not apparently wound the body in the natural or healthy condition. Another reason for this exemption from injury in the application of these strong currents is the precautions taken in using large electrodes or poles when applying them to the body. As the strength of the current is to a certain extent in proportion to the square surface of the electrodes or poles if, for example, we apply a certain strength of current to an electrode one square inch in area, by increasing the area of the electrode to one hundred square inches we give the current one hundred times as strong with little more disturbance of the parts than when employing the weaker current. In order to prevent injury to the external parts of the body the external electrode is covered with wetted clay, cloth, flannel, wet sponges, etc. The negative pole is usually placed in contact with the tumor and the positive pole on the outer surface of the body adjacent to the tumor or inserted into the substance of the tumor. The positive pole, you will remember, is always the one by which the electric current leaves the battery, and the negative pole the one by which it reënters it. The positive pole has very powerful properties in arresting hæmorrhage from tumors, and hence is frequently applied in that class of cases with very beneficial results.

Dr. Alfred C. Garrett, of Boston, reported to the Ninth International Medical Congress, recently held in Washington, 184 tumors of the breast treated by galvanism, from 1864 to the present time, in his practice. One hundred and fifty-seven of these were cured and disappeared entirely. Several others did not become quite obliterated and a small lump remained that gave no inconvenience. In every case the tumor disappeared or became harmless. He also recommends the use of soft, large poles with currents of from 10 to 50 milliampères.

Dr. Ephraim Cutter reports 400 cases of fibroid tumors treated by electricity, with the greater portion relieved. Dr. F. H. Martin, of Chicago, read a very interesting paper upon the electrical treatment of fibroid tumors, before the Gynecological Section of the Ninth International Medical Congress, and enumerates the following advantages of this method of treatment, viz.:

1. It is entirely free from danger.
2. It is absolutely painless.
3. It invariably checks hæmorrhage.
4. It rapidly reduces the size of tumors.
5. It relieves neuralgic pains.
6. It admits of exact dosage, so that we know exactly how strong a current we are using.

Dr. R. Newman, of New York, reported to the Section on Surgery, American Medical Association, which met in Chicago, June, 1887, his record of 100 cases of stricture, making 200 in all, which have been cured by the galvanic current. The concurrent testimony given, and which might be largely augmented if necessary, shows clearly that we have in galvanic electricity a most potent remedial agent, which is to revolutionize some of the branches of the healing art.

I have mentioned several times the words *ampère* and *milliampère*, and it may be necessary in explana-

tion to state that the ampère is the measure of the strength in intensity of the galvanic current. Let us imagine the galvanic current flowing along the wires connecting the poles like the flow of water in a river. As the water flows along the banks with greater or less friction, the rapidity of the current is retarded or accelerated; just so with the galvanic current. It is retarded in its progress more or less, and this resistance to the current we can measure. The unit of resistance, or rather rate of velocity, is called the *ohm*, from the celebrated scientist, and is composed of a column of mercury one square millimetre in section and 106 centimetres in length. The unit of the intensity of the current is the ampère, from the name of the distinguished French electro-physicist.

To give this concrete expression, it may be stated that an ampère represents the quantity of galvanic electricity generated by the unit of electro-motor force, the volt circulating in a conductor having the unit of resistance the ohm, during the unit of time. The volt is the measure of pressure or difference of potential of the current. It has been ascertained practically that this is the quantity of electricity furnished by a Daniels' battery. Having now obtained a standard, namely, the ampère, we can measure the intensity of our electric current just as accurately and almost as easily as we can measure a distance upon the earth by the use of the English yard or the French metre. The instrument by which this is done I now show you, and it is called the milliamperemètre. As its name implies, it is a measure of the intensity of the electric current, and enables us to know just as exactly the dose of galvanic electricity we are administering as we know the dose of medicine we are giving to a patient. It is capable of measuring from one-tenth of a milliampère to 500 milliampères, and is destined to do as much for the application of electricity to medicine as the use of the clinical thermometer has done in accurately determining the amount of fever present in a patient.

PAPILLOMATOUS CYSTIC TUMOR OF OVARY, WITH A HERNIAL POUCH DEVELOPED IN THE CICA- TRIX OF THE ABDOMINAL WOUND FROM A FORMER OVARIOTOMY.

