedure.	Result.	Cause of death.	Remarks.
Obstruction of gall-duct, based on aspiration.	Gall-bladder moderately thickened, and contained remnants of bile and blood. Cystic duct not distended. Hepatic disintegration.	Cholecystotomy, formation of fistula. Hemorrhage and shock.	Death in 36 hours.	"Hemorrhage and exhaustion" and shock.	
"No diagnosis attempted, and opening agreed upon."	Gall-bladder distended with white, starchy-looking fluid, and containing 2 large stones, one loose, and the other impacted in entrance of duct.	Cholecystotomy. Formation of fistula. Wound healed Sept. 9, 1879. Patient went home well in 5 wks.	Recovery.		
Gall-stone impaction, based on exploring with aspiration needle.	Gall-bladder distended with 8 oz. of a light green fluid, containing 4 stones, one impacted. No post-mortem.	Cholecystotomy. Formation of fistula; emptying gall-bladder of fluid and stones	Death in 26 hrs. though he reacted well after the operation.	Failure of heart's action	Gall-stone sought and distinctly felt by trocar at aspiration.
.....	.....	Cholecystotomy.	Recovery.		
"Gall-bladder distended on account of impacted calculi."	Gall-bladder contained a pint of glairy mucus, and 80 stones, largest weighing 15 grs.	Cholecystotomy. Formation of fistula, which was established perfectly in 30 dys	Recovery, Aug. 5 clear bile flowed from fistula		
"Cholelithiasis."	Gall-bladder not inflamed, but somewhat thickened; moderately distended; 2 small calculi.	Cholecystotomy. Cystic duct tied with silk, and bladder dissected away. Some hemorrhage.	Recovery. Up in 12 days.		
"Dilatation of gall-bladder by obstruction of bile duct" after evacuating 2 litres of bilious fluid.	Gall-bladder dilated, but condition of common duct not made out.	After tapping several times opened abdomen, punctured gall-bladder, fixed it to colon, and that to abd. wall. Five mos. later fastened a loop of small intestine around gall-bladder, and opened with bistoury.	Recovery, though an accidental opening of large intestine resulted in an artificial anus. Fistula healed.	.....	Anterior surface of gall-bladder adherent to peritoneum and transverse meso-colon.
"Distended gall-bladder"	Gall-bladder contained 16 stones varying from 7 to 35 grs. in weight.	Cholecystotomy.	Recovery; wound healed by 11th day.		
None. See present condition.	Gall-bladder distended and contained 1 stone.	Partial cholecystotomy.	Death.	Peritonitis and suppression of urine.	
Distension due to impacted calculus or inflammatory swelling of lining membrane of ducts, based on exploratory puncture two days before operation.	Gall-bladder containing 12 oz. muco-pus. Occlusion of common duct at duodenal opening.	Cholecystotomy. Formation of fistula. Reacted well from operation.	Death.	Exhaustion, inanition, and hemorrhage.	Autopsy:—Gastro-duodenal catarrh. Closure of mouth of duct. choled. Dilatation & inflammation of all ducts & gall-bladder. Retention cysts. Liver disintegrated.
?	Gall-bladder contained pus and 114 grs. weight of biliary calculi. Probable closure of cystic duct. Not probed.	Cholecystotomy. Wound healed in 12 days; some small sinuses which discharged glairy, light green exudation.	Recovery.		

TABLE II.—

No.	Date.	Reporter.	Source.	Sex	Age	Remote cause.	Condition at time of operation. General and special.	Duration. Present disease.
19	Oct. 31, 1882	Eddowes,	Brit. Med. Journ., May 1, 1884.	F.	53	?	Tumor upper half abdomen, dull in front, clear resonance on side during 7 yrs.; last $\frac{1}{2}$ yr. grew rapidly.	7 years.
20	1883	Savage,	Brit. Med. Journ., Mar. 8, 1884.	M.	ad.	Gall-stones.	Tumor when aspirated dis- charged first $\frac{1}{2}$ colorless vis- cid fluid, last $\frac{1}{2}$ bile.	.....
21 to 29	1882 and later.	Tait,	Brit. Med. Journ., May 3, and July 12, 1884.	..	..	.....	.....	.....
30	?	Tait,	Brit. Med. Journ., May 3, 1884.	..	..	.....	.....	.....
31 to 35	?	Tait,	Brit. Med. Journ., May 3, 1884.	..	..	.....	.....	.....

NOTE.—Case 11 has not been reported in detail by Mr. Tait, but is included in his general statement as to his 13 cases, all successful. Cases 21 to 35 are derived from the same source. In a private letter, he states that Case 30 he personally knew of, but it had not yet been reported by the operator, and that Cases 31 to 35 "are scattered through various publications of series of abdominal section."

MEDICAL COMMENTS BY DR. MUSSER.—The most striking feature of the above tables is the wonderfully successful results of operative interference. As is shown, but ten deaths occurred in thirty-five cases. The fatal case of Gross should, however, be excluded from the calculation, as it was merely an incident in a more serious operation.

When the conditions of the nine remaining cases of fatal issue are studied, this termination is not to be wondered at. Most of those of which we have exact details were exhausted by long suffering, and all of them presented evidence of grave organic disease or toxæmia at the time of operation. A study of the cause of death in these instances is important. Excluding the case of Gross, and the three in which the gall-bladder was extirpated, of which we have no details, exhaustion was one of the causes in every

Continued.

Diagnosis.	Condition shown by operation, etc.	Operative procedure.	Result.	Cause of death.	Remarks.
Cyst attached to liver above free at lower border, and containing fluid.	Contents not noted. Bile in discharge on 4th day.	Opened abdom. wall, tapped gall-bladder, and then enlarged the opening into it.	Recovery.		
Hydatid.	Tumor size of cocoa-nut; 14 gall-stones removed.	Cholecystotomy.	Recovery.		
.....	.....	Cholecystotomy. In one case a second operation at which a stone left in duct was crushed by padded forceps without opening the duct.	Recovery.	.....	Cases all grouped in a general "note on cholecystotomy."
.....	.....	Cholecystotomy. Gall-bladder closed by continuous suture and not attached to abdominal walls.	Death.	Probably escape of bile into abdominal cavity.	Operator unknown.
.....	.....	Cholecystotomy. Gall-bladder extirpated.	3 deaths. 2 recoveries.	?	Operators unknown.

