Bureau at Washington, with six divisions, through which the operations of the service, properly classified, are conducted by trained medical officers under the direction of the Surgeon-General.

RESPONSIBILITY OF THE PRIVATE PHYSICIAN

In the public health system of the United States, combining the national, state and local forces, the physician in private practice is an important factor. Indeed, he is the first unit, in that on him devolves a duty of reporting the facts that naturally first come under his observation. He has a direct responsibility to the state, in giving the notifications and making the reports required. He is the first to see and know the conditions and diseases which, at first local, may become afterward state or national in their importance. He should loyally support his state and local board of health.

In conclusion, I would say to the members of the graduating class: Do not be dismayed by the obligations, additional to those of your practice, which have just been indicated. At the beginning of a professional career, I know that the field of study, investigation and labor, opened up to the practitioner through the usual curriculum of a medical college, seems so large, so difficult to cover, that one is apt to be apprehensive as to acquiring all the information necessary in the several branches of medicine, and keeping apace with developments, and state medicine may seem an additional responsibility. But you have the advantage of youth and strength. Many years are before you. Your capacity and knowledge will grow with the increasing years. You surely will be able to master these principles of hygiene and sanitation, to become familiar with the public health laws and regulations, and to aid in their enforcement, thus adding to the dignity of your profession and the value of your lives to the common wealth; and will worthily fill the important place allotted to you in the resistless march of human progress.

Original Articles

CHRONIC CHOLECYSTITIS AS A CAUSE OF MYOCARDIAL INCOMPETENCE

REPORT OF THIRTEEN CASES

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It is said that one out of every ten adults has disease of the gall bladder and that one out of every thirteen has gallstones. If these figures are only approximately correct, there is certainly a remarkable discrepancy between the frequency of the occurrence and of the clinical recognition of chronic cholecystitis. This discrepancy is due partly to the ignorance of general practitioners concerning its frequency and partly to the obscurity of its symptoms. Yet when one's attention has been once directed to the subject, one is able to recognize certain symptoms which are very suggestive if not actually convincing.

Prominent among these is indigestion or stomach trouble, with or without more or less epigastric distress, distention or uneasiness coming on several hours after a meal and accompanied or relieved by eructations of gas. Not uncommonly these symptoms of indigestion occur at night, often waking the individual from

sleep toward morning, and they are sometimes associated with palpitation or irregular action of the heart. It is not uncommon for this discomfort in the stomach to be relieved by the taking of soda, food or even a drink of plain water. As belching of gas is apt to follow the ingestion of these substances, the relief experienced is generally attributed to the removal of gas from the stomach. The gas is tasteless and odorless as a rule.

Pain is not an essential symptom even when gallstones exist; and when the chronic cholecystitis is unattended with calculi there may be no history of pain whatever and even no tenderness except during and directly after an acute exacerbation of the gall-bladder infection. In some instances slight colicky pains are felt, and in two of my cases complaint was made of dull, intermittent pain below the heart. Attacks of "congestion of the liver" may be admitted, and at such times there is likely to be vague pain or tenderness in the region of the liver. In some cases also there is pain in the right shoulder, considered rheumatic, or in the back near the inferior angle of the right scapula, and Ewald's area of cutaneous hyperesthesia in the right back low down is generally discoverable.

There is, however, another point of interest in this matter of the symptomatology of gall-bladder disease; namely, the occurrence of disorders in the action of the heart, from arrhythmia and precordial oppression without dyspnea to demonstrable dilatation and incompetence dating usually from some attack of biliary colic or acute cholecystitis and thenceforth maintained by recurrences of the acute disturbance. This is shown by the case reports here narrated, the individuals having sought medical aid because of heart trouble, and, with but two exceptions, having no suspicion of anything being wrong with the gall bladder. Excepting in two cases in which outspoken attacks of hepatic colic were experienced, the symptoms referable to the heart overshadowed those pertaining to the gall bladder, and this viscus became an object of suspicion either on account of the complaint of "indigestion" or of facts in the anamnesis which directed attention to the gall bladder.

Without exception also in each of the cases reported, palpation detected a swelling in the proper location of the gall bladder which in most instances was shown by operation to be a Riedel's lobe. In nearly all cases, repeated and careful palpation was required before the swelling could be detected with certainty, and this was possible only after a more than usually pronounced attack of pain or indigestion. It was possible also at such times to perceive slight rigidity of the right rectus. The patient's color also was generally muddy or subicteric. There was not always a history of typhoid fever, while two patients gave a history of illness supposed to have been malaria, and some declared they never had been ill.

The cases to be reported number thirteen and have been divided into four groups in accordance with their clinical, not their pathologic, features. 1. In this group are five cases of pronounced cardiac incompetence showing considerable dilatation with arrhythmia and feebleness of heart's action with murmurs; in short, subjective and objective symptoms of serious heart disease. 2. This group comprises two cases in which there were attacks of pain that had been called angina pectoris or were of an anginoid character, and which attacks were followed by evidences of myocardial inadequacy. In

this group is included also one other case in which there was dull infracardiac pain, together with arrhythmia of the pulse and a moderate degree of dyspnea on exertion, both dependent on recognizable though not great dilatation of the heart. 3. In this group are embraced three cases of intermittence of the pulse of long standing and very intractable, but without dyspnea or other marked subjective symptoms of myocardial inadequacy. Two patients were much benefited by operation and thereafter enjoyed greater freedom from intermittence than by any previous lines of treatment. 4. This group includes two cases of valvular disease in which cardiac competence was destroyed either by outspoken attacks of hepatic colic or distressing symptoms thought referable to the stomach at first, but subsequently attributed to the gall bladder because of the recognition of a Riedel's lobe. A number of other cases could be reported, but are omitted because either not subjected to operation or not so plainly showing the signs of gall-bladder disease as to make its diagnosis certain.

CASE REPORTS

GROUP I.

CASE 1.—Patient.—G. R., life insurance agent, aged 44, examined Nov. 12, 1903, on account of heart trouble, had suffered from a biliary colic two years before and been jaundiced for ten days. In March, 1903, he had experienced a second attack of colic and been jaundiced for three weeks but had not been operated on because of the state of his heart. All other illnesses were denied and habits had been good. The chief symptoms were dyspnea of effort and distress in the region of the liver.

