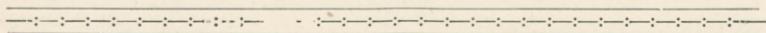


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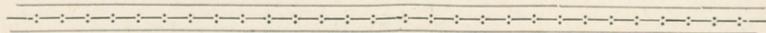


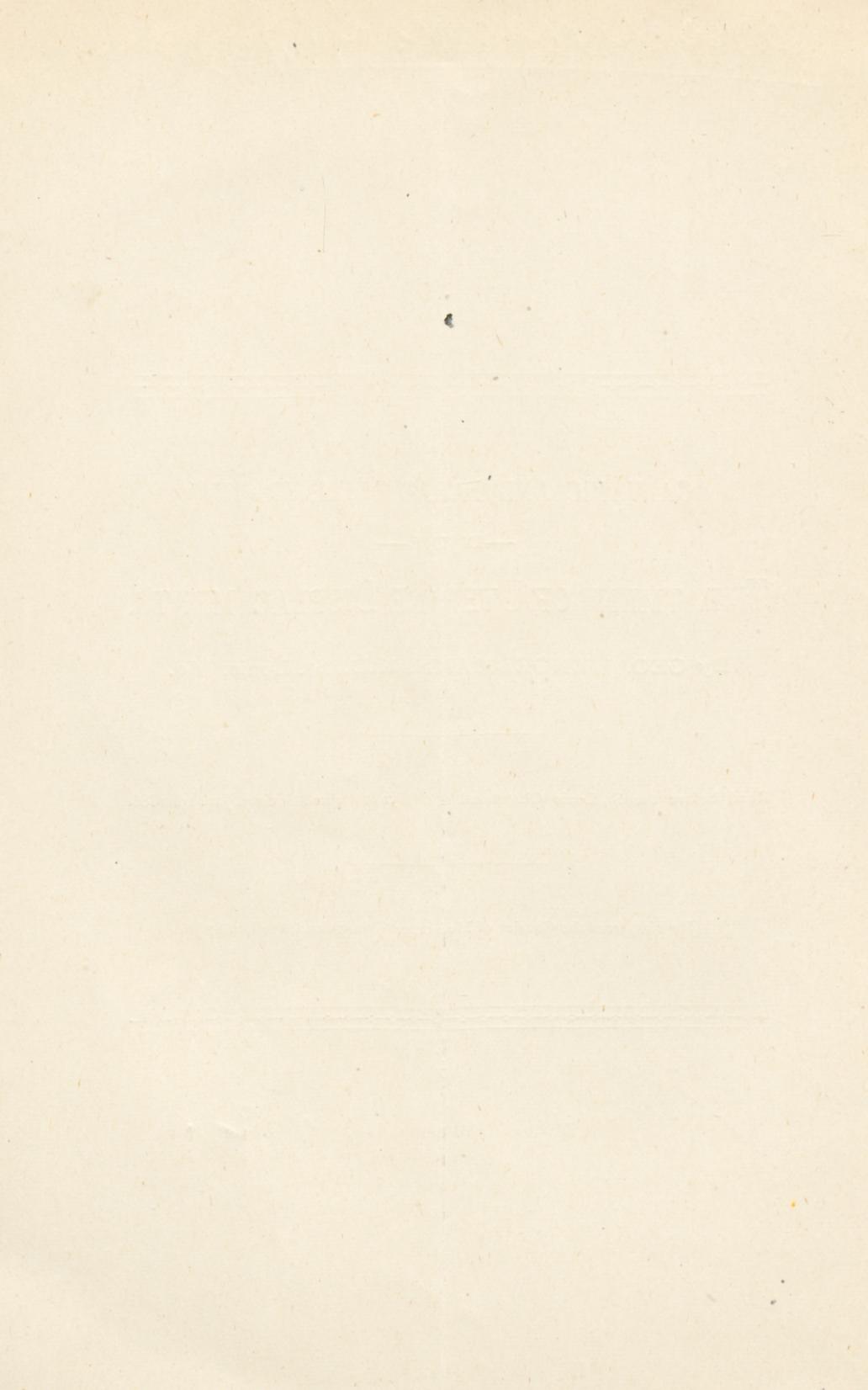
GALVANIC AND FARADIC ELECTRICITY  
—IN THE—  
TREATMENT OF UTERINE DISPLACEMENTS.

By GEO. J. ENGELMANN, M.D., St. Louis, Mo.

Read before the St. Louis Obstetrical and Gynecological Society, Jan. 19, 1886.

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THE treatment of uterine displacements by the electric current, or rather, as it would be more correctly expressed, the use of electricity in the management of uterine displacements, has been briefly discussed in my recent paper upon Gynecological Electro-Therapeutics, read before the American Gynecological Society, in September, 1886. I have not only verified the results previously obtained which are there reported; but I have been convinced by constantly accumulating evidence that we have in galvanic and faradic electricity a most potent and practically available method of treatment by which we are materially assisted in overcoming these persistent and often perplexing disorders.

As frequently as uterine displacements occur either as cause or result of pelvic disease in women, as much as the management of versions and flexions has occupied the professional mind, numerous as the devices resorted to for their relief have been, the

electric current has received no appreciable share of our attention, the most ruinous device, if in the form of a pessary or an intrauterine instrument and the most doubtful or dangerous medication, if for the cavity, have been treated with greater consideration than this truly valuable remedy.

Isolated suggestions have now and then appeared, but, falling upon sterile ground, were soon forgotten. Practically, electrotherapeutics of flexions and versions has never existed. The present status of the question is best demonstrated by the teachings of our text-books and the practice of our gynecologists.

A few lines only are devoted to these applications by comprehensive text-books on electro-therapeutics, and their superficial, and I may say theoretical, treatment of the subject seems to indicate but little faith, and readily explains the unwillingness of the practitioner to test them.

Erb (Translated by Putzel) p. 355 says:

"Displacements of the uterus have also been treated by the electrical current. Such treatment is not devoid of promise in those cases in which they are in the main due to relaxation of the walls of the uterus. In many other cases there is very little hope of relief from such measures.

Even Simpson had recommended a sort of electrical intrauterine pessary in displacements of the uterus, as well as in chronic metritis; favorable results from electrical treatment of versions and flexions have been since reported by various observers.

While Bartholow employed the galvanic current exclusively, E. Mann used galvanism and faradism alternately, the majority of writers, however, applied the faradic current alone in order to produce vigorous contractions of the uterus and thus relieve the change of position. As a rule the current was passed from the os uteri into the abdominal walls. Zannini introduces one electrode into the rectum, the other into the uterus, and faradizes for five or six minutes, with a current of gradually increasing strength.

