STATED MEETING, HELD MARCH 3, 1913.

DR. GWILYM G. DAVIS, President, in the Chair.

TOTAL EXTIRPATION OF THE EXTERNAL GENITALIA FOR CARCINOMA.

DR. E. HOLLINGSWORTH SITER presented a patient in whom a total extirpation of the external genitalia for carcinoma had been done.

SUBDIAPHRAGMATIC ABSCESS.

BY DUNCAN L. DESPARD, M.D.,
OF PHILADELPHIA.

A SUBPHRENIC abscess may be defined as a localized collection of pus situated immediately below, and in contact with, the diaphragm, or only separated from it by the peritoneum.

In order to better understand the localization of pus in this region a brief review of the anatomical relations of the viscera which occupy it will be of assistance.

If the organs are removed from the abdominal cavity, leaving only the parietal peritoneum, it will be seen that the reflections of peritoneum entering into the formation of the lateral ligaments of the liver, the gastrohepatic omentum, the gastrosplenic omentum, the gastrophrenic and the costocolic ligaments, divide the diaphragmatic area into an upper anterior and a lower posterior part. The space above this transverse chain is divided into right and left anterior spaces, both being intraperitoneal, by the falciform and round ligaments of the liver, while the part below it is divided by the reflection of the peritoneum to the duodenum and the hepatic vessels into a right and left posterior intraperitoneal space, both lying above the transverse mesocolon, but communicating

with each other through the foramen of Winslow; the former being known as the subhepatic fossa or the right renal pouch, and the latter, as the cavity of the lesser peritoneum.

H. L. Barnard, in his admirable paper on this subject, pointed out that in the presence of infection the viscera of the upper abdomen would adhere to each other and to the abdominal wall in such a manner as to form the lower and anterior limits of these spaces in which pus could accumulate, forming discrete abscesses, separated from each other and from the rest of the abdominal cavity.

The right anterior intraperitoneal space is bounded, behind, by the right lateral and coronary ligaments of the liver, below, by the upper surface of the right lobe of the liver, the falciform ligament is to the left, while its lower anterior limits are often formed by adhesions between the margin of the liver and the anterior abdominal wall; however, if the infection arises below, as from an anterior perforating gastric ulcer, the lower boundaries of the abscess are formed by adhesion between the surface of the stomach, colon or great omentum to the anterior abdominal wall. The left anterior intraperitoneal space is limited, above, by the diaphragm, behind is the left lateral ligament and the diaphragm, to the right by the falciform ligament, the reflections of the peritoneum entering into the formation of the gastrohepatic and gastrosplenic omentum, below and to the right, by the stomach. which, together with the great omentum becomes adherent to the anterior abdominal wall, shutting the abscess off from the peritoneal cavity below, while to the left is the spleen and the left abdominal wall.

The right posterior intraperitoneal space, or the subhepatic fossa, is overhung by the liver and the gall-bladder, which form its anterior wall behind, it is limited above by the right lateral and coronary ligaments, while, posteriorly is the right crus of the diaphragm and the right kidney; to the left is the duodenum, the bile ducts, vessel to the liver, and the foramen of Winslow, through which this space communicates with the lesser peritoneal cavity; while along the lower margin of the

left lobe of the liver in front and the anterior surface of the stomach a narrow communication exists with the left anterior intraperitoneal space. On the right side infection may find its way around the right ligament, as well as around the anterior margin of the liver to the right anterior peritoneal space and below it communicate with the right lumbar fossæ. The left posterior intraperitoneal space, or the lesser peritoneal cavity, rests upon the left crus of the diaphragm and the pancreas; to the left is the spleen, to the front is the liver, the lesser omentum, and the posterior wall of the stomach; to the right are the duodenal vessels, bile ducts, and foramen of Winslow.

An extraperitoneal subphrenic abscess is formed on either side by infection of the retroperitoneal tissues. On the right side the pus finds its way between the two layers of the lateral ligaments and the coronary ligament, thence forward to the falciform, often as far as the umbilicus, while on the left side the pus dissects up the peritoneum from the surface of the diaphragm in order to make room for the abscess between them.

Etiology.—Subdiaphragmatic abscesses may be, but are seldom, primary. They usually follow some lesion producing direct contamination of the peritoneum in this situation, or by the extension of a suppurative process distally situated, either by contiguity, continuity, through the lymphatic vessels or through the blood currents.

The most frequent cause is probably perforation of gastric or duodenal ulcers, while infectious processes occurring in the abdominal or thoracic organs are common, among which, in the order of frequency, are appendicitis, suppurative conditions of the gall-bladder, liver, pelvic organs, thorax, and spleen. They occur in septicæmia and pyæmia. In one of the cases reported here it was tubercular, secondary to a thoracic lesion.

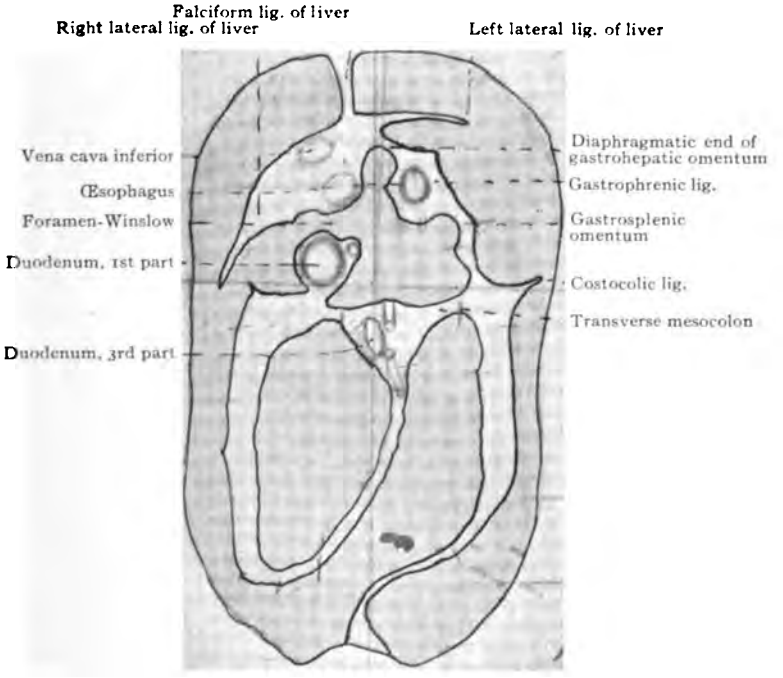
Symptoms.—The previous history is usually that of the condition which ultimately gives rise to the abscess. If it originates from a gastric or duodenal ulcer, a history of digestive disturbance, pain associated with the taking of food,

etc., would likely be obtained. The onset may be sudden or insidious; if intraperitoneal it is apt to be acute and violent when due to a perforating ulcer, but not always, as it may be subacute when the ulcer perforates through a small opening. During the course of a septic condition the formation of the abscesses may be largely masked by the preponderance of these processes. The amount and character of pain are variable; it is generally present early, at the site where the abscess ultimately forms.

