ing the elevated posture is desirable. Furthermore the majority of cerebellar lesions are in the cerebellopontile space, and he had found it most convenient to approach these from the lateral aspect along the posterior surface of the petrous bone. By placing the patient on his side (see Fig. 2), elevating the table, and flexing the head, satisfactory conditions for cerebellar work can be obtained.

In order that this position may be maintained and to prevent the patient rolling over on his face when under the relaxation of the anæsthetic a special device has been attached to the table which grasps the arm in the deltoid region. It is most important in cerebellar subjects that, when under the anæsthetic, throughout the operation respiration should not be interfered with.

This device will be found serviceable for any operation in which it is desired to keep the patient on his side, as in operations on the kidney and thorax.

Attention is called furthermore to an adjustable foot-board which may be moved up or down, according to the height of the patient, and by means of an automatic catch retains its position, thus preventing the patient from sliding off when the table is elevated.

While the table was designed for a special field of surgery, the essential features of a general utility table were not sacrificed. The foot of the table will drop so as to enable one to place the patient in a position suitable for operations on the perineum or in the Trendelenburg position for pelvic work.

STATED MEETING, NOVEMBER 2, 1908.

The President, Dr. William J. Taylor, in the Chair.

CONGENITAL DISLOCATION OF THE KNEE.

Dr. John B. Roberts said that at the meeting of the American Surgical Association on May 9, 1901, he presented a paper reporting a case of arthrotomy for congenital anterior dislocation of the tibia.[1] The girl, who was aged five years, was operated upon in March of that year through a large horse-shoe incision made across the front of the knee. After division of the ligament of the patella and almost complete section of the lateral ligaments of the joint the dislocation was easily reduced. A partial section of the four-headed extensor muscle of the leg was necessary in order to repair the cut ligament of the patella. Some infection of the wound occurred and it became necessary to open it and thoroughly drain the knee-joint, using also irrigation with mercuric chloride solution and subsequently with formaldehyde solution. After a number of weeks the child returned to her home with the bones in proper position, though there was still great restriction of motion at the knee-joint.

He presented illustrations showing a skiagraph and photographs of the child before operation. The photograph now presented (Fig. 1) shows the child as she is at the present time. Her physician, Dr. F. S. Nevling, reports that the child, who is a dwarf, can now use the operated leg just as well as the other and needs no brace or support for it. She can run and jump just like any other little girl. She is now about thirteen years old and has long since ceased to grow. The doctor thinks she is little, if any taller than when she was operated upon at the age of five. Inspection of the photograph indicates that she is probably a cretin. She has a large head and prominent abdomen. Her expression, however, is not that of a child of very defective

[1] Transactions of the American Surgical Association, 1901; and Annals of Surgery, August, 1901.

intellection. The scar of the operation on the left knee is shown on the picture; and the legs appear to be of the same length.

She is somewhat defective mentally, but Dr. Nevling says she can care for herself and ask for everything she wants, but that she gets very cross, if not humored. The parents have treated her like a baby and have not sent her to school. The physician mentioned has advised that they send her to school, but this has never been done. The other children are normal and bright. She has two brothers of adult age who are nearly six feet tall and weigh from 160 to 180 pounds each, and two sisters aged 17 years and 19 years who are bright and weigh from 125 to 150 pounds. There is another brother older than she and one younger. The latter is now 10 years old and weighs about 90 pounds. There have been no other deformities in the family, and Dr. Nevling thinks that possibly the dislocation of the knee was caused during delivery of the mother, as she says that she had a very hard time at that particular confinement. He can give no reason for the child's ceasing to grow and being a dwarf.

RECURRENT ACUTE APPENDICITIS AFTER OPERATION.

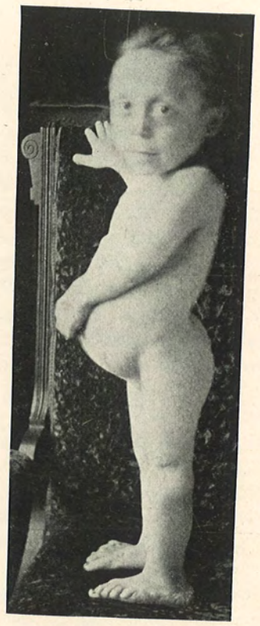
Dr. George G. Ross said that to a patient who has been operated on for an acute suppurative appendicitis and whose appendix has not been removed, the possibility and danger of another attack is no small matter. The actual occurrence of such an attack is not a rarity, and these cases offer additional difficulties at the second operation and bring to both the surgeon and the patient a realization of the shortcomings of the first.

During the past three months he had operated on three such cases, all at the German Hospital. In two the occasion for a second operation was an acute attack of appendicitis, in the third the procedure was for the relief of a persistent abdominal sinus.

The details of these cases are as follows:

Case I.— Mr. H., aged 37. On September 27, 1907, patient was taken ill with appendicitis. He was treated medically, apparently improved, and at the end of the second week passed about three pints of pus by the bowel in several evacuations. His chills and evening temperature however persisted, as did the tenderness and distress in the right iliac fossa. He lost forty pounds during his illness. He was finally sent to the Hospital and on October 31, 1907, an abscess to the right of the ascending colon was opened

Fig. 1.



Showing result of arthrotomy for congenital dislocation of the knee at the end of seven years.

and drained. The appendix was not searched for. The patient, after a long convalescence, made an apparent recovery. On August 23, 1908, he was admitted to the German Hospital. He complained of not feeling very well and of a tenderness at the site of the old scar, which had been present for six months. Physical examination revealed an exquisitely tender mass the size of a man's fist beneath the old scar, which had given away, leaving an incisional hernia. An incision removing the superficial scar was made, opening the peritoneum in the line of the original incision. The adherent intestines were separated from the cicatrix and a postcæcal abscess cavity opened. Within it was found a gangrenous appendix sloughed in two. The appendix was ligated and removed, the abscess cavity cleaned out and drained by a rubber tube through the loin, and gauze anteriorly. The patient made an interrupted recovery.

Case II.—Mr. C. S., age 30, had been operated on three years before at the Bellevue Hospital, New York, for acute appendicitis. His wound was drained and he was told that his appendix had been removed. He was admitted to the German Hospital of Philadelphia, August 3, 1908.

His present illness began one week ago, when after an indiscretion in diet he had an attack of diarrhœa lasting all night. Since then he has had a desire to have his bowels move very often, yet passes but little fecal matter each time. At the same time he has had general abdominal pain. The night before admission the pain became acute and was localized to the right iliac fossa. He vomited once.

Physical examination shows the absence of rigidity or distention. There was an excessively tender mass beneath the old scar.

Operation, September, 1908: old scar excised; intestines walled off with gauze pads and a pericæcal abscess exposed; the small amount of pus found was wiped away and an inflamed necrotic appendix found, which was ligated and removed; the abscess cavity was drained by the means of a rubber tube and gauze. Patient made an uninterrupted recovery.

Case III.—Mr. C. G., age 24, at the end of November, 1907, was operated on for acute appendicitis. He had been ill for three days before admission and had been treated by his physician with purgatives. At the operation an abscess containing very

foul pus was opened and drained. The record of the case states that a gangrenous appendix was found and removed as a slough. It is of interest in this case, that threatened obstruction from contracting adhesions was averted by repeated daily doses of castor oil.

Ever since the operation the patient has had a discharging sinus, for which he came for operation in June, 1908.

At this operation, after placing a probe within the sinus, the old scar was dissected out in the usual way and the intestinal adhesions separated. The sinus was found to communicate with the lumen of the remaining one-inch-long portion of the appendix. This inch of appendix was removed, a small drain introduced and the wound closed. The recovery was uninterrupted and did not recur.