Read before the St. Louis Medical Society, March 10, 1888,

BY L. H. LAIDLEY, M.D.,

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Mrs. C., æt. 39, American, married, had one child which is now eight years old, gave the following history: She was of healthy parents, menstruated at 14 years, was a healthy girl, married at 22. Eight years ago she had an ovarian tumor removed from the left side (it was a large, multilocular, benign ovarian tumor). One year after the operation she was delivered of a child at full term. The recent operation and the pregnancy developed a large hernial pouch, which allowed the bowels to protrude, forming a tumor as large as a child's head at full

period. No instrument could be made to keep the hernia in position, and for the past two years she was confined to the house. Eleven months prior to my first visit another tumor made its appearance, beginning in the right iliac region; it developed rapidly, occupying a position on the right side which could readily be felt through the hernial sac. Five months after its first appearance a "magnetic doctor" was allowed to treat the case, which he did by "the laying on of hands," in this case rather roughly, as the results will show. This doctor claimed "to coax the fluid out through the Fallopian tubes." When the tumor was pressed upon the patient noticed a great rush of water with blood from the vagina. This was repeated some time afterwards with the same results, the tumor almost disappearing.

I was called last November, and found a deplorable state of general health; anæmic, appetite poor, and patient so weak that she could not go from her chair to the bed without considerable fatigue. She had a distinct mitral bruit, weak and rapid pulse, temperature 100° F. I continued to visit her for one month, feeding and administering medicines to build her up. She urged an early operation. An examination of the abdomen revealed a tumor in the right iliac region as large as the head of a child at full period, which was fluctuating, movable, and easily defined by percussion. The uterus was plainly felt through the hernial pouch, separate from the tumor. Change of position did not influence its shape. No œdema of lower extremities, nor abdominal dropsy. Examination *per vaginam* showed a violent vaginitis with an opening through the floor of Douglas' cul-de-sac, which allowed the passage of a sound in the direction of the base of the tumor. A fluid escaped through the opening; pressure on the tumor increased the flow. That which escaped was white in color and mixed with blood. The amount of flow a day was estimated by the patient to be one pint. Diagnosis: Cystic tumor of right ovary, probably unilocular, with fistulous opening into vagina.

An operation was performed December 6, with every antiseptic precaution, assisted by Profs. Coles and Graves, and members of the senior class of the Beaumont Hospital Medical College. An elliptic incision was made over the site of the tumor, at least seven inches in length, the tumor exposed and the fluid drawn off, which was the same that flowed from the opening into the vagina. There was only one adhesion to the tumor; that of the extremity of the appendix vermiformis. This was torn off with the finger nail, and the end cauterized, completely controlling hæmorrhage. (Greig Smith reports his having to remove the entire organ without serious results.) The tumor was lifted from its broad base, which was transfixed at its attachments to the floor of the pelvis, the ligature tied, and all that remained of the sac charred with a hot iron. Another ligature was placed below, and entirely around the pedicle, so as to close any opening that might exist with the fistula leading to the vagina.

Attention was now given to the hernial sac. Before operating the line of incision was mapped out with iodine so as to remove all the pouch, and at the

same time be able to approximate the walls. The measurements before operation were seven inches by four and a half inches; a portion of the mesentery was attached to the cicatrix of the old wound, and it was ligated, cut and returned to the abdomen. The cavity was thoroughly cleansed of blood, the edges of the wound (closed with sutures less than one-half inch apart) were made to coaptate accurately, a drainage-tube was placed in the lower angle of the wound, the parts dressed antiseptically, and the patient put to bed. Reaction was complete within two hours, and for the first time since November her temperature was less than 100° F. A most aggravating nausea, which would not yield to any of the prescribed remedies, necessitated feeding per rectum from the first day. The temperature range for the first twenty-four hours was 99° to 99.8° , pulse 72 to 80. She did not sleep more than one-half hour during the night. On the second day the temperature continued less than 100° until 9 P.M., when it rapidly rose to 103.8° ; the pulse was rapid and weak, a dusky hue of the face was present with constant nausea, which forbade anything remaining in the stomach.

