TRANSACTIONS OF THE PHILADELPHIA ACADEMY OF SURGERY.

Stated Meeting, March 8, 1898.

The President, J. Ewing Mears, M.D., in the Chair.

OPERATIVE TREATMENT OF DISABLING DEFORMITY FOLLOWING FRACTURE OF HUMERUS AT ELBOW.

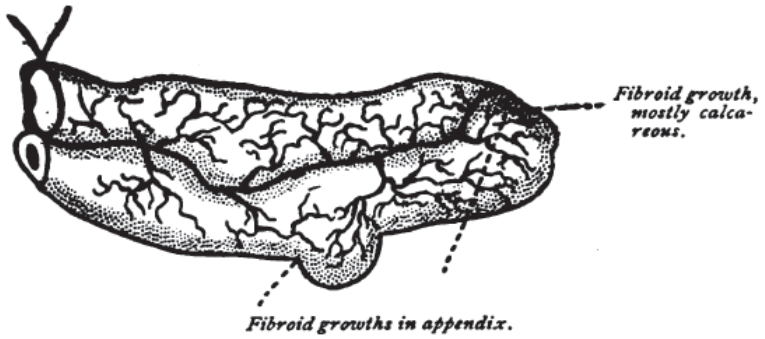
Dr. John B. Deaver presented drawings and radiograms illustrating the case of a boy, thirteen years of age, who had sustained fracture of the internal condyle of the left humerus and backward dislocation of the bones of the forearm. Six months later he had nearly complete ankylosis of the injured joint. An incision over the elbow-joint anteriorly revealed the internal condyle pushed forward and surrounded by callus. The displaced and obstructing bone was chiselled away until free flexion and extension of the forearm was possible. Four weeks later the patient was discharged, having full extension, and a little more than one-half flexion.

Dr. William J. Taylor stated that in two instances he had operated for the relief of badly united fracture of the elbow. A very important point in dealing with such cases was to remove more bone than might at first seem necessary, for during the after-course of the case, if a large amount of bone has not been taken away, enough to make practically a flail joint, there will be a sufficient amount of new material formed to very seriously hazard the ultimate mobility of the joint.

SUPRAVAGINAL HYSTERECTOMY FOR MYOMA.

Dr. Deaver presented five specimens of uterine myomatas removed by abdominal section and supravaginal hysterectomy. The first tumor was of the size of a fœtal head. No drainage. Recovery uneventful. The history of the second case was similar

to that of the first. For the third case glass-tube drainage was employed for three days. Recovery uneventful. The fourth case was a very vascular tumor, twenty-five pounds in weight, in the removal of which there was much unavoidable loss of blood and great shock. A litre of hot, normal, salt solution was left in the peritoneal cavity, and more was injected into the subcutaneous connective tissue. Death ensued shortly after completion of operation. In the fifth case a large subperitoneal mass had developed, between the folds of the right broad ligament. It was enucleated without accident, and a good recovery followed. The vermiform appendix presented two fibroid masses (see Figure), each about five centimetres in diameter; one situated at the midpoint of the organ opposite the mesenteric attachment; the other, which had undergone partial calcareous change, was situated at



Dr. Deaver's case of fibroid growths in the wall of the appendix.

the tip, within the mesenteric attachment. The appendix walls were much thickened throughout. This appendix was removed later.

Microscopic examination revealed the appendix coats greatly thickened, the lumen almost obliterated, the mucous membrane atrophic. There was great thickening of the walls of the blood-vessels with a round-celled infiltration throughout the various layers of the organ. The side of the appendix opposite the mesenteric attachment contained an encapsulated fibrous growth, which in spots showed a tendency to calcareous degeneration.

DR. GEORGE ERETY SHOEMAKER said: In the removal of fibromas Dr. Deaver has used a method which is rapidly coming to the front, and will undoubtedly replace all others,—*i.e.*, the control of the blood-supply prior to the removal of the tumor

This is a true surgical method and is theoretically the most simple, although practically it is in some cases a great deal more difficult than it seems. Any one who is familiar with the possibilities in the way of distortion of the anatomy of the abdomen will recognize this. There are but four vessels to tie, and then one can amputate at leisure. The elements of success in hysterectomies of this type are undoubtedly the avoidance of handling the intestines and the early control of the hæmorrhage. If the arteries can be reached very early in the operation there is practically no hæmorrhage.

OPERATION FOR PERFORATING TYPHOID ULCER.

DR. DEAVER reported the following case of typhoid perforation: A woman, aged twenty-three years, was admitted to the German Hospital by the direction of her attending physician, Dr. W. Duffield Robinson, January 16, 1898, on account of general peritonitis, due to perforation of the bowel, which had occurred on the twenty-first day of typhoid fever. Up to that time the disease had run rather an uneventful course.

At 3 A.M., on the day of her admission, the patient was suddenly seized with violent abdominal pain; symptoms of collapse followed. There was a drop in temperature, reaching a point below normal, and a slight increase in the rapidity of the pulse-rate. The abdominal muscles soon became rigid; slight distention followed the rigidity some hours after the onset of pain. The pain continued to be general, "cramp-like," and quite severe, perhaps greatest about the umbilicus. No vomiting. She was admitted to the hospital at 6.30 P.M., and was etherized as soon as removed from the ambulance.

A small incision was made in the median line of the abdomen. On opening the peritoneum gas and pus escaped. Pyogenic membrane appeared on the small bowel in several places. Small bowel was quite adherent at the site of a perforation which, large enough to admit a small pea, was detected in the ileum, opposite the mesentery, about seven inches from the ileo-cæcal junction. This was closed by black silk sutures. The peritoneal coat of the bowel was united over the deep layer of sutures. The abdomen was flushed with warm sterile water and glass drainage inserted. Wound closed with interrupted silkworm-gut suture. Light aseptic gauze dressing. Abdomen packed with ice. Oper-

ation lasted seventeen minutes. Patient in her room at seven o'clock, with a temperature of 101⅛° F.; pulse, 176.

January 17: Temperature range from 100⅜° to 102⅜° F.; pulse, 172 to 128. Distention increasing; no vomiting; no bowel movement or flatus.

January 18: Temperature 104⅜° to 101⅛° F.; pulse, 152 to 142. Distention more marked. Vomited once. Sponge bath given every two hours.

January 19: Patient died at 7.40 in the morning.

Autopsy revealed "general peritonitis;" many typhoid ulcers. The sutures closing the perforation had not given way. No other perforation was found.

Dr. J. Ewing Mears remarked that in cases of perforating typhoid ulcer surgical interference was not justifiable, and should not be instituted in cases in which the perforation occurs when the infective process is at its height. In mild cases of the disease, in which the pyrexia has not been of high grade and in which perforation occurs at the end of the third week or later, when the stage of convalescence is fully pronounced, laparotomy may be performed. In cases of this character Lücke's method is advised, —laparotomy with the formation of an artificial anus. Rapidity in operation will be an essential factor in the achievement of success.

GASTRO-ENTEROSTOMY.

Dr. Deaver reported the case of a man, thirty-one years of age, who, two years before, being in excellent health and without any gastric disorder, was struck violently across the abdomen and left arm with a wire one-half inch in diameter. About a dozen blows landed on his abdomen, as patient could not get out of the way, his back being against the wall, and the machine in front of him. With his right hand he brought the machine to a stop. He was immediately taken to his home, where it was found he had received a fracture of the lower left forearm. Patient confined to bed. On the third day he had bloody vomiting; the amount filling a washbasin and a chamber vessel. Fever continued for a day with delirium. In about a week or ten days was out of bed. From the time the vomiting set in he complained of severe pain on eating, followed by vomiting. For about a month vomiting continued three times per day, usually after eating, with very severe pain. During this time his

appetite was excellent, but he did not dare take much food on account of the severe gastralgia which followed. The pain in the epigastrium and vomiting every three or four days continued during the year of 1896 and spring of 1897. Lived on a light diet of eggs and milk. In October, 1896, had to stop work on account of weakness. On July 4 he had two attacks of bloody vomiting. The first spell contained bright red blood, the second, which followed after some hours, contained clotted blood. Vomiting and pain still continued. He lost about sixty pounds in weight.

Under ether, an incision was made in the linea alba from the ensiform cartilage to a point midway between the same and the umbilicus. A mass the size of a medium-sized orange was found at the pylorus. The extensive adhesions, the infiltration of adjoining stomach and duodenal walls, and the very bad general condition of the patient influenced him against so radical an operative procedure as excision. Stomach opened and digital examination made, which disclosed a practically occluded pylorus. A lateral anastomosis was established between stomach and small intestine by incision and suture. Abdomen closed without drainage. Uneventful recovery. The immediate result of the operation was that the patient was able to take more food, but not much solid food. There was no more vomiting, but some pain still continued.

Dr. Deaver remarked that the chief points of interest in this case were first the traumatic origin of the growth; second, the open question whether the growth be malignant or not; third, that the anastomosis was made by simple suture. It is the rarest thing for him to use any mechanical device in this operation, believing that greater good is accomplished by being able to make the orifice of communication between the parts anastomosed much larger than can be done by using most of the mechanical appliances originated for this purpose.

ABDOMINAL SECTION FOR GUNSHOT WOUND OF THE STOMACH.

Dr. Thomas S. K. Morton reported the case of a man, aged thirty-two years, who was admitted to the Samaritan Hospital July 31, 1897, and discharged August 29. He was sitting in a water-closet at a suburban park when a rifle was accidentally dis-

charged in a shooting gallery near by. The ball, a conical .22 calibre, penetrated the one-inch-thick board forming the wall of the privy and entered the patient's right loin, two inches outside of the vertebral column and about midway between the crest of the ilium and last rib.

Upon admission to the hospital, a few moments later, he was found to be in a condition of severe shock, and was reported to have vomited largely of blood. External heat and stimulants were applied. Dr. Morton saw him two hours after the accident. At that time he was in slightly better general condition, and complained of excruciating abdominal pains as well as of continued nausea. Manipulation of the abdomen originated severe cramps. The ball could be felt subcutaneously about half an inch to the left of the median line midway between the ensiform cartilage and the umbilicus. The urine was drawn and found to be free of blood, so far as ocular signs were concerned. The genito-crural nerve had evidently been cut by the projectile, as complete anæsthesia prevailed in the distribution of that nerve on the right side. He again vomited a quantity of blood during the examination. It was determined to at once proceed with operation without awaiting reaction, as bleeding evidently was continuing.

Ether was administered, and a three-inch incision made in the median line between the umbilicus and ensiform cartilage. Considerable free blood was found in the peritoneal cavity beneath the line of incision, and an opening in the anterior portion of the stomach was immediately discovered, owing to a circular ecchymosis about an inch in diameter surrounding it. Upon lifting the viscus a quantity of air, mucus, and clotted blood was ejected through the wound of its wall, because of a sudden contraction of the muscles of the organ, as is so often observed in handling it during operative manipulations. The wound was sutured by two stories of interrupted Lembert stitches of silk. The folds of peritoneum about the pylorus and the two omenta were distended with clots of blood, which made search for the posterior or entering wound difficult. It was determined, however, that the posterior wound was not in a free portion of the viscus, hence, while it might give rise to post-peritoneal abscess, which could be dealt with should it arise, it would not be likely, should leakage take place, to originate peritonitis. The question

then arose as to the desirability of freely incising the stomach for the purpose of discovering the wound of entrance and also to more effectually stop hæmorrhage from the gastric arteries supposedly divided by the ball in its course through the organ. But on account of the desperate condition of the man it was decided simply to carry a wick of iodoform gauze down to the pyloric region and bring it out through the partially sutured abdominal wound. This was done so that if leakage took place thereabouts it would be led up through the parietal wound.

The man made a good though slow recovery. The wicking was removed on the third day, and the portion of the wound through which it emerged healed by secondary union. The urine passed for some days after the operation contained blood in varying amounts, which led to the belief that the right kidney had also been traversed by the ball. No other symptoms of kidney injury or disease presented themselves, however, in the subsequent course of the case. He was discharged well in four weeks with a firm cicatrix but very anæmic.

At the time of the meeting the patient, who was exhibited, had regained his usual strength and color. He did not then suffer from dyspepsia or other sign of gastric ulcer, and stated that he felt about as well as ever and was able to follow his occupation,—that of leather-dresser. The cicatrix was very firm. Anæsthesia of the distribution of the genito-crural nerve remained.

CHRONIC OSTEITIS OF TIBIA, OF TRAUMATIC ORIGIN.