Dr. Ross further said that a consideration of the cases cited would direct our inquiries to several points: (1) the liability to recurrence after the simple opening and drainage of an appendiceal abscess; (2) the propriety of removing the appendix in cases in which the trouble outside of the organ is marked; (3) the importance of operation before the trouble becomes extra-appendiceal.

The Liability to Recurrence.—There can be no doubt that as long as any portion of the appendix in communication with the cæcum remains, recurrent attacks are to be feared. Could we predict in any particular instance what the subsequent behavior of the appendix would be it would be easy for us to determine whether to be content with the simple evacuation of an abscess or to search more thoroughly for the appendix. Yet this is manifestly impossible.

Sir Frederic Treves states that of 100 cases of appendiceal abscess operations which came under his observation, 16 had recurrences and 8 subsequently had the formation of inflammatory exudates in the right iliac fossa, no doubt appendiceal in origin—24 per cent. then really had recurrences after operation. And while this distinguished author states that of 100 patients operated on by simple drainage of the abscess 84 did not have recurrence, I would reverse this method of presenting the facts and emphasize the point that 16 per cent. to 24 per cent. did have recurrence.

Nor can any given patient, under such circumstances, be sure

at any time, however remote, that he will not again be the victim of an attack of appendicitis. It is almost impossible for us to calculate the hindrance that such a constant apprehension must be.

It is only in those cases in which the appendix has sloughed, disintegrated and really become a portion of the abscess mass that a recurrence is unlikely, and these, unfortunately, we are unable to recognize at operation unless one searches for the cæcum to locate the origin of the appendix. Twice in making such a search I have discovered a hole in the cæcum where the appendix had sloughed off. Several times in making a search for the appendix, unsuspected, isolated collections of pus have been discovered.

Nor is it necessary for the whole appendix to be present for us to have a re-awakening of the old trouble. Instances have been reported of cysts and infections of appendiceal stumps and Treves in his series of 100 cases found two in which subsequent trouble was due to pus formation in a mere stump of an appendix.

The leaving of such a portion of the appendix may occur in two ways:

1. The operator may do this by faulty technic. This is doubtless a rare occurrence, particularly at the hands of any one who has had the benefit of observation before attempting to operate.

2. After opening an appendiceal abscess the sloughed appendix may be removed and a portion inadvertently be left. This would also seem not likely to occur, yet Case III is an illustration of this.

On the other hand while the distal end of the appendix may be comparatively free, the proximal may be a portion of an abscess wall which the operator does not wish to disturb.

Should the appendix be already sloughed off an examination of the cæcum will often reveal the fact that the line of separation is some distance removed from the junction of the cæcum and the appendix and that therefore a considerable stump is left, which must be removed.

This was the case in an instance encountered recently by a colleague, Dr. Whiting. In a case which he operated on the thirteenth day of the attack, the entire distal end of the appendix was a slough, a whitish string almost, while a distinct stump was left, the lumen being closed by healing that had already taken place.

As regards such spontaneously healed appendiceal segments we know that they can also remain harmless and retain their nourishment for indefinite periods and that their reinfection and inflammation gives rise to attacks and lesions entirely similar to an acute appendicitis.

Williams (*Brit. Med. Journ.*, 1907) has lately cited the curious instance of acute inflammation in an appendix entirely separated from the cæcum, causing a typical appendicitis.

The lesions which we may expect from the remnant of the appendix, or rather the pathological processes to which it may give rise, may be classed as follows: (1) acute appendicitis, with or without abscess; (2) continuation of primary infection or residual abscess; (3) fistula.

An appendix left at operation for abscess is somewhat less liable to give another attack of appendicitis than one left unoperated in a mild attack. Yet the possibility is not remote. As might be expected in cases where there has already been so much damage to the structures of the right iliac fossa, abscess formation in these cases is common. Case II is an example of this class. Here a man, in good health for three years after an appendix operation, becomes subject to another very acute attack with abscess formation.

A residual infection, or one in which there has probably never been an entire subsidence of the infection about the appendix, and a gradual abscess formation takes place as shown in Case I. As to symptomatology they furnish us with a picture of slow abscess formation with mild infection as opposed to the acute signs as in cases of class 2. As to pathological conditions within the abdomen, and their treatment, they furnish us with nothing that varies from those of the first class.

In class 3, the fistula cases, we may really have two varieties: (*a*) those in which the appendix portion or stump acts solely as an irritant in keeping open a sinus tract; (*b*) those in which the sinus communicates with the lumen of the appendix, either of the appendix proper or of a sloughed segment, as in a case reported by Dr. Deaver.

It is not always possible to ascertain when the appendix is the underlying cause of the persistence of a sinus. Should we be able to exclude the possibility of the presence of a portion of ligature, etc., it will be probable that the fistula either arises from

the stump of the appendix or is kept active by the presence of a fecal concretion, etc. It is but in a few instances that we see a sinus or fistula of long standing in which at operation some such cause is not demonstrable.

The treatment of such recurrent infections, residual abscesses, or fistulæ, is based upon one general principle, viz., to remove the primary cause of the trouble and to repair the damage done by it.

To leave the appendix a second time in abscess cases would be only to invite another attack and the formation of another abscess with a continuation of local infections finally leading to a general infection.

But far more important than the treatment of these conditions is the question of their avoidance at the primary operation. It is known that they occur after abscess or pus cases. The question then arises: What is the proper operative treatment for appendicitis and abscess?

The treatment of appendiceal abscess cases must have been carefully considered by every one who has had occasion to deal with a number of these cases.

Authorities have differed greatly as to the mode of approach, the method of incision and of drainage and the after treatment. Equally have they differed as to the method of dealing with the appendix in these cases.

Amongst many surgeons the simple evacuation of an appendiceal abscess is held to fulfil all the indications in such a case, and that the treatment of a case is such as would be applied to a simple abscess anywhere in the body. This is a method of treatment much more in vogue upon the continent of Europe and especially in Germany than among American and English surgeons. Mr. Bottle has recently advocated secondary operation for the removal of the organ before the patient passes out of the surgeon's hands.

Others, such as Dr. Morris, of New York, speak for the removal of the appendix in every case regardless of its location or relationship to the abscess wall, etc.

The large majority of surgeons heretofore, however, have taken the position held by Dr. Deaver,—that it is advisable to remove the appendix whenever it is not so situated in the wall of an abscess that to remove it would be to spread infection over the general peritoneal cavity.

As will be seen the meaning of this statement varies largely with the surgeon applying it. In the opinion of the reporter the incision and drainage of an appendiceal abscess represents the most unsatisfactory of all operations for acute appendicitis. To operate upon a resultant pathological condition and leave the original focus and cause of infection *in situ* is opposed to all the fundamental principles of surgery.

A primary incision with secondary operation for the removal of the appendix is no less unsatisfactory. As a rule patients cannot be induced to return when they are feeling well even if they know that they may at any time become most gravely ill. This method also exposes the patient twice to anæsthesia and the discomfort and inconvenience of operation. Not only this but a second operation shows us instead of a free appendix or one covered by fresh adhesions, easily loosened, an appendix hidden and covered by adhesions often so dense that the removal of the organ becomes a surgical procedure of the greatest difficulty and danger.

A decision must be made, between those who would always remove the appendix, and those who advise its removal as a rule but do not regard its remaining as a serious matter.

He was not willing to say that the appendix should be removed in absolutely every case. But his experience with these recurrent cases that he had himself operated, and others that had come under his observation, leads him to believe that the cases in which the appendix should not be removed are rare indeed. Surgeons have been too fearful of hunting for the appendix in the presence of small amounts of pus, too prone to hesitate in removing it from among adhesions or from the limiting membrane of an abscess.