Tenderness and rigidity accompany the onset of a local peritonitis, but as the abscesses become walled off they lessen to some extent. The temperature in these cases, if the abscess is well localized, may be very slight, but sooner or later it becomes septic in character, and may be accompanied with rigors and sweats. The patients become anæmic, lose weight and strength rapidly; often their only complaint is extreme weakness. Leucocytosis is always present, but varies with the degree of the infection and the resistence of the individual. In about two-thirds of the cases an abdominal mass can be detected; it is dull to percussion, tender and firm if due to inflammatory tissue; while signs of fluctuation, slighter tenderness; and sometimes tympany is present, if the pus is due to a gas-producing organism. Displacement of the liver depends upon the formation of a line of adhesion between the liver and the anterior abdominal wall, which is usually the case, when the infection progresses from the posterior part of the upper surface of the liver to its anterior margin, in this case the liver does not descend with respiration.

As pus accumulates between the liver and the diaphragm the lung is displaced upward and more or less compressed, thus giving rise to altered physical signs at the right base, and sometimes accompanied with the plastic or serous pleurisy or a localized bronchitis. However, if an abscess is situated in the right intraperitoneal space and the line of adhesions does not form between the liver and the abdominal wall, or the abscess originates below the liver margin it would assume

FIG 1.



After Delépine, showing lines along which the peritoneum leaves the abdominal wall to invest the viscera. (From Gray's Anatomy, page 1269, Fig. 876, 17th edition. By Da Costa and Spitzka.)

a triangular shape which would extend from the ensiform process to the umbilicus by a line convex to the left representing the falciform ligament and from there to the right costal margin. In an abscess situated in the corresponding space on the left side, the mass would have its right boundary convexed toward the right, while its left boundary would extend from the umbilicus to the left costal margin, and the left base would be the situation of the altered physical signs.

Should the abscess be localized in the subhepatic fossa, there would be tenderness and rigidity below the costal margin, extending downward and posteriorly toward the crest of the ilium.

If the lesser peritoneal cavity is the situation of the abscess the diagnosis becomes more difficult; an accumulation of pus here may present forward in one of several places, between the stomach and liver, the stomach and colon, the stomach and spleen, or below the colon. Altered physical signs at the left base are sometimes present.

Right-sided extraperitoneal subphrenic abscesses are caused most frequently by retrocolic appendicitis, infections of the liver, pancreas, or the kidneys.

The onset of the symptoms is associated with the systemic evidences of infection and are usually gradual. There are, of course, no symptoms of peritonitis, very little if any pain or tenderness, as these retroperitoneal spaces may be considered silent areas, just as infectious lesions of the brain or liver substance give rise to little or no pain; when, however, the abscess extends into the lumbar region, or advances along the falciform ligament anteriorly, tenderness is more easily elicited. In the latter the abscess may point in the middle line between the ensiform cartilage and the umbilicus, and be open in this situation without entering the peritoneal cavity. The signs at the right base are only marked in a well developed abscess, if the left lateral ligament is invaded; the left base may also show altered physical signs.

The left extraperitoneal subphrenic abscess, originates

usually from the kidney, pancreas or spleen, and is apt to present in the lumbar region, but occasionally it dissects the peritoneum from the under surface of the diaphragm, under which circumstances there may be tenderness in the right hyphochondrium, with symptoms of compression of the left base.

Three of the following cases occurred at the Jefferson Hospital in the service of Doctor John H. Gibbon, to whom I am indebted for the privilege of operating upon them and of reporting them.

CASE I.—A woman, sixty-three years of age, who had been ill for six weeks with what had started as gall-stone colic. She commenced to have fever soon after the onset of the illness and for the four or five days preceding the operation had rigors, with a temperature of 104° to 105°, followed by sweats. The patient was evidently very ill, and upon examination there was found a diffuse cellulitis extending over the lower part of the thorax, the right side of the abdomen as far as the umbilicus, and spreading from there to the right iliac crest and loin. A little to the right of the costoxyphoid angle there was a fluctuating area about two inches in diameter.

An anæsthetic was administered and an incision made over this fluctuating area which liberated a large quantity of pus. A sinus was found leading through the abdominal wall to a secondary abscess in the subhepatic fossa, containing between a pint and a half and two pints of pus. On account of the extensive cellulitis it was not deemed wise to open the general peritoneal cavity, and after placing a gauze pack covered with guttapercha tissue at the base of the gall-bladder, the operation was terminated. There were no gall-stones liberated with the pus and none discharged afterward. The patient made an uneventful recovery and is reported to be well at this time, some eighteen months after the operation.

There is some doubt in regard to the origin of this infection, but I am inclined to believe that subhepatic fossa became infected from a cholecystitis and from there the infection spread to the right anterior intraperitoneal fossa around the anterior margin of the liver.

CASE II.—W. C. F., age thirty-three, male. The family and

previous history had no bearing upon the present illness. On August 9, 1911, the patient was seized with very severe pain in the region of the gall-bladder, which radiated to the right shoulder. He was nauseated but did not vomit until after salts had been administered to him. He was admitted to the Medical Ward of the Jefferson Hospital, August 11. At that time he complained of a dull, aching pain over the gall-bladder, much less severe than at the onset; temperature 100 3/5°, pulse 106, and a leukocytosis of 18,400. I saw the patient August 15. At this time his temperature had fallen to 99° and the leukocyte-count was 10,600; the pain was described as much less tender upon physical examination. By deep palpation a moderate amount of tenderness was elicited in the region of the gall-bladder, still less over McBurney's point, and no appreciable rigidity of the recti muscles. I concurred in the diagnosis of cholecystitis, which was subsiding, and advised his transfer to the Surgical Ward.

On August 18, his leukocytes rose to 14,600, and the following day he was sent to the Surgical Ward. I saw him on the morning of the 20th. At this time a distinct mass could be felt reaching a little above the level of the umbilicus on the right side. I then felt that we had a high posterior appendix to deal with and operated the same day. Upon opening the abdomen the gall-bladder and ducts were normal, but the ascending colon was pushed forward by a mass behind it and was bound down by adhesions to the outer side. The general peritoneal cavity was packed off and the adhesions broken up, liberating a moderate amount of pus; a necrotic appendix was lying behind the colon and reaching high up toward the gall-bladder, this was removed and the abscess drained through the rectus wound, posterior drainage was not thought necessary.

Following the operation the patient ran a slightly elevated temperature, going as high as 101°, but became normal on the 10th day. From then on it gradually rose again and by the twenty-fourth day assumed the septic type, accompanied by chills. Frequent examination failed to find a reason to justify further operative interference. The patient had several chills on succeeding days, and continually lost weight, and, while there was no pain, he complained constantly of great weakness. The wound continued to discharge pus rather freely and on the forty-third day after the operation friction sounds were heard at the right

base, two days later it was evident that a pleural effusion existed. The patient died of exhaustion on the forty-seventh day following the operation.

