OBSERVATIONS ON BRONCHO-BILIARY FISTULA.

(WITH THE REPORTS OF TWO CASES).*

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At the meeting of the Association of American Physicians in 1886, I presented a paper entitled: "Notes of a Case of Hepatic Bronchial Fistula;" I then gave the history of a case in which a complete recovery seemed to have taken place. It is my present intention to describe the further progress of this case, and to give a summary of the literature relating to the subject, especially that which has appeared during the last ten years. A brief account of the previous history of the patient, as it was recorded in my former paper, is necessary to the proper understanding of the case. The following notes were made in the spring of 1887:

S. H., aged 33, paper-box manufacturer, married, father of two healthy children. Patient is temperate and regular in his habits, and has never suffered from any form of venereal disease. He has had but one illness, which occurred three years ago. This attack may have some bearing upon his present condition. He was seized with pain in the region of the gall bladder, which passed around to the back. He suffered from ever, but had no jaundice. The treatment employed was principally of a palliative character. Hot fomentations were applied locally, and sedatives given. Patient was in bed three weeks, and the attack lasted altogether about six weeks. He complained, however, both before and afterwards of pain in the hepatic region. He recovered completely, and remained quite well until the commencement of the illness about to be described. In the latter part of November, 1886, he was seized with coughing and pain in the right hypochondriac region, at a point 3 inches to the right of the median line, and a little below the margin of the ribs. He was also troubled with nausea and vomiting. The vomited matter had a greenish-yellow transparent appearance. These symptoms began on November 27th, and continued until December 2nd, when he first saw Dr. Stark, who is his family physician, and who attended him during the previous attack. His pulse was then 120; skin hot and dry; countenance flushed and anxious; mouth, nose, and ears stained with the greenish-yellow matter he had been vomiting. He had had a severe chill during the previous night. Temperature not taken. Treatment: quinine, hydrobromic acid, and compound tincture of camphor.

December 3rd. On examination of the chest, the area of hepatic dullness was found to be much increased, and a pleuritic friction sound could be distinctly heard immediately below the right nipple. The pain in that region was very severe: the patient complained of most intense headache; his face continued flushed; pulse 140; temperature 104°. He continued vomiting freely; bowels constipated; urine high coloured. During the evening he began to cough up bile.

December 4th. Patient coughed up bile freely, and complained of a burning sensation in the right side. He always had to cough several times before the bile came up. The bile was of a dark green colour. Temperature 102°; pulse 100; pain less severe; headache less intense.

He continued in this condition until December 9th, when I saw him, in consultation with Dr. Stark. He was then lying in bed with his head and shoulders raised. Pulse 108; respiration 22; temperature 102; face flushed, skin slightly jaundiced. He coughed up bile at short intervals. During my visit he had two or three spells of coughing. He brought up each time a large tablespoonful of bile. It never came without coughing. A half cupful was collected that day, and sent to Professor Hayes for analysis. He reported it to be pure bile, and used it as a specimen for testing in his physiological chemistry class. The urine was also found to contain a small quantity of biliary colouring matter.

On examination of the chest and abdomen I found that the depth of hepatic dullness on a line below the right nipple was 6½ inches. A friction sound was heard over the upper surface of the liver in front. Coarse mucous rales were also heard over the anterior region of the right chest. On examination of the posterior region no abnormal sounds were heard; no dullness, no rales. So far as could be discovered the physical signs existing were: increased hepatic dullness, friction sounds, and rales over the anterior and lower portion of the chest.

From this date the patient gradually improved. The amount of bile became every day less, and ceased rather suddenly on December 19th, ten days after my visit. His cough ceased at the same time. He went back to work on January 1st, 1886.

During the attack the bowels were constipated, and when moved by a cathartic the motions were of a light greyish colour. Patient remained well until April 13. When riding in a street car he commenced to cough, and on going out on to the platform he felt a choking sensation, and expectorated matter similar to that coughed up in the winter. This was not examined by the physician. He felt no pain, and after a few days' rest resumed his work. The cough and expectoration continued for two days, and then ceased. During the attack he enjoyed fair health.