The leaving of the appendix in an acute abscess case is a serious matter. Such an incomplete procedure simply tides the patient over the acute condition and one should not be satisfied until the offending organ is in a bottle of alcohol. Until this happy event takes place the patient remains in a condition of no uncertain danger.

He had left an appendix in but one case for two years and had not lost one of these cases as a direct result of the removal.

But one other point remains,—instead of reoperating in abscess cases, surgeons should not have to operate on abscess cases

at all. A case of appendicitis, diagnosed and operated early, cannot give rise to a fraction of the complications that delay brings with it. Operation should follow diagnosis at once and there would result clean cases, without drainage, mortality or complications.

Unfortunately we seem to be far from this happy state of affairs. Sometimes it seems as if we were still in the pre-surgical stage, when the evacuation of an appendiceal abscess into the intestines, as in one of these cases, was esteemed a most fortunate result.

To the average layman the word appendicitis is spelled OPERATION. Where then lies the fault for the large percentage of appendiceal abscesses still encountered?

Of 194 cases of acute appendicitis on the records filed so far this year, January to September inclusive, at the German Hospital but 79 or 40 per cent., were clean *i.e.*, early cases.

Of 23 cases that he operated there during the summer but 10 were clean cases that could be closed without drainage.

Since January 1, 1907, he had operated 161 cases of appendicitis,—100 at the German Hospital, 56 at the Germantown Hospital, and 5 at other institutions. Of these, 105 were clean cases which were closed without drainage, this included both chronic and acute cases. There was one death. The patient was a Jew and had, in addition to his appendix troubles, enlargement of the lymphatic glands of the mesenteric chain as far as the finger could reach. After operation he was extremely restless, became actively delirious and died promptly of exhaustion. A partial postmortem revealed nothing about the seat of operation to account for death. The glands were not malignant, probably tubercular.

Fifty-six cases required drainage for pus, either in localized collection or involving the entire peritoneal cavity.

So far as he could recall, or the records state, there was but one case in which the appendix was not removed. This man had been operated a year before at the Bellevue Hospital, N. Y., and reported at the German Hospital, September, 1907, with a sharply outlined abscess in the right iliac fossa, which was opened extraperitoneally by an incision parallel to and above Poupart's ligament. He recovered and was discharged nineteen days later.

Three died,—two of these had general peritonitis and sepsis

which was very profound before operation and which did not improve, one of these died in the operating room of acute septic œdema of the lungs, the other had had intestinal obstruction for four days before admission. The third case was one of localized abscess presenting in the median line. The pressure of the collection had caused complete occlusion of the rectum. The surroundings of the abscess were necrotic from pressure necrosis. The patient had been ill for two weeks.

As far as could be traced the three cases of peritonitis were infections of the retroperitoneal space. Total mortality, 2.4 per cent.; non-drainage cases, 0.9 per cent.; drainage cases, including general peritonitis, 5.3 per cent.

Dr. John H. Jopson mentioned three cases of this kind operated within a few months of each other. One case was a patient Dr. Wharton operated upon, with the assistance of Dr. Jopson, the other two cases were his own. These three cases emphasized the necessity of removing the appendix in all cases of abscess. He could recall only two cases in recent years where he could not remove the appendix. In one a careful examination of the cæcum showed it sloughed off, and in the other it could not be found. In one of his own cases the child had had an operation for drainage of an appendiceal abscess a year or two previous, then had a second abscess at the time the appendix was removed, and a third abscess after removal of the appendix.

It always seemed to him that to open an abscess and leave the appendix was a very unsatisfactory procedure and incomplete surgery. It had frequently been his experience when removing the appendix where there was an abscess, to find fresh pockets of pus behind and around it.

One hears much less advice now in favor of leaving an appendix which "forms part of the abscess wall." It is much less dangerous to remove such an appendix, after careful protection of the uninvolved peritoneum, than to leave it and run the risk of overlooking other purulent collections.

AMPUTATION AT THE SHOULDER-JOINT FOR EMPHYSEMATOUS ("TRAUMATIC") GANGRENE.

Dr. Astley P. C. Ashhurst reported the case of Laurence S., aged 14 years, who walked into the receiving ward of the Episcopal Hospital on December 27, 1907. While at his usual

work in a yarn factory he had caught his right arm in the machinery, and had had the skin squeezed off it from just above the elbow to above the wrist, by the revolution of two rollers. The skin hung loose like the inverted sleeve of a coat. A somewhat similar case, in which the skin had been squeezed off the hand from the wrist to the fingers, had recently been under treatment in the hospital, and as a considerable portion of this hand had been saved by conservative measures, the Resident Surgeon determined to attempt to save this second patient's arm. Accordingly, after thorough cleansing of the parts, the skin was stitched in place, leaving ample spaces for drainage through various rents in the tissues. The arm was surrounded with hot water bottles. It was considered barely possible, as the deeper structures were not injured, that some degree of union might take place, and that amputation, if it had to be done eventually, might be done through the forearm, and not at the middle of the humerus, as would have been necessary had it been done on admission.

The patient did well for twenty-four hours, when his temperature rose abruptly to 102° F., his pulse however not exceeding 104 per minute. On the third day after admission, at the morning dressing, a little emphysema was noticed in the forearm. The temperature had fallen to 100° F. The patient was isolated by direction of Dr. Frazier. When seen by Dr. Ashhurst in the afternoon, the emphysema had spread, and he urged amputation below the shoulder. Consent of the family could not be obtained, however; and in accordance with the advice of Dr. Neilson, the sutures were all cut, and the limb was placed under constant irrigation, this being the only form of palliative treatment that seemed available. Free incisions were also made throughout the emphysematous tissues, thus relieving the patient's pain, and giving exit to quantities of frothy fluid. A culture was made from this fluid, and it was found that an air-producing bacillus was present; but unfortunately, owing to changes in the laboratory, the culture was mislaid before it was possible to determine whether the growth was due to the bacillus of malignant œdema, to the *Bacillus aërogenes capsulatus,* or to some other gas-producing micro-organism.

The next morning, December 30, the patient appeared better, and the local condition was no worse: the fingers were absolutely gangrenous, and the whole forearm, as well as the elbow, was

numb. The temperature was 100° F., and the pulse 90 to 100, rather weak, and very irregular. The patient was clear in his head, as on the previous days, and did not present the aspect of one who was seriously ill. The accompanying photograph (Fig. 2), made on this date, shows the appearance of the arm. As the emphysema had not spread toward the trunk, being sharply limited by the circular wound above the elbow, where the skin had been torn loose, it was considered safe to postpone amputation, in the hope that a line of demarcation might form. As a matter of fact, the next day, December 31, there was a suggestion of a line of demarcation at the border of the skin surface above the circular slough in the lower third of the upper arm. The notes for this day read: "Forearm is emphysematous and gangrenous. Gangrenous process does not appear to pass beyond point of sutures at elbow. Several incisions made in forearm to liberate gas and fluid. Upper arm is discolored for about two inches above line of incisions. General condition good. Pulse is irregular and slow, but of good volume." The pulse, on this and the preceding day, varied from 52 to 94 per minute. No digitalis had been given.