Autopsy.—Pleura: On the right side shows a few adhesions at the apex; the cavity contained 60 c.c. of slightly blood-tinged fluid.

Peritoneum: To the right of the umbilicus the intestines were knotted together by numerous adhesions, which were separated with difficulty; these extended up to the under surface of the liver, and when broken up, this region shows numerous small pockets of pus, a large pocket behind the ascending colon communicates with a sinus in the abdominal wall, a branch of this sinus extends up the muscle in the abdominal wall for a distance of 10 centimeters. The liver extends two finger's breadth below the margin of the ribs in the midclavicular line; the liver is normal in size, somewhat soft in consistency. On the posterior surface of the right lobe there is a necrotic area 13 cm. in diameter and 1 cm. deep; it is covered by shaggy, grayish-yellow tissue, posterior to the gall-bladder and between the right and the left lobe the finger can be passed up into the liver tissue into a cavity 5 cm. in diameter, filled with necrotic material and pus.

Kidneys: The right kidney measures 13 x 5 x 4 cm. and resembles its fellow except that at the right upper pole, anteriorally, there is a necrotic area 5 cm. in diameter and 5 cm. deep. The cavity in the liver and that just described in the kidney constitute respectively the top and the bottom of a retroperitoneal abscess; while it probably communicated with the sinus mentioned above. This was not demonstrated owing to the fact that the abscess was not thought to exist and was only discovered on removing the kidney after all of the normal relations had been disturbed. The abscess had apparently started in the retroperitoneal tissues, gradually invading both the liver and kidney. Its situation marked so accurately the point of greatest tenderness that I am of the opinion that the infection occurred here early, but probably from the escape of pus through the sinus it failed to reach sufficient size to give the distinctive signs.

CASE III.—A woman, seventy-one years old. She had been conscious of a pain in the right lower abdomen for the past month and for the last two weeks had been unable to extend her right thigh; five days before admission she discovered a large mass in the region of the cæcum; for the last three days she had had chills followed by sweats.

Upon admission to the Jefferson Hospital, Aug. 26, 1911, the temperature was 101 3/5°, pulse 120, respiration 20; physical examination showed a large tender mass in the right iliac region. Operation was performed, shortly after admission,

through a Kammerer incision; a large appendiceal abscess was opened and a rather long retrocolic appendix was removed. The abscess cavity was then drained through the anterior wound.

The subsequent course of this patient very closely resembled the other appendix case, just described; the temperature gradually became septic in character and the patient lost weight and strength. Frequent physical examination failed to disclose any accumulations of pus or evidence of peritonitis; drainage from the original wound was still quite free.

The day following the autopsy on Case II, I determined to establish posterior drainage in this case and to explore the region in which the abscess had been found in the previous case. Using the triangle of Petit as my point of entrance I connected this with the original wound but failed to find that this liberated any accumulation of pus. I then passed a long curved pair of hæmostats up the outer border of the right kidney, to its upper pole, and in this region, or a little beyond, entered an abscess containing about five ounces of pus. The hæmostats were admitted their full length without meeting with any resistance; the lower end and posterior margin of the liver could be felt in the wound, so that the abscess must have been in, approximately, the same position as in Case II. The patient's temperature gradually fell, reaching and remaining normal on the tenth day; her recovery was uninterrupted although slow, probably due to her advanced age.

CASE IV.—A lad, seven years of age, had complained of pain in the left hypochondrium for the last fifteen months; recently the parents noticed a protrusion of the ribs on that side. Upon admission, Aug. 20, 1912, the left side of the thorax was found to be distinctly bulging from the seventh to the eleventh rib in the anterior axillary line; the breath sounds over this area were normal but by deep palpation a mass could be felt, about in the position one would feel the spleen or a little above it. The radiogram showed a shadow in this position and also showed evidence of tuberculosis in the lungs, consisting of an increase in the amount and the density of the fibrous tissue.

Believing that I had an extraperitoneal subdiaphragmatic abscess to deal with, I determined to avoid, if possible, having the drain pass through either the pleura or the peritoneum.

The abdomen was explored through a left-rectus incision just below the costal margin revealing a mass above, and anterior to the spleen; this was walled off from the rest of the abdomen by gauze packs and a second incision made through the skin just below the ribs in the left flank; the peritoneum was exposed, then with a finger in the abdomen as a guide, the peritoneum was dissected from the diaphragm through the second incision until the abscess was broken into. The abdominal wound was then closed by an assistant who had remained clean for that purpose. The abscess was then explored and found to extend to the region of the cardia, and to penetrate the diaphragmatic muscle a little to the inner side of the left nipple line and well posterior, but did not communicate with the pleura or the peritoneum. Drainage was established by means of rubber tubes and the patient's convalescence was uneventful.

Treatment.—The treatment of subdiaphragmatic abscesses consists primarily, in establishing drainage. If a mass presents in front it should be reached through an abdominal incision without opening the general abdominal cavity if possible, or if this danger cannot be eliminated, the peritoneum should be opened below the abscess and the general cavity protected by gauze before evacuating the abscess. If the abscess is situated in the subhepatic fossa or is retroperitoneal on either side, it can be reached through a loin incision alone, or in conjunction with an abdominal incision through which the lower limits of the abscess can be determined and the dissection which is conducted through the loin incision aided and guided to the abscess without opening into the peritoneum. This accomplished the abdominal wound can be closed by an assistant who has remained clean for the purpose.

If there is reason to fear that the peritoneum may be entered in the effort to reach the abscess the intraperitoneal site may be walled off from the general cavity of the peritoneum by gauze packs introduced through the abdominal wound.

When the physical signs are well marked at either base the lung is apt to be displaced upward and the diaphragmatic

and parietal layers of the pleura are frequently adherent, or in contact, so that they may readily be united. Under these circumstances the transpleural route is thought, by some, to be the best. This may be conducted in two stages, the first of which consists in resecting a rib, or ribs, and uniting the pleural surfaces and a day or two later exploring beyond these.

It is permissible to precede this operation by an exploring needle, provided the operation is to follow at once, keeping in mind the danger of infecting the pleural cavity; this danger may be lessened by leaving the needle in place until the pleura is incised and, if necessary, the two surfaces united by sutures.

This method has the very great disadvantage of endangering the pleura, both to the infection or to the formation of pyopneumothorax, and the difficulty in some cases of maintaining adequate drainage. On the other hand, there are very few subdiaphragmatic abscesses that cannot be dealt with satisfactorily by one or the other method, that is, by direct incision, as in my first case, or by a loin incision, and when necessary associated with an opening in the abdomen.

