ELECTRICITY IN GYNECOLOGY.

BASED ON AN EXPERIENCE OF OVER ONE THOUSAND APPLICATIONS.

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The practice of gynecology, during the last two decades, has undergone more violent revolutions, perhaps, than any other branch of medicine.

But a short time ago it was believed and taught that displacements of the uterus were the foundation cause of nearly all pelvic troubles, and laboring under this delusion, but few cases of uterine disease could be properly treated without a carefully adjusted pessary. With nearly all gynecologists it was the *sine qua non*. To-day, the pessary is practically a thing of the past, and but seldom serves a useful purpose.

At one time the most powerful caustics were applied, without reserve, to the endometrium; but soon they were dropped for the milder ones, and still later, the hot water douche and glycerine or boro-glyceride tampon have nearly displaced them all.

At another time the lacerated cervix and perineum were the causes of all the ailments to which the unfortunate woman was subject, and operative procedure was the only remedy. The fallacy of such a claim very soon became apparent, and something else must take its place.

This and all other previous methods of procedure are to-day largely displaced by a sudden infatuation for removing the appendages of the uterus, a procedure which is already proving itself to be a futile effort to relieve the sufferer.

So many and radical changes in so few years can only be interpreted to mean one thing; and that is, results of none of the methods or lines of treatment have been satisfactory. I believe that the experience of those present will corroborate the following experience of the writer.

I have replaced a prolapsed uterus, carefully adjusted a pessary and followed out all the details in the general management of the case, and for a time felt secure in the belief that I had done much for my patient. So I had; but it was only to have her return to me in due time suffering from the results of the foreign body in the vagina, which served to fix the uterus more firmly, and thereby render it still more susceptible to injury by every misstep or jolt to which the body might be subject; perhaps she returns with increased tenderness of the uterus, a more profuse vaginal discharge than ever, erosions caused by the pessary, etc.

Or, may be, I have faithfully applied the glycerine or boro-glyceride tampon, in connection with a free use of the hot water douche, for from three to six months, once or twice a week, making my patient feel much better; but mortified in the extreme to have her return to me in less time than it took to relieve her, and find her in the same condition as when I first began to treat her.

It is in this state of gynecological science that we welcome to our aid a power which bids fair to remove from that branch of medicine an opprobrium which all must have painfully realized.

It is an energy as powerful for good as it is mysterious, and like all things in nature, equally powerful to harm when misapplied. As a therapeutic agent

in gynecology, we have come to regard it as the most powerful weapon against disease at our command.

In order to explain its therapeutic action in a large proportion of the cases which apply to the gynecologist for aid, it will be necessary to say something as to the pathology of these cases. The everyday patient that comes to your office seeking relief from miseries which she has suffered until she can endure them no longer, details to you a history something like the following: Backache, leucorrhœa more or less profuse, sharp pains in the region of one or both ovaries, perhaps, displacement of which she herself is conscious, headache, severe pain or a feeling of oppression on top of the head, nervous, irritable, sleepless and perhaps emaciated. She may also tell you that she has a strange feeling in her head as if she would go insane.

Many of the younger and ambitious gynecologists would diagnose the case as one of badly diseased ovaries, pus tubes, ovarian abscess, etc., and recommend castration as the *only means of saving the patient from an early grave* Especially is this conclusion reached without hesitation, if an examination reveals more or less tumefaction in one or the other side of the pelvis.

We do not wish to be identified with that class of pathologists. We do not believe that the ovaries or annexes are the primary seat of the trouble in more than an extremely small proportion of these cases. The trouble is, without doubt in my mind, primarily in the uterus. The endometrium we believe to be the point of departure.

A catarrhal inflammation is no doubt the first step in the departure from the normal condition, and with others, I believe microbic life to be an active agent here, whether as a cause of the catarrh or a result. In either case the trouble, once set up, is the least likely of all known disorders to be self-limited. The catarrh continues, congestion of all the pelvic viscera sooner or later follows, the uterus becomes enlarged to two, three or four times its normal size, and gradually the trouble steals along to the appendages, and there adds still more fuel to the flames.

If this is the correct pathology and course of many of these cases, what benefit could be expected from amputating the last to be attacked and smallest portion of the disease—the ovaries—and leaving the corner stone of the trouble—the uterus—remain? These facts explain to me the frequent failures to relieve the patient of symptoms, on account of which she submitted to undergo so great an ordeal.

I shall here introduce a brief history of a case illustrative of this point:

Mary ——, æt. 26 years, unmarried, has always been very corpulent, menstruation always very scanty. Has suffered pains more or less severe for a number of years; usually has had profuse leucorrhœa.

Electrical treatment was attempted, but being unable to introduce the intra-uterine electrode on several occasions, efficient treatment on that account not being given, the patient became discouraged, and asked permission to consult another physician, which was granted.

Only once while the patient was under my care, did I succeed in getting a sound into the cavity of the uterus, when it passed in about 3½ inches.

In less than two weeks from the time she was last at my office, the physician whom she consulted had removed a pair of atrophied ovaries. Before the operation, you will remember, her menstruation was always scanty. Since the operation, covering a period of more than a year, she has been unwell almost continually.

The patient's own words will best tell the story: "I had shed tears before the operation, but I have shed a great many more since." She now claims to have more pain than she ever had in her life.

What could you expect from detaching a pair of atrophied ovaries from a uterus large enough to allow a sound to enter three and one-half inches? Such a procedure, in my opinion, is putting the cart before the horse; it is like amputating a dropsical limb to get rid of the dropsy when the cause still continues to exist in some one of the vital organs.

The plea which I wish to make for this class of patients is that in electricity we possess an energy which is capable of curing the metritis, causing at the same time absorption of the hypertrophied tissues and tumefactions of the uterus itself, as well as the other pelvic viscera, causing also the uterus to contract and assume its normal weight and mobility, and sometimes position; and while this is going on the sharp pains in the pelvis, the soreness, feeling of weight, leucorrhœa, etc., and the much dreaded diseased ovaries, gradually vanish, thus relieving the patient, and that too without putting her life in jeopardy, or mutilating her body, but leaving her as nature made her, a woman and not a *thing*.