Tripier has developed these methods most elaborately: in anterior versions and flexions he faradizes the posterior surface of the uterus with a suitable electrode which is placed in the rec-

tum ; in similar posterior displacements the anterior surface of the uterus is faradized from the bladder or abdomen; in both cases a (negative) electrode is introduced into the uterus. In prolapsus uteri he states that good results have been observed from "bi-inguino-uterine," or "bi-inguino-vaginal faradization."

This is all that Erb, one of the most prominent electricians of the day, says about the subject, in a book of 266 pages, and since he refers us to Tripier, as the one who in his opinion, had most fully developed this field, and quotes his method, I take it that he looks upon Tripier as the authority. Now let us consider the teachings of the great Frenchman in the electro-therapeutics of versions and flexions.

Tripier in his recently published *Electrologue Médicale*, Third Edition. Paris, 1885, says:

"Anteversión and anteflexión, recto-uterine faradization, sittings of three minutes usually on alternate days. Sittings more frequent and treatment less prolonged for versions; sittings less frequent and of longer duration for flexions; the same being true of retro-displacements. Retroversion and retroflexion, vesico-uterine faradization."

An important subject rapidly disposed of! The contracting action of the faradic current utilized to pull forward retro- and and drag backward antero-displacements.

I will enter no further upon the literature of the subject; the above quotations from most eminent and recent authorities will suffice to demonstrate how little has been accomplished, but the utter insignificance of electricity as an available agent for the relief of flexions and versions is made most evident by the silence of all writers. Gynecological text-books ignore the electric current, notwithstanding that all possibly available remedies are cited for the relief of these often very trying conditions; not even the present revival of electro-therapeutic science, especially upon the field of gynecology, as inaugurated by our esteemed colleague, and honorary fellow, Dr. Apostoli, of Paris, has as yet suggested the application of this subtle fluid, by which so much has been accomplished, from which so much is yet expected.

It is apparent that treatment such as that recommended by

Tripier must fail, or at best prove so unsatisfactory, that it could never be be classed among the methods recognized as available in the management of flexions and versions; the very idea upon which the application is based bears upon its face the stamp of the study, and must at once appear to the clinician as theoretical, and moreover faulty, so that we cannot wonder that it has not been tested, and if tested has failed and was consigned to oblivion.

I was not satisfied with this verdict, having found the electric current so valuable a remedy in gynecological practice, and observing the improvement of displacements during the treatment of other uterine disorders by this method, I very naturally concluded to resort to electricity direct for their relief. The result was a most satisfactory one, and after prolonged investigation I can most conscientiously corroborate what I have said upon the subject in the paper already referred to; the electric current serves as an aid more or less valuable according to the existing condition, in the management of the various forms of uterine displacements. Though the current assists in the treatment only, it is one of the most potent elements in what I would call the proper method of treating displacements, *the removal of the cause.*

I have looked upon a version, a flexion or a prolapse in the main not as a disease and to be treated as such, but as a resultant or concomitant of other pathological conditions, and to be remedied by overcoming the determining cause and the accompanying changes. For this purpose I have recommended the medicated and supporting tampon; and the electric current I have found to be a potent auxiliary, though by far more effective and rapid in its action; it neither interferes with the dry treatment, nor does it render it unnecessary or ineffective; each serves its particular purpose, and both tend to accomplish the same result.

An admirable feature of this method is that it does not counteract or prevent the use of other applications.

*Method Used.*—A few words only with regard to the method which I have fully described in the paper repeatedly referred to. We must cease to look upon electricity as one rem

edy: it is a *general term* for a *method* of treatment, comparable to *medication*, or to *surgery*. In the management of uterine displacements we employ the polar method altogether, polar action mainly, the interpolar current only when the part to be affected is beyond the reach of the former. The *therapeutic qualities* utilized are the *alterative*, the *absorbent* and even the *electrolytic*, the *tonic*, *stimulant* and *contractile*, all directly effective for the relief of those conditions which most frequently determine or accompany displacements, *i. e.*, *relaxation* of tissue, *induration*, and *chronic inflammation*.

The electric current, by reason of its peculiar character is especially adapted for the treatment of deep-seated tissues, which are beyond the reach of other agents: This invisible fluid permeates every part and particle of an organ which is interposed between the electrodes, and affects alike the nearest and the most remote; the anatomical relations of the female pelvic viscera are such as to admit of the most advantageous use of all the valuable qualities of this agent for any and all of their parts. Many of the tissues can be reached directly as the mucous surface of canals and cavities, and others by puncture with the needle, but all can be brought isolated between the poles, so that the interpolar current can be utilized to its fullest extent without the interposition of parts not to be affected. Whilst neither medication nor medicinal applications can be made to exert any marked or rapid influence on the indurated tissue of a uterus in a stage of chronic metritis, or the tenacious peritoneal bands and inflammatory exudations of a perimetritis, they respond to the action of the electric current as readily as any external hyperplasia, be it applied by the stylet direct, by puncture, by cauterization of the mucosa or carried through from pole to pole.

The electric current has proven in my hands more effective than any other individual agent for the permanent relief of uterine displacements, but to obtain satisfactory results every method which may assist in the treatment must be utilized, and none is more necessary than the tampon or such mechanical means as will serve to retain the parts in a position as nearly as possible to the normal, thus giving permanency to the conditions temporarily established; the advantage derived from each single

application must be retained and developed by proper support.

If the vagina has been contracted by faradization in a prolapse, the circulation stimulated in a flexion, and absorption inaugurated, by galvanism if metritis exist, the tampon will keep the parts in such a position that the condition so established may be continued, and the return of any causative morbid status may be prevented.

I rely upon the dry treatment, medication and support by the elastic tampon, to further and establish the results obtained by electricity; the pessary I employ only in cases of relaxation, uncomplicated by inflammatory conditions, and then but rarely; never if the patient can remain for treatment. I seek to give the necessary support by the elastic tampon, which affords a soft, non-irritating mechanical support, and by the remedy added, contracts, or stimulates the tissues as needed; this can be used to advantage in all cases, even in inflammatory stages and will soon supplant the dangerous pessary, by which inflammation is aggravated, if not excited, and the parts often irritated and distended.

In the treatment of displacements I employ the electric current to overcome the existing pathological conditions be they cause or result of the uterine deviation, (this I look upon as the main object to be attained, and to be furthered by such therapeutic measures as may be called for).

Mild intra-uterine applications are made, if necessary, and with the medicated supporting tampon and postural treatment at the home of the patient enable us to cope successfully with displacements which have so long been vainly attacked by the pessary.

I apply the electric current, then cleanse the parts, removing the frothy coagulum if puncture or cauterization has been used; if in the cavity, it is touched with a 10 per cent carbolic acid solution, unless other intra-uterine medication be indicated; the vagina is thoroughly dried, dusted with an astringent, antiseptic or antacid powder, and the tampon applied, which remains in place, until a few hours previous to the next treatment, and in cases of extreme, purely mechanical displacement, is not removed until the patient returns, which is either upon the second or third day.