On April 21st the patient was carefully examined by Dr. Stark and myself. He was now quite free from cough, and presented a very healthy appearance. He was able to do an ordinary day's work. Pulse and temperature normal, and tongue clean; in fact, he seemed to be in excellent health. On examination of the chest we could find no abnormal condition. The area of hepatic dullness was normal, and there were no friction sounds or rales.

After this period (April, 1887), for a period of over ten years, the patient enjoyed good health. He had attacks of alternating constipation and diarrhoea, and during the latter part he noticed that the stools were light coloured. He also suffered almost constantly from an itching of the skin, which was not so severe as to prevent his sleeping.

In the early part of May, 1896, he noticed that his skin was becoming jaundiced, but did not consult a physician until the middle of the month. Late in the evening of Saturday, May 31st, he felt a severe pain in the right side in the region of the gall bladder, which gradually became worse, and on the following morning he was seen by his physician.

Soon after the commencement of the pain he coughed a greenish fluid, which was, no doubt, partly composed of bile. He remained in bed a month, and after getting up he noticed that his urine, which had previously been high coloured, had now a dark red tint. This passed away in two weeks' time. The attending physician thought that this change was due to the presence of blood, but neither a chemical nor a microscopical examination was made.

About the middle of July, 1896, the great toe of his right foot became swollen and very painful. The pain and swelling extended up the limb and became very severe. This lasted two weeks, and shortly afterwards his left shoulder became swollen and painful, a condition which continued three or four days. He was not troubled with pain in any of his joints before, nor has he had an attack since.

He continued to cough up bile from May 31st until November 22nd, with the exception of two or three days, when he expectorated a large amount of mucus. The amount of bile varied from a few ounces to 2 pints. The skin during that time, although not normal in colour, was not remarkably jaundiced. On the days when the biliary expectoration ceased he noticed a return of the jaundice, both in the integument and in the conjunctiva.

November 20th, 1896. Digestive system: The tongue was somewhat swollen, and covered with a yellowish green film. His appetite was good, and he could eat any ordinary food without inconvenience. Sometimes a disagreeable feeling of fullness in the stomach was noticed after dinner. The passages from the bowels during the summer were lightish in colour, but in the last two weeks they became darker, and at this time were of a slightly greenish tinge. On physical examination the abdomen was found slightly distended and tympanitic on percussion. The relative hepatic dullness in the nipple line commenced at the lower border of the fourth rib, and absolute dullness at about the seventh. The lower margin of absolute dullness was found in the nipple line at about 2 inches below the margin of the ribs. The lower line of dullness commenced on the left side at the seventh costal cartilage, about an inch from the left border of the sternum, passing downwards to the right to a point at equal distance from the ensiform cartilage and the umbilicus, and a little to the right of the median line. It then passed horizontally to the junction of the cartilages of the ninth and tenth ribs of the right side. A distinct swelling was noticed below the costal margin, which was more or less tender, and felt somewhat elastic. The patient complained at times of pain in the gall bladder region, extending toward the umbilicus. The spleen was not enlarged.

The Respiratory System.—The patient had spells of coughing, which recurred at regular intervals, and were more distressing when he was in a recumbent position. The sputum contained bile and mucus. No pus was found. The chest was well developed and normal in shape. Expansion normal on both sides. The vocal fremitus was slightly increased on the right side. Dullness on percussion extended upwards from 1 to 2 inches above the normal limit between the mid-axillary line and the sternum. From the mid-axillary line to the spine, the lower margin of pulmonary resonance was in the normal situation. Rales of various kinds—sibilant, sonorous, and coarse mucous were heard in the right side below, from the mid-axillary line to the sternum. A friction sound of a creaking character was also heard in front. The impression given by physical examination was that the portion of the lung in front between the mid-axillary line and the sternum was probably the part through which the fistula passed.

Genito-urinary System.—No pain or difficulty in passing water. Analysis of urine: specific gravity 1020, reaction acid, albumen and sugar absent, bile pigment present in small quantities, no casts.

Facial expression comfortable when not troubled with cough, but during an attack of the latter the face became livid and the lips cyanosed. The blood was examined microscopically, and found normal. His temperature was taken night and morning for a week, and was often sub-normal and never higher than normal.