The action of electrical energy in these cases can be fully appreciated only by one who has seen and examined one of these patients before and after a systematic course of its application. The great change which takes place in some patients in a comparatively short time is almost incredible. In many others its effects are not as striking, but sooner or later, through care and perseverance, the results for which we are laboring will come.

A mathematically accurate and scientific explanation as to how this work is done cannot be expected from me at this time, inasmuch as no physicist has yet told us what this mysterious agent is. We know it only by its effects. We know that under certain conditions of matter, certain phenomena result, which we attribute to a something which we call electricity.

But, little as we may know of this energy in itself, and great as may be the changes in views regarding it in the future, the laws which govern its behavior are well understood and immutable

In accordance with these laws we are able to handle it, measure it, guide, direct and control it. Having then a thorough knowledge of the behavior of a current, and the necessary skill to manipulate, we apply it in the treatment of disease, and the results we obtain are substantially the only evidence we have that *anything* has been done. If then we fail to show just how this or that thing is done, our consolation is that we are no worse off than the physicist himself. Or, until you can explain just how quinine cures malaria, drug medication is no farther along than the treatment by electricity.

We shall content ourselves, therefore, by stating briefly what, according to our present state of knowledge, is believed to be the mode of action of the electrical current in the cure of pelvic disease, and stand ready to have these views criticised, upset or verified as investigation in this direction may advance.

The action of an intra-uterine application is not a single one. We have first, an action on the part which is in immediate contact with the active electrode, which is acid caustic with the anode and alkaline caustic with the cathode, the extent of cauterization being accurately controlled, and suspended

instantly at any point, a thing which is impossible when caustics are introduced from without. Not only is the action of the two poles different in that the one is acid and the other alkaline, but we have in the anode an unquestionable hæmostatic action, tending to arrest hæmorrhage, a sedative action calculated to relieve active congestion, inflammation and pain. The action of the cathode is directly the opposite; it increases the tendency to hæmorrhage, incites congestion, inflammation and pain. It is this stimulating and exciting action of the cathode that so often renders us invaluable service in the chronic forms of pelvic disease.

Besides this action of immediate contact, it is universally accepted that there is a decided interpolar action; *i. e.*, an action upon all the tissues included between the poles. In the case under consideration, this action affects the walls of the uterus, the cervix, all the appendages, and in fact no portion of the nerve and muscle supply of the pelvis escapes it.

To this action is attributed the absorption of the hypertrophied tissue, shrinkage and contraction of the uterus, dispersion of inflammatory products and tumefactions in the pelvis, thereby rendering a previously heavy and fixed uterus and appendages lighter and more movable, and thus affording entire relief from a trouble which seemed so formidable.

There is still another action of the electric current which has recently attracted some attention. A passing notice of it is all that space will allow. Some recent writers are of the opinion that some of the good results obtained from intra-uterine galvanism depend upon the power of the current, especially the anode, of destroying microbes. This power can easily be tested, and no doubt the question will soon be put beyond cavil.

Some of the more important special applications of the electric current in the cure of pelvic disease shall next engage our attention.

Uterine hæmorrhage is more certainly controlled by electrical energy than any other known remedy. In subinvolution with hæmorrhage, the swelling faradic current of low tension and slow interruptions, intra-utero-abdominal method, seems to me to be one of the most brilliant in its results of any remedy we possess. The patient can usually be cured in from two to five weeks.

I use the ordinary platinum intra-uterine electrode as anode in the uterus, and clay electrode as cathode on the abdomen. The application is made "swelling" and continued about ten minutes, of a strength up to the point of tolerance. In this use of the current I have never been disappointed. Moreover, the results are so quick in showing themselves that there is no room for doubt as to what has done the work.

I shall speak later on of its effects in hæmorrhage in uterine fibroids.

Menorrhagia and metrorrhagia as found in that everyday class of patients to which I have already referred, are usually best treated with the galvanic current. Unless the hæmorrhage is very severe, however, I usually disregard it, and strive to give the treatment best suited to the associated conditions, or the conditions upon which the hæmorrhage depends.

The history of the following case will illustrate a common phase of uterine disease, and I shall give, in detail, the history of the case with results.

May 29, 1890.—Mrs. B., æt. 39 years, married and has three children, youngest ten years old. Has been in ill health ever since last child was born. Menstruation has always been very free, but during the last five years, has often been alarmingly profuse. The periods are quite regular as to time. Suffers severe backache the most of the time, sharp, shooting pains in the region of both ovaries. Head symptoms have been very prominent. Pain and distress, especially in the back part of the head, sometimes on top. Ideas are confused and often has a feeling as if her mind would become disturbed; walking is difficult and sometimes impossible. During the last five years hæmorrhages have been so profuse as to require her to remain in bed from seven to twelve days every month. There have been periods of six months during which she has been unable to do any shopping up town, a distance of one-eighth mile from her residence. An examination revealed nothing strikingly abnormal except a uterus about three times its normal size. Treatment was instituted with a view of relieving pelvic congestion, and reducing the size and weight of the uterus thereby expecting to overcome the hæmorrhage and pain, as well as the constitutional symptoms resulting therefrom.

Intra-uterine galvanism was employed from June 29, 1890, up to Dec. 11, 1890, a period of five months and a half. During the first four months, there was slight improvement from time to time, but from this time on for the next six weeks I was able to use currents of much greater intensity and improvement was rapid. At this time, Dec. 11, the patient was feeling quite well, free from the ovarian pain and distressing head symptoms, as well as the excessive hæmorrhages, and the uterus about half its original size, and it was mutually agreed upon, that she should take a rest and see what would follow. Each succeeding period seemed to be an improvement on the preceding one, which improvement was progressive up to July 4, 1891, at which time she left the city to make her home in Pennsylvania.

The occasional reports I have had from her since then have been favorable. I had a letter from her husband September, 1892, in which he stated that his wife was well and doing all her own work with ease. He also stated that she had gone up in weight from 116 to 146 lbs; and that he could attribute the great change in her condition to nothing else than the treatment she had received at my hands. This has probably been the most tedious and trying patient I have ever handled, yet the final outcome was satisfactory, and no one will regret the time and labor spent.