Papillomatous cystic tumor of ovary.

Believing that I had an incipient peritonitis to deal with, I ordered calomel, grs. iijss, placed upon the tongue, which was the first retained since the operation. I continued the dose every half hour until ten grains was used, when I gave every hour mag. sulph. grs. xx—two doses were given. At 2 A.M. the next morning, by the use of a rectal tube, a half pint of thin fecal matter was expelled, which was followed by an enema, and the bowels thor-

oughly cleaned out; flatus for the first time began to pass; the patient became free from pain and slept for six hours. The temperature went down to 99.6°. From this time she retained food, and showed nothing unusual in the progress of the case. On the seventh day the stitches were all removed (the tube having been removed on the fifth day) showing the walls had united by first intention. A well-fitting truss, made from the cast of the abdomen, was adjusted four weeks later, which allowed the patient to go about the room with comfort. Examined three months later, she was much improved in health, the fistulous opening into the vagina had closed, and the operation had proven entirely satisfactory. I submitted the tumor for examination to Dr. Adolf Alt, who said it was of the papillomatous form.

Hernial pouch, showing shallow secondary pouches in peritoneum.

Coblenz believes that when ovarian tumors show a papillomatous development they invariably arise at the hilum of the ovary; this form is the most common affecting these organs, and like villous growths elsewhere is not always malignant. In the malignant form papillary growths will be found in patches upon adjacent structures, or else the womb and broad ligaments are also involved in one cauliflower-like tumor. Tait observes that he has had two cases of ovariectomy in which he left large masses of papilloma attached to the womb, yet in each case these masses wholly disappeared and the patients are both in perfect health. If this is true, may we not hope that this specimen is a benign tumor?

This tumor was roughly handled five months be-

fore the operation, causing the fistulous opening. May we not conclude, if it is true, as Tait and Bankton claim, that tapping hastens degeneration, and after an accidental rupture of such a cyst the peritoneum will be found studded with patches of papillary cancer (hence they argue that ovarian tumors should never be tapped and that they should be removed in their earliest stages before any malignant transformations have taken place), that had this tumor been removed entire at the time it was injured, there would be no question that it would not return?

Grand and Washington Aves.

SIMULTANEOUS TRIPLE AMPUTATION FOR RAILWAY INJURY, WITH REMARKS ON THE TECHNIQUE OF MULTIPLE AMPUTATION.

Remarks before the College of Physicians of Philadelphia, March 7, 1888.

BY JOHN ASHHURST, JR., M.D.,

PROFESSOR OF SURGERY IN THE UNIVERSITY OF PENNSYLVANIA; SURGEON TO THE UNIVERSITY HOSPITAL.

This patient is brought before the College largely on account of the rareness of simultaneous triple major amputations. It is quite possible that some of the Fellows may not have had an opportunity of seeing such a case.

The patient is a Moor, 20 years of age. He was admitted to the University Hospital November 28, 1887, having been run over on the Pennsylvania Railroad. I saw him within two hours after his admission. I found a compound comminuted fracture of the right leg, the laceration extending above the knee; complete avulsion of the left leg, the limb having been torn off in its lower third; and a compound fracture of a severe character of the right hand and wrist. There was also a compound fracture of the skull, involving the frontal bone. This, however, was an impacted fracture, of course without much depression, and did not require interference. In addition to these injuries there were numerous brush-burns and contusions, some of a grave character. One upon the left buttock was so severe that the separation of the slough left a cavity fully two inches in depth. Notwithstanding these serious injuries, the patient's general condition was very good; he had reacted thoroughly, and his axillary temperature was 99° F. Under these circumstances I felt justified in proceeding to the immediate removal of the injured limbs, and amputated successively the right thigh by the antero-posterior flap method; the left leg, about its middle, by a modified Sédillot's external flap operation, the modification consisting in making both flaps from without inward, instead of cutting the external flap by transfixion; and the right forearm by an oval incision, making use of the uninjured skin of the back of the hand and wrist. Certain variations from the ordinary procedure in amputations I shall refer to when I come to speak of what I have ventured to term the technique of multiple amputations. After the operations were completed, the temperature had fallen only to 98° F. The patient had no bad symptom and rapidly recovered, and as you