STATED MEETING, HELD FEBRUARY 3, 1908.

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

EXCISION OF THE CLAVICLE WITH PERFECT FUNCTIONAL RESULT.

Dr. James K. Young presented a girl, 11 years of age, who fell in the school yard on January 30, 1907, injuring the left knee. The following day she had a high temperature and great prostration which continued until four days later when she had a hemiplegia of the left side. The knee continued painful but there was no swelling until the end of six weeks, when it swelled suddenly and to a great degree. A small pustule formed on the anterior surface and was opened and drained by the attending physician, and a drainage-tube was inserted. A slough occurred over the left clavicle which extended until the central third of the bone was fully exposed. The lower part of the neck and face also became enormously swollen and for three or four days she could not move her head. Pieces of bone were discharged from the right side of the inferior maxilla within the mouth.

On July 11, 1907, she was admitted to the Polyclinic Hospital under the care of Dr. Young. The pus discharging from the wounds at this time showed the presence of Staphylococci pyogenes aureus, and a diagnosis of osteomyelitis was made. On September 20th, 1907, the clavicle still being exposed and it being impossible to close the wound, the entire clavicle was removed subperiosteally. The specimen examined in the pathological laboratory of the Polyclinic by Dr. James A. Kelly, Pathologist, showed an acute suppurative condition of the medullary cavity and osseous structure. The proximal extremity of the right clavicle was also removed.

Both wounds healed by granulation, and the X-ray taken January 31, 1908 shows a regeneration of the clavicle. The functional use of the part is remarkable but corresponds with what has been described by other observers where after removal of the clavicle the function of the shoulder has not been materially changed.

MALIGNANT ULCER OF ORBIT.

Dr. Warren Walker presented a woman, thirty-five years of age, who came to the surgical dispensary of the Episcopal Hospital for treatment in the first week of December, 1907, giving the following history: married for nineteen years; has three healthy children; has had two miscarriages during past year; smallpox at four and abscesses of neck following typhoid five years ago.

Present condition began eighteen months ago with a small sore at left inner canthus which gradually increased in size. There was a clear watery discharge; no blood. The growth has within the past three months ulcerated into the nasal cavity and destroyed the muscles on the inner side of the eyeball. She has no pain but suffers from severe headaches. She was put on K. I. and inunctions of mercury, and the wound appeared to be slowly granulating when she developed a nephritis and treatment had to be stopped.

THE NON-ABSORBABLE SUTURE AND LIGATURE.*

BY OSCAR H. ALLIS, M.D.,

OF PHILADELPHIA,

Surgeon to the Presbyterian Hospital.

THERE are few subjects that have occupied the surgical mind more than that of suture material. Animal suture material has the disadvantage that when moist it is difficult to tie, when fine it has little tensile strength, and when coarse it is not suited to fine plastic work. Silk on the contrary is the easier handled when wet, makes all the firmer knots from moisture, possesses adequate strength in its finest sizes for the work for which it may be selected, and when rendered sterile satisfies most of the requisites for suturing material.

In the class of surgery that permits of immediate closure of the initial wound, primary union and return to soundness always gives rise to the question, What becomes of the silk suture or ligature? In amputations bleeding vessels are surrounded by different structures than when operations are performed in serous cavities; yet in both instances the sterile suture or ligature is probably immediately enveloped in exudate which is later organized and becomes a part of the economy. If the suture material is fine, it may never give rise to any irritation; but if large, and of sufficient strength to ligate an ovarian pedicle, the ligature may finally come away.

But in the class of surgery—especially abdominal surgery—in which it is not feasible to close the initial wound, pus cases, or cases where drainage is indicated, the fate of the non-absorbable suture or ligature is not a matter of doubt. The suture about an appendix, the stump of a pedicle, or the peripheral suture in a plastic operation of the intestine, is liable to infection; and healing will be retarded until the suture comes away. It is hard to explain why in so many cases of necrosed appendices the sinus leading to the part will be two, three, four, or more months in closing and

finally without any assignable cause will heal, unless it can be explained by the presence of infected ligature that has finally been ejected.

No part of the operation for the removal of the appendix has given rise to more discussion than the treatment of the stump. The usual way of ligating with silk and dropping the bowel back, while it often answers perfectly well in clean cases, is, it seems to me, open to objection in the gangrenous ones. The earlier surgeons in amputations always brought the ends of the ligatures out of the wound, and such it seems to me would be good routine surgery in ligations in infected areas.

In anastomoses of the intestines, whether the Murphy button be used or suture, it is the practice of many surgeons to put a fine running stitch around the serous border of the approximated structures. If such a case could be insured against infection this peripheral suture would do no harm; but if infection is unavoidable and drainage necessitated, then this peripheral suture may become a permanent annoyance and be the cause of an intractable sinus.

In a case of gangrene of the intestine following a neglected umbilical hernia, after resection of about five inches of intestine and approximation with the Murphy button I employed a fine silk peripheral suture.

On the tenth day I was surprised to see a large accumulation of fecal matter at the opening of the wound. My fears that the button had escaped at its point of insertion into the abdominal cavity led me to probe for it, but as the patient presented no untoward symptoms I concluded that the rent in the bowel had been made as the button became detached and that only a small rent had occurred. The fecal discharge continued for only a few days but a sinus remained for several weeks, which I attributed to the infected peripheral suture. I therefore took a piece of wire upon which I had made a hook like a crochet needle and passed it down to the bottom of the sinus, and had the satisfaction of catching a loop in the suture. This I seized with a pair of forceps and after

dividing it upon one side of the forceps drew out a single piece quite two inches long.

Such an experience would lead one to adopt some other means of suturing the border of an approximated bowel than entirely surrounding it, or suggest the propriety of bringing the ends of the suture out of the initial wound.

REPORT OF SATURDAY SURGICAL CLINICS FOR STUDENTS,

HELD AT THE GERMAN HOSPITAL OF PHILADELPHIA, 1906 AND 1907.

BY JOHN B. DEAVER, M.D.,
OF PHILADELPHIA,
Surgeon-in-Chief.

DURING the 26 clinics there were 193 patients operated upon with a total of 261 operations. Upon 113 of these patients 181 operations were performed.

There were 55 cases of appendicitis, of which 25 were acute. Of the patients with acute appendicitis, there were 18 males and 7 females. The appendix was found acutely diseased and removed in 2 patients operated for other conditions: one a male with inguinal hernia; the other a female with prolapse of the uterus.

Of these 25 cases, 12 had abscess. The average duration of the attack in the non-abscess was 5 days, and in the abscess cases 3.6 days. Six of the non-abscess cases were operated in their first attack, and in 9 of the abscess cases the history of a previous attack was not elicited.

The incision varied according to the pre-operative findings. Of these acute cases, in 9 the McBurney or gridiron incision was made; in 3 the incision was made through, and in 9 at the outer border of the right rectus muscle.

In 4 cases the incision was made above and parallel with the outer third of Poupart's ligament and carried well up into the loin space, making the operation in greater part extraperitoneal. When I can do this operation I much prefer it, as the less intraperitoneal interference, particularly when infection is present, the better for the patient.

The appendix was subcæcal in 4 cases, to the outer side of the cæcum in 1 case, to the inner side in 4, and in 4 cases in the pelvis. In 2 cases the pathological conditions were so severe as not to warrant searching for the appendix. (In the

remaining 10 cases the position of the appendix was not noted.) The appendix was gangrenous and perforated in 4 cases, gangrenous in 4, and in 2 of these had ulcerated off near the base, while in the remaining 17 the appendix was either adherent, congested, swollen, or covered with inflammatory exudate.

The technic in removing the appendix varied with the pathological condition of the organ. In 12 of the acute cases, ligation with catgut and cauterization of the stump was done. In 5 cases the stump of the appendix was invaginated, and held in this position by a purse-string suture of linen thread: in 3 cases simple ligation with linen thread covering the stump with the adjacent serous coat of the cæcum. In 4 cases the appendix was ligated with silk, and the stump cauterized; in one the appendix was amputated flush with the cæcum, and the opening in the cæcum closed by two interrupted Lembert sutures of linen thread.

Drainage was introduced in 16 of the 25 acute cases and consisted of gauze, with or without a rubber or glass drainage-tube. In 8 cases a glass tube was placed in the pelvis. In abscess cavities, one or more pieces of gauze were used, multiple wicks frequently being required to drain the ramifications of the cavities. Rubber tubes were used when there was much to drain; cigarette wicks in a few cases in which there was little to drain. In the 9 undrained cases the wound was closed with tier sutures of chromicized catgut.

Leucocyte counts were made in all these acute cases except six. Of the non-abscess cases, a count of 8000 prevailed in 2 cases, of 9000 in 1, of 11,000 in 2, of 15,000 in 1, and of 16,000 in 1. Of the cases with abscess, there were 7000 in 1, 10,000 in 2, 11,000 in 2, 14,000 in 1, 15,000 in 1, 17,000 in 1, 18,000 in 1, 20,000 in 1, and 22,000 in 2. Thus of the non-abscess cases in which counts were made, in 5 the count was below 15,000, whilst in 2 only, the count was 15,000 or more.