The same general rules which I have given for electro-thera-

peutic applications in gynecological practice hold good for the administration of electricity in flexions and versions; the time of treatment varies from 3 to 8 minutes, usually five minutes, and this should be repeated before the effect of the previous application has completely passed away, yet time enough must be given for the treatment to take effect; only if strong contractile action is desired should the sittings be repeated daily; in most cases every second day will suffice. On an average the applications are made every second or third day; only in cauterization or puncture with high intensities, once a week.

*How is This Force to be Utilized?*—As the electric current is a medicinal agent *sui generis*, neither comparable to nor conflicting with others, but compatible with them, so in the treatment of uterine displacements peculiar functions are relegated to this new found potential; which is not to supplant, but to assist and further such methods as are already in use: those who use the pessary will find this more efficient if the vaginal tissues are strengthened by the proper application of faradism: Those who rely upon postural treatment will hasten a result if the tissues are stimulated or pelvic adhesions relaxed by galvanism: medicinal applications are assisted by electro-therapeutic measures, and the tampon is strengthened by the increase of functional activity brought about by electricity; whatever measures be resorted to, their effect will be furthered by the proper use of this powerful agent, which will prove a most desirable addition to the methods already in use, if not the most effective in the treatment of uterine displacements.

*The conditions most commonly causing and accompanying Uterine Displacements* and which are amenable to treatment by the electric current are:

- A. Chronic inflammations.
  1. Hyperplasia of the uterus and metritis.
  2. Endometritis.
  3. Perimetritic adhesions.
  4. Contraction and induration of ligaments and support.
- B. Relaxation and Congestion of tissues.
  5. Subinvolution of uterus.
  6. Subinvolution of vagina and uterine supports
  7. Permanent relaxation, anemia and atony

In all conditions of relaxation, we rely upon the contractile action of the faradic current of quality and low tension from the short secondary helix of heavy wire, with interruptions of moderate rapidity.

Induration and chronic inflammation is met by the alterative and absorbent influence of the negative pole of the galvanic battery, the small, non-metallic cathode as the active pole as near as possible to the part to be affected, the anode, as the dispersing plate directly over its abdominal site. I would recommend for alterative purposes, currents of ten to thirty m.-a., to produce absorption intensities of 40 to 80 or 100 m.-a., for five minutes more or less. An electrolytic action is necessary, for the relief of hyperplasia, and, I use the negative metallic pole in the diseased tissue with currents of 50 to 100 and 150 m.-a. for four or five minutes, with the medium or large plate over the fundus as positive dispersing pole. The same current is relied upon if endometritis is present, but applied with the sound to the diseased membrane.

If the hyperplastic uterine tissue cannot directly be reached by puncture with the electrolytic needle, an intra-uterine application is made, as in endometritis. This application of the cathode to the mucosa for the purpose of inaugurating a retrograde métamorphosis is one of the most effective and successful remedies.

To stimulate functional activity in the uterus, or in the atrophied portion, as in the angle of flexion, we utilize the cathode with intensities of 10 to 20, hardly as highly as 30 m.-a. or bipolar, intra-uterine faradization with currents of moderate tension and quality, in sittings of from four to six minutes.

To stimulate pelvic circulation and hasten retarded development of the uterus itself, similar applications are made, varied by vagino-abdominal faradization, or negative vagino-abdominal galvanism with intensities of 10 to 20 m.-a.

To promote involution of the uterus, utero-abdominal and bipolar intra-uterine faradization with currents of quality and low tension is very effective; bipolar intra-uterine galvanism with stronger currents will produce contraction and functional stimulation.

Mild faradic currents of medium quality may serve as a tonic and stimulant, and currents of quality and low tension as a powerful contractor to produce what may be called massage of the parts, for which purpose interruptions should not be frequent, that the effect may not be tetanic.

*How the Current is Utilized.*—Uterine hyperplasia and chronic metritis, so frequently a cause of anteversion and an accompaniment of retroflexion, is treated by electro-cauterization of the uterine mucosa with intensities of from 50 to 150 or 200 m.a.; this is at the same time the most effective remedy for endometritis which so commonly co-exists; in this cauterization the diseased mucosa is destroyed, (or stimulated according to the intensity of the polar action) absorption is promoted in the surrounding tissues, uterine and circumuterine, by the interpolar current, and retrograde metamorphosis is inaugurated in adhesions, effusions and metritic induration. If the uterus is large, low, readily reached, negative electro-puncture is resorted to, the cathode, armed with a platinum needle or a small stylet, (= to No. 1 catheter), is plunged into the tissue, parallel to the uterine canal, and a strong current is passed for five minutes, more or less.

If an anteversion has become excessive by long continuance, and metritis with the usual train of accompaniments has appeared, the canal may be so narrowed as not to admit of medicinal applications, and the diseased part cannot be reached by the needle without difficulty. A negative electro-cauterization of the endometrium is then our first entering wedge, the canal is enlarged and straightened; at the same time the endometritis is treated by chemical cauterization by the pole direct, and absorption and retrograde metamorphosis is inaugurated, and functional activity stimulated in the hyperplastic fundus by the interpolar action of the current.

If the anteversion is caused by adhesions, or perimetritic effusion fixing the lower portion of the uterus posteriorly, absorption of such inflammatory products is furthered by the cathode of the galvanic current, and later the activity of the tissues is stimulated by faradism, both currents applied in the same way, a non-metallic, cotton covered ball electrode, the cathode, is placed in

the vagina and pressed against the part to be reached, whilst the anode serves as the dispersing electrode over the fundus, on the abdomen. From 40 to 80 m.-a. for five minutes, even eight or ten minutes in extreme cases, with the medium or large plate are applied; weaker currents, with the cathode, serve rather as a stimulant. Faradism of moderate quality and tension with frequent interruptions follows as a stimulant: greater quality, lower tension, and less frequent interruption is used when we wish to contract the congested and relaxed vagina.

A flexion due to relaxation of tissue is overcome by utero-abdominal, or bipolar applications of faradic currents of quality and low tension, moderate intensity, or by the stimulating action of galvanism: the cotton wrapped applicator, insulated up to within two inches of the end, well soaked in warm water, is placed within the cavity, the small or medium plate over the fundus, and currents of 10, 20, at most 30 milliamperes are applied for six or eight minutes.

Retroversions, unless due to adhesions, are commonly the direct result of subinvolution of the uterus itself, or of the vagina and other uterine supports, which is effectively treated by faradic currents of quality; bipolar intra-vaginal and labile vagino-abdominal applications to affect the vagina, stable vagino-abdominal currents, for the circum-uterine tissues and intra-uterine, or utero-abdominal currents for the uterus itself, with non-metallic intra-uterine pole.

