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ELECTRICITY AS A THERAPEUTICAL AGENT IN
GYNECOLOGY.

BY

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THE value of electricity in the treatment of certain pathological conditions peculiar to parturition, and of some of the chronic affections of the female sexual organs, has been recognized for some years, and is superficially referred to in some of the older and all recent text-books on obstetrics and gynecology. From time to time, also, the medical press has brought articles extolling the value of the remedy for one particular purpose or the other.

Thus, in obstetrics, it has been chiefly the faradic current which has been found useful as a substitute for ergot and other oxytocic measures in averting and controlling post-partum hemorrhage, and securing a firm permanent contraction of the uterine muscular fibres. Simpson, Barnes, Playfair, Kilner, of England; Alexander Murray, of New York; St. Germain and Apostoli, of Paris, and numerous others of more or less experience, have recommended it for this purpose.

Some authors, either specialists in electrology or enthusi-

astic general practitioners, have endeavored to extend the utility of the agent to the whole period of labor, and have claimed for it, not only the effect of alleviating the pain of the normal uterine contractions, but also the power of regulating and increasing those contractions at will, thus soothing while expediting the delivery of the child.

Such effects are claimed for the faradic current by Dr. Wm. T. Baird, of Albany, Texas, in a series of elaborate articles recently published in the *JOURNAL OF OBSTETRICS*, and are substantiated by the reports of numerous cases. Heinrich Bayer, in a recent article, reports six cases of the induction of premature labor by the galvanic current (*Zeitschr. für Geb. und Gyn.*, XI., 1, 1885).

While some of the marvellous results obtained by the faradic current in the hands of several of the authors mentioned (notably Apostoli and Baird) may as yet appear to many in the profession slightly exaggerated, there is one peculiar, and fortunately not very common, affection in which the electric current, both the faradic and the galvanic, has proved itself capable of destroying and saving life at one and the same time: I refer to extrauterine pregnancy, where by destroying the life and arresting the growth of the fetus and its envelopes the life of the mother is saved, or at least a subsequent capital operation is averted. The cases in which this unfailing result has been obtained have now become sufficiently numerous to allow us to feel that an early recognition of the condition before rupture has begun is equivalent to a favorable termination, if the electric current be at once employed and repeated until fetal life is destroyed. Experience has shown us that the faradic current, while less powerful and less rapidly effective, is equally safe in arresting fetal development as the galvanic, which latter (as I had occasion to observe in a successful case of tubal pregnancy in my own practice) may cause alarming shock.

I will but refer to another use of the faradic current during pregnancy, that is for nausea and vomiting, which the late Dr. Lente claimed could be frequently checked by passing the current directly through the body at the epigastric region.

I have referred to the use of electricity in obstetrics merely to show very briefly what has been done and what is claimed

for the agent in that branch. My object in this paper is, however, to confine myself to the discussion of the therapeutical application of electricity to gynecology.

The modern text-books on diseases of women casually refer in general terms to the faradic or galvanic current as a measure to be employed for certain diseases, and the manner of using the agent is briefly described in some of the works on electricity, notably in Beard and Rockwell's comprehensive text-book. Among journal articles on this subject which have attracted attention during recent years are chiefly those of Blackwood, of Philadelphia, and of Tripier and Apostoli, of Paris, the former having lauded the value of electricity in uterine displacements; the latter, in uterine fibroids and pelvic cellulitis. Bayer (l. c.) has but little to say as regards gynecology, limiting his observations almost entirely to obstetrics.

In spite of these various articles and the undoubted value of electricity in many of the conditions referred to, it can scarcely be said to have become popular with the mass of the profession, either in obstetrical or gynecological practice. Chiefly is this the case in obstetrics, where the effect is usually more rapid and marked than in the more chronic affections of gynecology. And this is not strange in view of the difficulties attending its employment during labor, the inconvenience of carrying a battery to every case, the impossibility of having it at hand in an emergency, etc. It is to be feared that these obstacles, which will always cling to the practice of obstetrics, in city and country, will limit the adoption of the remedy to exceptional cases and to maternity hospitals.

These objections, however, do not apply to gynecology which is practised to a great extent in the consulting-room, where the physician can keep and have in constant readiness for use such electrical appliances as may be required, the employment of which should in no case be attended with severe pain, or be followed by disturbance or evil consequences of any kind, or prevent the patient's returning home immediately in the same manner as she came, or require rest for some time afterward, or indeed any special precautions. On the contrary, if pain was present before the application, it is very frequently relieved, even if but temporarily, chiefly by the galvanic current. Further, the range of applicability of electricity in the