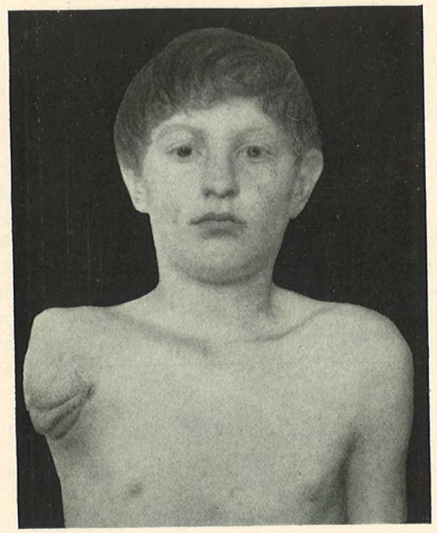
On the morning of January 1, 1908, it is noted that "there is slight crepitation for about one inch above line of suturing, and the discoloration seems to have spread nearer the shoulder, the upper arm is somewhat more swollen. Pulse irregular and not so strong." The temperature was just below 98° F., and the pulse from 64 to 68 per minute.

As it was evident that the infection by the gas bacillus had crossed the barrier set up by the solution in continuity of the skin and subcutaneous tissues, produced by the original injury in the lower third of the upper arm, amputation was decided upon at once. It was found that the inner surface of the arm almost to the fold of the axilla was greenish in hue, and that the only region from which a flap could be obtained was the deltoid; accordingly amputation at the shoulder joint was done by Dupuytren's method, using Wyeth's pins and an Esmarch band for hæmostasis, cutting the deltoid flap from without inward, and the inner, short flap, from within outward, after disarticulating the humerus at the shoulder. A large rubber tube was left in the stump for drainage, and the flaps were not sutured tightly. The patient was much shocked, though only a few drachms of blood

FIG 2.

Emphysematous gangrene.

FIG. 3.



Amputation at shoulder joint for emphysematous gangrene.

had been lost, and the operation had been completed with reasonable speed (about 25 minutes).

After the amputation the patient's temperature rose in a few hours to over 103° F., and by 4 A.M. the next morning reached 105.6° F., his pulse being about 138–148. At 4.30 A.M. he was given one pint and a half of saline solution, intravenously. This somewhat improved the force of his pulse. From the time the boy came out of ether, on the afternoon of January 1, to the morning of January 5, he suffered from the most frightful and violent traumatic delirium: he shrieked and yelled constantly, acting over and over again in his delirium the scenes of his accident, and throwing himself around on the bed so vehemently that he was with difficulty kept off the floor, even by strapping his ankles to the bed, and fastening his body by a sheet. During the first 72 hours succeeding the operation he obtained only six and one-half hours sleep, in two periods of about three hours each, in spite of the generous use of morphine, chloral, and hyoscine. Finally on the night of January 4, after a dose of paraldehyde, but perhaps merely as a result of exhaustion, he slept seven hours and a half, and awoke the next morning clear in his head. His temperature had gradually fallen, and after this date did not rise above 100° F.

The wound was dressed on the second day after the operation, to make sure that the gangrene had not affected the flaps; fortunately these were found in excellent condition.

To combat the toxæmia which seemed to be the cause of his delirium, he was forced to take as much liquid diet as possible. On the day after the operation, only 16 ounces of liquid nourishment could be taken, but this was supplemented by giving him a pint and a half of saline solution intravenously, as already mentioned. On the second day he took by mouth 68 ounces of fluid; and on the third day 65 ounces. No doubt it would have been beneficial to administer more saline solution intravenously, or by hypodermoclysis, but his delirium and tossing were so absolutely uncontrollable, that it would have been impossible to do either without the administration of a general anæsthetic. No record could be kept of the amounts of urine excreted, as these, as well as his bowel movements, were passed in the bed.

Two days after he came to his senses, he was removed from isolation, and returned to the general ward. His recovery henceforth was uneventful. A photograph made four weeks after operation, shows the appearance of the stump (Fig. 3).

This case is deemed worthy of record because of the rarity of recovery from emphysematous gangrene, even after prompt amputation. Although a case of this form of gangrene is received at the Episcopal Hospital every few years, this is, so far as can be determined, the first case to recover. In 1902, a man was admitted to the service of Dr. Neilson with compound fracture of the left elbow-joint; one morning, a few days after his admission, he was found to have developed emphysematous areas in his arm above the elbow. Three or four hours later, when seen by Dr. Neilson, the emphysematous crackling had invaded the thorax, and all thought of operation was abandoned, the patient dying the same afternoon or evening. In the summer of 1907, a patient who had been operated on for typhoid perforation, in Dr. Deaver's service, developed emphysematous gangrene in the abdominal wound, and died in a few hours.

Dudgeon and Sargent (*Trans. Pathol. Soc.*, London, 1905, lvi, 42) refer to two cases of emphysematous gangrene due to the Bacillus aërogenes capsulatus, following crushes, both patients recovering after amputation. Gayet (*Revue de Chir.*, 1908, i, 575) has recently reported the case of a patient with compound fracture of the forearm, which was repaired by operation, and who developed "benign gaseous gangrene," but recovered without amputation in three months and a half.

Writers in general recognize two main forms of "traumatic" or spreading gangrene (*"gangrène foudroyant"*)—the more serious form of malignant œdema, caused by Koch's Bacillus, in which variety the formation of gases is a secondary and minor characteristic; and a less serious form, due to any one of a number of gas-producing micro-organisms, of which that most frequently encountered is the Bacillus aërogenes capsulatus of Welch. Among other bacteria which may be the cause of emphysematous gangrene, Freeman ("Keen's Surgery," Phila., 1906, vol. i, p. 340) mentions the Bacillus proteus vulgaris, Bacterium pseudo-œdematis maligni, and the Bacterium coli commune.

The infection in the present case was probably due to one of the less malignant bacteria; and it seems not impossible that the delay in the emphysematous gangrene spreading toward the trunk may have been due to the form of the injury, which ripped the skin and subcutaneous tissues from around the arm above the elbow, thus leaving a gap in the lymphatic and cellular tissues

between the infected and healthy parts, which completely encircled the limb, and prevented extension of the infection upward.

The slowness of the pulse (52 to 64), and the absence of local inflammatory reaction before the operation, are also noteworthy. These features, as well as the fact that emphysema developed before the parts became gangrenous, show that the condition was not one merely of putrefaction in already mortified tissues; a fact which is further testified to by the finding of gas-producing bacilli in the fluids of the part, before the gangrene itself was evident.

Dr. Ashhurst expressed his indebtedness to his chiefs, Dr. Chas. H. Frazier, and Dr. G. G. Davis, in whose services the patient was treated, for the privilege of operating, and of reporting the patient's history.

TEMPORARY PARALYSIS OF LEFT VOCAL CORD AFTER EXCISION OF TUBERCULOUS CERVICAL LYMPH-NODES.

Dr. Ashhurst also reported the case of Frank J. S., aged four years, who was admitted to the Children's Hospital on July 28, 1908, in the service of Dr. E. B. Hodge, Jr., to whom he was indebted for the privilege of operating and of reporting the operation. In February, 1908, this patient had had his tonsils removed at the Children's Hospital by Dr. F. R. Packard, and shortly afterward developed measles, on account of which he was sent home. During his convalescence from the measles the lymph-nodes in the left submaxillary region became enlarged, and in spite of palliative treatment the swelling persisted. When he returned to the hospital in July, there was a firm, nodular mass in the left submaxillary region, the size of a goose egg, seven or eight more or less fused nodes being palpable through the skin. Operation was undertaken July 30, 1908. Through Dowd's incision parallel with the border of the mandible, and about an inch below it, the mass of lymph-nodes was removed entire: they surrounded the great vessels for a distance of about two inches and a half, a distinct groove being left in the specimen where the vessels ran. The hypoglossal nerve and descendens hypoglossi had to be dissected out of the inflammatory mass, and in so doing profuse hemorrhage arose, thought to be from a puncture of the internal jugular vein. The bleeding vein was clamped, but as the hemorrhage was then seen to come from a longitudinal slit, and not from a mere puncture of the vein, it was impossible to apply a

ligature satisfactorily, so the rent in the vein was sutured with fine chromic catgut. When the hemorrhage had thus been effectually stopped, it was seen that the tear had not been in the internal jugular itself, but in the temporomaxillary vein close to the trunk of the jugular; as part of the mass of lymph-nodes lay below this vein, it was accordingly ligated in two places and divided between the ligatures, in order to facilitate the operation. The deep fascia was closed with buried sutures of chromic gut, and the skin with silk-worm gut, a small gauze wick being inserted for drainage. The duration of the operation was one hour.