Retroflexions, like anteflexions, are dependent upon or aggravated by metritis, endo-metritis and cellulitis, or by perimetritic adhesions, but most frequently they may be traced to subinvolution and relaxation of the uterine supports, especially the vagina, hence the stimulating and contracting action of faradism of quality and low tension is almost invariably called upon. Chronic inflammation must be relieved, contracted tissues or adhesions relaxed by the absorbent influence of galvanism, but until the weakened supports are restored, permanent reposition by mechanical means cannot be expected.

Descensus or prolapsus, if due to enlargement of the uterus or relaxation of the vagina, may be relieved if the tissues retain sufficient vitality; if the perineal support is insufficient the result

can only be palliative. I rely mainly on the contractile action of faradic currents of quality and low tension applied to the vagina, the uterus, the ligaments and abdominal muscles; but galvanism is frequently needed for the relief of accompanying endometritis and hyperplasia.

#### MECHANICAL DETAILS.

I.—*Applications to the Uterus* are made

*a.* With both poles in the cavity, the bi-polar application to contract and to stimulate, making it possible to use stronger currents, as they are confined to the less sensitive intra-pelvic tissues and do not enter the sensitive cutis.

*b.* The active pole in the cavity and the indifferent pole with the dispersing plate on the abdomen, over the fundus.

1. The active intra-uterine pole is metallic, and is so used with stronger galvanic currents as a chemical cautery for the endometrium, electro-cauterization of the uterus.

2. The active intra-uterine pole is non-metallic, a moistened cotton wrapped applicator, if cauterization of the mucosa is to be avoided and a stimulating effect is desired.

3. The active intra-uterine pole is used for purposes of medication; the cotton wrapped applicator is saturated with fluid electrolytes.

*c.* The active pole in the tissue, with strong galvanic current for electrolysis and absorption. Electro-puncture. The indifferent pole with the dispersing plate is over the fundus on the abdomen.

*d.* The active pole against the cervix, as a non-metallic (cotton covered) ball, or cup-shaped electrode, the indifferent, dispersing pole on the abdomen. This is applied, if the cavity cannot, or should not be entered, and it is desirable to affect the entire organ either by galvanic or faradic currents.

II.—*Application to the Vagina:*

*a.* Both poles in the canal, the bipolar or intra-vaginal application. When very strong faradic currents are to be used, which are not borne externally and should not extend to parts not to be affected, especially in sub-involution, the poles should be non-metallic, covered with moist absorbent cotton.

*b.* The active pole is in the vagina, non-metallic unless cauterization is desired; the indifferent pole, as a dispersing plate, is on the abdomen over such part to which treatment is also directed, the fundus uteri or the diseased ovary.

III.—*Application to the Circum-Uterine Tissues, Ovaries or Ligaments.*

*a.* Vagino-abdominal applications; the active pole is placed in the vagina as near as possible to the tissue to be reached, always non-metallic, a round or oval ball,  $\frac{1}{8}$  to 1 inch in diameter, covered with absorbent cotton saturated with warm water. The dispersing electrode at the indifferent pole is placed on the abdomen as nearly as possible over the part to be reached.

*b.* Medicinal application may be so made by saturating the pole nearest the affected part with a fluid electrolyte.

*c.* If powerful electrolytic action is desired, and the part under treatment presents sufficient body, it may be reached by the pole direct, a platinum needle which is inserted into its tissue per vaginam, electro-puncture.

The applications are invariably stabile, with the most careful avoidance of shock. Labile applications are admissible only in vagino-abdominal faradism for contraction of the vagina, when the intra-vaginal pole may be moved along the vaginal walls to reach all points.

The resistance of the tissues, between the vaginal or uterine, and the abdominal electrode varies from 100 to 600 Ohms, being generally from 200 to 300 Ohms.

CASE I.—*Anteflexion*. Miss C., æt. 26. Anteflexion, endometritis, metritis, and remnants of chronic ovaritis and perimetritis, low form of chronic cystitis due to pressure of the uterus on the bladder, frequent and painful micturition, dysmenorrhœa.

I mention this case, because it is typical of the most annoying form of anteflexion of long standing, the uterine tissues hard, indurated, and the organ held in its abnormal position by the contracted thickened ligaments, and because I, myself, had tried treatment by other methods, and did not resort to electricity until I had exhausted the known remedies.

Patient came to me in June, 1885, in a debilitated condition, harassed by menstrual suffering and pain which accompanied frequent micturition, excessively nervous, in fact so seriously was her nervous system affected that her condition was one bordering on mental disturbance. She had been under the treatment of able physicians for the most annoying symptom, cystitis, but without benefit, and seemed grateful for the very slight improvement which was noticeable when she returned home after I had made all possible efforts to afford relief during the one month of treatment. I gave her tonics, applied blisters and poultices, ordered a hot douche; applied cocaine to vagina and urethra, iodine to the cervix and vaginal vault, endeavored to raise and replace the uterus, which lay directly behind and underneath the symphysis, with tampons, and, when these seemed ineffective, with pessaries. Intra-uterine medication was difficult and but partially possible on account of the sensitive condition of the parts and the occlusion of the canal by the acuteness of the flexion; a fine, flexible probe entered with difficulty, and applications were so painful, when possible, that I

did not persist. Some relief was afforded by galvanism, mild currents, with the positive pole, being applied for their sedative effect, to the vagina and also to the urethra, some temporary improvement was referable to the tampon; but though the pessary effected a more thorough reposition, it caused irritation in the hypersensitive inflamed viscera and could not be retained.

Miss C., returned in December: the local condition was unaltered, but her appearance was decidedly better, the cervix, as before, was almost in the vulva, and the fundus bent right upon the neck, against the symphysis.

*Treatment.*—Dec. 9. Mild vagino-abdominal faradism, positive (mild) pole with cotton-covered ball electrode in the vagina, the negative pole, with the small abdominal plate over the fundus uteri; fine wire coil, current of high tension, frequent interruptions (3,000 per minute), for three minutes. This application, which was made for the purpose of quieting the nervous irritability, was followed by a negative electro-cauterization of the cavity. The finest probe only could be introduced when sharply bent, this was connected with the negative pole, and the medium abdominal plate with a surface of 28 square inches over the fundus with the positive; a current of 45 milliampères was passed for five minutes, ( $13\frac{1}{2}$  coulombs), with an electro-motive force of  $10\frac{1}{2}$  volts, tissues and electrodes representing a resistance of 250 ohms. Had the patient not been so excessively sensitive, as well as nervous, I should have used at least 60 to 80 milliampères. The metal pole was used in the cavity as a cautery to the diseased endometrium, and the electrolytic action of the current emanating from it was utilized to overcome the induration in the uterine walls and in the circumuterine tissue. An intra-uterine application of a 10 per cent carbolic acid solution was made, the vagina was dried, dusted with iodoform, and the uterus replaced by three tampons of iodized cotton, the lowest coated with ferrated cotton to hold the parts in place by contraction of the tissues around it, these were removed on the evening of the following day, before taking a douche of six gallons of water, at  $118^{\circ}$ , F. which was repeated next morning.