NOTE.—The formation of this table was rendered less difficult by the use of an elaborate one by Dr. George Dock, Resident Physician elect of St. Mary's Hospital, who was engaged in an investigation on the operative measures for the relief of biliary calculi. The writers desire to express their acknowledgments.

instance. Hemorrhage was noted in three instances, cholæmia in one. In no instance was either of these causes due to operative interference, but they were the necessary sequence of the original disorder, and were conditions preventable by earlier interference. Nothing need be said of exhaustion: of hemorrhage it is distinctly shown in the reports of the cases that it was due to the lowered vitality of the blood, caused by the biliary salts.

The autopsies of the few cases on which they were known to be held showed that the liver tissue had undergone such degenerative changes as were incompatible with life—conditions undoubtedly present before the operation. The lesson, therefore, to be learned from the causes of death and the structural changes of the liver, is not to abstain from operating, but to operate in the early progress of the case.

Especially is this conclusion forced upon us when we consider the favorable results our table indicates, and the remarkably brilliant results of Tait, who has not lost one case of the thirteen he operated on.

These conclusions become convictions when the great risks and absolute dangers of biliary obstruction are remembered—dangers arising from exhaustion and toxæmia, risks of rupture, of suppuration, and of ulceration of the biliary passages, and, if caused by a gall-stone, of its passage into various parts of the body. It may be said and truly, that there are many cases, for instance, of gall-stones that terminate favorably even though the patient be seriously ill. But this may be said also, that it is impossible to tell which case will have such fortunate ending, and therefore why wait and take such grave chances?

If it be determined that there are cases of obstruction to the flow of bile which can be relieved by operative measures, and if such an operation be considered justifiable, it is important to indicate the proper cases and the mode of recognizing them. The following pages are intended to be a contribution to these questions.

There are four pronounced conditions which are dangerous sequences of biliary obstruction, and which may be looked upon as operative indications. They are *jaundice*, a *tumor* in the right hypochondrium, presumably an enlarged gall-bladder, *frequently recurring paroxysmal pain*, and symptoms of *suppuration*. Practically these are the symptoms or sequences of biliary calculus, and therefore it may be said that, to consider that affection and lay down rules for its recognition would suffice, especially as in most of the

tabulated cases gall-stones were the primary cause. But then they are also symptoms of other forms of obstruction, some of which are removable by operative measures. It seems, therefore, proper to study the conditions separately, considering gall-stones in connection with each one of the above conditions.

One of the most distinctive evidences of obstruction is jaundice; and at once the nature of it must be determined. Is it jaundice by suppression so-called or jaundice by obstruction? But two of the writers quoted in the table considered this question—Sims and Keen. Both of them laid great stress upon the value of itching, which occurred in their cases, as a symptom of the obstructive variety. The former considered it a pathognomonic symptom of this form and not due to the jaundice, but being a reflex nervous symptom due to the over-distension of the gall-bladder. We think this is making too strong and absolute a case, for itching often occurs in jaundice without over-distension of the bile reservoir, while it may be absent when this reservoir is enormously distended without jaundice. Again, why should not the same symptom occur when other hollow organs or cysts are over-distended? Some important facts concerning jaundice may be gained by further study of our table.

This symptom was stated to be present in but seven cases. The average age of these patients was a fraction over forty-six years; five were males, two females; the duration of the jaundice (when given) was over four and one-half months; enlarged gall-bladder was present six times; a distinct history of gall-stones in four cases; of cancer of the pancreas, of occlusion

by lymph externally, and of catarrhal jaundice, in one each; while cholæmia was noted in only one. The variety of jaundice by suppression most likely to have been confounded with any of the above cases is that due to acute yellow atrophy of the liver. But the persons liable to this disease are generally under thirty and females, while pregnancy, nervous influences, low fevers, phosphorus poisoning, etc., are the exciting causes—conditions and circumstances not revealed by the above analysis. In not one of the seven cases were any of the other causes of this form of jaundice present, viz: Mental emotion, cerebral injury, the poisons of the various fevers, pyæmia, snake-bite, and the mineral poisons. Comparing further, we find enlargement of the gall-bladder in seven cases, a condition impossible in jaundice by suppression.¹

To recapitulate, we may say that the varieties of jaundice may be differentiated, in a measure, by a consideration of the age and sex of the patient, the cause and the duration of the disease, the intensity of the jaundice, and the presence or absence of itching; more definitely, however, by the occurrence of leucin and tyrosin in the urine and the diminution of the urea; still more positively by the study in addition

¹ It is well known that in the later stages of cirrhosis, jaundice, the pathology of which is probably the same as in acute yellow atrophy, often occurs. It is slight, gradual in onset, without pain, but with ascites. (Murchison.) The writer had a case of cirrhosis and obstruction of the bile-duct, from adhesive inflammation, which presented symptoms during life of the organic change—ascites, enlarged veins, etc., with an *intense* jaundice and paroxysmal pain. The latter symptoms, differing from those which Murchison notes and being the most marked, might have led to operative interference. This combination must be remembered and ascites noted as the evidence of grave organic change.

of the anatomical changes in the liver, the biliary passages, and the surrounding organs. If the liver be atrophied, jaundice by suppression is probable; if enlarged, by obstruction. If the gall-bladder be enlarged, obstruction. If anatomical changes in the stomach, duodenum, pancreas, lymphatic glands, bloodvessels, etc., be present, the jaundice is in all probability obstructive.

Obstructive Jaundice.—There are some organic diseases of the liver which give rise to jaundice, the mechanism of which is no doubt obstructive, which should be distinguished from other forms of obstructive jaundice, for, save in one instance, operative measures are not to be considered in those cases. Reference is made to cirrhosis, atrophic and hypertrophic, to carcinoma, to abscesses, simple and multiple, to hydatid disease, simple and multiform, and to amyloid disease. When discussing the second indication for operative measures, tumor, simple abscess, and hydatid disease will be considered. Amyloid disease and carcinoma will be referred to later; cirrhosis and multiple abscess remain. The atrophic variety of cirrhosis is easy to recognize by its well-known symptoms, save in the exception noted in a previous foot-note. Not so the so-called hypertrophic. The jaundice is intense, the liver enlarged and smooth, ascites is absent, paroxysmal pains occur and irregular fever is present.¹ In other forms of obstruction the liver is not so large, the gall-bladder is enlarged, while a distinct cause for the jaundice, as a tumor, may be discovered. Regarding multiple abscess Dr.

¹ See Path. Soc. Trans. Phila., 1877-78. Am. Journ. Med. Sci., July, 1884.