diseases peculiar to women is quite large enough to make it a valuable adjunct to other methods of treatment, especially as some of these affections are but little amenable to the routine remedies. Thus, the faradic current is found useful in the various conditions of malnutrition of the sexual organs (arrest or deficiency of development of uterus and ovaries before puberty or excessive involution after parturition; amenorrhœa, irregular menstruation); deficient contraction of uterus (subinvolution, menorrhagia); displacements due to relaxation of ligaments. The galvanic current has been employed with benefit under circumstances where the melting down and absorption of adventitious products was desirable (subinvolution and hyperplasia of uterus, old plastic exudations, and adhesions from pelvic cellulitis and peritonitis, chronic oöphoritis and perioöphoritis; pelvic neuralgia, chiefly when due to pressure by exudations; fibroid tumors. And the galvano-cautery has been recommended by some authors for the cure of hyperplasia, fibroid and ovarian tumors). The use of the galvano-cautery does not properly come within the scope of this paper, since the electric current then acts merely in a secondary capacity as a heat-producing factor, the heat and not the galvanic current being the therapeutic agent.

But with all these advantages, its safety, ease of application, and beneficial results, I believe I do not exaggerate when I say that the routine, every-day use of electricity in gynecology is still limited to comparatively few specialists in that branch. Why is this? Possibly the expense of procuring the batteries, etc., may at the outset deter many of the younger practitioners, even such as adopt the objectionable course of starting as specialists. But I cannot help thinking that the chief reason lies in ignorance on the one hand, and the want of faith on the other, which the general practitioner, or the follower of another specialty than that of electrology, has in the therapeutic value of that mysterious and invisible power, the electric current. Many are deterred from using it because they "do not believe in it," because they do not understand it, and because, not believing, they do not care to learn its use. And I fear the extravagant claims and praises of some electrological enthusiasts may be in a measure to blame for this want of faith and indifference.

Now, my object is precisely to show that it requires no special talent and no prolonged study of the mysteries of electricity, and no complicated or very expensive apparatus with mysterious foreign names, ancient and modern, to enable the practitioner, *who is competent to correctly diagnose his patient's condition and form therefrom the proper indication*, to employ the electric current in *gynecology* with safety, and in many cases with considerable benefit. And in making this statement, I speak from experience; for the many excellent results which I have obtained with electricity during the past twelve years have been gained under precisely such conditions. I dare say the electrologists may call the employment of electricity in this manner empirical. Perhaps they are right; but I can only ask, Is not the whole therapeutical use of the agent to some extent empirical? I should judge so, when I learn from practical electricians that it seems to make little difference whether the current ascends or descends, or whether the faradic or galvanic current is used, so far as the therapeutical result is concerned, if only the poles be applied in the proper spots and the current be not too strong.

After this introduction, which has, I fear, attained proportions not originally intended, I will proceed to discuss the various affections of the female genital organs in which, as an empiric and non-specialist in electrology, I have employed electricity, both the faradic and galvanic varieties, with more or less benefit.

The apparatus which I have found all-sufficient in my practice as a gynecologist is the following:

I. A portable faradic battery, either the well-known Kidder tip instrument, or that made by the Galvano-Faradic Co., or any other reliable manufactory.

II. A portable galvanic battery, containing from 16 to 36 cells, with hydrostat and reversible current button.

For years I used exclusively a simple Kidder tip-battery when I wished the interrupted current; and a Galvano-Faradic Co.'s battery of 16 cells, without a hydrostat; later, a more complete and elegant portable battery of 36 cells (one circuit of 12, and a second of 24 elements) with hydrostat and reversible current, made for me by Waite & Bartlett, of New York. Within the past year I had made for me by the same

firm, for office use only, a more expensive combination battery in cabinet form, containing both the faradic and galvanic currents, either to be used separately at will, with reversible currents and galvanic interrupter; the number of elements in the galvanic part is 40, an entirely too large number for practical purposes, since a larger number than 24 to 30 is scarcely ever required, safe, or borne by the patient. A galvanometer for measuring the exact strength of the current, graduated to measure milliampères, prevents shock, and tests the actual power of the battery at each sitting.

The galvanic interrupter seems to me to be of questionable necessity or utility in gynecology (except in subinvolution), since I believe that a steady, quiet, not too strong, *constant* current, if employed sufficiently long and often, answers every therapeutical requirement to be expected from that agent.

III. The instruments used in applying the current to the pelvic organs are:

a. Several round flat sponges about 2" in diameter, fastened on metal disks, which are screwed into universal wooden

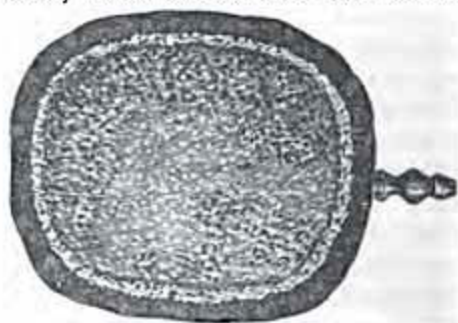


FIG. 1.—Large flat sponge electrode.

handles, to which the insulated (silk-covered) wire cords are attached, which connect the sponge electrodes with the battery.