But of the 12 cases with abscess, in 6 the count was below 15,000, and in 6, 15,000 or more. There were two patients, both of whom had been sick equally long before operation (10 days), and in whom the leucocyte count was equal (15,000). One, who had a previous attack one month before, showed an acute ulcerative appendicitis, with adhesions between the cæcum and appendix, and the posterior parietal peritoneum; the other

revealed foul greenish pus at operation. Thus, while in the majority of cases a high leucocyte count is strongly suggestive of pus, yet, as we have just illustrated, cases can be selected which exhibit an equal count, but in which the findings at operation are entirely different. It is this very fallibility which compels the operator to give more weight to the clinical examination, and less to that of the laboratory. We found that differential leucocyte counts were of no more significance in determining the presence of pus than the leucocyte counts alone. The differential count is of moment in judging of the patient's resistance.

Microscopic examination in 18 of the appendices showed that the disease was interstitial in 5, ulcerative in 7, and chronic, with acute exacerbations in 6. Of this last group, namely, those six in which the microscope revealed chronic appendicitis with acute exacerbations, one gave a history of a previous attack, and exhibited adhesions at the operation; one gave no history of previous attacks, but exhibited adhesions at the operation; whilst the remaining 4 gave no history of previous attacks, and had no adhesions.

The fact that in four of these six cases the clinical history,—provided, of course, that it is correct and the patient's memory was not faulty,—and the operative findings did not support the laboratory diagnosis of chronic appendicitis with acute exacerbations, shows either that the microscopical diagnosis, as in cancer, is subject to error, or else that, as occurs in the gall-bladder, there may be latent or masked infections of the appendix which, while causing the patient little or no discomfort,—or at least not enough to impress his memory,—yet leave their marks in the organ, to be revealed only by the microscope.

The Bacillus coli was recovered in cultures taken from the appendix or the abscess in 5 cases.

I desire to call attention to the immediate or remote effects of appendiceal pus. Last year in reporting my Saturday Clinics I referred to the frequency of toxic nephritis in cases of acute appendicitis with abscess, as revealed by examination of the urine previous to operation, and I mentioned its subsidence, usually within a few days after operation. Now I shall speak of some of the post-operative effects of pus. Individually I might refer to one of the cases whose peritoneal cavity harbored much pus. The patient was 55 years of age, and had been sick

eight days. Operation, by lateral incision, carried above and parallel with upper third of Poupart's ligament and into the loin, revealed the peritoneum acutely hypertrophied, the appendix lying mesial to the cæcum, pointing towards the umbilicus, and partly gangrenous and perforated. Pus was found near the liver,—presumably on its way to form a subdiaphragmatic abscess; running over towards the umbilicus, along the appendix; and in the appendix in large quantity. A gauze strip was placed in each of these directions, and a glass tube in the pelvis. While I do not sanction drainage by multiple wicks in acute diffuse peritonitis, yet when the pus is present in definite multiple collections, the latter should be reached, if at all possible, and freely drained, so as to avoid the disastrous and so-called secondary collections, by evacuating them when they are primary collections. Six days after operation, a fecal fistula, at the site of the gangrenous area around the base of the appendix, occurred. After another month, the fistula not having closed, a second operation showed numerous adhesions between the visceral peritoneum of the cæcum and omentum and the parietal peritoneum. These adhesions proved that the drainage had been effectual, and that the omentum had prevented dangerous peritonitis, by exercising its function of throwing out large quantities of exudate about the site of infection. The adhesions were divided, and the fistulous tract obliterated by inverting with a broad base the offending stump of the appendix.

One patient developed, one month after operation, an abscess low down in the pelvis about the rectum. At the first operation no pus was found, but there were adhesions between the visceral peritoneum of the cæcum and the appendix, and the parietal peritoneum of the posterior abdominal wall. There was no note made in this case as to whether or not the pelvis was explored at the time of the first operation, therefore, I cannot say definitely if there was at that time a small collection which had been overlooked, or whether subsequent abscess formation was consequent upon the extension of infection.

Another patient, from whom four ounces of thick, foul pus had been evacuated, developed, shortly after operation, suppurative parotitis, and tonsillitis.

One patient had infection by contiguity of the right Fallopian tube, necessitating removal of the tube.

Pelvic appendicitis in the female I believe to be a not uncommon cause of sterility, therefore one of the many arguments in favor of early operation,—operation if possible before the infection has travelled beyond the confines of this organ.

Three deaths occurred in this series, one in a patient who, one week after operation, developed acute intestinal obstruction. Operation for the relief of the obstruction revealed two areas of gangrene in the lower part of the ileum, which formed part of the abscess wall. One area was three inches long and involved half the circumference of the bowel; the other area situated four inches higher, was still more extensive. Resection of the bowel was necessitated.

The second death occurred in a patient 53 years old who had been sick five days before admission and operation. The abdomen was greatly distended and universally tender, showing diffuse infection of the peritoneum. Operation revealed quantities of thick, foul, yellowish pus, and the appendix free in an abscess, it having separated at its base by ulceration. This was an example of the fulminating type of this disease.

The third death occurred in a patient who had been sick for forty-eight hours before admission and operation. Examination revealed general board-like rigidity, with tenderness. Incision gave exit to a large amount of free pus from the general peritoneal cavity as well as from the pelvis. The appendix, subcæcal, was perforated at the base close to the cæcum,—a second example of the fulminating type. Two subsequent operations were performed to establish free drainage, in the attempt to drain the peritoneal cavity. Postmortem revealed diffuse purulent peritonitis; a large collection of pus between the right lobe of the liver and the abdominal wall; another about the spleen; and perforation of the right cupola of the diaphragm, with bilateral bronchopneumonia.

Of the 30 cases of chronic appendicitis, 17 were in males and 13 in females. The longest appendiceal history was 18 years; the shortest two weeks.

Of the 20 cases in which the number of attacks was definitely stated: 10 had one, 6 had two, 3 had three, and one had six attacks. In these cases the time that elapsed since the last attack varied from two to five months. The patient (a cornice-

worker) who had the greatest number of attacks, had his first one year before operation. He had suffered from constipation during the entire time of his appendiceal history. This latter patient was operated upon six months previously and an appendiceal abscess was evacuated. For sixteen days following this operation the patient was very ill. Two months after discharge from the hospital a fecal fistula developed, which discharged for a period of two months and then closed. Since then the fistula has opened and closed several times.

Two days before re-admission for operation for the correction of the fistula, the fistula re-opened. Operation revealed numerous adhesions, in addition to a hole on the outer and back part of the cæcum, which was surrounded by necrotic, inflammatory material. The fistulous tract, and the diseased appendiceal stump were excised, and the rent in the cæcum closed.

The symptoms complained of were, in 6 cases, sudden, diffuse abdominal cramp, followed by nausea and vomiting, and localizing within a few hours to the right iliac fossa. In 16 cases the symptoms varied. In 10 the pain began in the right iliac fossa, and was variously described as severe or violent, sharp, shooting, cutting or stabbing, or dull, heavy or aching; in some of these the pain spread throughout the abdomen, like that of cholera morbus. Six patients complained of constant or intermittent, dull, aching soreness in the right iliac fossa. In the remaining 3 the symptoms were not noted. In 11 cases constipation was a marked feature.

In 22 of the cases, tenderness over McBurney's point was a constant objective sign. Rigidity, but only moderate, was present. The McBurney incision was used in 18 cases, and the short rectus incision in seven. The purse-string suture was employed in 14 cases, after clamping and removal of the appendix, and invagination of the appendiceal stump.

In 4 cases the appendix was ligated with silk or linen thread, the mucous membrane excised from the stump, the latter cauterized chemically, and covered by the adjoining serosa of the cæcum; in 7 cases the organ was simply ligated with silk. The abdominal layers were approximated with tier sutures of chromicized catgut.

Cholelithiasis.—There were 10 cases of cholelithiasis, 3 in

males and 7 in females. The youngest patient was 29, and the oldest 46 years of age.*

A history of a definite infection, preceding the onset of gall-bladder disease was obtained in 5 cases, in all of which the infection was enteric fever. This disease preceded manifestations of gall-bladder symptoms by a few months, one year, six years, 25 years and 26 years respectively.

The lowest number of attacks was three, those in the remaining cases being designated as numerous. All of the cases had pain and this symptom was described in 4 cases as colic or cramp in the region of the gall-bladder: in 2 cases the pain was noted as severe only, and in the remaining 4, the character of the pain was not mentioned. In all the cases the pain was in the gall-bladder area, in 4 it was referred, in addition, to the epigastrium, and in 4 to the inferior angle of the right scapula. The pain was followed by nausea and vomiting in all of the cases except one, and of these cases a history of chills was elicited in 3.

Various digestive disorders, such as loss of appetite, gastric tympanites, indigestion, catarrhal gastritis, hyperchlorhydria in the shape of heartburn, eructations of sour fluid and constipation were complained of. Jaundice was present at some or other times in 5 cases.

Physical examination revealed tenderness at the site of the gall-bladder in all of the cases; rigidity of the supraumbilical portion of the right rectus muscle in 4, and palpable liver margin in 3.

Calculi were present in the gall-bladder alone in 3 cases, in the gall-bladder and cystic duct in 2, in the gall-bladder, hepatic, cystic and common ducts in 1, in the gall-bladder and common duct in 1, and in the common duct alone, in 1. The walls of the gall-bladder were thickened in 4 cases, the gall-bladder en-

* The analysis of these, as well as of the cases to follow, is presented with the understanding that an undeterminable amount of error is apt to be present, owing to the unavoidability of having to accept the diagnosis of previous illnesses, and description of symptoms entirely from the patient's memory. It is well known that the lay diagnosis is often incorrect, and also that the human memory is very untrustworthy, and apt to respond too quickly at the expense of truth, to the stimulus of the prodding questions of the enthusiastic examiner.

larged in 3, contracted in one, and impacted with calculi in another. Bile was absent in the contracted gall-bladder, profuse in one of the enlarged organs, tarry in another bladder, and darker than usual in 2. Adhesions present in 5 cases, were described as pericystic in 2, between the omentum and gall-bladder in 2, and between the omentum, transverse colon, duodenum and gall-bladder in one. The bile was examined bacteriologically in 6 cases, of which in 3 it was sterile, in 2 the Bacillus coli, and in one the Bacillus typhosus was present.