November 12th. The patient was examined by Drs. Teskey Sweetnam, Stark and myself, and the liver and gall bladder were much palpated and percussed. For some days after the examination the patient ceased coughing up bile, and the jaundice was not increased. At the same time the stools became more coloured. The manipulation of the gall bladder appeared to assist the passage of bile through the natural channels.

In December and January the patient again coughed up bile as he had done during the previous six months. The amount coughed up in twenty-four hours varied from a half to two pints. It was mixed with frothy mucus. Chemical examinations were made several times, when Gmelin's test showed the presence of bile. The general health of the patient had slowly declined during the summer, and in December he became much weaker.

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At the consultation on November 12th an operation was advised, to remove, if possible, the obstruction, so as to allow the bile to flow through the natural channels, and, if this were not possible, an opening between the gall bladder and some part of the intestines was spoken of.

The patient decided to have an operation done, and on January 26th Dr. Sweetnam operated, assisted by Dr. A. H. Wright and Dr. Stark. I am indebted to Dr. Sweetnam for the following notes:

"The abdominal incision, 6 ins. in length, was made in the right semi-lunar line. The muscles gave evidence of previous infiltration, and the fasciæ, when divided, passed rapidly out of sight, leaving a widely gaping wound. The peritoneum was deeply injected and the intestine distended and adherent. The fundus of the gall bladder was packed round about, and aspirated 6 or 7 ozs. of dark-coloured bile being secured. The common and hepatic ducts could be felt distended with gall stones, the ducts measuring something over $\frac{1}{2}$ in. in diameter. As bile of fair colour kept oozing up through the wound in the gall bladder made by the aspirating needle, the obstruction in the hepatic and cystic ducts was thought to be but partial. As the gall bladder was deep set and separated by several inches from the abdominal wall, and the patient was coughing more or less constantly, it was not thought possible to bring about adhesion of the gall bladder to the abdominal wall. Owing to the distended and adherent condition of the intestines, and the known tendency of the patient to bleed, it was decided not to disturb the adhesions and incise the cystic and hepatic ducts, especially as this would involve leaving the abdominal wound partially open for drainage with the risk of having a loop or loops of intestine forced out by the violent and prolonged coughing. The wisest course under the circumstances seemed to be to do a cholecyst-enterostomy, which was done, making use of the hepatic flexus of the colon instead of the duodenum with the hope that the gall stones, which appeared to be small in size, would gradually find their way into the gall bladder, and on through the newly-formed opening into the bowel. The patient died on the twelfth day from hæmorrhage from the nasal mucous membrane, the stomach, and gall bladder."

Patient did fairly well until about the sixth day after the operation. During the first three or four days he continued to cough up large quantities of bile, but after that the amount was not so great. The cough was very distressing, so much so that on the third day during one attack the sutures were torn through the abdominal walls and had to be replaced. On the sixth day the patient coughed up matter having a disagreeable odour, which suggested the possibility of bowel contents, but the sputum was examined for the bacillus coli communis and it was not found.

The temperature gradually rose and evidences of pneumonic consolidation developed in the anterior and lower part of the right lung. On the eighth day he coughed up some blood; afterwards the cough became more constant and the hæmoptysis more marked. The sputum at times was largely made up of blood and bile; on the ninth day the amount of blood was increased, on the tenth coagula appeared in the sputum. On the same day patient had a severe attack of epistaxis; this continued for some hours, and plugging of the nostrils became necessary. On the eleventh day the cough and hæmorrhage ceased, but returned to a slight extent on the twelfth day. Death took place on the twelfth day after the operation. During the last few days of his life blood passed in large quantities from the bowels, and during the last week patient became intensely jaundiced. The temperature did not rise above 100° except on one occasion, when it reached 102° F. In the latter part of the illness the blood became more fluid.

I regret very much that it was quite impossible to obtain a post-mortem examination.

In my opinion, we may safely conclude that in the former illness, which occurred ten years ago, the obstruction to the flow of bile was of a temporary character, and on its removal the sinus to the bronchus closed. It would appear, however, that this closure, although it lasted ten years, was easily overcome, because in the last illness the patient expectorated bile very shortly after the symptoms of acute biliary obstruction made their appearance. In the latter attack the obstruction was of a more permanent character—calculi lodged in the common bile duct. It was not, however, complete at all times, as shown by the coloration of the stools.