Dec. 13. I saw patient for the second time, and could now introduce a sound of ordinary thickness, but with a strong curve,

almost bent double; the same treatment was repeated. A slight flow coming on, I did not see patient again until Dec. 21. Same treatment. The uterine walls had lost their rigidity, the organ was not so low, and the bladder was less irritable.

Dec. 23. Faradism not used for sedative purposes, but after the (galvanic) cauterization, with a current of less tension and greater quality, heavier wire coil, for purposes of contraction and massage. Flexion quite overcome so that a sound of ordinary thickness with very slight curve at point entered readily, 60 m.-a. for four minutes, with medium plate on abdomen as positive pole,

Dec. 27. Same treatment, slightly curved platinum sound 45 m.-a., uterine walls soft, organ movable, readily replaced. Patient does not micturate so frequently, still feels a burning in the urethra, for which I applied the positive metallic pole to the urethra as a sedative, 4 m.-a. for two minutes.

Dec. 31. Improvement continuing, patient visibly better, sleeps well, looks brighter; negative electro-cauterization of uterus, 35 m.-a. application to urethra has given no noticeable relief, hence I resorted to the bipolar application, both poles in the urethra.

Jan. 3, 1887. Same treatment: believes to have found benefit from urethral application.

The menstrual flow came without the usual premonition, without pain; and, though profuse, passed off with little suffering, a relief which patient has not experienced for years.

Jan. 12. Treatment was resumed but I was obliged to resort to the curved sound again as the flexion had in part returned. The same applications were made, and

Jan. 14. I had so far overcome this that I could again use the slightly curved instrument. The uterus is readily replaced, but again sinks down when the support is removed.

After this eleventh treatment by (galvanic) electro-cauterization the canal is open, the endometritis greatly bettered, the metritis, as shown by the loss of rigidity, improved, the indurated circumuterine tissues are more pliable, the uterus can be raised and replaced, and all parts are less sensitive; by faradism with currents of high tension the hyperesthesia was re-

duced, and later by currents of less tension and greater quality, the circulation was stimulated, and the tissues invigorated; by the tampon of iodized cotton a mild continuous iodine action is attained and the parts held in position, so that the pressure on the bladder is diminished and the circulation is relieved.

I believe that the greatest difficulty is mastered, and treatment may now be directed to the vesical catarrh, since the rigid flexion is completely overcome and the pressure, which caused the irritation, will no longer continue.

In this case the electric current enabled me to overcome these long existing and unyielding conditions, in a comparatively short space of time, which I had in vain attempted by other means six months previous. The first and most difficult step accomplished, other methods might now, perhaps, be employed with equal effect, which in the first stage of the treatment must have failed. Pessaries are of little avail in antelexions, and dangerous in cases accompanied by chronic inflammation, the very conditions under which we can use electricity with such rapid and decided effect.

CASE II.—*Anteflexion due to Relaxation of the Uterine Walls and Atrophy of Tissue about the Internal Os.*

Miss K., æt. 20, anemic, consulted me Oct. 10, on account of painful and scant menstruation. The cervix was conical, large and hard, the fundus small, acutely flexed, could be entered only by a fine well-curved probe: this I attached to the negative, stimulating pole of the galvanic battery, placing the positive pole with the dispersing plate on the abdomen, over the fundus. Ten m.-a. were applied for six minutes, a quantity of  $3\frac{1}{2}$  coulombs being used. At the close of the sitting I was enabled to introduce an ordinary sized, strongly curved sound. October 12, I repeated the same application for four minutes, and then being able to introduce the large sound, used this as my intra-uterine electrode for three minutes more.

Oct. 14. I could now introduce the large sound, still strongly curved, and applied 15 m.-a. for five minutes, following the application by vagino-abdominal faradism to stimulate the circulation in the pelvic tissues, the negative cotton-covered ball electrode being in the anterior fornix, against the fundus.

After this third application the menstrual period came on with but little pain, and much more free. Oct. 21, the treatment was resumed, the flexion being again more acute, but still admitting the large sound. Oct. 23, I could now introduce the large sound with but a slight curve, but did not continue the treatment with this, using the cotton-wrapped applicator instead; a negative electro-cauterization<sup>1</sup> 10 m.-a. to stimulate the muscular walls and mucosa, especially in the angle of flexion was followed by vagino-abdominal faradism. The patient was improving and did not come with the same regularity, sometimes every third day: still the second period, Nov. 13, came on her unawares, lasted five days and caused no pain whatsoever. The uterus was more firm, and in a position of normal anteversion with slight flexion.

CASE III.—*Anteversion and Latero-flexion by Perimetric Adhesions, with Metritis and Endometritis.*

Mrs. R., æt. 30, consulted me on account of pelvic weakness, pain in the left leg, nervous irritability and great physical weakness; her condition had been rendered unbearable by an exposure soon after a recent miscarriage, and she had been under treatment for some time without apparent benefit, her suffering being on the contrary aggravated by repeated attempts to correct the misplacement by various pessaries.

The irritability of the parts was first relieved by mild vagino-abdominal faradism with currents of high tension. The application caused a pleasant feeling of warmth in the abdomen during and immediately after the treatment and an improvement in the circulation. A noticeable stimulus throughout the entire body was felt during the remainder of the day.

When the irritability had been somewhat allayed, after the third treatment upon alternate days, I resorted to negative elec-

<sup>1</sup> More properly, negative *utero abdominal Galvanism*, since I shall limit the term electro-cauterization to the application of the current with the active metallic pole; this was the case in the previous applications by which it was desired to enlarge the canal. This being accomplished, I then used the cotton wrapped applicator in the cavity, to stimulate the uterine tissue, and to avoid further cauterization, as it would be caused by a metallic electrode.

tro-cauterization of the endometrium 40 m.-a. for five minutes, 60 m.-a. two days later, increasing the intensity to 100 m. a. With this I was obliged to use the large plate (with a surface of 55 square inches) as the dispersing electrode at the positive pole over the fundus, the resistance of the tissues being 212 ohms., that of the electrode 18 ohms, with warm water, the quantity of electricity varying from 18 coulombs (60 m.-a.) to 30 coulombs (100 m. a.) With the improvement in the condition of the uterus and its mucosa, the fixation was lessened by the action of the inter-polar current on the circumuterine tissue, and I was enabled to replace the uterus somewhat by the tampons.