Dr. J. Ewing Mears exhibited a skiagraph of an injury of the lower end of the tibia of the right leg. The patient, a young man, aged nineteen years, in climbing a picket-fence, five years ago, caught his foot between the pickets and fell. Immediately after the fall he was able to walk home, a slight abrasion alone indicated the point of contact of the ankle with the pickets—about two weeks after the receipt of the injury swelling supervened, the patient began to feel pain, and to walk lame. These conditions have continued until the present time, notwithstanding the efforts which have been made to relieve them. Local applications of all kinds—the use of fixed apparatus, the application of splints, change of climate, internal medication—have failed in

turn. An interesting feature of the case has been developed in the fact that the patient, who was sent to Denver, Colorado, for relief, could not remain in that climate on account of the severe pain he suffered. As is well known, this climate is a notably dry one, and yet it is not regarded favorable, so the patient states, for the relief of rheumatic conditions. Measurement about the ankles shows the right to be one inch greater in circumference than the left one.

The skiagraphic picture is not as distinct as desired. It shows, in a sufficiently distinct manner, however, the increase in size of the lower end of the right tibia. The evidence of fracture is not present. There appears to be a difference, whether real or apparent, between the articulating relations of the astragalus, os calcis, and scaphoid bones of the right and left foot.

Abscess of the bone has been suggested. The symptoms seem to indicate the existence of periostitis, with resultant osteitis, slight in character.

The patient now uses crutches, keeping all weight from the foot. Pain still continues. Dr. Mears proposed for relief of the condition counter-irritation, preferably by the cautery.

DR. H. R. WHARTON said that he had under his care a woman who presented somewhat the same history, and there appeared to be some thickening about the lower end of the tibia. She suffered with severe pain of an intermittent character, especially at night. He suspected some specific trouble, and put her on full doses of iodide, with which she had been very thoroughly treated already. He then thought of a periostitis, which might be relieved by a simple incision of the periosteum, so he cut down and incised. In doing this he discovered a large thickened and obliterated vein, probably the internal saphenous. He excised this and several branches of the internal saphenous nerve adherent to it, and a perfect recovery resulted, the wound healing promptly. Some months afterwards he saw the patient, who said she was entirely relieved.

THE IMPORTANCE OF CHRONIC IRRITABILITY OF THE COLON WITH MUCOUS STOOLS AS A SYMPTOM OF APPENDICITIS.

By GEORGE ERETY SHOEMAKER, M.D.,

GYNÆCOLOGIST TO THE METHODIST HOSPITAL.

As time goes on the number of cases increases in which appendicitis can be studied in its relation to the life-history of the patient, and relations of the disease can be determined which were at first obscure. It is not designed in this place to consider at all the well-established symptoms which accompany the acute inflammations of the appendix, but to draw attention to a point apparently much neglected in the history of some chronic forms of the disease,—viz., the prevalence, possibly for years in the life-history of the individual, of attacks of catarrhal enteritis with copious discharges of mucus. Also to the symptom of mucous discharges, in relation to attacks of recurrent appendicitis.

Patients complain of attacks of diarrhœa with general abdominal soreness without adequate cause. They may be extremely susceptible to temperature changes, so that the abdomen must be protected by woollen clothing at all seasons of the year to prevent the onset of attacks of diarrhœa with pain and soreness. The whole abdomen may be more or less constantly sore to the touch in some cases, and the jar of walking is felt. The slightest indiscretion in diet brings on copious bowel movements, often quite offensive, accompanied by pain, and the free discharge of mucus. The patient often mistakes this mucus for pus, and even intelligent persons will erroneously give a history of an abscess, filling

and emptying through the bowel repeatedly. The condition may date back to a pelvic inflammatory attack, which, according to the statement of the patient, has been diagnosed typhoid fever, but which was probably appendicitis. This condition of irritability of the colon—for it is a form of colitis—may continue for years before an attack occurs which is sufficiently definite to lead to the suspicion of appendicitis.

The relation of appendicitis to these mucous discharges and irritability of the colon may be approached from two points of view.

(*a*) As assisting in the differential diagnosis of appendicitis in obscure or complicated *acute* cases of localized pelvic inflammation.

While the typical case of inflammation of the appendix in perfectly healthy young adults can be diagnosed with great certainty along certain well-understood lines, yet no one conversant with the variety of conditions to be met in the abdomen can fail to admit that the question of differential diagnosis in atypical attacks, where long-standing abdominal disease of gall-bladder, ovary, tube, etc., has been present, is often one requiring the nicest discrimination, particularly in women with a history of recent post-puerperal trouble. For example, the writer to-day operated upon a case of ruptured ovarian abscess and ovarian cyst with inflamed appendix adherent to the cyst. One need not look far into the literature of the subject to find that even good surgeons have been mistaken in the separation of appendicitis from such conditions as tubal or ovarian inflammation or abscess, perirenal abscess, extrauterine pregnancy, obstruction from bands, inflammation of misplaced gall-bladder, tubercular disease of the right pelvis, perforated typhoid ulcer, and the like.

The point which it is desired to urge in this connection is simply this: that, whether a history of previous attacks of appendicitis can or cannot be made out, if there is a history of chronic irritability of the colon, with frequent *mucous*

discharges, the probability of the involvement of the appendix is enormously increased.

The following case may illustrate the applicability of this test in the recognition of appendicitis in connection with disease of the female pelvic organs:

Mrs. H., aged thirty-eight years, three children, youngest two years old, applied to the writer's service at the Methodist Hospital, suffering from subacute (seven weeks old) inflammation of the right side of the abdomen, together with a history of uterine prolapse and disease. The uterus, however, having been kept inside the body during the recent inflammatory attack, no longer descended, but was held up by a high attachment of the right tube and ovary to a very tender thickening indistinctly outlined in the lower appendical region. The tube was lost in this thickening, and its outer end could not be demonstrated bimanually. Now, according to her history, she had been a great sufferer from pelvic distress ever since the birth of a child three years before, when she had had fever. This looked towards a diagnosis of tubal disease. But the right-sided symptoms especially dated from a so-called attack of typhoid fever eighteen months before, since which she had had four inflammatory attacks in the right side, and was just recovering from the last. This suggested appendicitis also. The writer long ago learned to place a history of typhoid fever in a case presenting itself with a pelvic inflammatory lesion in the same doubtful category with the history of malarial fever occurring in childbed.

The thickening could readily be felt by the vagina, but, while rather low for an appendicitis, it was rather high for a salpingitis, and the question as to whether a median or lateral incision should be chosen had to be decided. When, however, attention was directed to the presence or absence of mucous discharges, their presence was considered strongly confirmatory of the involvement of the appendix, whether anything else were involved or not, and lateral incision was made. The pertinent history was this: During each of the four attacks severe pain would begin over the lower border of the liver; it would gradually extend to the region of the appendix, and this would be followed for a week or more by discharges, several times a day, of mucous stools, a teacupful at a time, with much pain. The Fallopian tube was

found, at the operation, to be several times its normal thickness, but when freed from adhesions near the ilio-pectineal line behind, was seen to contain no fluid, and it was not removed. The appendix was very short and nearly half an inch in diameter. Its walls were thickened by inflammation. It was buried in comparatively firm adhesions beneath the caput coli, and though some yellowish lymph was in its bed, there was no perfcration and no pus. There was subacute adhesive peritonitis of the surrounding viscera. The appendical wall was so softened as to perforate during the stripping of the peritoneum prior to ligation. The appendix was removed, the whole abdomen flushed but not drained, and the woman, having recovered, is now awaiting the contemplated operation for prolapse of the uterus.

(*b*) The possible *rôle* of the appendix in chronic catarrhal intestinal conditions.

This is a subject which calls for more careful study than it has yet received at the hands of the profession.

The writer is convinced that in many individuals suffering from symptoms of chronic colitis or chronic entero-colitis, without distinct crises referable to the right side, the appendix may be and sometimes is at fault. If called upon for an explanation of such a relation, it may be said that an appendix only moderately diseased, as regards its muscular walls, no doubt often presents a sacculated culture field. Its walls are not simply those of the intestine, but contain many glands, and an especial development of lymphoid structure analogous to lymphoid gland structure elsewhere. It is not unlikely that in such a sac or culture-chamber there may be presented a suitable field for the development of such modified conditions of the colon bacillus, or other normal bacteria of the intestine, as render them, when poured out into the intestine, a new factor in its chemistry, favoring the production of the extremely offensive, peculiar, mucous stool seen in these cases.

Two cases may be narrated as further illustrating the subject under consideration.

(1) Male, aged forty-four years. A vigorous and athletic

man of strong character and entirely free from neurotic symptoms. For ten years subject to frequent attacks of catarrhal enteritis due to the slightest causes, especially exposure of the abdomen to cold. Obliged to wear a flannel apron. Gradually increasing sensitiveness of bowels, until allowing a sack-coat to be unbuttoned for a few hours would bring on diarrhœa. In the summer of 1894 a slight attack of appendicitis occurred, recovery following without operation. Two attacks somewhat more severe followed in the next two years. An adherent appendix was removed by another surgeon during an interval in April, 1896. Since that time there has been complete disappearance of bowel trouble. He never resumed the heavy flannel bandage previously worn, and now habitually wears no overcoat in winter, as he says "never knowing that he has any bowels." The relation appears to be established in this case by the two years' subsequent experience of immunity.

(2) A marked case of chronic mucous diarrhœa or colitis. X., aged thirty-four years, married, was sent for operation from a Western city, with a diagnosis of old pelvic abscess, which had discharged repeatedly into the bowel. According to letters brought from attendant and consultant physicians she had had eight months before a tumor in the region of the *left* ovary, which had disappeared after a "very copious discharge of pus from the rectum." This discharge followed several weeks after the miscarriage of a dead fœtus. She had been quite ill at the time, with a temperature ranging to 102° F. and a pulse of 130. Every two or three weeks since there were said to be painful accumulations of pus and discharges by the rectum. Her physicians considered her a case of old pelvic abscess with rectal sinus, following abortion. On admission she was found to have a badly torn perineum and a completely retroverted uterus, with a large prolapsed ovary. No pus was found in the stools, which were offensive, frequent, and contained large quantities of gelatinous mucus. She was quite neurotic and was practically invalided. From the remarkably circumstantial account of the former pus discharges, obtained both from the patient and physicians, it was supposed that the remains of an old pus-sac might be found somewhere in the abdomen, but on section this was found not to be the case. The Fallopian tubes were absolutely sound. The left prolapsed ovary contained a cyst, with bloody contents, not more than two

inches in diameter, and not adherent. The uterus was large and doubled sharply back, but no thickening of the broad ligament existed; in fact, nothing could be found which would indicate that an extensive connective tissue inflammation had ever existed. The cystic left ovary was removed, and the uterus suspended. The appendix was very long and large, its walls abnormally thick, but *not adherent*. It was removed in accordance with the writer's custom when operating under such conditions. The perineum was afterwards repaired. During convalescence treatment was directed to the mucous entero-colitis. Colon washing and peptonized milk diet were the chief measures used. Recovery was perfect, though little immediate general improvement followed. She discontinued the milk diet at once and colon lavage later, but her health gradually returned. The mucous diarrhœa ceased in three months; her nervous symptoms entirely disappeared. She gained greatly in weight, and writes nine months later gratefully, "I am in perfect health."

Comment.—She had undoubtedly had puerperal sepsis long before, but it had left no physical traces. At the time of the operation her symptoms were due to lacerations, uterine and ovarian descent, and to chronic mucous colitis. I am, however, unable to explain her cure, except on the hypothesis that the removal of the appendix removed an exciting cause of the colitis.

An examination of some of the principal monographs upon appendicitis fails to show that any considerable attention has been given to the symptom under discussion. Nearly all writers fail to mention it at all. The most complete consideration found was in the excellent treatise of Talamon ("Appendicite et Perityphlite," Ch. Talamon, *Médecin de l'Hôpital Tenon*, 1892, Paris, p. 155). He speaks of chronic irritation of the large intestine, followed by mucous colitis (la colite muqueuse), as associated with recurrent appendicitis. Alternating constipation and painful mucous stools are among the symptoms mentioned as occurring between the crises. He also says that it is not always easy to decide whether these intestinal symptoms precede or follow the first attack of appendicitis. Not only does he consider, however, that mucous colitis in a number of cases ought to

be considered as a predisposing cause of appendicitis, but that it is also certain that the symptoms of this colitis are observed in recurrent appendicitis during the intervals between crises.