In 3 cases the gall-bladder was so badly diseased as to necessitate removal. Drainage in these 3 cases of cholecystectomy consisted in one of a piece of gauze to the fossa of the gall-bladder, in one of a piece of gauze in the sub-hepatic space, and a cigarette drain, cleft, with one end above the lesser omentum and the other in the foramen of Winslow, and, in one of a rubber tube in the hepatic duct supplemented by a cigarette drain. In the remaining cases a rubber tube was placed in the gall-bladder in one; in the gall-bladder and the cystic duct in 2 cases; and in the gall-bladder and common duct in 2 cases. A small counter-opening for the emergence of the drainage, was made in 5 cases, in order to allow the laparotomy wound to heal *per primam,* and thus minimize the risks of incisional hernia.

It is my practice when removing the gall-bladder in the presence of infection to drain the stump of the cystic duct when this is feasible, and if not the stump of the cystic, the common duct.

In one case, the appendix, the seat of chronic inflammation was removed at the same sitting.

The most interesting and instructive case was that of a woman, aged 31, who had had enteric fever seven years previous to operation and from whose gall-bladder the Bacillus typhosus was cultivated. She recalled having pain in the gall-bladder during her attack of fever (probably typhoid cholecystitis). Nine months previous to operation, that is, over six years after the attack of enteric fever, her gall-bladder disease from being latent, became active, and at this time she had her first attack. In addition to three attacks, each of which was characterized by severe colicky pain in the right hypochondrium, which radiated to the right scapula, and which was followed by nausea and

vomiting, she had, as other salient features of the disease, loss of appetite, constipation, and profuse sweats on exertion. The latest, or third attack, preceded the operation by two weeks. That these clinical symptoms are explained by the pathological findings, is quite true. There were numerous adhesions between the omentum, transverse colon and duodenum on the one hand, and the gall-bladder on the other. The gall-bladder was contracted, empty and thickened. The bile-ducts were thickened and surrounded by adhesions, and the hepatic and common ducts were greatly dilated. There was a calculus at the distal end of the common duct.

The death occurred in a female aged 29, who succumbed to shock twenty-two hours after the operation. This patient had an endocarditis which was undoubtedly caused by the toxæmia of the gall-stone disease.

Cholecystitis.—In addition to the cases of chronic cholecystitis associated with the 8 cases of cholelithiasis, there were 2 instances of cholecystitis, one of which was subacute and the other chronic, both in females.

The subacute cholecystitis was present in a woman aged 46, who four years previously suffered an attack of pneumonia. The duration of the previous gall-bladder history was not mentioned, if, indeed there was any. However, while in the hospital, the attack occurred, upon which the diagnosis was based. The pain started in the gall-bladder region, radiated to the umbilicus, and back to the gall-bladder. Coincident with the pain were regional tenderness, and rigidity of the supra-umbilical portion of the right rectus muscle. Furthermore, there was distinct, though slight, jaundice. The duration of the attack was three and a half hours.

Abdominal section revealed a gall-bladder the size of a hen's egg, the serous covering of which was opaque, the musculature friable and thick, and the mucosa swollen, and granular. Two ounces of dark reddish-brown bile were removed. Adhesions were present: several, soft and recent between the omentum and colon, and the gall-bladder; one dense and old, between the inferior margin of the liver, near the gall-bladder, and the parietal peritoneum; another, likewise dense and old, between the duodenum and the gall-bladder. The head of the pancreas was hard and

enlarged. The gall-bladder was drained by a rubber tube, reinforced by a cigarette drain.

The laboratory reported the presence of occult blood in the feces, and the colon bacillus in the culture from the gall-bladder.

The case of chronic cholecystitis did not present anything of special moment.

Carcinoma of the Gall-Bladder.—Cancer of the gall-bladder occurred in a man aged 26. There was no family history of carcinoma.

Six months previous to operation, after the evening meal the patient experienced sudden cramp in the gall-bladder region, which was soon relieved by vomiting. Such attacks have occurred frequently since then. Jaundice attended each attack after the third, but was absent in the intervals.

Two months before operation, patient stated that he passed gall-stones per rectum. Five weeks before operation the latest attack occurred, and lasted several weeks. Since the first attack the patient estimated his loss in weight at 27 pounds. At the time of operation the patient was anæmic and slightly jaundiced.

Abdominal section exposed an enlarged, tense gall-bladder, whose fundus and body exhibited nodules. Adhesions existed between the omentum and gall-bladder. After cholecystectomy, drainage, consisting of one rubber tube in the stump of the cystic duct, surrounded by a cigarette drain, and one piece of gauze in the fossa of the gall-bladder, all of which were brought out through a counter opening. Culture from the contents of the gall-bladder proved sterile, but microscopical section of the gall-bladder showed the nodules to be cancerous.

Hepatic Abscess.—This case of abscess should, I think, on *a priori* grounds, be classified under chronic cholecystitis instead of under the heading "hepatic abscess."

The patient, a laborer, aged 49, gave no history of previous infection. Two months before operation he had a chill, which lasted half an hour. The following morning he noticed soreness throughout the epigastrium, with much fulness here. His appetite became poor. A month later the soreness localized in the right hypochondriac region, and now, for the first time, he thought he could feel a mass, which was moderately tender. He had no more chills. The epigastric soreness changed into a gnawing pain,

which appeared, together with epigastric distention, immediately after eating.

The pain in the gall-bladder was occasionally referred to the inferior angle of the right scapula.

The patient stated that he had lost thirty pounds in flesh since the illness began, although it must be borne in mind that his diet was restricted during that time.

Physical examination revealed moderate rigidity of the muscles in the upper right half of the abdomen, some tenderness about the umbilicus and the presence of a palpable swelling. The liver dulness extended nearly to the umbilicus. The stomach was dilated, holding a quart of water.

Abdominal section revealed the gall-bladder thickened, atrophied, and bound down firmly by strong fibrous adhesions; from it fluid bile escaped. There were numerous firm adhesions between the stomach and duodenum and the liver.

An abscess, the size of a small orange, was located one inch beneath the inferior surface of the liver, in close proximity to the fossa of the gall-bladder. Its walls were a quarter of an inch thick and its contents, creamy pus.

Drainage consisted in three pieces of gauze, one in the gall-bladder, one in the abscess cavity, and one in the subhepatic space.

Culture from the gall-bladder proved sterile.

Cirrhosis of the Liver.—There were two cases of cirrhosis of the liver operated upon, of which one was biliary, and the other was an example of Henoch's disease. The latter patient was cholæmic at operation, and died the next day.

Gastric Ulcer.—There was one case of gastric ulcer, in a woman 32 years old. She had had enteric fever eleven years previous to admission.

Her illness began three months before admission with sharp cutting pains in the epigastrium, radiating low in the abdomen: duration, three weeks.

Five weeks before operation there was a second attack, similar to the first, the pain lasting up to within a few days before operation.

Physical examination showed the greater curvature of the stomach four centimetres above the navel.

Abdominal section and gastrotomy revealed the gastric

mucosa congested. It bled readily when touched, and rubbed off easily. Several small areas were especially hemorrhagic. After posterior gastrojejunostomy, recovery was apparently complete.

The appendix, chronically inflamed, was removed at the same time through a McBurney incision.

Duodenal Ulcer.—There was one case of duodenal ulcer, in a man 60 years of age. His illness began nine months previous to operation, with severe dull aching pain in the epigastrium, coming on from one to two and a half hours after eating, and radiating to the shoulders. The pain lasted several hours.

Four months before operation ten teeth were extracted,—an event which naturally increased the severity of the morbidity. Shortly afterwards, the epigastric pain returned, and was followed two hours after eating by vomiting, which relieved the pain.

Three months before operation, after unusually severe pain in the right side of the epigastric region, the patient became jaundiced. From this time on the intervals between attacks were three to five days, and occasionally two weeks: during these intervals the patient was fairly comfortable. The bowels were loose, occult blood was present. The patient stated that during these nine months he had lost twenty pounds in weight.

Physical examination showed the stomach dilated, its greater curvature extending down as far as the navel. There was resistance in the epigastric region, more marked on the right.

Abdominal section revealed an ulcer in the anterior and upper walls of the first part of the duodenum which extended to the pylorus. There was no obstruction at the latter site.

Posterior gastrojejunostomy, no loop, resulted in cure. In this connection I beg to say that in my experience the operation of gastro-enterostomy (no-loop operation) in the presence of an open pylorus has not been followed by the disagreeable symptoms described by some operators. While I was doing the loop operation I did see vomiting, etc., which from my more recent experience, I must attribute in part at least to the former faulty technic.

