especially for the needs of the nurse which would be exceedingly interesting and stimulating. With such a preliminary training the nurse would approach the practical work in the hospital in an entirely different spirit.

Each hospital cannot possibly give such a preliminary course as has been outlined. Even if it were possible it would not be an economical system. A single plant — the same corps of teachers, the same lecture rooms and laboratories — could provide for a number of different hospitals. It would be an advantage to have several sections with courses beginning and ending at different periods of the year. In this way all the nurses would not be ready to begin their practical work at the same time.

If there were an educational institution to give this preliminary training, the hospitals could require all candidates to furnish a certificate of having taken such a course, and could select the best of those presenting themselves for the hospital positions, just as is now done in the case of house officers.

The nurse's diploma should come from this educational institution, rather than from the hospital. Its award should represent good work in the preliminary course, together with satisfactory service in a hospital in which there was a high standard of nursing.

There appear to be no serious objections to such a system from the point of view of the hospitals. They will be relieved of all instruction except in the practice of nursing. It seems certain also that the hospitals would be supplied with better nurses, and would receive better service. A nurse will more intelligently take up the work of preventing and treating bed sores, if she has already learned something about the cause and formation of bed sores. If she has studied anatomy she can more readily be taught to syringe the ear or pass a rectal tube or catheter. She will more intelligently carry out the practice of asepsis if she has some knowledge of suppuration, and, in some simple experiment which she herself performed, has found suppurative bacteria on her own hands.

The chief gain for the nurse from such a change will of course be that she will have a better preparation for private nursing. Too often a nurse's work deteriorates after a few years' absence from the hospital. It may happen that she spends many months with a single case, during which time her experience amounts to practically nothing. With a knowledge of the *principles* of nursing as a foundation for her training, she will not so easily lose her hold of the work. With a better trained mind her reason will more often come to the aid of her memory in meeting emergencies.

Other changes and reforms in the training of nurses are needed. Dr. Cabot has suggested some of the most important, and the Waltham Training School has many excellent features which should be followed by other schools. Such reforms are sure to come if the training is wholly in the control of an institution whose only object is to secure the best possible education for the nurse.

Any plan to increase the educational features of a nurse's training is sure to be met with the objection, just as in the early days of the trained nurse, that there is danger of a nurse knowing too much and overstepping her position. Experience has shown, however, that increased education does not have that effect. It is a *little* knowledge which is dangerous. Diagnosis and treatment of disease would not be taught the nurse any more than at present. The nurse's broader education will enable her to see her own work and position in truer perspective.

The establishment of such radical changes as have been suggested, for which the co-operation of so many varied interests is necessary, will require great tact and judgment. If, however, all parties concerned have a true interest in securing a better education for the nurse, such a plan could be carried out.

What has been said here is intended only as a criticism of the present *system* of training, and not of the work of those who are engaged in teaching or practising nursing. On the contrary, it is felt that the fine work which is now being done under such adverse conditions is the best indication of the good results to be derived from an education worthy of the profession.

HEMOSTASIS BY COMPRESSION AND HEAT.

BY JOHN W. KEEFE, M.D., PROVIDENCE,

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Further experience with the Downes' electro-thermic angiotribe leads me to think that we may dispense with the use of the ligature; certainly to a great extent, if not wholly. Since November, 1902, I have not used a ligature in the abdominal cases operated upon in my gynecological service. I wish to report in addition to the work published in the Boston Medical and Surgical Journal, Jan. 8, 1903, the following series of cases taken from my service at the St. Joseph's and the Rhode Island Hospitals, in which the electro-thermic angiotribe was used:

Case XII. Celiotomy. Double salpingo-oöphorectomy. Ureters catheterized. Hydrosalpinx and cystic ovaries. Fibroid. Electro-thermic angiotribe. Recovery.

Female, thirty-seven years of age. She has been married fourteen years, and never has been pregnant.

Dec. 27, 1902. Median celiotomy. Both Fallopian tubes were found markedly distended and filled with dark-colored serum. The ovaries had undergone cystic degeneration. Both tubes and ovaries were removed with the aid of Downes' electro-thermic angiotribe, four applications of 45 seconds each being necessary. Catheters were introduced and allowed to remain in the ureters during the operation to serve as guides to locate the ureters. A small pedunculated fibroid was removed with the clamp. Patient made a good recovery.

Case XIII. Celiotomy. Salpingo-oöphorectomy. Ureters catheterized. Electro-thermic angiotribe. Recovery.

Female, single, nineteen years of age. Two years ago the left tube and ovary were removed at another hospital with relief until recently, when severe pain is almost constantly complained of on right side. A painful mass can be felt in right ovarian region.

Jan. 3, 1903. Ether. Median abdominal incision. Catheters passed into ureters and allowed to remain during the operation. The electro-thermic angiotribe

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was made to grasp the broad ligament just below the left tube and ovary and include the ovarian artery. The current of 60 ampères was applied for 50 seconds, the clamp removed and the desiccated strip of tissue three-eighths of an inch wide was cut through with the scissors. The left round ligament was grasped near the uterus with the electro-thermic clamp, and was crushed, cauterized and divided.

The right broad and round ligaments were treated in a similar manner. The bladder was then separated from the uterus and a posterior peritoneal flap made. The electro-thermic clamp was made to grasp the left uterine artery and the current applied for 50 seconds; the uterus cut across, and the right uterine artery treated in a similar manner with a clamp. The desiccated strip left was cut in the center with scissors. The peritoneum was united with a continuous cumol catgut suture. Abdomen closed in layers, cumol catgut in peritoneum, chromicized and cumolized catgut in fascia and subcuticular silver wire in skin. Recovery normal.

CASE XIV. Celiotomy. Right salpingo-oöphorectomy. Appendectomy. Ureters catheterized. Electro-thermic angiotribe. Recovery.

Female, thirty-two years of age; married. Operated upon five years ago, left tube and ovary removed. Severe pain on right side for last six weeks.