There is a remarkable disease of the large bowel known as mucous colitis or membranous colitis, which is essentially chronic, lasting for years, and which is characterized by stringy, tenacious sheets of mucus, or even tubular casts of the colon, and frequently associated with great pain. According to Osler ("Practice of Medicine") the origin is unknown. He states (page 440) that mucous colitis with enteralgia in nervous women is sometimes mistaken for appendicitis, and that in two instances of the kind he has prevented proposed operation. In his description of appendicitis, however, the writer has failed to find reference to the painful crises followed by discharges of several ounces of mucus, which are undoubtedly observed in some cases of marked chronic appendicitis. Whether he really did the patients a kindness in preventing the operations referred to might be a matter for further consideration and investigation. The differential diagnosis in true mucous colitis would appear to rest upon the existence of mucous casts in the stools. It is not claimed that the pathology of this disease can be settled off-hand by calling the cases appendicitis, but it is claimed that in every such case careful investigation should be made with this relation in view, and if there is good reason to suspect the appendix, it should be removed.

Abundant mucous stools may occur in tuberculous intestinal disease, and in some forms of colon ulceration.

The object of this paper is to draw greater attention to the relation of the two conditions, especially in doubtful cases, and where other diseases coexist. In all cases of chronic intestinal catarrh, especially in chronic nervous invalidism with obscure disease of the pelvic organs, the writer has learned by experience, in a number of cases, strongly to suspect the vermiform appendix. No case should be considered hopeless until this clue has been thoroughly worked

out. A thickened appendix can often be palpated. The very wide distribution of pain must not be allowed to weigh too heavily against the probability of appendical disease. This diffusion of pain is due to the fact that the same plexus of the sympathetic, the superior mesenteric, which supplies the appendix, is also widely distributed to the small intestine. The varying position of the appendix must also be considered. Careful attention to the points under discussion may save a serious error in diagnosis and may lead to the cure of a very troublesome condition of chronic invalidism.

DISCUSSION.

DR. JOHN B. DEAVER said that he had met with more cases of colitis in neurasthenic women with movable kidney than with appendicitis. He had operated for movable kidney under these circumstances several times. He had followed up some of these cases since, and a large percentage of them had been relieved. A movable kidney in contact with the colon is capable of exciting an irritation which will result in this condition of affairs. He also believed that the appendix was responsible for a certain percentage of cases, but did not think one could settle this matter definitely until the appendices had been examined microscopically. He had gone so far as to say that all cases of intestinal dyspepsia would get well sooner by having the appendix removed, combined with dietetics, rather than medication. There is no doubt that the *rôle* the appendix plays is a most important one. So far as differential diagnosis goes, Dr. Shoemaker had brought this out strongly. In cases of right-sided inflammation of the Fallopian tubes, ovarian cysts with a comparatively short pedicle twisted upon itself with gangrene of the walls, small ovarian cyst of right side having undergone suppuration, etc., is in many instances impossible to differentiate, and nothing short of an operation will disclose the actual condition of affairs. The case that Dr. Shoemaker reported proved this very well, and showed the intimate relation that the appendix held to a small ovarian cyst. Bimanual or vaginal examination would not show this. A certain percentage of tubal cases are the result of appendicitis, since the appendix is associated with the right broad

ligament by another ligament, and, in addition, there is an intimate connection between the lymphatics of the two, so that infection may take place through the one to the other.

As to enterocolitis, he had operated, during the last year, on 230 cases of appendicitis, and the percentage of those with enterocolitis was very small, but there is no doubt that it does occur as the result of chronic appendicitis.

ACUTE INFLAMMATION OF THE GALL-BLADDER.

By MAURICE H. RICHARDSON, M.D.,
BOSTON.

My attention was first called to the subject of acute infections of the gall-bladder, not, as might naturally be supposed, in well-known or suspected lesions of the gall-bladder, but rather in those cases in which acute abdominal symptoms suggested most strongly an acute intestinal obstruction or an appendicitis. Acute inflammations of the gall-bladder are by no means uncommon, especially in the course of acute infectious diseases, and as the result of prolonged cholelithiasis. I do not intend, however, to discuss those inflammations of the gall-bladder, whether chronic or acute, which are known to be dependent upon gallstones, upon typhoid fever, upon pneumonia, or upon infectious processes elsewhere, but rather those of sudden onset in patients of apparently perfect health. Though in most of the cases herewith reported no lesions of the gall-bladder, of the bile ducts, or of the liver had ever been suspected, yet careful questioning brought out in several a history more or less suggestive of gallstones in the gall-bladder. In a total of fifty-nine operations upon the gall-bladder, not more than ten cases can be regarded as cases of acute infection without known pre-existing disease.

The subject seems worthy of discussion in connection with that of acute abdominal lesions demanding immediate interference; for acute cholecystitis—acute accidental cholecystitis, if I may thus designate this lesion—though comparatively rare, is more frequent, at least in my experience and in that of the Massachusetts General Hospital, than such well-recognized lesions as intussusception, volvulus, or other forms of acute intestinal obstructions.

The importance of early recognition is quite as great in cholecystitis as in appendicitis, though, perhaps, it is not so pressing as in those acute intestinal obstructions dependent upon lesions which produce an early intestinal gangrene. Furthermore, the disease under consideration has received but scanty consideration, especially as regards diagnosis. Indeed, the differentiation of this lesion from inflammations of contiguous organs, or even from lesions remote from the gall-bladder, is, with our present knowledge, at times practically impossible. I have therefore ventured to present the clinical, operative, and pathological aspects of

a few cases, hoping to suggest points the discussion of which may prove of value in the future.

Acute infections of the gall-bladder are very serious; surgical intervention is almost always demanded. Left to themselves, the cases are liable to result in rupture, or even in gangrene, with escape of septic fluid either into the adherent contiguous viscera or into the general peritoneal cavity. In some instances the process is so violent and the invasion of the gall-bladder walls so extensive that gangrene is produced, the patient's life threatened, and often lost. Very recently an instance of this kind arose in which the lesion was not even suspected before operation, and yet in which the gall-bladder was found to be gangrenous and the focus of a spreading general infection.

Case I.—Mrs. C. D., a woman of great strength and endurance, aged sixty-two years, a patient of Dr. Chase, of Sharon, was taken Saturday, October 9, 1897, with severe abdominal pain. There had been for seven years occasional attacks of pain, which were supposed to be dependent upon gallstones. The attack of October 9 was the first after an interval of fourteen months. This lasted only a few hours. On Tuesday, October 12th, she was seized with lancinating pains near the anterior superior spinous process of the right ilium. With the attack of Tuesday she began immediately to regurgitate a dark fluid; the abdomen became rapidly distended, everywhere tympanitic and tender, the tenderness being most acute in the region of the appendix. There was no tumor, no localized resistance, no dulness. The ascending colon seemed greatly distended. The pain, which came on in paroxysms, with intervals of apparent ease, was accompanied by loud borborygmi, which suggested mechanical obstruction. The evening temperature of the day before was 99.4° F., the pulse 96; the morning temperature 99°; the noon, 101° F. There was a small femoral hernia. No jaundice had ever been observed. There had been slight loss of weight.

In this case it seemed clear that there was some kind of a mechanical obstruction, probably a malignant stricture of the sigmoid flexure, of long standing, plugged by a solid particle of food, a condition of things which I had often seen. Appendicitis was considered as a possible cause. Whatever the lesion, there seemed to be a serious peritoneal infection, and the prognosis was grave. Under ether nothing new could be discovered; there was no guide to the lesion; no choice for the line of incision. A median cut was therefore made, sufficiently long to explore the whole alimentary tract. The large intestine was normal, the sigmoid flexure and the ileo-cæcal valve healthy, the appendix unaffected. The gall-bladder, however, was acutely inflamed, distended, black, gangrenous, adherent to the contiguous viscera, and surrounded by a thin, offensive exudate. The right upper quadrant of the abdomen was the seat of a spreading peritonitis. After closure of the abdominal wound the gall-bladder was exposed by an oblique incision. The fundus was aspirated; then, after having been carefully walled about with gauze, freely opened. The gall-bladder contained hundreds of minute gallstones, suspended in a dark, offensive fluid. The gall-

bladder was drained, and the wound partly closed. The patient died in eight hours from the original peritonitis and the operative shock. The operation was too late. This was not my first experience in acute cholecystitis, but one of my latest.

Was a diagnosis in this case possible? Could the lesion have been correctly localized, or at least limited to one quadrant of the abdomen, so that the shock of preliminary exploration might have been avoided?

Although it is doubtless true that most cases of acute infection of the gall-bladder—other than those from such sources as typhoid fever, gastro-duodenal catarrh, etc.—are directly or indirectly the result of gallstones, nevertheless, some forms of gall-bladder infection are met with in which the connection between the lesion and the gallstones cannot be established. In four at least of the cases herewith reported no signs of gallstones were perceptible. If the infection was a result or a complication of gallstones in these cases, the stone must have escaped into the duodenum at the very outset of the inflammation, an hypothesis which, in the absence of jaundice, does not seem tenable. It is probably true that in most instances the integrity of the gall-bladder has been impaired by gallstones in such a manner as to invite infection —an impairment especially conspicuous when this viscus has been making violent and prolonged expulsive efforts. In these cases the gall-bladder is often found thickened and contracted; in many the cystic duct is closed. Such pathological changes are doubtless the result of long-continued inflammation and persistent contraction—conditions which have resulted in excessive hypertrophy of the walls, and serious changes in the mucous membrane, changes which in many cases may result in malignant disease. Even in cases of gallstones without contraction or hypertrophy of the gall-bladder, adhesions to contiguous viscera, as demonstrated during cholecystotomies, show that at one time or another inflammation or at least irritation of the gall-bladder has existed. It is through such changes in the structure of the gall-bladder wall that infections generally take place, whatever may have been the means of infection. In those cases of cholelithiasis in which there have been no changes in the gall-bladder or its ducts, and in which there have been no symptoms, the manner of infection admits only of conjecture; indeed, it is hard to see what bearing a few smooth bodies, such as gallstones usually are—bodies with rounded edges, neither large nor impacted—can have in producing a septic infection; for the ordinary experience in the surgical treatment of gallstones shows that in many instances the mucous, as well as the serous, surface of the gall-bladder is unaffected. Moreover, even if gallstones are found in the acutely inflamed gall-bladder, they have in most instances never given the

slightest evidence of their presence. We are forced to the conclusion, therefore, that in some instances, at least, gallstones have no influence in the production of the infection, though their presence may indicate an abnormal condition of the bile or the existence of the germ contaminations by which they were originally produced. Gall-bladders in which calculi exist without symptoms may be the seat of some obscure process which facilitates bacterial infection. Be that as it may, the fact remains that acute infections do take place without the influence of gallstones.

The case seems to be different when a gallstone has become impacted in the cystic duct, or has become, through ulceration, imbedded in the gall-bladder wall; for the altered surface distinctly invites infection. An impacted gallstone makes the gall-bladder vulnerable to invasion, just as a fæcal concretion makes the vermiform appendix. The analogy between the vermiform appendix and the gall-bladder, however, is not complete for several reasons: the gall-bladder does not resemble closely the appendix in its anatomical structure; in the appendix there is always, at the very seat of the ulceration or the irritation, abundant septic material; in the gall-bladder the bacterial invasion from the alimentary canal must take place through the common duct and the cystic duct, or through the intestine adherent to the gall-bladder. The last channel is an improbable one, however, because adhesions presumably do not take place until after the invasion; indeed, in all cases of acute inflammation of the gall-bladder which I have seen the adhesions have been recent; they have been the result of the infection rather than the means. Invasion through the medium of the blood would seem to be the only explanation of those infections which take place in the normal gall-bladder, in the absence of calculi and of infection of the bile ducts. Furthermore, with reference to the invasion of the gall-bladder through the common duct, in practically all instances of acute cholecystitis that I have seen there has been no indication whatever of disease of the bile ducts, cystic, biliary, or common; there has been no gastro-duodenal catarrh, no plugging of the common duct, no general liver infection. Had any such complications been present in Case I., herewith reported, the source and channel of infection would have been obvious.

In the disease under consideration, the great distention of the gall-bladder always present suggests a possible cause of infection, the over-distention interfering more or less with the circulation of the gall-bladder wall, and thereby inviting bacterial lodgement. Carried to an extreme degree, the distention may result in complete stasis, causing total gangrene.