Death was due to several causes. The constant coughing disturbed the parts operated on, and the hæmorrhage probably took place from a congestion of the gall-bladder mucosa. At the same time the sinus through the lung became closed either by blood clot or pneumonia, so that only a small amount of bile was expectorated. The patient then became intensely jaundiced, a condition which accounted for the general hæmorrhage which supervened. There were no special signs of any terminal infection except the pneumonia. In such rare cases one cannot foresee the results of surgical interference, but this case showed that it was necessary to make at once a free opening for the bile to pass in some safe direction, so that the patient might have rest from coughing. Then in making an opening between the gall bladder and any part of the intestinal tract, the possibility of a regurgitation of the contents of the canal into the biliary passages and then into the lung ought to be considered.

Under the head of fistula between the biliary passages and pleura or lung, Courvoisier mentions the fact that such fistulæ are rare, and usually result from tropical abscesses of the liver. Besides those produced in this way, Courvoisier tabulated 24 cases. I have collected 8 which occurred since

the publication of Courvoisier's work: these with the 1 now given and 1 of Barth's make 10 cases, or 34 altogether. Of Courvoisier's 24 cases 6 were described during life, and the diagnosis in each was confirmed by the presence of bile in the expectoration. Recovery took place in all. In 2 of the 6 cases no cause was discovered; the origin in 1 was thought to be a calculus obstructing the hepatic duct. In 1 case hydatids without abscess, and in the remaining 2 hydatids with suppuration were present. In the 18 fatal cases post-mortem examinations were made. Echinococci were found in 6, and in 2 cases ascarides were the cause of the perforation. Ten were cases of cholelithiasis, and in 4 of them the right lung was adherent to the diaphragm, and the fistula was found within the adhesion; in these cases there was no pleural effusion. Since they more nearly resemble the case described by me, I will give briefly the pathological condition found in 3 of the cases.

1. *Bristowe's Case (a).*—Patient, a female, aged 32, suffered from intense jaundice and other symptoms of hepatic diseases. A few days before her death she commenced to cough up bile. At the post-mortem examination the lower part of the right lung was found adherent to the diaphragm. It had a leathery, tough consistence, and was slate-coloured. A fistula was found passing through the diaphragm, and communicating with the bronchial tube. The common bile duct was obstructed by a calculus. Dilatation, suppuration, and destruction of the hepatic ducts were observed. Cavities existed in the liver, some as large as hen's eggs. One of the latter, the largest, was situated at the convex surface of the right lobe and communicated with the lung. The contents of this, as well as of the other cavities, were soft, pulpy, and of an olive-green colour. The diaphragm was firmly adherent to the liver and lung, and presented an opening which corresponded to the opening situation of the abscess.

2. *Dreschfeld's Case (b).*, which was described in my former paper, and which more closely resembled the one now under consideration than any one of the tabulated cases.

3. *Gaston's Case (c)* (Atlanta, Georgia).—The patient, a middle-aged man, suffered from symptoms of biliary obstruction, and a few days before death began to cough up offensive bile much stained. At the post-mortem examination the common bile duct was found to be completely occluded. A collection of disorganised bile and serous exudation, which was doubtless confined in the dilated sac of the gall bladder, had made its way into a cavity found between the upper surface of the liver and the lower surface of the diaphragm, and extended through an aperture into the pulmonary tissue. The flow of the offensive matter into the bronchial tubes seemed to be the immediate cause of death.

4. *Laboulbène's Case (d).*—Male, aged 41. Enlargement of the liver. Broncho-biliary fistula. Spontaneous cure.

October 4th, 1875. The patient when in good health went on a journey, and while away was seized with a violent cough, and expectorated a greenish fluid, which had an offensive odour, and contained pure bile. This continued until the following March, when he was admitted into the hospital. He improved under treatment, and in May was discharged quite well. Mucous râles were heard over the right lung.

The following six cases of broncho-biliary fistula have occurred since the publication of Courvoisier's book.