As the child had shrieked continuously for fifteen minutes before the anæsthetic was started, it was without much surprise that he was noticed to be very hoarse the next day. But as this hoarseness persisted with no appreciable diminution for two weeks, it was considered wise to have a laryngoscopical examination made, as it was feared the superior laryngeal nerve had been injured. Dr. Packard very kindly examined the child's larynx, and reported as follows: "I only saw him once and it was pretty hard to make an accurate diagnosis as he was very nervous. I thought at the time that there was a partial paralysis of the vocal cord on the side upon which the operation had been performed, and which I attributed to injury of the recurrent laryngeal nerve. Of course, if his superior laryngeal had been injured there would have been loss of sensation in the laryngeal mucous membrane, and the paralysis in such cases is never quite as marked as it appeared to be in the case which I examined. I have seen at least one other case of this kind, in an adult who had had tubercular cervical glands removed from her neck, following which she developed hoarseness and the vocal cord on the side which was operated upon was in a cadaveric condition. She regained the use of her voice completely. I think in these cases the recurrent laryngeal must be injured by being pulled upon or pressed, and as it is not completely severed, it recovers spontaneously after a greater or less lapse of time."

The hoarseness gradually diminished, and eventually disappeared completely, as did the slight facial paralysis present immediately after the operation.

If the injury had been to the recurrent laryngeal nerve, it seems certain that it must have been produced indirectly, by pulling upon the trunk of the vagus while dissecting the lymph-nodes off the great vessels; if the paralysis of the vocal cord was not due to injury of the fibres of the recurrent laryngeal nerve, then it must have been caused by injury to the superior laryngeal, which supplies the cricothyroid muscle and through stimulation of this muscle elongates the vocal cord of the same side, by elevating the anterior border and depressing the posterior border of the cricoid cartilage.

ACUTE PANCREATITIS.

Dr. John B. Deaver presented the following case history: Male, age 27 years. One year before admission to hospital had four or five attacks of abdominal pain accompanied by jaundice.

Two and a half weeks before admission had severe attack of epigastric pain accompanied by nausea and vomiting. Pain continued to day of admission, with frequent exacerbations. Pain started in epigastrium, referred to lower abdomen, back and shoulders. Has been jaundiced more or less ever since onset of this attack.

Physical Examination.—Patient is jaundiced, the respiratory excursions are limited, the respirations are short. Liver extends from the sixth interspace to two finger-breadths below the costal margin in the mammillary line. There is slight epigastric fulness and spasticity of both recti muscles. Some tenderness over entire epigastrium, quite marked over Mayo Robson's point. The pain continued without relief up to the time of operation. Temperature on admission 98.4°, and, during entire course of illness, febrile for only about three days after operation, with a maximum of 100.4°

Operation.—Incision through right rectus. The gall-bladder was found adherent to colon and omentum and contained calculi. Posterior to the stomach there was a soft, fluctuating mass about the size of two fists, pushing the stomach forward. The finger placed in the foramen of Winslow found this to be in the position of the pancreas. The gall-bladder was walled off with gauze pads and aspirated. Forty cubic centimetres of mucopurulent fluid were removed. This was sterile, as shown by culture. The gall-bladder was then incised and four large and twenty-four small stones were removed from it and the cystic duct, which was dilated. Tube drainage was introduced into the gall-bladder and the gall-bladder sewn to the parietal peritoneum. The chole-

dochus was patulous. The laparotomy wound was closed after placing a gauze drain in the subhepatic space.

The patient was then placed on his right side and an incision made in the left loin, extending down 7 cm. from the costal margin and just external to the outer border of the erector spinæ. In the fatty capsule of the kidney there was much fat necrosis. An abscess was evacuated in the location of the pancreas and about half a litre of bloody purulent fluid escaped. The cavity was drained with a large rubber tube and two pieces of gauze.

The patient made an uneventful and practically afebrile recovery. The drain was left in the gall-bladder eleven days, and in the posterior incision for several weeks, although the drainage gauze in this incision was all removed in six days. The discharge from this wound was found to be very irritating to the skin.

Dr. Deaver remarked that this case presented these points of interest: (1) The slow pulse and afebrile course; (2) the presence of biliary calculi,—for which the operation was performed; (3) the presence of fat necrosis in the abscess cavity; (4) the irritating character of the pancreatic discharge.

THE VALUE OF THE CAMMIDGE REACTION IN THE DIAGNOSIS OF PANCREATIC DISEASE.

FROM THE PRIVATE LABORATORY OF DR. JOHN H. MUSSER.

BY EDWARD H. GOODMAN, M.D.,

OF PHILADELPHIA,

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THE diagnosis of pancreatic disease is usually a matter of the greatest difficulty, and any symptom, sign, or test which is suggested as an aid to our diagnostic equipment, should be given a thorough trial before it is accepted or discarded.

Great assistance has already been given by the laboratory worker, for the most part from the study of the fæces, though strangely enough the urine has been grossly neglected. Glycosuria has been urged as a symptom of pancreatic disease, but its absence in the majority of cases robs it of any diagnostic importance, and the same may be said of the other, almost forgotten, urinary findings.

In the Arris and Gale Lecture for 1904, Cammidge [1] reported the result of his extensive research on pancreatic disease, and described a new laboratory test which he claimed to be of great value in diagnosing pancreatic lesions. Based on the fact that acute and gangrenous pancreatitis are usually associated with fat necrosis, and chronic pancreatitis not infrequently, Cammidge believed that even in the latter condition when there was no visible sign of fat splitting, there might still be some change in the chemical composition of the blood. This change he believed might be due to glycerin, but after a few unsatisfactory examinations of the blood for this substance or its derivatives, he devoted his attention to the study of the urine. At this time he made use of two tests, the A and B reactions. Cammidge believed that in certain diseases of the pancreas the formation of crystals with the A reaction could

be prevented by preliminary treatment of the urine with mercuric chloride, and this formed the basis of the B reaction.

The very unscientific claims urged for the method by Cammidge, and the insufficient grounds for most of these claims, called forth a storm of criticism from subsequent observers (Ham and Cleland,[2] Schroeder,[3] Gruner,[4] Willcox,[5] and Haldane[6]) and the pancreatic reaction as first described, has fallen into almost universal disrepute.

To render the test free of the personal bias of the investigator, Cammidge[7] has modified his reaction, making the technic a little more complicated, but at the same time making the result an absolute one. This third reaction has been named by him "improved method" or "C" reaction, and is the one I have used in the present series of cases.