Distention of the gall-bladder is certainly an important factor in acute cholecystitis. At the outset the distention may be due to an irritation at the mouth of the cystic duct, with closure often caused by the pressure or the irritation of a gallstone, without impaction. An overdistention results, which closes still more tightly the cystic duct. Finally, by bulging of its walls a valve-like action is produced upon the duct, by which the greater the pressure the tighter the valve. The causation of distention is not unlike that in an intermittent hydronephrosis. It is doubtless as true in the gall-bladder as in the kidney, that overdistentions tend to relieve themselves; yet at times the distention is, from the beginning, sudden and complete. These are the cases which without premonitory signs result in acute inflammation. I have seen, for example, two cases in which pain of an intermittent character in the right hypochondrium has suggested gallstone colic. These symptoms, persistent, distressing, disabling, seemed to justify interference. Cholecystotomy relieved completely the symptoms, but did not explain the intermittent and painful distention which caused them; for in neither instance was anything abnormal found—there were no gallstones, the gall-bladder walls were unaffected. Obstruction to the flow of bile, whether by impaction of stones in the biliary passages or by closure of the cystic duct, favors rather than hinders an ascending infection. Experiments show that ligature of the large bile ducts does not prevent infection, but renders it more liable to occur (Horman: *Cent. für Bakt.*, 1895, p. 48). The inference is that obstructing calculi act in the same way.

The shape and size of an acutely inflamed and distended gall-bladder do not differ materially from those of a chronically distended one, except that the former assumes its altered shape suddenly, and is not influenced by those adhesions which almost always exist in lesions of long standing. In acute distention the gall-bladder usually attains its greatest elongation toward the long axis of the body, in the direction of the foramen of Winslow. In such cases its depth is often remarkable. The attachments to the liver hold the fundus against the abdominal wall; its circular fibres prevent dilatation from side to side. Elongation must, therefore, take place upward and inward, in the direction of the long axis. The escape of bile through the cystic duct is doubtless impeded in this form of distention more than in any other, the dilated base forming a pouch above the mouth of the duct, which is thereby compressed and more or less completely closed. Whether such valve-action is produced or not, the subsequent history of these cases would seem to indicate that excessive distention does in some way add to the difficulties of drainage through the cystic duct, for in most, if not in

all cases, drainage through the abdominal wound is followed in the course of a few days by the flow of normal bile, even though at first nothing but mucus, pus, or decolorized bile escapes.

It seems not unreasonable, therefore, to conclude that in many cases, and in fact in all in which no stone is found impacted, the cystic duct is first closed or at least obstructed by swelling of its mucous membrane, and that this obstruction is augmented by dilatation of the gall-bladder and pressure upon the cystic duct.

The shape of the dilated gall-bladder is usually conical, whatever the direction in which its fundus may point. Not infrequently its conical fundus points directly downward. In this form of dilatation its size may be excessive, and it lies, in most cases, over the descending colon. In one instance it was buried among the intestines, though not retro-peritoneal.

The degree of distensibility depends upon the strength and thickness of the walls of the gall-bladder and upon the adhesions. In the cases especially under consideration in which no previous symptoms have been prominent, the gall-bladder has usually been thin-walled and its dilatation excessive. In some instances the attachments between the liver and the gall-bladder are very strong and thick, the gall-bladder appearing as a rounded, sessile tumor upon the under surface of the liver. In such instances the dilatation has been downward, and the shape globular.

As a rule, the septic gall-bladder is symmetrical, not irregular. It has a distinctly abnormal feel. The sensation which such a gall-bladder gives to the finger is that of a resistant, adherent, but easily separated viscus. It feels like the acutely inflamed and thickened vermiform appendix surrounded by omentum and buried in easily-yielding adhesions. This pathological condition, which in most cases is recognized first by the finger, is characteristic and very important. Many instances might be given in which the situation of a serious abdominal lesion is detected by this peculiar condition of acute inflammation with recent, easily separated, granular-feeling adhesions.

The gall-bladder itself varies in its appearance to an extreme degree. When distended by healthy bile, by thin mucus, or by decolorized bile, the gall-bladder is translucent, and its peritoneum unchanged. When a septic lesion is present, the surface of the gall-bladder is opaque, granular, and roughened. The color varies: it may be pink, red, dark red, green, light green, dark green, hemorrhagic, and even black. The variation of the gall-bladder in color and consistency is not unlike that seen in various acute lesions of the intestine—lesions varying from acute

septic inflammations of the intestinal walls to the necrotic changes of advancing gangrene.

The contents of the gall-bladder are usually dark in color, purulent, puriform, or hemorrhagic. In most cases the gall-bladder contains bile recently changed. It is usually dark green, and contains mucus and blood. Odor is generally absent, except in complete gangrene.

The presence of a clear fluid, of a white fluid, or of a simple mucus is not to be expected in the acute inflammatory cases. Such a fluid is almost invariably aseptic, like bile itself.

The mucous membrane on the inner surface of the gall-bladder is acutely congested—bright red, dark red, brown, dark brown, green, light green, dark green, hemorrhagic, or gangrenous. In many instances the mucous membrane resembles the interior of an acutely inflamed appendix. If not a necrotic process, it is the beginning of one, sufficiently established to substitute a green or a black for the normal color. Drainage is usually followed by restoration of the mucous membrane to its natural appearance. Often the supernatant fluid is comparatively light in color, the lower portions dark or purulent.

In all the acute inflammations of the gall-bladder that have come under my observation, easily separated adhesions have attached the gall-bladder firmly to all contiguous structures. In such cases the septic process has passed through the gall-bladder walls, even though gangrene has not been present. The inflammation, after a few days, results in a considerable thickening of the wall, with so much friability that stitches easily tear out. In some instances a bulging of the internal layers of the gall-bladder through the serous surface will be seen here and there. These bulging areas indicate a threatening rupture, and are due to necrotic changes in the bladder-walls.

Surrounding viscera—the hepatic flexure of the colon, the transverse colon, the duodenum, or even the stomach—may share in the septic process. The peritoneum of these surfaces is reddened, finely granular, and adherent.

Such are the usual anatomical appearances as observed upon the living by the surgeon. They doubtless differ materially from those seen at the autopsy-table.

The anatomical situation of the gall-bladder influences materially the extension of infections. The viscera in direct contact are the duodenum, colon, omentum, liver, and kidney, and sometimes the stomach. In the right upper quadrant the gall-bladder is to a certain extent shut off from the rest of the abdominal cavity, and extravasations are to that extent retarded. I called attention to this isolation of the gall-bladder

in a paper on the "Surgery of the Gall-bladder," read before the American Surgical Association at Buffalo in May, 1893, as follows:[1]

"The right upper quadrant of the abdomen, containing the liver, gall-bladder, and portions of the kidney, stomach, and duodenum, is separated from the peritoneal cavity below by the transverse and ascending colon, with their mesentery. The colon is usually in contact with the abdominal wall from the ileo-cæcal valve to the splenic flexure. Extravasations will be immediately opposed by this intestinal and mesenteric barrier, which may, however, be avoided by travelling downward along the right border of the ascending colon. In extensive extravasations the fluid will easily overcome any such obstacle, but in the slow escape of bile the opposing surface will be sufficient to prevent, by rapid adhesion-formation, any considerable infection. Anteriorly and toward the median line the stomach and duodenum act as more or less efficient barriers; posteriorly the fluid may enter the lesser cavity of the omentum through the foramen of Winslow."

The bacteriology of acute inflammations of the gall-bladder is a chapter as yet incomplete. The bacillus coli communis, from the frequency of its presence, seems to have an important rôle in producing gall-bladder infections. It must be borne in mind, however, that this prolific organism is very apt to crowd out of notice others which have much more pathogenic importance. From the contiguity of the gall-bladder to the alimentary canal, the colon bacillus is especially liable to infect the biliary passages, though the channel of infection may be difficult to determine. Should the bacillus make its way from the duodenum through the common duct and through the cystic duct, some evidence either of its source or of its progress would necessarily exist. Such evidence, however, is rarely if ever present. It must be admitted, however, that the urgency of these cases does not permit examination of the bile ducts; for the surgeon must be content with simple drainage of the gall-bladder itself. The rapid relief of symptoms afforded by drainage would seem to indicate that no general biliary infection exists.

The commoner infections of the gall-bladder naturally take place by contaminations from the intestinal tract by means of those micro-organisms always present in the healthy intestine. The nidus of infection is ever present; direct channels of invasion are ever patent; yet in some instances an infection takes place through the malign influence of bacteria that do not exist in the body in a state of health. Such, for instance, is the infection of the typhoid bacillus in patients seemingly

[1] Annals of Surgery, 1893, vol. xviii. p. 388.

well. Infections by the diplococcus of pneumonia may take place in the gall-bladder without involving the lungs or other organs. Indeed, this organism may invade the peritoneum, the appendix, the pericardium, as well as the gall-bladder, without affecting the lungs at all. Such infections have been recently observed at the Massachusetts General Hospital. In one case there was a fatal general peritonitis in which pure cultures of the diplococcus of pneumonia were obtained. Mixter has recently operated upon a case of appendicitis in which the appendix was perforated and gangrenous, and in which pure cultures of the diplococcus were found. In one of the cases here reported the gall-bladder had been infected by this micro-organism; in another by the typhoid bacillus. These clinical observations throw some light upon the question of the diversity and the malignancy of such bacetria; they suggest the possibility of a remote bacterial origin in obscure cases; they confirm the theory that in the comparatively healthy body a great variety of pathogenic bacteria may be present, ready to implant themselves upon an inviting field.

In Case IX. the typhoid bacillus was found. The disease had not been suspected; no case of typhoid had been known in the community in which the patient lived. It was only after careful questioning that a semblance of typhoid history could be obtained. Yet the culture showed a micro-organism which withstood the most rigid tests. The influence of the different forms of infection is not manifest from any observations that I have been able to make; those from the colon bacillus, the typhoid, the pneumococcus, did not differ materially; those from the typhoid and the pneumococcus were, perhaps, less fulminating than those from the colon bacillus. In the fatal cases the cultures either were lost or were not taken. Further observations in this interesting class of visceral infections are necessary.

The symptoms of an acute cholecystitis, as I have observed them, have been those of a confined abscess at the border of the right costal cartilages in the vicinity of the tip of the tenth rib. They may be those of an acute inflammation of the vermiform appendix situated near the liver; they may be those of an acute intestinal obstruction; they may be those of the sudden closure of an organic intestinal stricture; they may suggest an inflammatory process in a diseased kidney, an acute pancreatitis, an extravasation from the stomach, a malignant abdominal tumor, a tumor with a twisted pedicle.

In acute cholecystitis of whatever origin, pain is the first, the most important, the most invariable symptom. It is usually severe and paroxysmal. It is situated in the right half of the abdomen, though not always localized in the region of the liver; it may be in the normal situation of the gall-bladder; it may be in the epigastrium, or

it may be referred directly to the usual seat of the vermiform appendix. In many cases the pain becomes localized in the region of the gall-bladder; in a few it persists in areas remote from the liver. With the onset of pain are other symptoms of bacterial infection—nausea, vomiting, rise of pulse and temperature, prostration, distention of the abdomen, rigidity, general tenderness becoming localized, or localized tenderness becoming general. Often the symptoms are strongly indicative of a general peritoneal infection. Chill may or may not be present. Jaundice is seldom seen, unless the infection involves the bile duct. Vomiting, an almost invariable symptom, may be intermittent and transitory, or may be persistent. As a rule, the initial violence subsides, and the vomiting, which was at first excessive, becomes slowly diminished, to reappear, however, in case the infection becomes general. Tenderness is always found, and is generally more extensive than the lesion would seem to indicate. In this respect acute cholecystitis resembles appendicitis. The temperature is moderately high, and the pulse seldom over 100. In this disease, however, as in other peritoneal infections, the temperature seems to depend largely upon the character and virulence of the micro-organism—some causing mild constitutional reaction, others violent. The rate and quality of the pulse are reliable guides to the depth of constitutional depression. The temperature indicates an infection of some kind, but is less to be depended upon than the pulse. As in some general infections of the peritoneum, a hopeless lesion may be present with a temperature and pulse practically normal, so in acute infections of the gall-bladder the constitutional disturbance is no infallible indication.

The bowels are unaffected for the first hours of the attack. They may be unaffected throughout; yet in a certain number of cases there is complete stoppage of gas and feces. Such a condition is owing, not to a general peritonitis with intestinal paresis, but to some other cause. In three of the following cases the symptoms were such as to suggest very strongly an acute obstruction. In two of the few cases of cholecystotomy reported in the last ten years, one by Lane[1] and one by Murphy,[2] there were symptoms of acute obstruction. In Lane's case an acute obstruction was supposed to exist; in Murphy's an acute cholecystitis. Both were acute infections of the gall-bladder, and both recovered after drainage.