Examination.—The only points of the physical examination worthy of note were the following: Icterus absent, temperature normal and urinalysis negative; accessible arteries not thickened, pulse intermittent and so arrhythmic that its rate was not recorded; the feeble apex beat in fifth interspace below left nipple and deep-seated dullness increased transversely from one inch to right of sternum to four and a fourth inches to left of the midsternal line; no murmurs, but all sounds very feeble and the second succeeding the first by too short an interval; below the right costal margin a tender, palpable swelling that extended downward the width of two fingers, while elsewhere the liver could not be felt. The diagnosis was made of cardiac hypertrophy and dilatation with inadequacy, due to the cholecystitis and hepatic colic, not to chronic myocarditis. Accordingly an operation was advised in the belief that it would not prove especially dangerous, if properly performed, and would remove the source of irritation which was preventing the restoration of cardiac competence.

Later History.—The subsequent history is interesting. After a period of much suffering from both heart and gall bladder the man at length went to Rochester, Minn., in the hope of an operation, but this being denied on account of the state of the heart I saw him again at St. Luke's Hospital in a very serious state of myocardial inadequacy, somewhat icteric and his gall bladder swelling, very tender and large. An operation was again urged but declined because of the apprehension occasioned by the unfavorable opinion previously received. In February, 1905, a letter received from him stated that, although his heart still troubled him, he was able to attend to business; and quite recently this man, now 50, was married for a second time and was reported actively pursuing his vocation, although still troubled at times by both heart and gall stones. Consequently it is believed that had his gall bladder been opened and drained when this was first advised he would have endured the operation, his heart been reinstated and years of suffering prevented.

CASE 2.—Patient.—T. C. H., policeman, aged 43, examined in June, 1904, on account of heart disease, gave the history of illness of ten months duration. Syphilis was denied and whiskey used to excess only during present illness. Two years previously patient suffered from chills and fever which, occur-

ring again ten months previous to examination, was called malaria. The perspiration was of bad odor and there was heaviness in the pit of the stomach. Ten days later palpitation and dyspnea set in and six months before the patient was seen his feet began to swell; he went to Mudlavia, where he took but fourteen baths. He was then obliged to return home and take to bed; he changed from doctor to doctor without relief. In April the abdomen was tapped and fluid withdrawn.

Examination.—Present symptoms were dyspnea on slight exertion, cough, and scanty muddy-looking sputum, anorexia and vomiting, poor sleep on account of shortness of breath. The skin was slightly jaundiced and pitted on pressure over lower extremities to knees, pulse 84, irregular and of low tension, radial arteries slightly thickened, tongue moist and red, temperature 99.9 F., leucocytes 12,600, urine slightly albuminous, lungs negative, but heart dilated, as shown by absence of impulse and increase transversely of both absolute and relative dullness, which latter reached from 1¼ inch to right of sternum to 1 inch outside of left nipple, all heart sounds very feeble and the first at apex impure. The liver was palpable and in the right parasternal line below the costal margin could be felt a swelling of the size of a small fist tender to palpation and the right rectus muscle was tense.

Diagnosis.—The history indicated that the symptoms of heart disease first appeared about ten days after the onset of an illness supposed to be malaria, but as malaria, in my opinion, does not cause disease of the heart and on account of the findings, namely, an enlarged and tender gall bladder, icterus, slight febrile temperature and moderate leucocytosis, the opinion was expressed that the dilatation and inadequacy of the heart had been initiated by an acute cholecystitis and was maintained by what was probably an empyema of the gall bladder. The heart muscle was thought to have suffered irreparable damage and yet without removal of the disturbing element by opening and drainage of the gall bladder, a restoration of even a part of its old-time power was impossible, although even after an operation a recovery of compensation was questionable. Accordingly operative interference was advised.

Operation.—The recommendation was accepted and his physician at home performed the operation. From him it was learned that the gall bladder was found enlarged, thickened, white and distended with mucus and dark bile but without stones. Local anesthesia was used.

Postoperative History.—The man stood the shock of the operation well and for seven days was progressing finely, when suddenly the flow of bile ceased, his temperature rose, the heart grew still more feeble and death occurred on the eighth day after the operation. No autopsy was permitted, but I believe that the findings at the time of the operation substantiated the diagnosis in so far as the relation between the heart and gall bladder was concerned, although an empyema did not exist.

CASE 3.—Patient.—C. S. H., real estate agent, aged 53, was first examined in November, 1904, because of heart trouble and shortness of breath for the past two weeks. Habits were excellent and venereal diseases denied; he had had malaria twenty-five years previously and in June, 1903, pneumonia, following which severe attacks of abdominal pain, coming on three to four hours after meals and compelling the patient to lie on his right side with knees drawn up, yet without nausea or vomiting. The last attack of pain had been in June, 1904, and had been diagnosed as acute appendicitis by his physician, who had kept him in bed and on a strict diet which had been maintained up to the present time and been responsible for his loss of weight. His complaint was dyspnea of effort and indigestion characterized by formation of great quantities of gas.

Examination.—Marked emaciation and pallor but no icterus; pulse irregular and intermittent, varying from 88 to 104 per minute; arteries soft and veins not turgid; systolic blood pressure (Gaertner), 95 mm.; no edema. Urine showed a trace of albumin and a few granular casts but no sugar or bile. Temperature 98 F. but leucocytes 12,200. Right lung showed reflex retraction at base behind but no râles. Heart dilated, the total transverse diameter being six inches, impulse very feeble and first sound at apex weak with a faint soft murmur, while

at base all tones were feeble, the second pulmonic being somewhat louder than the corresponding aortic. Examination of the liver revealed a swelling that extended from the costal margin in right parasternal line to the level of the umbilicus and was sensitive both to palpation and percussion. The stomach was somewhat dilated.

Diagnosis.—This disorder was plainly serious myocardial inadequacy with dilatation of both ventricles and muscular mitral insufficiency, but the question of moment concerned the state of the heart muscle and the possibility of its restoration to a fair degree of function power. The history of pneumonia eighteen months before and the man's age rendered likely the existence of a chronic myocarditis. But inasmuch as the gall bladder complication appeared responsible for the break-down of cardiac competence and seemed militating against recovery an operation was recommended in the hope that subsequent rest and treatment might restore some degree of compensation.

Operation.—Accordingly the gall bladder was opened a few days later and was found to contain stones besides exhibiting the usual changes of chronic infection. The heart stood the slight shock of the operation and ten days subsequently was reported by the attending physician to be showing a little improvement.