One more case to illustrate a different phase of disease, and more rapid results:

Mrs. S., æt. 38 years. Married nine years, sterile, menstruation scanty, accompanied with distressing headaches, especially on the top of the head, severe paroxysmal pain in the left ovarian region and dyspeptic symptoms prominent. An examination revealed chronic metritis, leucorrhœa, abrasions surrounding external os, and an indurated mass in the left side of the pelvis about the size of a small lemon, shading off into the surrounding tissues.

The treatment covered a period of about eight weeks, viz: from June 25, 1890, to Aug. 18, 1890, during which time eleven applications were made. After six applications the abrasions about the os, and the mass of indurated tissue in the left side of the pelvis had entirely disappeared. Her menstruation following the eighth application lasted eight days and never had as free a flow in her life. After eleven treatments she was dismissed as well.

It will not be out of place to repeat here that this lady had been married nine years and had never been pregnant, although she was very desirous of becoming so.

On December 9, 1892, she gave birth to a fine nine-pound boy.

Dr. Apostoli declares that when pus exists in the annexes, intra-uterine cauterization of from 80 to 150 m/s. will positively not be borne. His experience

is sufficient to give weight to the declaration. I accept it as true.

In an experience of some magnitude I have personally met but few cases in which this current was not well borne, by carefully educating the uterus up to it. This demonstrates to my mind one of two things, viz: either I have had a very unique experience, or else *pus tubes* and *ovarian abscesses* are far from as common as many gynecologists would have you believe. Of course, they do exist, but certainly not in every woman who may have sharp pains in the pelvis or even tumefactions on one side or the other.

Paul F. Munde, in an article in the September number of the *International Journal of Surgery*, says: "I am convinced that in the past, many uterine appendages have been removed which, with a little patience and perseverance on the part of the physician and the patient, could have been saved. I see every year several hundred cases at least of this disease, and if I look back during the last fifteen years, I may well say that I have seen at least from two to three thousand women suffering from acute, subacute and chronic inflammation of the uterine appendages. It would not have strained my conscience very much if I had operated on, we will say, one-half of these cases; because in many of them the appendages were undoubtedly inflamed, adherent, and more or less enlarged; but I can say, and I believe with all due modesty, that I am proud of having operated only on sixty-three such patients, two of whom died, the rest making an uneventful recovery; I wish I could say as much of the ultimate results of the operation. In eight, menstruation persisted with increased intensity for from two to three years after the operation, and in a larger number of cases the pains for which the operation was performed continued with almost no improvement." Further on he says: "I have seen a tube which was the size of a small banana gradually diminish, shrivel and entirely disappear after several months of treatment."

"A lady from Buffalo consulted me eight years ago for as violent a salpingitis as I ever saw. Her ovaries and tubes were bound down, uterus absolutely immovable, the right appendages enlarged to size of an orange, and I felt obliged to tell her that an operation was imperative. She refused the operation, but insisted upon being treated. Local treatment with persistent local use of galvanism for months so materially improved this case that now she has been in very fair health for five years and has seldom been compelled to consult me or any other physician for her pelvic organs."

With the words just quoted I close this part of the subject.

Another important application of electrical energy in gynecology is for the purpose of relieving pain.

Dr. Apostoli, as well as numerous American gynecologists, are almost extravagant in their praise of the use of the high tension faradic current, with rapid interruptions, as an analgesic. My experience in this use of the current is comparatively limited, but I have seen enough of it to convince me that, with the proper instrument for the purpose, much good can be accomplished in this direction. Of all electrical appliances, however, there is probably none more difficult to procure than the instrument adapted to this use.

This instrument must possess two definite qualities in order to make it a success. It must produce a current of extremely high tension, and it must be constructed so as to produce rapid interruptions. The former quality is obtained from a very long and very fine secondary coil, and the latter quality depends upon the construction of the vibrator.

Dr. Hutchinson, of Providence, R. I., claims to have determined about the rapidity of vibrations necessary to obtain the best results. This he puts at 35,000 per minute, which rapidity will cause the vibrator to emit a musical tone which will correspond to first C above middle C. When the frequency is much greater than this, the current is no longer appreciable, and no longer has any analgesic properties. It remains to be seen whether or not other investigators shall verify the observations of Dr. Hutchinson.

I shall here introduce into this paper another use of the electrical current in gynecology, not on account of personal experience had with it, but on account of what seems to me to be of such practical importance that I am exceedingly desirous of having the matter before you for discussion. I refer to its use in ectopic gestation. I have reasons for believing that in electricity we have a power of converting what may later on prove to be a terrible catastrophe into an insignificant and harmless condition. Gynecologists in whom surgical tendencies predominate will advise laparotomy at once, or as soon as there is little doubt of the real condition of things. The procedure seems to me to be too radical and unwarrantable. Unless rupture has occurred, and provided it has not gone beyond the fourth month, there can hardly be a comparison. This statement is made on the following grounds: 1st. There is no possible condition which will in any way interfere with efficient electrical applications at the moment that ectopic gestation is first suspected. Thus we have an opportunity of taking advantage of treatment at a time when any method is most effectual, and when there is the least possible danger. 2nd. A current of a strength sufficient to destroy the life of the fœtus, when properly applied, can be administered without an anæsthetic, and if necessary, without an assistant, and without the slightest pain or discomfort to the patient, and does not require her to remain in bed more than several days or a week.

An attempt is often made to intimidate the advocates of this plan by holding out the possible danger of rupture during an electrical application. The facts are, however, that although many hundreds of cases have been operated upon in this way, I can find but a few reported deaths, in one of which puncture was used, at present considered highly improper, and the method in the other cases is not known. With modern methods the danger must certainly be exceedingly small, and not to be compared with the dangers of a laparotomy.

Although the length of this paper is becoming much greater than was expected, it cannot be closed without, at least, a brief reference to a subject that has been the source of many acrimonious discussions during the last few years. I refer to the treatment of fibroid tumors of the uterus by electricity.

When such men as Sir Spencer Wells, Thomas and Skene Keith, Playfair and Stevenson, of Great Britain, and Munde, Massey, Goelet, Martin and numerous others of this country, have substantially discarded the knife and adopted the Apostoli method,

claiming for it advantages over any other method, it will no longer do for men who have not tried the method to stand back, shrug their shoulders and wink at it, and try to console themselves by the antiquated idea that electricity in medicine is quackery. The question is no longer one of theory, but one of practical facts.