The symptoms of acute obstruction may point, however, toward the seat of the lesion, which, on exploration, will prove to be the gall-bladder. Yet, occasionally, as in Case I., the obstructive symptoms do

[1] Lancet, 1889, vol. i. p. 411.
[2] Twentieth Century Practice, vol. ix. p. 731.

not indicate in the least the point of stoppage. The cause is hard to tell. Lane attributed it to the paralyzing effect of the inflammatory exudate upon the hepatic flexure of the colon, with resulting paralysis; for beyond this point the colon was collapsed. In Case V. the autopsy showed a constriction at the hepatic flexure, caused by an inflammatory exudate. In the two other cases of apparent obstruction there was a peritonitis involving the whole right upper quadrant. The symptoms may have been owing to the paralyzing effect of the infection upon the contiguous coil. With the constipation of gas and feces there may be violent peristalsis and loud borborygmi—symptoms strongly confirming the possibility of an acute obstruction. Rigidity of the abdominal wall is present in the early stages of the initial peritonitis. This rigidity is right-sided, and soon accompanied by distention. As the infectious process becomes more firmly localized, the rigidity slowly disappears, until a swollen and tense gall-bladder can be felt. Often the distention persists or increases, so that the gall-bladder, masked at first by the abdominal rigidity, is later too deeply buried for palpation.

The distended gall-bladder can sometimes be felt in its normal position; in a certain number it cannot. Failure to palpate the tumor may be owing to the rigidity or to the distention; it may be owing to an unusual form of enlargement, by which it is more or less covered by the stomach, duodenum, or colon. When enlarged, lobular, and in contact with the abdominal wall, it can usually be felt, though not always, even when there is excessive distention.

In unfavorable cases, or in cases in which operation has been too long delayed, the symptoms of general peritonitis supervene. Fortunately, for reasons already given, the infectious process is successfully limited to the right upper quadrant, unless the gall-bladder wall suddenly gives way and floods with its septic contents the whole peritoneal cavity.

A correct diagnosis of acute cholecystitis may be extremely easy; it may be extremely difficult; it may be impossible. When it complicates typhoid fever, pneumonia, or cholelithiasis, the true nature of the lesion is of course at once suggested. The detection of a tender tumor close to the liver, at the usual seat of the gall-bladder, after an attack of sudden pain, nausea, vomiting, with rise of temperature and pulse, makes the diagnosis almost certain. It is necessary, however, to discriminate between the tumor of an inflamed gall-bladder, an appendicular abscess high up, a pyonephrosis, a subphrenic abscess, a suppurative pancreatitis, a localized peritonitis from gastric or duodenal extravasations caused by ulcers or foreign bodies. Symptoms appearing in persons of previous good health in whom, if suspected, gallstone symptoms have been transitory and slight, or in patients absolutely without a previous gallstone pain,

point to the gall-bladder with certainty only when the tumor is, from its position, shape, and relations, undoubtedly a gall-bladder—that is to say, when it is smooth, well-defined, rounded, moving with the movements of the liver. When the tumor is immovable, indistinctly outlined, its dulness gradually lost in a surrounding tympany, when, in other words, it is an indistinct mass buried among the viscera of the right upper quadrant, and especially when the surface of the abdomen over the tumor is adherent and reddened, its true nature admits only of conjecture, unless a history of gallstones can be obtained. Such a history, no matter how vague, should incline toward cholecystitis. On the other hand, the confounding lesions have each its suggestive history. A correct discrimination cannot always be made, however. In fact, in some cases nothing more than an indefinite inference can be drawn. Moreover, many cases are so urgent that exploration cannot be deferred for a careful study of the case. I have seen, for instance, several tumors dependent upon conditions of great rarity close enough to the gall-bladder area to be readily confounded with a gall-bladder. Not to mention the ordinary subphrenic abscess, I have seen five cysts of the pancreas, an epigastric abscess probably pancreatic, a pancreatic hemorrhage with tumor, two cases of abscess about the pylorus and duodenum —one owing to a safety-pin sticking through the pylorus; the other to a collection of gum in the stomach, swallowed from time to time by a neurotic girl. In none of these cases could the gall-bladder have been positively ruled out as a possible cause.

An exact discrimination between such infections is not indispensable, for the indications for interference will guide the surgeon to the lesion, whatever it may be.

The case is different when the symptoms are so indefinite that we can only guess from what quarter of the abdomen the infection proceeds—whether from a gall-bladder or a normally-seated appendix; when they point quite as clearly to an acute intestinal obstruction as to an acute cholecystitis. It is at times impossible to discriminate between acute cholecystitis and inflammation of the vermiform appendix. It is not strange that confusion should arise between these two infectious processes, for in many ways they are alike: the nature of the infection is the same; the relation to the peritoneal cavity the same; the symptoms of rigidity, of general tenderness, of distention the same, and the constitutional infection the same. Moreover, the bacterial influence is often identical. The only discriminating signs of importance are the situation of the pain and tenderness and the presence and seat of the tumor.

In the three cases supposed to be appendicitis the symptoms were ap-

parently so clearly appendicular in their origin that the incision was made over the appendix. The cardinal symptoms of appendicitis were present—pain, vomiting, tenderness over the appendix, fever. In two there were right-sided rigidity and distention. In none could any tumor in the gall-bladder region be felt, even under ether; nor could any resistance or cake be detected in the region of the appendix. The absence of perceptible tumor does not disprove appendicitis any more than it does cholecystitis. In none of these cases was there a history pointing in the least toward gallstones. An exact discrimination was therefore impossible. Could the cases have been watched from the beginning, with the idea that the lesion might be in the gall-ladder, it is possible that a more accurate localization of the initial infection might have been made. The difficulty of diagnosis under such conditions will be generally admitted.

In other instances the symptoms may not indicate even the half of the abdomen involved. Pain, vomiting, distention, constipation, paroxysmal peristalsis—visible distended writhing coils, without tumor or other localizing signs—these symptoms point toward an acute intestinal obstruction of uncertain origin; they may be appendicular, peritoneal, intestinal, pancreatic, cholecystic—they may be from a general peritoneal infection; they may be from an acute mechanical obstruction. In the absence of a history pointing, no matter how indirectly, to the appendix, the intestine, the pancreas, or the gall-bladder, the diagnosis is too uncertain to guide the exploring incision. In two of my cases of acute cholecystitis, in which acute intestinal obstruction was suspected; a tumor was present in the region of the hepatic flexure of the colon; in one there was no guide. In the two former the lesion was at once discovered and treated; in the last a serious preliminary search could not be avoided.

The chief importance of an exact diagnosis in these lesions is for the selection of a suitable incision. When the symptoms point more to the gall-bladder than to the appendix, the incision should be made over the gall-bladder; when to the appendix more than to the gall-bladder, it should be made over the appendix. When the operator is in doubt as to which organ is affected, the cut may be made over a not uncommon situation for the appendix, behind the cæcum, high up. The opening will then be made about half-way between the ordinary situation of the appendix and the gall-bladder, to be enlarged in either direction as the information gained may determine. Whenever the symptoms are general—when there is neither a persistent pain nor a localized tenderness; when there is no tumor; when there is no history pointing to a definite lesion—the incision must be made in the median line.

The treatment of an inflamed gall-bladder consists in so draining that viscus as not to infect the surrounding peritoneum. As soon as the gall-bladder is well exposed, all the points about it should be packed abundantly with gauze. The tension should then be relieved by aspiration. The next step consists in suture of the fundus of the gall-bladder to the abdominal wound. The gall-bladder is then either freely opened and washed out with sterile water, or it is carefully wiped with sterile gauze. Gallstones are removed, if any are present, by the use of suitable instruments. A pliable rubber tube should then be passed to the bottom of the gall-bladder, accompanied by a strip of gauze. The external wound should be closed, except just below the gall-bladder, where a small strand is left between it and the duodenum. Further exploration should not be made. A gall-bladder hopelessly necrotic should be removed.

In almost every instance of acute inflammation, and, in fact, in almost all cases of chronic inflammation of the gall-bladder with closure of the cystic duct, drainage is followed in the course of a few days by an abundant flow of bile through the cystic duct. After drainage the duct becomes pervious, either from alteration in the shape of the gall-bladder or from subsidence of the acute inflammatory process. The operator may expect, almost without exception, to see in the course of thirty-six or forty-eight hours, bile appear through the drainage-tube, even if the gall-bladder has no bile whatever in it at the time. With the subsidence of the inflammation of the gall-bladder and of the cystic duct, the gall-bladder resumes its functions as a reservoir; it empties itself from time to time through the cystic duct to carry on digestion; the opening in the fundus of the gall-bladder gradually closes, and the patient is fully restored to health.

The prognosis in acute inflammation of the gall-bladder is grave; with timely interference it is highly encouraging. In most of the cases that I have operated upon recovery has followed. What the course would have been had the cases been left to themselves it is impossible for me to say.

From the rapid extension of the gangrenous process and its necessarily grave consequences when operation is not resorted to, from the fatal results observed even after operation in cases far advanced, I cannot but think that the outlook is extremely serious, and that acute cholecystitis demands interference even more strongly than appendicitis. In cholecystisis, as in appendicitis, some varieties are more serious than others. Those in which the process does not destroy the integrity of the gall-bladder wall may result in empyema, or in a gradual subsidence of the inflammation, absorption of the septic fluid, and permanent con-

traction of the gall-bladder; those in which a necrosis of the gall-bladder ensues must be regarded as essentially fatal.

CASE II.—H. A. W. This man, aged forty years, I saw on Thursday evening, February 8, 1894, with Dr. Davis, of East Somerville, Mass. At 12 o'clock the night before he had been seized with pain in "the pit of the stomach." There had been no indiscretion of any kind. At 10.30 Thursday morning he began to vomit, and vomited all through that day until my visit. The vomitus was at first yellow, then coffee-colored.

Five years before he had had "inflammation of the stomach," never before or since. He had been a very strong and healthy man. The attack of inflammation of the stomach was accompanied by continuous vomiting and a good deal of pain.

The temperature on the morning of the attack (Thursday) was at 97°, where it remained until after the pain ceased. The pulse was 60. At 6 P M. the temperature was 100°. About 6 o'clock he vomited, and the pain suddenly ceased. The pulse, however, continued to rise, and vomiting recurred. At 9 o'clock the temperature was 100°; at 11.15, 101°. The pulse was 108, of poor quality.

The general appearance of this patient was unfavorable; his color bad. The abdomen was distended and rigid; the skin circulation sluggish. No tumor could be made out. The tenderness was general, but more on the right than on the left. The lesion was supposed to be appendicitis, with a general infection. A grave prognosis was given.

The incision was made midway between the appendix and the gall-bladder. The appendix was found to be deeply buried in old adhesions, and inseparable except with great difficulty from surrounding structures. There was no evidence of recent appendicitis. The region of the gall-bladder was next explored; here a globular tumor could be felt adherent by easily separated adhesions to the contiguous viscera. The cut was extended upward, and the gall-bladder explored. The edges of the gall-bladder were sewed to the abdominal wound, and the contents drained. No gallstones were found. The patient made a good recovery, in spite of the unfavorable prognosis.

Cultures from the contents of the gall-bladder showed the bacillus coli communis.

CASE III.—On Saturday, August 24, 1895, I saw Mrs. E. J., aged sixty-one years, a patient of Drs. Howe and Pillsbury, of Newburyport. She had never had any sickness until the present attack, which began on Tuesday, with pain in the abdomen, though she had been complaining for about two weeks that the abdomen was sore. When the soreness in the abdomen first came on she took some kind of cathartic. She had been inclined to constipation, for which she had been in the habit of taking physic.

The pain became so severe by Thursday that she sent for medical aid. Dr. Pillsbury found her suffering with severe paroxysmal pain in the right side of the abdomen. There was nausea, with vomiting of small quantities of bile. The temperature on Friday morning was slightly above normal; on Saturday morning, 101°. A tumor filling the right

side of the abdomen had been discovered on Thursday as soon as the pain had become fully controlled by an opiate.

The family history was decidedly phthisical, most of the relatives on the mother's side having died of consumption. The bowels had been completely constipated. Two quarts of soapsuds had been injected without effect. The urine was normal. Nothing unusual in the way of food had been taken. The pain had been controlled by morphia, taken hypodermically and by the mouth. I found the abdomen distended and tender. The right half was filled with a tense and extremely tender tumor, the dulness of which was continuous with that of the liver. The whole abdomen was rigid. The patient was in great pain.