These are used for external applications over small portions of the skin of the abdomen or back, either both being placed over the pelvic and abdominal regions, or one being held in the palm of the hand or placed on some distant portion of the body.

b. Two large flat sponges, 4" to 6" by 3" in size, covered on one surface with rubber cloth, which slightly projects over the edge of the sponge, and provided with protected metal attachment for the connecting cords (Fig. 1). These are used when

it is desired to include a larger surface in the current, such as the whole suprapubic, sacral, or the sub-trochanteric region of the hip.

All these sponge electrodes are soaked in warm salt water, and squeezed nearly dry before being applied to the skin. The counter-irritant effect of the galvanic current is intensified by the addition of salt to the water, so that patients generally speak of the sponge feeling like a mild mustard plaster when the negative pole is external, and the skin is found distinctly reddened. Warm water alone suffices to insure the passage of the current; hence with the faradic current the addition of salt is unnecessary. As often as they become dry, the sponge electrodes must be re-moistened.

c. Two metal electrodes, one a ball about an inch in diameter, for married women (Fig. 2); the other, a small olive for



FIG. 2.—Ball electrode for vaginal vault used in chronic ovaritis, cellulitis, and peritonitis. The detached balls of different sizes can be screwed to the rod.

virgins (Fig. 3), each attached to a steel sound, covered with



FIG. 3.—Olive electrode, for vaginal vault in virgins, or for rectum.

English catheter, and furnished with a screw by which it is connected with the universal handle. These metal balls or olives are covered with tight-fitting chamois leather (which should be renewed frequently, as it becomes hard and discolored), and are used for applications to the cervix and vaginal vault, and through them to the uterus and its adnexa. The leather covering prevents the escharotic effect accompanying the negative pole of the galvanic current, and helps to concentrate the current in one spot.

d. One long, flat metal electrode, of about the size and length of a finger, for applications to the whole vaginal surface, as in relaxation of its walls (Fig. 4).



FIG. 4.—Vaginal electrode.

e. One sound-shaped metal electrode, isolated by catheter

covering to within $2\frac{1}{4}$ " of its tip, and to be screwed to the universal handle, for intrauterine use, either with galvanic or faradic current (Fig. 5).



FIG. 5.—Intrauterine electrode insulated to within $2\frac{1}{4}$ " of tip.

If the current is to act only on the fundus uteri, an electrode insulated to within a quarter of an inch of the point (Fig. 6) should be employed, but I generally use the other.



FIG. 6.—Intrauterine electrode insulated up to within $\frac{1}{4}$ " of tip, for fundus only.

If it is desired to confine the current to the uterus alone, the electrode shown in Fig. 7 should be used.



FIG. 7.—Intrauterine electrode for confining the current to the uterus alone.

A cup-shaped electrode (Fig. 8), with or without a central



FIG. 8.—Cup electrode for cervix uteri.

pin about 1" long, for galvanization of the cervix and cervical canal, is a useful instrument when the introduction of a sound beyond the internal os is to be avoided.

For a rectal electrode, the olive tip already described answers very well; for the bladder, the intrauterine sound electrode. When it is desired to act particularly on certain points in the pelvis, either through the vagina, bladder, or rectum (as, for instance, in electrifying the ante- or retro-uterine ligaments in chronic uterine displacements, or the broad ligaments in bilateral pelvic exudations), special electrodes with double points or olives may be constructed. But my experience has not con-

vinced me of the utility or necessity of these contrivances. All metal electrodes for internal use should be dipped in warm water and covered with vaseline before being inserted into the respective passages.

f. Four or more isolated cords, each pair of different colors, so as to enable the operator to recognize at a glance, without exposing the patient, which cord is attached to the negative and which to the positive pole.

The expense of these instruments need not be great, \$100 would probably cover it if only the actually necessary articles are procured. Of course, twice that sum can be spent on a single battery, without counting any of the other requisites.

The only expense of keeping the batteries in order is the occasional changing of the fluid, and every year or two a few new plates of zinc in place of those damaged by wear. The platinum and carbon plates last a long time. The amount of wear naturally depends to a great extent on the amount of use the battery has, and on the care taken not to waste its strength when not in use.

I seldom have to refill my batteries oftener than once in three months, and keep new fluid in jars for the purpose. My new cabinet battery, I am told, will run two years without change.

An experience of over ten years' almost daily use of one or the other of the two varieties of electric batteries has impressed me with several cardinal points of practical importance in the use of these instruments in gynecology, which are a necessary preface to the discussion of the separate affections in which electricity is beneficial.

Firstly. I have found the galvanic current far more generally useful than the faradic, because the latter is restricted to those conditions in which a stimulating influence is required, whereas the majority of chronic hystero-pelvic diseases in which electricity is indicated call for the soothing, anesthetic, alterative action of the constant current.

It is on this specific difference in the action of the two currents on living tissues that their special indications in gynecological therapeutics depend.

