anæmic and easily fatigued. The former complained of numbness, amounting at times almost to loss of sensation in both arms and general muscular weakness, especially in the forearms. Her daughter was still more anæmic and poorly nourished, although having a good appetite. For a long time she had been subject to severe muscular cramps of short duration and sudden onset, affecting mostly the calves, but often, also, the muscles of the trunk. After taking iodide of potash, the mother's urine was analyzed and found to contain a small amount of lead. The daughter's urine contained much lead, also a slight trace of albumen, and a few hyaline casts.

The elder daughter was well nourished and of fairly good color. For several years she had suffered from severe attacks of abdominal colic, attended often with vomiting and diarrhœa, and followed by constipation. These attacks were constantly becoming more frequent and severe in spite of medicine to regulate the bowels and the most careful attention to diet. Her urine was not examined. These three persons were all put on iodide of potash and spring water, with the result of gradual, but complete, disappearance of the above symptoms.

The family on Ash Street, likewise, consisted of a lady and two adult daughters. Although not under the writer's care, he has learned that the daughters have never been strong and well. They are both very anæmic, suffer from constipation, frequent headaches and occasional colic. There is nothing in their habits of life to explain these symptoms. The mother complains only of chronic bronchitis. The urine could not be obtained for examination in this group of cases.

Although these notes are quite incomplete, it is hoped that they will direct attention more strongly to the frequency with which lead is found in common drinking-water, the difficulty of getting the pipes clear of it and the dangers which are liable to follow from drinking-water as ordinarily drawn.

SOME CLINICAL NOTES ON THE WORK OF M. APOSTOLI.

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As the work of M. Apostoli has been a source of so much general interest in the last few years, it does not seem amiss to introduce the following clinical notes by a short account of the immediate conditions, under which he conducts his methods.

We find Apostoli busy at the examining table; his assistant taking histories at a desk, and a capable woman attendant watching and reporting the galvanometer and turning the electric current on or off, as she is ordered. On the presentation of a visiting card, Apostoli says some word of welcome which puts us at our ease at once, and we join the group of six or eight interested observers, about the table. Apostoli invites us to examine all the new cases and, from time to time, the older ones of special interest. He calls on his assistant for the various histories, and puts us in rapport with his cases, explains his methods to the newcomers, and answers questions with patience and courtesy. He begins his afternoon clinic somewhat before three and rarely closes before six. A constant attendance of three times a week for several months, affords an insight into his cases and the results of his

now celebrated methods. Apostoli's face and bearing denote the hard worker. His dignified manner to the patients, his conscientious attention to the minute details in his treatment, the extreme care with which he notes the symptoms and the success or failure of his applications, inspire the observer with confidence in the man and his devotion to his work. The cases that present themselves for treatment are chiefly those of metritis, following subinvolution, hæmorrhagic endometritis, prolapsed ovaries and tubes, and fibroid tumors; also, cases of hysterical ovarian pain, and occasionally something more unusual.

The statement that this wide range of pathological conditions can be successfully treated by electricity must presuppose first, a careful investigation of the requirements in each individual case, and second, a thorough understanding of M. Apostoli's methods and the many delicate variations with which he adapts them to different conditions. To understand when to apply the positive pole and when the negative, when the carbon and when the platinum electrode, when to faradize and when to galvanize, when the long, fine wire should be used and when the short, coarse one, cannot be acquired in one visit to his clinic, or explained within the limits of one paper.

So much has already been written by, and about, Apostoli, that the medical public is too well acquainted with his instruments to require more than a passing mention of them. The abdominal electrode is of potter's clay, twelve inches long, by eight broad, and one and a half thick, well moistened and enveloped in a layer of tarlatan which keeps it from falling apart. The flat, tin plate with rheophore well soldered to it, is imbedded in its upper surface. Apostoli prefers this electrode to all others that he has tried, on account of its perfect adjustment to the skin. He also recommends the warm-water electrode, designed by Dr. Martin of Chicago; it is cleaner and quite as serviceable with a current of less than 200 milliamperes, after which, the application is more painful than with the clay.