In reviewing the reported cases, it would seem that the intraperitoneal abscesses form pus much more rapidly than the extraperitoneal ones do, the physical signs are detected earlier, tenderness and rigidity are apt to be present and well marked, even if the abscess has not reached large proportions, the infection is less apt to pass beyond the original limits of the abscess and thorough drainage is more easily accomplished.

The retroperitoneal abscesses are more insidious in their onset, are detected with greater difficulty, the infection is liable to extend far beyond the walls and into region where it is impossible to follow.

In neither of the extraperitoneal cases, II and III, was it possible to make a positive diagnosis of abscess, and had I not witnessed the autopsy on the former of the cases I should have not sought the abscess in the latter. In those cases where abdominal infections are known to exist, which progressively grow worse, and especially those that have come to operation late, I believe that we are justified in exploring the retro-

peritoneal subdiaphragmatic area on what would otherwise be slight evidence, that is persistent localized tenderness, accompanied by altered physical signs at the corresponding base.

REFERENCES.

Osler: Canadian Practitioner, 1893.
Beck: Med. Record, Feb. 15, 1896.
Jopson: Archives of Pediatrics, Feb., 1904.
Barnard: Contributions to Abdominal Surgery, 1910.

Dr. John H. Jopson said that it had been his misfortune to see a good many cases of subphrenic infection, including cases following appendicitis, ruptured gastric and duodenal ulcers, operation for cholecystitis, and one case of probable kidney infection,—12 cases in all, with a mortality of 58 per cent.

Appendicitis is probably the most frequent cause of subphrenic infection in this country, although it frequently follows the accident of perforating gastric or duodenal ulcer. Appendicitis is easily the most frequent cause in children, as was shown in his study of all the reported cases up to 1903.

Some distinction should be made between subhepatic and subphrenic abscesses, because the symptoms of the latter are often more characteristic. Several times in subphrenic infection he had found an early inflammation of the pleura present, as shown by pleuritic pain, friction rub, fine râles and an early involvement of the lung. In many cases of true subphrenic abscess, however, these symptoms are transient or absent, as are nearly all of the classical symptoms detailed by Dr. Despard. A persistently high temperature and the physical signs of a collection, large or small, usually on the right side, are sometimes the only symptoms present. In one young child under his care rapid emaciation was a striking symptom. In some cases physical signs suggesting subphrenic abscess are apparently present and no abscess exists. A few weeks ago there was such a case at the Presbyterian Hospital which was studied very carefully by both the medical and surgical men and also by the radiographer. All signs pointed to a pleural effusion. The patient had had perforative appendicitis followed by high fever, and all agreed

upon a probable diagnosis of subphrenic abscess. Aspiration and subsequent abdominal exploration were both negative and proved this diagnosis to be wrong.

In another case in which the patient was demonstrated at operation to have a large collection of pus in the subphrenic region an X-ray was taken before the operation, and the radiographer denied the possibility of a subphrenic collection, but after operation, acknowledged that he had failed to read his plate correctly. We must, therefore, acknowledge that X-ray pictures in this condition require very careful study and expert interpretation, and even then, may be deceptive; but they should be taken in all suspected cases, as they will in time undoubtedly furnish us valuable information as to the presence of such collections.

Dr. George G. Ross said that it had been his experience that subdiaphragmatic abscess is due more often to inflammations of the vermiform appendix. He remembered one case due to perforative gastric ulcer which was of the anterior subdiaphragmatic variety. He thought the appendix gives rise more often to infection of the subhepatic space, but when it occupies a position behind the cæcum the direct line of infection is toward the subdiaphragmatic space, largely on account of the arrangement of the psoas-iliacus muscle which gives a distinct upward flow to the infection when the patient is recumbent. His attention was called to this subject by an occurrence at the German Hospital in which in one week there were four cases of subdiaphragmatic abscess in patients operated on for appendicitis.

Dr. Astley P. C. Ashhurst said that he had gone carefully over the case reports, and found that only an exceedingly small number were what should be called true subphrenic abscesses; the vast majority were what are properly described as subhepatic abscesses or abscesses of the kidney pouch. The incision in these cases was made over the appendix, and whenever pus was found running up toward the liver the case was classed as one of subphrenic abscess. It is correct to distinguish between these cases and those of true subphrenic abscess. If he were to add to his relatively small number of subphrenic abscesses the large number of cases of appendicitis in which at operation he had found pus extending up toward the liver he should have a very large number of subphrenic abscesses with a very low mortality, instead of a few cases with about the average mortality.

A subphrenic abscess in the left region of the diaphragm he had seen only in one case of a child of two years, at the Children's Hospital in the service of Dr. Hutchinson, in 1906: this apparently was the result of tuberculous peritonitis. The abscess had discharged at the umbilicus before the child was admitted to the hospital; with Dr. Jopson's assistance he explored the sinus, but a fecal fistula developed within a week, and the child died about a month later.

As to pleural effusion as a valuable sign in the diagnosis of subphrenic abscess, a patient with stab-wounds of the liver on whom he operated last year for Dr. Frazier at the Episcopal Hospital developed thoracic signs during convalescence; but although his chest was tapped on several occasions at the point indicated by the consultant (Dr. Geo. W. Norris) no fluid was found at any time, nor did he have any other evidence of subphrenic or hepatic abscess. He carried a septic temperature for a long time, and all the physical signs of pleural effusion were present, but he finally recovered.

Dr. Despard has spoken of the danger of infecting the pleura in doing a transpleural operation for drainage of a subphrenic abscess, and while no doubt this danger is greater in cases of subphrenic abscess than in cases of hepatic abscess yet if the technic is proper the danger he believed was overestimated. Dr. W. W. Ashhurst had a large experience in these operations when he lived in Mexico, and devised the following technic: after subperiosteal excision of the rib selected, a curved needle is passed through both layers of the pleura in the costo-phrenic sinus and is made to penetrate the diaphragm; the fact of penetration is ascertained easily by the sensation when the needle catches in the diaphragm. A row of such sutures is inserted along the upper margin of the space left by excision of the rib, and not until the intact pleural cavity is in this way isolated from the operative field are the deep layer of the periosteum, the contiguous layers of the pleura and the diaphragm incised. In this way the chance of infecting the pleura is very remote.

Dr. Despard remarked, in closing the discussion, that the belief that subdiaphragmatic abscesses are more usually due to the appendix, is true if only applicable to the subhepatic fossæ, but if all the subdiaphragmatic areas are considered statistics will show that perforating ulcers of the stomach or duodenum are

the most frequent cause. The subhepatic fossa is the site of an abscess truly subdiaphragmatic for it rests upon the right crus of the diaphragm and is limited above by the right lateral ligament of the diaphragm.