Careful questioning failed to elicit any symptoms of previous gall-stone colics, of gradual invasion of malignant disease in any form, of obstructive lesions or their causes, of renal or pelvic disease. There had been no loss in weight, no typhoid fever or dysentery, no intestinal colic, no pelvic symptoms, no abnormal sensations in the abdomen, no rupture, no bunches. It was clear that a grave abdominal emergency was present, the chief indications of which were indefinite pains for two weeks, increasing to violent paroxysms, obstipation, vomiting, abnormal distention, right-sided tumor.

There were considered acute and chronic obstruction, tumor with twisted pedicle, inflammation of the gall-bladder, abdominal abscess, and appendicitis. No diagnosis was made. I was inclined to believe it to be a tumor with twisted pedicle. Under ether a smooth, round tumor could be felt in the region of the ascending colon. The tumor was conical, and pointed downward. It seemed, then, likely that there was a malignant growth of the intestine causing obstruction. Appendicitis was not seriously considered. The abdomen was opened immediately by an incision beginning at the usual seat of the appendix. The tumor was found te be a distended gall-bladder containing about a hundred faceted gallstones. The gall-bladder was everywhere adherent by recent inflammation. It contained about a pint of bile, having a peculiar, sweet odor. The edges of the gall-bladder were attached to the abdominal wound, and a large drainage-tube fastened into the gall-bladder.

In this case the bedside impresssion was strongest in favor of a mechanical obstruction suddenly developing in the course of slowly increasing malignant obstruction. The temperature, to be sure, was indicative of a septic process, but the temperature has, as a rule, little significance in acute abdominal lesions. It was clear that some acute emergency was present, and that exploration was imperative; a diagnosis, however desirable, was of secondary importance.

The patient made a rapid convalescence, and has been perfectly well ever since. No bacteriological examination was made.

Case IV.—February 7, 1894. Mrs. W. B. J., aged seventy-four years, a patient of Dr. H. W. Boutwell, of Manchester, N. H., had had for five years an obscure trouble in the abdomen which had been regarded as a floating kidney, or a malignant tumor, etc. Three months before I saw her she had complained of a sharp pain in the right side. Dr. Boutwell had found a small, rounded, painful tumor. The pain was so sharp that it "took her breath away." There was no fever. When the bowels were full of gas the bunch was more painful. Before

this trouble began she had been a remarkably strong woman. Five weeks before my first examination she had renewed pain, with vomiting and dizziness. During the winter she had lost considerable weight. There was no jaundice. I found a tumor in the right side of the abdomen, about at the level of the umbilicus, not far outside of the right linear semilunaris; it was hard, smooth, and tender. There was some tympanites over it, and the gurgling of gas could be heard going by it. The borders of the tumor were blended into the surrounding parts. The pulse was 82; the temperature normal. The intestinal coils could be seen contracting under the thin abdominal walls.

In view of the progressive emaciation, the situation of the tumor, the exaggerated intestinal peristalsis, the gurgling at the seat of the tumor, the loss of weight, and the absence of temperature, it seemed probable that this was a case of malignant tumor involving the ascending colon. An exploration was undertaken, however, because of the uncertainty of the diagnosis.

The tumor was exposed by separating the intestines and lifting the ascending colon. It proved to be a dilated gall-bladder with thickened walls. The contents were yellow pus. The woman made a good recovery from the operation, and did fairly well for several days, when she died of exhaustion.

CASE V.—John K., aged twenty-eight years, a glazier, entered the Massachusetts General Hospital May 1, 1896. He had always been well except for lumbago. The day before entrance he awoke with griping pain in both groins. This pain grew worse during the day, so that morphia had to be given subcutaneously. The bowels moved twice. The following morning he began to vomit, and vomited all day. The bowels were moved by enema on the day of admission to the hospital. He was a large, well-nourished, well-developed man. On entrance, the temperature was 102°, pulse 108; general appearance good. The abdomen was slightly distended and rigid, chiefly on the right side. The pain was described as being over the crest of the right ilium and running into the back. There were pain and tenderness at McBurney's point. There was no dulness or cake. The case seemed to be an urgent one, and an operation was decided upon at once. The diagnosis was acute inflammation of the vermiform appendix.

An incision five inches in length was made over the usual seat of the appendix. The appendix itself was found normal, two inches in length. When the peritoneal cavity was opened there was evidence of general infection. As the condition of the appendix did not explain the obvious peritonitis, the hand was introduced. The gall-bladder was found to be tensely distended and everywhere adherent. The incision was thereupon extended to the lower costal border. The gall-bladder was dark in color and had the appearance of acute gangrene. The intestines were walled off on all sides with gauze, and the lower part of the incision was closed with silkworm-gut sutures. The gall-bladder was then aspirated, and several ounces of bloody, gelatinous bile were drawn off. The gall-bladder was then sewed to the abdominal wall and the fundus opened for the insertion of a medium-sized drainage-tube. The bladder was packed about with sterile gauze. The wound was closed everywhere except where the drainage-tube and gauze emerged.

On the next day bile escaped freely through the tube. On the third day the abdomen became distended and the patient began to vomit. An intestinal coil presenting in the wound was incised; much gas and fecal matter escaped. Death took place on the fourth day. Autopsy showed a general septic peritonitis and a gangrenous gall-bladder. There were no gallstones. The hepatic flexures of the colon were covered with fibrin, and its lumen was nearly occluded by adhesions.

Case VI.—Major G. S. M., aged fifty-six years, Lawrence, Mass. I saw this gentleman, a stout, rugged man of great energy, on September 14, 1896, with his physician, Dr. O. T. Howe, of Lawrence, and Dr. F. W. Johnson, of Boston. He was in extreme distress. The abdomen was distended, everywhere painful and tender. There were constant vomiting and hiccough. The temperature was 103°; the pulse irregular and weak, between 80 and 100. In the region of the gall-bladder there was a tense, rounded, tender tumor. There was no jaundice. It appeared that for some six months the daughter of the patient had noticed that he did not look as well and had not acted as well as usual. On September 9th, five days before I first saw him, Dr. Johnson attended him in Boston. He was then complaining of pain in the epigastrium, a little to the right. He had been subject at times to this pain. When seen on the 9th by Dr. Howe, he was in a state of collapse. The temperature was 103°; the pulse slow and weak at 70. The body was cold and covered with sweat. The pain was intense, and required repeated hypodermatic injections of morphine, from a quarter to a third of a grain each time. The patient remained practically in this condition until I saw him on Monday, the 14th. The temperature had remained in the vicinity of 103°; the pulse had become gradually poorer in quality. On Wednesday he himself had noticed a very tender spot, hard to the touch, which he indicated was in the region of the gall-bladder. From that time his condition grew decidedly worse. In the afternoon of Wednesday he began to vomit, and the vomiting was mero or less continuous until I saw him on Monday. The bowels were open on the first and second day. On Sunday the pulse was weak, rapid, and irregular; the temperature 102.5° to 103°. There were vomiting and hiccough. I made a diagnosis of acute inflammation of the gall-bladder, depending chiefly upon the situation and physical characteristics of the tumor. Although the patient was in an extremely grave condition, it seemed imperative to operate at once. The tumor was exposed by a short incision. The gall-bladder presented in the wound. It was thickened, darkly congested, friable, and everywhere adherent. There was no evidence of a general infection of the abdominal cavity. The contents of the tumor were first removed by aspiration. The gall-bladder was then incised and its edges sewed with silk to the margin of the abdominal wound. A drainage-tube was fastened into the gall-bladder, and a small amount of gauze was placed outside and below the gall-bladder wound. The rest of the abdominal wound was closed by interrupted sutures.

Though operation was a brief one, the patient stood it badly. He was put to bed, and seemed to be near his end. The respiration was shallow and hurried, the color was bad, the pulse extremely irregular; there was constant vomiting. For two or three days this gentleman

was in a very precarious condition; he then began to mend slowly and normal bile began to escape through the tube. He made a very satisfactory recovery, and was able to return to his professional work at the end of a few weeks. Cultures from the aspirated fluid showed a mixed infection of bacilli and cocci of various sizes. It was impossible to determine their nature or their source.

CASE VII.—Mrs. C. M., a patient of Dr. C. W. Stevens, of Charlestown, I saw on September 17, 1896. She was thirty-three years of age, had had one child, and was two months pregnant. There had never been any previous disease, nor had there been any unpleasant symptoms; in fact, she had always been very well.

On September 6th she was taken with cramps confined to the epigastrium, with more or less constant vomiting. There had been no rise of temperature. Dr. Stevens thought that there were symptoms of intestinal obstruction, as he was unable to move the bowels.

Following the first attack of cramps, September 6th, there had been three others. The pain seemed to go up into the shoulder-blade. There was no jaundice. There had been no previous history of pain, paroxysmal or constant.

The cheeks were somewhat flushed. The pulse was 100; the temperature 100°. The general appearance was good. Under the liver, in the normal position of the gall-bladder, there was a tender tumor, like that of a distended gall-bladder. The patient stated that she had had these cramps in the gall-bladder for a long time, but she had never been jaundiced. The abdomen was not especially distended, and was neither tense nor rigid. There was an absence of the reflex abdominal symptoms seen in the other cases. An operation for draining the gall-bladder seemed imperative, although the condition of pregnancy contra-indicated operative interference unless it was absolutely necessary.

On the following day the tumor was exposed. It proved to be a gall-bladder. The fluid was withdrawn with the aspirator. A number of gallstones were then removed. A drainage-tube was fastened into the gall-bladder after its edges had been sewed to the abdominal wound. The patient made a very satisfactory recovery. Some weeks after the complete healing of the wound the patient began to have renewed pain, with a slight rise in temperature. Examination of the scar showed a tender tumor, which was evidently due to a refilling of the gall-bladder. An opening was made through the scar, and a couple of ounces of perfectly clear fluid were withdrawn. From that time until the present it has been necessary to keep a sinus at this point. Most of the time there has been a discharge of clear fluid, which is perfectly aseptic.

The failure to find any bacterial invasion of the gall-bladder in this case removes it somewhat from the category of cases under consideration. The distention seems to have been an acute mechanical one. What would have happened in case no drainage had been attempted is problematical. On the chances, an empyema with septic infection would sooner or later have taken place. That there was some infection at the time seems probable, in spite of the failure of the bacteriological examination.

The condition of the gall-bladder in this case was not that which I usually have found in acute infectious cholecystitis, for its walls were smooth, the peritoneum was not altered, and there were no adhesions. The mucous surface of the gall-bladder was reddened and injected.

CASE VIII.—Dr. F. E. K., aged thirty-four years, I saw at Nashua, N. H., November 30, 1896. This gentleman, who was rather spare and not in especially good condition, was taken on the morning of November 29, 1896, with what was supposed by himself and by his physician to be appendicitis.

On Saturday, the 28th, he had an attack of epigastric pain, which was relieved by morphine. That night he was very restless, and had tenderness over cæcum. On the following morning he went to his office, but he was obliged to give up his work and go home. His temperature was then 101°. In the afternoon he had severe pain and tenderness over the region of the cæcum, with distention. The bowels moved well.

On inquiry I found that he had always been subject to trouble with digestion, and had often suffered pain; in fact, he had had two attacks of pain before the present one. The pain would last through the night, and was unattended by jaundice. His physician, Dr. Wallace, said that he was jaundiced after an attack of scarlatina two years before. Up to the preceding Saturday he had been attending to his work, and had been better than usual. On Saturday and Sunday he vomited, but there had been no vomiting on Monday.

I found the pulse between 96 and 100; the temperature 101°. The general appearance was good. There was extreme tenderness over the ascending colon, and also over the region of the appendix. Immediate operation was advised. The abdomen was not especially distended. Even after etherization no tumor could be felt. It was supposed to be a case of acute appendicitis, although the absence of any physical signs in the region of the appendix made it probable that there was neither perforation nor localized peritonitis. The abdomen was opened over the usual seat of the appendix, a little higher than usual. The appendix was found to be normal. Through the upper part of the incision I explored with the finger the region of the gall-bladder, and found a tense, somewhat roughened adherent tumor, which I immediately recognized as a distended and inflamed gall-bladder. The incision was then carried upward into the region of the gall-bladder. The peritoneum was dark in color, greenish, but not necrotic, and there were easily separated adhesions on all sides. Gauze was packed all about the tumor, and it was aspirated. A considerable amount of fluid was removed. The gall-bladder was then opened, and from it were removed a number of large, irregular gallstones. A drainage-tube was placed in the gall-bladder with a small amount of gauze, and a little provisional packing was placed under the gall-bladder as in the other cases.

The patient made an uninterrupted recovery and remains well.