Carcinoma of the Stomach.—There were 3 cases of carcinoma of the stomach, all in males, aged 34, 37 and 45. There was a family history of carcinoma in all these cases: one patient's father died of carcinoma of the stomach; another patient's father died of carcinoma of the jejunum, whilst the third patient had a sister suffering from epithelioma of the face. Common symptoms were pain, dyspepsia, vomiting, loss of weight, and in two, constipation. In 2 patients, both of whom had pyloric obstruction, the vomiting was that of retention: in all, the vomitus contained either streaks, or considerable amounts of blood. The loss of weight amounted to 20, 50 and 52 pounds.

The site of the carcinoma was, in one patient, the anterior wall; in another, the pylorus and duodenum; in the third, the pylorus and anterior and posterior walls. In all partial gastrectomy with posterior gastrojejunostomy was done. In all three cases clinical diagnosis was confirmed by microscopical examination. Subsequent history of the patient favorable, with one exception; this man died nine months after operation from what was thought to be recurrence, yet a postmortem was not made.

Carcinoma of the Jejunum.—There was one case of carcinoma of the jejunum, in a female aged 45, whose illness began five months previous to operation, with daily vomiting. There was dull aching pain, boulemia, and loss of twenty-five pounds in weight. Occult blood was found before the operation.

Abdominal section revealed a hard, annular growth three inches beyond the duodenojejunal flexure, of hour-glass shape which caused an almost total stricture, nearly three inches long. Adhesions were present between the pylorus, the inferior surface of the liver, and the lesser omentum. Resection of the jejunum, with end to end anastomosis, and posterior gastrojejunostomy were performed.

Carcinoma of the Intestines.—There were three cases of intestinal carcinoma, one in a male and two in females.

Carcinoma of the colon was present in a male aged 39. A sister had been operated upon for carcinoma of the breast. Six years previous to admission the patient had had an attack of dysentery. Six months before admission there appeared abdominal colic, with obstinate constipation. Three months before admission the patient was operated upon for bilateral inguinal hernia, and during his stay of three weeks in the hospital, he lost 27 pounds in weight, and since then has lost eight pounds, making a total loss of thirty-five pounds in three months. Five weeks before admission the patient noticed for the first time, blood-clots in the stool,

rectal tenesmus and borborygmi. After the operation for the herniæ, the constipation was relieved, but the colic and tenesmus continued. One month before admission the stools became loose and watery.

Physical examination revealed, in addition to emaciation and cachexia, rigidity of the muscles in the left half of the abdomen. There was dulness to the left of the navel, over an area of a little over an inch, and this dulness corresponded to a tender mass.

Abdominal section disclosed a large movable mass, the size of a large orange. Involved in this mass were the small gut and the mesentery. No surgical procedure was employed in this case.

Carcinoma of the cæcum was present in a woman aged 32, whose family history was negative. Five months previous to admission this patient complained of tearing, dragging pain in the right iliac region, followed by soreness over the whole of the abdomen. Six weeks before admission she noticed for the first time a lump in the right iliac fossa, just below the site of the previous pain. The abdomen at this time was swollen, and this swelling increased and decreased alternately.

Physical examination of the abdomen revealed considerable distention but no rigidity. There was general tenderness. A mass, indefinite in shape, hard and nodular to be felt in the right iliac fossa, by combined abdominal and pelvic palpation. There was free fluid in the abdomen.

Abdominal section permitted the escape of dark, thick, serous fluid and disclosed a malignant growth in the right iliac fossa to which the intestines were adherent. The growth was extensive, but sprang, apparently, from the ileocæcal junction. There were metastatic nodules on the uterus and adnexæ, floor of pelvis and anterior abdominal wall. The case proved to be inoperable.

There were 2 cases of carcinoma of the rectum. One, a woman aged 54, whose father's sister had an epithelioma on the forehead.

She had been constipated ten months before admission. Since three months before admission, she had movements the size of sheep-stools, and, at times, passed a little blood. There was rectal tenesmus. Lately, there had been much rectal bleeding.

The patient lost weight. At times there was considerable pain in the sacral region.

Digital examination discovered a large, hard, nodular mass, fixed in the lower half of the posterior wall of the sacrum. The finger was streaked with blood when withdrawn. The operation consisted in left inguinal colostomy.

The second case was similar to the above and too far advanced to allow of other than a left inguinal colostomy, which was done.

Hernia.—There were 12 operations for the radical cure of inguinal hernia, 10 were in males, and 2 in females. Seven of these were on the right side and 4 on the left: in one case the site of the hernia was not recorded. There were two cases of congenital hernia: the father of one of these patients also had a hernia. Trusses were worn in 8 cases. The duration varied from one to thirty years. Four were ruptured by heavy lifting. Concomitant pathological conditions consisted in varicocele in two cases, chronic appendicitis in two, acute appendicitis in one, and in another case, part of the cæcum with the appendix was in the sac. Incisional hernia was present in addition to inguinal hernia and chronic appendicitis in a woman who had had an abdominal section four years previously. There was one ventral hernia.

There were 2 cases of strangulated femoral hernia, both of which recovered.

There were 2 cases of umbilical hernia, both in females. One patient had the rupture for three years, and could assign no cause to it, but notes in the history show that she was very stout, and had borne five children. The other woman acquired the hernia when fourteen years old, or 28 years before operation, by heavy lifting. The hernia protruded two and a half inches beyond the navel, and was seven inches in diameter. Its contents were omentum and gut, and, as is usual in long standing cases, many adhesions. The appendix, the seat of chronic obliterative inflammation, was removed at the same time.

There were two cases of incisional hernia, both in females. One case had in addition an inguinal hernia and a chronic appendicitis. The other patient had been operated fifteen months previously and an appendiceal abscess evacuated through a three inch incision. She then returned to her work in a hosiery mill,

where considerable standing was required. She wore an abdominal belt for a period of eleven months after the operation, and then dispensed with it. One month later the scar relaxed. At operation, numerous adhesions were broken up, and a chronically inflamed appendix removed.

Wandering Kidney.—There were 6 cases of wandering kidney, four in males and two in females, and all on the right side. Analysis of the case histories shows that symptoms, aside from pain, were few. In all cases, the pain was in the right lumbar and hypochondriac regions and varied in character from numbness, or dull and aching, to severe and stabbing, like renal colic. In one case pain was aggravated by standing in one position and in another by motion. In one case it radiated to the glans penis, and, in another, to the right testicle. Pain in wandering kidney so frequently resembles that in renal calculus as often to make the diagnosis very doubtful. Associated with the pain was nausea in one case, and vomiting, which relieved the pain, in another. Urinary symptoms, though usually frequent, are mentioned but once, and here consisted in difficulty in starting the stream. Two patients complained of constipation. One patient had a chronically inflamed appendix removed at the same time. Another had diastasis of the recti with visera optosis, and a split celery-stalk laceration of the cervix. In this instance, conservative treatment, by means of abdominal binder, would probably have fulfilled the indications better than operation. Anchorage, in five cases, consisted in separation of a triangular flap of the true capsule, twisting of this flap, and suturing of it into the anterior layer of the lumbar fascia, and quadratus lumborum muscle. In the sixth case the kidney was anchored by means of polar gauze. The presence of hæmaturia in a percentage of cases of very movable kidney has been my experience, also jaundice in a few.

Pyonephrosis.—There were 4 cases of pyonephrosis, three in males and one in a female. Two were on the right side and two on the left. The etiology of this condition was, in two cases renal calculus; in another tuberculosis. The fourth case, while the cause is not mentioned, I believe was consecutive upon wandering kidney.

Both of the cases which were due to long-standing calculous disease, were in males, and both died. The ideal time to operate would have been of course in the pre-suppurative stage. In all

suppurative states, the surgeon is more or less subservient to the caprices of infection. In one of these patients, the calculous history had existed since the patient was fourteen years of age, or for twenty-seven years. Infection began five months previous to operation, when he noticed for the first time, pus in the urine. In addition to the attacks of renal colic, in which the pain was referred down the right ureter and also to the right testicle, there was dysuria, and profuse sweats at frequent intervals.

Physical examination showed that the patient was anæmic and decidedly septic. There was a tender mass in the right hypochondrium. Nephrotomy revealed a kidney enlarged and disintegrated, from which a basinful of greenish-yellow pus was removed. Near the vesical end of the ureter a softened calculus was removed. The kidney was extirpated. Drainage was established by three pieces of gauze. The laboratory reported chronic suppurative nephritis and ureteritis.

The other patient had had a calculus removed from the left kidney eight months previous to operation, and a month later the calculous history on the right side was inaugurated. The time of inception of infection was not definitely stated. There was progressive loss of weight and strength, increased frequency of urination in the day, and headaches towards evening. Functional activity of the left kidney was established by ureteral catheterization.

Nephrotomy gave vent to a large amount of thick, foul, yellowish pus. The ureter was much thickened, and dilated, and near its vesical end contained a small calculus.

The patient with tuberculous pyonephrosis had had her condition for six years. Seven weeks previous to the present operation an abscess of the left kidney, which had ruptured, was evacuated. However, in spite of this, the same dull aching pain persisted, together with a sinus, which repeatedly opened and closed. Nephrectomy.

Pyelonephritis.—There was one case of pyelonephritis, in a woman aged 31, who gave a definite history of previous infection Two weeks before the operation she noticed for the first time, the urinary symptoms of pain after micturition, frequency and urgency, and consequent passage of small amounts of urine. Ten days before admission, she experienced violent, sharp, shooting pains in the right iliac region, and aggravated by motion. The

next morning and for two days after there were chills, fever, sweats, and vomiting, and up to time of operation constant high fever persisted.