Postoperative History.—Unfortunately this improvement did not last and when the man was examined three months later the dilatation and myocardial inadequacy were still very serious. Nevertheless he persisted in his attempt to do business, with the result that he overstrained his weak heart, was removed to a hospital for treatment, but to no purpose, and death took place in March, 1906.

CASE 4.—Patient.—H. C. S., manufacturer, aged 61, was seen in April, 1907, because of heart disease. Ten years previously he had had symptoms of glycosuria but not of diabetes and at length sugar had disappeared; seven years before the present illness an operation for perirectal abscess was followed by a perineal abscess that broke into the bladder; several years prior to the glycosuria some sort of trauma with internal injury. In November, 1906, he had a fall, succeeded two weeks later by numerous attacks of epigastric pain that eventually became constant, was accompanied by fever and kept patient in bed. In December, while sitting up in bed to take a drink, he was seized with a sudden sensation of something having burst in the abdomen and fell back in a state of shock from which he was aroused with difficulty. From this obscure illness convalescence was slow and never complete, so that when Mr. S. went south in February he had slight ankle edema and symptoms of cardiac incompetence; by end of March ascites, and a physician ordered rest in bed, cathartics and heart tonics; as soon as able to travel the patient returned home and I examined him.

Examination.—Symptoms were dyspnea on exertion, slight cyanosis, pulse regular and 96 to 105 at rest, systolic blood pressure 154 (Janeway), diastolic 80, radials moderately stiff, no fever, and appetite, digestion and bowel movements good, urine increased at night but without albumin. Physical examination, briefly stated, yielded the following: Heart dilated as shown by feeble apex tap $4\frac{1}{2}$ inches to left and transverse increase of both superficial and deep cardiac dullness, the tones feeble and first at apex obscured by systolic murmur of maximum intensity over right ventricle; the second sound at apex doubled and aortic second tone intensified. Lungs were negative. The really interesting feature in this case was connected with the liver, which on superficial examination appeared enlarged from stasis. It was soon discovered, however, that the enlargement was strictly circumscribed and presented the shape of a swelling with convex upper surface and slightly uneven inner border that projected from the costal arch almost to the level of the umbilicus. This swelling was tender to palpation and by means of the tuning-fork could be differentiated from the body of the liver, which percussion showed of normal size and shape. Lastly, there was a right inguinal hernia.

Diagnosis.—Dilatation and incompetence of the heart, probably also some degree of chronic myocarditis, complicated by an intra-abdominal condition, thought to be a cholecystitis. It was stated also that the illness in the preceding fall with in-

termittent and afterward constant epigastric pain had been an acute exacerbation of an old gall bladder infection—that the sensation of something having burst in the abdomen and the resulting shock might have been due to rupture of the distended gall bladder, and that unless this complication were removed surgically restoration of cardiac competence was impossible.

Operation.—Accordingly a surgeon was called in who agreed in the diagnosis of chronic cholecystitis and concurred in the advisability of operative intervention. The consideration of the heart symptoms having developed during or directly subsequent to the acute illness in the fall gave hope that after removal of the abdominal complication myocardial adequacy might be regained. A week later the operation of opening and draining the gall bladder was done under ether. On incision of the abdominal parietes a clear, sticky serum gushed forth which coagulated speedily and the swelling collapsed. The gall bladder was then found, stitched to the abdominal wall, opened and drained. It was large, white, thick and filled with viscid almost black bile and no calculi.

Postoperative History.—A week later the pulse was of normal rate, the murmur gone and dilatation no longer demonstrable. Before long the man was going to his office but with the drain still in his gall bladder, and he had no further cardiac symptoms except for a short time when the flow of bile became checked. The pulse then became rapid but again fell to its wonted rate on re-establishment of the discharge of bile. In August he suffered a fall from a height of eight feet, which accident was followed by a return of the tumor and pain in the abdomen but without disturbance of the heart's action. Consultation with another surgeon resulted in a diagnosis of pancreatic cyst and a decision to operate. This was never completed, however, as death occurred on the table.

Autopsy.—This disclosed no cyst of the pancreas but a remarkable condition of the omentum. This was attached to the hernial sac and so twisted on itself as to have formed a pouch at its upper part. Into this pouch serum had transuded in consequence, probably, of constriction of the mesenteric vessels, and it was this localized ascites that created the swelling in the vicinity of the gall bladder.

CASE 5.—Patient.—J. B., marine engineer, aged 47, was seen in May, 1907, because of dyspnea and other symptoms, due, as he had been told, to heart disease. The only points in the history worthy of note were typhoid fever in youth and, ten years before the present illness, a severe abdominal pain relieved by a purge.

Physical Examination.—The patient's height was 5 feet 7 inches, weight 177 but normal 202 pounds; conjunctivæ subicteric; no edema, or fever; urine negative; pulse 107 and regular, radials slightly thickened; systolic blood pressure 112 and diastolic 75 (Janeway). There was no perceptible cardiac impulse and deep-seated dullness was greatly increased to left, reaching six inches to left of the midsternal line; sounds were all weak but clear and no murmur was audible. The chest and abdomen were negative. Questioned particularly as to other symptoms than shortness of breath, the man mentioned occasional pains in the lower chest in front which, beginning on the right side, extended upward and across to the left. The diagnosis seemed clear of cardiac hypertrophy with dilatation in consequence of chronic myocarditis and the patient was ordered to bed in charge of a physician in proximity to the man's temporary abode.

Course of Disease.—Treatment for the next two weeks seemed to be improving the condition of the heart, when suddenly, in June, the patient experienced acute pain in the region of the gall bladder, temperature rose to 103 F. with great acceleration of the pulse, marked tenderness below the right costal arch and rigidity of the rectus. Acute cholecystitis was diagnosed and an operation performed, the surgeon finding an enlarged enormously thickened and white gall bladder distended with sticky, black bile and mucus. But the significant feature of this case is that after the opening and drainage of his gall bladder the area of cardiac dullness became appreciably reduced in size and the man lost all symptoms of myocardial

incompetence. When last heard from a few months ago the man was following his occupation as chief engineer on one of the boats on our Great Lakes.

