

TRANSACTIONS OF THE PHILADELPHIA
ACADEMY OF SURGERY.

Stated Meeting, October 7, 1901.

The President, DE FOREST WILLARD, M.D., in the Chair.

GUNSHOT WOUNDS OF THE ABDOMEN.

DR. ROBERT G. LE CONTE presented a negro man, twenty-seven years old, who was admitted to the Pennsylvania Hospital, September 7, 1901, at 11.57 A.M. Fifteen minutes before admission he was shot twice with a thirty-two calibre revolver. The first bullet caused a superficial wound of the left thigh; the second struck him in the back while he was running away from his antagonist. The estimated distance at which this shot took effect was twenty feet. Dr. Le Conte saw the patient two and a half hours after the injury was received. He was then in a highly excited condition, in part, perhaps, due to the fact that his antemortem statement had just been taken by a magistrate, and the necessary legal procedures had terrified him. He complained of intense cramp-like pains in the abdomen which made him cry out every few minutes. He was moderately shocked, with a rapid pulse and labored respiration which was almost entirely costal. The wound of entrance was three inches to the right of the fifth lumbar spine and on a level with the crest of the ilium, and a probe refused to pass beyond the latissimus dorsi aponeurosis. There was no wound of exit. The abdomen was universally tender, distended, and resistant, tympanitic in front and dull in the flanks. Liver dulness in front reached to the costal border. The man was etherized, placed on his face, and the skin of the back carefully disinfected. As the probe still refused to enter, the skin wound was enlarged sufficiently to see where the bullet had separated the fibres of the aponeurosis. These were divided and a finger was carried along the track of the bullet to the crest of

the ilium, where two or three splinters of bone were encountered. The bullet had then passed beyond the reach of the finger. It being thus certain that the missile had penetrated the peritoneal cavity from behind, a rubber drainage tube was inserted in its track and the skin incision closed. The patient was then turned on his back, the skin of the abdomen carefully disinfected, and a six-inch incision made in the median line, the centre of which was the umbilicus. On opening the abdomen, fluid blood immediately gushed out. The quantity was estimated at six pints. The whole of the small intestine was hastily drawn out of the abdominal cavity to the left of the incision, and surrounded with hot, wet gauze. In doing this a perforation of the small gut was seen. Its position was noted and the place covered with gauze to prevent further extravasation of faecal material. The abdominal cavity was then cleared of blood by scooping it out with the hand and with gauze sponges, and it was seen that the bullet had perforated the upper portion of the mesentery, severing one of its large vessels. As it emerged from the mesentery it had torn an opening one inch long in the transverse colon. The hæmorrhage was readily controlled by suture, the wound of the colon repaired, and the perforation of the small gut closed with silk. No further damage was found. Twenty pints of hot salt solution were used in washing out the abdominal cavity and the surface of the intestines, a glass drainage tube was inserted, and the wound hastily closed with through and through silkworm-gut sutures. During the operation the patient's pulse had become very rapid and feeble, and an assistant opened the median cephalic vein and introduced five pints of hot normal salt solution. As the bullet had almost certainly lodged in the anterior abdominal wall and was out of harm's way, no search was made for it, the patient's condition being so precarious as not to warrant any further interference.

Immediately after operation the patient's temperature was 98.4° F., the pulse 160, and respiration 60. Eight hours later the temperature had risen to 101°, while the pulse and respiration had dropped to 124 and 44, respectively. He vomited twice while coming out from the effects of ether. The convalescence was uneventful. At the end of twenty-four hours one-sixth of a grain of calomel with a mouthful of water was given hourly for six doses. This was followed by an enema which was very

effectual. As soon as the bowels were opened he was placed on peptonized milk, and the diet gradually increased from day to day. At the end of forty-eight hours the abdominal drainage tube was dry, and it was removed. At the time he received his injury he was suffering from a mild bronchitis, and during the convalescence he had some cough with free expectoration. This was partially controlled by heroin; but the paroxysms of coughing everted the edges of the wound in three places, although none of the sutures gave way. The stitches were removed on the eleventh and the patient was out of bed on the twenty-second day.