The first menstrual period, since the beginning of treatment, passed with less pain and a more profuse flow, and I now devoted my attention to the perimetric adhesions, using bipolar intra-uterine galvanism for three minutes, and negative vagino-abdominal galvanism for five minutes. The negative pole with the cotton covered ball electrode was placed for two minutes against the posterior adhesions in the cul-de-sac, behind the cervix, and for three minutes against those to the left of the fundus. The medium plate, 28 sq. ins. of surface, in connection with the positive dispersing pole, was firmly pressed on the abdomen over the fundus; a current of 30 m.-a. was first used, later, 40 and 60 m.-a. (With higher intensities a heavy layer of absorbent cotton must surround the vaginal ball electrode so that it may not cauterize.) During one intermenstrual period this treatment was pursued, and finally vagino-abdominal faradism or faradic massage was applied to strengthen the vagina and stimulate the functional activity of the parts; currents of moderate quality and tension were used. In this case, as in so many others, I observed a very welcome action of the faradic current on the atonic condition of the bowel. The patient who had been suffering from constipation, for which I had given the Friederichshall water, found that smaller quantities sufficed, and that she was enabled to do without it altogether after the second week of the faradic treatment. In the vagino-abdominal application sufficient of the extra-polar current radiates throughout the surrounding tissues to affect the muscular fibres and the nerves of the intestinal tract to stimulate and contract the flabby tissues. We have no better means

to overcome constipation, when due to relaxation or distention of the bowels, than the properly applied faradic current of quality and low tension, and in gynecological treatment this is more or less influenced, so that I not unfrequently observe the relief of constipation of long standing, which has resisted medication, in the course of treatment; but if this be not continued for a sufficient length of time the constipation returns after the cessation of the faradic application.

CASE IV.—*Retroversion and Flexion and Descensus Uteri, with deep Laceration of Perineum, Laceration of Cervix, Subinvolution and Hyperplasia with Endometritis.*

Mrs. H., æt. 40, came to me complaining of inability to perform her usual duties, bearing down and dragging sensations, together with numerous neuroses. For several years she had been under the care of a prominent gynecologist who had treated her, operated on the perineum and endeavored to replace the uterus by means of pessaries. Though she had been improved, her condition was still a very unsatisfactory one.

I found the enormously enlarged cervix in the vulva, screened from view only by the thin band of tissue which had been formed by the perineal operation, the fundus in the hollow of the sacrum, the vagina relaxed and congested.

The following line of treatment was pursued to reduce the size and weight of the uterus:

Scarification to reduce the congestion.

Negative electro-cauterization of the cavity to overcome the endometritis and inaugurate absorption in the hyperplastic uterus.

Negative electro-puncture into the hyperplastic uterus, after the endometritis had been relieved, for its direct electrolytic action.

Astringent supporting tampons were placed after each treatment, and allowed to remain in place until the evening of the following day, when a hot alum injection was taken, which was repeated upon the following morning before returning for treatment.

Contraction, then stimulation and reposition.

Contraction of the uterus by bipolar intrauterine galvanism and faradism.

Contraction of the pendulous abdominal walls, the uterine and vaginal tissues, was furthered by vagino-abdominal and intravaginal faradization, with currents of quality and low tension, 2-300 interruptions, and notwithstanding the deep vaginoperineal laceration, patient now quite comfortable, the uterus reduced in size, high in the pelvis in a position of normal anteversion and flexion, but as some extra exertion is demanded by the festivities of the season, and she cannot come regularly for treatment so that the astringent tampon can be inserted, I have placed a soft Albert Smith pessary, with which she is perfectly comfortable, and which she will wear until ready to submit to a colpoperineorrhaphy, which will restore her to perfect health. Even now, *without the pessary, notwithstanding the deep laceration, the womb retains its position unless subjected to unusual strain.*

This result was accomplished by the electric current aided by astringent tampons, in a case which had resisted intrauterine medication, the pessary and even the operation at the hands of a prominent gynecologist.

The treatment was inaugurated by negative electro-cauterization of the endometrium; the platinum sound, of ordinary thickness, insulated up to its point of contact with the cervical canal, connected with the negative pole, the medium abdominal plate, (28 sq. in's. of surface) as the positive pole over the fundus, with an electro-motive force of 8 volts, 40 milliampères were used for five minutes, representing a quantity of 12 coulombs, used in the treatment, the resistance of tissues and electrode being 285 ohms in the beginning of the sitting, reduced in the course of a few minutes to 200 ohms by thorough saturation of the epidermis and penetration of the current. The resistance of my No. 2 electrode being about 14 ohms, when merely moistened with warm water (I never use salt on account of the ill results of electrolysis by stronger currents, the chlorine developed injuring the electrode and causing greater burning) the resistance of the tissues in this case, large abdomen, from the fundus to the abdomen, was 186

ohms, and that of the dry epidermis 85 ohms, which was overcome by saturation with the fluid from the electrode.<sup>1</sup>

At the next sitting, 60 m.-a. were used, increasing, without the addition of more cells, to 80 m.-a. as the resistance was decreased from 285 to 200 ohms by the soaking of the epidermis; 80 m.-a. was applied for five minutes, under an electro-motive force of 16 volts, the entire quantity of electricity used upon the patient in the sitting being 24 coulombs. As the endometritis improved, though some effect of the inter-polar current was visible in the lessening of the induration of the walls, I attacked this direct by electro-puncture, using the platinum needle to the depth of  $1\frac{1}{2}$  inches in the tissue as the negative pole, with the medium electrode on the abdominal wall, at first 60, later, 100 milliamperes, and then 120 m.-a. for six minutes, 43 coulombs, but with the large abdominal plate. These applications were followed by vagino-abdominal faradism; the cotton-covered ball electrode as the more irritating negative pole in the vagina, the same electrode which I had before used on the abdomen, with a current of quality and low tension, for three minutes; not only did this seem to contract and strengthen the vaginal and uterine tissue, but the circulation was stimulated, the activity increased, and absorption, which was inaugurated by the electrolytic action of galvanism, was furthered by this faradic massage of the tissues, a massage most effectively obtained by this method, with benefit and without pain to the patient, far more effective than that suggested by Reeves Jackson, by digital manipulation.

Finally, as the uterus was reduced in size, as the inflammatory condition had been overcome, and the tissues had been strengthened, I resorted to bipolar intra-uterine, and bipolar intra-vaginal faradism with the same current of great quality, each application in the same sitting for three or four minutes. This is the most powerful contractor and stimulant, since stronger currents can be applied if we limit their effect to the uterine or

<sup>1</sup>My abdominal electrode, No. 1, or large, No. 2, or medium, No. 3, or small, are respectively  $6\frac{1}{4}'' \times 9\frac{1}{4}''$ ,  $4\frac{1}{2}'' \times 6\frac{1}{4}''$  and  $3\frac{1}{2}'' \times 4\frac{1}{2}''$ , very pliable sheet lead covered with punk or absorbent cotton, which is held in place by chamois skin).

vaginal tissues exclusively, which are much less sensitive than the cutis of the abdomen.

After each application the parts were cleansed and dried, dusted with an iodoform and alum mixture, and the uterus replaced and fixed by the astringent elastic tampon (wool with alum).