Dec. 30, 1902. Celiotomy. Ureters catheterized and catheters left in during the operation. Adhesions broken up. Right tube and ovary, also appendix clamped with electro-thermic angiotribe and removed. Stump of appendix invaginated with silk purse-string suture. Abdomen closed in layers. Recovery uneventful.

CASE XV. Celiotomy. Double salpingo-oöphorectomy. Curettage. Ureters catheterized. Salpingitis. Cystic ovaries. Endometritis. Electro-thermic angiotribe. Recovery.

Female, twenty-five years of age; married; no children or miscarriages; irregular and painful menstruation; pain in right side of pelvis.

Jan. 6, 1903. Celiotomy. Median. Both ovaries and tubes adherent; ovaries cystic. Four applications of the electro-thermic angiotribe, current 60 ampères, left on 45 seconds. Desiccated strip cut through with scissors. Catheters introduced into ureters and remained in during operation. Abdomen closed in layers. Recovery normal.

CASE XVI. Celiotomy. Abdominal hysterectomy. Double salpingo-oöphorectomy; curettage; ureters catheterized. Salpingitis; cystic ovaries. Recovery.

Female, twenty-eight years of age; widow. Has had menorrhagia and severe pain in left side and back. Menstruation irregular; painful flow for ten or fifteen days.

Jan. 10, 1903. Celiotomy. Median. Ureters catheterized. Left allowed to remain during operation. The electro-thermic angiotribe was applied to the left broad, left round, right round and right broad ligaments in rotation, and current turned on for about 50 seconds each. The bladder was separated and a posterior peritoneal flap stripped from the uterus. The left uterine artery was treated with the electro-thermic clamp, the uterus cut across and the right uterine artery served in like manner. A continuous cumol catgut suture united the separated pelvic peritoneum. Abdominal wound closed in layers. Recovery uneventful.

CASE XVII. Celiotomy. Left salpingo-oöphorectomy. Appendectomy. Ureters catheterized; cystic ovary; adherent appendix. Electro-thermic angiotribe. Recovery.

Female, twenty years of age; single. Was in hospital one year ago with inflammation of bowels. Since then has had severe pains in right side of pelvis, worse during past month.

Jan. 20, 1903. Celiotomy. Median. Both ureters catheterized and catheters left *in situ* during operation. Small left ovarian cyst. Removal of cyst of ovary and tube on left side with electro-thermic angiotribe. Appendix adherent throughout its entire length. It was cut free, clamped with the electro-thermic angiotribe and cut across through path of the clamp. Stump inverted and silk purse-string suture inserted in cecum. Abdomen closed in layers. Recovery uneventful.

CASE XVIII. Celiotomy. Appendectomy. Electro-thermic angiotribe. Recovery.

Male, twenty-three years of age; single. First attack four days ago, of general abdominal pain; vomited; rigidity; pain and dulness over McBurney's point. No tumor. Leucocytes, 12,500.

Jan. 23, 1903. Gridiron incision in right iliac region. Slight amount of fluid exudate and local peritonitis. Appendix adherent; distal portion gangrenous but not perforated. Meso appendix and base of appendix treated with electro-thermic angiotribe. Current, 60 ampères applied for 45 seconds. Incision in path of the clamp. Purse-string suture over inverted stump of the appendix. Flushed with saline solution and one cigarette drain inserted; partial closure of wound. Discharged cured, Feb. 26.

CASE XIX. Celiotomy. Appendectomy. General peritonitis. Electro-thermic angiotribe. Recovery.

Male, twenty-one years of age; married. This is his first attack; symptoms commenced three days ago. Pain in abdomen; vomited; chill day before entrance; abdomen distended, rigid and tender on pressure all over. Dulness in flanks. No palpable tumor. Leucocytes, 20,500.

Jan. 24, 1903. Celiotomy. Three-inch incision outer border of rectus. Appendix removed with the electro-thermic angiotribe. Purse-string suture inserted about base of appendix. Intestine shows evidence of general peritonitis, free fluid in abdominal cavity. Flaky, fibrinous exudate on intestine. Cavity flushed with normal salt solution. Six cigarette drains inserted in different parts of abdomen. Intravenous injection of 1,250 cc. salt solution during operation. Partial closure of incision with interrupted silk-worm gut and chromicized cumol gut. Feb. 28 discharged cured.

CASE XX. Vaginal hysterectomy. Right salpingo-oöphorectomy; ureters catheterized. Electro-thermic angiotribe. Fibroid. Recovery.

Female, forty-four years of age; married. Never pregnant. Felt a growing mass in pelvis for many years.

Jan. 27, 1903. *Operation.* Ether. Ureters catheterized to serve as guides. Cervix amputated with cautery knife. Bladder separated from uterus and posterior cul de sac opened. Two applications of the electro-thermic angiotribe on each side, for 45 seconds each. The uterus and right tube and ovary removed by cutting with scissors in path left by angiotribe. The left tube and ovary allowed to remain. Vagina packed with iodoform gauze. Recovery uneventful. Feb. 20, discharged cured.

CASE XXI. Celiotomy. Abdominal hysterectomy. Double salpingo-oöphorectomy. Ureters catheterized. Fibroids. Electro-thermic angiotribe. Recovery.

Female, thirty-nine years of age; widow. Never pregnant. Noticed present trouble five years ago. Metrorrhagia, pelvic pain.

Feb. 3, 1903. Celiotomy Median incision. The electro-thermic angiotribe was applied six times, 50 seconds each, 60 ampères, in the following order: across left ovarian artery and broad ligament; left round ligament, left uterine artery, then a supra-cervical amputation of uterus after separating bladder, then clamp applied to right uterine artery, right round ligament, right ovarian artery and right broad ligament. Peritoneum closed over stump with cumol gut; catheters left in ureters during operation. Wound closed in layers. Recovery uneventful. Discharged March 1 cured.