In connection with this case, Dr. Le Conte said that until within a few years ago a gunshot wound which opened any part of the alimentary tract was considered fatal unless operation was undertaken, and even then almost all cases died. At that time gunshot wounds were alike in that they were dirty, usually infected, lacerated wounds, made by a comparatively large lead bullet of slow velocity. To-day one meets with a wound of very different character, made by a clean, small, steel bullet, of high velocity. When such a missile has attained its true flight, it leaves a clean, sharp-cut wound, splitting the tissues as a wedge rather than tearing its way through. Penetrating abdominal wounds with a lead bullet he believed to be as fatal to-day as ever they were, if expectant treatment is pursued; but military statistics of field operations show that wounds inflicted by the modern weapon have proved much less fatal under expectant treatment than when operation has been undertaken. This is scarcely to be wondered at when one considers the surroundings under which operations were performed after battle in field hospitals, where the medical department had an immense work to do with scanty supplies and few assistants. But if such wounds presented themselves in a city hospital, with all the modern conveniences for aseptic work, no surgeon would hesitate between expectant and operative treatment. Wherever one could open an abdomen with safety he believed that every penetrating gunshot wound demanded operation, no matter what may be the character of the bullet that inflicted it.

Shock in such cases is almost invariably associated with hæmorrhage, and its severity is almost directly proportional to the amount of blood lost. Occasionally, however, it is profound

where hæmorrhage has been slight, and in such cases it is probable that the bullet has done very extensive injury to the hollow viscera, or perhaps some important nerve trunks. Under such circumstances what benefit can accrue by delaying operation? An anæsthetic is of course much more dangerous in the presence of a profound shock, but its increased danger in no way counterbalances the benefits derived from its use. It permits the surgeon at once to get at and control the cause of shock by preventing further hæmorrhage or greater soiling of the peritoneum; it enables him to repair the injuries inflicted and to reduce the dangers of septic infection to a minimum, and at the same time permits the use of the two most valuable remedies for combating shock, namely, intravenous injection and douching the abdominal cavity with hot salt solution. He would therefore urge that if operation is to be undertaken it be done immediately, as every half-hour of delay proportionately decreases the chance of success.

When the wound of entrance or of exit does not give a positive sign of penetration, as protrusion of omentum or escape of fæcal material, it should be carefully enlarged until the peritoneum is reached, when sight or touch will tell of penetration. One should never take for granted that the abdominal cavity has been invaded from the apparent course the bullet has taken, nor from the tenderness, distention, muscular rigidity, or shock that may be present. All of these signs may be present without an opening in the peritoneum. Four or five years ago he saw a woman who had been shot with a revolver. The wound of entrance was on a level with the anterior superior spine of the left ilium and about two and one-half inches to its inner side. The apparent course of the bullet was directly inward and there was no wound of exit. The patient was considerably shocked, slightly tympanitic and distended, with rigidity of the left rectus and marked local tenderness. He was confident the abdominal cavity had been opened, but proceeded to assure himself of it by exploring the wound. It was then proved that the bullet had ranged downward, and had penetrated to but not opened the peritoneum, passed under Poupart's ligament, and lodged in the muscles of the thigh. The woman was very stout, with a pendulous abdomen, and as she reclined on her back the wound of entrance was on a level with the anterior superior spine of the

ilium, but in the standing position, the position in which she was shot, the wound assumed a relatively lower place.

Penetration having been ascertained, where the incision for exploring the abdominal contents should be made should depend upon two factors,—the position of entry and the course the bullet has taken. If the missile has penetrated outside the semilunar lines and at a right angle to the anterior abdominal plane, he should prefer to open the abdomen in the semilunar line, rather than enlarge the wound sufficiently to make careful search of the abdominal organs. If it has entered in the same plane but passed inside the semilunar line, he should prefer a median incision, unless it is in the region of the liver, when a curved incision below the border of the ribs gives the best exposure. When the bullet has entered the flank or back, and ranged across or diagonally across the abdomen, he should always prefer a median incision, except when the liver is probably the only organ perforated. An incision through the median line or semilunar line saves time, as it can be enlarged or closed more quickly than when through several layers of muscle; it permits of a more extensive and thorough examination of the abdominal contents, and also a better cleansing of the same.

In operating for gunshot injuries, it has always been his practice to treat the track of the bullet as septic until it has proved itself otherwise, and he had drained such wounds in all portions of the body. If, in addition to a septic bullet, the alimentary canal has been opened, the indications for drainage become doubly imperative. If the bullet has penetrated the lesser peritoneal cavity, this also should be drained by an opening in the flank. When the patient's skin has been properly cleansed, and the drainage tube carefully attended to, the risk of infecting peritoneum from outside sources must be very slight, certainly very considerably less than the dangers arising from the presence of septic material in a closed cavity.