Carrington¹ analyzes a series of cases and shows that the following group of symptoms portray the disease. The patient is extremely ill, and the "illness appears to be abdominal," with evidences of local or general peritonitis; he is emaciated; his abdomen is distended and the seat of pain; the liver is enlarged, painful, and tender; vomiting is frequent; diarrhoea or constipation occurs in an equal proportion of cases; jaundice in one-third of all cases; the temperature is irregularly febrile; rigors occasionally; the pulse and respiration are hurried. The cause of these abscesses is either the occurrence of an ulceration at some point in the area of the portal circulation or prolonged obstruction to the flow of bile, the condition that arose in the second of our cases. In no case was there a tumor of any kind. There is no one sign or symptom pathognomonic of this disease, and it can be inferred only by the previous history of the patient with the grouping of the detailed symptoms. The presence of such symptoms, even though indications of biliary obstruction be present, would make an operation for the relief of the latter hazardous, almost unjustifiable.

The diagnosis of obstructive jaundice having been determined and the presence of irremediable hepatic disease eliminated, it is next important to define the nature of the obstruction, for only some varieties would admit of interference. Recurring to the tabulation,² we find of seventeen cases, gall-stones caused the obstruction in thirteen of them; cancer of the

¹ Guy's Hospital Reports, 1882.

² Any numerical estimate is necessarily only tentative, since details of many of the cases (especially Mr. Tait's) are wanting.

pancreas, peri-hepatitis, and gastro-duodenal catarrh in one each; and one was doubtful. This proportion is probably the proper one. It is not within the province of this paper to discuss in full all the forms of obstructive jaundice, and their differential diagnosis. The following remarks are suggestive of cause and conditions that may arise and of a few methods of diagnosis.

The causes in general of stenosis of the bile-ducts are three:—

1. Foreign bodies within the ducts (gall-stones, parasites, etc.).
2. Diseases of the walls of the ducts (*a.* Congenital; *b.* Adhesive inflammation or cicatrization of ulcers; *c.* Peri-hepatitis).
3. Tumors, etc., external to the ducts.

1. *Foreign Bodies.*—If due to *worms* they may be recognized by the age of the patient, and the presence of the parasite in the ejecta. Their presence is indicated by an attack of hepatic colic; an absolute diagnosis cannot, and practically it need not, be made. Not so *hydatid cysts* bursting into the bile-ducts, with symptoms of hepatic colic. The diagnosis can be more readily made in this instance: first, by the previous history and physical signs of an hydatid tumor; second, by the disappearance of the tumor after the colic; third, by the subsequent occurrence of fever and local inflammation; lastly, the appearance of sacs or hooklets in the vomited or aspirated matter.

Gall-stones.—It is of the utmost importance to determine the presence of biliary calculi; for of twenty-one tabulated cases they were present in six-

teen, causing obstruction or otherwise endangering life. In most of the others, also, they were undoubtedly present. The differentiation of them is sometimes very difficult, and in fact often impossible. The varying symptoms of cholelithiasis are so many that it is not possible to name one of them, or to present a group of them, for the purpose of making a diagnosis, without being able to give an exception to each and every one. The only absolutely definite sign is to see or feel the calculus. If one has been passed by the rectum, it probably was the cause of obstruction; if it have facets on, a fellow may be the cause.¹ If not detected in the stool, exploration of the gall-bladder must be resorted to, either by opening the abdominal cavity, or, as successfully practised by Whitaker, the insertion of long needles into the viscus.² Martin-Solon (*Jour. des Conn. Med.-Chir.*, Paris, 1849, xxxiii.) reports a case in which the stones could be on palpation detected, if the patient took a forcible inspiration, the hand being on the gall-bladder. He considered it a new mode of diagnosis.

Aside from these positive methods, a correct conclusion cannot be arrived at without a study of the case in its entirety; the age and sex of the patient, the habits, the family history, the temperament, all are important to examine into. If these circumstances are favorable, and, in addition, the patient has had previous attacks of hepatic colic, *followed* by jaundice and the symptoms of duodenal catarrh; if constipation and putty-colored stools accompany the jaundice, the diagnosis is very probable. Then if, after impac-

¹ In cases of cancer of the gall-bladder and ducts, calculi are often passed.

² N. Y. Med. Record, 1882, i. 568.

tion has taken place, the nutrition of the patient remains good for a long time, the liver enlarges only slightly, while the gall-bladder increases in size, it is scarcely possible to name any other affection. Campbell (*Brooklyn Annals*) suggests that if, after aspiration of the gall-bladder, bilious stools are present, calculi are the cause of obstruction. The relief of the tension allows the stone to recede, and the bile to escape. Gall-stones, threatening life, without jaundice, will be treated of later.

2. *Diseases of the Ducts*.—1. Congenital closure. Jaundice in an infant, continuing over four weeks, with cholæmia supervening, is due most frequently to this circumstance. 2. Closure of the ducts by chronic catarrh of the duodenum, adhesive inflammation of the ducts, the healing of an ulcer in the duct or at the duodenal orifice, and by fibrous bands. The first may be recognized by exclusion, and the history of the cause of, and the attack of, catarrhal jaundice. The second case reported in this paper belongs to this category, and the reasons for the diagnosis in that case (see remarks under Case II.) appear to be ample for the diagnosis of any stenosis from a similar cause. Adhesive inflammation of the ducts is due either to the passage of biliary calculi or to a previous catarrh. The respective symptoms of the two must be considered in such case.

Ulcers in the bile-ducts are due to gall-stones or are secondary to the low fevers. In the former case, in addition to the symptoms of gall-stones, we have, accompanying the ulceration, irregular chills and fever and extreme exhaustion, conditions not likely to be present in the early stages, at least, of simple impac-

tion. If these symptoms of obstruction develop after such phenomena or after a low fever, the exciting cause is probably the healing of an ulcer in the ducts. The well-known symptoms of duodenal ulceration precede for a long time the symptoms of obstruction of the biliary passages due to the healing of the ulcer; while it may be said that the gall-bladder is enlarged under such circumstances, it is not necessarily so when the seat of ulceration is in the duct. Closure of the ducts by fibrous bands may be inferred, if the cause (as syphilis) and the symptoms indicate a peri-hepatitis, and if other evidence of old lymph be present, as atrophy of the liver or ascites, etc., due to pressure on the portal veins.