Secondly. A mild, steady, absolutely painless current from a galvanic battery will answer every therapeutical purpose, and is in every way preferable to a powerful or interrupted con-

stant current, which causes painful shock or gives positive pain. As a rule, the galvanic current should produce no other sensation in the organs through which it passes than a pleasant tingling sensation in the skin to which the negative pole is applied.

The faradic current, on the other hand, is effectual exactly in proportion to its strength, and should generally be given as strong and with as many interruptions as the patient can endure.

It is always advisable to avoid a contact between an uncovered metal electrode of a galvanic battery and the skin or mucous membrane, because the negative pole, if the current is sufficiently strong or is continued for some time (say over sixteen cells, and longer than five minutes), is liable to cauterize the part, and produce an eschar. This caustic property may at times be used for treatment, as in erosions of the cervix, to be referred to hereafter. I have several times inadvertently cauterized the vaginal mucous membrane or the skin of patients, producing a troublesome slough, by using the negative pole in the vagina too long, or too strong, when the nurse had omitted to cover the metal ball with leather, or when the metal screw of the sponge had accidentally come in contact with the skin.

The operator should remember that the fresher the fluid in his battery the more powerful is the current, and the more frequently and the longer the battery has been used, the weaker the current becomes. While ten cells of a newly filled galvanic battery will answer for a given case, after a month or two of use sixteen or more cells may be required to give the same intensity of galvanism.

Thirdly. When a constant current causes pain, or even momentarily increases the pain which it is intended to relieve, it is doing harm, and should be either reduced in strength or discontinued.

Only once have I known the galvanic current (in a case of recurrent pelvic peritonitis) to apparently increase the diffuse pelvic pains of which the patient complained, and even to be followed by one of the characteristic attacks. I will not say that the electricity actually caused the exacerbation, but am compelled to admit that possibility, and hence discontinued its use entirely in the case.

Fourthly. In spite of frequent inquiries of electrologists and experiments on my patients, I could never decide that it

made any special difference, so far as the therapeutical result was concerned, which pole—negative or positive—was placed within the body, if care was only taken not to have the current too strong, and the metal was covered by leather, when the internal electrode was connected with the negative pole.

There are two marked exceptions to this rule, one of which is, in case it is desired to relieve pain in a certain circumscribed spot; then it is best to place the *positive* pole next to the painful point. Hence, in pelvic exudations with consequent local or reflex neuralgia, I connect the vaginal electrode with the positive pole, and attach the negative cord to the large sponge on the abdomen, sacrum, or hip, as the case may be.

The second exception is, that the negative pole, if of uncovered metal, acts as a caustic when a sufficiently strong current is employed.

In hyperplasia and chronic oöphoritis I usually place the positive pole within the body, in order to avoid the possible caustic influence of the negative pole on the cervix or the endometrium. But, knowing the peculiar catalytic property of the negative pole (cathode), I often use it internally in these cases when I am particularly anxious to have an alterative (absorbent) effect, but am then very careful to use only a very mild current, never more than ten cells. I often reverse the current once or twice during a sitting, either breaking the circuit or reducing the strength before reversing.

I have tried to produce di-electrolytic effects in some cases, hoping that the iodine painted on the abdominal skin or the vaginal vault would be conducted through the diseased organs by the galvanic current, but have seen no decided benefit from these experiments.

With the faradic current it has always seemed to me perfectly immaterial which pole was internal and which on the skin.

I intend these remarks to apply only to the use of electricity to the pelvic organs, without inclusion of the cerebro-spinal contents, or of any particular set of muscles or nerves. When central electrization, or the touching of any special groups of muscles or nerves is intended, I presume it does make a difference whether the current goes from or to the central ganglion; and then, also, is the gauging of the exact intensity of the current and the avoidance of shocks of vital importance.

Fifthly. I have always found it a safe plan to begin with a mild current (the galvanic, say four to six cells, the faradic as much as the patient can bear without discomfort), and gradually increased to the limit, either at one sitting or day by day, and toward the end of each sitting gradually diminish the current before disconnecting the poles.

Sixthly. When internal electrization is to be employed (vaginal, vesical, or rectal), it is always well to introduce the internal electrodes before closing the circuit, and to break the circuit before removing them, since the contact of the metal electrode with the sensitive skin at the orifices of the cavities mentioned, while the current is at its height, causes acute pain.

Seventhly. Whether benefit will be derived from the electric treatment cannot be known for some time, except when the faradic current is used to bring on the menstrual flow, the result then being either immediate or, at least, speedy, after one or several applications.

Several sittings will show whether the patient bears galvanism well, and will probably also, by the sensation of relief and freedom from pain for several hours after each application, give a forecast of the probable benefit to follow in course of time.