As to a search for a bullet that remains in the body being made at the time of operation: If in the examination of the abdominal organs for injuries received, the bullet is not encountered, it generally proves that the missile has passed beyond the peritoneal cavity, and probably lodged in muscular tissue. Under such circumstances he would make but a very short search for it when the patient's condition is good; if his condition is serious, he

would not hunt for it at all beyond the peritoneum. When embedded in muscular tissue, its presence causes no immediate danger. At some later period it can be accurately located by a radiograph, and it may then be removed without danger. Time spent in cleansing a large area of skin around the proposed incision is always well expended; and if the patient's condition is so grave that one dare not spend the time for this, operation should not be undertaken.

Several years ago, before the days of normal salt solution or intravenous injection, when speedy operations seemed the most successful, he operated on a case of gunshot wound of the liver. The wound of entrance was in the back, the ball having passed through the pleura, diaphragm, and whole thickness of the liver, and lodged under a rib in front. The man was profoundly shocked from loss of blood. He enlarged the opening in the back and packed the liver wound as thoroughly as possible from this position, and then made a curved incision along the border of the ribs and completed the packing of the liver from the front. The patient's condition was so serious that he did not spend over three or four minutes in cleansing the skin of the abdomen. He was dying from hæmorrhage, and it had to be stopped soon. He reacted well from the operation, but died on the fifth day from septic peritonitis. A post-mortem examination revealed the wounded liver in excellent condition. No further hæmorrhage had taken place, and the bullet-track was filled with organizing sterile clot. The infection had started from the skin of the abdominal incision, and was traced layer by layer through the abdominal wall to the peritoneum, where it became diffused. In trying to save the man from a death by hæmorrhage, he had condemned him to one from peritonitis. Had ten or twelve minutes been spent in disinfecting the surrounding surface of the abdomen, infection most probably would not have taken place, and the man would have undoubtedly recovered.

DR. RICHARD H. HARTE reported the case of a man, aged nineteen years, who, while out gunning on the afternoon of July 27, attempted to remove his rifle from one boat to another, and in so doing discharged the weapon so that its contents, a long 22-calibre bullet, entered his abdomen along the right side of the rectus muscle, one and one-half inches above the umbilical line. He was hastily removed to the Pennsylvania Hospital,

which necessitated a long drive in a wagon, so that nearly six hours had elapsed from the time of the receipt of the injury until Dr. Harte saw him in his bed in the hospital. His condition at that time was fairly good,—temperature, 99.2° F.; pulse, 102; respiration, 30. On examination a small wound was found, its point of entrance being one and one-half inches above the umbilical line, and just at the right margin of the rectus muscle, with no corresponding wound of exit on the posterior part of the body. The abdomen, on examination, was tender, with marked muscular rigidity, especially in its upper right segment, leading to the belief that the missile had punctured and wounded some of the abdominal contents; although a probe could not be carried any distance into the wound owing to obstruction apparently from some fibres of the rectus muscle. The patient was made aware of the gravity of his condition and told that an operation was necessary, to which he readily assented.

At eight o'clock, six hours after the receipt of the injury, he was etherized, and the abdomen opened in the line of the wound corresponding to the right edge of the rectus muscle. Considerable hæmorrhage was present and some blood-clots found close to the parietal peritoneum. Careful cleansing soon revealed its source in the margin of a penetrating wound of the upper part of the duodenum, the missile having made an opening which would admit the little finger, producing what Mr. Making calls a grooved wound of the intestine; in fact, it was as sharp and clear as though it had been cut from the upper margin of the intestine with a gouge, from the edge of which there were several small vessels freely bleeding. The opening was easily closed with a single row of continuous sutures, again fortified by a row of Lembert sutures approximating the edges of the intestinal wound transversely, which is less liable to reduce the lumen of the gut than if closed longitudinally. In the mesentery, just below, was quite a large hæmatoma, which was incised, the clot removed, and the cut edges of the mesentery closed with a continuous suture. This apparently controlled all bleeding in the anterior portion of the abdomen. On tracing back the supposed course of the ball, a large amount of fluid blood was found in the fossa posterior to the liver, and alongside of the vertebra, which was removed, where another large hæmatoma was discovered extraperitoneally and in close relation to the kidney, but

no other point of bleeding was found in the abdomen, which was then thoroughly cleansed and the abdominal wound closed, three pieces of gauze being left in for drainage.

A temporary dressing was applied and the patient turned upon his face. Another incision was then made in the back, exposing the kidney, and enabling the blood-clot to be removed and several small vessels tied. Apparently no injury was done to the kidney or to its circulation. The posterior wound was closed and the layers of fascia brought together with buried sutures, leaving a small space for a gauze drain, and a permanent dressing was applied over both wounds. The patient reacted very well and passed a fairly comfortable night.