3. *Diseases external to the Ducts.*—1. Carcinoma and other neoplasms of the liver and surrounding organs. A diagnosis of this affection can be made by the exclusion of other causes of obstruction, by the presence of carcinoma elsewhere, if tumors or nodules and the physical signs on palpation, etc., be present, if the tumor preceded jaundice, if cachexia be present, if there be alterations of the functions of adjacent organs, and the presence of the symptoms of malignant disease of these organs, and finally by the duration of the disease, the stenosis from carcinomata being of shorter course than from other varieties. 2. Enlarged lymphatic glands. Obstruction from this cause is probable if there be elsewhere present any of the well-known causes of hypertrophy of these glands, as carcinoma, tuberculosis, amyloid disease, etc. Amyloid disease but rarely causes jaundice by any other way; its symptoms are too well known to be detailed in this paper. 3. Aneurism. This rare

form of obstruction may be recognized by the pressure-symptoms of a tumor located in the region of the duodenum and by the physical signs of aneurism.¹

The *second* indication for the performance of cholecystotomy is the presence of a *tumor*, presumably an enlarged gall-bladder, which is seriously imperilling the life of the patient. It is not so much that the tumor is serious as that the cause of it is serious; it is a sign of a harmful lesion. This enlargement is due to obstruction to the outflow of bile, to the retention of gall-stones, to inflammation of the walls of the bladder, to malignant disease of the walls. It was observed in eleven of the tabulated cases. The following account of the characters of such a tumor is based on the study of these cases and the conclusions of various authors.

Position and Size.—They varied very much in the thirteen cases in which they were recorded. Regarding position, it was said to be in the position of the gall-bladder (15),² in gall-bladder region (17), in right hypochondrium (12), to be a tumor of the gall-bladder (10), and to be in anterior upper half of abdomen (19).

The location differs with the age of its development; thus, early in one case, it was on the right side (5), or the position named; in another in the right iliac region (14). Late in the disease the position was more definitely defined, extending in one from the liver five and a half inches to the right iliac fossa, just inside the right ilium (5); from median line to the right flank, and from the liver to the groin in another (1); again, from lower border of liver to four inches below

¹ Frerichs, Dis. of the Liver. Von Schüppel in Ziemssen's Encyclopædia, vol. ix.

² The bracketed numbers refer to the number of the cases in the table.

it, the lateral border bounded by two lines, the upper from nipple line to spine of pubes, the lower from the same point to one-half inch to right of umbilicus (4); at lower border of liver in right hypochondrium continuous with the liver, extending below umbilicus 11 cm., and from linea alba to false ribs (6); median line to right flank, liver to groin (14). In the size there was considerable variation. It ranged from that of a hickory-nut (5) to that of a man's fist (10) or head (7); one was five and a half inches in diameter, and filled its half of the belly (8); one contained thirty-two ounces of fluid (6); another yielded six ounces, and did not change in size. In the main these facts agree with the teachings of authors on this subject, though some narrate more remarkable cases; thus the position and size have been so great as to distend the floating ribs on both sides (Coupland, *Dict. Pract. Med.*, ii. p. 4), or to fill almost the entire abdominal cavity, causing a diagnosis of ascites to be made (Benson. See Frerichs, *op. cit.*). Generally the tumor was evident to the naked eye. An area of resonance was often found between the liver and the tumor. It is important to bear in mind the point from which, and the direction toward which the tumor grew—in the right half of the abdomen toward the umbilicus, or into the right iliac fossa. Prof. Janeway¹ states that the gall-bladder is enlarged if it be situated under the free border of the ribs at a point where it is crossed by a line drawn from the point of the shoulder to the symphysis pubis. Then it is to be remembered that the gall-bladder is not so large when gall-stones or

¹ On the Diagnosis of Hepatic Affections. By Prof. E. G. Janeway, Sims's Am. Clin. Lectures, vol. iii., Nov. 1877.

carcinoma is the cause, nor when purulent rather than biliary fluid is confined in the cavity.

The Shape.—Most authors describe an enlargement of the gall-bladder as a pyriform,¹ or a semi-globular,² or globular³ tumor. In seven of the cases the tumor was described: as globular in two cases (8-10); in one oblong rounded (6); long oval (7); pyriform (2); reniform (12); heart-shaped (9); round (17); rounded irregularly (1).

Character of Tumor.—The following terms have been used to express the character of the tumor on palpation (numbers in parentheses show how often preceding term used): Hard or firm (5); elastic (3); tense (2); smooth (2); fluctuating (2); non-fluctuating (2), and soft (2); as to sensibility, painful (1) or tender (6); as to movement, seven were movable and two noted as rising and falling synchronously with respiratory movement. Collating the terms most frequently used, an enlargement of the gall-bladder may be said to be, in the majority of cases, movable, tender, firm, elastic, and fluctuating; on the other hand, it may have directly opposite qualities. If the gall-bladder be filled with calculi, or be the seat of malignant disease, its semblance would be far different from that presented when distended by fluid. Again, the character may change; hard at first, it may become soft; tense, it may fluctuate later. The detection of fluctuation is of extreme importance. The difficulty of detecting it is due to tension of the cyst, to tympanitis, and to fatty abdominal walls.

A further proof of a tumor in the right hypochon-

¹ Murchison and Von Schüppel.

² Frerichs.

³ Harley.

drium being an enlarged gall-bladder is in the fact that the intestine is never in front of the growth. Finally, an investigation into the nature of the contents of the tumor, if it be a hollow organ, yields the most definite facts for diagnosis. This knowledge is furnished by tapping, or by the introduction of long needles. The latter procedure has been mentioned before in this paper, and will be at once dismissed. The former is worthy of full discussion.

The contents of the gall-bladder vary much in character, as an analysis of eleven cases will show. The fluid described is generally that taken from the gall-bladder at the autopsy, and may differ from the fluid evacuated by an aspirator before any operative interference, as in Case 17. This fallacy must be noted; remembering it, we find that the contents were a glairy pellucid fluid in three of the cases; pus in two; and bile and blood, a light-green fluid, a thick brown fluid, a fluid and muco-pus in one each. When bile or bile-stained fluids are present, that the source is the gall-bladder is almost positive. But when the fluid is of a serous nature, a chemical analysis must be resorted to as well as in those cases the fluid of which appears to the eye like bile (Sims's case), the examination alone determining its character positively. In fine, in every case the analysis should be made. This was done in Sims's case, the first one of Keen's, and in one of the cases here recorded. The first contained no bile; the second contained a trace of bile acids and cholesterine; the third resembled serum in its reactions.¹ Even if the fluid contain no bile-

¹ In two unpublished cases of the writer a similar fluid was found, the one by tapping, the other at the autopsy.

elements it may still come from a distended gall-bladder whose duct is occluded so that no bile enters it, for after a certain time the bile that was at first present may disappear and be replaced by the mucoid secretion of the gall-bladder itself. Naturally this occurs especially frequent in prolonged cases. How rapidly this secretion may increase is shown by Sims's case, in which the gall-bladder increased 3 cm. each way in eight days, yet no bile was present in the fluid. Under these circumstances we would have to decide whether the fluid was from the peritoneal cavity—a general or localized effusion—or from the gall-bladder. Prof. Richardson tested fluids with fresh blood for Dr. Keen, and found that well-defined red corpuscles are destroyed in a fluid containing more than seven per cent. of bile. A similar test, Keen says, would be of value from a diagnostic point of view. The history of the case, together with the occurrence of fluid in other parts of the peritoneum, if localized, goes to make up the diagnosis. The absence of the well-known chemical and microscopical characters of a hydatid, renal, or ovarian cyst would exclude either of these.