CASE XXII. Celiotomy. Appendectomy. Acute appendicitis. General peritonitis. Electro-thermic angiotribe. Recovery.

Male, twenty-four years of age; single. Three days ago he was taken with general abdominal pain; vomited; general rigidity and tenderness more marked on right side. Dulness on percussion in right iliac fossa. Leucocytes, 12,500.

Feb. 3, 1903. Celiotomy. Gridiron incision. Fluid exudate; edema of parietal peritoneum. Large perforated and gangrenous appendix removed with the aid of the electro-thermic angiotribe. Mattress silk suture over stump. Abdomen flushed with saline solution. Pus in pelvis and among coils of intestine in general abdominal cavity. Five sterile gauze cigarette drains

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inserted in different directions. Incision partially closed, in layers with chromicized cumol gut. All wicks removed Feb. 14. Discharged March 9, cured.

CASE XXIII. Celiotomy. Appendectomy. Electro-thermic angiotribe. Recovery.

Female, fourteen years of age; single. First attack of appendicitis last Christmas. Chills, pain, vomiting, constipation.

Jan. 20, 1903. Abdominal pain; vomited. At present time systolic murmur at apex and heard in back; tenderness on deep pressure over appendix. Leucocytes, 10,500.

Feb. 9, 1903. Celiotomy. Gridiron incision. Appendix found adherent to cecum, showing evidence of inflammation. Appendix removed with electro-thermic angiotribe, current applied for 45 seconds, cut made in path of angiotribe. Purse-string suture about the stump of appendix. Small cigarette drain left in for three days. Wound partially closed in layers with chromicized cumol gut. March 1, sitting up. Discharged March 8, cured.

CASE XXIV. Celiotomy. Multilocular ovarian cyst. Appendectomy. Recovery.

Female, seventeen years of age; single. Menstruation always irregular, intervals often six months. Abdomen commenced to swell Dec. 15, and has grown gradually larger until it is the size of a full term pregnancy. Flowing more or less during past three weeks. Systolic murmur present.

Feb. 14, 1903. Celiotomy. Median incision. Numerous adhesions of abdominal wall, intestine and appendix to a large multilocular ovarian cyst arising from the left side were separated. Long pedicle clamped across with the electro-thermic angiotribe for 60 seconds. Pedicle severed in the desiccated strip of tissue left by the clamp and tumor removed. Appendix removed with the clamp. Abdomen flushed and left full of normal salt solution. Abdominal wound closed in layers. Exceptionally good recovery. Discharged March 1, 1903.

CASE XXV. Celiotomy. Appendectomy. Interval operation. Recurrent appendicitis. Electro-thermic angiotribe. Recovery.

Female, twenty-five years of age; married. First attack of appendicitis two years ago. Abdominal pain, vomiting, chills, diarrhea. Has had similar attacks, about every four months since. Last attack was last January. At present she has local tenderness over appendix. Leucocytes, 8,500. Appendix palpable.

Feb. 16, 1903. Celiotomy. Gridiron incision. Appendix found adherent to cecum, congested and thickened. Removed with electro-thermic clamp. Purse-string suture inserted about inverted stump. Abdominal wound closed in layers with chromicized cumol gut and subcuticular silver wire. Discharged March 9, cured.

CASE XXVI. Celiotomy. Abdominal hysterectomy. Appendectomy. Ureters catheterized. Double salpingo-oöphorectomy. Fibroid. Recovery.

Female, thirty-six years of age; married. Never pregnant. Severe pelvic pain each month; backache and headache.

Feb. 21, 1903. Celiotomy. Median. Ureters catheterized and catheters allowed to remain during the operation. Multiple fibroids in the uterus found. Broad and round ligaments clamped on each side with the electro-thermic angiotribe and current applied. Bladder separated and clamps applied so as to grasp each uterine artery. Uterus cut across at internal uterine os. Peritoneum united with cumol gut. Appendix removed with the electro-thermic clamp; purse-string of silk about stump. Abdominal wound closed in layers. Recovery rapid. Discharged March 18, 1903, cured.

CASE XXVII. Celiotomy. Removal of Meckel's diverticulum. Death.

Male, seventeen years of age; single. Three years ago ill with severe abdominal pain, most severe to right of umbilicus; vomited; duration five days. Diagnosed by his physician as appendicitis. In good health from then to present time. Three days before entering Rhode Island Hospital was taken with abdominal pain and vomiting. Vomiting has continued; no movement of bowels during last twenty-four hours. Vomitus of dark color and fecal odor. Mental apathy and hebetude. Abdomen uniformly distended, rigid and tender on left as well as right side. Dullness in flanks; no palpable tumor.

Feb. 23, 1903. Celiotomy. Incision outer border right rectus, beginning below level of umbilicus. Intestine found dilated and injected. Cecum with normal appendix presented at the wound. Four feet from ileocecal valve a diverticulum was found arising from the ileum with its upper end attached to the abdominal wall near the umbilicus. This band constricted the gut, producing obstruction. The diverticulum was cut at its attachment to the abdominal wall and clamped with the electro-thrmic angiotribe near its junction with the ileum. The current was applied for 50 seconds, and the diverticulum removed by cutting through the path of the angiotribe. A purse-string suture inserted about the inverted stump of the diverticulum. Abdominal cavity was flushed with normal salt solution. While I was closing the abdominal wound the patient, whose condition was good until now, regurgitated some of the contents of the stomach, which entered the trachea and lungs, producing cyanosis and death in a half hour.

CASE XXVIII. Amputation of leg. Electro-thermic angiotribe. Recovery.

Male, thirty-eight years of age; single. Operated upon by another surgeon for popliteal aneurism by tying the femoral artery in Scarpa's triangle. Gangrene of foot and lower portion of the leg followed.

Feb. 25, 1903. *Operation.* Amputation of the leg at middle third, lateral flap method. Vessels clamped and cauterized with the electro-thermic angiotribe. No ligatures used. Wound suppurated, and is healing by granulation. No secondary hemorrhage.