On the fourth day all the packing was removed from the abdominal wound and one piece replaced. This was followed in a few days by some slight suppuration; otherwise the convalescence was uninterrupted, save a rise in temperature at the end of the fourth week and a corresponding rise a week later.

Dr. Harte said that this case was interesting as illustrating how little can be determined in abdominal injuries until the abdomen is opened and explored. If it had been treated expectantly, the result would have been disastrous. Mr. Making, speaking of gunshot wounds of the small intestines which occurred during the Boer war, says that in the majority of cases which recovered spontaneously, the injury was not of a perforating nature, and that in five cases in which the injury was certainly diagnosed in the hospital death occurred.

He divides these injuries of the small intestines into three classes:

(1) Those which die shortly after the receipt of the injury, where the external wound is large, with consequently much hæmorrhage and shock, and which are regarded beyond the bounds of surgical aid except if immediately seen after the injury.

(2) Those cases which find their way to the field or stationary hospital, whose symptoms are of moderate severity, or even of an insufficient character, in which evidence of septic peritonitis suddenly develops and death ensues.

(3) Cases in which the position of the wound raises the possibility of injury to the intestine, but in which the symptoms

are slight or of moderate severity, and which recover spontaneously.

In military surgery it would appear, for various reasons, that the expectant treatment of abdominal wounds, especially from small calibre bullets, is the one on which most dependence can be placed. Mr. Making again says that he only saw one successful case in which the small intestine had been treated by excision and the insertion of a Murphy's button; he learned of two cases in which the large bowel had been successfully sutured, and a similar case where the small intestine was sutured with a favorable result.

In the case just reported no special attempt had been made to locate the bullet. In his opinion too much stress is often placed upon the removal of bullets, and much harm often results from unnecessary interferences in seeking for bullets which otherwise would be harmless. In fact, they should not be interfered with unless some obvious reason exists. Of course there are exceptions in bullets lying immediately beneath the skin, or quite superficially to it, or at the bottom of an infected tract where they cause secondary suppuration, or where they cause pressure upon important structures, especially nerve trunks, or, again, where the bullet is in close proximity to a joint, interfering with its function. These, of course, all demand removal by surgical interference. On the other hand, bullets sunk in the great cavities of the body, or in positions difficult of access, are much better left alone, and should never be interfered with unless the symptoms demand surgical interference for their removal.

DR. WILLIAM L. RODMAN said that in cases of gunshot wound of the abdomen one should not wait for the subsidence of shock, but should proceed at once to open the abdomen, because in the great majority of instances shock is due to hæmorrhage, and if one waits for the subsidence of shock, he will wait until the patient dies. Nothing has been more exaggerated than the amount of shock that arises from gunshot wounds of the abdomen unaccompanied by hæmorrhage. He had seen seven perforations of the intestine, and yet the patient had a normal temperature and a pulse of 72. In a second case he had seen a normal temperature and pulse of 80. If there was a great deal of shock due to hæmorrhage, it was not best to wait, but to proceed at once to do a laparotomy.

There was one position taken by Dr. Le Conte which he would be disposed to question a little. He did not say he would never enlarge the incision, but his testimony would be to let the bullet opening alone and to open in the middle line or semi-lunar line in the majority of cases.

There is much to be gained by following the bullet. In the first place, the danger of converting the non-penetrating into a penetrating wound of the abdomen is avoided by following up the bullet. If done with the finger instead of the probe, the perforations in the gut are found more quickly immediately under the bullet-wound than when the abdomen is opened in the median line. There is a disadvantage in opening the cavity well to one side, and yet he had done so in two instances: one where there was a double wound of the intestine. In this latter case the man was in general peritonitis, and had been shot fifty-one hours before the operation, but he made an excellent recovery. The line of the bullet should be followed in the great majority of instances; then, if it be found that the incision does not give access to all abdominal contents, it is easy to supplement it by median laparotomy.

Time is usually saved by following the bullet, and this is oftentimes of the greatest moment. He thought that wounds made by balls of large calibre should always be regarded as septic wounds, as these balls will, in the vast majority of cases, if not always, carry in foreign bodies with them. It has been very rare not to find pieces of foreign body along with the bullet, or probably find the foreign body and not the bullet. He remembered one case where he took out a piece of felt that had been agglutinated to the intestine. Drainage should practically always be made in penetrating wounds of the abdomen. He never knew of a case of shot-wound of the intestines or stomach to recover where drainage was not made.