A portion of the twenty-four hours' urine, or a portion of the mixed night and morning specimens, is examined for albumin and sugar. If albumin is present it is removed by boiling with the addition of a few drops of acetic acid, cooled and filtered. The removal of the sugar will be spoken of later. To 40 c.c. of the filtered, albumin-free, acid-urine are added 2 c.c. of concentrated hydrochloric acid, and the mixture gently boiled on the sand bath for ten minutes following the first evidence of ebullition. A small flask, with a funnel as a condenser, is used for the purpose. After ten minutes' boiling the flask is removed from the sand bath, cooled in a stream of running water, and the contents made up to 40 c.c. with distilled water; 8 Gm. of lead carbonate are then added to neutralize the excess of acid, and after standing a few minutes the flask is again cooled in running water, and the contents filtered through a moistened, close-grained filter-paper.*

At this stage of the procedure, if sugar has been found on qualitative analysis, a portion of yeast is added to the clear filtrate, and the flask placed in the incubator over night. The next morning the solution is filtered and the test is continued.

The acid filtrate is thoroughly shaken with 8 Gm. of

*I have found the most satisfactory paper to be Schleicher & Schüll 589 Blue Ribbon.

tribasic lead acetate, and the precipitate removed by repeated filtration through a well moistened, close grained filter-paper. To get rid of the excess of lead, 4 Gm. of powdered sodium sulphate are added, the mixture heated on a wire gauze to the boiling point, cooled in running water to as low a temperature as possible, and the precipitate removed by careful filtration. Ten c.c. of the filtrate are put in a small flask, made to 17 c.c. with distilled water, and to this are added 0.8 Gm. of phenylhydrazin hydrochloride, 2 Gm. sodium acetate, and 1 c.c. of 50 per cent. acetic acid. The flask is then fitted with a funnel condenser and gently boiled on the sand bath for ten minutes, at the expiration of which time it is filtered hot through a filter-paper moistened with hot water. The filtrate if necessary is made up to 15 c.c. with hot distilled water, and the whole well stirred with a glass rod.

"In well-marked cases of pancreatic inflammation a light-yellow, flocculent precipitate should appear in a few hours, but in less characteristic cases it may be necessary to leave the preparation over night before a deposit occurs. Under the microscope the precipitate is seen to consist of long, light-yellow, flexible, hair-like crystals arranged in delicate sheaves, which, when irrigated with 33 per cent. sulphuric acid, melt away and disappear in ten to fifteen seconds after the acid first touches them. The preparation must always be examined microscopically, as a small deposit may be easily overlooked with the naked eye, and it is also difficult to determine the exact nature of a slight precipitate by macroscopical investigation alone." (Cammidge, *loc cit.*, p. 253.)

The nature of the phenylhydrazin precipitate is unknown, though Cammidge believes that the body is a pentose, not preformed but obtained by hydrolysis. To quote his words (*loc. cit.*, p. 251), "We are not in a position to make any definite statements with regard to the nature of the mother-substance from which the sugar is derived, but our earlier experiments proved that it was not the so-called animal gum of the urine, and the fact that a positive reaction has not, so far, been obtained by the 'improved method' with the urine,

from any but pancreatic cases, suggests that it is probably a body resulting from change in the pancreas, and possibly derived directly from that organ. The relatively large proportion of pentose-yielding material in the pancreas (2.48 per cent.) . . . points to the pancreas as the most likely source. It cannot be denied, however, that the disintegration of other tissue may also at times influence the urine in this respect, and it has also to be remembered that the ingestion of large amounts of pentose-containing food-materials may also cause small quantities of pentose to be excreted in the urine. Therefore while we maintain that a positive reaction by the 'improved method' of performing the so-called 'pancreatic reaction' is strongly suggestive of inflammatory disease of the pancreas, we are not prepared to contend that it is pathognomic of pancreatitis."

Cammidge's present attitude toward his reaction seems to be a very fair one, as the last sentence of the above quotation indicates. He has made 250 consecutive examinations, of which 125 were negative. These negative reactions were observed in 50 normal cases, 92 miscellaneous cases concerning which no further information is given, 10 cases of gall-stone in common duct, 11 cases of gall-stones in gall-bladder, both conditions unassociated with pancreatitis, and 12 cases of cancer of the pancreas. Two cases of acute pancreatitis gave a positive reaction. There were no negative findings in cases of chronic pancreatitis *sui generis* or of pancreatitis accompanied by gall-stones.

Control work on this "C" reaction has been slow in forthcoming, probably on account of the adverse criticism aroused by the previous reactions.

Watson [8] in a series of 250 analyses from 120 consecutive cases found the reaction positive in such cases as acute and chronic pancreatitis, acute suppurative appendicitis and peritonitis, malaria (jaundice with epigastric tenderness) pneumonia (arteriosclerosis), alimentary glycosuria and constipation, duodenal ulcer and chronic pancreatitis, gall-stones in common duct (pancreas inflamed), pregnancy (alimentary glycosuria), mitral stenosis (inflammatory disease of pancreas), uræmia, colitis, gout, tuberculous enteritis, constipation, chronic nephritis, cerebral hemorrhage, exophthalmic goitre, gastric ulcer, malignant disease of stomach, leukæmia, chronic bronchitis, arteriosclerosis, nephritis, simple catarrhal jaundice, and lymphosarcoma.

This is a startling variety of conditions and would tend to invalidate Cammidge's claims. Watson arranges the cases giving a positive reaction in the following three sub-divisions:

1. A group in which there is a definite clinical or pathological evidence of serious organic disease of the pancreas, for example, acute and chronic pancreatitis, usually associated with disease of the bile-ducts.

2. A group in which the reaction in the urine is associated with pronounced arteriosclerosis, a condition usually accompanied by more or less sclerosis in different glands.

3. A group in which the reaction is dependent on congestion and catarrhal conditions of the gland duct and substance, with associated toxæmia, for example, advanced heart disease, appendicitis, pneumonia, malaria, and the like.

Despite the many varying disorders which give a positive pancreatic reaction Watson believes the test will prove of great value to physicians and surgeons in the diagnosis and treatment of pancreatic disease.

Edgecombe [9] publishes the report of an interesting case of mumps in which, owing to abdominal pain and tenderness with vomiting, an examination of the urine for the pancreatic reaction was undertaken. Cammidge himself conducted the observation and diagnosed "an active inflammation of the pancreas" based on a positive pancreatic reaction.

Schroeder [10] found a positive reaction in chronic pancreatitis, cancer of the pancreas, cancer of stomach, gall-stones, catarrhal jaundice, tuberculous peritonitis, and tumor of upper abdomen, probably of pancreas. Negative findings were seen in chronic pancreatitis, cancer of stomach, abscess of pancreas, gall-stones (three of four cases), catarrhal jaundice (three of four cases), cancer of liver, cholecystitis, and pulmonary tuberculosis. His conclusions are as follows:

1. It has been proved that inflammatory and destructive diseases of the pancreas may give rise to the appearance of certain as yet undefined bodies in the urine, belonging possibly to the sugars or related compounds.

2. The reaction is not pathognomonic for disease of the pancreas in the clinical sense.

3. Extensive clinical observation on the urine in pancreatic and other diseases must finally determine the value of the pancreatic reaction.

In making my observations on the pancreatic reaction, I purposely chose to exclude examination of any normal cases, as Cammidge has reported 50 normal urines of which none gave a positive reaction. I have so far examined 62 individual cases. In several of these, control-examinations were made, which I have not enumerated. The majority of these cases were from the practice of Dr. Musser, but additional cases were furnished me by Dr. J. B. Deaver, Dr. W. Wayne Babcock, Dr. Joseph Sailer, and Dr. Warfield T. Longcope, all of whom I wish to thank for their courtesy. Great kindness has been shown me by Drs. Sailer and Speese in allowing me to study the urines of their cases of experimental pancreatitis. Full details of these are omitted, as the question of the value of the Cammidge reaction based on experimental and pathological work will be presented in a subsequent paper in conjunction with Dr. Speese.