To recapitulate, we may say that if a tumor be found in the right hypochondrium, pyriform or globular in shape, fluctuating, tense, or elastic, tender on pressure, movable, yielding a fluid on tapping containing bile elements, we may conclude positively that it is an enlarged gall-bladder. An enlarged gall-bladder may be found in other regions, as the lumbar, hypogastric, or iliac. The sac of a hernia contained the gall-bladder in one case. The nature

of the tumor in these cases would be determined by the history of the case and the results of tapping.

It may, however, be a tumor of the liver itself, of the stomach, duodenum, pancreas, or the lymphatic glands. When considering jaundice by obstruction, these conditions were discussed, and it is only necessary to say that the combined symptoms and signs then noted with a study of the tumor as above indicated will render a diagnosis possible. There were two conditions of the liver not mentioned, because jaundice rarely occurred in them, that must be distinguished from a tumor of the gall-bladder—abscess, and hydatid disease. If an abscess is suspected, the cause, the general and local symptoms, the absence of jaundice, the induration, and then the softening and fluctuation of the swelling should be present. The painless, slow course of hydatid disease, the broad base of the cyst, the fremitus and the results of tapping serve to render the recognition of this disease possible, if taken with the negative symptoms of enlargement of the gall-bladder. In multilocular hydatid disease, the tumor resembles a gall-bladder enlarged and containing gall-stones; like the latter, it is nodulated, hard and tender, but it is associated with early jaundice, ascites, an enlarged spleen, œdema of the legs, great emaciation and prostration, with rapid decline of the patient, conditions, excepting jaundice, not likely to be present in gall-stones.

In addition to the various conditions which have been mentioned, which are liable to be confounded with an enlarged gall-bladder, the following are yet

to be considered: floating kidney, and renal and ovarian tumors.

Floating Kidney.—One of the cases in the above table was diagnosticated as floating kidney. A similar case was under the writer's care, and there are others scattered through the literature of hepatic disease. If it be remembered that the enlarged gall-bladder is more movable at the lower than the upper portion, that one end is larger and more rounded than the other, that fluctuation may be present, that biliary symptoms are generally present, while the absolute sign of floating kidney, an abnormal area of resonance in the renal region, is absent, the mistake is not likely to be made. Tapping would also be invaluable as an aid.

Renal Tumors.—Sarcoma, hydro-nephrosis and pyo-nephrosis. In these diseases there are changes in the urine to call attention to them. These renal tumors at first always have the intestines in front of them; they are not influenced by respiratory movement or continuous with hepatic dulness; in hydro-nephrosis, a previous renal colic and possibly frequent discharges of urine followed by diminution in size of the tumor occur. These questions of diagnosis arose in the study of the case of Kocher, as did also that of ovarian tumor. He relied much on the results of exploratory puncture, as previously discussed. A connection between the tumor and the uterine appendages, and the seat of origin and direction of development of the growth, are the points in favor of ovarian tumor; in addition to which, if the fluid be characteristic, the diagnosis of such a tumor would be doubtless correct.

Having determined the presence of an enlarged gall-bladder, the next question to decide is the nature of this enlargement. The gall-bladder is enlarged on account of dilatation by bile, pus, serum, mucus, or calculi, or on account of carcinoma of its walls. Practically we need only decide if carcinoma be present. If secondary, this is not generally difficult; if primary, it is extremely so. Primary carcinoma occurs generally in the old and in females; it is generally preceded by attacks of biliary colic and accompanied with jaundice and vomiting, sharp localized pain, and all the symptoms of the cancerous cachexia. The tumor is hard and nodulated, not movable and not fluctuating.

The *third* indication for the performance of cholecystotomy is the occurrence of *severe pain* in the region of the gall-bladder, due presumably to a gall-stone. In order to prevent these attacks in persons disposed to the formation of biliary calculi, extirpation of the gall-bladder has been proposed and successfully performed.

Hepatic colic without jaundice occurs when the stone is confined in the bile reservoir or cystic duct. The recognition of gall-stones has been previously discussed. Pain, being the very distinctive symptom of this class of cases, must be distinguished from the pain of pleurodynia, intercostal neuralgia, gastralgia, renal and intestinal colic. The points of distinction are sufficiently obvious not to need detailing. A decided answer would be to find the stone by the long needles previously referred to. If the exit to the gall-bladder be entirely closed, a tumor will certainly form, the mode of recognition of which we have pre-

viously discussed. It is to be remembered that the aspiration of such a cyst would yield not bile, but a clear or colored fluid, the product of secretion from the walls of the gall-bladder.

Finally, cholecystotomy is clearly indicated in cases the symptoms of which are due to internal suppuration. Hectic endangering life may be from simple or multiple abscess of the liver, abscess of the gall-bladder, suppurative inflammation of the ducts and of the portal vein. The latter condition especially must be differentiated. Having the symptoms of jaundice, pain, enlargement of the liver, hectic and emaciation in common with the other inflammatory affections, we have to rely on the enlarged spleen and the discovery of the foci of inflammation to distinguish it. The tumor in the gall-bladder affections, and in abscess of the liver, is wanting in pylephlebitis. Excluding it, and also simple and multiple abscess of the liver by means indicated earlier in the paper, we have left the similar affection of the gall-bladder. The characters of the tumor have been dwelt upon; the surgical means, aspiration, spoken of, both of which, taken with the history of the case, aid one materially in the diagnosis. Withal it may be said, if pylephlebitis can be excluded, laparotomy at least should be performed in cases of suppuration dangerous to life. It is true there are cases of suppurative inflammation of the hepatic ducts that get well; rare are the cases, if any, of multiple abscess. Now, if the gall-bladder be opened and vent given to the discharges, it certainly gives the patient a very good chance of recovery. After a study of hepatic affections in their entirety, with the brilliant results

of surgical treatment shown by the tables, the conviction is forced upon one that the duty of the medical man is to observe with extreme minuteness the course of the affection, so as to be able to make a clear diagnosis, and above all not to postpone any attempts at surgical relief until pathological changes have taken place in the liver which are beyond repair. Many cases undoubtedly are lost by this fatal delay, our own among the number.