Not every tumor of the uterus is curable by electricity; but I believe that every *fibroid* tumor can be symptomatically cured.

Myomata, or the very soft variety of uterine tumors are not so much benefited by this treatment, and in this variety requires great care in its application.

But in the case of fibromata or myo-fibromata we may make the following claims without reserve: Intra-uterine cauterization, from 100 to 250 milliampéres, will arrest hæmorrhage, relieve the pain and reduce the size of the tumor, sometimes slightly, and sometimes greatly. In the case of small tumors I believe that they are often made to disappear entirely.

The almost absolute freedom from danger in this method of treatment may be inferred when it is known that Apostoli lost but two out of two hundred and seventy cases, and Thos. Keith in a large number lost but one.

I can do no better in this connection than quote a few paragraphs from a man who to-day stands, perhaps, unparalleled in his success in hysterectomy. I refer to Thomas Keith, of London. He says:

"What I now plead for is that for a time all bloody operations for the treatment of uterine fibroids should cease, and that Apostoli's treatment, as practiced by him should have a fair trial.

Hysterectomy, remember, which is performed every day for a complaint that rarely of itself shortens life, kills every fourth of fifth woman who is subjected to it. This mortality must cease; it is not a question of surgery, it is a question of humanity. Every time that a disease can be cured without resorting to a bloody operation progess is made in our art, and there is a gain to humanity; while surgery is the better for being purged of a deadly operation. It may seem strange to some that after the results I got in hysterectomy—results that almost made it justifiable—I should now begin to throw stones at the operation instead of trying still further to improve upon it; and but for Dr Apostoli I would now be doing so. I would give something to have back again those sixty-four women that I did hysterectomy for, that I might have a trial of Dr. Apostoli's treatment upon them. I have thrown over all surgical operations for this new treatment, and the longer I follow it the more am I satisfied."

In conclusion, I cannot refrain from anticipating some of the stumbling blocks that will naturally be hurled in the pathway of the sincere, earnest and efficient worker in this field of electro-therapy.

The application of electricity in gynecology does not differ in certain respects from any other art. Skilled work is not usually the result of unskilled hands, and nowhere is this more true than in the application of electricity.

Nor is this skill easily attained by every one. Certain requisites are indispensable to begin with. First and foremost there must be *earnestness* of *purpose*. Unless enthusiasm enters into the work failure must result. Other essentials are a thorough knowledge of the behavior of a current, a thorough equipment with apparatus and instruments, mechanical ingenuity, a hand capable of delicate and gentle manipulations, and a *bountiful supply of time and patience*.

In addition to this, there is such a thing as *special aptness* for certain kinds of work, and when this is associated with the other requirements mentioned, the claims we have made will certainly be verified.

The venerable and grand Dr. Robert Newman, of New York, who has so successfully treated hundreds of cases of stricture of the urethra by electrolysis, has been striving for years to force upon the profession at large just how he acccomplishes it, and yet we find men here and there decrying the method as inefficient and dangerous, claiming that they had tried it, and in some instances exposing their abominable ignorance by admitting that they had produced cauterization, and that the treatment was followed by a worse stricture than the one it was attempted to cure. We simply say that Dr. Newman does not cauterize with his own hand, and when some fool through his ignorance and clumsy manipulation does do so, neither Dr. Newman nor his method are responsible. It is the operator alone, and that too in spite of clear and explicit directions in every detail, laid down by Dr. Newman. Will a Lawson Tait or a Joseph Price submit to have the results of their laparotomies judged by the results of the operator who has killed half of his patients? By no means. We must distinguish between the *method* and the *operator*. They are entirely different factors. All we demand in this matter is fairness. We demand that each factor shall carry its own proper share of responsibility. We demand that you do not shoulder upon the method, responsibilities which belong to an individual operator.

SOCIETY PROCEEDINGS.

American Electro-Therapeutic Association.

Second Annual Meeting, held in New York, October 4, 5 and 6, 1892.

WILLIAM J. MORTON, M.D., PRES'T.

THIRD DAY, OCTOBER 6—EVENING SESSION.

(*Concluded from page 424.*)

SOME SUCCESSES AND FAILURES WITH ELECTRICITY IN GYNECOLOGY.

By A. Lapthorn Smith, B.A., M.D., M.R.C.S. England, Fellow of the American Gynecological Society, Fellow of the American Electro-Therapeutic Association.

My experience with electricity in gynecology has been limited to:

1. Positive galvano punctures.
2. Negative galvano punctures.
3. Positive intra-uterine applications of galvanism.
4. Negative intra-uterine applications of galvanism.
5. Sacro-abdominal applications of galvanism.
6. Vagino-abdominal applications of galvanism.
7. Intra-uterine bipolar fine-wire faradism.
8. Vaginal bipolar fine-wire faradism.
9. Intra-uterine coarse-wire bipolar faradism.
10. Vaginal bipolar coarse-wire faradism.
11. Vagino-abdominal coarse-wire faradism.

Positive Galvano Punctures.—I have had one very marked success with positive galvano puncture in a case of enormous uterine polypus, in a patient who was so exhausted with hæmorrhage that no surgeon would dare to give her an anæsthetic in order to remove the polypus, which was the size of a seven months' fœtal head, and nearly filled the pelvis. Half a dozen positive galvano punctures were made into the tumor as a palliative measure, with the result that the hæmorrhage and profuse watery discharge were stopped, and the patient improved so much in health that she would not entertain the proposal to remove the tumor, apparently suffering no inconvenience from it. I followed her up for about a year, since which I have lost track of her. Although I employed currents of 150 m., the treatment was absolutely devoid of pain.

On the whole, I am opposed to galvano puncture, having lost one case through an error of diagnosis and neglect of strict antiseptic precautions, and having, in another, caused a good deal of suffering without proportionate results. My chief objection to it, however, is that it almost surely causes adhesions which, in case of the necessity ever arising for removal of the uterus, would greatly increase the difficulties of the operation. A minor, but still important objection to punctures is that they frighten the patient away from continuing the treatment. I have to record one complete failure with the negative galvano punctures to relieve the pain of an impacted non-bleeding fibroid. The death above referred to is the only fatal or even dangerous accident I have had since I first began the use of galvanism.