GROUP 2

CASE 6.—Patient.—Mr. McA., contractor, aged 73, seen in consultation May 16, 1907, because of angina pectoris, heart and kidney disease, gave the following history: He had considered himself well until three weeks ago, when one morning while sitting at his office desk, he was seized with a severe pain in the epigastrium and lower part of the chest. The patient arose, went into his cashier's room adjoining and asked to have a physician summoned. This doctor considered the pain due to indigestion and prescribed accordingly, but the pain did not cease for four hours. Symptoms of cardiac incompetence developed the day following and the family physician quite naturally regarded the attack as having been one of angina pectoris, and finding the heart dilated ordered the patient to bed. The only other illness in the patient's recollection had been thirty years previously and consisted of abdominal distress with fever and diarrhea. The symptoms were shortness of breath, especially at night, troublesome eructations of gas, urine scanty, showing a few fine granular casts but no albumin, temperature normal.

Examination.—The patient was in bed, breathing somewhat hurriedly and superficially, looked pale and thin; no edema; pulse 76 to 80 and frequently intermittent; systolic blood pressure 140 (Janeway) and diastolic 78, radials slightly thickened, veins negative. The heart-apex beat was distinct but feeble in sixth space five inches to left of the midsternum and relative dullness increased to one inch outside nipple; the first sound at apex accompanied by blowing systolic murmur and at base both second tones accented. The lungs were negative. The abdomen was thin, and below the right costal margin could be felt what seemed to be the liver. Careful percussion, however, showed the liver to correspond with the inferior costal arch, while below this line was a smooth, rounded body which, slightly tender, glided easily beneath the fingers with each act of respiration and by means of the tuning-fork could be differentiated from the liver. May 19 the patient had another slighter attack of pain in the hepatic region, and at my visit on the 22d the conjunctivæ were subicteric, the temperature was about 100 F., pulse more frequent and more irregular, heart's dullness still more increased, the murmur more intense, the liver congested and the swelling at its lower edge more easily palpable and unmistakably tender.

Diagnosis.—This was now clear and the opinion unequivocally expressed that the underlying cause of the trouble was chronic cholecystitis which had led to an attack of hepatic colic and not angina pectoris and had precipitated the myocardial break down. Degenerative changes in heart, arteries and kidneys were present no doubt, and on this account the gall bladder complication was preventing and would prevent restoration of compensation unless the gall bladder were removed by operation. This being hazardous, surgical counsel was obtained from three men of wide experience. The first was noncommittal; the second dismissed the case as purely medical; while the third coincided in the diagnosis already given and the view that although attended with great risk an operation afforded the only chance of the heart being restored to even a fair degree of competence.

Operation.—The friends decided to incur the risk and on May 25 the gall bladder was opened under gas. This anesthetic was borne badly, but at the end of eighteen minutes was withdrawn, as the operation was almost finished. Such was the rigidity of the abdominal wall, however, that a little more gas was ordered, whereupon respiration ceased promptly and death took place in spite of vigorous efforts to revive the patient. As in the other case, the gall bladder was large, thick, white and filled with black, viscid bile. No calculi were obtained. The only consolation possible under the circumstances was the corroboration of the accuracy of the diagnosis regarding the part played by the cholecystitis in destroying the competence of a heart muscle already diseased and only requiring a biliary colic to overpower its potential integrity.

CASE 7.—Patient.—Mrs. H., housewife, aged 64, was seen in consultation May 22, 1907, because of great irregularity of the pulse and other symptoms of heart disease. She had had typhoid fever in childhood; twenty-five years before, when pregnant, she had been trampled on in a crowd, and this was followed by bloody vomiting but not abortion; seven years before the present illness a severe epigastric pain lasting two or three days and slighter pains at intervals ever since; during the past winter an almost steady distress in region of stomach and for past three weeks shortness of breath on exertion. The present illness began with severe epigastric pain, which, radiating into the chest, was thought to be angina pectoris, especially as the patient had signs of mitral stenosis.

Physical Examination.—The patient was in bed, with rapid, feeble but regular pulse, rectal temperature of 101 F., a moderately distended, tympanic abdomen with marked tenderness and appreciable rigidity directly below the right costal margin. The heart showed a tapping apex beat, increased dullness, both absolute and relative, a short presystolic thrill and murmur ending in a faint systolic whiff heard with the thumping first tone. The diagnosis was made of acute infection of the gall bladder with gallstones, the pain having been a hepatic colic, not angina, and this state of things having broken down the compensation of a mitral stenosis of moderate degree.

Operation.—As there was danger of acute peritonitis as well as of irreparable injury to the heart an immediate operation was advised. This was consented to with reluctance and hence delayed until the following morning. Beginning peritonitis was discovered and, in addition, a large, thick gall bladder which contained pus and a single black stone.

Death occurred thirty-six hours subsequently.

CASE 8.—Patient.—J. A., hotel keeper, aged 48, sought advice of me Dec. 1, 1908, because of dyspnea, irregularity of the pulse and a dull infracardiac pain present most of the time. The history, obtained with much difficulty, was in brief as follows: Typhoid at 14 years of age; fifteen years ago congestion of the liver; six years ago, after a bicycle ride, severe pain in epigastrium with vomiting, lasting six hours and called gastritis; since that time frequent bilious attacks; in May, 1908, pain in the left thigh with nausea and a few hours later, while walking, pain in the left leg with limping, and later, while sitting still, a slight stroke which speedily disappeared, leaving no ill effects behind; a week subsequently pain in region of liver and jaundiced; previous to his experience in May the patient was in the habit of taking an early morning plunge from the wharf into the ice-cold river without any ill effect on his heart; since May had not been well.

Physical Examination.—Patient subicteric but well nourished; pulse 116 in dorsal decubitus and so arrhythmic that the rate could be determined only by auscultation of the heart; systolic blood pressure 155 (Erlanger), accessible arteries slightly thickened; temperature and urine negative. Heart dilated, apex beat in fifth and sixth interspaces five inches from the median line and deep dullness much increased transversely, from 1¾ inches to right of midsternum to 5¾ to left; many extrasystoles and over the body of the heart a feeble blowing systolic murmur, the pulmonic second tone accentuated. Abdomen corpulent, but below the ribs in the right parasternal line a body feeling like the liver extended downward in a convex shape for about two inches and from the right mammary to the median line, but not especially tender to palpation. The diagnosis was made of dilatation of the heart with incompetence, probably a chronic myocarditis, the incompetence having resulted from an attack of the hepatic colic in May, cholecystitis having caused also an intermittent claudication.