Now, as I do not see the patient regularly, I have substituted a pessary for the tampon, and remove this for treatment once or twice a week, or every two weeks, as it happens, applying bipolar intra-uterine galvanism and bipolar intravaginal faradization; notwithstanding constant exertion, the uterus is high in the pelvis, in normal position, and I merely seek to retain the present favorable condition until operative interference will be possible. The pessary was inserted as a safeguard merely, as the patient was perfectly comfortable, and the parts remained well in position; but under the present unusual strain I feared a relapse if more effective measures were not taken.

CASE V.—*Prolapsus Uteri.*

Mrs. H., æt. 64. Notwithstanding the age of the patient, the uterus was still large, the cavity wide, emitting a profuse discharge: the perineum was lacerated, and the vaginal walls distended and relaxed. Patient had been unable to walk any distance for the past 30 years; living in a country town, she had moved about considerably with the aid of a low phaeton, but did not dare trust her feet; when she first came to the city, it was with great effort that she reached my office: in fact it was some days before she could summon courage to make the attempt, being obliged to walk one-half of a square from her home to the street cars, and from the cars to my office. During three months Mrs. H. gave herself up completely to treatment, resting the greater part of the time during the first two months in the semi-prone position. Negative electro-cauterization was first resorted to to overcome the rather profuse discharge and to diminish the size of the uterus, from 50 to 80 m.-a. being used for four minutes, followed by bipolar intra-vaginal faradization for four minutes, with a current of greater quality, 500 interruptions per minute, which served to contract and strengthen the vaginal tissue. For the same purpose, and the support of the

uterus as well, I inserted tampons of tannated cotton coated with a thin layer of ferrated cotton. These were left in place for two days and removed by me before renewed treatment. After the second week the discharge being diminished, negative electro-puncture of the uterus with platinum needles was resorted to, 80 to 100 m.-a. for four minutes, sittings on alternate days until eight or ten punctures had been made. The uterus was hereby reduced in size.

The treatment for the following months was bipolar intrauterine galvanism, 10 to 20 m.-a. for four minutes, followed by vagino-abdominal faradization for three minutes, and bipolar intra-vaginal faradization for three minutes; the vagina was then dusted with an astringent antiseptic powder, and the same astringent tampons used; these were, however, now removed upon the second day, just before returning for treatment, and a hot alum injection taken. During the third month the patient began to take some exercise, walking a square at a time until gradually she walked the six squares to my office. Her general condition improved very much, her appetite was much better; the swelling of the left leg, due to edema and venous congestion from pressure of the enlarged, prolapsed uterus upon the pelvic veins, steadily diminished; the pains in the leg, which had been supposed to be rheumatic, became less and less; leg and foot thinner, and for the first time in many years the patient was enabled to wear a shoe in place of a slipper, upon the left foot, such as the one she wore upon the right. Her walks were extended, the treatment became gradually less frequent, every third day, twice a week, weekly, until after four months of steady treatment this lady, who had not walked but a few steps at a time for the past thirty years, was enabled to walk with comfort as far as could be expected for one of her age and general condition. Her spirits, and the tone of her system were all much improved; she had increased in weight, the swelling of the leg which had existed for years had disappeared; though for several months she continued to use tampons, which she herself inserted. I believe that now she has done away even with these.

This lady, the mother of a physician, had been under treat-

ment so long, had patiently tried so much with so little benefit, that for years she had given up all hope. Unwillingly she began treatment, yet the result which surpassed my most sanguine expectations, was a striking one.

#### CONCLUSION.

It is needless to continue the recital of cases, since these here related will suffice to demonstrate the applicability of the method for the improvement and cure of these conditions which have so long troubled, if not resisted, the efforts of the gynecologist, as is clearly shown by the varied forms of the innumerable pessaries vainly devised for their relief.

The various forms of galvanism and faradism afforded by the polar method are so admirably adapted for this treatment that a cure is now possible, and that within a brief space of time. Whilst the pessary, the main reliance hitherto, endangers the patient, is liable to give pain and excite inflammation, the secondary effects of properly applied electricity are most beneficial; the circulation is improved, absorption is furthered, pain is relieved, many of the neuroses are dispelled, dysmenorrhea is checked, and constipation may be overcome, but under no other circumstances do we see the superiority and the wonderful efficiency of this agent so apparent as in flexions with narrowing of the canal accompanied by metritis and endometritis, which yield but slowly to any other method; whilst immediate relief follows galvanic treatment. This relief may be so rapid and so complete as to surpass our most sanguine expectation. As in a patient who had suffered for five years from constant pain and intense dysmenorrhea, due to an anteflexion with stenosis of the internal os, which had heretofore resisted treatment until the poor woman had given up in despair, after two applications, the menses appeared, to the amazement of the patient, without any appreciable pain.

By the same application which serves to overcome the causative pathological condition, the accompanying neuroses are dispelled, and a most excellent tonic effect is exerted on the pelvic viscera. But the polar method, as I advocate it, must not be confounded with the vague use of electricity generally prevalent, and success can only be attained by methodic scientific application.

Contraindications are found only in the rarely existing idiosyncrasies.

I sincerely trust that electricity will be accorded a thorough trial in the treatment of uterine displacements, and will receive that consideration which it merits; it is a welcome addition to our limited means, more especially so since it is intended to supplement, and not to supersede or replace, the methods already in use.

## SUMMARY.

### ABBREVIATIONS.

- = negative.
- + = positive.
- E. C. = electro-cauterization.
- E. P. = electro-puncture.
- V. A. = vagino-abdominal.
- U. A. = utero-abdominal.
- Ic. = coil of short, heavy wire, low tension, quality.
- Iic. = coil of medium wire, medium tension.
- IIIc. = coil of long, fine wire, high tension, little quality.
- 1P. = large plate, 6x9.
- 2P. = medium plate, 4x6.
- 3P. = small plate, 3x4.
- I<sup>3</sup> = few interruptions, up to 500.
- I<sup>2</sup> = 500 to 1500 interruptions.
- I<sup>1</sup> = 1,500 to 2,500 interruptions.

### CONDITIONS.

#### ANTEFLEXION.

PRIMARY. Frequently due to a *defect of development*

or an abnormally *large cervix*

### ELECTRICAL APPLICATIONS.

Utero-abdominal and vagino-abdominal faradization, 6 to 8 minutes, moderate quality and tension, moderate intensity, frequent interruptions, (—U. A. and V. A. farad. 6 to 8 min. Iic., I<sup>1</sup>) moist, non-metallic, penetrating electrode, negative intrapelvic; or galvanism, negative, non-metallic electrode in or against uterus, small abdominal plate, externally, (—U. A. and —V. A. + 3P.), 8 to 15 m.-a. 4 to 6 minutes.

Negative electro-puncture (—E. P.) 60 to 100 m.a., 5 min.

aggravated by *passive hyperemia* of the fundus resulting from compression of vessels.