1. *Carter's Case (e).*—A woman, aged 70, had good health, with the exception of occasional severe spasms in the hepatic region. Four years before the notes were taken she had suffered from biliary colic, followed by jaundice. These attacks recurred every five or six months until July, 1888, when, after a severe paroxysm of pain, jaundice supervened, and became persistent. A month after this the patient had what seemed to be bronchitis, during which she coughed up large quantities of bile. Moist râles were heard in the lower half of the right lung, but there was no tenderness in the right hypochondrium. The expectoration of bile continued with occasional intervals until April, 1889, when the patient gradually sank and died. A post-mortem examination was not made.

2. *Adam's Case (f)* is of special interest in this connection. The patient, aged 70, had for six or seven previous years severe attacks of jaundice, lasting a week, and then passing away. In January, 1889, jaundice appeared, accompanied by moderately severe pains in the hepatic region. These symptoms persisted until July of the same year, when severe pain was experienced in the region of the liver. Two days afterwards the pain ceased, when she coughed up bile. Patient could not lie down on account of the severity of the cough. Signs of acute bronchitis were present in the right lung. Temperature normal. No change in right hypochondrium. Patient continued to expectorate bile during the next four days, when the jaundice partially disappeared. Consolidation of the right lower lobe then took place, and the expectoration of bile ceased. The patient became intensely jaundiced, and the distended gall bladder could be felt below the liver. Death from cholemia and marasmus. No post-mortem examination. In this case the immediate cause of death appeared to have been the complete closure of the broncho-biliary fistula by the pneumonia and the subsequent cholæmia.

3. *Colvé's Case (g).*—A general in the army who had been some years in the tropics, and had suffered from hepatic disease, the result of malaria. For four years he had attacks of bronchitis, and on October 7th, 1889, he was seized with a severe pain in the hypochondrium, accompanied by fever and vomiting. After some days he commenced to cough up bile. This continued until May, 1890, when the notes were written. The patient on several occasions coughed up small biliary calculi, which fell into the sputum with a distinct noise. They were not examined chemically. The author concluded that the patient suffered from hepatic calculi, which had been the centre of an abscess that perforated the diaphragm into the lung.

4. *G. C. Macdonald's Case (h).*—The patient, a male, aged 49, commenced to cough up bile in the latter part of March, and this continued until June, when it gradually ceased. On June 1st, the patient coughed up three small gall stones, two of which were faceted about the size of a

split pea. The other $\frac{1}{2}$ inch long, and $\frac{1}{8}$ inch in diameter formed the mould of a tube. The patient ceased expectorating bile, and rapidly recovered his health. He had syphilis, and potassium iodide was given at the same time.

5. *Vissering's Case* (5).—The patient, a male aged 30 (?), suffered from pain in the right side in the caecal region. The seat of pain moved afterwards to the under surface of the liver. Signs of pleurisy were discovered, and shortly afterwards the patient began to cough up foul-smelling pus and bile. Jaundice, which had previously existed, now disappeared. About two months subsequent to the commencement of the bilious expectoration, the patient coughed up a gall stone the size of a bean, of a brownish colour and with a roughened surface. After this the biliary expectoration ceased, and the patient recovered gradually. When the report was made, the patient could take outdoor exercise.

6. *Cattani's Case*.—A female, aged 43. Previously in good health. Suffered at first from pains in the hepatic region, and from digestive disturbances. She afterwards coughed up bile and pus. Sometimes lung and liver tissue and striated muscle fibre were found in the expectoration. Patient suffered from jaundice, and a tumour was noticed in the hepatic region. An inflammatory process followed by suppuration began in the liver and extended through the diaphragm into the lung. Cattani gives a most exhaustive account of the case. Patient recovered. The probable cause was calculi in the common duct.

The cases which I have collected in addition to those of Courvoisier are 10 in number, including the one now reported. All of these were published since 1889, except those of Barth's (?). Of these 2 were due to hydatids, and the remaining 8 to biliary calculi.

The diagnosis of broncho-biliary fistula is not difficult. There are cases of pneumonia and bronchitis occurring in connection with jaundice when the expectoration is stained with bile. When a fistula is present the amount and purity of the bile are sufficient to render the diagnosis certain. The bile is sometimes expectorated in very large quantities, as high as 700 c.cm. per day.