CASE XXIX. Celiotomy. Appendectomy. Acute appendicitis. Electro-thermic angiotribe. Death.

Male, twenty-four years of age; single. Yesterday morning awoke with abdominal pain, which increased during the day; vomited several times. Pain became localized in right iliac fossa. Leucocytes, 12,500.

Feb. 25, 1903. Celiotomy. Gridiron incision. Appendix firmly bound down with adhesions. Cecal end of appendix distended and contained a concretion; tip gray and gangrenous. Appendix clamped with electro-thermic angiotribe; current applied for 45 seconds. Appendix removed and purse-string suture of silk about stump. Patient seemed to be steadily improving until the evening of March 4; vomited and had some abdominal distress. March 7, died. Autopsy showed intestinal obstructon from adhesions; peritonitis.

CASE XXX. Celiotomy. Appendectomy. Recurrent appendicitis. Electro-thermic angiotribe. Recovery.

Male, thirty-one years of age; single. One year and nine months ago ill with abdominal pain, becoming localized in right iliac fossa; vomited. Five days ago taken with pain, nausea, chills, vomiting. Up and about next day. Examination showed tenderness on deep pressure over McBurney's point. Leucocytes, 10,500.

Feb. 25, 1903. Celiotomy. Gridiron incision over palpable appendix, which was found to be congested and thickened. Mesentery was clamped with electro-thermic angiotribe for 25 seconds and appendix for 35 seconds. Appendix removed by cutting in path of clamp. Purse-string suture of silk over invaginated stump. Abdomen closed in layers with chromicized cumol gut. Silver wire subcutaneously. March 22, discharged, cured.

CASE XXXI. Celiotomy. Appendectomy. Appendicitis. General suppurative peritionitis. Electro-thermic angiotribe. Recovery.

Male, nine years of age. Illness commenced Feb. 21, with chill, pain in abdomen and vomiting. Three days later seemed much better and was up and about. Feb. 26 pain localized in right iliac fossa; another chill. Entered Rhode Island Hospital Feb. 27. Abdomen distended, rigid, tender on pressure all over. Leucocytes, 15,000.

Feb. 27, 1903. Celiotomy. Gridiron incision. Two portions of gangrenous omentum excised. A gangrenous and perforated appendix clamped with the electro-thermic angiotribe; current applied for 40 seconds and appendix removed. Purse-string suture in stump. Three separate pockets of pus evacuated, one in pelvis, one in umbilical region and one in region of the spleen.

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Abdominal cavity flushed out with normal salt solution. Six cigarette drains of sterilized gauze and rubber placed in abdominal cavity in different directions. April 1 still in hospital, but gradually improving.

Case XXXII. Celiotomy. Abdominal hysterectomy. Salpingo-oöphorectomy. Removal of intraligamentary cyst. Ureters catheterized. Appendectomy. Electro-thermic angiotribe. Recovery.

Female, forty-three years of age; single. Abdomen size of an eight months' pregnancy.

March 5, 1903. Celiotomy. Median incision. Ureters catheterized, and both catheters left in ureters during the operation. Large intraligamentary cyst presented; punctured with trochar and some of contents removed. The growth was adherent to uterus and intestine. The broad ligaments were clamped on either side with electro-thermic angiotribe; the round ligaments and uterine arteries were also treated by using the clamp. Uterus cut across at internal os, removing tubes, ovaries, intraligamentary cyst and uterus. Appendix was bound down, elongated, and removed with the aid of the electro-thermic angiotribe. Stump invaginated and purse-string suture applied. Uninterrupted recovery. March 29 discharged, cured.

Case XXXIII. Celiotomy. Appendectomy. Acute appendicitis. Electro-thermic angiotribe. Recovery.

Male, age ten years. March 6 taken sick with abdominal pain and vomited, pain localized in right iliac fossa. Next day was worse; vomited. Entered Rhode Island Hospital March 8. Pain less; abdomen not rigid or distended; no visible or palpable tumor. Some tenderness on deep pressure over McBurney's point. Leucocytes, 15,500.

March, 8 1902. Celiotomy. Small gridiron incision. Appendix found inflamed with a long vascular mesentery. Appendix removed with the aid of the electro-thermic angiotribe. Purse-string suture over invaginated stump. Abdominal wound closed in layers. March 11 developed lobar pneumonia in the right side. March 27 discharged, cured.

Case XXXIV. Celiotomy. Appendectomy. Electro-thermic angiotribe. Recovery.

Female, twenty years of age; single. First attack March 8, 1903. She was taken with pain in lower right abdominal region while at supper. Nausea, but no vomiting. Rigidity, local tenderness, dullness, and mass on palpation. Entered Rhode Island Hospital March 11, 1903.

March 11, 1903. Celiotomy. Gridiron incision. Transversalis fascia and subserous tissues found edematous. Small collection of offensive pus found on opening peritoneal cavity; this was wiped away. A large, perforated appendix was removed with the electro-thermic angiotribe, the current being applied for 50 seconds. The stump was invaginated and covered by inserting apurse-string suture of silk. A fecal concretion the size of a date seed was found free in the peritoneal cavity and removed. Irrigation with normal saline solution and two cigarette drains inserted, one into Douglas' pouch, the other down to stump of appendix. Wound partially closed in layers. Recovery uneventful. Discharged charged April 9.

Case XXXV. Celiotomy. Double salpingo-oöphorectomy. Appendectomy. Ureters catheterized. Recovery.

Female, twenty years of age; single. During the last six years has suffered a great deal from pelvic pain and backache. Profuse, foul discharge from vagina.