CASE IX.—Mrs. C. P., aged fifty-nine years, was seen March 5, 1897. This case of cholecystitis proved to be an infection by the typhoid

bacillus. The history obtained from Dr. Chandler, of Townsend, the attending physician, was as follows:

Twelve days before my visit the patient had had an attack of acute cystitis. The spasmodic pains in the bladder were entirely relieved by treatment. The temperature was at all times elevated. With the last menstrual period there was a decided rise in temperature without increase in bladder symptoms. The general appearance was bad. Two days before my first visit she began to have pain with tenderness in the right iliac fossa. The temperature was 103.2°. The pain and tenderness were over McBurney's point, from which the pain radiated. There was some nausea. The temperature and pulse continued elevated. The pain was controlled by opium. On the day of my visit the temperature was 99.4°; pulse 80; the tenderness less. She had always been in very good health, and was of good constitution. During the past winter she had been complaining of the stomach. She had not looked as well as usual, but had lost no weight. Had never been jaundiced, and had had no attacks of pain. No history whatever of gallstones could be obtained. A tender tumor in the region of the gall-bladder or right kidney could be made out, but very indistinctly. The general condition was good, though the pulse was small and feeble. Operation was not advised. Three weeks later I saw her again. She had been having a good deal of pain and fever. The tumor had increased in size; it was elastic and fluctuating, exquisitely tender, and extended from the region of the gall-bladder into the back. A diagnosis of acutely inflamed and distended gall-bladder was made, with a possibility of its being a kidney.

Immediate operation was advised. The kidney was first explored by a small lumbar cut, and found normal. The gall-bladder was next exposed and found to be distended and inflamed. It was aspirated and then drained. A cylindrical stone, with smooth sides and rounded ends, was removed with great difficulty from the cystic duct. The gall-bladder was drained by means of tube and gauze. A good recovery followed. Examination of the culture showed the typhoid bacillus. This case was published by Dr. Mark Richardson in the *Boston Medical and Surgical Journal* of December 16, 1897. A careful review of the history in the light of the culture showed a strong probability that it was a case of typhoid fever with a complicating cholecystitis. The case is here reported because the disease was watched, treated medically, and operated upon without the slightest suspicion of a typhoidal origin.

Case X.—On November 3, 1897, Mrs. S., aged sixty-seven years, a patient of Dr. Gay, was taken with severe pain in the epigastrium extending toward the left. This attack had been preceded by a few days of uneasiness in the region of the stomach. The temperature was 102°. There were vomiting and distention.

The patient had been subject to "bilious" attacks, but had never been jaundiced. The present attack was supposed to be indigestion, and little was thought of it. The next day the pain was much more severe, and was localized in the region of the gall-bladder. There was constipation of gas and feces. There were general distention of the abdomen, tenderness over the gall-bladder, and dulness in the flanks. The diagnosis of acute cholecystitis was made. On the evening of the second day the tempera-

ture had fallen to 100°, the pulse to 90—the patient was decidedly better. Operation was therefore deferred.

On the following day the pain increased in severity; the pulse and temperature rose; the abdominal symptoms were more acute. Both Dr. Gay and myself concluded that interference was imperative, and I was asked to operate, Dr. Gay being called away unexpectedly.

An extremely distended gall-bladder was found, everywhere adherent by recent exudate. It was dark in color, and contained numerous calculi suspended in a dark, hemorrhagic, turbid fluid. The mucous membrane was dark gray and œdematous. The gall-bladder was drained with tube and gauze. Fully as many gallstones escaped through the tube as were extracted at the time of operation. The patient made a good recovery, and remains well. Cultures taken from the gall-bladder showed numerous bacteria of different kinds, which were supposed to be contaminations, so that no conclusions could be drawn as to the nature of the infection in this case.

DISCUSSION.

Dr. J. M. Da Costa, in discussing the paper presented by Dr. Maurice H. Richardson, said: I really came as a listener to-night, and have very little to say; it has been a great pleasure to hear such a valuable paper. A few matters suggested themselves, however, while listening.

The first point that struck me was the statement that the condition was invariably fatal, unless surgically interfered with, although I may have misunderstood this mark. I cannot agree to this. There is now in the wards of the Pennsylvania Hospital a patient who had acute pneumonia. Cholecystitis developed in an acute form, and with such unmistakable symptoms that there could be no difference of opinion as to its existence. There was a tumor, with jaundice and great pain, the latter being the prominent symptom before the tumor; there was no previous history of gall-stones. Most likely the pneumococci infection gave rise to the cholecystitis. After many ups and downs, and a great deal of difficulty in the treatment, caused chiefly by the gastric irritability, the woman is recovering. This is not an isolated case in my experience, as I know of other instances of undoubted cholecystitis that have ended in recovery, and I cannot, therefore, agree that it is necessary to at once resort to an operation, or that cases cannot get well under medical treatment.

Then we cannot overlook the fact that gall-bladder infection in typhoid fever is very common, and that the milder cases of cholangeitis in connection with this are constantly recovering. We find, indeed, that in the majority of instances there are no marked symptoms, and it is only when the patient dies of one of the grave complications of typhoid, such as intestinal hæmorrhage, perforation, or lung affection, that more or less inflammation of the gall-bladder is discerned. Still, there are cases in which even painful swellings of the gall-bladder, readily detected during the progress of the disease, end in recovery, and in which the cholangeitis slowly passes away. Such a case, for instance, is the well-known one recorded by Frerichs (Observation No.

LXVIII, "Diseases of the Liver"), in which a very painful tumor of the gall-bladder was found on the fifteenth day of typhoid fever, and gradually passed away.

Another matter of great interest in the notable paper we have heard to-night, quite irrespective of its surgical and therapeutic value, is the consideration of doubtful diagnostic points as regards appendicitis; in this respect, too, it adds much to our knowledge.

DR. TYSON'S remarks: In limiting the subject-matter of his paper to acute septic processes of the gall-bladder, which come on without previous warning in patients apparently well, Dr. Richardson narrows the field of discussion in such a manner that I fear very few present are qualified to discuss it from the standpoint of personal experience. I at least cannot do so, and in order that I may contribute something to the discussion I must go somewhat out of the boundary he has outlined. I have never met a case of acute cholecystitis occurring under the conditions named,—that is, without previous warning in patients apparently well. Dr. Richardson's paper will have had at least this useful result, that it will have stimulated us to be on the lookout for a condition which had previously been scarcely suggested to us.

The nearest approach to such a case, in my own experience, has been very recent, the autopsy having been made only Saturday last, April 2. I was asked to see Mr. S. by Dr. E. C. Howard in November, 1897. Mr. S. was sixty years old. His health had been failing since midsummer, when he had a perirectal abscess; but for five or six years he has been subject to attacks of pain, which were referred to the stomach. Only since September were the attacks very severe. They closely resembled biliary colic, and were so severe as to require hypodermic injections of morphine to relieve him. They were sometimes accompanied by vomiting, which relieved the pain. Sometimes they were accompanied by chills, and sometimes there were chills without pain. He was slightly but evidently jaundiced. The temperature ranged from 99.1° to 101.3° F.

The bowel discharges were carefully strained and examined with a view of finding gall-stones for some weeks, but without success. No enlargement of the gall-bladder or liver was recognized before death. There was no ascites; no inequalities could be found on the surface of the liver. He failed very slowly, in

fact kept about until a few days before his death, when he was prostrated by colliquative discharges from his bowels, after which he declined rapidly. The autopsy disclosed the liver of hypertrophic cirrhosis and a gall-bladder much enlarged, fully three times the normal capacity, and distended with a thin, yellow fluid resembling thin bile. There were numerous black, friable gall-stones and the *hepatic duct was obliterated.* The mucous membrane of the stomach was hyperæmic and injected. There were no other lesions found in the abdomen. The thoracic viscera were not examined.

The closure of the hepatic duct was so tight that a probe could not be passed through it. No bacteriological examination of the contents of the gall-bladder was made. The relation of the attacks of the pain to the obliterated duct can only be surmised. I regarded the case as one of hepatic fever. It seemed at first thought likely that the inflammation of the duct was caused by the impacted stones. On the other hand, it is more in accordance with modern views to suppose that these were the favoring cause which facilitated the infectious influence of a colon bacillus, a typhoid bacillus, or some other bacterium capable of producing infection.

The cases of cholecystitis which come to the notice of the physician are generally those which complicate typhoid fever, due to infection of the biliary passages by the typhoid bacillus, but even under these circumstances they have heretofore been more frequently met on the autopsy-table than recognized before death. Yet Louis referred to changes in the bile and gall-bladder in his work on typhoid fever, published in 1835, and not a few cases have been since reported. Quite recently the papers of Osler and of A. Lawrence Mason, both read before the Association of American Physicians in 1897, have brought the subject up to date, and will do much to attract attention to it in America. The symptoms are largely those to which attention has been called by Dr. Richardson, although they are apt to be obscured by those of the existing disease, especially by tympany, which is so frequently associated with typhoid fever. There is almost never jaundice, while the pain is often not localized to the region of the gall-bladder. Moreover, the acute pain of perforation of the gall-bladder has probably more than once been interpreted as perforation of the bowels.

The most interesting feature in connection with the disease is its resemblance to appendicitis, as illustrated by a remarkable case reported by Osler, and operated on successfully by Halsted, as well as by some of the cases reported by Dr. Richardson. Another interesting feature is the frequency of gall-stones as a predisposing cause. If it is true, as held by Chiari and Councilman, that the biliary passages are invaded in practically every case of typhoid fever, some such favoring cause as this would seem to be necessary. Pain and vomiting are quite common, while jaundice is rare, though it does occur.

The most reliable symptom is the area of dull percussion starting from a point corresponding to the end of the gall-bladder.

DR. JAMES C. WILSON, in discussing Dr. Richardson's paper, said: I must join with the other gentlemen in the feeling that Dr. Richardson has done us a great service in presenting this subject this evening. He has called attention to a condition which must be much more common than any of us have heretofore recognized, and for which, in the future, we will be more closely on the outlook. He has with great emphasis urged the necessity for surgical interference in cases of rapidly developing peritonitis, and more particularly in cases of sudden perforation. This subject seems to me not to have been sufficiently regarded in the past by practitioners at large. I think I may say that Dr. Richardson's limitation in regard to the subject is narrower than the cases he has mentioned would justify, or the subject itself would warrant. For my own part, it seems to me to exclude those infectious diseases due to pathogenic organisms which may be sometimes found in cases of acute cholecystitis, and to look upon the cases to which he has referred as occurring in people in previous good health is narrowing the subject too closely. Not only would that appear to be true of his own cases, but it would also be equally true of the large number of recorded cases that occur as sequels of enteric fever. I cannot see where the line of difference from the stand-point of diagnosis can be drawn between a case which arises under these circumstances and those which arise in individuals apparently in previous good health. In all probability there are many individuals in whom acute illness develops where there was no history of previous disease, except that they may have passed through an attack of enteric fever some years before.

It is well recognized, at the present time, that the contents of the gall-bladder during an attack of enteric fever become very often a pure culture of the bacilli, and that this bacillus is capable of a prolonged existence in the organism. This being the case, I think the limitations drawn are too strict, and I think a broader consideration of the subject may be undertaken without interfering with the facts of diagnosis, the pathological conditions, or the treatment. We should take all phases of acute cholecystitis into consideration. My own experience is limited to cases that have occurred in connection with enteric fever. Dr. Wilson briefly reported two cases of acute cholecystitis following enteric fever, recently under observation. In both recovery took place.

Dr. John Ashhurst, Jr., in discussing Dr. Richardson's paper, said: With regard to the adhesions often found connecting the gall-bladder and neighboring viscera, they, no doubt, are the result of previous inflammation, and it is true that we often find them where there are no symptoms of acute cholecystitis, but where there has evidently been an inflammation, acute or subacute, some time before. I operated on such a case some months ago, in which there was no evidence of existing cholecystitis, but in which the adhesions caused the gall-bladder, which was deeply seated, to be almost completely overlapped by the stomach, so that I narrowly escaped opening the last-mentioned organ. Dr. Richardson has pointed out very clearly what many of us have, of course, recognized long ago,—viz., that gall-stones alone are not a cause of acute inflammation. As a matter of fact, if a patient has gall-stones and they lie quietly in his gall-bladder, they will probably give no trouble; it is when they attempt to make their way down through the ducts that pain and other grave symptoms arise.

I was interested in Dr. Richardson's demonstration of the cause of intermittent distention of the gall-bladder, and in the comparison which he drew between it and intermittent hydronephrosis. I have thought that there was another cause for this intermittent distention, and that is the valve-like action of calculi themselves. In the case of the kidney we may have small calculi entering the orifice of the ureter, and when the pelvis becomes distended with urine, these calculi may float back like a ball-valve; and a similar condition may be present in the gall-bladder.

a gall-stone temporarily occluding the cystic duct, and then floating back when a certain degree of distention has occurred.