The intra-uterine electrodes are three:

No. 1. The gas-carbon electrode, of seven different diameters, for canals of various dimensions; used for the positive current of high intensity, its rounded, bulb-like extremity adjusting itself perfectly to the endometrium so as to cauterize it equally on all sides. The shaft of this applicator is notched at intervals of two and one-half centimetres, these notches, during the withdrawal of the instrument, serving to inform the examining finger as to the exact extent of the surface cauterized.

No. 2. The platinum electrode, uninfluenced by the acids which gather about the positive pole, or the intense heat to which it is often subjected; in shape, like an uncurved uterine sound.

No. 3. The intra-uterine, bipolar electrode, by which both poles of a faradic current may be applied to the endometrium at the same time.

The intra-vaginal electrode is on the same pattern as the one last mentioned, but of larger calibre, and can be obtained in two sizes. Fine steel trocars serve for the galvano-punctures.

Any good galvanic battery of sufficient power will answer the purpose of this work. Apostoli, by preference, uses the bisulphate of mercury battery of A. Gaiffe. A reliable galvanometer is an absolute necessity. The best is one manufactured by Gaiffe, with a

registering power of three hundred milliamperes; it can be easily attached to any battery.

In his employment of electricity, Apostoli calculates its therapeutic value, not only from the transitory application of the current, but from its continuous chemical action. This, he thinks, may last for hours and often for days after the treatment. Apostoli claims that electricity must influence the entire fibromuscular substance, inducing permanent contraction, thereby increasing the firmness of the uterine tissue, while the application of caustics, or astringents, or the use of the curette affect only the diseased mucosa of the endometrium. This applies especially to the cases of metritis and other consequences of subinvolution. On this chemical action, too, he depends in his treatment of salpingitis and old cellulitis. In his treatment of hæmorrhagic fibromata, and also of polypi, which occasion profuse bleeding, Apostoli relies on the cauterizing action of the strong acids, which, according to the well-known laws of electrolysis gather about the positive electrode.

In order to test the action of the different currents and electrodes on uterine tissue, Apostoli first experimented on the cervix with electrodes made especially for the purpose, using, at the same time, a speculum, in order to have ocular proof of the effects he might be producing. For example, after scarifying, he employed different currents and electrodes of different material, thus satisfying himself as to the best method of checking hæmorrhage.

Some questions always present themselves to any one not personally acquainted with his methods.

(1) Can they be carried out antiseptically? Apostoli has proved, that they can be. Disinfecting injections must be given before and after treatment. All instruments are so constructed that they may be sterilized by boiling, before being dipped in carbolic acid. An iodoform gauze tampon is left in the vagina after an application.

(2) Is the application free from pain? This depends, as in other applications, on the endurance of the patient and the skillfulness of the manipulation.

The first treatment will often be painful, but tolerance increases with the number of applications. It is best to inform the patient that sharp, colicky pains may continue for some hours after treatment, but that they will invariably pass off. One important point may be mentioned here—Apostoli does not give a second treatment till the painful reaction of the previous one has passed off.

(3) Does the treatment confine the patient to her bed? Less than almost any other. All the patients, during the months of my observation, were working women, unable to rest while attending the clinic. Apostoli is glad when he can have a patient in a hospital for a few weeks, as he finds his results are more rapidly accomplished; after a strong application, he enforces a rest of one to four hours.

(4) In his treatment of fibromata, for instance, does he really terminate the disease? If the disease consists in the symptoms, yes, in the greater number of cases; if simply in the presence of the neoplasm, no, or only partially; hæmorrhagic symptoms are controlled, the feeling of weight and the gastric reflexes are ameliorated, a sensation of well-being takes possession of the patient and the tumor frequently diminishes in size. In making the first measurements of the patient, Apostoli always measures the thickness of the skin

and adipose over the tumor; this may be tense and thin at first, but as the fibroma diminishes in size, the subcutaneous tissues increase in thickness. Hence, without the independent measurement of the skin, one might be easily deceived about the changes in the size of the tumor.