In regard to the case spoken of as not having been drained, the evidence of infection in this region at the time was not sufficient to justify drainage. At the autopsy this abscess was found to be both intra- and extraperitoneal, involving the upper pole of the right kidney and the under surface of the liver. It was probably imperfectly drained through the anterior wound, so that the pus did not accumulate in sufficient quantities to give such definite physical signs as would justify exploration.

How this extended to the point above the kidney is uncertain, but probably by means of the retroperitoneal lymphatics. He suggested this differential point, lumbar or postcæcal abscesses are entirely different from subdiaphragmatic abscesses and are often due to imperfectly drained appendiceal infections; none of his cases were of this variety or in this situation.

TUMORS OF THE CAROTID BODY.

Dr. John Chalmers DaCosta presented a specimen of a carotid tumor which he removed several months ago. The patient was a woman of thirty-six years of age. The growth began 16 years ago, was very slow for many years but during the last 6 months it has grown more than it did in the previous 15½ years. The tumor is about the size of an English walnut. The diagnosis was made in this case before operation. The very slow growth for years, the carotid pulsation which lifted the tumor at every beat of the artery, the absence of expansile pulsation, the free movement from side to side, the absence of mobility from above downward and from below upward indicated a tumor of the carotid gland.

A few years ago he made a report of a case of tumor of the carotid gland upon which he had operated. In that case he was obliged to tie the common carotid artery and as a result of the ligation hemiplegia developed. He stated on that occasion that he would never again remove one of these growths, a statement which is proof of the truth of the saying of James Russell Lowell, that "one should not prophesy unless one knows!" In spite of that prophecy he now reported another case. There are

very few cases of carotid tumor on record, 32 altogether. The mortality has been 25 per cent. and in 6 of the cases there was recurrence. In several of the more recent cases it was found possible to remove the growth without tying the common carotid.

Again, these growths when they begin to show rapid enlargement have become malignant and if let alone will produce death. He determined to operate on this patient and succeeded in getting the gland out of the carotid bifurcation without tying the common carotid, although he was forced to tie the external carotid. The pathological report shows that the growth is a perithelioma.

MYXOCHONDRO-ENDOTHELIOMA OF OCCIPITAL BONE.

DR. DA COSTA presented an enormous tumor which he had removed from the nasopharynx of a colored woman aged twenty-four years. The pathological report shows it to be a myxo-chondro-endothelioma. It was so large that it filled the entire back of the throat and between it and the dorsum of the tongue it was not possible to pass the handle of a spoon laid flat. The woman was in immediate peril of suffocation. This growth had lasted for 6 years. He performed a preliminary tracheotomy and a few days afterward tied each external carotid artery and explored to see if he could possibly remove the growth without serious mutilation of the patient. It was necessary to remove the right half of the upper jaw, because the growth had invaded the posterior part of the antrum. The growth sprang from the basilar process of the occipital bone and had fused with the palate bone, the soft palate and a part of the superior maxillary bone on the right side. The removal was accomplished with difficulty and in spite of the carotid ligation occasioned severe hemorrhage.

LACTEAL CYST OF BREAST.

DR. DA COSTA presented a specimen being a huge milk cyst of the breast. He said that it was the second one he had ever seen. The previous one, which was much smaller, was in the service of Professor Keen. This growth did not start during pregnancy nor lactation, at least if it did the woman never noticed it, but it began six years after a child birth. It grew slowly, was free from pain, troubled her only from its weight, and felt soft, as though it ought to fluctuate, but there was no

fluctuation. As one pressed upon it it suggested thick walls with fluid beyond them. There were many large veins in the skin of the breast. There was no discharge from the nipple and there never had been.

On opening into this it was found that the entire breast was converted into a grayish yellow mass of the consistency of butter. Macroscopically there was no breast tissue remaining. Therefore, he removed the gland. Chemical tests showed that it contained products from milk and a study of it proved it to be a typical galactocele, the breast being practically completely destroyed.

ACUTE SPONTANEOUS PERFORATION OF THE GALL-BLADDER INTO THE FREE PERITONEAL CAVITY

Dr. George G. Ross reported the history of a case of perforation of the gall-bladder into the free peritoneal cavity due to ulceration of the gall-bladder walls, as follows: Woman, age sixty-three years. In childhood had measles. At thirty-three years of age had catarrh of the bowels, during and immediately following which she had malaria which lasted one year. During malarial influence she had a chill every other day but did not go to bed. About this time (33rd year) she had indigestion so bad that she ate only "starch" and "camphor," eating about a pound of washing starch daily and now and then camphor.

In April, 1912, she was suddenly seized with a severe pain in the epigastrium which lasted about one day leaving her tender and sore for one week afterwards. On May 13, 1912, there was another attack of very severe and excruciating pain in the lower abdomen. Three days prior to May 13 she had complained of marked abdominal soreness, but the sudden pain on May 13 seemed to be a climax. This pain was accompanied by nausea and vomiting, constipation and a diminished amount of urine. This lasted until Wednesday, May 15.

Monday, May 13, the temperature was 99 degrees, pulse 84 and respiration 12. The very slow respirations were said to be due to morphin sulphate. As time went on from Monday, May 13, to Wednesday, May 15, the abdomen continued to become more and more distended and the urine smaller in amount and of redder discoloration. Tuesday, May 14, during the morning she again had a very sudden, severe and excruciating pain in

the lower abdomen which also radiated to the shoulder and back. Wednesday morning, May 15, the abdomen became greatly distended and was quite tender and sore and more or less painful, but the pain was not so severe as during the previous few days. There were no peristaltic sounds audible. The urine was diminished in amount. The bowels had not moved and she had not passed flatus.

Operation, May 15, 1912. An incision was made in the right upper rectus close to the semilunar line. On opening the peritoneum the abdominal cavity was found to contain free fluid, of the appearance and nature of bile. The "bile" spurted from the wound on incising the peritoneum. In the pelvis was found a cloudy, bile-stained fluid. The gall-bladder was perforated and had discharged its bile content and 10 or 12 stones into the abdominal cavity. About 250 gall-stones of greatly varied sizes, the majority of which were small, split-pea size and the largest of which was about 1.50 x 2.00 x 0.75 cm., were removed from the gall-bladder. The gall-bladder "rupture" occurred on the inferior surface near the cystic duct. The gall-bladder mucosa was inflamed and the wall thickened. There were fine adhesions in many places. The bile ducts were patulous. A rubber drainage tube was sutured to the gall-bladder wall entering the bladder. There was no attempt made to sew up the rent in the gall-bladder. A small puncture was made in the hypogastrium and a rubber catheter inserted into the pelvic cavity, for drainage purposes. The peritoneal cavity was not washed out, the excess of bile being mopped out with gauze sponges.

May 15. White blood cells 10,000.

May 22. Culture of fluid from ruptured gall-bladder showed staphylococcus and streptococcus and bacillus coli

It is quite evident that the organism found in the gall-bladder and peritoneal cavity were of a low state of virulence as the peritonitis was of a distinctly low grade, there being little or no lymph deposit and the cloudy, bile-stained fluid found in the pelvic cavity was not true pus.