With positive intra-uterine applications, on the contrary, my success has been almost invariable. I have employed them in rapidly growing bleeding fibroids, in subinvolution, in *fungous endometritis*, and in *menorrhagia* from other causes, the disease having been arrested in about ninety per cent. of the cases. Success has been due to attention to the following points: Correct diagnosis; the introduction of a solid or flexible sound the whole depth of the uterus; the employment of a sufficient current strength to furnish at least twenty-five milliampères to each square centimetre of surface of the sound, and the rigorous following out of the septic and all the minor details of the method as laid down by Apostoli. One of my failures (Miss B.) to arrest hæmorrhage with positive intra-uterine applications of galvanism was due to the eating into a small uterine sinus with the end of the electrode, which, at that time, I was not in the habit of taking the precaution of insulating with a little wax.

This case would have been a complete success had it not been for this accident, but owing to the slight hæmorrhage, lasting, however, two weeks, I was led to class it as a failure and the uterus was removed, the patient making a good recovery and now enjoying good health.

It is interesting to note that although she received over fifty strong applications with the clay electrode on the abdomen, there was not found the slightest sign of an adhesion anywhere, except at a small spot at the back of the uterus where the latter had been rubbing on the brim of the pelvis.

Another failure, Miss S., was due to the condition of the appendages, which prevented me from giving adequate doses. By the aid of a little anæsthetic occasionally I was able to give her 100 applications lasting each from seven to ten minutes, and of an average strength of 100 milliampères. The tumor was reduced in size one-fourth, the hæmorrhage was reduced fully three-fourths, and the patient regained her color. But her home being a thousand miles away, and as she feared that the hæmorrhage might return when she would not be able to return for treatment, she urged me to perform hysterectomy, which I told her was the only absolutely certain treatment that would prevent the hæmorrhage from returning. At the operation there was not a sign of an adhesion anywhere after 100 applications of galvanism, some of the doses going as high as 175 milliampères. She made a rapid recovery and is now in excellent health, performing her duties as principal of a high school where there are 600 girls. So far from the treatment with electricity making the operation more difficult and complicating it with adhesions, I certainly should have dreaded undertaking the operation while she was in the exsanguinated condition which she presented when she first came under my care. If she had resided in this city, or anywhere where she could have reached me and received further treatment in case of a return of the bleeding, she would not have required to have undergone the operation at all.

In another case, Miss S., of failure with the positive pole in the uterus, the patient had been sent to me with a diagnosis of fibroid, which had been made and confirmed by several leading surgeons. The tumor at first diminished in size, and the patient's general health was much improved, but after a time it suddenly began to grow again, when I sent her to the hospital for operation, at which I was present. The tumor proved to be a sarcoma of the ovary, into a depression in which the uterus was imbedded, rendering it difficult to differentiate the one from the other by a digital examination.

A brilliant success, however, was a Mrs. P., who had bled so much that as a last resort a leading gynecologist in the city had packed her in ice. I kept her tamponed with alum tampons for a few days until I could improve her enough to be carried to my office. The introduction of a soft bougie to measure the depth of the uterus caused the blood to pour out on to the floor of my office before I had time to catch it. Her skin was waxy and absolutely colorless. After twenty or twenty-five applications her periods became perfectly normal, and have remained so for several years. I took the trouble to hunt her up a few months ago to present her to the medical society, and found that she had been in perfect health ever since, suffering no inconvenience whatever from the tumor, which had been reduced fully a third. This

woman would surely have died, whether she had been operated on or left alone; in fact, no one would have dared to operate on her in the almost pulseless condition in which I first saw her.

Another brilliant success was Mrs. S., an artist by profession, who had almost become a hopeless invalid, but who after only fifteen applications of galvanism was restored to almost perfect health, and has not lost a day from her work since. The tumor was reduced a third in size, and she suffered no inconvenience from it whatever. It is now three years since the last application, and she has had no relapse. Another successful result from the positive pole in the uterus was Miss A., chambermaid in the Windsor hotel, who was about to abandon her occupation when she came under my care, but after fifteen applications was able to resume her work, and has been well ever since—now two years ago.

Mrs. X., wife of physician in this city, used to bleed so severely that she had to pass a week out of every month in bed, with her feet raised and her head low, and even then she would faint repeatedly; after ten applications was so much improved that she was no longer obliged to remain in bed at all. I subsequently curetted the uterus and repaired lacerated cervix and perineum, and now she is enjoying very fair health.

Miss A. was sent to me from Scranton, Penn. She was an expert stenographer, but was unable to keep a situation because for ten days in every month she had to remain in bed. If she attempted to remain up, large clots would come away, so that she would have to stand in the office over a newspaper and allow them to fall on it, besides she would saturate a dozen napkins a day with the serum. After one hundred applications her periods came down to three days, and she is now married.

Mrs. P. from a distant city, had to be carried into my office, but was able to walk a distance of a mile or two after having received ten applications. She received in all fifty applications, the last one three years ago, but she has remained well ever since.

One of my most recent successes is Mrs. F., of this city, who was affected with severe hæmorrhages, and who after about twenty applications was relieved of all her symptoms. There has not been any return of the hæmorrhage since leaving off the treatment three months ago.

Two cases which were sent to me as bleeding fibroids were not cured by electricity, as they subsequently proved to be one sarcoma and the other epithelioma of the uterus.

In both, however, the hæmorrhage was arrested, although one has since died and the other will soon die.

All the cases so far mentioned with the exception of the last two of cancer, were cases of bleeding fibroid tumors of the uterus, and they were all in women under forty years of age. They were all treated with positive intra-uterine applications.

In another case of a woman, Mrs. N., who had been bleeding steadily for a year and who had also a bad lacerated cervix, there seemed to be no doubt about the cancerous nature of the disease. Her hæmorrhage was permanently arrested by only have a dozen applications of the positive pole. My success in this case led me to entertain the hope that we had at our hand a cure for uterine cancer, but in another case far advanced the treatment proved an utter failure. If it is to be of any use the cases must be seen early.