(5) Is the treatment of fibromata by electricity superior to surgical measures? It is, of course, more gradual, requiring many applications. It does not, however, endanger life—like a laparotomy—neither does it, like the latter, compel the patient to relinquish her ordinary employment for a number of weeks. We make our brilliant hysterectomy in the hospital; the patient does not die of shock on the table, the wound heals by first intention, we send her out at the end of three weeks, or a month, and write “cured,” or “perfect recovery,” in our books. We do not see her, as with weakened abdominal muscles or sense of pelvic inertia, she wearily resumes her household cares. I was told, in Paris, of a sad show of patients collected at the Hôpital Lourcine, one morning in December, 1888; those who had had laparotomy performed during the previous year, a sickly crowd, with aches and pains innumerable. At Apostoli's clinic, I have seen women find immense relief from fibromata, which surgeon after surgeon had refused to interfere with. So, whether we believe or not, that electricity can be a substitute for surgery, we can, at least, feel that we have some alternative to offer in those desperate cases, where the surgeon refuses to operate, or to those timid women who cannot decide to submit to a capital operation.

By permission of M. Apostoli, I will present a few cases whose treatment and progress came under my own observation at his clinic, in Paris, in the latter months of the year 1888, adding further note on his peculiar methods, as the cases themselves may suggest:

CASE I. Madame R., fifty years old, newspaper vendor. Works from 3.30 A. M. till 7 P. M. Multiple fibroma, extending far above the umbilicus. Uterus measures 13½ c. m. During twenty years has suffered with menorrhagia; scarcely ever goes over three or four days without losing blood; hæmorrhage profuse. At one time she passed such large clots on the street, that the police would not believe her statements, and sent her to the Maternity for abortion. After two treatments at Apostoli's clinic, she went a whole month without flowing.

October 15th. Galvano-caustic, positive, carbon electrode, 250 milliamperes; ten minutes; well tolerated. Rests for half an hour at the clinic; then goes off to her work, from which she cannot long be absent.

November 15th. Doing well; menstruates regularly once a month, flowing only three or four days. Receives her sixth treatment; galvano-caustic, positive, carbon electrode, No. 2; six minutes in two successive cauterizations.

Here let me say that for hæmorrhagic cases the positive current is used, either with the platinum or carbon electrode. The latter electrode is employed when hæmorrhage is severe, and a definite cauterization is deemed advisable. For simply reducing the size of a tumor, the negative current is employed; this is, as a rule, more painful than the positive, and must be used with greater discretion. The introduction of the straight electrode is effected without the intervention of a speculum.

CASE II. Madame B., forty-eight years. * Interstitial fibroma with profuse hæmorrhages. Uterus measures $9\frac{1}{2}$ c. m. For two years patient has never had more than twenty days between her periods. During the four months preceding her first treatment by Apostoli, she was unable to leave her bed, on account of hæmorrhage. After the first application of electricity, the hæmorrhage ceased; she was less nervous, slept better, urinated less frequently.

October 20th. Galvano-caustic, positive, carbon electrode, No. 3, 184 milliamperes; ten minutes; well borne.

November 1st. Walks much better; 200 milliamperes; ten minutes.

November 8th. Still loses a little bloody fluid, but feels much better. Does not urinate at all in the night, formerly, five or six times; 110 milliamperes; ten minutes; galvano-caustic, positive, carbon electrode, in two successive cauterizations.

November 10th. Galvano-caustic, positive, carbon electrode, 210 milliamperes in three cauterizations of three minutes each.

November 20th. No blood since last treatment; 210 milliamperes; six minutes.

December 15th. Much better; very slightly indisposed at last menstruation. Walks better, feels perfectly well.

CASE III. Madame G., forty-seven years. Multilobular, non-hæmorrhagic fibroma. Patient is director of a public school of five hundred children. Has suffered with inconvenience from tumor for seven years. Lately, it has been increasing in size, and during the last two weeks she has walked with such difficulty that she has been obliged to give up her work. Two of the first surgeons in Paris have refused to operate. The patient looks pale, haggard and thin, and seems very weak; suffers constantly with migraine, has no appetite and says she gets feverish towards night. She has an immense bilobular tumor, the left lobe of which is so sensitive that she can scarcely bear the lightest palpation. The measurements are as follows: Circumference at umbilicus, 100 c. m.; below the umbilicus, at most prominent point of tumor, 113 c. m.; above the umbilicus, 96 c. m.; distance between the anterior superior spines of crista ilii, 29 c. m.; symphysis pubis to umbilicus, 25 c. m.; symphysis pubis to summit of tumor, 45 c. m.; symphysis pubis to xiphoid appendix, 49 c. m.; symphysis pubis to summit of right lobe, 36 c. m.; to summit of left lobe, 47 c. m.