The physical signs have been very uniform in the cases described. Dulness, which in some extended as far back as the mid-axillary line, and forwards and inwards to the margin of the sternum and upwards as far as the third intercostal space. In one case, Laboulbène's, dulness was marked over the posterior part of the right lung. Roughened breathing, somewhat bronchial, was heard over the same area, and in most instances loud mucous *râles* were also heard. The cough is usually a very distressing symptom, and in many cases the patients were not able to lie down on this account. It is probable that so long as the bile is passing through the right lung in large quantities, it may, when the patient is in a recumbent position, find its way out through the left lung, thus interfering with respiration.

According to the pathological reports broncho-biliary fistula in cholelithiasis, may begin in three or four different ways:

1. The occlusion of the common bile duct by a calculus may be followed by a suppurative cholangitis, and the formation of abscesses in the liver. A large one near the convex surface may extend upwards through the capsule and diaphragm into the lung. Adhesive inflammation preceding the extension of the abscess would prevent entrance of pus into the pleural cavity.

2. After the closure of the ductus communis choledochus intrahepatic calculi may form and become the centre of an abscess, which, if it exists near the convex surface of the liver, may find its way into the lung in the way already described.

3. One or more gall stones from the gall bladder or larger bile ducts may perforate the liver and diaphragm into the lung. The writer, not long ago, was present at a *post-mortem* examination of a gall-stone case, in which an abscess about the size of an orange was found in the right lobe of the liver. The cavity, which nearly perforated the convex surface, was continuous with that of the gall bladder. It contained a large number of calculi. In such a case one can easily understand that by a continuation of the process a broncho-biliary fistula would be established.

4. It is quite possible that a gall bladder in a state of inflammation may rupture and a circumscribed abscess result, which may be situated on the upper surface of the liver, between it and the diaphragm, and that the abscess may perforate the diaphragm into the lung or pleural cavity.

Laboulbène mentions the possibility of bile passing directly from the gall bladder into the bronchi, and quotes two cases in which a communication was found between the gall bladder and an abscess cavity on the convex surface of the liver.¹ Courvoisier mentions four cases in which this direct com-

munication existed. In one of these the abscess ruptured into the mediastinum, and then into the right bronchus; and in another it perforated directly into the lung. In the other two empyema was also present.

The aseptic non-irritating character of the bile is well exemplified in these cases. In some the fistula lasted several months without exerting any injurious effects on the lung, while in those in which pneumonia supervened there was evidence of septic infection.

When the fistula is once formed, the passage of the bile upwards is not so difficult as might be imagined. The pressure of the diaphragm downwards in respiration favours the flow of bile into the bronchus, and the coughing assists it further.

The second case which I wish to present to the Association is one, perhaps, of greater interest to the surgeon than the physician, since the broncho-biliary fistula was formed after an injury.

The patient, a young man, aged 25, had enjoyed excellent health up to the time of the accident. There was no history of biliary colic, no syphilis, and no tuberculosis. He was kicked by a horse, January 28th, 1897. The blow was received over the cartilages of the fifth, sixth, seventh and eighth ribs. He was standing at the time, and was not knocked down. The contusion was not marked, nor the cartilages injured. He felt immediately a severe pain beneath the part struck, as well as in the right shoulder. He was able to walk to the house, and since his sufferings rather increased than diminished, Dr. Thomson, of Galt, was sent for. He arrived about four hours after the accident, and found the patient suffering from most severe pain of a spasmodic character, both in the hepatic region and in the shoulder. The stomach was very much distended, and he had frequent eructations of gas, which seemed to relieve the pain. He at the same time expectorated mucus tinged with blood.

A hypodermic of morphine was given which relieved the pain. It was necessary to continue the morphine for four days after the accident. At the end of that time pneumonia developed in the lower and anterior part of the right lung. After about a week's time the inflammation of the lung subsided, but the consolidation did not altogether disappear. Fluid then formed in the right pleural cavity.