SURGICAL REMARKS BY DR. KEEN. *Diagnosis.*—The diagnosis from the medical point of view is fully discussed by Dr. Musser. The diagnosis by surgical means is made by 1, aspiration with or without exploration by a probe; and 2, by acupuncture.

1. Simple aspiration is not a wholly harmless method, as was proved by the first case I operated upon, in which considerable local peritonitis was lighted up (No. 8), and not a little hemorrhage was caused even by a hypodermic needle. But it is one of the slighter risks incident to the disease, and ought in our opinion always to precede any more serious operation, such as opening the abdomen. The light it throws upon the physical facts is too valuable to be neglected.

Combined with aspiration we may use a probe passed through the canula. Petit as early as 1733 (*Maladies-Chir.*, i. 282) proposed paracentesis and exploration by a sound, but his proposal was apparently forgotten till Bartholow, in 1876, actually used this method successfully. Brown (*Brit. Med. Jour.*, 1878, ii. 916) also apparently put it in practice. It should certainly be tried when an aspiration is done, but that it will not always give information to be

relied on implicitly is shown by Campbell (*Brooklyn Annals*, i. 87). No stone was found by the probe, yet the *post-mortem* showed that one existed in the common duct. Stones in the gall-bladder, however, could ordinarily be so discovered.

2. Acupuncture was first proposed by Whittaker of Cincinnati, and practised by him and Ransohoff (*N. Y. Med. Record*, 1882, i. 568), and more recently by Harley (*Med. Times* (London), May 17, 1884). Harley terms it "an easy and safe method of sounding for impacted gall-stones," and fails even to make mention of Whittaker and Ransohoff's much earlier proposal. That it is fairly "easy" both cases show, but that it is not "safe," except when very carefully and guardedly done, Harley's own case shows. After a short convalescence, due, it was believed, to dislodgment of the stone, and its escape into the duodenum (an assertion not proved, however, by finding the stone either during life or at the post-mortem), a fatal enteritis and peritonitis supervened. In both cases the Dieulafoy needle (or long French exploring trocar) was used. Whittaker and Ransohoff state that the gall-bladder was fixed by pressure from below, and the aspirator needle was introduced "just below the gall-bladder." At $4\frac{3}{4}$ " they detected the stone on two occasions, though it had to be searched for more than once the second time. Harley introduced it first fruitlessly "midway between the umbilicus and the liver margin $1\frac{1}{2}$ " to the right of the median line." On-re-inserting it 1" higher up and 2" from the median line the stone was struck at a depth of 6". On withdrawing the stylet its size and shape were estimated with the end of the canula to be those

of a hazelnut. From the point of puncture the instrument in both cases was pushed upwards and backwards "in the direction of the common duct," as nearly as could be judged—a rather vague statement.

We are not averse to exploratory punctures. They are, as Mr. Barwell said, in discussing Harley's case, "a valuable preliminary," and may throw much light on the diagnosis. But such groping around in the dark among important and vital organs should be done with great care. Rather than to search out of the direct line of puncture by vertical or lateral deflections of the point which might do much mischief, we would prefer either almost to withdraw the needle and to advance it again in a new direct line two or three times or to make wholly new punctures, as in Harley's case. Once that the stone is struck Harley's method of investigation by the canula alone seems proper and useful. It would be even more useful in searching for stones in the gall-bladder than in the duct.

Operation.—If the diagnosis be then reasonably well established, or if it be obscure and yet the symptoms so serious as to require surgical interference, an operation should be done. In a certain sense, every operation is one of exploration. With former views such an operation as laparotomy would only be undertaken *in extremis*, but with our modern views and methods much earlier and therefore much more frequently successful operations may be done. Exploratory opening of the abdominal cavity, under antiseptic precautions, strange as the doctrine may sound to those of us old enough to have been accustomed to hear the peritoneum named with dread, is one of the safest operations in surgery. But little if any reaction follows it, and if the facts learned are such as to pro-

hibit any further action, the abdomen is simply closed and the patient almost invariably recovers, the wound healing by first intention within a week. Mr. Tait even states that he has never lost a patient from such an operation. We would do well to cultivate more of his boldness. In reading the many cases that have perished from gall-stones perfectly accessible and perfectly removable, I have been struck with the many lives sacrificed to timidity and neglect of action. To wait, as was formerly done, for adhesions to form and the "abscess" to point is in most cases simply to wait for death. We would therefore strongly advocate exploratory operations, followed, if the ascertained facts warrant it, by cholecystotomy properly so called.

Before considering this operation in detail, reference should be made to Kocher's case of cure of an almost certain case of empyema of the gall-bladder by three injections of a five per cent. solution of carbolic acid. The quantity used was a hypodermic syringe-ful. But this is the only case I believe so far recorded, and we know too little of its details to assert anything as to the method save that it is worth further trial.

Cholecystotomy.—Mr. Hulke (*Brit. Med. Jour.*, 1879, i. 819) says that the operation is treated exhaustively in the "Mem. de Chir." about 1706. I can find no such memoirs in the complete list prefaced to the index catalogue of the Surgeon-General's Library (vol. i. to v.), and the *Mém. de l'Acad. Roy. de Chir.* do not begin until 1743. All of the earlier references to an operation for gall-stones (such as Bloch, Morgagni, and others referred to by Good (*Study of Med.*, 1825, 2d ed., i. 420), and other

writers) are to operations ether by opening supposed abscesses or similar tumors and removing stones from them, or by dilating old fistulæ the results of spontaneous rupture. Such was Mr. Bryant's recent case, often erroneously referred to as a "cholecystotomy." Last April Dr. Marie B. Werner called me in consultation in a similar and successful case in Camden, N. J.

There are several different methods that have been adopted to reach the gall-bladder. They may be grouped in four categories:—

First, those in which the gall-bladder has been opened after adhesions have formed to the belly wall in the progress of the disease. Some of these cases have been incised as if simple abscesses. In other cases the cyst has opened externally spontaneously, resulting in biliary fistulæ, through which later operations have been done. All of the older operations, as far as known, belong to this first class, which we dismiss at once, as not within the purview of this paper.

Secondly, operations to reach the gall-bladder performed, after provoking adhesions by caustics, such as potassa fusa, etc. Caustics, however, often fail to produce such adhesions (as in Campbell's case), and the patient is needlessly tormented and pained by what are practically two operations; and much valuable time is apt to be lost.