As to the reference made by Dr. Harte to the treatment of such injuries on the battle-field. Treves and MacCormac during the Anglo-Boer war, and practically all of our American surgeons in the late war with Spain, taught that soldiers with gunshot wounds of the abdomen did best if not operated upon. We cannot question the position military surgeons have taken for the past four or five years concerning penetrating wounds of the abdomen on the battle-field. In the first place, everything is

unfavorable for operating such cases. The congestion along the firing line and in field hospitals, with their poor equipment, make it simply out of the question to do ideal surgical work. In the second place, the modern rifle-ball, which is .30 of an inch in diameter, is made of steel or steel jacketed, or covered with cupro-nickel, and goes with the greatest velocity, revolving on its long axis at the rate of over 2000 revolutions a second, and when it enters the tissues cuts like a knife; therefore extravasation of the alimentary contents, even in case of undoubted injury, may not occur, as the opening may quickly close. That many soldiers in our own and the British armies recovered after undoubted perforation of the alimentary tract cannot be doubted, though we may question whether so large a per cent. as many think recovered from *undoubted intestinal wounds*. Who can say that many of the *supposed* cases of perforating wounds of the intestines really were of such nature? They may have been perforating wounds of the abdominal cavity, and yet, on account of the empty state of the alimentary tract, it might have escaped injury. We know that soldiers often fast when on forced marches; that they frequently suffer from diarrhoea, both of which conditions would favor emptiness of the gastro-intestinal tract and make wounds of the stomach and intestines less likely to occur. He had seen a man shot through and through, the ball entering just below the ensiform cartilage without injuring either stomach or intestine. It lodged behind the eleventh dorsal vertebra, and unquestionably traversed the peritoneal cavity. He was a telegraph operator, who could not leave his key, and had taken nothing in his stomach for twenty-four hours. He was shot with a pistol-ball of large calibre (44). He had not the slightest symptom referable to the stomach or intestine. He was immediately paralyzed in his lower extremities, and some months after the injury Dr. Rodman did a laminectomy, and removed the ball from the spinal cord opposite the eleventh dorsal vertebra. At last account he was still living; the paralysis, however, remaining.

DR. LE CONTE rejoined that Dr. Rodman had probably misunderstood him when he said that he did not advocate opening in the line of the bullet. Dr. Le Conte always does that until he finds out that the peritoneal cavity has been entered, and then prefers abandoning this exploratory incision and opening the

abdomen in either the median or semilunar line, believing that such openings can be extended and closed much more quickly, and the abdominal cavity can be explored more thoroughly and better cleansed.

DR. HARTE agreed with the last remarks of Dr. Le Conte in regard to the opening of the wound. Of course he always explored the external wound and determined, if possible, whether it be perforated or not. If so he makes an opening, preferably in the median or semilunar line, since it is a mistake to sacrifice muscular tissue except where it cannot be avoided, as there is always more or less difficulty in closing the wound later on, and there is much more liability to hernia than if the abdomen is opened in either of the above-mentioned places. In regard to the possible presence of foreign bodies in the wound, this is a condition which we are liable to see a great deal of in civil practice, especially where missiles are used of slow velocity. Here we invariably have particles of clothing carried in before the projectile and left in the wound, leaving all the conditions favorable for infection later on. It has been the experience of surgeons that wounds thus received are very much more apt to become infected than where the modern high velocity missile is used, as in military practice; and this explains why a certain percentage of abdominal wounds that were received in the Spanish and Boer wars recovered, which otherwise, if they had been inflicted with a slow velocity bullet, would unquestionably have resulted fatally.

The character of the wound as ordinarily seen is a lacerated, contused wound, such as was seen during the late Civil War. The modern bullet, on the other hand, with its high velocity, produces practically an incised or punctured wound. As to drainage, he was strongly in favor of drainage in these wounds, especially when there is any involvement of the bowel. He preferred the use of gauze rather than the tube as being much better in absorbing any leakage, and it is certainly very much better borne by the intestine, with which it is bound to be more or less in direct relation. A glass drainage tube carried down and left in the abdominal cavity in contact with the intestine is very often responsible for the fæcal fistulæ which so often follow abdominal operations, especially when there is some involvement of the bowel.

DR. DE FOREST WILLARD emphasized the septic condition of these wounds and the necessity for drainage. With all slow-moving missiles some septic infection is almost necessarily carried in.

As to the question of shock, he remembered one Fourth of July night seeing a man accidentally shot at fifty feet. He reached him within two minutes from the time he dropped in the street. Although he had only received a small bullet wound in the muscles of the back, yet that man was apparently dying from shock, so profound and complete was it. Hæmorrhage was but slight. The element of fright was undoubtedly largely accountable for the depression, which lasted for twenty-four hours.