My series includes only abdominal disorders, and I have tried to select several cases presenting the same disease, as a means of control. The list includes acute experimental pancreatitis, acute pancreatitis, chronic pancreatitis, cancer of the pancreas, cirrhosis of the liver, cancer of the gall-bladder and liver, cholecystitis, cholangeitis, gall-stones, cancer of the stomach including cases of mural, pyloric, and cardiac carcinomata, gastric ulcer, gastritis, hyperchlorhydria, gastroptosis, enteritis, renal calculus, fibroid of uterus, autointoxication, and diabetes mellitus. These cases I have tried to arrange in a consistent table, but the combination of several diseases has prevented a systematic classification.

	No.	Pos.	Neg.
Experimental pancreatitis (acute)	4	2	2
Acute pancreatitis	1	1	0
Chronic pancreatitis	2	2	0
Carcinoma of the pancreas	1	0	1
Carcinoma of the stomach and pancreas	2	1	1
Carcinoma of pylorus	3	0	3
Carcinoma of stomach wall	1	0	1
Carcinoma of cardia	1	0	1
Sarcoma of stomach	1	0	1
Gastric ulcer	2	0	2
Hyperchlorhydria	1	0	1
Gastroptosis	1	1	0
Gastritis	2	0	2
Cirrhosis of liver	10	0	10
Carcinoma of gall-bladder	2	0	2
Cholecystitis	4	0	4
Cholangeitis	1	0	1
Gall-stones	2	2	0
Enteritis	1	0	1
Abdominal tumor of obscure origin	1	0	1
Renal calculus	1	0	1
Fibroid of the uterus	1	0	1
Autointoxication	2	0	2
Diabetes mellitus	14	1	13
Myocarditis	1	0	1

Of the 62 cases studied, but ten cases gave a positive Cammidge reaction and in six of these the diagnosis of a pancreatic lesion was confirmed at operation. The case of acute pancreatitis died with all the classical symptoms of the disease, and the diagnosis of the case of carcinoma of the stomach and pancreas was corroborated post mortem. The case of gastroptosis was sent me by Dr. Babcock, with symptoms suggestive of pancreatitis, but revealing a markedly ptosed stomach on examination. As this condition was the prominent feature, I have classed the case under this head, but it is not unlikely that a pancreatitis may have been associated with the gastroptosis. The fourth case was a diabetic woman, a private patient of Dr. Musser, who had been troubled for some time with irregular attacks of indigestion and constipation. Von

Noorden [11] says, "To make a diagnosis of pancreatic diabetes in the absence of symptoms referable to marked pancreatic lesion is most daring"—and although this is very true, the question of the concurrence of pancreatitis with many cases of diabetes must be borne in mind, even though no symptoms are present (Herzog,[12] Ssobolew [13]).

Four cases of experimental pancreatitis were examined, two of which were positive and two negative. The two cases giving a negative reaction were found at autopsy to show barely discernible evidences of pancreatitis. The two positive cases were typical cases of acute hemorrhagic pancreatitis. Further work is being carried on in this direction, and will be reported in a later paper in collaboration with Dr. Speese.

I have studied but one case of carcinoma of the pancreas *per se,* and this gave a negative reaction, agreeing with Cammidge's results. Of two cases of carcinoma of the stomach with metastases to the pancreas, one was positive and one negative, so of the three cases of pancreatic carcinoma, two were negative, giving a percentage of 33 per cent. positive reactions. Cammidge found four positive reactions in 12 cases of carcinoma of the pancreas, or 33 per cent.

The finding of a positive pancreatic reaction in gallstones associated with pancreatitis is a common occurrence, according to Cammidge, but Schroeder found three negative reactions in four cases of cholelithiasis. My cases are not numerous, but confirm the report of Cammidge.

The cases of cirrhosis of the liver were studied with a special object in view, inasmuch as they were all cases in which an alimentary levulosuria has been found after the ingestion of 100 Gm. of levulose. It has been stated by Steinhaus [14] that the principal reason why cirrhotic cases are not able to utilize levulose is because of the common association of a chronic pancreatitis with the cirrhosis. This was based on post-mortem findings, but has not been generally credited, so it was thought of interest to examine all cirrhotic cases for the pancreatic reaction. As will be seen from the table, ten cases

were studied, but with no positive reaction. This would seem to point to another interpretation of alimentary levulosuria, as was mentioned in my preliminary report before the Section on Medicine of the College of Physicians last January.

All cases of glycosuria were examined for the reaction, and in but one case was it obtained.

Conclusions.—Of 62 cases studied, but ten gave a positive reaction. In seven of these the diagnosis was confirmed by operation or autopsy. One case died with all the clinical symptoms of acute pancreatitis, and in the other two a concurrent pancreatic lesion was not improbable. In no cases other than those presenting clinical evidence was a positive reaction obtained.

I firmly believe the test to be a very useful one and to mark a decided advance in the diagnosis of pancreatic disease. The technic is long and complicated and requires great care, but is one that can be readily mastered and is within the scope of any clinician with facilities for laboratory work. Sometimes the end-reaction is obscure on account of crystals forming which are not properly the osazon described by Cammidge, but observation as to structure and their insolubility in 33 per cent. sulphuric acid suffice to render the diagnosis less difficult.

The test is not pathognomonic, and the discoverer himself has never had the temerity to claim this property for it; but taken in connection with the clinical history and examination, and a careful study of the fæces, the Cammidge reaction is strongly suggestive of inflammation of the pancreas.

NOTE.—Since reading this paper I have studied many more cases and have made between 150 and 200 examinations. The results of these observations are in harmony with the above conclusions.

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[11] Von Noorden: Die Zuckerkrankheit, fourth edition, p. 158.
[12] Herzog: Virch. Arch., 1902, clxviii, p. 83.
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[14] Steinhaus: Deutsch. Arch. f. klin. Med., 1902, lxxiv, p. 537.

Dr. John H. Musser (by invitation) said that in the main he agreed with the writer, feeling that there is in this test a symptom or sign of great significance in the diagnosis of pancreatic disease. In the previous reactions as described by Cammidge, however, he had felt that there was very little of satisfaction, and he had so reported at the Association of Physicians a few years ago. There were good chemical reasons for one to feel that perhaps the reactions were artificial rather than arising from the occurrence of any pancreatic disease or any change in the urine the result of pancreatic disease. The C. reaction has proven much more satisfactory, however, in the few cases observed, but as Dr. Goodman has said, one must consider it only an aid, a suggestive, but certainly not a pathognomonic, sign in pancreatic disease.

He had just recently put on record nine cases of acute pancreatitis. Four had been under the care of surgeons and three got well. The fourth was seen very early in our studies of pancreatic disease, as long ago as 12 or 15 years, and while an abdominal section was done in the presence of the extraordinarily large accumulation of blood, it rather made the surgeon hesitate to go further than to do an exploratory operation, and in consequence—or perhaps it would have happened anyway—the patient died. In the present time more heroic measures might have been carried out and the patient's life been saved. Of the five remaining cases three died and two got well, so that a person with pancreatic disease may get well without surgery, and therefore one must consider that acute pancreatic disease is in part,—that is up to a certain degree,—a medical affection, but the time comes very soon when it is a surgical disease. That borderland, so far as known at the present time, is not so distinct as one would

like to have it, but it cannot really be said that in every case of pancreatitis an operation should be done, and perhaps more particularly not because of the pancreatitis but because of the associated features in connection with the various cases. Pancreatitis is more frequently seen in patients past 50 or 60, who have other lesions, particularly degenerative lesions of the heart and blood-vessels, which may prevent operative interference. Under such circumstances perhaps life is not in quite as much peril as if operation were resorted to. In his experience the patients who got well were both young subjects; for the patient who died, an autopsy confirmed the diagnosis of pancreatitis. It is not an easy matter to make a diagnosis of pancreatic disease in acute pancreatitis. Of the nine cases mentioned five were women, four men, and five of the number were over 50 years of age.