Eighthly. In order to give permanent relief, in fact, in order to derive any appreciable benefit from galvanism, it must be used often, steadily, and for a long time. Thus, less than two sittings a week is merely waste of time; every other day, or even every day, is much better than less frequently, and the sittings should vary from fifteen to thirty minutes each. As improvement becomes manifest, the frequency of the sittings may gradually be reduced. In chronic pelvic inflammations, I am in the habit of giving several long (one-half to one hour) sittings of a very mild galvanic current (not more than ten cells) during the week preceding the menstrual flow for several months, as a sedative at this dangerous time, and think I have seen good effects from this plan.

A course of treatment by local galvanization should last from three to six months. This may seem a very long period, but when we consider how little amenable to any treatment most of these cases of chronic enlargement and inflammation of the female pelvic organs are (hyperplasia, subinvolution, chronic oöphoritis, cellulitis and peritonitis), and how long the condi-

tion generally existed, neither patient nor physician should begrudge the time, trouble, or expense involved, if only a chance of relief is extended. The treatment is tedious, both for the patient and the physician; for the latter can scarcely dispose of more than two such patients in an hour, and if he is fortunate enough to have a large office practice, may spend the better part of the day there. But as he would probably feel in honesty compelled to confess himself unable to benefit many such cases by other methods, he should not fail to afford them such relief as electricity offers, even at a personal inconvenience.

The results of faradism, so far as some of the chronic affections for which it is used are concerned, have been less positive in my hands than those of galvanism. When the object was to arouse dormant menstrual energy, I have been fairly successful, and the effect was speedy; of the restoration of tone of relaxed uterine ligaments, I can say but little that is favorable.

I can truly say that among the most appreciative of my patients were those whom I relieved of their sufferings by the persistent use of galvanism, after they had ineffectually tried other remedies.

Ninthly. But while relief and freedom from pain may be often achieved by galvanism, a permanent cure, a complete absorption of the exudation, and a restoration of the organ to perfect health in hyperplasia, chronic oöphoritis, cellulitis, and peritonitis, is seldom achieved. But this is unfortunately the case with all other methods of treatment for these obstinate affections, without even the relief afforded by galvanism.

Tenthly. I have seen no bad effects follow the rational and careful use of either form of current. A slight bloody oozing from the uterus after intrauterine electrization may occur, but is of no consequence.

Conditions Indicating Electric Treatment.

The pathological conditions of the female sexual organs in which electricity will be most likely to prove beneficial are the following:

- Deficient development of uterus and ovaries.
- Amenorrhœa.
- Dysmenorrhœa, obstructive and neuralgic.
- Superinvolution.
- Subinvolution (with or without menorrhœgia).

Hyperplasia uteri.

Chronic ovaritis and salpingitis.

Chronic cellulitis and peritonitis, and lymphangitis.

Pelvic neuralgia, local and reflex.

Uterine displacements.

Erosions of cervix.

Uterine fibroids.

Ovarian tumors.

It is not my intention to make more than this passing mention of the tonic effect of the faradic, and the sedative influence of the galvanic current on the general system in the anemia so frequently accompanying utero-pelvic disease.

1. *Deficient Development of Uterus and Ovaries.*

If the uterus and ovaries are congenitally so deficient in development as to be mere traces, no means at our command will stimulate them to a practically available growth, and all efforts to arouse in them a functional activity will fail. This is the case in the so-called uterus bipartitus, where the uterus is represented by a solid fibrous nodule, or a mere conglomeration of loose muscular fibres. Even when but a small hollow rudimentary sac takes the place of the uterus, it is scarcely worth while to try to develop the organ, since it is hardly likely that it will ever grow sufficiently to enable it to receive and retain an impregnated ovum.

CASE I.—Precisely such an instance came under my observation during the past year, in a young Irish girl of 21 years, who came to my clinic at the Polyclinic because she had not yet menstruated. She was a buxom, apparently in every way fully developed girl, and I was therefore greatly surprised to find that she had no vagina, and that on vesico-rectal examination merely a soft, doughy body of the size of an English walnut could be felt between bladder and rectum. Although indistinct, menstrual molimina had been present for some months; no distinct ovaries could be felt. Having admitted her to my service at Mt. Sinai Hospital, I dissected inward in the median line about two inches, until I reached the soft sac mentioned, on opening which fully an ounce of glairy mucus escaped, revealing a thin membranous sac about two inches in depth. This soon contracted down to scarcely more than one and a half inches, and as this seemed to be all there was of the uterus, and as no ovaries could now be detected, and no menstruation appeared, I was obliged to content myself with keeping the uterine cavity and the vaginal canal open with iodoform gauze and a glass plug, feeling that all at-

tempts to develop so imperfect a uterus to functional usefulness would prove futile.