INTRA- AND RETROPERITONEAL HÆMORRHAGE AND TRAUMATIC RUPTURE OF THE MESOSIGMOID.

DR. GEORGE G. ROSS reported the case of a man, aged twenty years, who had been always in good health until eight hours before admission to the German Hospital, having been injured in a fight by being struck or kicked on abdominal wall. Two days prior to admission he had been struck in the left loin by a piece of machinery. Following the fight he felt weak, but otherwise all right. He walked several blocks to the Park to cool off. About 11.30 P.M. he had severe pain in abdomen and went home and to bed; felt somewhat better for a short time, but the pain again became severe. He then came to the hospital and was admitted about 4 A.M. on June 17. On admission the temperature was 98.2° F., pulse 72, and of good volume. The abdominal wall showed no evidence of traumatism. His face was severely bruised and showed numerous ecchymoses and one contused wound on the upper lip. The abdominal muscles were somewhat rigid, no dulness, no tympany, but he had severe cramp-like pain, for which a hypodermic injection of morphia, one-fourth grain, and ice-bags to the abdomen were ordered. Patient went to sleep; about 8.30 A.M. again complained of pain; temperature 98° F., pulse 84, good volume. Abdominal muscles rigid, but no tympanites. Ice-bags removed about 9.30 A.M., as patient complained of feeling cold; temperature 97.8° F., pulse 124, skin cold and clammy. A mass could be felt in the right iliac fossa.

Immediate operation advised; but there was considerable delay in gaining consent of parents.

At the time of operation patient was in a state of collapse; temperature 97° F., pulse about 160, but could not count with any accuracy.

Patient given intravenous injection, saline solution, 3000 cubic centimetres, temperature 120° F. prior to operation. Under ether, an incision, about five inches long, was made through left rectus muscle. On opening the peritoneum a large quantity of free blood escaped. General cavity washed out with saline solution. Intestines found intact. There was an extensive hæmorrhage between the layers of the mesentery and some hæmorrhage under the peritoneal coat of the large bowel at several points. The outer layer of the mesosigmoid was denuded of its serous coat for about four inches, giving origin to the intraperitoneal hæmorrhage. In addition to the intraperitoneal hæmorrhage, a large collection of blood was discovered behind the peritoneum. The origin of the retroperitoneal collection was not discovered or searched for.

The serous coat of the mesentery was sutured with fine silk. After completing the toilet of the peritoneal cavity, two pieces of iodoform gauze were packed in to stop the oozing from the mesenteric wound, and to aid in controlling the retroperitoneal hæmorrhage by pressure. The abdominal incision was partially closed with silkworm-gut sutures.

During the operation the pulse was very weak. Saline again injected into the median basilic vein (4000 cubic centimetres). The pulse fell after operation from 152 to 96, and his temperature came up from 97° to 99° F., so that he reacted promptly from shock. This prompt reaction was the result of the intravenous transfusion and the controlling of the hæmorrhage.

The convalescence of the patient was interrupted by the development of a fæcal fistula, which made its appearance on the eighth day, or twenty-four hours after the removal of the gauze packing. The fistula was due, apparently, to the pressure of the gauze upon a weakened and badly nourished portion of the bowel, as the torn mesenteric vessels would naturally favor necrosis of the area which they normally supplied. The fistula healed spontaneously on the sixteenth day. The subsequent history was uneventful, and on August 1 he was discharged, being

the forty-fifth day after operation; his temperature and pulse having been normal for seventeen days.

The patient was readmitted to the hospital on August 6, having been home six days. Upon admission, he complained of severe pain in the epigastrium, running into left loin and lower abdomen. Vomiting, profuse and dark brown in color, began the evening previous to admission. He said his bowels had not been moved for twenty-four hours, but he had a stool shortly after admission.

Upon admission the patient had a temperature of 99° F. and a pulse of 96; great pain and tenderness upon palpation in the epigastrium and left loin. The abdomen was not distended, but there was an area of tympany corresponding to the position of the stomach and gastric flexure of the colon. The loin space was flat posteriorly; the tongue was coated; each act of vomiting temporarily relieved the nausea. The vomited matter was not fecal in odor or appearance. His condition generally became worse; the pulse increased in rapidity until it reached 160 on August 8, two days after his readmission. The temperature reached 100-102° F. His bowels had moved on the 6th and on the morning of the 7th of August. After this stool the obstruction seemed to be complete, for he passed no flatus and his condition grew steadily worse. A diagnosis of slow obstruction, the result of contracting adhesions, was made; on the 8th he was operated for its relief.