Besides these fifteen cases I have treated about forty-five cases with the positive intra-uterine pole, for other conditions, principally for fungous endometritis, edometritis with hæmorrhage at the periods, but also in cases of subinvolution. Of these forty-five cases I can only recollect two failures to arrest the hæmorrhage. In every case the depth of uterus was diminished. There has been no failure to produce this result. In one case the effect was especially gratifying, an old lady with her womb lacerated, large and heavy, hanging between her legs, to whom I administered about half a dozen positive applications followed by coarse wire faradism. The womb became reduced so that a little toning up of the supports rendered them able to keep the organ within her body, where it remained till her death, two years later, from apoplexy.

The following cases were treated with negative intra-uterine galvanism, and gave me some of my most brilliant results.

Miss W., who had suffered agony for several years from pressure on the urethra and rectum, and was obliged in consequence to abandon her position as cook in a gentleman's family, was completely cured four years ago by about twenty applications, so that she was able to start and carry on successfully a large boarding-house, for which she now does both the cooking and the catering. The last time I examined her the tumor could not be felt.

Mrs. D., from a town near here, had suffered for eight years from pressure symptoms, but not from bleeding, from a large interstitial fibroid. Her health had been completely broken down by the large quantities of morphine which her suffering necessitated. One hundred applications cured her, so that two years afterward her physician wrote to me that the tumor had entirely disappeared. Although it is now over four years since her treatment, menstruation is regular and painless, and she continues in excellent health.

Miss McP. suffered so much from pressure symptoms that she was obliged to give up her situation as cook. Her tumor was growing rapidly. After about twenty applications the growth was arrested, and she felt so well that she entered the writer's service, where she has ever since, now five years, performed her duties without interruption.

Mrs. D., from Holyoke, had a large submucous fibroid which was growing rapidly. After the first application there was so much diminution in the size of her waist that she decided she was cured, and started for home. She was taken with severe expulsive pains on the train, and soon after reaching home she gave birth to a broken down fibroid about the size of a seven months child's head, since which she has enjoyed good health.

In half a dozen other cases of fibroid the pains and pressure symptoms were fairly well relieved by negative applications.

In the treatment of dysmenorrhœa I have had some very gratifying results, so that I can say that I know of no treatment except removal of the appendages which can offer such good prospects of relief. Since reporting nine cases of dysmenorrhœa cured by negative galvanism, I have added half a dozen more to the list, while only one has utterly failed to be relieved, and one relapsed until she received two more applications, since which she has remained well.

With sacro-abdominal application of galvanism I have not had any marked success, although I have only given it a limited trial. With vagino-abdominal applications I have seen the tender, enlarged and prolapsed ovaries become lighter, painless, and to disappear from Douglas' *cul-de-sac*. I have also, on three occasions, seen the uterus, which was previously bound down and retroverted, become movable. While I can hardly believe that organized bands of adhesions can be dissolved or, in the words of the electro-therapeutical poet, "melt away like snow before the summer sun," I can believe that such a powerful alterative may so improve the circulation in the lymphatics that soft or liquid exudations may be reabsorbed.

With bipolar fine wire faradism I have treated at least fifty cases, principally of inter-menstrual pain due to neuralgia of the uterus and ovaries, and of varicocele of the

pampiniform plexus. I have sometimes used it in some of the above-mentioned cases of fibroid in order to establish tolerance for the galvanic current. For any kind of pain in the pelvis, in which no organic disease of the uterus or appendages could be felt by careful bimanual examination, I have found bipolar faradism invaluable.

Where it has failed to relieve, subsequent operation has revealed undiagnosed pus in the pelvis, for which of course there is only one treatment, and that is evacuation. I have sometimes used it in the uterus, but most often in the vagina, which seems to me much safer and almost as effectual.

With coarse wire faradism I have also had very satisfactory results in cases of retroflexion due to atony of the uterus, and also in cases of prolapsus. In one case of procidentia of a very advanced type it failed to keep the uterus up; but in least a dozen other cases of moderate degree in which the uterus was not so much enlarged, a few applications of coarse wire faradism so toned up the relaxed vagina and perineal muscles, especially the levator ani, that the women have declared that they were greatly relieved, and some of them have even returned each summer during the hot weather to have their pelvic contents toned up. The subinvoluted uterus, like the uterus at the end of pregnancy, responds very readily to the faradic stimulus, and any one who has employed coarse wire bipolar faradism in the vagina cannot have failed to notice how the electrode is grasped by the sphincter of the vulva and drawn up by the levator ani.

Vagino-abdominal coarse wire faradism I have used several times with the view of shortening the round ligaments, as it has been demonstrated that the freshly removed round muscle will when stimulated by the faradic current lift a weight of a pound and a half off the table. But the result was too slow in coming, so that I was tempted to perform Alexander's operation instead.

As this paper is entitled some successes and failures with electricity in gynecology, I have not given a very detailed account of every case. It is rather a general stock-taking after nearly five years' experience with it.

As far as I know the harm I have done with it has been limited to one death and two miscarriages all due to mistakes in diagnosis. I believe that I have saved at least twenty women from operation and three or four from death, while I am absolutely positive, certain electrobobists to the contrary notwithstanding, that in those whom I treated with electricity but whom I did not save from operation, the operation was in no way rendered more difficult thereby, but in all probability their chances were improved, all of them having made easy recoveries.

I think it is unjust and unfair for my friend Dr. Joseph Price and others to lay all the blame of adhesions on electricity when they know as well as I do that these complications are met with in cases which have never been touched with electricity, while on the contrary they know that cases which have been treated for a year with electricity were found at the operation to be absolutely free from adhesions.

NOTE UPON A NEW APPLICATION OF THE ALTERNATIVE SINUSOIDAL CURRENT IN GYNECOLOGY.

Presented by Dr. G. Apostoli simultaneously at the International Gynecological Congress at Brussels, and the session of the American Electro-Therapeutic Association, in New York, October 4, 5, and 6, 1892.

The alternating sinusoidal current which M. Arsonval has introduced into electro-therapeutics is utilizable in gynecology, and the following is a summary of the new acquisition:

In five months, from March to August inclusive, 1892, thirty-four patients, comprising twelve fibromata and twenty-two affections of the appendages, were treated at the clinic of Dr. G. Apostoli by the alternating current. This was done with the coöperation and assistance of Drs. Grand and Lamarque, the total number of séances being 320.