Indeed, it may be said that on this point of previous adhesions, produced pathologically, or by caustics, the whole progress of modern surgery in contrast with the older, more painful, and more uncertain operations hinges. It is precisely in this respect

that modern surgery has the advantage, not only as to the surgery of the liver, but of all other abdominal operations. He who waits for nature or caustics to make adhesions ere he ventures to open the belly, is practically prohibited from exploratory abdominal section, with all the knowledge, and certainty, and success attending it. Boldness, in view of the safety of modern methods, is true conservatism.

Thirdly, operations done *en deux temps*, in which the first step is an exploratory laparotomy with a view to subsequent opening of the gall-bladder when adhesions have followed. These adhesions are produced by awaiting the results of inflammation, the bladder being left *in situ*, and the wound either let alone or kept patulous by dressings; or the unopened gall-bladder may be stitched to the abdominal wound. The former method should rarely if ever be employed. It is too uncertain, for in the constant movements of the abdominal contents, other organs than the gall-bladder may adhere to the wound, and our object be defeated; and, moreover, it has the serious objection of leaving the abdomen open, with the possible risk of displaced dressings, and herniæ from vomiting, coughing, etc.

The latter method is not without its advantages. The exploratory laparotomy has given us all the knowledge of existing pathological facts, except exploration of the interior of the gall-bladder itself, and adhesions will certainly form and prevent the escape either of bile or of the mucous secretion of the gall-bladder into the peritoneal cavities, the only object to be attained by such a modification of the operation. But practically the scoop before referred to prevents any such escape during the operation, and

the accurate attachment of the sides of the opening in the bladder to the abdominal wall by sutures, and the later adhesions, which speedily occur, obviate all such dangers. That the bile, or even the mucus secreted by the bladder, especially if it contains a ferment, as Mr. Tait thinks, would be a very possible cause of peritonitis is most likely, but the singular immunity of the patients from such peritonitis is a sufficient practical answer to the theoretical objection.

Fourthly. Cholecystotomy properly so called. The first one to propose this operation was undoubtedly Thudichum, in a paper on the "Pathology and Treatment of Gall-stones" (*Brit. Med. Journ.*, 1859, ii. 935). "In decided cases," he says, "the surgeon should consider the propriety of planning and performing an operation for the extraction of these foreign bodies, *either in a direct manner*, or by forming a biliary fistula and adopting a lithotriptic proceeding. The operation is much slighter than lithotomy. Compared to such operations on the abdominal organs as extirpation of ovarian tumors, it sinks into insignificance." Again, in 1876 (*Brit. Med. Journ.*, 1876, ii. 694), had he found evidence of a stone by palpation (which had been frequently done before but could not be done later), Mr. Maunder was willing, after explaining all the risks to the patient, to open the abdomen, fix the bladder to the abdominal walls, and open it after adhesions. Still later, Dr. Handfield Jones (*Med. Times and Gaz.*, 1878, i. 246) proposed cholecystotomy.

But the actual surgical initiative was taken by two American surgeons. June 15, 1867, Dr. Bobbs (*Trans. Indiana State Med. Soc.*, 1868, p. 68), in an

obscure case of abdominal tumor, opened the abdomen, and then the tumor, which proved to be the gall-bladder, and removed a number of calculi. While not knowingly intending to do cholecystotomy (he calls it "lithotomy of the gall-bladder"), yet such it actually was. But to Sims must be given the credit of first distinctly formulating such an operation and of practically perfecting it both in design and technique. (*Brit. Med. Journ.*, 1878, i. 811.) Slight modifications have been proposed and done, but practically the real work was done when his paper was published. "The entire possibilities of the treatment of gall-stone and distended gall-bladder are exhausted" by Sims's paper (Tait). Let us now consider its steps in detail.

The incision should be made, as a rule, over the centre of the tumor and parallel to the free border of the ribs. The far greater facility of access to the tumor overbalances any less hemorrhage from one in the linea alba. It should be about three inches long, *i. e.*, sufficient for exploration. If need be, it may be enlarged later. All bleeding should be arrested by hæmostatic forceps or catgut ligatures before opening the peritoneum.

This being opened, two fingers should be used, or if necessary the whole hand, to explore the condition of the various abdominal organs and learn the exact nature, attachments, etc., of the tumor, and, as far as possible, the character of its contents. The cystic duct and common duct should be examined with special care, to determine, if possible, the presence and situation of gall-stones, their size, shape, mobility, etc. If any be found in the ducts, the sug-

gestion of Handfield Jones to endeavor to push them into the duodenum should be tried. This failing, we should endeavor to push them back into the gall-bladder—a manipulation much more likely to succeed, for this part of the ducts has already been dilated by their onward passage. Very possibly they may be so fixed as to be immovable (Tait). Whether we can find any stones or not, if the bladder be distended with fluid, it should now be aspirated, the scoop already described being used to carry off any liquid contents, thus preventing its escape into the peritoneal cavity, and at the same time to keep back the intestines, which would otherwise tend to escape.

The gall-bladder should now be incised to the extent of an inch, or more if necessary, the scoop still serving as a conduit for any escaping fluid. By the probe and various ordinary forceps any gall-stones may now be discovered and removed. It is not always easy to find all the stones that are present. In Bobbs's case, and in one of Tait's, a stone known to exist had to be left. In the former it was probably sacculated, but at all events, though felt, it could not be reached. In Tait's it was in the common duct, and could not be removed. [Because of adhesions?] The case recovered, but with a pin-hole fistula. All the bile escapes at the fistula and none into the bowels. Three times he has tried to close it, but each trial was followed by severe bilious colic, until the bile re-escaped in about fifty hours. In this case he proposes to re-open the abdomen and crush the stone *in situ* with padded forceps outside

of the duct.¹ In his first case, Tait was compelled to extract a stone piecemeal, by a careful and difficult operation. In many, if not most of the operations, other stones not discovered at the operation have escaped subsequently. This shows the wisdom of the last step in the operation, viz., the establishment of a biliary fistula by stitching the edges of the opening in the gall-bladder to that in the abdominal wall. A large fenestrated drainage tube should be inserted and the whole covered with antiseptic dressings. For the first few dressings, when the discharge will be large, some carbolyzed sponges may be also placed under the dressings to absorb this discharge.

The fistula will ordinarily heal within a few weeks at least—in marked contrast to the fistulæ following nature's method of adhesion and external discharge. In these the opening is generally insufficient to permit the escape of the gall-stones, and the fistula with all its dangers may continue open even so long as fourteen years.

The collapsing gall-bladder might be supposed to drag on the abdominal wall by its adhesions, but no such trouble has been reported.