Physical examination revealed marked tenderness in the right lower hypochondriac region anteriorly, and lumbar region posteriorly. Palpation caused exquisite pain.

Nephrotomy showed an enlarged, inflamed kidney that contained a large amount of pus.

Renal Calculus.—There was one case of renal calculus, which occurred in a man aged 52. For twelve years preceding operation this patient had suffered from periodic—*i.e.* every four months—attacks of sharp, cutting pain at a localized point in the left lumbar region, and without radiation. Later on, the attacks were more frequent and severe, and the pain radiated along the left ureter to the testicle. These attacks lasted from one to two hours, were accompanied by chill, and occasionally by vomiting. Nephrotomy, with removal of a calculus from the pelvis of the ureter.

On the eighth day after operation, there was a severe attack of renal colic, followed by increased frequency of urination, and the passage of a shower of calculi, which varied in size from a millet to a mustard seed.

In all my kidney cases it is my practice, with few exceptions, to have cystoscopic and ureteral catheterization; this is done by one of two members of our staff, Dr. Alexander Uhle or Dr. William McKinney. I cannot lay too much stress upon this practice, the importance of which I need not dwell upon, as I am sure all of the Fellows will agree with me in this.

Hypertrophy of the Prostate Gland.—This patient, 65 years old, suffered, more than twelve years before operation, from pain before, during, and after urination; from increased frequency, and, at times, from sudden blockage of the stream, with dribbling. For twelve years he has led a catheter life.

Ten years ago pus and blood appeared in the urine at intervals of three months. On admission, the patient had pain, referred to the end of the penis, occasional priapism, vesical tenesmus, and often difficulty at stool. At operation there was removed by the suprapubic route, a calculus, the size of a peach-stone, and a much enlarged prostate.

Sarcoma of the Prostate.—There was one case of sarcoma of the prostate, which occurred in a patient 69 years of age. Nine months previous to operation he began to suffer from frequency of urination, with dysuria and hæmaturia. On admission, the frequency amounted to one to two hours by day, and five to six times by night. Complains of severe pain in sacrum. Rectal examination revealed the prostate soft, tender, and uniformly enlarged to the size of a large orange.

Suprapubic operation confirmed rectal palpation, and showed, further, that the growth was very vascular, and so soft that it ruptured during manipulation,—an event that necessitated removal piecemeal. The resulting cavity was as large as a fist, and bled freely. Drainage consisted of one Freyer tube in the bladder. Six hours after the operation profuse bleeding, which required gauze packing to control it, occurred. Saline intravenous infusion two quarts, was administered. Microscopical examination confirmed the clinical diagnosis of sarcoma.

Cystoscopic examination in enlargement of the prostate is equally as important as is cystoscopy and ureteral catheterization in kidney conditions.

Carcinoma of the Breast.—There were six cases of carcinoma of the breast, all in women, although last year I reported an instance of this in a male. The ages were from 32 to 45, with the somewhat low average of 37 years. The right breast was involved in five and the left breast in one. One patient gave a family history of cancer, and one a history of traumatism.

The duration was three months in one case, six months in three, and nine months in one. Pain in the breast was described as sharp and shooting in two cases, and stabbing in another. Involvement of the axillary nodes was present in two cases. Radical operation was performed in four cases. In all drainage of the axilla was carried out by means of a rubber tube.

Tuberculosis of the Breast.—There was one case of tuberculosis of the left breast in a woman aged 44. Three years previous to operation, the patient experienced for the first time, pain in the left breast. Five months before operation, she noticed, for the first time, a tumor, which has grown rapidly. Small areas became tender, inflamed and swollen, and then broke down and discharged foul pus. Examination of the breast revealed a round, red, slightly elevated area, the size of a silver quarter,

in the centre of which was a sinus discharging non-odorous pus: this area was situated above, and slightly to the outer side of the nipple. Above this there was another similar area, not so red, and without a sinus. Beneath these spots there was an ill-defined, irregular, fairly hard, moderately tender growth. Radical operation was performed, and the axilla drained by a rubber tube. Microscopical study showed tuberculosis.

Fibroid of Uterus.—There were 8 cases of fibroid tumor of the uterus, of which one was complicated by carcinoma, under which caption it will be considered. The duration of the disease was six weeks in one case, one year in two, two and a half years in two. The pain was dragging or bearing down, lumbar or sacral, radiating down the thigh in one, and aggravated by the menses in another. Metrorrhagia was present in four cases, and in two was profuse and clotted. Four complained of leucorrhœa. In two cases there was increased frequency and urgency of urination. At operation, which was supravaginal, amputation of the body of the uterus and adnexæ in three cases; uterus with the left tube and ovary in two cases; uterus with both tubes and right ovary in one case. The appendix was the seat of disease, and for this reason was removed in five cases. One patient who had a fibroid removed fifteen years previously through the vagina, showed at operation a right intraligamentary cyst; chronic appendicitis, and adhesions between the ileum and the vagina.*

Carcinoma of Uterus.—There were 4 cases of carcinoma of the uterus, all in married women, whose ages were 42, 46, 47 and 49. There was no family history of carcinoma, nor any history of trauma apart from that ordinarily attending childbirth. The duration was three months in one, four months in another, and indefinite in the other two.

Metrorrhagia was present in two cases: in the case complicated by fibroid it contained clots; in the other case it was profuse, and before admission, foul. In all these cases the cervix was the seat of the malignancy.

Operation was performed by the abdominal route in 3 cases, and by the vaginal in one. One case was complicated by fibroid

*In addition to the above cases of fibroid uterus, an example of subserous fibroid removed by myomectomy will be referred to under "Diseases of the Tubes and Ovaries."

and showed, in addition, chronic appendicitis; the uterus with the adnexæ, the uterine third of the vagina, and the appendix were removed.

Another case was complicated by polyp, and showed chronic appendicitis; complete abdominal hysterectomy and appendectomy were performed. Upon the third patient it was intended to perform trachelorrhaphy and perineorrhaphy, which had existed since childbirth, four and a half years. The cervix showed a stellate laceration, and was unduly hard, thus creating the suspicion of carcinoma. Therefore, the uterus was removed by the vaginal route, and the perineum repaired. The diagnosis of malignancy was confirmed by microscopical examination. Here, then, was a very early carcinoma, springing from the site of a lacerated cervix—and the conclusion may properly be drawn, that trauma was the cause of malignancy in this patient.

Prolapse of the Uterus.—There were four cases of prolapse of the uterus. Operation consisted in vaginal hysterectomy in two; ventrofixation, perineorrhaphy, anterior colporrhaphy, and, incidentally, appendectomy for chronic appendicitis in one, and in the remaining case, Dudleys' operation, together with amputaton of a redundant cervix, and repair of a lacerated perineum. One of these patients had decidedly weak abdomino-pelvic musculature, having been operated upon four years previously, for femoral and inguinal hernia, and lacerated cervix and perineum. There was one death in this series.

Chronic Metritis and Endometritis.—There were 4 cases of chronic metritis and endometritis in multiparæ, of whom two had borne eight children each, and one two children. Operation in two cases consisted in hysterectomy by the vaginal route; in one of these the uterus was, in addition, retroverted. Two cases were cured by complete abdominal hysterectomy, in one, at the same sitting, appendectomy for chronic appendicitis, and perineorrhaphy, for rectocele.

In all these cases the microscopical examination showed arterio-sclerosis and hyperplastic endometritis. It is my belief after a considerable experience in dealing with this class of cases that this is the only rational treatment. I have had the opportunity of observing cases a long time after operation, and in-

variably the immediate as well as the remote results have been most satisfactory to patient as well as surgeon.

This may be thought to be too radical treatment, but in being so radical it is conservative in the true sense of the word in that it is the best possible safeguard against the development of carcinoma which will take place in some of these cases if left alone and more likely to if subjected to traumatism by the ill-advised use of the curette.

Diseases of the Tubes and Ovaries.—There were 12 cases of tubo-ovarian disease. Miscarriages had occurred in five of these patients, one of whom had eight. Of these patients who had had miscarriages, the character of the pain in four betrayed a some-time pelvic peritonitis. The pain was usually in the pelvis, and was sharp, or sharp and shooting, or cutting in seven patients, four of whom had had a miscarriage: this pain was accompanied by chills and fever in two, and was followed by nausea and vomiting in two more. There was bearing down pain in two patients. The pain was referred down both lower limbs in one and up to the inferior angle of the left scapula, and down to the left knee in another, who suffered from left-sided salpingo-oöphoritis. In two cases there was frequency and urgency of urination. The menses were irregular in five patients, of whom four had menorrhagia: they were scanty in another. Dysmenorrhœa was present in five patients; leucorrhœa in five, and constipation in six. Associated conditions consisted of chronic appendicitis in all the twelve cases; retroversion in two, endometritis in two, and bilateral hydrosalpinx in one. The operations consisted of appendectomy in all cases; of bilateral salpingo-oöphorectomy in five, in two of which the uterus being adherent, was freed; of left salpingo-oöphorectomy, with resection of the right ovary, and right salpingectomy in four cases, in one of which a myomectomy was performed; of right salpingo-oöphorectomy in two; and of complete abdominal hysterectomy in another patient, who had a severe fundal endometritis.

In addition to the operations described above, fifty-two others of less interest were also performed in the Clinics.

FRACTURE OF THE PROXIMAL END OF THE FIFTH METATARSAL BONE.