Patient made an uneventful recovery, going home with a small fistulous tract to the gall-bladder.

Since preparing the report of the above case a second case was admitted to the Germantown Hospital, which Dr. Ross saw

in consultation with Dr. Wm. N. Johnson to whose ward the patient was admitted.

The patient was a man, forty-seven years of age who three days before admission was seized with pain in the lower right side of the chest. This pain was made worse by a cough, which was dry, and unproductive, or by deep inspiration. For five days before this severe pain in side, patient had been coming to the medical dispensary complaining of a feeling of weakness—general vague pains, headaches, constipation, loss of appetite and restlessness at nights. Gives no history of nausea, vomiting or chills.

When admitted the abdominal wall was rigid. The distention was marked. The abdomen was so tender that palpation was painful (the weight of an ice water bag causes pain to be increased). Lower liver margin could not be felt. At a point over the gall-bladder area the tenderness was more pronounced.

The patient died the second day after being in the ward. The following are the notes taken from the autopsy report:

"Lungs, heart and pleura normal; abdominal cavity contains a large quantity of free, greenish pus; intestines distended, highly inflamed and covered with exudate; omentum matted together in the region of the pylorus and gall-bladder; gall-bladder contains a few ounces of pus; a large gall-stone found in the cystic duct; perforation (ulcerated through) in cystic duct through which pass bile and pus; dome of the liver up as high as the third rib; pancreas, spleen, kidneys and appendix normal."

Dr. John H. Gibbon asked what are the causes of rupture of the gall-bladder outside of ulceration from stone and traumatism. He had had such a case and had no idea what caused it; he expected to find a stone but on opening the abdomen there was a lot of free bile in the peritoneal cavity and the gall-bladder was full of bile. The head of the pancreas was quite hard; there was no stone. There was no difficulty in examining the pancreas, the ducts or the duodenum; and the patient was made quite comfortable by drainage. The gall-bladder was red and inflamed but there was no pus, just bile, which was seeping from the gall-bladder wall.

Dr. Astley P. C. Ashhurst called attention to the question of biliary peritonitis without perforation of the bile-ducts, and referred to the cases reported in 1906 to this Academy, in which

was found bile-stained peritoneal effusion without any apparent cause. In one case the appendix was removed and the patient got well; in another simple drainage was employed and the patient died. In the first case the yellow color of the effusion was shown on examination not to be due to bile, but to "disorganization of the coloring matter of the blood." Recently he had seen an article on biliary peritonitis without perforation of the bile-tract, putting on record several cases in which operation was done. In one case, just as in the case which Dr. Gibbon has mentioned, the bile could be seen oozing through the walls of the gall-bladder even after they had been wiped dry. In none of these cases was the fluid examined to see whether it was really bile, but it may be presumed that it was in Dr. Gibbon's case, and in the similar case where it was seen oozing through the walls of the gall-bladder. In the case reported by Clairmont and Haberer (*Mitth. a. d. Grenz. d. Med. u. Chir.*, 1910, xxii, 154) the common duct was obstructed by stone, but the gall-bladder appeared healthy. These observers made a number of experiments on dogs for another purpose, but involving obstruction of the choledochus, and found in a small proportion of cases, in 3 cases out of a large number of experiments, that peritonitis occurred with bile-stained effusion, but without perforation of the bile-tract. Other cases encountered at operation have been reported by Schievelbein, by Johansson, and by Wolff. It has been suggested by Schievelbein that this filtration of bile may be due to the presence in the gall-bladder of structures known as "Luschka's Gänge." These are mucous canals extending to the subserous tissue of the gall-bladder, and are said to exist only in about 3 per cent. of cases. Schievelbein claims that inflammatory changes in the gall-bladder wall destroy its permeability. It is, therefore, only when the unusual coincidence arises (1) that these canals are present; (2) that acute obstruction occurs in the presence of a nearly normal gall-bladder, that biliary peritonitis can occur without perforation of the bile-tract. This theory, however, fails to explain cases like those reported by Dr. Davis, where the fluid was shown not to be bile, but altered blood.

While the post-mortem discoloration of neighboring parts by the bile is well recognized, it does not facilitate the explanation of such a change during life.

Dr. Gwilym G. Davis said that the cases reported by him

some years ago in the ANNALS OF SURGERY were carefully studied and the liquid was examined; the coloring matter was found to be hemoglobin.

DR. JOHN H. JOPSON said that he had operated on two cases of perforation of the gall-bladder into the general peritoneal cavity. One of these which was reported before the Academy of Surgery in 1904 was in a woman of fifty-one, sick for 48 hours with gall-stone colic, but the perforation was probably not over 6 or 8 hours duration. There was a single stone in the first portion of the cystic duct, and the site of perforation, while not determined exactly, was near the cystic duct. This patient recovered.

In the second case which was in an elderly woman the perforation was of much longer duration, probably 36 hours or longer; the patient came to operation in bad shape suffering from sepsis and exhaustion and afterward succumbed.

THE RELATIONSHIP BETWEEN GASTRIC AND PANCREATIC CARCINOMA.

BY EDWARD A. SCHUMANN, M.D.,
OF PHILADELPHIA.

OBSERVATION of a case of carcinoma of the stomach, which had invaded the pancreas, eventually causing leakage of pancreatic secretion with subsequent generalized fat necrosis, has led the writer into a survey of the literature of this subject with the result that there is found a comparatively large group of recorded cases, wherein the combined symptomatology of a gastric carcinoma with extension to the pancreas has occasioned a peculiar, baffling train of events, presenting great diagnostic difficulties and uncertain of explanation even when the diagnosis is assured by laparotomy or autopsy.

The history of the case prompting this report is as follows:

Mrs. X, forty-nine years, III-para, a woman of excellent heredity and a negative previous medical history was first seen in consultation June, 1911, when she complained of some acid indigestion with œdema of the feet.

She was a very large, robust woman, who suffered from some distress and eructation after eating, but with no nausea or vomiting.

Examination of the chest and abdomen proved entirely negative, there was no demonstrable disease of the nervous system, the urine was normal, the hemoglobin 95 per cent. A short course of antacid treatment with regulation of the diet promptly relieved the symptoms.

In Nov., 1911, the patient suffered from an acute attack of pain in the abdomen, well localized in the right hypochondrium, the pain coming on without apparent cause and during what seemed to be normal health. She was under the care of Dr. J. O. Tilton, of Lexington, Mass., and in spite of all medical treatment failed to improve. The pain continued, the patient became jaundiced, constipated and a small mass developed on the right side in the gall-bladder region.