Dr. William L. Rodman said that this test of Cammidge had been too long neglected by American physicians and chemists. It has been used with great advantage in England. In Leeds six years ago Robson and Moynihan spoke optimistically of this test in pancreatic disease and cholelithiasis. Neither liked to do an operation without the opinion of Mr. Cammidge, and both have reported, at that time and subsequently, that he was almost invariably right. He did not know why it was that the test had not been more satisfactory in this country, unless perhaps it was due to the fact that it is such a complicated procedure and requires a skilful technic in order to obtain results. It is certain that in the right hands and made in the right way it is a good test. The experience he had had with the test led him to believe that it was most valuable. Of course, it may not be a pathognomonic sign, but that it is a really substantial aid in cholelithiasis and in pancreatic disease there was not the slightest doubt. The test is not apt to be positive in carcinomatous pancreatitis. It is in chronic pancreatitis that it finds its best field of usefulness.

Dr. John B. Deaver, in closing, said that he was inclined to take the same view that Dr. Goodman had brought out in his paper. He agreed with Dr. Musser entirely when he speaks of a case of acute pancreatitis as being medical in the beginning of the attack. He also agreed with him as to the difficulty of diagnosis in the great majority of these cases, and certainly he felt that this test should be made, at any rate before operative interference was resorted to, particularly in acute pancreatitis. His expreience in

acute pancreatitis,—and he had seen a number of cases,—was that one should not be in too great a hurry to open the abdominal cavity. In cases where he had had the best results he had operated posteriorly, and this is what he proposed doing in the future if he could locate the lesion.

THE VALUE OF OPERATING IN TWO STAGES IN STRANGULATED HERNIA WITH THREATENED GANGRENOUS PERFORATION.

Dr. John B. Roberts said that inspection of the intestine after opening the sac of a strangulated hernia sometimes leaves the surgeon in doubt as to the wisdom of returning to the abdomen a coil, upon which there are dark spots suggesting approaching gangrene. This is not an infrequent occurrence after exposing to view a portion of gut, which has been tightly constricted by Gimbernat's ligament in femoral hernia.

Resection of the suspicious area or the formation of an artificial anus at the time the kelotomy is done are eminently proper procedures, when there is no doubt of the impending death of portions of the wall of the gut. Pushing the suspected part of bowel just within the inner ring of the hernial canal and providing for drainage have often been used.

A year ago he operated with local anæsthesia upon an old woman in feeble health with a tightly strangulated femoral hernia. He found a black line running around the gut where the ligament of Gimbernat had exercised linear pressure. The general condition of the patient and the suspicious character of this dark line made him doubtful as to what was the safest procedure. Resection seemed a serious risk and to replace the gut without waiting for more definite knowledge of the extent of damage appeared unwise. He finally concluded to allow the intestine which had been relieved of constriction to hang out of the wound. It was covered with a sterile dressing with the idea that in a day or two, he would know definitely whether or not perforation would take place from devitalization. The result justified this action; for a day or two afterwards the healthy condition of the exposed loop showed that all danger of gangrenous perforation had passed. He then, without general anæsthesia, loosened up the plastic adhesions which were easily broken and reduced the hernia. The wound was then closed and the patient made a prompt recovery.

It is likely that many surgeons have acted in this way under similar circumstances, but he had never done so, being willing in other cases to finish the kelotomy in one stage.

THE RELATIVE MERITS OF SUPRAPUBIC AND PERINEAL PROSTATECTOMY.

Dr. John B. Deaver presented three specimens of prostate glands recently taken out, the smallest of which was removed for a chronic prostatitis with persistent urethrovesical catarrh, and the two larger for obstruction, both of which were of the soft adenomatous type. The larger of the prostates weighed 9 ounces, and was the largest gland he had ever taken out. Both of the patients were 80 years of age; they were both sitting up in bed on the fourth day after operation.

The points he wished to raise for discussion were the following: That the suprapubic method is the method of choice in large adenomatous prostates under all circumstances; that the small adenomatous, as well as the hard prostates, be they fibrous, tubercular, carcinomatous, or sarcomatous, are possibly best attacked by the perineum, the so-called Young operation; that greater damage to the bladder results from the infrapubic removal of the prostate in large adenomatous prostates (and the hard prostate where the sheath of the gland is closely adherent); that the rectum is more likely to be injured in the infrapubic operation; that a permanent fistula, urinary incontinence and secondary hemorrhage are more likely to follow the infrapubic operation.

When secondary hemorrhage occurs after the infrapubic operation, the control of which entails packing the perineal wound, urinary incontinence and fistula are greatly favored. The primary bleeding, while it is greater in some cases in the suprapubic operation, it is more easily arrested by packing the cavity made by removal of the gland, and particularly purse-stringing with a catgut suture the mucous membrane around the opening of the cavity. Secondary hemorrhage seldom occurs following the suprapubic, while this cannot be said to be the case in the infrapubic operation. Though the prostatic urethra is destroyed in the majority, if not in nearly all suprapubic operations, the ultimate result is as good as when the urethra is saved. The one

thing however in favor of leaving the prostatic urethra is the lessened chance of stricture following. That stricture follows both the suprapubic and the infrapubic method in a percentage of cases is true. The question of preserving the ejaculatory ducts in the large adenomatous prostates, occurring as they do at an advanced time of life, to his mind cuts no figure. Again, he deemed it better practice to remove the adenomatous gland entire than to leave the portion forming the floor of the prostatic urethra on account of the likelihood of recurrence of obstruction from increased growth.

That the power of voiding urine occurs as early in the suprapubic as in the infrapubic is quite true. That the infrapubic operation calls for a master hand, if it is to be carried out with the least amount of risk to the surrounding structures he admitted to be so, but in either operation the more expert the operator the better must be the results. That the mortality of the two operations is practically the same in equally good hands is true; providing the statistics are honestly made and not doctored. That the ultimate comfort of the patient is greater following the suprapubic method in the class of cases he regarded as fitted for it, he was sure was so. He had done a sufficient number of operations by both routes to convince him that he was correct in making this statement.

That the chief factors in the mortality following either operation in advanced life are governed by the functionating ability of the kidneys and especially the great care and judgment in the after-treatment, he knew to be so.

One of the most important symptoms in connection with enlargement of the prostate, and fortunately comparatively rare, is free hemorrhage. Free bleeding endangers the life of the patient from retention and clotting in the bladder, which can only be thoroughly emptied by suprapubic incision. It was his experience that the danger to life under these conditions is greater than the operation of suprapubic prostatectomy under favorable circumstances. He had known patients to loose as much as one pint of blood at a urination. A repetition of the loss of this amount of blood demands at least that prostatectomy be seriously considered.

The infrapubic removal of the prostate in some of the cases of gonorrhœal chronic prostatitis and vesico-urethral infection is the only thing that offers permanent relief. This will not be

disputed by those who have had much experience with this troublesome class of cases and with the operation under these conditions. He protested, however, against the indiscriminate selection of these cases, and wished to warn the young surgeon of the responsibility he assumed when advising the removal of the prostate in this type of cases. Further, he never performed this operation without having told the patient of the risk of injury to the ejaculatory ducts; this should not occur, however, yet that it can occur is true.