Dr. Henry R. Wharton reported the following cases:

Case I.—W. A. G., aged 45 years, in jumping from a wagon in a runaway landed upon his right foot and found he had pain and difficulty in walking. On the third day after the accident, and as the foot was still painful and interferred with walking, he consulted Dr. Wharton, who found on examination that there was marked swelling over the proximal end of the fifth metatarsal bone, and great tenderness upon pressure of this portion of the bone. An X-ray examination showed that there was a fracture through the proximal end of the bone. A plaster-of-Paris bandage was applied for two weeks, and upon its removal, as the tenderness had disappeared, strapping and a bandage were applied, and he was able to walk comfortably with the aid of a cane. Two weeks later he was able to discard all dressing and walk without difficulty.

Case II.—E. B., aged 10 years, while skating upon roller skates ran into the curbing and fell, twisting her foot. She immediately experienced pain in the outer portion of left foot and walked with great discomfort. Dr. Wharton saw her within an hour of the accident, and found a distinct swelling over the proximal end of the fifth metatarsal bone; this region was also extremely tender upon pressure. An X-ray examination on the following day showed a fracture passing through the proximal extremity of the bone. A plaster-of-Paris bandage was applied for two weeks, and upon its removal strapping and a bandage were applied, and the patient walked without difficulty.

Case III.—J. C., aged 10 years, received a wrench of the foot while playing foot ball. He applied to the Dispensary of the Children's Hospital on the following day, complaining of pain in right foot, and difficulty in walking. Upon examination there appeared swelling of the tissues, and tenderness on pressure over the proximal end of the fifth metatarsal bone of the right foot. From the symptoms presented, which were exactly similar to the two cases reported above, Dr.Wharton thinks he had the same variety of fracture. Dr. Wharton further remarked that fracture of the shaft of the metatarsal bone is not an uncommon accident,

and is said to be most common in the first and fifth metatarsal bones. The special variety of fracture reported in the above cases, the accurate diagnosis of which is impossible without the aid of an X-ray examination, does not seem to have been described by surgical writers. Hamilton speaks of fracture of the first and fifth metatarsal bones as most common, but makes no mention of fracture of the proximal end of the bone. Scudder mentions the greater susceptibility to fracture in the first and fifth metatarsal bones, and shows a skiagraph of a transverse fracture of the fifth metatarsal bone near its proximal extremity. Von Bergmann mentions a condition formerly described as tumor of the foot which was not uncommon in soldiers who made long marches carrying heavy weights. Bruthaupyt, Schentze, Kocher and others, with the aid of X-ray examinations, have shown that this condition is usually due to a fracture of the second or third metatarsal bone. It is probable that the systematic X-ray examination which is now so generally employed in fractures, will show that it is a comparatively frequent injury.

Fracture of this portion of the bone is probably of the nature of a sprain fracture, the fragments being separated by the ligamentous slips from the dorsal or plantar ligaments which attach it to the cuboid. Displacement of the fragments seems slight.

The treatment which seems most satisfactory is the application of a plaster-of-Paris dressing for a few weeks, or firm strapping and a bandage, which is followed by good use of the foot in from three to four weeks.

Dr. James K. Young wished to place on record a case in which union did not occur. This was verified by X-ray examination. In this case the distal end of the fifth metatarsal bone was first removed. This did not relieve the metatarsalgia, and therefore the distal end of the fourth metatarsal bone was removed. This gave some relief to the patient, and no other operative treatment was undertaken. Dr. Young simply wanted to show that the treatment advocated by Dr. Wharton is not always satisfactory in producing union in fracture of the fifth metatarsal bone.

Fig. 1.

X-ray showing fracture of proximal end of fifth metatarsal.

FIG. 2

X-ray showing fracture of proximal end of fifth metatarsal.

MULTIPLE FRACTURE OF THE LOWER JAW TREATED WITH AN INTERDENTAL SPLINT.

DR. HENRY R. WHARTON reported the case of a man, aged 24 years, who received an injury of the lower jaw probably by a blow from a blackjack. He came under the operator's observation upon the following day, when it was found that there was a small lacerated wound of the left cheek which did not communicate with the mouth, and there were also two fractures of the body of the lower jaw, one on the left side just in front of the wisdom tooth, the other on the right side near the mental foramen. The bone between these two lines of fracture was displaced downward, several teeth were loosend, and one had been knocked out near the fracture on the right side of the jaw. It was found by manipulation that the fragment could be replaced, but even with a compress and Barton's bandage it could not be kept in position so that the teeth could be made to articulate.

An X-ray examination made with the compress and Barton's bandage applied showed that distinct deformity still existed, and it seemed that satisfactory correction of the deformity could only be obtained by wiring the fragments or employing an interdental splint, and Dr. Gritman, of the Dental Department of the University of Pennsylvania, made casts of both jaws, and from these casts metal moulds were made upon which the splint was shaped. The most difficulty in fitting the splint was due to the fact that the only retaining point posterior to the fracture on the left side of the jaw was a partially erupted wisdom tooth.

The interdental splint was applied on the fifth day after the injury, and the jaws were firmly held in contact with the splint by means of a Barton's bandage. An X-ray examination at the end of a week showed that the displacement of the fragment had been corrected and the articulation of the teeth was perfect. The splint was removed at the end of five weeks, and the articulation of the teeth was found perfect, but as the union at the seat of the fracture was not quite firm, it was re-applied for two weeks longer, making seven weeks in all that it was worn. Even at this time it did not seem safe to remove all retentive apparatus, so the patient wore through the day a light Barton's bandage, and was not allowed to use the jaw in mastication, and at night he re-applied the splint, to guard against any violent involuntary movement of the jaw during sleep. The patient during

the whole course of treatment was kept on liquid nourishment.

The result obtained was an excellent one, there being absolutely no deformity and the articulation of the teeth being perfect.

Dr. George M. Dorrance (by invitation) said he had had during the past year 77 cases of fracture of the jaw, 23 of which he had treated with intermaxillary splints or interdental splints. Some were treated by the so-called Angle method, which really does not belong to Dr. Angle; others with the Matas splint, which he modified somewhat; and others with the Barton bandage. Reviewing all these cases he thinks the Barton bandage should be discarded absolutely. In cases where it is impossible to obtain the interdental or intermaxillary splints the Angle or Dorrance modification of Matas' method give most satisfactory results. In speaking of results one takes the articulation of the teeth, not their alignment. If a fracture is within the line of the teeth all that is needed is an interdental splint which covers over the lower teeth. The patient can open his mouth, talk, and eat semi-liquid food. In every one of the 23 cases in which Dr. Dorrance used the intermaxillary or interdental splint he has perfect articulation. In those in which the Angle method was used he had some failures because the application was not correct, or because of the slipping of the two bands which go around the teeth. The Angle method consists of a band around the upper teeth and a band around the lower teeth; between these two there is a rod which is held in place by a clamp around the band on the upper teeth, and again by a clamp on the lower teeth. This holds the lower jaw against the upper. It is easily applied by a surgeon; but an interdental splint should be applied by a dentist. Dr. Dorrance has treated 3 cases of fracture of the upper jaw with the interdental splint. The jaw is immediately reduced and a cast taken; this will undoubtedly show some deformity; then another cast is made and a die is made of that, and finally a German silver die is wedged over the copper one. This silver splint is placed on the teeth by cement and fracture is in perfect position, and the patient can eat food he does not have to chew. The results from the intermaxillary and interdental splints have proven most satisfactory in every respect.

CASES OF FRACTURE OF THE PATELLA TREATED BY OPEN OPERATION AND SUTURE OF THE FRAGMENTS.

Dr. Henry R. Wharton reported the following cases:

Case I.—W. R., aged 23 years, in December, 1907, while fox-hunting, fell with his horse and received an injury of the left knee. A temporary dressing was applied and the patient was removed to the Presbyterian Hospital.

Upon the third day after the injury the patella was exposed by a transverse incision over the knee-joint, and a very large amount of blood-clot was removed. Examination of the fracture showed that there were three fragments, the upper fragment consisting of two pieces, the smaller one to the left side was held by a periosteal hinge. The upper and lower fragments were drilled and were brought into apposition by several strands of chromicized catgut passed through the drill holes and secured by tying. After securing the fragments two additional layers of chromicized catgut sutures were employed to approximate the periosteum and capsular structures, and a third layer of silkworm gut sutures were employed to approximate the connective tissue and skin. A small cigarette drain was introduced at the angle of each wound before the capsular structures were closed by sutures. The wound was covered by a gauze dressing, and a plaster-of-Paris dressing was applied to the limb from the toes to the groin, with provision for strapping when dressing of the wound became necessary. The small drains were removed on the third day, and the sutures were removed on the tenth day, and the wound was found healed.

The plaster-of-Paris bandage was removed at the end of a month, and gentle passive motion of the joint and massage of the limb were practised. The patient was allowed to walk on crutches at the end of six weeks. Motion of the joint gradually improved, and at the end of ten weeks he walked with a cane. The function of the joint gradually returned, and six months after the injury he apparently had full extension and flexion of the joint. An X-ray taken eleven months after the injury shows the condition of the patella.

Case II.—Mrs. M. R., aged 60 years, tripped upon a rug and fell, fracturing the right patella.

She was removed to the Presbyterian Hospital, and upon the third day after the injury the patella was exposed by in-

cision, and the fragments and capsular structures were approximated, as in the case previously described. The dressing applied and the after-treatment were similar to that described above. The result obtained was very satisfactory, and at the end of six months motion of the knee-joint was almost perfect.