Course of Disease.—This man subsequently returned to Chicago and received treatment by means of rest in bed, cardiac tonics and Nauheim baths. The heart became reduced in size and the murmur disappeared, while the tones grew stronger, but the dull infracardiac pain persisted, and from time to time, especially when this pain was most persistent, the Riedel's lobe could be made out with great ease. In February the gall bladder was opened under ether and drained. It was much thickened, enlarged, white and filled with mucus, dark-colored bile and sand. When the man went home ten days later his pain had disappeared entirely and his heart's action was slightly

less irregular. He felt perfectly well. A recent report states that when the drainage-tube was removed after six weeks and the wound closed, great abdominal distention and distress, weakness of heart and asthma occurred, necessitating reopening of the wound, on which mucus and bile escaped with great relief to symptoms. What the ultimate effect on his heart will be can not be predicted, but it is feared that the heart muscle has suffered irreparable damage.

In this case, as well as in one other of which I have notes, the pain felt below the heart was spoken of as in the heart. In this connection mention may be made of the circumstance that in a certain instance when a surgeon was exploring the gall ducts for stone the patient exclaimed, "Oh, that gives me a pain in my heart!" I also recall a case seen in consultation with Dr. McCaskey of Fort Wayne, in which besides myocardial inadequacy there were attacks of pain that bore a close resemblance to angina pectoris, yet may have been hepatic colic, since there was a history, together with local findings, that seemed to implicate the gall bladder. It is these considerations that have led to the classification of some of the cases reported in Group 2; namely, that in which there is pain simulating angina pectoris.

GROUP 3

CASE 9.—Mrs. B., aged 57, short and stout, consulted me in April, 1907, on account of a heart difficulty from which she had suffered for three years. She had a fever in the spring of 1904 on arriving in Italy from India, which illness was called malaria. Directly thereafter her heart began to trouble her and she was sent to Bad-Nauheim, where she took a course of baths under Dr. Schott. This course of treatments was repeated in the summer of 1905, and although improved thereby she still suffered from the same symptoms. No other facts of importance could be ascertained. Symptoms: persistent and annoying, irregularity of the heart, with a feeling of weakness and oppression in the region of the heart. This irregularity of the heart was especially bad when she was having indigestion, and at such times she had bad nights and was much exhausted. Naturally ambitious and energetic, she now could endure very little.

Examination.—The pulse was frequently intermittent, 80 standing and 70 in dorsal decubitus, systolic blood pressure 112 (Janeway). Percussion and palpation of the heart were impossible because of the mammary development, but the tones were feeble, especially the first, which in all areas was scarcely audible. The liver could not be palpated, but below the costal margin, right parasternal line, there was tenderness. The two points that attracted particular attention were the absence of dyspnea and the history of the cardiac symptoms having originated in or directly after an attack of supposed malaria. The want of dyspnea and the fall in pulse rate from the standing to the recumbent posture seemed to cast doubt on there being any serious degree of myocardial weakness, while the tenderness below the ribs and the belief that malaria does not cause heart disease directed attention to the possibility of the illness in 1904 having been an acute cholecystitis.

Course of Disease.—During the next six weeks Mrs. B. took a course of Nauheim baths and digitalis with slight improvement subjectively but no appreciable change in the pulse or heart sounds. At length in June she reported her heart as particularly bad because of an unusually bad night from indigestion. The pulse was more intermittent than had ever been noticed, but the point of special interest was connected with the gall bladder. Palpation of the liver had been made repeatedly but always with rather undecisive results. This day, on the contrary, it required but a moment to enable me to feel a smoothly rounded body projecting downward from the inferior costal margin about two inches, which was tender and glided easily down against the fingers with each act of quiet inspiration. The patient was now told that she had chronic cholecystitis, probably a sequel to an acute infection of the gall bladder three years before and that the irregularity of the heart was secondary to or greatly intensified by the chronic infection of the gall bladder. An operation was advised.

Operation.—On June 16 the viscus was opened and drained under ether. There was the usual finding of a large, thick, white gall bladder filled with tarry bile but, in addition, a quantity of sand and small stones.

Postoperative History.—Recovery was uninterrupted, but a little digitalis was ordered for a short time both during the days directly following and for a week or so in July. Not only did the patient improve in every other respect but the pulse soon became regular, and with occasional exceptions has remained so. During December, 1908, and until February, 1909, two months, the heart's action remained perfectly regular, but the patient then contracted an attack of grip, and at present writing, April 4, her pulse intermits but nothing like so frequently as it used to. Another noteworthy fact is that soon after the operation the heart tones became appreciably clearer and stronger and in particular the first sound previously almost inaudible became distinct. The patient herself is more than pleased with the result of the operation.

CASE 10.—*Patient.*—W. M. M., dealer in live stock, aged 58, was seen on July 8, 1908, on account of attacks of palpitation with eructations of gas which awoke him in the small hours of the night, and for which he had been treated without benefit for six months. He denied dyspnea and all other symptoms except flatulence and also declared he had never been ill before.

Physical Examination.—This showed a healthy-looking man of medium height and 158 pounds in weight. The pulse was of variable rate in consequence of frequent irregularity and intermissions, but when regular for a few seconds and running at the rate of 78. Systolic blood pressure was 148 and the brachial arteries felt rather stiff. Temperature and urine were negative. Heart: The indistinct apex beat was in fifth space below the nipple and relative dullness was increased to the left to $4\frac{3}{4}$ inches from the median line. The first tone at the apex was somewhat valvular and over the body of the heart was accompanied by a feeble systolic murmur heard with especial distinctness during each strong beat following a feeble systole. These extrasystoles were at times frequent. The abdomen was negative excepting that below the ribs on the right could be felt indistinctly a resisting body seeming very like Riedel's lobe. There was no tenderness.

Course of Disease.—Treatment by means of digitalis, strophanthus, etc., and various remedies to improve digestion, including correction of the diet, was absolutely without effect on the heart. At length in August, after an unusually troublesome time with his heart, palpation revealed the Riedel's lobe or gall bladder, whichever it was, so plainly that the opinion was expressed that a chronic cholecystitis was responsible for the indigestion and behavior of the heart, and an operation was advised. This was done under ether on August 28, and a thick, white, large gall bladder filled with molasses-like bile but no stones, was opened and drained. Convalescence was uninterrupted, but for a while strophanthus was administered as the state of the heart muscle was doubtful and it was desirable to reduce what slight dilatation was present. At length the heart, previously intractable to all treatment, became regular and for several months gave the man no trouble whatever. Recently, however, this patient has returned, complaining again of his annoying heart symptoms. This time flatulence was particularly pronounced and intestinal toxemia was thought to be the cause of the disturbed heart action. At the present writing treatment addressed to this condition is steadily improving the rhythm of the pulse.