The old cicatrix was excised. Upon opening the peritoneum, the small bowel and sigmoid were found to be matted together in numerous places. The obstruction was not due to a single band of adhesion, but to compression of the adherent mass of bowel caused by the contraction of the entire mass. The adhesions were broken up and the bleeding points ligated, but in doing so the serous coat of the bowel was torn in several places. The rents were repaired, and an opening in the bowel at one place was closed by Lembert's sutures. The abdominal wound was closed by through and through sutures. He never fully reacted after the operation, and died on the third day thereafter.

On the second day after operation he had a very good bowel movement and passed considerable flatus. His temperature gradually became higher until it reached 100-104° F., and the pulse ran up to 150, weak and running. The cause of death was a

general purulent peritonitis, probably from infection through the weakened and denuded bowel.

The autopsy proved the correctness of the diagnosis and the fact that the obstruction was not the immediate cause of death.

The cause of the retroperitoneal hæmorrhage was not discovered. The urine did not contain blood at any time during the illness, so the kidney must be excluded as a causative factor. It seems probable that it arose from the torn mesenteric vessels before they entered the layers of the mesentery.

COMPOUND FRACTURE OF THE ANTERIOR FOSSA OF THE SKULL.

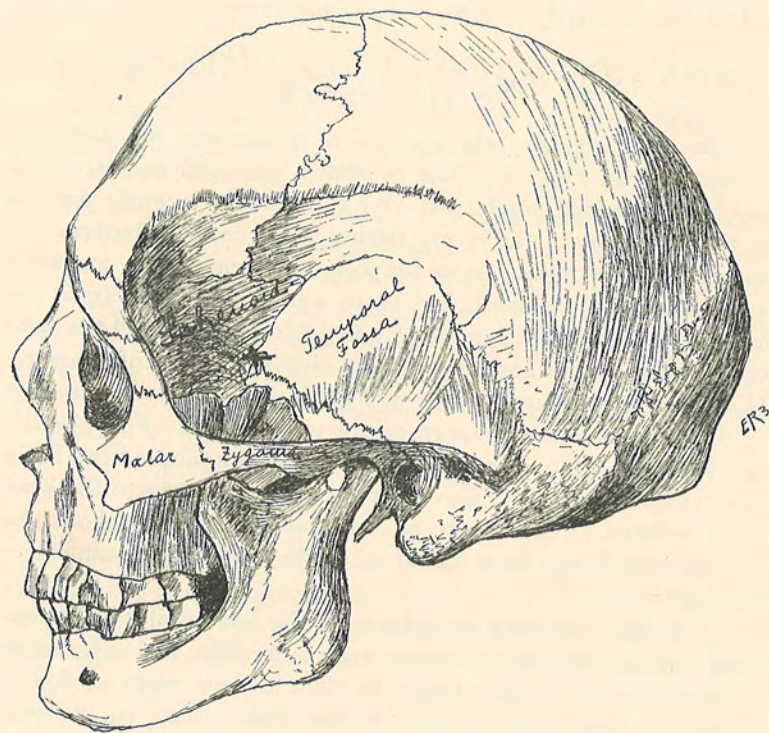
Dr. Ross reported also the case of a man who was admitted to the German Hospital, June 6, with a contused and lacerated wound of the left temple just over the external angular process of the frontal bone, the injury having been received the previous day. There was oozing from the wound. Hæmorrhage had been quite free from the nose, and there was some oozing from the left external auditory meatus. Upon probing the wound the bone could be felt, but there was no positive symptoms of fracture. His pupils were equal; there was no paralysis. He was mildly delirious and restless. Temperature was 100-104° F., pulse 96, and strong. A provisional diagnosis of concussion of the brain was made, and calomel, Dover's powder, and ice-bag to the head were ordered. There was an area of emphysema about the wound, which was later found to be due to the communication with the nose.

The day following his admission the left pupil had become fixed midway between dilatation and contraction, and the periods of unconsciousness were longer in duration and more profound. Thirty-six hours after admission and nearly forty-eight hours after injury he developed a paralysis of the left side of the face involving the muscles of the eyelids, the mouth, and cheek. His left pupil remained fixed. There was no paralysis of the body at any time. He was more profoundly unconscious, but not comatose.

The diagnosis was revised to fracture of the anterior fossa with contusion of the brain, with areas of hæmorrhage in the cerebrum. It was a matter of doubt as to whether there was a depression of fragments and extradural hæmorrhage arising

from laceration of the anterior meningeal artery, or whether his condition was due to the contusion and cerebral hæmorrhage.