CASE III.—Mrs. R., aged 45 years, in August, 1906, fell downstairs, doubling her right knee under her, sustaining a fracture of the right patella. She was sent to the Presbyterian Hospital and was under the care of Dr. Hodge, who exposed the fragments by incision and approximated them by suture of the capsular structures. The patient did well and was discharged with good union of the fragments. She states that she regained normal use of the limb.

On February 12, 1907, she stepped upon a piece of ice and fell, fracturing the same patella. She was admitted to the Presbyterian Hospital on February 18th, and the fragments were exposed by a longitudinal incision. It was found that union of the fragments had occurred by isolated bony areas, five or six in number, the intervening union being fibrous. The edges of the fragments were freshened, drilled and approximated by a few strands of chromicized catgut. The periosteum and capsular structures were next approximated with chromicized catgut sutures, and the skin and connective tissues with silkworm gut sutures. The limb was put up in plaster, and the case made a good recovery, and was discharged from the hospital on March 3, 1907.

An examination of this patient within a few weeks, shows that she walks without a limp, and has regained full function of the knee-joint.

OSTEOPLASTIC RESECTION OF THE SKULL,

WITH DESCRIPTION OF A MODIFICATION OF STELLWAGEN'S INSTRUMENT FOR PERFORMING THIS OPERATION.

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AMONG the notable advances in surgery in recent years, intracranial operations occupy a prominent place. This fact is due largely to the development of the osteoplastic method of exposing the brain and its membranes. Wagner, who has the credit of first performing this operation in 1889 employed the chisel and mallet to cut through the skull. The value of this method of exposing the brain was at once recognized by surgeons, and almost immediately suggestions of new instruments to replace the chisel and mallet in effecting the bone section began to appear, and have continued, at frequent intervals, up to the present time. Without reviewing the discussion as to the relative merits of the original method, and the numerous substitutes that have been recommended, which is now an old story, it may be confidently stated that the chisel and mallet are employed less frequently each year in the operation now under consideration.

At the present time, the rivalry is chiefly between bone-cutting instruments and saws driven by power,—usually electricity,—and certain cutting forceps and instruments manipulated entirely by the hands.

It is not the purpose of this report to open a controversy on the relative merits of these two general methods of procedure. It will be admitted at the outset that each has its well-defined field of usefulness, as have also a number of the different instruments that have been described. Nothing can be more trite than the statement that an instrument that one surgeon will use with facility and satisfaction will be

considered wholly inappropriate under identical circumstances by another operator. I have, therefore, no arguments to advance against any of the methods that have been successful in other hands. I desire, merely, to describe an instrument that has been eminently satisfactory to me, and one, I believe, that deserves a trial from those who have not felt satisfied with the methods they have heretofore employed.

In 1903 Dr. Thomas C. Stellwagen, Jr., of this city, devised an instrument for cutting an osteoplastic flap of the scalp and skull. Shortly thereafter I had the opportunity of assisting Professor J. William White in some cases of osteoplastic resection of the skull in which he used this instrument, and subsequently employed it in two or three cases in my own service. I was surprised at the ease with which the bone flap was cut, and although the instrument accomplished the object for which it was intended it seemed to me susceptible of improvement in certain minor features. The first objection encountered in this limited experience was the severe tax on the pronator and supinator muscles of the forearm, which, being unaccustomed to prolonged efforts of this kind, became very tired, so that it was necessary to rest from time to time. The second objection from my standpoint, was the lack of security of the plate upon which the shaft of the instrument revolved. In spite of every effort I could make it would soon become loose * and had to be held by the fingers of the left hand, or by an assistant, whose hand in the vicinity of the wound, was usually more or less in the way and impeded the progress of the operation. A third objection was the free hemorrhage from the vessels of the scalp while the bone was being cut through. While hemorrhage from a scalp incision is always copious, and requires the application of a large number of hæmostatic forceps, the sweep of this instrument made the use of the forceps impossible and the well-

* Dr. Stellwagen informs me that he has since adopted the use of wood screws which overcome this difficulty. However, I prefer the modification here described as this instrument has a fewer number of parts and less time is consumed in establishing the central point or base.

known difficulty of tying the scalp vessels results in a great loss of time. This last objection was overcome to some extent, theoretically, by some operators, by cutting a short segment of the flap at a time, and sawing through the subjacent bone, then enlarging the scalp incision and the bone section, part by part, until the necessary flap was formed. My own observation leads me to say that the total amount of bleeding which occurred when this method was employed was just as great as when the whole flap was cut at once and in addition the time required to change from the knife to the saw and back again, and the extra time required in forming the flap, prolong the operation unnecessarily.

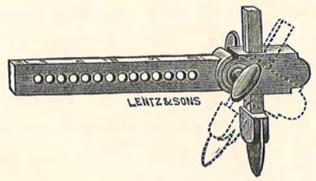
To overcome the first difficulty mentioned, it occurred to me that by attaching a handle to the end of the arm carrying the saw, the force required in cutting the bone could be applied more comfortably, that is, in a way that would be much less tiresome to the operator. This addition to the instrument required the shaft to turn freely upon the handle instead of being fixed as in the original model. Further, as both hands were required to operate the instrument, an effort was made to do away with the base plate which had been a source of inconvenience as already stated.

In my first model all of the features of the Stellwagen instrument were retained. To these were added the handle at the end of the arm, the rotating shaft armed with a spear-pointed pin at the end opposite the handle, which bored a hole in the skull as the shaft rotated, and thus became fixed. A shoulder at the junction of the shaft with the pin prevented the latter from penetrating too deeply and injuring the membranes of the brain. Motion was provided at the joint between the arm and the shaft, otherwise it would be necessary to incline the shaft at various angles, as the saw swept over the irregular surface of the skull, and as it penetrated the bone. In order to combine both ideas in one instrument it was necessary to have means: first, to fix the shaft rigidly to handle; and second, to fix the arm firmly to the shaft,—when used

in the original way. To meet the requirements in the other case, both of these points must be freely movable.

Subsequently, the idea of retaining all of the original features was abandoned, as the instrument was thus unnecessarily complicated and further experience with the modified form led me to feel that in the latter, all of the requirements were fully met. An effort was made at first to cut the skull obliquely rather than perpendicularly, in order that, when the operation was completed and the skull flap returned, it would be supported by the bevelled edge of the section and would thus be prevented from becoming displaced inward. With this object in view, in the first model, the clamp at the outer end of the arm in which the saw was secured was arranged so that the latter could be adjusted at any angle

FIG. 1.



desired (see Fig. 1.). After a little experience this feature was omitted, as the perpendicular section is, I believe, in every way satisfactory. The theoretical preference for the formation of a support for the bone flap must be admitted, but I have never observed any tendency of the fragment of bone to become displaced inward, nor do I recall having heard of such a complication.

The drill-pointed pin at the end of the shaft which did not give satisfaction was substituted by a blunt pin, and a separate drill was provided.

The various parts of the instrument are shown in Fig. 2, and are as follows:

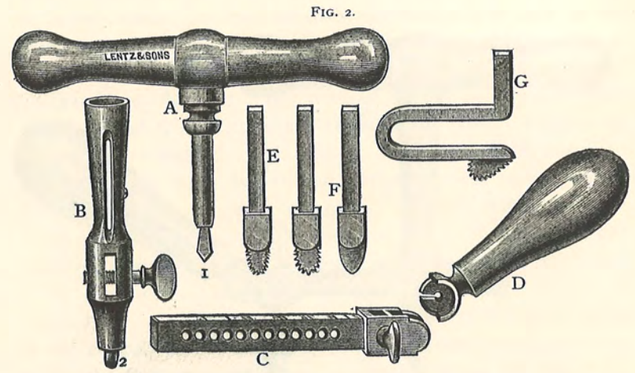
1. A T-handle (A), armed with a bone drill (1).
2. A shaft (B), to which the handle is adjusted, provided

with a fenestra to accommodate the radial arm, and a blunt centre-pin at the end (2). The handle is held to the shaft by a spring, but is instantly released by slight traction.

3. A radial arm (C) which is received in the fenestra in the shaft, and is secured by a thumb screw. The knife and saw are carried at the outer end of this arm and are held by a set screw.

4. A radial arm handle (D), to be adjusted to the extremity of the arm, and used to give the circular motion to the knife and saw. The arm is graduated in inches and centi-

FIG. 2.



metres so that it may be instantly adjusted to cut an opening of the desired size.

5. Knife and saws (E, F, G).

The saw (G) is designed to cut the base of the bone flap by carefully raising the pericranium and scalp along the proposed saw line. The sawing must be done very deliberately in order not to detach the scalp from the body of the bone flap.

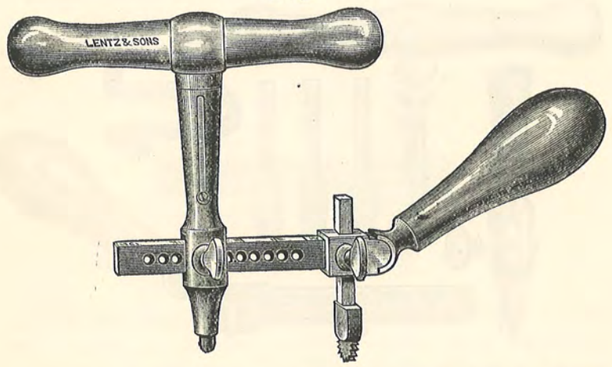
Fig. 3 shows the instrument assembled ready for use.