GROUP 4

CASE 11.—*Patient.*—Mr. A., bank cashier, aged 39, consulted me in October, 1908, because of irregularity of the heart's action, slight dyspnea on stairs and fatigue out of proportion to its cause. He thought these symptoms had existed since a certain occasion when he overstrained himself in swimming two years ago. In the winter of 1907 he had been threatened with typhoid fever and since then had been much troubled with gas on the stomach. Other illnesses were unimportant and habits were good.

Physical Examination.—A healthy-looking man; pulse 96 and very arrhythmic, systolic blood pressure 131 and diastolic

80, vessels negative. Temperature, skin, tongue and urine were negative. Heart: Apex beat indistinct in fifth space five inches to left of midsternum; deep dulness reached 5¾ inches to left and also slightly increased to right. The sounds were short and valvular and the first at apex was accompanied by a faint whiff most audible with the systole immediately succeeding an intermission. The abdomen was negative.

Course of Disease.—As the heart was dilated and serious incompetence seemed imminent, Mr. A. was advised to take a course of Nauheim baths, which he did with much benefit, his heart's area becoming reduced in size and the murmur disappearing with appreciable improvement in the strength of the tones. His indigestion was troublesome, however, and on one occasion he was given four quarter-grain tablets of calomel with soda to take that evening at half hour intervals. The next day he returned with a still more intermittent pulse, saying that half an hour following the first tablet and directly after the second he had been seized with cramps, vomiting and diarrhea which lasted well into the night and that slight colicky pains were still present. In the belief that these symptoms were not due to the calomel but to a possible gall-bladder trouble, careful palpation of the liver was made with the discovery of a small, tender swelling in the exact location of the gall bladder and extending about two inches below the costal arch. Two days later this swelling was less tender and less easily felt. By the end of the week all sensitiveness had subsided and the mass could be detected with difficulty. The precise degree of influence exerted on the heart by the cholecystitis, and whether or not it was responsible for the maintenance of the arrhythmia was a question hard to decide in view of the history of possible strain while swimming two years before. Nevertheless, an operation was recommended but was not performed owing to an adverse opinion given the patient in Rochester, Minn. This patient has since reported himself as pretty well, having but slight annoyance with his heart and no return of the gall bladder trouble.

CASE 12.—This as well as the next one illustrates the disastrous effect of gall-bladder disease on a heart already damaged by a valvular lesion, but for the sake of brevity will be given only in outline.

Patient.—In 1905 I was required to treat a man of 40 who had an unmistakable insufficiency of the aortic valve, probably of vascular origin. The complaint was more or less dyspnea and palpitation, but the man was always dwelling on his distress in his stomach. As the liver appeared greatly enlarged and sensitive to palpation the epigastric discomfort was thought due to hepatic congestion secondary to the cardiac disease.

Course of Disease.—At length, however, the man's gastric distress and inability to eat and digest food became so pronounced that I was led to examine the liver with particular care. To my surprise I at length was able to determine that the generally enlarged organ showed a contour and tenderness suggestive of a Riedel's lobe. On minute inquiry into the previous history it was ascertained that the man had suffered from symptoms highly suggestive of gallstone colic. A diagnosis of chronic cholecystitis was made and an operation advised, notwithstanding the serious state of the heart. The advice was heeded and an enormously enlarged and thickened gall bladder was opened and drained. It contained the usual tarry bile but no stones. The gastric symptoms were removed and the patient became able to eat, although the liver remained engorged and the heart inadequate. This latter condition better for a time, gradually grew worse and sudden death occurred some three months subsequent to the surgical procedure.

CASE 13.—*Patient.*—Mrs. F., Jewess, was in my care for about a year and a half suffering from dyspnea of effort due to mitral stenosis and occasional attacks of gallstone colic which latter she said she had for a number of years. During the fall of 1908 she was twice in a hospital.

Course of Disease.—During the first of these times the inadequacy for which she had been admitted was yielding satisfactorily to rest and the usual remedies when she was seized with one of her hepatic colics. Not only did the liver become greatly enlarged in the characteristic form of Riedel's lobe, but the heart dilated and became very rapid and arrhythmic,

while the patient herself grew so hysterical and despondent as to be controlled with difficulty. As the gall bladder condition improved the associated cardiac and nervous symptoms gradually disappeared and the patient at length went to her home improved but still far from well. A few weeks subsequently she was again sent to a hospital where she went through a repetition of her former experience, but in an aggravated degree. The liver became much enlarged and underneath its lower margin could be felt a soft, exquisitely sensitive body believed to be the distended gall bladder. Her heart weakness became alarming. Tricuspid insufficiency developed, the legs became edematous, the woman was unable to take food, vomiting was frequent and her nervousness was almost uncontrollable.

A digitalis preparation was administered intravenously; morphin and codein and cathartics were prescribed freely without appreciable benefit. The condition became so grave that both the patient and her husband were told that without an operation, which under existing circumstances would be attended with considerable risk, a restoration of compensation was impossible. Thereupon the patient decided to go home and place herself under the care of a competent neighboring physician. This she did and I was informed subsequently by the attending physician that at length, with subsidence of the gall-bladder symptoms, the heart regained a fair degree of competence, so that the woman was able again to get about. His treatment had consisted essentially of that employed in the hospital, digitalis intravenously administered, etc. It is believed that the history in this case justifies the opinion that with permanent removal of the gall-bladder complication, the heart would have regained and retained its compensation, but without an operation will go to pieces again so soon as another gallstone colic is experienced.

The contemplation of the foregoing cases raises the queries as to what the explanation is of the effect of gall-bladder disease on the heart and why not all persons with chronic cholecystitis develop cardiac symptoms. I acknowledge frankly my inability to answer these questions, but with regard to the second I suggest that a previous state of the myocardium may be a determining factor. A healthy heart muscle may endure such a disturbing influence or may recover quickly from its derangement of function. A myocardium already the seat of structural disease, on the contrary, is seriously affected by conditions of strain or by illness which otherwise would prove harmless. Therefore, since chronic infection of the gall bladder manifests itself chiefly in persons at or past middle age, when presumably the heart muscle is no longer so able to resist attacks, there are furnished the conditions capable of producing the symptom-complex reported in these cases.