March 14, 1903. Celiotomy. Median incision. Ureters catheterized and catheters allowed to remain in ureters during the operation to serve as guides to locate the ureters. The omentum was adherent to the parietal peritoneum, uterus and bladder. Everything in pelvis adherent. Both tubes and ovaries were found diseased, and were removed with the aid of the electro-thermic angiotribe; four applications of 50 seconds each being found necessary. Intra-abdominal shortening of the round ligaments by forming loops in them, held the uterus in good position. The appendix was crushed and cauterized with the electro-thermic angiotribe; it was then excised by cutting through the aseptic path left by the clamp, with no soiling of the peritoneum by the contents of the appendix. Recovery uneventful.

Case XXXVI. Extra-uterine pregnancy. Celiotomy. Left salpingo-oöphorectomy. Appendectomy. Ureters catheterized. Electro-thermic angiotribe. Recovery.

Female, twenty-five years of age; married. She has had three children, last one four months ago; did not nurse child. Two months after last confinement she felt a sharp pain in left side followed by a hemorrhage from the vagina. Flowed more or less during the last six weeks, chills, sweats and rise of temperature. The cervix is soft, uterus enlarged and a mass may be felt in the abdomen extending to within a few inches of the umbilicus.

Feb. 5, 1903. Ether. Incision into posterior cul de sac and drainage through vagina. In one month there was no discharge; patient had greatly improved; mass had become quite small and temperature was normal.

March 23, 1903. Celiotomy. Median incision. Both ureters catheterized and catheters left *in situ* during operation. Dr. Downes of Philadelphia was kind enough to favor us with his method of using the Downes' electro-thermic angiotribe, and in a very dexterous manner removed a ruptured tube on the left side with a diseased ovary. One application of the clamp of about 40 seconds being sufficient.

Dr. Downes then placed the small electro-thermic angiotribe on the base of the appendix, and applied the current for about 30 seconds. A clamp was placed on the dry path left by the clamp, and the portion of the appendix beyond this clamp was removed. The stump was invaginated and a purse-string suture united the peritoneum above it. The abdominal wound was closed in layers. Recovery uneventful.

Case XXXVII. Celiotomy. Appendectomy. Interval operation. Electro-thermic angiotribe. Recovery.

Male, nineteen years of age; single. One year and a half ago he had his first attack of appendicitis. Sudden cramplike pains in lower right abdominal cavity. Nauseated; vomited and perspired freely. In bed three days. Sat up, and he had return of trouble, which lasted a week. March 7, 1903, similar symptoms; in bed four days. Entered Rhode Island Hospital March 21. Tenderness and a small palpable mass may be felt at McBurney's point. Leucocytes, 10,500.

March 23, 1903. Gas-ether. Celiotomy. Gridiron incision. A long, injected and thickened appendix, curled upon itself, was clamped near its junction with the cecum with the Downes' electro-thermic angiotribe, and a current of 60 ampères applied for 45 seconds. An artery clamp was placed on the path left by the angiotribe, and the peritoneum drawn over the stump with a purse-string suture of silk. Abdominal wound closed with cumol and chromicized cumol catgut and sub-cuticular silver wire. Recovery uneventful.

Case XXXVIII. Celiotomy. Appendectomy. Interval operation. Electro-thermic angiotribe. Recovery.

Female, twenty-six years of age; single. First attack of appendicitis last October; ill one week. Abdominal pain; vomiting; pain becoming localized in right iliac fossa, chill and constipation. In December another attack of pain, less severe, vomiting; pain radiated from region of appendix. March 18 the attack commenced from which she is now convalescing. Local tenderness and slight rigidity over region of the appendix. Leucocytes, 8,000.

March 23, 1903. Celiotomy. Incision at outer border of the right rectus muscle. Diseased appendix removed, the electro-thermic angiotribe being used. Stump invaginated and purse-string suture of silk united peritoneum over the stump. Abdominal wound closed with cumol gut in peritoneum, chromicized cumol gut in fascia, and sub-cuticular silver wire in skin. Wound covered with silver foil and an aseptic dressing. Wire removed in ten days. One dressing. Recovery uneventful.

Case XXXIX. Resection of 14 inches of small intestine. End-to-end anastomosis with the aid of the electro-thermic angiotribe. Death.

Incarcerated and strangulated scrotal hernia with peritonitis.

Male, fifty-seven years of age; widower; wheelwright. Entered the Rhode Island Hospital March 27, 1903, with the following history: Fifteen years ago, while lift-

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ing, a hernia appeared in the left inguinal region. He has never worn a truss, and the hernia was reducible until three and one-half weeks ago. At this time he was taken with sharp abdominal pain radiating from site of the hernia; nausea; vomiting. Remained in bed three days and was treated by a physician. Then he went to bed and called another physician, who found the strangulated hernia, which was partially reduced, giving some relief. During the past two weeks he has been nauseated, and vomited almost every day. Last night felt weaker and more prostrated, and the vomiting was continuous and severe. Bowels have moved with the aid of cathartics and enemas. During the past year he was run over by a team and on an another occasion he fell into a trench that was being dug for a sewer. These accidents shook him up considerably, and he has been failing in his general health, having lost about twenty pounds.

Physical examination.— Poorly nourished. Anxious expression. Intermittent and weak pulse. Slight diffuse tenderness over abdomen. A hard tense scrotal hernia is found on the left side about the size of an orange. It feels almost cartilaginous in consistency, and is dull on percussion. *Diagnosis.* — Incarcerated and strangulated hernia.

March 27, 1903, 8.30 P.M. *Operation.*— Under cocaine anesthesia. Infiltration method in skin, Schleich's solution 1 to 1,000. Patient did not seem to feel incision through skin and internal oblique muscle. A 4% solution of cocaine was then injected into the ilio-hypogastric nerve, and the cord and sac with its contents isolated from the inguinal canal. This procedure caused the patient quite a little pain, although two members of the house staff engaged the patient in conversation during the operation and a sheet hid the field of operation from the patient. The sac was opened after isolating the cord and found to contain a coil of intestine, portions of which were chocolate colored. The coils in the scrotum were adherent to each other and to the lining of the sac, and the most dependent portion of this mass was gangrenous and surrounded by about a drachm of pus. To free the adherent coils from each other was impossible, as they were firmly bound together with old adhesions and formed one solid mass. Some of the intestine in the abdomen was drawn through the wound into the inguinal canal, a resection of 14 inches of the intestine made with the aid of the electro-thermic angiotribe. I carried out the method which I had previously practiced with success on a number of dogs.