The patient began to cough up bile about February 15th. The quantity was small at first, and came up after a severe attack of coughing. Subsequently it came up in larger quantities, and with less effort. The amount of bile and mucus expectorated in twenty-four hours was never more than a pint, and as a rule much less. On February 23rd the right pleural cavity was aspirated, and about a pint and a half of bile stained with serum and pus was drawn off. On the following day an opening was made and a drainage tube introduced. For some time the bile-stained fluid made its way through the tube, but after a week or so the green colour disappeared. So that now (April 8th) a small quantity of serous purulent fluid escapes from the opening.

The expectoration of bile increased after the operation. Jaundice was not present at any time. After the operation the temperature fell to normal, and remained but slightly raised for a week, when it again began to ascend. At the same time an increased area of dulness was observed in the hepatic region, and on aspiration about a pint of bile and mucus was drawn off.

On March 2nd a second operation was determined on, and an oblique incision was made from the mid-axillary to the anterior axillary line, and portions of the sixth and seventh ribs were removed. A second drainage tube was introduced directly below the first, through which mucus and bile flowed. After the second operation the stools for the first time became colourless.

The patient was seen by me on April 8th, when the following conditions were found. He was pale and somewhat emaciated, and could sit up with difficulty. He did not complain of much pain when quiet. The posterior portion of the right chest did not present any abnormal condition except that the pulmonary resonance extended only to the ninth interspace. On the anterior surface resonance was normal as far down as the fourth rib, and then absolute dulness was observed down to the sixth rib; below the sixth rib to the costal margin a tympanitic note was present. The resonance on the right side was noticed over an area very similar to that of Traube's semilunar space on the left side. On the right side the line of the incision from the fourth rib to the eighth was plainly seen. Two openings were present in which were drainage tubes: the upper opening through the sixth intercostal space in the anterior axillary line gave vent to a small quantity of pus; the lower opening through the seventh intercostal space nearer the mid-axillary line gave exit to a green-coloured fluid composed of bile and mucus. When the drainage tubes were removed, and the patient coughed, the quantity flowing through both openings increased, and bubbles of air or gas produced a foam. The amount of gas which passed through the lower opening was much greater than that through the upper. The openings did not communicate with one another, since fluid injected into one never passed out through the other. At various times during the progress of the case the bile flowed in the different channels: (1) through the bronchi, (2) through the pleural cavity and out of the upper opening, (3) into a cavity on the convex surface of the liver and through the lower opening, (4) through the common bile duct. When I saw the patient on April 8th the bile passed upwards through the lungs and outwards through the lower opening.

After the second operation Dr. Thomson remarked that the patient suffered from severe pain in the right shoulder when the finger was introduced into the lower opening. He also noticed that the bile flowed in larger quantities after a quarter of a grain of calomel had been given every hour for five or six doses.

The history points to a partial closure of the common bile duct, and to the existence of a cavity beneath the diaphragm, which was either a distended gall bladder or an abscess with which the gall bladder communicated freely. Direct communication also existed between the biliary passages and the pleura and bronchi. Before the second opening was made the obstruction in the common duct was apparently not so complete but that it was overcome, and the bile passed into the duodenum. Afterwards the exit through the chest wall was easier, and the bile ceased flowing through the natural channels.

It is difficult to make an accurate diagnosis in such a case as this. There is no doubt a displacement of the liver backwards, so that the anterior border with the fundus of the gall bladder were brought into close contact with the diaphragm. A rupture of the diaphragm may have taken place at the time of the accident. This would account for the very severe pain and possibly for the pulmonary hæmorrhage. If the diaphragm had been ruptured one would have expected greater shock. Direct contusion of the lung might have accounted for the pulmonary hæmorrhage.

Cases of laceration of the liver have been described which we followed by little hæmorrhage, although the opposite is the general rule. Such lacerations have been known to occur from very slight injuries. A blow which is not heavy enough to produce much contusion of the skin may cause laceration of the liver. One case is mentioned where a quick turn in bed when the patient was very much frightened was the only cause which could be discovered for a laceration in the posterior part of the right lobe of the liver.

Dr. Peters² reports a case in which a blow over the liver resulted in perihepatitis and pleurisy on the right side. Dr. Peters thought there had been a wound of the liver substance. There was no interference with the biliary functions.