The explanation of the baneful effects on the heart of some cases of gall-bladder disease and not of others is hypothetical, and accordingly several theories may be advanced: (1) the circulation in the blood of bacteria or their toxins; (2) the depressing influence of bile constituents on the myocardium; (3) disturbance of the splanchnic circulation and secondarily of the systemic circulation and heart; (4) a reflex inhibition through irritation of the vagus. It is quite possible that a different explanation is applicable to different cases and, moreover, that there must be a predisposing cause residing in the heart muscle, that is, chronic myocarditis, in consequence of which the heart is unfavorably affected by influences which a healthy myocardium would be able to resist.

1. As regards the first explanation: The disastrous—even fatal—effects on the heart of acute cholecystitis, of which every practitioner of experience must have seen instances, is a direct result of the acute infection which is capable of setting up a parenchymatous myocarditis.

In the same manner, but, of course, very slowly, a chronic gall-bladder infection may induce a chronic myocarditis. This view seems borne out by the necropsy findings in a case which I have briefly mentioned elsewhere. A woman of 33, who had suffered for nine years with cholelithiasis, died as a result of an operation on her gall bladder. The autopsy disclosed pronounced coronary sclerosis and an extreme degree of brown atrophy of the heart. Careful search failed to reveal signs of syphilis or any source of infection than that for which the woman had been subjected to surgical interference.

2. The depressing effect of cholemia on the heart has long been known clinically and demonstrated experimentally. Its most common manifestation is in a bradycardia, but the investigations of Stewart and King, of which a summary has been graciously furnished me, prove a toxic action on the myocardium of the pigment biliverdin and a blood-raising power of the bile salts. Furthermore, the combination of biliverdin with an alkaline metal, sodium or calcium in gallstones, prevents its entrance into the circulation and, therefore, its toxic action on the heart. These facts explain the pernicious effects of chronic cholecystitis whenever there is mild but prolonged cholemia shown by slight icterus. Not only may there be chronic, though slight, toxic effect on the heart, but the increase of blood pressure caused by the bile salts may be a factor in gradually overcoming the functional integrity of an already degenerated heart muscle. Given on top of this an acute exacerbation of the chronic cholecystitis and we have all the factors necessary to acute myocardial incompetence.

3. The third hypothesis of irritation of the splanchnic is one which should not be ignored, but in the present state of our knowledge can only be hinted at vaguely. Nevertheless, since the splanchnics are the regulators of the circulation, it may be that disturbance of the intra-abdominal circulation may prove an added factor by unfavorably affecting an already weakened heart and to lead to its dilatation and incompetence.

4. Lastly, the disastrous effect on the heart of biliary colic is probably a reflex result of stimulation of the filaments of the pneumogastric distributed to the wall of the gall bladder. This is more likely, since the formation of gallstones tends to protect the heart from the toxic effect of biliverdin by preventing its absorption into the blood. It is likely also that reflex derangement of the heart is occasioned when soreness is present and not intense pain. It does not seem applicable, however, to cases in which the gall-bladder symptoms are indigestion and not colic, although it must be acknowledged that in many of these cases palpation of the liver reveals marked tenderness. In chronic cholecystitis, therefore, without colic or subjective distress, the harmful effect on the heart must be ascribed to the circulation in the blood of biliverdin and possibly of bacterial toxins, to which may be added the prolonged blood-raising influence of the bile salts. Then if to these be conjoined the disturbing effects of chronic indigestion, we have a variety of factors capable of setting up the cardiac disorders observed. That more or less structural damage to the myocardium ensues seems likely from the readiness with which arrhythmia returns on slight disturbing conditions as in Cases 9 and 10.

The question of operative interference in cases of the kind here reported is one that must be met and answered by the physician according to the exigencies of

each case. That the cholecystitis should be recognized and drainage of the gall bladder instituted before cardiac symptoms arise is self-evident, and the cases are here reported in the hope that general practitioners may be impressed with the frequency of inconspicuous gall-bladder disease and probably may derive some aid in its recognition. Experience has convinced me that the opening and drainage of the gall bladder is attended with less danger, when properly performed, even though myocardial incompetence be present, than is non-interference. Did time permit, cases could be cited which would prove the peril to the patient and the culpability of the physician in leaving a chronically diseased gall bladder unoperated on when timely surgical intervention would have preserved the heart from irreparable damage and even spared life.

LITERATURE

A search of the literature, so far as that has been possible, with a view to discovering cases of the kind here reported, has not been very fruitful of results. Scattered references to the effects on the heart of acute and chronic cholecystitis and to the behavior of the heart during an attack of biliary colic exist in works devoted to the practice of medicine, but, with exception of a paper by Riesman and of certain cases therein cited, no report of the kind here made has been found. For example, Osler,¹ in describing the symptoms of biliary colic, says: "Palpitation and distress about the heart may be present, and occasionally a mitral murmur develops during the paroxysm, but the cardiac conditions described by some writers as coming on acutely in biliary colic are possibly pre-existent in these patients." Krehl,² also in an article on myocardial diseases, says what may be translated as follows:

Disorders of the liver, especially gallstones, and also diseases of the genital organs, occasion at times motor or sensory disturbances on the part of the heart; palpitation, slowing or acceleration of its rate, precordial pressure, pain or anxiety, at times indeed stenocardiac attacks. Often these symptoms are united with heavy and difficult breathing.

And Sticker,³ in his chapter on asthma, narrates a case of a woman whom he was called to treat for an asthmatic seizure that came on during an attack of gallstone colic and in whom the right heart was much dilated, both the asthma and dilatation disappearing after cessation of the pain. Doubtless similar passages might be found in other works.

In 1907 David Riesman⁴ published a report of two cases seen by him which displayed a systolic murmur at the apex and increased cardiac dulness during or directly following a gallstone colic. He also cites the following cases gathered from the literature: Gangolphe,⁵ 9 cases, 4 of cholelithiasis, 2 of emotional jaundice, 2 of hepatic cancer and 1 of cholangitis, in which cardiac murmurs occurred; Fabre,⁶ 8 cases of jaundice, the heart affected in 5; Rendu,⁷ in 1883, a case of hepatic colic in which systolic murmur developed, another case of colic and icterus in which there was marked arrhythmia.