But if the uterus has the normal shape and is merely smaller and more slender than that of a healthy nubile woman, and when the ovaries, by occasional molimina, show evidence of normal glandular elements, then a systematic course of local electric treatment will generally result in an increase of size, and a proportionately active functional activity of the organs. Such treatment is indicated in nubile girls who have never menstruated, or but imperfectly, and in whom a local examination, called for by an apparent dependence of the physical and mental obliquity on the absent menstrual function, reveals a uterus scarcely two inches in length, and small, infantile ovaries. This condition is known as uterus infantilis, and, as a rule, is susceptible of improvement by persistent local stimulation, chiefly the faradic current, aided by occasional spongetents and frequent irritant applications (carbolic acid) to the endometrium. If the ovaries are normal, there may be amenorrhea, because the diminutive uterus does not possess a sufficiently large or sufficiently vascular mucous surface for the discharge of blood. Besides the amenorrhea, a more or less stunted physical growth, and certain forms of mental or neurotic disturbances (such as hebetude, hystero-epilepsy, chorea) which depend on the non-performance of the sexual functions, will call for the awakening of those functions by means of electricity.

Method.—The sound electrode in the uterus, and one sponge over each ovary, or one large sponge covering the whole hypogastric region. The interrupted galvanic current, or the faradic current gradually increased to the limit of endurance, and continued for at least half an hour every other day, month after month, specially long and strong sittings every day for a week before the expected menstrual epoch, every effort being made to force the periodicity of the menstrual flow. Of course, a number of months may elapse before the ovaries respond and the uterus has acquired a degree of development sufficient to enable it to exude a satisfactory amount of blood in response to the stimulus of ovulation. As a rule, it may be assumed that so long as there is an evidence of more or less perfect ovulation in the existence of a regularly recurrent menstrual molimen, there is a

good prospect of success in developing the sexual organs, and permanently establishing the menstrual function and the possibility of conception. When all molimina are absent, little is to be hoped for from any sort of treatment, because the ovaries are probably atrophied and devoid of glandular elements.

Intrauterine stems, composed of alternate zinc and copper elements, have been largely used to stimulate uterine growth and menstrual activity, and if the patient could wear the instrument sufficiently long, often with success. But I am inclined to think that the irritation of the foreign body in the uterus had more to do with the result than the somewhat problematical galvanic current induced in the stem.

Should the faradic current fail, it is possible that galvanism might succeed, and I have several times found an alternation of currents at the same sitting, or at alternate sittings, prove more effective than the one current alone. As an excitant of muscular growth, as an irritant, in fact, the rapidly interrupted galvanic current excels the faradic. Of course, I do not wish to be understood as advising local treatment by electricity or otherwise for every case of chlorosis and amenorrhea in young girls. Only when deficient development of the sexual organs is present should local treatment be adopted in such individuals.

2. *Amenorrhœa.*

The suppression of menstruation may be either temporary (acute), due to extraneous causes (cold, mental and physical shocks), or it may be more or less permanent, caused by local or constitutional influences in the patient herself (such as deficient development or atrophy of uterus and ovaries, anemia, wasting diseases, or large drains on the system, sluggish circulation of abdominal and pelvic organs, deficient innervation of ovaries, change of climate and occupation, etc.). Under the term "amenorrhœa," I wish to include also deficient, scanty, irregular menstruation, not necessarily total absence only.

When the amenorrhœa is due to anemia and other debilitating conditions of the general system, or when a change of climate and occupation are at fault, local stimulation is obviously improper, or, at all events, it should be employed merely as an auxiliary to general tonic and expectant treatment. In the other conditions mentioned, however, while constitutional measures should not be omitted, the chief reliance should be

placed on local irritation, especially electricity in the shape of the interrupted current. The method of using it has already been described in the previous section (deficient development), and the chief effort should be made just before the regular menstrual epoch. Hot foot, hip, and full baths, sinapisms to calves and thighs, hot vaginal douches, apiol and manganese, laxatives, tonics, exercise, etc., should, if necessary, accompany the local treatment, and in the intermenstrual period bi-weekly stimulant applications (impure carbolic acid and glycerin, iodized phenol) and occasional forcible rapid dilatation of the uterus may prepare the endometrium for the final touch of electricity; or faradization may be continued two or three times a week without intermission, each sitting concluding with a carbolic application.

If the amenorrhœa was caused by some sudden physical or mental shock near the time of the normal period, there is probably considerable venous congestion of the pelvic organs, and the abstraction of a few ounces of blood from the cervix by leeches or scarification several days before an expected period will materially aid the other remedies.

In cases where the amenorrhœa is of long duration (one or more years), especially if there is sluggish innervation of the sexual organs, considerable perseverance is required to obtain a successful and permanent result. The following case will show that even such patients may be relieved.

CASE II.—E. C., 20 years, single, formerly regularly menstruated, gradually lost the flow in her sixteenth year, and for four years had no sign whatever, although the menses were fairly well marked and regular. Between three and four months of uninterrupted treatment by almost daily intrauterine faradization, daily hot vaginal douches and hip baths, brought on a normal menstrual flow, which, by means of several months further treatment at longer intervals, gradually resumed its healthy periodicity.

The cause of the amenorrhœa in this case was obscure, for the girl was not anemic; the history pointed to neurotic influences, which could not be overcome by general remedies.