The operation with this instrument is carried out as follows:

The head is prepared in the usual way. The fissure of Rolando, the fissure of Sylvius, or any intracranial landmark

desired as a guide at the operation should be marked upon the scalp. After the patient is anæsthetized, important points may be scratched with the point of a scalpel and the entire scalp may again be cleansed with alcohol and bichloride solution. The size of the circle required to expose the area of brain which it is desired to inspect, is determined and the central point marked by scratching an " X " on the scalp with the point of a knife. The radial arm should now be adjusted by the scale to cut a circle of the desired size. When all is ready, a half-inch incision is made in the scalp at the central

FIG. 3.



point (X), the handle, carrying the drill, is then removed from the shaft by slight traction, and a hole bored in the skull at the centre of this incision. The drill is prevented from going through and injuring the membranes by a shoulder. The handle is then replaced in the shaft and the knife inserted in the outer end of the arm where it is secured by the set screw. The T-handle is held in the left hand, the arm handle is applied to the end of the arm and held in the right hand, while the pin at the end of the shaft is introduced into the hole bored in the skull. The scalp flap is now cut, down to the bone, usually by a single sweep of the knife, which should

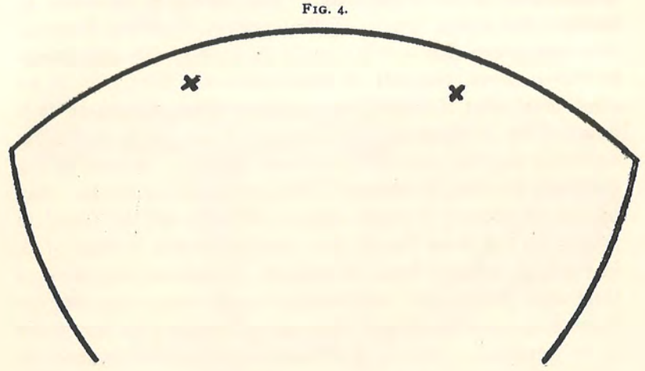
be introduced at the point at which it is desired to begin the incision, and carried around to the point at which it should end, forming two-thirds or three-fourths of a circle. During this manœuvre, as the scalp is freely movable on the skull, an assistant should steady the former and make traction against the pull of the knife, so that the flap shall not be distorted. The knife is then replaced by the saw and the bone cut by moving the saw forward and backward by means of the handle held in the right hand. The saw may be made to traverse the entire length of the incision in either direction with one sweep, but it will usually be found more convenient to cover about one-half of this distance. The saw is so constructed that it cuts equally well in either direction; it is guarded by a shoulder, the blade is scant 3/16 inch long so that it may be used freely without danger of wounding the dura. If the skull is unusually thick at any point the saw may fail to cut entirely through, but no difficulty will be found in prying up the bone flap if two narrow chisels be employed. If the bone has not been cut entirely through at any point, a little edge will be left, which may be cut away with rongeur forceps, or may be allowed to remain to support the flap when it is returned. This support may always be obtained, if desired, by leaving one or more points where the inner table is not entirely sawed through. After the bone section is complete, the base may be sawed through (under the dura) or the bone may be pried up by two chisels, thus breaking the base of the bone flap. No special comment is needed as to the incision in the dura, which is made according to the usual rules.

Two points in connection with the use of the instrument require special mention. First, in placing the radial arm in the shaft, be particular to see that the proper face is uppermost, otherwise the arm handle cannot be adjusted. Second, when sawing the bone, the shaft should be kept perpendicular to the skull, for, if inclined, the saw will be carried in the same direction. After a groove has been cut in the skull, if the saw does not tend to follow this track it will be because the

position of the handle has changed. A very little manipulation will again bring the saw in its proper position.

If a larger exposure of the brain is desired than is afforded by the circular flap a somewhat rectangular flap may be made by cutting the segments of three circles of the required size. Fig. 4 illustrates this idea. The " X's " indicate the three centre points used to form this flap. Many variations in size and shape are possible.

FIG. 4.



I have employed this instrument in a number of cases with very great satisfaction. Its use does not tire the muscles at all, it is easily manipulated by any one, it is absolutely safe, and it cuts rapidly. The whole time required to expose the brain has not been observed, but in a number of instances the time has been taken from the moment I began to saw the bone until the flap of scalp and bone was turned up and the dura exposed. The longest period required was eight minutes, and the shortest, one minute and fifty seconds. The latter was in a man about 35 years of age, the flap being three and one-half inches in diameter. With a little practice this part

of the operation should be done easily in from three to four minutes, the hole for the centre pin may be made in from one-half to one minute and the scalp should be cut in a minute. Thus in the absence of complications the whole operation of opening the skull need not consume more than from five to six minutes. The very short time consumed in the operation results in a marked decrease in the amount of blood lost, and as soon as the flap is raised forceps may be applied or other measures adopted to prevent further hemorrhage from the scalp wound.

Among those for whom I have operated, and who have witnessed the use of this instrument are: Drs. Charles K. Mills, William G. Spiller, M. Howard Fussell, Charles S. Potts, T. H. Weisenberg, J. H. W. Rhein and S. Ross Crothers.

I believe the following claims may be made for this instrument.

1. It enables one to cut an osteoplastic flap of the skull quickly and safely.

2. No injury can possibly be done. The careless or clumsy use of the instrument can do no harm.

3. Every part may be sterilized by boiling.

4. It is always ready for use as there are no complicated parts to get out of order.

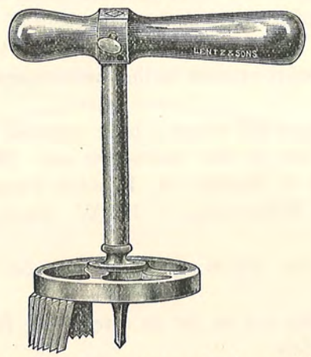
5. It is complete in itself and does not depend upon electric currents, motors, assistants, or anything but the hands of the operator.

DR. JOHN B. ROBERTS said he was very much interested in trephining instruments and had employed Stellwagen's and others. He showed last September at the State Medical Society a device of his own which he thinks is good; the instrument is simply the segment trephine, a modification of the old-fashioned trephine. He has never made use of the Cryer instrument, run by a surgical engine, although he believes it to be one of the best instruments obtained if the power is run by a practised and competent man. It is, however, very much more expensive than most individuals can afford. The price of his modification of the old-fashioned trephine he believes to be only a few dollars.

Dr. Roberts thinks Fetterolf's nasal septum rasp an exceedingly good tool to cut the hinge of the flap made by the segment trephine in osteoplastic resection of the skull.

Dr. Thomas C. Stellwagen (by invitation) said that Dr. Wood had overcome most of the difficulties that the surgeons had

Fig. 1.



in the use of his instrument through his modifications. When this instrument was first used the great trouble was that the pressure was put on the saw; they did not let the saw act with its own weight, and this pried the centrepiece away. Afterwards a plate was made to screw into the bone,

Fig. 2.

which largely overcame the difficulty. This however required extra time and so necessitated a little longer time in the operation. Dr. Stellwagen does not recall in some fourteen cases trephined in which he assisted, any case where there was an injury to the dura. He does not think the dura will be injured if ordinary care is taken in terphining. It may be scratched but he has never seen a case where the dura was cut through. Another advantage of the plate is that it controls hemorrhage from the central portion of the flap and keeps it from being torn from its attachments. In one case which Dr. Stellwagen attempted to

trephine for Dr. Deaver at the German Hospital the hemorrhage was so great that it was necessary to stop.

Dr. Stellwagen said he thought there was one suggestion which might be made regarding Dr. Wood's instrument to make it practical for the average surgeon. Instead of having an ordinary smooth tip to let into the bone, have it screw in, and then it will be held more firmly and will overcome entirely the danger of the point being pulled out. He thought Dr. Wood's objection to the instrument in that it tired the wrist, was a proper one.

Dr. Stellwagen referred to a case in which it took about twenty-eight minutes to get the osteoplastic flap up. He afterwards helped in the autopsy on this case and it took him about one hour to remove the calvarium.

Dr. Stellwagen has seen a good many men try to use the surgical engine, and he thinks unless they are especially trained in its use it is a very dangerous instrument. He does not think the general surgeon has either the time or the inclination to become proficient with such a complicated instrument; it further runs so rapidly that it dulls the sense of touch.

Dr. Stelwagen's own instrument was devised in 1903.

Dr. Charles F. Nassau referred to a demonstration given upon the cadaver before the Academy some years ago by Dr. Hopkins, who used an instrument which in principle was exactly like the one presented by Dr. Wood, except that it was very much larger, and Dr. Hopkins employed a fixation apparatus of different character.

Dr. A. C. Wood, in closing, said in regard to cutting the base of the bone flap, referred to by Dr. Roberts, that he had a model of a saw to fit his instrument for that purpose. Dr. Wood does not employ this method as a rule, but simply fractures the base.

In regard to the instruments run by power, such as the Cryer instrument, Dr. Wood admits that they are very satisfactory when they work well but they have one great disadvantage which must always be borne in mind—they have great power for harm. He believes a great many operators can report a long series of cases without a serious accident, but such accidents do occur. In the circular-saw type, he has heard of the saw breaking loose from the handle and being thrown with great force. If the power instrument while in operation catches a fibre of gauze or other material it may be at once jerked from the hands of the operator who is powerless to control it.