November 8th. First application; galvano-caustic, platinum, positive, 100 milliamperes; five minutes. The treatment gives her great pain; she is lifted from the table and laid on the bed for some hours.

November 10th. Has recovered from the immediate effect of the treatment. Less sensitiveness over left side; otherwise, about the same. No treatment.

November 13th. Sensitiveness over left lobe has entirely disappeared; face looks very much less worn. Application, galvano-caustic, positive, platinum electrode, 210 milliamperes; five minutes; admirably tolerated. Walks from the table unassisted, and requires no repose.

November 15th. Eats and sleeps better; no pain, and much lighter in abdomen; feels better every way.

November 20th. Has resumed her work, is constantly on her feet, going from one story to another in a large building, in supervising her classes. Feels

better than for months previous. Treated the same as last time.

November 27th. Much better. Can walk the long distance, two miles, between her home and the clinic without fatigue. Treatment continued.

The measurements were not again taken in this case before I left Paris, but the patient seemed like a different woman, and was profoundly grateful for the relief afforded by the treatment.

CASE IV. Madame D., forty-one years. Fibroma extending to umbilicus. Has suffered for several years with profuse hæmorrhages, lasting five to six days. Has been three times operated for mucous polypi. Between October 1st and November 1st, she menstruated three times, with so much pain that she was kept in bed. After four treatments by Apostoli, at the Hôpital Saint Louis, her period appeared at the regular time, and lasted only three or four days. On the 7th of November, she presented herself at Apostoli's dispensary clinic, and between then and December 15th, when I saw her for the last time, she had had six galvano-cauterizations, always with the positive current, sometimes with the platinum and sometimes with the carbon electrode, the intensity varying from 120 to 200 milliamperes. During this time her menstruation was regular, the flow of a normal character, and the tumor was so reduced in size that the summit was felt midway between symphysis pubis and umbilicus.

In some cases, the os uteri will be so inaccessible as to render treatment by galvano-puncture necessary. This is made per vaginam, in the posterior cul-de-sac, at the most salient point of the tumor. The puncturing needle, made of steel, is sharp and fine, and is introduced only one centimetre into the tissues. This operation is performed without anæsthetics, and a negative current of 30 to 100 milliamperes is employed.

CASE V. Miss G. Large fibroma, filling the entire abdomen and occluding the cavity of the pelvis, like a presenting fetal head. Cervix found with difficulty, very high, and pressed by the tumor against the symphysis pubis. No possibility of entering the os uteri. Patient suffers with frequent and profuse hæmorrhages and with inability to walk, owing to œdema of legs. She was treated with galvano-punctures, November 25th, December 1st, December 10th and January 5th (when I saw her for the last time). The œdema in her legs had entirely disappeared, she was walking quite easily, and had resumed her work as seamstress, which she had been obliged to give up before coming to Apostoli.

Other cases might be cited to illustrate the improvement of old exudations of cellulitis, or prolapsed tubes and ovaries, under intra-uterine galvanism. Some times Apostoli secures a more speedy cure and absorption of the inflammatory masses by galvano-puncture.

In ovarian neuralgia and the hyperæsthesia of hysteria, great relief is afforded by use of intra-uterine faradism, the bi-polar electrode described above, being used for this. In unmarried women, where intra-uterine treatment would be difficult, these symptoms respond well to intra-vaginal faradization.

The methods of M. Apostoli present new fields of usefulness to the gynecologist. The technique is not so simple as it sounds. It requires special study, skillful manipulation, great caution, perfect antisepsis and close adherence to the details so carefully presented in the writings of M. Apostoli himself.