A dog which is still alive and in good condition, although he has been operated upon twice, four inches of the intestine having been removed on one occasion and five on the other, with the aid of the electro-thermic angiotribe, followed by end-to-end anastomosis. The three-eighths electro-thermic angiotribe was placed on the intestine at a right angle to its long axis, and the current of 60 ampères applied for one minute. On removal the desiccated strip remaining was clamped by two straight forceps, to guard against leakage should there happen to be a faulty technique, and was cut between the forceps. A similar procedure was carried out on the intestine 14 inches beyond. The mesentery attached to the partially excised portion of intestine was clamped in three sections, the current being applied about 45 seconds each time, and the diseased intestine removed by cutting through the dry path left by the clamp.

The patient seemed to suffer very little pain during these manipulations, although no cocaine was applied to the intestine, and yet when I placed the sutures in the skin to close the wound he complained considerably with the entrance of each stitch. The ends of the intestine were now placed in apposition, and a loop stitch of silk joined the intestine near the mesentery. Two Lembert sutures were then placed in the ends of the intestine, thus dividing the circumference of the gut into thirds. Then a Cushing right-angle suture approximated the peritoneum of the ends of the intestine. This was followed by a similar suture over the last, which was an extra safeguard against leakage. Two Cushing sutures now approximated the rent in the mesentery. The intestine was now rendered patulous by invaginating the gut with the finger near the site of union, using sufficient force to separate the desiccated strip left by the angiotribe. Gas and feces could be pressed through the united ends with no leakage. The gut was dropped into the abdominal cavity, and the wound closed as in the Bassini operation. Silk sutures were used in the intestine. The patient received several drachms of whiskey during the operation, and seemed in fair condition at the close. During the next two days he vomited at intervals and complained little of pain. Bowels moved freely. Four days and one-half after the operation he died. During the last twenty-four hours he had not vomited, and had a dozen bowel movements. A partial autopsy showed good union about the site of the anastomosis; no gas or intestinal contents could be pressed through the bond of union. There was general peritonitis due to a continuance of the peritonitis present at the time of the operation or an infection by contamination with the pus present in the lower part of the excised portion. The operation proved the worth of cocaine in an extensive abdominal operation and the value of the electro-thermic angiotribe, there being no leakage of the intestinal contents during the operation.

CASE XL. Amputation of thigh. Electro-thermic hemostasis of vessels. No ligatures used.

Male, fifty-three years of age; widower; oyster-opener. Was run over by a freight train and the right leg almost crushed off just below the knee with a fracture at the middle and lower thirds of the femur, with a crushing of the soft parts of the lower part of the thigh.

March 31, 1903. Operation. Ether. Amputation just below the middle of the thigh, by the circular, musculo-cutaneous flap method was made. The femoral artery and vein was grasped at the same time with the Downes' electro-thermic angiotribe, and the current applied for 50 seconds. Later there being some oozing into the vicinity of eschar, these vessels were again crushed and cauterized, leaving the current on for the same length of time. Several other vessels were crushed and cauterized with the electro-thermic angiotribe. No ligatures were used. Wound closed with silk-worm gut. Cigarette drain. Intravenous saline solution during operation. Recovery.

CASE XLI. Varicocele. Electro-thermic angiotribe. Recovery.

Male, eighteen years of age; single. Entered the Rhode Island Hospital March 30, complaining of varicocele.

April 1, 1903. Operation. Gas-ether. Incision over cord on left side, veins isolated, crushed and cauterized with the electro-thermic angiotribe. Wound closed with catgut sutures. Recovery.

CASE XLII. Nephrectomy. Pyelonephritis. Downes' electro-thermic angiotribe. Recovery.

Female, married, thirty-five years of age. In June, 1900, a surgeon did an exploratory celiotomy and found distended left kidney, which was drained by an incision in the left lumbar region, pus and urine being discharged. In October she was operated upon by another surgeon, and again in January, 1901, by still another, incision being made into the kidney. Entered the Rhode Island Hospital March 25, 1903. Has had pus and urine discharging more or less ever since last operation; when sinus closes there is considerable pain until it opens again.

March 27, under cocaine anesthesia I catheterized the right ureter with the patient in the Trendelenburg position, using a modified Kelly's cystoscope with small electric light in the bladder. Right kidney not diseased

April 1, 1903. Chloroform anesthesia. Catheter placed in left ureter as a guide. Left lumbar incision and removal of kidney with its pelvis enormously dilated, and but a small portion of the cortex at one pole remaining. Three applications of the electro-thermic angiotribe closed all bleeding points. The kidney was raised from its bed with difficulty on account of its shape and its intimate relation by adhesions with the surrounding parts. The wound was partially closed and two wicks of gauze introduced. April 8. The patient has done well since the operation, and has averaged 50 ounces of urine each day.

CASE XLIII. Celiotomy. Abdominal hysterectomy. Double salpingo-oöphorectomy. Appendectomy. Ureters catheterized. Recovery.

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Female, age thirty; married. One child and one still-birth, the latter eight years ago. Present trouble dates back five years. Pelvic pain, headache, backache; yellowish vaginal discharge; metrorrhagia. Pain more severe on right side.

April 1, 1903. Celiotomy. Pus tube and ovarian cysts on both sides. Many adhesions. A pan-hysterectomy and appendectomy was performed without the use of ligatures, the electro-thermic angiotribe checking the hemorrhage with six applications of 45 seconds each. The right ureter was catheterized and the catheter left in as a guide during the operation. April 12, patient in good condition.