1. Practice of Medicine, Ed. 4, 1901, p. 564.

2. Von Marings: Lehrbuch der Inneren Medicin. Ed. 5, 1908, p. 371.

3. Nothnagel's Specielle Pathologie und Therapie, xiv, part 2, sub-division 2, p. 17.

4. The Development of Cardiac Murmurs During Attacks of Biliary Colic, THE JOURNAL A. M. A., May 11, 1907, xlviii, p. 1589.

5. Du bruit de souffle mitral dans l'ictère, Thèse de Paris, 1875.

6. Gaz. d. Hôp., 1877, p. 916.

7. De l'influence des maladies du cœur sur les maladies du foie et réciproquement, Paris, 1883.

mia, and another of catarrhal jaundice with gallop rhythm but no arrhythmia. Rendu also cites a case of Potain, which showed all the signs of tricuspid insufficiency without the recognized causes of that condition. According to Riesman, Tessier⁸ classifies the cardiac disturbances due to gastrohepatic diseases as (1) intensification of the second sound, (2) doubling of the second sound, (3) a tricuspid murmur, and (4) complete tricuspid incompetence with venous pulse. Other writers who have dealt with the development of cardiac murmurs in cases of jaundice are Revillout¹⁰ and Guéneau de Mussy, who, according to Revillout, was the first author to mention their occurrence. Quinke,¹¹ likewise mentioned by Riesman, recognizes a systolic murmur and intensification of the pulmonic second tone in icterus, but thinks them no more frequent than in other states attended with anemia.

In addition to the foregoing, I have discovered reports of cases of inflammatory lesions of the heart due to gall-bladder disease. Thus, Leva,¹² from Eichhorst's clinic at Zürich, reported two cases of ulcerative endocarditis resulting from disease of the gall bladder. The first was that of a 50-year-old multipara, who, after having suffered from icterus and gallstones, suddenly developed signs of endocarditis, from which she died in a short time. The autopsy showed gallstones in the common duct, expansion of the biliary passages and fresh thrombotic endocarditis of the tricuspid valve. The second case, in 1889, was that of a 44-year-old woman who was brought moribund to the hospital and died three days later. At the necropsy were discovered a fresh endocarditis developed on an old mitral disease, gallstones with dilation of the bile passages, abscess of the pancreas and meningitis. Leva cannot prove a definite connection between the disease of the gall bladder and the endocarditis, but any other etiologic factor for the valvulitis is wanting, and hence he concludes that in the first case the organism must have wandered from the gall bladder into the blood without leaving any changes behind, while in the second the pancreatic abscess and meningitis were undoubtedly secondary to the gall-bladder disease.

Leva failed to find similar cases in the German literature, but in the French found the following: Martineau¹³ in 1866, Netter and Martha¹⁴ in 1886—a case of multiple abscesses with gall gravel scattered along the intrahepatic bile ducts of the right lobe of the liver and an ulcerative endocarditis of the mitral valve. They believed that the two conditions were of common origin, since they identified the same organism in both situations and in the duodenum. These authors also cite reports by M. Luys (1864), Murchinson (1868), Jacquoud (1872), Roudot (1883) and Malibran (1884), but think the etiologic connection was not proven.

In 1893 C. Oddo¹⁵ of Marseilles reported a case of a 40-year-old man who, having had gallstone colic for several years, suddenly developed a typical attack of biliary colic and jaundice; two days later a feeble arrhythmic pulse with signs of pericarditis from which he died a few days later. Oddo did not find similar cases in literature.

L. Bard¹⁶ reported two cases of catarrhal icterus with bradycardia. In the first the pulse rate varied in the recumbent position between 48 and 52, but in the upright posture 84 to 88. In the recumbent position two jugular pulsations were seen to each cardiac systole and there was a doubling of the second sound, the third element being feeble and distant. In the second patient, the pulse in the dorsal decubitus was from 48 to 52, but in the erect posture 96. The heart sounds were the same as in the former case, but in the jugulars four pulsations were observed to each systole of the ventricles. The condition of the heart continued for several days after disappearance of the icterus.

Finally, the literature contains numerous references to the effect on the heart of the injection of bile into circulation, but, as these experiments are foreign to the class of cases here reported, they are omitted.

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MANAGEMENT OF HEMORRHAGE FROM THE PARTURIENT CANAL *

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The successful management of hemorrhages of the parturient canal requires an intimate knowledge of their causes, unerring judgment, and immediate action for their prevention or control. It is important, therefore, to have in mind a well-developed plan of aggressive action in these emergencies; for on promptness and directness depend the safety of the mother and child.

These hemorrhages may occur before, during, or after labor. Those occurring before and during labor are either accidental or unavoidable. The accidental are due to the partial separation of the placenta from its normal situation in the upper segment of the uterus on account of some pathologic state of the uteroplacental union or traumatism. The hemorrhage may be concealed, visible, or both. The concealed may be dependent on bleeding between the uterine wall and the placenta, the margin of the latter remaining attached; to extravasation of the blood between the membranes and the wall of the uterus; to rupture into the amniotic sac; to stenosis of the cervix or its occlusion by the presenting part.

The unavoidable variety is due to the separation of a vicious implantation of the placenta in the lower segment of the uterus. It is designated lateral, marginal, or central prævia, according to its relative position to the cervix.

Hemorrhage occurring after the delivery of the fetus may originate in any part of the parturient canal; but postpartum hemorrhage proper is only from the placental site. It is primary when it occurs within twenty-four hours after birth of the child; it is secondary when it takes place at any time during the puerperium subsequent to the first twenty-four hours. While the true form is from the placental site, yet there are other cases in which the bleeding may originate from the cervix, vagina, or pelvic floor. Finally, one or more of these types may be combined.

FREQUENCY

Premature separation of the normally implanted placenta is not of common occurrence, and, in fact, its

8. *Gaz. d. Hôp.* 1878, p. 667.

10. *Gaz. d. Hôp.* 1878, p. 666.

11. *Diseases of Liver*, Nothnagel's Practice, English transl., p. 438.

12. *Deutsch. med. Wchnschr.* 1892, xvii, 228.

13. *Arch. gen. de méd.* 1866.

14. *Arch. de physiol. norm. et path.* 1886, xiii, 7.

15. *Péricardite complication de colique hépatique*, *Rev. de méd.*, 1893, xiii, 829.

16. *Semaine méd.*, 1902, xxiii, 15.

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