Dec. 6, 1911, the writer was called into consultation and the following conditions were noted:

A well nourished woman, suffering a moderate degree of abdominal pain but not exhibiting any evidences of shock. She was moderately jaundiced, the sclera deeply stained, the tongue was pale and flabby, the pulse full and strong. There was no history of sweats but occasional slight chills were noted; the temperature rose from normal in the morning to 100° F. at night, there was some degree of nausea and distaste for food, but no vomiting. Pain was considerably increased immediately after eating solid food. The heart and lungs proved negative to physical examination, the blood pressure was 130 mm.

The abdomen was slightly distended but soft and presented a small rounded mass in the right nipple line, just below the costal margin; the mass moved synchronously with the respiratory excursion, was semi-fluctuating in character and was very tender, pain on palpation was distinctly transmitted to the left lumbar region, high up.

The stomach could be indefinitely outlined and revealed no evidence of gross change.

The pelvic organs were normal, the urine was bile-stained, negative for sugar, albumin and casts. There was no fat present in the somewhat pale stool. After further consultation with Dr. Tilton and Dr. E. H. Stevens, of Cambridge, a diagnosis of cholelithiasis was made and the patient removed to the Copp Hospital for operation. It may be noted that she walked without discomfort down a flight of stairs to an automobile and rode six miles to the hospital where she mounted another flight of stairs without exhaustion.

Under ether anæsthesia, the gall-bladder was exposed by an incision parallel to the costal margin. Upon opening the peritoneum the palpable mass was found to consist of rolled up omentum, densely adherent and undergoing fat necrosis. The entire upper segment of the abdomen showed extensive fat necrosis and the structures were so densely adherent that relations were indistinguishable. The gall-bladder was collapsed and pale and contained no stones. On account of the violent hemorrhage encountered when adhesions were separated, it was impossible to examine the pancreas in detail, but it was found hard and indurated and considerably enlarged. The stomach

was normal in size and presented a small thickened area at the pylorus which was buried in adhesions.

Free drainage was instituted with no attempt at any radical measures which were obviously impossible in the face of the fat necrosis and severe hemorrhage, and the patient returned to bed.

She improved slowly for ten days, with free drainage of seropurulent fluid containing pancreatic ferments, and with marked relief of pain and tenderness. Then, suddenly the temperature rose to 104° F., the abdomen became enormously distended and the patient died in collapse.

The autopsy performed by Dr. A. F. Boretti showed the parietal peritoneum thickly covered with granular and stringy fibrous exudate matting together every loop of intestine and forming a mass of adhesions around stomach and in right hypochondrium. Abdominal cavity contains (estimated) 1500 c.c. of turbid blood-stained fluid with a marked odor of formalin. Pelvic organs not remarkable. In right hypochondrium, in region corresponding to abdominal wound, several structures are firmly matted together and cannot be separated without tearing. The liver is enlarged, all its surfaces adherent to the surrounding peritoneal layers. The gall-bladder is covered with fibrous adhesions but contains no stones and is practically empty. The stomach feels thickened in its pyloric portion. The spleen is greatly enlarged, soft and held down in its fossa by soft, fibrinous adhesions. Because of the very marked adhesions all attempts at dissecting and following out the branches of the portal vein and bile ducts are unsuccessful. The intestines are removed as far as the duodenum and are not remarkable except as described. Duodenum opened *in situ*, shows no gross change. Stomach shows, bordering on the pyloric rim, and located in its posterior surface, a round, conical ulceration measuring 2 cm. in diameter by about 1 cm. in depth with an eroded, granular, grayish-red floor, the substance around it being thickened, on section presenting a grayish, nodular appearance and firm consistence.

This thickened portion tapers off gradually into the surrounding stomach wall, the mucosa of which has a granular, atrophic appearance.

Pancreas.—Is firmly adherent to the posterior abdominal wall and to the surrounding structures; the head and tail are normal as is the lower part of the body. In the upper part of the body, near its middle, is a mass the size of a hen's egg showing on section, the same grayish. nodular appearance noticed in the above described area in the stomach. On manipulating the structures some purulent material can be expressed from around the nodules. The nodules deeply infiltrate the normal pancreatic substance. The duct is patent as far as can be followed toward the head.

Liver.—Is large and voluminous, on section presents a grayish green, pale appearance, the substance somewhat greasy to the touch. Near the

beginning of the middle lobe and starting in the hilum, around one of the large branches of the left portal vein, the periportal structures are greatly thickened, of a whitish, nodular appearance, a large number of droplets of purulent material being expressed from the spaces around the vein. The vein itself shows roughening and thickening of the intima, which is covered by a thin film of whitish material. The periportal process infiltrates the liver substance bordering on it.

Gall-bladder.—Not remarkable except as before described.

Spleen.—Very large, about twice normal size. Capsule tense, of livid violet hue. On section substance is very soft and diffluent, follicles appear as irregular grayish bodies averaging 2 mm. Trabeculæ not visible.

Kidneys.—Both kidneys show normal amount of perinephritic fat. Capsule strips with slight difficulty leaving a very finely granular surface. On section somewhat pale. Pelvis and ureters normal.

Aorta.—Shows a few yellowish elevated plaques in its lower part.

Anatomical Diagnosis.—Carcinoma of the stomach with ulceration. Carcinoma of the body of the pancreas. Purulent infection of periportal spaces in one branch of vein in liver. General acute fibrino-purulent peritonitis with extensive fat necrosis. Chronic adhesive peritonitis in right hypochondrium and around pancreas. Operation wound and trochar puncture.

Microscopical Examination.—Sections taken from affected regions of stomach and pancreas show a markedly infiltrating carcinoma, in some places it being of an almost pure medullary type, while in others the fibrous stroma is much more marked. Necrotic areas are very abundant, abscess cavities are numerous, polymorphonuclear leucocytes are seen in large numbers, being also found infiltrating the stroma around these areas. The pancreatic substance shows a fairly well marked increase of fibrous tissue between the acini.

Diagnosis: Carcinoma of stomach, infiltrating pancreas and surrounding lymph nodes. Chronic interstitial pancreatitis.

Liver: Section shows very marked fatty infiltration around central veins.

Sinusoids contain many endothelial leucocytes.

Spleen: Follicular structure is almost obliterated. Sinuses distended and filled with fine granular coagulum and containing many endothelial cells and several polymorphonuclear leucocytes. Blood pigment abundant in these cells. Capillaries congested.

Diagnosis: Acute splenic tumor (acute œdema, congestion and hyperplasia).

A summary of the foregoing case history, brings out the rather surprising fact that there were present four of the more grave affections of the upper abdomen existing simultaneously, three of them presumably superimposed upon the fourth.

The primary focus of disease was in all probability the

gastric ulcer, which later suffered carcinomatous degeneration, the carcinoma subsequently becoming secondary in the pancreas. This latter organ under the irritating influence of the carcinoma became the seat of a chronic interstitial inflammation.

In a very careful study of the patient, none of these four lesions was suspected, except the pancreatitis which was considered because of the persistent pain in the left lumbar region.