Tissue in the angle of flexion is *badly nourished* by reason of the compression of vessels. Atrophy of the flexed part results; consequently the muscle is weakened.

The *walls are flabby*, erection fails to occur during the menstrual congestion, the blood cannot enter the vessels, the flow cannot escape through the canal, the blood stagnates, the uterus becomes hyperemic. The sequence is frequently *chronic metritis* and hyperemia in circumuterine tissue which may lead to disease of the parts about the uterus.

SECONDARY flexions may be caused by circumuterine diseases. Inflammation in the fossa of Douglas—posterior to lower part of the uterus from perimetritis or extending uterine inflammation (gonorrhoeal)—produces *adhesion of the lower posterior part of uterus to opposite peritoneum*; this and inflammation and contraction in the folds of Douglas may lead to fixation of uterus in angle of flexion; as the cervix and the angle is drawn upward, the fundus sinks down. (Posterior ligaments indurated).

Atrophy of the angle and above mentioned conditions follow, by whatever cause the anteflexion be produced, by a fibroid or by a fall.

ANTEVERSION is usually the result of *chronic metritis* by which the normal angle of flexion is obliterated—more common since metritis frequently ac-

Bipolar intra-uterine or utero-abdominal faradization (II.c. I<sup>3</sup>) moderate quality and tension, frequent interruptions; if not inflammatory, quality and low tension, interruptions of moderate rapidity. Ic., I<sup>1</sup>

Negative galvanization (— U. A.) of cavity, 8 to 15 or at most 20 m.-a., cotton-wrapped applicator in utero, small plate on abdomen (3P.)

Utero-abdominal faradization (—U. A. far. II.c., I<sup>3</sup>) especially before menses.

Negative electro-cauterization of cavity 50 to 150 m.-a., 3 to 5 min.

Negative vagino-abdominal galvanism 40 to 80 m.-a. 2. or I. P. negat., cotton-wrapped ball electrode per vaginam against point of fixation, and positive pole on abdomen, according to intensity of current used, medium or large plate.

Negative electro-cauterization of uterine cavity, if with endometritis; by negative electro-puncture of uterus, if hyperplasia is great, 50 to 150 m.-a., 2.P., 4 to 5 min.

companies *perimetritis*.

Perimetritis may cause anteversion by *fixation* of lower end of uterus posteriorly, or upper end anteriorly.

Anterior fixation by perimetritic *adhesions* of one tube and ovary to anterior pelvic wall causes anteversion with lateroversion.

RETROFLEXION.—Mostly follows *retroversion in the puerperium*, or post abortum. The ligaments gradually yield; as involution progresses the uterus becomes more *flexible*, the large upper half bends back more and more and sinks into the hollow of the sacrum, and

*Adhesions*, remnants of the puerperium, bind and hold down the fundus.

*Chronic metritis*,

disturbed circulation—*hyperemia*—cause or follow retroflexion, and are frequently found with it.

*Adhesions* holding one peritoneal wall, or fold, to the opposite are common, and may result from cellulitis, hematocèle, especially gonorrhœal perimetritis.

Retroflexion itself may cause adhesions; feces, increased intra-abdominal pressure, or the weight of the fundus, may press this enlarged body against the pelvic floor and thus create adhesive inflammation.

Negative vagino-abdominal galvanism, cotton ball electrode in vagina: positive, medium plate (2. P.) on abdomen, 40 to 80 m.-a., 3 to 5 min.

Same as above, ball electrode against point of fixation; if no pain or acute inflammation, to be followed later by massage; vagino-abdominal farad heavy wire coil, quality and low tension, moderate intensity, moderately rapid interruptions 2 to 4 minutes, cotton-covered ball electrode per vaginam, small plate over fundus.

Same as above. Absorbent effect of galvanism, — V. A., 40 to 80 m.-a., 3 to 5 min., negative ball electrode against point of fixation.

Vagino-abdominal faradization as in subinvolution, short coil of heavy wire, high quality, low tension.

Bipolar intra-uterine and utero-abdom. farad. with currents of quality interrupt of moderate frequency, 4 to 6 min.

For absorption—vag. abd. galv., 40 to 80 m.-a., and later, when all acute and inflammatory symptoms have disappeared, massage.

Negative electro-cauterization if endometritis prominent, electro-puncture if metritis predominates.

Positive vag. abd. galv., 10 to 20 m.-a. 2.P. and massage by vag. abd. farad.

Vag. abd. galv., 10 to 20 m.-a. if stimulation is desired, 40 to 80 m.-a., if absorption is desired.

Vag. abd. or abd. farad. to overcome constipation and pressure of intestines.

RETROVERSION is frequently transitional developing into normal anteversion, retroflexion or descensus.

We have this condition, post partum or post abortum, when the *organ is still too thick* to permit flexion at the internal os,

since the *supports*, especially the vagina, are *still weak* and these conditions;

a. *hypertrophy of the uterus* with

b. *relaxation of the vagina* must lead to retroversion.

DESCENSUS OF THE UTERUS is usually followed by descensus of the vagina, and is

caused by *imperfect involution* of peritoneal attachments which remain hyperemic, relaxed—the uterus is large, its supports are weakened and insufficient, hence it cannot be held up, and sags down, and then

if the uterus is normal, increased anteversion follows—

If the uterus is retroverted it slips downward.

Most frequent causes of diseases are perineal rupture, relaxed vagina, cystocele, retroversion, and *relaxed peritoneal attachments* which may all exist together.

Increased pressure from above, traction from below, absence of physiological supports as by excessive dilatation of vagina by too large pessaries.

Utero-abdominal faradization, sound in uterus, small plate on fundus (U. A. farad. I.c., 3. P., I<sup>3</sup> or I<sup>2</sup>) low tension, quality, few or medium interruptions. or bipolar, intra-uterine faradization.

Vagino-abdominal faradization, ball electrode in vag., small plate on abdomen, to strengthen ligaments. Bipolar intra-vaginal or vagino-abdominal faradization for vagina.

Negative electro-cauterization of the uterus, and in severe cases negative electro-puncture, 50 to 150 m.-a., 5 min., II or I.P

Vagino-abdominal faradization, positive pole, medium or small plate on abdomen; or bipolar, intravaginal farad. currents of quality, low tension, few interruptions.

Vagino-abdominal faradization, I.c., I<sup>2</sup> or I<sup>3</sup>. 3 to 4 min.

Treatment of uterus as in subinvolution or hypertrophy.

Vagino-abdominal faradization, currents of quality.

Vagino-abdominal faradization and treatment of uterine condition.

Intra-vaginal and vag. abdom. farad. I.c. I<sup>3</sup> or I<sup>2</sup>.

In lying-in women and in convalescents, in whom fat in circumuterine cellular tissue, is absorbed these conditions exist.