CASE XLIV. Celiotomy. Abdominal hysterectomy. Salpingo-oöphorectomy. Fibroids. Appendectomy. Ureters catheterized. Electro-thermic angiotribe. Recovery.

Female, twenty-nine years of age; married. One year and nine months ago, following the birth of a child, the attending physician found uterine fibroids.

April 2, 1903. Celiotomy. Large fibroid extending above the umbilicus presented. Removed with the aid of the electro-thermic angiotrobe, clamping in the following order: The right ovarian artery, left ovarian artery, right round ligament, left round ligament, right uterine artery, left uterine artery, and supra-cervical amputation of the uterus. Ureters were catheterized, the catheters being left in place during the operation to serve as guides. Appendix also removed with the aid of the electro-thermic angiotribe. Stump inverted and purse-string suture placed over the stump. Recovery uneventful.

CASE XLV. Celiotomy. Appendectomy. Electro-thermic angiotribe. Recovery.

Female, age twenty-six; single. She was taken ill, in this her first attack, at two o'clock this morning, with general abdominal pain, which increased in intensity, until partially relieved by morphia. By 8 A.M. pain was localized in the right iliac region Nausea. Examination shows local tenderness over McBurney's point; no rigidity or mass on palpation. Leucocytes, 16,000.

April 3, 1903. Gas-ether anesthesia. Celiotomy. Gridiron incision. Cecum with appendix rolled out of the wound without a finger having entered the abdominal cavity. The appendix and mesentery were grasped in a single bite by the electro-thermic angiotribe, and the current applied for 45 seconds. The appendix was removed by cutting through the path left by the angiotribe. The stump invaginated, and a purse-string suture placed above it. The abdominal wound was closed in layers. Recovery uneventful.

CASE XLVI. Celiotomy. Appendectomy. Electro-thermic angiotribe. Recovery.

Female, thirty-one years of age; single. She had an attack of appendicitis last summer. Present illness commenced three days ago; general abdominal pain, headache, constipation, and has vomited each day since. Temperature 104, pulse 120. Abdomen distended, localized tenderness on pressure over McBurney's point. No muscular rigidity.

April 4, 1903. Celiotomy. Gridiron incision. Cecum picked up with the thumb forceps and drawn out of the wound, the appendix following. A large inflamed appendix on the verge of perforation was clamped near its base with the electro-thermic angiotribe, the current being applied for 45 seconds, and the appendix removed by cutting in the path of the clamp. The stump was invaginated and covered by placing a purse-string suture above it. Recovery uneventful.

CASE XLVII. Celiotomy. Appendectomy. Electro-thermic angiotribe. Recovery.

Male, eighteen years of age; single. He has had seven attacks of appendicitis since last July, three of which were within the last five weeks. General abdominal pain becoming localized in the right iliac fossa. Vomited with each attack.

April 9, 1903. Celiotomy. Gridiron incision. The appendix was found inflamed, thickened, and adherent to the cecum throughout its length. It was clamped across near its base with the electro-thermic angiotribe and removed by cutting through the path of the clamp. The stump was inverted and the peritoneum brought together with a purse-string suture of silk. Drain left in for two days. Wound closed in layers. Recovery.

CASE XLVIII. Celiotomy. Appendectomy. Electro-thermic angiotribe. Recovery.

Male, age twenty years; single. Three weeks ago was taken with pain in the abdomen radiating to the right iliac fossa; vomited. Symptoms have gradually lessened until at the present time there is slight tenderness over the region of the appendix.

April 10, 1903. Celiotomy. Gridiron incision and cecum presented, and with the aid of the forceps was drawn outside, the appendix following. A large inflamed appendix was removed with the aid of the electro-thermic angiotribe. The stump was invaginated and the peritoneum above approximated with a purse-string suture. The forceps was the only thing that entered the abdominal cavity during the operation. The wound was closed in layers with chromicized and cumolized gut for the muscles and silver subcuticular suture for the skin. Recovery uneventful.

CASE XLIX. Celiotomy. Appendectomy. Electro-thermic angiotribe. Recovery.

Male, married; thirty-six years of age. Has had indigestion during the last ten years and twenty-two attacks of appendicitis, covering a period of five years. The last attack was two years ago. Symptoms during these attacks are sharp pain across abdomen, later becoming localized in right iliac fossa; nausea; vomiting and constipation.

April 21, 1903. Celiotomy. Gridiron incision in right iliac region. Cecum withdrawn from abdomen followed by the appendix. Downes' electro-thermic clamp applied, including base of appendix with its mesentery. The current was turned on for 45 seconds, and the appendix removed by cutting through compressed area. Purse-string suture about base of appendix, invaginating stump. Wound closed in layers. Ten days later dressing applied at operation removed and silver wire suture withdrawn. Primary union. Two weeks from operation walking about his room.

CASE L. Celiotomy. Appendectomy. Removal cyst. Catheterization of ureters. Electro-thermic angiotribe. Recovery.

Female, twenty years of age; single, mill-hand. Menses at thirteen, always regular, lasting three to five days. Some pain three days before flow. Menstruated last two weeks ago. Present trouble began one and a half years ago with swelling of abdomen. This tumor has gradually increased in size. Little pain except occasional backache. *Physical examination.*—Well nourished, heart and lungs normal. Abdominal tumor present rising gradually from pubes and sloping gradually to ensiform. On palpation tumor is very tense and elastic. Percussion is flat except in flanks. Percussion wave present. Tumor is freely movable except in right side of pelvis, where it is apparently attached. By vaginal examination the uterus could not be definitely made out on account of the tumor, but there is a small mass felt in the posterior cul-de-sac, apparently the fundus of the uterus.

April 23, 1903. Celiotomy. Incision in median line. Large cyst of right ovary filling whole abdominal cavity. Cyst had a long pedicle, which was clamped across with the electro-thermic angiotribe and cut away, after evacuating the contents of cyst through a canula. Clamp was left on 55 seconds. Left ovary cystic, and plastic work done on this. Sutured with cumol gut. Appendix was swollen and injected. It was clamped across with one bite of clamp and removed. Stump invaginated with purse string of silk and reinforced with a second one. Abdominal incision closed with cumol gut in peritoneum, chromicized cumol gut in fascia and silver wire subcutaneously. Recovery uneventful.