All the patients were submitted to a uniform application, one pole in the form of a sound being introduced into the uterine cavity, and the other, a large clay pad, upon the abdomen. The duration of each séance was five minutes, and was renewed two or three times a week.

The rapidity of the alterations varied according to the circumstance, or rather to the sensibility of the patients, and oscillated between a mean of four to six thousand, and a maximum of ten to to twelve thousand per minute.

The apparatus employed is the first model constructed by Gaiffe, which is really but the magneto-faradic machine of Clark, modified and transformed by Arsonval, giving at its greatest rapidity a maximum difference of potentiality of sixty-four volts and its average rapidity a difference of thirty-two volts. This apparatus is driven by a pedal.

All the thirty-four patients were carefully watched, and the following are the general conclusions which were obtained from this initial period of treatment, conclusions which do not always appear definite to Dr. Apostoli because of the imperfect instruments and the relative short duration of the period of experimentation:

1. The alternating sinusoidal current applied to the interior of the uterus under the operative conditions under which Dr. Apostoli was placed, was always inoffensive and well supported.

2. Its application was not followed by any painful or febrile reaction, but on the contrary, was very often accompanied by a manifest sedation.

3. It did not seem to have a restrictive action on hæmorrhagic symptoms, but, on the contrary, sometimes had a tendency to cause their continuance.

4. It exercises a specific action on the symptom *pain*; this action obtains in the first séances, and most often at the end of the first séance.

5. It usually, but not universally, relieves leucorrhœa, which diminishes or disappears under its use.

6. It has no appreciative action on the hydrorrhœa associated with certain fibromata.

7. Its influence upon anatomical retrogression of fibromata is not yet definitely established.

Its action favors the resolution of peri-uterine exudates.

In conclusion, this treatment, though recent and still apparently incomplete, has always given a sufficiently definite response that it may be permitted to be considered a happy conquest in gynecological therapeutics. Succeeding researches will enable us, in the near future, to determine and fix the operative conditions under which we may the better combat the different pathological states (hypertrophies, infection, or cellular inflammations), and there will be opportunity to vary in such and such a case the number, the duration and the frequency of the séances, and to study the different curative results due to variations in voltage and intensity of the current as well as the rapidity of the alternations.

The results achieved prove that the alternating sinusoidal current should take a place in gynecology by the side of, but not yet above, the faradic and galvanic. It is destined to assist them either as a completing active auxiliary or as a supplement to them, and to fill the new and personal indications which the future will establish more definitely.

It is at present the remedy *par excellence* for pain, and if it will not make a clean sweep of galvanic and faradic applications, which have proven their efficacy, it is always an arm the more, and conservative gynecology is unable to do

otherwise than accept all that tends to enlarge and fortify her domain.

THE RESTORATION OF VITALITY TO MUSCLES WHICH HAVE BEEN COMPLETELY PARALYZED FROM POLIO-MYELITIS.

By Graeme M. Hammond, M.D., New York.

It has always been a question of considerable doubt as to whether electrical stimulation of muscles which have become paralyzed from disease of the spinal cord has any decided influence in restoring them to a normal condition and at the same time reflexly stimulating degenerated nerve cells in the cord into a condition of vitality. I think it may be taken for granted that if any permanent benefit is derived from electrical stimulation of the muscles, it must be in consequence of aroused energy in the nerve cells which supply those muscles. Stimulation confined entirely to the muscular tissue, if it has any regenerative effect at all, can only be temporary, and must cease to be operative soon after the stimulation is discontinued. To be permanent at all, the cells in the anterior horns must be stimulated or developed sufficiently to enable them, by their own activity, to supply the paralyzed muscles with motion and nutrition. I do not refer to acute diseases of the cord. In such cases a certain amount of repair takes place in the cord after the destructive process has ceased; but while the disease is in progress the paralyzed muscles are undergoing atrophy, which degeneration local applications of electricity can retard to a great extent. I refer particularly to chronic cases, in which the destructive process in the cord has long since ceased, and in which the patient is left with some muscles over which there is slight voluntary control, and with others which seem to be totally paralyzed.

Microscopical examinations of sections of the spinal cord in such instances show the affected anterior horn to be atrophied, while many of the nerve cells have entirely disappeared, and others again have become rounded, have lost many of their processes, their nuclei are indistinct, and the body of the cell is shrunken, pigmented or granular. Cells are observed in all stages of degeneration, from almost total destruction to a nearly normal condition.

It is the general opinion, and it is probably correct, that the paralysis and atrophy of the muscles are in direct ratio to the destruction of the cells in the anterior horns; that muscles which are partially paralyzed are supplied by cells in a more or less partial state of degeneration; and that those muscles of which the patient has absolutely lost all motor power, have reached that condition on account of the total destruction of the cells which formerly enervated them.

There is a wide diversity of opinion in regard to the value of electricity in the treatment of the paralysis of spinal origin. Nearly all investigators admit the efficacy of this agent in acute cases of polio-myelitis, in retarding the paralysis and atrophy of the affected muscles simply by its local stimulating action on the muscles themselves. But there is not the same unanimity of opinion when the chronic form of polio-myelitis is considered. As I have previously remarked, the only way in which voluntary movements of the paralyzed muscles can be regained is by the more or less complete regeneration of the nerve cells in the anterior horns. No one for a moment believes that nerve cells which have been entirely obliterated can be reproduced again by the action of electricity or by anything else, and many refuse to believe that nerve cells which still exist, though in a more or less degenerated condition, can be stimulated to a more healthy growth or to any further development by electrical applications applied to the muscles supplied to such cells. It is quite possible, in some instances, even in apparently favorable cases, that electrical applications are unavailing, but the cases reported in which permanent benefit has been derived are two numerous to be disregarded. I shall not, therefore, consider the question of the efficacy of electricity in cases of polio-myelitis; I shall take that for granted. I do not mean to say that I believe all cases can be benefited, but I believe many of them can be, if properly treated. The subject which I shall call particular attention to is in reference to the ability to discriminate between those muscles which are capable of being improved and those which are too degenerated to admit of such a possibility.