For a considerable time afterwards it might be

¹ Tait (*British Med. Journ.*, July 12, 1884), in this case of stone in the common duct, states that he did crush the stone (size of a cherry) by two strokes of the forceps. "After it was broken the fragments dispersed, and they have given no trouble at all since the operation, only a very small quantity of mucous fluid faintly tinged with bile has come through the fistula, and the patient's motions are normal in color." He intends to close the fistula in a few days. [Should not the fragments have been removed, unless indeed they escaped into the intestine (the word "dispersed" does not seem entirely clear), lest they prove the nuclei for formation of future stones? K.]

necessary in some cases to prevent any possible tendency to a ventral hernia by a compress and bandage.

The experience of operators has varied very much as to hemorrhage. In two of my operations this has been a formidable danger, not so much by the vessels wounded as by the tendency to profuse and uncontrollable oozing even from inadvertent needle-pricks; this seems to be due to the condition of the blood in those cases in which the long-continued jaundice has disorganized that fluid. In Sims's case large intestinal hemorrhages occurred, probably from the same cause; the liver, also, in such cases, is softened, and its integrity almost destroyed. Both of these facts are strong arguments in favor of an early rather than a late operation. Many lives will be saved in the future by such an early resort to abdominal section. Coupled with the slight dangers attending such an exploratory incision the dangers of delay should make us unwilling, by waiting, to jeopardize life in any serious case.

The hemorrhagic tendency in such cases should make us careful not to excise any portion of the wall of the gall-bladder. I see no object worth the risk of such a procedure, and where it entails additional danger it should certainly be avoided. Sims did it in his own operation, but considered it, and rightly, an error.

Whether the opening in the gall-bladder should not be closed by sutures, and the bladder be abandoned in the abdominal cavity, is a question worthy of consideration. In Bobbs's case he seems to have so closed it by a single suture, and yet the patient recovered and was well after ten months. In Gross's case the stone was drawn into the fundus of the gall-bladder, and both were cut away after securing the bladder by

a catgut ligature, presumably encircling it; the patient lived only sixty-five hours (nephrectomy had been done for medullary sarcoma), but the biliary pedicle was found "in an excellent condition." Mr. Tait says this procedure (which he ascribes to Sir Spencer Wells) has been adopted once, he knows, and unsuccessfully, a large quantity of bile being found in the peritoneal cavity (Case 30). The case has not yet been reported. He calls attention to the periodical filling and emptying of the gall-bladder, the latter by a much more vigorous muscular action than is generally believed, and he points out the fact that if a gall-stone is left in the duct (which may readily occur), the wound would probably be reopened. Whether the stone be in the cystic duct or the common is of no moment, for, in the latter case, the bladder would be refilled with bile; and, in the former, by its own secretion. We think, as a rule, his point is well taken especially in view of the impossibility, in general, of affirming that all the stones have been removed at the operation. Even if all the stones have been removed, the fistula resulting from an attachment of the gall-bladder and the abdominal wall will close very soon if the duct be pervious. Moreover, the danger of obstruction in the duct by other causes than gall-stones, as in our third case, is to be remembered; to establish a biliary fistula, therefore, seems the better practice by far. If, however, a probe could be passed into the duodenum, and there be a reasonable certainty that all stones have been removed, closure of the gall-bladder, by Gély's sutures or otherwise, might be done with propriety.

Still another question is raised by Langenbuch's

successful case, viz., the propriety of the entire removal of the gall-bladder after ligation of the cystic duct, and evacuation of the gall-bladder (if distended) to prevent the escape of its contents into the peritoneal cavity. Tait states that this has been done six times, with three deaths.

As a general rule, we should be opposed to such a removal; true, some animals have no gall-bladder, sometimes it is congenitally absent in man, and sometimes it has been removed (as by Langenbuch), or has been functionally absent when all its bile has escaped by a biliary fistula. The only object in removing a gall-bladder is to prevent the future formation of stones; and hence, as in Langenbuch's case, it is rather a remedy to be applied to chronic and repeated cholelithiasis than to any ordinary case of acute and unwonted obstruction. Moreover, the danger from an unremoved or undiscovered stone, if it be in the common duct, is too great to justify such a removal, unless it is clear that the duct is patulous. Even severe cases of inflammation of the gall-bladder, the result of calculi, are readily cured by the removal of the calculi, and the establishment of a temporary fistula. It seems as a rule, therefore, needless to add to the already sufficient dangers those which may follow the extirpation of this organ.

One other possibility exists. If we are sure that no calculi remain in the gall-bladder, it might be possible, instead of establishing an external biliary fistula, to open the small intestine at as high a point as possible below the duodenum, and by sutures unite this opening to that made in the gall-bladder, thus re-establishing the flow of bile into the intestine. Von Winiwarter

(*Prag. mediz. Woch.*, No. 21, 1882) attempted this procedure with partial success. New dangers would attend it, but in a favorable case it might be worth at least a trial. Clearly nature meant that the bile should enter the small intestine high up, and play its rôle in the digestive process. If, by art, we can re-establish this disordered process without too much danger in the doing it, it should be our aim.

Finally, while loth to differ from one who has had so large and successful an experience as Mr. Tait, we are still firmly convinced that strict antiseptic precautions and methods should be used in this as in all other abdominal sections.

NOTE.

At the last moment, after the foregoing paper was printed, Mr. Tait has kindly sent us the following memorandum of his 13 cases, which we append. Except cases 8 and 13, we presume they are all women.

1. Aug. 23, 1879.	æt. 40	Married.	Recovery.	Complete cure.
2. Oct. 9, 1881.	" 55	Single.	Recovery.	Complete cure.
3. Jan. 15, 1882.	" 24	Married.	Recovery.	Complete cure.
4. Oct. 13, 1882.	" 39	Married.	Recovery.	Complete cure.
5. Jan. 5, 1883.	" 28	Single.	Recovery.	{ Complete cure. No gall-stone found.
6. May 6, 1883.	" 35	Married.	Recovery.	Complete cure.
7. May 10, 1883.	" 42	Married.	Recovery.	Complete cure.
8. May 28, 1883.	" 66	(Man.)	Recovery from operation.	{ No gall-stone found; obstruction probably due to cancer. Death some time after from this cause.
9. Nov. 14, 1883.	" 44	....	Recovery.	Complete cure.
10. Dec. 20, 1883.	" 44	.....	Recovery.	Complete cure.
11. May 8, 1884.	" 62	Married.	Recovery.	Complete cure.
12. June 26, 1884.	" 45	Married.	Recovery.	Complete cure.
13. Aug. 6, 1884.	" 73	(Man)	Recovery.	Complete cure.