That such profound tissue change could proceed without any manifestation, for a period evidently extending over several months and culminating finally in an attack characterized only by moderate abdominal pain, jaundice and slight fever, is worthy of attention.

There are on record several cases highly suggestive of the same condition, and a comparative study of these case histories leads one to the conclusion that there must exist some interaction of the nervous and chemical relations between the stomach and pancreas by which the effects of disease in one organ are, in a measure, counteracted by a compensatory or sympathetic hyperactivity of its neighbor.

A few typical case reports from the literature follow:

Bode[1] cites one case in a woman of 33 years, who complained for a few weeks of a feeling of abdominal fulness, some loss of flesh and strength. She developed jaundice, enlargement of the liver and retention of urine. On examination the gall-bladder was enlarged and tender, there was slight fever, the urine contained bile but was free from albumin and sugar.

Under a diagnosis of gall-stones, operation was performed; the gall-bladder was found distended with bile, its ducts obstructed from the outside, no stones or adhesions present.

The head of the pancreas was greatly enlarged by a firm, smooth tumor which obstructed the common bile duct at the ampulla. Cholecystduodenostomy was done and the patient discharged upon convalescence.

One year later she again presented herself, much emaciated and with a tumor visible at the site of operation. On section there was found a large, nodular adherent carcinoma of the pancreas firmly adherent to the papilla.

In this case it is doubtful whether a primary carcinoma was present or whether the primary focus was in the ampulla of Vater with secondary development in the pancreas. Bode thinks it possible that the carcinoma may have developed in an old interstitial pancreatitis.

Syms[3] reports an interesting case in a male twenty-four years of age. For one year there were noticed slight stomach symptoms; three months before these symptoms had grown more severe and were attended with some nausea and occasional vomiting, jaundice developed, with pale stools, the urine bile stained and there was slight fever. On examination there was found a rigid abdomen with tenderness in the epigastrium and marked pain in the upper left lumbar region. Upon operation the gall-bladder was found distended but there was no disease of the biliary system. A firm, nodular mass was attached to the posterior wall of the stomach, extending from behind the duodenum well across the posterior gastric wall. The gall-bladder was drained, but the patient died in four days.

Autopsy showed the gall-bladder and ducts free from disease. There was present a large carcinoma involving the pancreas, the posterior wall of the stomach and the suprarenal on the right side. The jaundice was due to the compression of the duct.

Körte[3] reports a case in a woman of forty-one, who for two years had had indefinite symptoms referred to the stomach, with slight loss of weight. She was suddenly seized with severe pain in the upper abdomen and breast, vomiting and diarrhœa. The abdomen was distended; at the epigastrium, above the umbilicus and a little to the left was a tender, fist-sized tumor, which did not move with respiration and presented a small area of fluctuation. On operation a large abscess was found between the layers of the gastrocolic omentum and attached to the stomach and colon. Its contents were thick pus, particles of fat and necrotic tissue. The wound was drained, the patient dying two months after operation. Autopsy showed a mass of adhesions in the upper abdomen and a well advanced carcinoma of the pylorus, to which is firmly attached the head of the pancreas, which is penetrated by the carcinoma.

It has been proved beyond doubt that a close nervous and chemical relationship exists between the stomach and the pancreas and that if the sequence of this mechanism be altered by disease, changes may result in the function of either or both organs.

According to Howell[4] the order of digestive stimuli in the stomach and pancreas is as follows: the acid of the gastric juice, upon reaching the duodenum produces the material called secretin, which is in turn absorbed by the blood and carried to the pancreas where it stimulates that organ into activity. There is also present and active a nervous mechanism contained in the secretory fibres of the splanchnic and the vagus.

It is perfectly reasonable to suppose that in certain cases of gastro-pancreatic disease the secretory activity of the pancreas may be excessively stimulated by the presence of an irritating neoplasm and may reflexly cause excessive secretion and hence increased peristaltic action on the part of a stomach invaded by carcinoma. The greater secretion of gastric juice, with the increased peristalsis may readily counteract the symptomatic effect of a well advanced carcinoma of that organ. It is some such interaction of function that, in the opinion of the writer, makes possible the clinical expression of the cases under discussion.

Secondary invasion of the pancreas in abdominal carcinoma is not a common occurrence. Willigk[5] in 467 autopsies upon patients dying of carcinoma, found the pancreas involved in 29.

Biach[6] found in the Wiener allgemeinen Krankenhaus in 1270 autopsies in cancer cases that the pancreas was involved in 22. In the Rudolphspital one case of pancreatic cancer was noted in 221 cases dying from this form of malignant tumor.

As to the location of the growth in the gland itself, the head is most frequently involved. Mailand[7] found in 57 cases, the head as the seat of disease in 35, the tail 1, the body 2 and 19 were diffuse throughout the entire organ.

Morallie[8] found in 113 cases of pancreatic cancer, the head affected in 82, the tail seldom involved.

Of the histologic varieties of carcinoma, the glandular type is the most frequent, closely followed by scirrhus.

A point of interest in this connection is whether the primary tumor in the pancreas is really of pancreatic origin, or whether many such growths are not secondary to an overlooked focus in the pylorus or duodenum.

Oliviere[9] in a very careful study, holds that a neoplasm apparently primary in the pancreas may have had its origin in the duodenum, and that only the most painstaking microscopic study can differentiate the two.

Fähndruch[10] in an inaugural dissertation reports several

cases wherein apparently primary pancreatic cancers had their true source in a small tumor in the gastric mucosa.

The conclusions gathered from a review of the foregoing are: that secondary invasion of the pancreas is a somewhat infrequent sequel of pyloric or duodenal carcinoma and that in a certain group of cases, where the pancreas is attacked early in the course of the disease, there may arise a mutual functional compensation between stomach and pancreas, which permits both organs to satisfactorily perform their duties, with a decided absence of symptoms of disease of either, even though there may be extensive destruction of tissue.

BIBLIOGRAPHY.

[1] Bode, P.: Operative Behandlung der Pankreas krank. Beitrage zur Klin. Chir. 1910–1911, vol. lxxi, p. 610.
[2] Syms, Parker: Carcinoma of the Pancreas, Inter. Jour. Surgery, 1910, vol. xxiii, p. 51.
[3] Körte, W.: Die Chir. Krankheiten und Verletzungen der Pankreas. Deutsche Chirurgie, Lief 45 D, 1898.
[4] Howell, Wm. H.: Text Book of Physiology, p. 779.
[5] Willigk: Prager Viertaljahrsschr. 1856 (quoted by Körte).
[6] Biach: Wiener Med. Wochenschr. 1883, No. 8 (quoted by Körte).
[7] Mailand, (quoted by Körte).
[8] Morallie: Gaz. des hop. 1893, No. 94.
[9] Oliviere, (quoted by Körte).
[10] Fähndruch: Inaug. Diss. 1891.