This report completes a series of fifty cases in which the electro-thermic angiotribe was used: Forty-five celiotomies, 13 abdominal hysterectomies, 2 salpingo-oöphorectomies, 28 appendectomies, 2 ovarian cysts, 1 resection of intestine, 1 nephrectomy, 1 amputation of thigh, 1 amputation of leg, 1 varicocele, 2 hemorrhoids, 1 removal

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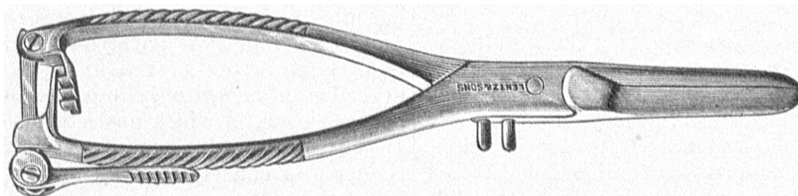
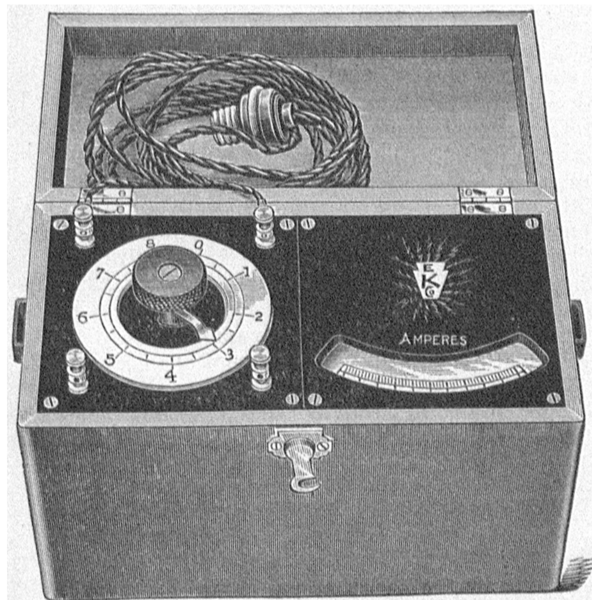
of Meckel's diverticulum, 1 ruptured tubal pregnancy, 2 vaginal hysterectomies.

Although pressure and heat have been used for more than a quarter of a century for preventing hemorrhage, the methods heretofore employed for this purpose were in the developmental stage and in consequence were but seldom employed. Baker Brown, in 1862, heated a heavy clamp by the aid of the actual cautery, until the pedicle of an ovarian tumor was rendered dry and bloodless. His results even in this pre-aseptic period were better than his confrères', which may have been due in part to this method.

The instrument perfected by Downes, known as the electro-thermic angiotribe, is unquestionably of practical value, as shown by the results in the foregoing cases, no secondary hemorrhage having taken place. The femoral was clamped in a thigh amputation and the anterior and posterior tibials in an amputation of the leg. In an operation upon a dog I clamped the femoral and applied the current until the vessel parted, having been completely charred; yet no hemorrhage or edema followed. I performed complete gastrectomy on a dog and found the method, with the use of the proper electro-thermic angiotribe, of marked improvement over the usual technique. I also found the clamp useful doing a gastro-enterostomy. The fold in the stomach of the proper size is grasped with the electro-thermic angiotribe and pressure and heat applied. A similar process is carried out on a fold of the intestine at the desired point of union. Sutures passed one-fourth of an inch beyond the cauterized areas unite the stomach and bowel. The compressed area will slough in from 30 to 36 hours, as shown by actual experience with dogs.



ELECTRIC ANGIOTRIBE.



DIRECT CURRENT TRANSFORMER.

The most interesting case to me was the resection of fourteen inches of the intestine on a man; following numerous experiments on dogs. The ease with which we may resect the bowel, and the perfect asepsis assured by the use of the electro-thermic angiotribe, is certain to eliminate the mechanical appliances now in use for this purpose. The wide range of usefulness of this instrument renders a surgical outfit incomplete without it.

The advantages of the use of the electro-thermic angiotribe are: the exclusion of the ligature; hemostasis *en masse* or of isolated blood vessels; aseptic gastrectomy; gastro-enterostomy and resection of intestine; appendectomy; salpingectomy; extrusion of septic material during operation being rendered impossible; sterile occlusion of the Fallopian tube; absence of irritable and painful stumps; less tendency to post-operative adhesions; rapidity of operation; no secondary hemorrhage from slipping of ligatures, or suppurating sinuses due to ligatures; less pain subsequent to operation, and there is no puckering or dragging on the tissues; value in removal of cancer as there can be no danger of inoculation, with cancerous material during the operation, and the heat destroys the cancer cells beyond the point of application of the clamps.

POLIENCEPHALOMYELITIS AND ALLIED CONDITIONS.

BY E. W. TAYLOR, M.D., BOSTON.

From the Neurological Department, Massachusetts General Hospital.

(Concluded from No. 24, page 638.)

The term "inflammation" as applied to affections of the nervous system has led to the same confusion as in other organs. It is well for practical purposes to limit its meaning to the exudative phenomena produced by an irritant acting temporarily, with accompanying signs of general infection, and thereby to distinguish lesions which may be called inflammatory from others in which these phenomena are not present. For example, in the present state of our knowledge we shall not be very far wrong in making a sharp distinction between degenerative affections of chronic, continuous course like progressive muscular atrophy, with its accompanying bulbar manifestations and diseases of acute onset, ending in death, or in partial or even complete recovery, such as poliomyelitis or polienccphalitis. It is safe to assume that the causes which lead to degenerative

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