Drs. Thomson and Wardlaw, of Galt, to whom I am indebted for the history of this case, have recently (April 26th) written to me that the patient is slowly recovering. The bile passes largely into the bowel, and the stools have become normal in colour. The patient coughs up very little bilious fluid, and very little finds its way through the lower opening.

CASES COLLECTED BY COURVOISIER.

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ITALIAN MEDICAL CONGRESS.—The Società Italiana di Medicina Interna will hold its eighth congress at Naples in October next under the presidency of His Excellency Professor Guido Baccelli, late Italian Minister of Public Instruction. In connection with the congress there will be an exhibition arranged in two sections—one of hydrology and climatology, the other of instruments and appliances used in medical practice for purposes of diagnosis and treatment.

REMARKS

ON A

CASE OF PANCREATITIS FOLLOWED BY CYST OF THE PANCREAS.

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CONCERNING disease of the pancreas there yet remains much to be made clear. Since the publication of the extensive studies of Senn¹ in 1885 and of Fitz² in 1889 our knowledge of these diseases has been added to chiefly by the reports of cases, each serving to demonstrate some special characteristics. The following case possesses some features that render it of special interest:

G. A. B., aged 53 years, a member of the Civil Service. His father had some liver affection, and died suddenly; his mother died of carcinoma of the breast. In all other respects the family history is good. His own history is good until 1891, when he had his first attack of what appeared to be biliary colic, lasting about one day, with well-marked jaundice and pale faecal discharges; otherwise the attack was uneventful and recovery satisfactory. The jaundice disappeared within a few days. After this he had annually two or three similar but milder attacks. On the first threatening of an attack he would call upon the nearest physician for a subcutaneous injection of morphine and then return to his official duties. Each physician of whom he sought relief accepted the diagnosis of gall-stone colic, and advised operation; one assured him that he had a "gall bladder full of gall stones." During the winter of 1894-95 the attacks became more frequent and his health began to suffer, in consequence of which he obtained leave of absence and spent the summer at the seaside. While there the attacks recurred very frequently but were not severe, nor was there any jaundice. There was indigestion with considerable flatulence, and almost constantly some degree of discomfort in the epigastrium.

After his return home he was taken with a severe paroxysm of pain, with vomiting and prostration. This was the first occasion on which I saw him since his first attack in 1891. This attack was very severe, and not fully relieved until the third day. There was pain and tenderness in the epigastrium, from which pain radiated in various directions. Vomiting did not recur after the first day: the tongue was heavily coated; no appetite; considerable thirst; bowels constipated. There was slight jaundice and some bile pigment in the urine. The temperature was elevated for five days, rising as high as 101° F. There was fulness in the gall-bladder area, but tenderness was too great to permit of examination of the deeper parts. There was some pain across the back in the lower dorsal region.

He improved gradually, and in ten days—September 16th—he returned to the office. His digestion improved, the bowels being kept open with Carlsbad water, but there was considerable flatulence. The discomfort in the epigastrium persisted, with some tenderness; on deep pressure slight thickening could be made out about the head of the pancreas and extending to the left. He had occasional attacks of pain, many of them due to intestinal colic. For these he took half a grain of codeine from time to time. In the severe attack he lost flesh, and still continued to fail a little, but he was not emaciated. His complexion was of a peculiar ashy-grey colour.

On October 5th it was noted that there was an increase in the thickening in the deep part of the epigastrium to the right side; some tenderness. He was feeling ill, and had to cease work; but on the 8th, when next examined, a large, smooth, cyst-like tumour was found in the epigastrium extending from the right parasternal line to the left mammary line and downward to the umbilicus. The upper boundary was ill-defined; stomach resonance was above and to the left. It was most prominent to the left, where the percussion note was flat; there was slight resonance over the right part of it. (Fig. 1.) There was no increase of tenderness.

FIG. 1.

The temperature was 99.5° F.; pulse quiet. He was feeling quite ill. From the sudden formation of the tumour and its situation it seemed evident that it was formed by fluid in the lesser peritoneal cavity, and on account of the absence of symptoms of hæmorrhage it was probably a