It is generally conceded that muscles which do not respond at all to repeated attempts at electrical excitation are those whose cells have been destroyed. It is therefore useless to hope for any improvement in their condition. I will admit that if there is no contraction of the muscular elements, or if there are no muscular elements remaining, then electricity is a useless remedy. But how is it to be determined whether a muscle contracts or not? This question is usually decided by the senses of touch and sight. If the operator cannot feel a muscle contract or see it contract, he usually comes to the conclusion that it does not contract, and consequently gives a hopeless prognosis so far as that particular muscle is concerned. But there may be cases—I am satisfied there are such cases—in which the nerve cells, though greatly degenerated, are not entirely destroyed, and the muscular contraction under electrical stimulation does take place, though it may be so slight as to escape detection by the senses of the most acute observer; furthermore, that such cases are sometimes capable of a certain amount of improvement. In support of this view, I desire to report the following cases:

Case 1.—A lady about twenty-five years of age consulted me in the year 1889. When six months old she had suffered from an attack of anterior polio-myelitis which left her with the anterior tibial and peroneal groups of muscles paralyzed in both legs. As she grew older, both gastrocnemii contracted, giving rise to marked talipes equinus. On examination, I found that all of the muscles in the right leg responded to the galvanic current, but not to the faradic. The contractions were, however, very slight. In the left leg the peroneal muscles responded very slightly to galvanism—the anterior tibial muscles not at all. The contraction of the gastrocnemii was so powerful that they could not be overcome by any force it would have been proper to have used. At my request Dr. A. M. Phelps divided the tendons of both muscles. After the tendons had reunited, it was found that the feet could be flexed passively to their normal limit. Voluntarily the patient could flex the right foot and extend the toes slightly. On the left side all the muscles responded faintly to will power except the tibialis anticus and the extensor proprius pollicis. These muscles seemed to be completely paralyzed, nor would they respond to any form of electrical stimulation.

My opinion was that those muscles which could be made to react to electricity could be developed to a limited degree, while it was hopeless to look for any improvement in the tibialis anticus and extensor proprius pollicis in the left leg. I made applications of galvanism almost daily for over a year. The applications were made to the two completely paralyzed muscles just as regularly and as thoroughly as they were made to the others. The development of the others was slow, but progressive. The power of flexion of the right foot gradually increased until it could be perfectly accomplished. I was greatly surprised, about six months after treatment began, to observe a very faint reaction in the left tibialis anticus. As time went on the contractions became more noticeable, and finally could be induced by efforts of the will. A year after treatment began, flexion of the left foot could be performed fairly well. A

little over a year after treatment began, slight contractions were observed in the extensor proprius pollicis. This muscle has slowly developed, but not to the same extent as the tibilis anticus. The great toe can be partially extended, but the muscle is very weak. At the present time the patient walks quite well without a brace of any kind. The heel strikes the ground first, and in bringing the feet forward they can both be so well flexed that the toes never strike the ground.

Case 2.—A lad, eleven years of age, consulted me in April, 1891. When he was six years of age he had an attack of unilaterol polio-myelitis, which resulted in partial paralysis of the anterior tibial group of the left leg, with the exception of the tibialis anticus, which was totally paralyzed. The peroneal group were in the same condition. These muscles could not be made to contract to the electrical current to the slightest appreciable extent. All other muscles acted feebly. There was slight talipes equino-varus. The gastrocnemius was contracted and unyielding; so the tendon was cut.

Electricity was used daily, all of the muscles reacting except the peroneals and tibialis anticus. These muscles, however, received applications just the same as the others. It was only after seven months of daily applications that faint contractions were observed in the tibialis anticus. These, however, increased in vigor, and soon slight contractions could be induced by efforts of the will. This muscle has slowly developed power, so that the foot can be voluntarily flexed; but it requires a mental effort to perform the act, and the muscular effort cannot yet be maintained longer than a few seconds. Although I persistently endeavored for a year and a half, to arouse some vitality in the peroneal muscles, I was not successful. The muscles are just as inert to-day as they were when I first examined them.

Case 3.—A boy, nine years old, came to my clinic at the Post-Graduate Hospital, in May, 1891. When he was three years of age he had had an attack of anterior polio-myelitis, which had paralyzed the muscles on the anterior and external sides of the leg. Electrical examination showed that all of the muscles responded slightly except the tibialis anticus and the extensor proprius pollicis, which appeared to be totally inert. Daily electrical applications were made. It was only at the end of five months that slight contractions were obseved in the tibialis anticus. This muscle gradually developed until voluntary control was fairly well established. The foot could be flexed, but the muscle has never become what could be called strong. The electrical applications were continued almost daily to the extensor proprius pollicis for nearly eleven months' but without obtaining the slightest evidence of reaction.

These three cases show that in some instances it is possible to restore, or at least to partially restore, vitality to muscles which were at first regarded as hopelessly degenerated. Because the senses were not able to appreciate minute muscular contractions, there was no proof that such contractions did not occur. They probably did occur. Those muscles which, after months of careful attention, showed visible signs of vitality were probably in relation with cells in an extremely degenerated condition, but which were not completely destroyed, and which, under stimulation, were capable of a certain degree of regeneration. Those muscles which, even after many months of assidious applications, still failed to show evidences of vitality were evidently completely degenerated and their cells obliterated. These cases simply demonstrate that our senses are not sufficiently acute to determine whether totally paralyzed muscles are capable of improvement or not, and, that it is only after long-continued treatment that this point can be definitely ascertained.

EXECUTIVE SESSION.

A letter written from Paris by Dr. George J. Englemen of St. Louis, was read.

The President thanked the members for their courtesy and coöperation, which had made such a pleasant and profitable meeting possible. Some of those coming a long distance had expressed their pleasure at the large and interested audience present. He then presented the newly elected president, Dr. A. H. Goelet.

Dr. Goelet expressed his appreciation of the honor conferred upon him, and also hoped that he would be able to discharge his duties half as well as the retiring president had done.

Dr. Nunn said that while of course the success of the meeting had depended to a certain extent upon the members, it had depended no less upon the presiding officer, whose courteous manner of conducting the business was worthy of all praise, as it was decidedly exceptional in the history of such gatherings. Last year, after listening to his paper, he admired him as a physicist; last night, he admired him as a toast-master. He felt therefore, that he should congratulate the Association on having such a president, and he moved a vote of thanks to him for the extraordinary way in which he had presided over the deliberations of the Associations.

The Association then adjourned.