I need hardly say that in unmarried women, especially young girls just budding into womanhood, the temporary absence of the menstrual flow does not at once call for a local examination or local treatment.

Having ascertained as nearly as possible the probable cause of the suppression, expectant remedies should be advised (iron, manganese, apiol, hot baths, etc.), and only on continuance of the suppression for some months might it be considered justifiable to resort to local measures. Of course, the possibility of a physiological reason for the amenorrhœa should not be forgotten, although this event is rather more likely to be suspected in married women, and it behooves the physician to satisfy himself by the most careful physical examination (bimanual) that the uterus is empty, and if in doubt, to temporize until satisfied of the exact facts.

In view of the usual causes of amenorrhœa in unmarried women, and the success commonly following medical and general treatment, I very seldom have occasion to use local measures in such individuals, except where there is deficient development or innervation of the sexual organs. The chief contingent of cases of amenorrhœa for which I use electricity are the married women, whom a succession of pregnancies has left with a large, hyperplastic uterus, with indurated vessel-walls, and who, with a rapidly increasing general obesity, have become anemic or hydremic. Such women usually take but little exercise, their circulation is sluggish, and there does not seem to be sufficient vascular activity in their pelvic organs to produce an adequate periodical congestion for the menstrual discharge. Their pelvic organs are full of venous blood, through the speculum the cervix has a purple hue, on scarification, dark venous blood freely escapes; but the circulation is too sluggish, and the congestion seems to fall just short of the point of rupture of the capillaries.

Nulliparous women may also combine rapidly increasing general obesity with amenorrhœa, or at least scanty irregular menstruation. In them the uterus, however, is generally not enlarged, but rather the reverse.

In both these classes of women, parous and nulliparous, it seems as though all the trophic energies of the system are diverted to the production of adipose tissue, and that the sexual organs are proportionately neglected. There certainly seems to be a direct relation between the obesity and amenorrhœa, since by reducing the weight of these women, at least tem-

porary resumption of the normal menstrual habit may be achieved.

In parous women of this class, it is exceedingly difficult to distinguish whether a suppression of a few weeks may not be an early pregnancy, for the uterus is large, heavy, and soft (through venous hyperemia) in both conditions. It is, indeed, usually impossible to decide, unless the medical attendant is thoroughly familiar with that particular uterus, until a second period has been skipped, when the presence of gestation will be sufficiently evident.

The immediate result of the suppression is the production of cephalalgia and insomnia (from cerebral hyperemia), irritability of temper or melancholia, bearing-down sensation, pelvic throbbing, all of which symptoms may become so distressing as to render the patient almost frantic, especially when a second and a third period pass without a flow.

Irregular or scanty menstruation in plethoric well-nourished women of the above description is a source of incessant trouble and anxiety, and leads the patients to try all manner of means to bring on the flow, the result usually being a failure. I have often tried the so-called emmenagogues recommended in the books (rue, savin, etc.), but have never been able to place any dependence on them. Manganese, either the binoxide or the permanganate of potash, has been more efficient. But I found the faradic current, alone or alternating with the galvanic, the only reliable emmenagogue. Indeed, at times it has been almost too efficient, producing too sudden and too profuse a flow, as shown in

CASE III.—Mrs. L. E., 29 years, one child six years old. No miscarriages. Large, finely developed woman, weighing over two hundred pounds. Had grown stout since birth of her child. Often missed two or three months, and for several years had never been sufficiently unwell. In consequence, the symptoms above mentioned were more or less constant. When she first came under my care, I used first the galvanic (ten cells) and then the faradic current, each for about twenty minutes. When the lady left my office there was no flow, but she returned within ten minutes and asked for a napkin, saying that before she reached the corner she found herself flowing. The hemorrhage continued for over a week, and was so profuse that I finally, failing to check it with ergot, was compelled to tampon the vagina.

I frequently brought on menstruation in this lady afterward, but was careful to use only a very moderate current.

The effect of one electrization is usually limited only to that period, and the sittings will need to be repeated as often as the occasion for treatment recurs. And very frequently several sittings are required to bring on a flow, and it has occurred to me to fail entirely. In the latter case, local venesection by leeching or scarification was the last resort. In the intervals between the periods, local and general measures to remove the original cause of the irregularity should be steadily employed. In this manner, I have repeatedly succeeded in regulating the periods for a number of years.

CASE IV.—Mrs. H., 28 years, mother of three children, the youngest six years of age, had always suffered from irregular, scanty menstruation, with cold hands and feet. Ultimately the resulting insomnia became so distressing that she consented to submit to local treatment to regulate her menstruation. I found the uterus anteфлекed, hyperplastic; the cervix swollen and blue. I first tried the steady, irritating influence of a galvanic stem, but decided to employ less dangerous means, after being suddenly called for intense uterine colic one day some two weeks after I had introduced the stem. I then began a regular course of intra-uterine galvanization, three times weekly, substituting the faradic current for a week prior to each menstrual epoch, and after having regulated the flow for about six months in this manner, had the satisfaction to see it return unaided in a perfectly normal manner for six years, during which two children were born. Since the birth of the last child, the lady has grown stout, and her old menstrual irregularity has returned in a less degree. Two or three times a year she comes for electricity, and is temporarily relieved. But as she does not care to submit to a systematic course of treatment, the benefit is merely temporary.