With regard to the frequency of acute cholecystitis, my own experience would lead me to say that it is rare, though no doubt it is more apt to come under the observation of the physician than under that of the surgeon. I can recall but one case in which I have operated for a condition of the kind which Dr. Richardson has described, and that was in a patient who, when admitted to the Pennsylvania Hospital, was manifestly extremely ill. The abdomen was distended, vomiting was marked, and the pain was intense. The symptoms seemed to point quite as much to appendicitis as to inflammation of the gall-bladder, and, in fact, I supposed the case to be one of appendicitis in which the appendix was in an abnormal position. An incision was made, and the gall-bladder was found enormously distended, discolored, and inflamed. It was opened and drained, several large calculi being removed, and the patient, after some days of extreme illness, made a good recovery.

As to diagnosis, I do not see how it can always be made. Undoubtedly, if the surgeon has the possibility of acute cholecystitis before his mind, he will be more apt to recognize these cases than he otherwise would, and I have no doubt that hereafter, in Philadelphia, our attention having been directed to this subject, they will be recognized much oftener than they have been in the past. It is certainly important that a diagnosis should be made if possible, so as to avoid preliminary median incisions, which can but add to the danger of a subsequent operation.

As to treatment, I entirely agree with Dr. Da Costa that there are cases in which the patients recover without operation, and this is sufficiently evident from the number of instances in which we find old adhesions in ordinary operations for gall-stones. But, on the other hand, I have no doubt that there are cases of infectious cholecystitis, such as have been described by Dr. Richardson, where no benefit can be expected without an operation. If I may be allowed to venture the statement, I would say that in the same class of cases in which, the disease being appendicitis, the surgeon feels that immediate exploration is necessary, the same decision should be arrived at when the affected organ is the gall-bladder. There are cases of appendicitis in which the most conservative surgeon feels that unless the patient be imme-

diately operated on he will almost surely die, and the operation may be resorted to in these cases within only a few hours of the first onset of the disease. There is something in the general condition and appearance of the patient which satisfies us that immediate operation is necessary, and I think that in the same class of cases of acute cholecystitis the same rule should apply.

As to the technique of the operation of cholecystotomy, Dr. Richardson has very properly laid stress upon the importance of stitching the gall-bladder to the abdominal wall, whenever this is possible. In some cases, however, it is impossible to bring the gall-bladder to the surface, and under such circumstances I have been obliged to rely upon packing gauze around a large unfenestrated drainage-tube left in place for about ten days.

I feel that I have added very little to the consideration of this subject, but the affection is so rare that I came here rather to learn than to take part in a discussion.

I may add that, in the case to which I have referred, the patient after the operation was in a very critical condition from that state of paralysis of the bowel, without peritonitis, with which we are all familiar. There was enormous distention with persistent vomiting, and she seemed about to die. Just at that time I had read an article recommending that under such circumstances a fresh incision should be made into the small intestine for the introduction of a purgative saline solution. I did not feel that my patient could endure a second operation of this kind, and, as no remedies could be given by the mouth, I had two ounces of Epsom salt in a saturated solution administered by enema. This produced a large discharge of flatus followed by a fæcal evacuation, and the patient's progress towards recovery seemed to begin from that moment.

DR. JOHN B. DEAVER, in discussing Dr. Richardson's paper, said: I desire to express my pleasure at having an opportunity to hear Dr. Richardson's paper. That the initial disturbance in the class of cases to which Dr. Richardson refers is a catarrhal condition, I have no doubt, and that, as a result of the catarrhal disturbance, micro-organisms normally found here are capable of exercising deleterious effects resulting in the type of inflammation referred to. While it is a well-known fact that bile has escaped into the peritoneal cavity during operation without occasioning peritonitis, in the presence of a catarrhal inflammation of

the bile-passages, the bile is no longer sterile, therefore, capable of exciting inflammation of the peritoneum if brought in contact with it. It has been demonstrated by experiments that the aseptic properties of normal bile is slight. In the presence of disease of the gall-bladder or bile-ducts, the bile always contains micro-organisms. When the flow of bile along the ducts is interfered with, micro-organisms invade the gall-bladder either from the blood or intestines; the latter has been demonstrated by ligaturing the common duct. Netter, in 1886, demonstrated that twenty-four hours after aseptic ligature of the common duct staphylococci and the common colon bacillus could be cultivated from the bile.

The common colon bacillus exists normally in the human body in every part of the alimentary canal, from the mouth to the anus, and in the normal condition of the same is harmless. When the intestines or any of its offshoots become the site of morbid conditions then the colon bacillus may become at once virulent. That simple empyema of the gall-bladder is due to inflammation in which pyogenic organisms play an important *rôle* is true. From a clinical stand-point empyema of the gall-bladder may be considered under two headings, that of simple empyema and, the more serious form, phlegmonous inflammation of the gall-bladder.

Simple empyema may result from the extension of a catarrhal inflammation, or from irritation in the cystic duct, or may be associated with suppurative inflammation of the remaining ducts of the biliary apparatus; the latter being, however, an extremely serious affection for which operation promises most. The constitutional symptoms in simple empyema are slight in comparison with those of the more serious form. There is usually increase of temperature, increased pulse-rate, nausea, and localized tendeness, due to local peritonitis, rigors or chills. As a rule, there is no jaundice, unless there is an associated catarrh of the bile-ducts. If the case be seen early and a tumor be present, it will be felt to move with respiration; the inflammation going on, the tumor sooner or later becomes anchored as it were. If the gall-bladder is not drained by the surgeon, nature may interfere and accomplish drainage through the umbilicus, the pus being guided to the latter point by the suspensory ligament of the liver, find its way beneath the ribs, in this wise simulating a subdiaphragmatic

abscess, or the pus may be evacuated through an ulcerative communication with a neighboring coil of bowel. Operation in the presence of a gangrenous gall-bladder calls for extirpation of the gall-bladder.

Acute phlegmonous cholecystitis, as in simple empyema of the gall-bladder, is caused by micro-organismal invasion. Acute phlegmonous inflammation of the gall-bladder presents symptoms much more serious than does the simple variety of inflammation. The tumor makes its appearance suddenly with most acute pain, at first referred to the right side of the abdomen but rapidly becoming general. The pulse is rapid and feeble, breathing quick and thoracic. There is high temperature, great depression, marked tenderness on pressure at the site of the gall-bladder. Jaundice may or may not be present, usually not. The condition most frequently mistaken for this trouble is acute gangrenous appendicitis. Relief is afforded only through operative interference. Acute gangrene of the gall-bladder is only an exaggerated condition of a cholecystitis. The predominating pathological condition being the absence of drainage, thrombosis of the nutrient vessels, which is true in the case of acute gangrenous appendicitis. In dealing with this class of cases, the condition most likely to be confounded with it is acute appendicitis. The differentiation between the two conditions, acute cholecystitis and acute appendicitis, in the majority of instances, is capable of being made. The onset in both is sudden, the pain acute, etc. The points in favor of cholecystitis are the location of the pain being higher, the rigidty confined more to the upper right quadrant of the abdomen, the vomiting being more persistent, and the presence of rigors or chills. In acute appendicitis chills are never present, except in the acute gangrenous variety. Again, the difference in the location of the pain, the extreme tenderness, the degree and difference in location of rigidity, the absence of so pronounced constitutional symptoms, except in the acute variety of gangrenous appendicitis, should enable us, as I have already said, in the majority of cases to reach a correct conclusion.

The association of the two conditions, acute cholecystitis and acute appendicitis, has occurred in my experience. One of the cases which I recall distinctly was that of the wife of a physician, in which the appendix was removed and the gall-bladder drained; the recovery was uneventful.

When a tumor is present, it is sometimes impossible to say definitely whether it is one of the kidney or of the gall-bladder. Where the tumor is an enlarged gall-bladder and anchored by adhesions, thus not allowing its being pushed back into the flank space, the differentiation is much less difficult than under the reverse condition. Simple acute cholecystitis, in my experience, is not necessarily fatal if not interfered with surgically. I believe, however, that all of these cases should be operated upon. Cases which I have seen recover without operation, like cases of appendicitis supposed to recover without operation, but which never permanently recover unless operated upon, are left with adhesions, etc., thus occasioning trouble from time to time, which discomforts the patient to say the least.

Cases of acute phlegmonous cholecystitis, I am of the opinion, should be operated on most promptly, which, I believe, promises the patient his or her only salvation for recovery.

It will not be out of place for me to say here that I am equally strong in my belief that cases of obstruction of the biliary passages from gall-stones are not operated early enough. That an impacted gall-stone may excite irritation to ultimately occasion a malignant growth, I am also certain of.

The mortality following operation in acute intra-abdominal inflammation, particularly of the gall-bladder and the appendix, if done early, by which I mean within a few hours of the onset of the attack, is practically *nil*. The deaths following gall-bladder inflammation, in my experience, have been in those cases where the patients have been markedly jaundiced, under which circumstances the broken-down blood necessarily favors free bleeding, and gives us great anxiety as to the outcome of the case. In the latter class of cases I have seen blood vomited, passed in stool and in the urine, the result of the blood dyscrasia.

Dr. Richardson cites some cases in which adhesions are very troublesome to deal with, but, as a rule, however, they are easily disposed of.

The point the doctor makes concerning the position of the gall-bladder is important. Recently the writer operated upon a case which illustrated this condition very well. The gall-bladder, occupying a position distant from the anterior abdominal walls, excited comment from the physicians witnessing the operation, they remarking that the gall-bladder was much more accessible.

The anatomical position of the gall-bladder and the arrangement of the peritoneum in this neighborhood explain the presence of biliary fistula occurring at the site of the anterior iliac spine, or, in short, the lower abdominal wall, the result of overlooked gall-bladder suppuration.

There are one or two points in connection with the technique of the operations upon the gall-bladder or the gall-passages to which I will venture to call attention. The importance of isolating the field of operation by the proper disposition of gauze. The establishment of a biliary fistula by stitching the walls of the gall-bladder to the parietal peritoneum and the aponeurosis of the external oblique muscle, thus not bringing the walls of the opened gall-bladder flush with the skin. In the cases where drainage is not indicated closing the gall-bladder, dropping it into the peritoneal cavity.

In closing, I would beg to say that I have not referred to the operation of cholecysto-enterostomy, as personally I believe that in the majority of instances this operation is only a make-shift, and that radical interference should always be preferred.

Dr. L. McLane Tiffany, of Baltimore, in discussing Dr. Richardson's paper, said: What has been said by Dr. Richardson it seems to me would be much more important if it were made a little more general. I think that many of the cases, at the present time, which we are able to recognize as cholecystitis are the sequelæ of some pre-existing trouble, such as enteric fever. Where there has not been some previous disease the cases have been much more rarely recognized than they will be in the future. I am not sure but that Dr. Richardson will shortly be placing the ovary, gall-bladder, and appendix in one operative class.

It has been my fortune to operate on a case of acute cholecystitis followed by acute infiltration of the omentum, which latter was four inches thick. The patient, in apparently good health, was taken suddenly ill, and the diagnosis of probable appendicitis was made by his physician. When I saw him the pain was in the neighborhood of the liver; operation showed inflammation of the gall-bladder, which was contracted and gangrenous, and a much thickened omentum. The patient died of acute sepsis on the third day. I have seen as many as five or six acute attacks not going on to the extent of a phlegmonous inflammation, but which were recovered from without operation, save in two cases.

The diagnosis was always very plain. I do not think that inflammation of the gall-bladder is to be considered as something by itself, but it should be considered as a possible thing for the gall-bladder to be infected by organisms which give rise to the acute inflammatory troubles elsewhere. The symptoms are often identical with appendicitis and with acute inflammation of the small bowel, and I do not think there is any difference in the symptoms clinically between an acutely inflamed gall-bladder, an acutely inflamed appendix, an acutely inflamed diverticulum, and a markedly inflamed small bowel. The clinician is not at present able to make a diagnosis in all cases. The presence of gall-stones has been noted in inflammation of the gall-bladder; on two occasions I have opened the gall-bladder for inflammation, and found a pure culture of the colon bacillus with gall-stones. In a certain number of cases the colon bacillus is present without the gall-stones. I suggest aspiration of the gall-bladder with the intention of finding out, while doing other operations, if an apparently normal gall-bladder is sterile. After aspirating a Lembert stitch would close it without having any serious result to follow.