There was also some doubt as to the involvement of the base of the skull. The external auditory canal was full of blood and there seemed to be some oozing, but it could not be said with positiveness that the blood had not run backward from the external wound and collected in the canal. In view of the doubt, it was decided to explore the wound.



Line of fracture to the mark X was plainly seen, from X backward the fracture is a surmise.

The original wound was enlarged, and a fracture of the external angular process of the frontal and a portion of the malar bone was discovered. Upon further search, a fissured fracture of the orbital plate of the frontal bone was made out. The line of fracture extended backward and downward, involving the greater wing of the sphenoid. This much of the fracture was

plainly demonstrated. The accompanying diagram illustrates the line of fracture. Beyond the mark X the line of fracture is a matter of surmise, as the patient recovered, and it was impossible to demonstrate the exact facts.

It seems probable that the petrous portion of the temporal bone was involved, as evidenced by the bleeding from the ear and the line of fracture. The emphysema about the eyelids and external wound points towards a communication with the nose. There were no depressed fragments.

The wound was drained and dressed. The external auditory canal and nose were cleansed and packed with gauze.

The patient recovered, and was discharged forty-two days after operation. His temperature and pulse ran a practically normal course throughout the convalescence. He developed a pachymeningitis, and continued to have attacks of mild delirium, which became gradually less marked, and finally disappeared altogether. The left pupil remained fixed, and the paralysis of the eyelids remained at the time of his discharge.

ANEURISM OF THE THORACIC AORTA OF TRAUMATIC ORIGIN; TREATMENT BY INTRODUCTION OF WIRE AND ELECTRICITY.

DR. DE FOREST WILLARD submitted a supplemental report to the original paper presented February, 1901, to the Academy, and published in the *ANNALS OF SURGERY*, July, 1901, p. 143.

The man returned to the hospital two months later suffering with increased pain and dyspnoea. The tumor beneath the pectoral muscle at the anterior border of the right axilla had decidedly increased in size, having evidently eroded the ribs. The principal suffering, however, was in the left chest posteriorly, probably from erosion of the vertebræ.

Twenty feet of No. 24 silver wire were inserted through a long hypodermic needle, and a galvanic current of eighty milliamperes applied for one hour. The patient bore the operation well, and was relieved of pain even on the left side, owing probably to change in the direction of the blood current. The wire, however, evidently failed to produce coagulation in the right thorax, and the tumor, having lost the restraining power of the ribs, increased rapidly in size, lifting the entire right pectoral. Although the walls became very thin, the sac did not burst, and

the patient died slowly from exhaustion four weeks after the second operation, five months after the first operation.

In spite of every effort, he was unable to obtain permission for an autopsy, and the exact point of original rupture of the aorta must remain in doubt.

Since the above report was written, Dr. Matas has published an able article on the subject ("American Medicine," June 22, 1901, page 546; also Transactions of Southern Surgical and Gynæcological Association, 1900), and Dr. Leonard Freeman also read a paper before the American Surgical Association at Baltimore, May, 1901.

One of the dangers of gelatin injections is reported in the *Journal of the American Medical Association*, October 5, 1901, page 923; two deaths being reported from tetanus.

TRANSACTIONS OF THE PHILADELPHIA ACADEMY OF SURGERY.

Stated Meeting, November 4, 1901.

The President, DE FOREST WILLARD, M.D., in the Chair.

AN INSTRUMENT FOR FACILITATING INTES- TINAL ANASTOMOSIS.

By OSCAR H. ALLIS, M.D.,

SURGEON TO THE PRESBYTERIAN HOSPITAL.

My first intestinal anastomosis was with the Murphy button. With its magic assistance I united the small intestine to the stomach to overcome pyloric obstruction. As the button was not subsequently found in the stools, the blame was visited upon the attending nurse. A year or more later it was found at the autopsy in the stomach.

In my second employment of the button for fæcal fistula, the walls of the intestines to be approximated were thick and infiltrated and unsuited to the buttons in ordinary use. I did the best I could with the button, but the thickened walls held it a prisoner and would not let it pass on. The result was a second fistula at the point of operation. In due time I cut down and removed the button. Several months later I again attempted to close the fistulous orifice. I had to resect the gut, and when I had done this, I found the spring out of order in the button that I had depended on for my closure of the parts. Left to my own resources, I was obliged to unite the severed gut-ends as best I could. The result was satisfactory, and since then I have depended on no other instruments than those described in the present communication.