3. *Subinvolution of the Uterus and Menorrhagia.*

In this condition, which may exist for from three to six months after a confinement or abortion, the uterus is abnormally large, soft, succulent, and vascular; both its muscular and vascular elements require contracting, and the circulation needs stimulation in order to hasten the normal retrograde metamorphosis. Therefore the faradic current is especially indicated. But if the subinvolution is less recent, and the uterus has become somewhat dense and hard, the constant current will act very well in promoting absorption of the adven-

titious elements. The rapidly interrupted *constant* current will often be found more efficient than the faradic in these cases.

As subinvolution is usually accompanied by menorrhagia, or even metrorrhagia, it is best not to irritate the endometrium by sounding; hence intrauterine electrization should be avoided, and the current should be passed through a cup-ball or olive applied to the cervix.

Frequent, mild sittings are necessary, except when there is menorrhagia, when the strongest faradic current only should be given in order to produce as powerful a contraction of the uterus as possible. Usually, however, the effect will be gradual, and only little by little will the uterus diminish and the profuse flow decrease.

4. *Hyperplasia Uteri.*

I have seen a great deal of benefit in this distressing, although by no means serious affection, both in the relief of reflex neuroses and in a gradual moderate diminution in size and hardness of the uterus. As the peculiarity of this condition, which is a very common consequence of subinvolution, is an excessive formation of areolar tissue, which gradually assumes a density similar to fibrous tissue, the object of treatment should be to promote the softening and ultimate absorption of this abnormal tissue. This is best done by long and frequent applications of the galvanic current, which should be passed through every part of the uterus as thoroughly as possible. As menstruation is usually scanty in marked cases of hyperplasia, intrauterine galvanization is decidedly indicated, precisely the reverse from subinvolution. But as there is no disease of the female reproductive organs more difficult to cure than inveterate hyperplasia of the uterus (Scanzoni, indeed, pronounces it incurable), it is evident that only perseverance will insure improvement. And relapses are frequent.

The current should be used as strong as the patient can bear it, twelve to eighteen cells, the negative pole being internal. But it should be borne in mind that the intrauterine pole is uncovered metal, and that a milder current must be used than when the covered ball merely touches the cervix. A very strong negative current passing from a metal sound might

easily cauterize or char the endometrium, and do serious injury.

I do not pretend to explain the manner of action, but I know that I have seen the cephalalgia, the hemicrania, the intercostal neuralgia, and the gastralgia, which so commonly accompany hyperplasia uteri, disappear under a steady course of uterine galvanization, although the uterus itself showed no change. I will relate such a case later on when speaking of pelvic neuralgia (see Case XI.). Perhaps the galvanization of the ovaries, which no doubt come in for their share of the current, may have something to do with this remote benefit.

I have seen so many such cases that it is difficult for me to pick out one as illustration, for they are all more or less alike.

5. *Superinvolution of the Uterus.*

For some unknown reason, nature at times overdoes her work, and the reverse of that common condition, subinvolution, takes place, the uterus, with or without the ovaries, becoming atrophic after parturition. This affection may be irremediable, particularly if the ovaries are included. But in the early stage an energetic stimulation of the organs will generally prove effectual. Intrauterine faradization, the galvanic stem, sponge-tents, irritant applications to the endometrium; in fact, precisely the same treatment as that described under defective development. Here also must it be the object to bring on regular, normal menstruation as the evidence of normal ovulation.

I have been fairly successful in the few cases of superinvolution which I have seen. Fortunately they are not very common, at least not in my experience.

CASE V.—Mrs. G., Sacramento, Cal., 24 years of age; one premature confinement at seven months, two years before. Since then, irregular and scanty menstruation, skipping two or three months, and never unwell more than one or two days, very slightly. At the same time, peculiar hysterical symptoms, simulating melancholic mania, persistent insomnia, and pain down the whole length of the spinal column, chiefly in the cervical and lumbar regions.

Examination showed retroversion of the second degree and an atrophied uterus, the sound entering barely two and one-quarter inches. The ovaries could not be felt.

Steady intrauterine galvanization, with faradization before the

expected period, brought on a moderate flow, and a continuation of this treatment during three months not only restored the uterine cavity to its normal depth and re-established normal menstruation, but also entirely relieved the nervous symptoms and the insomnia; a lever pessary kept the uterus in its normal position, and the lumbar ache disappeared. The large, flat sponge was in this case placed part of the time on the hypogastrium, and for the last half of the sitting over the lumbo-sacral region.

The patient returned home greatly relieved, wearing the pessary, and I heard some months later that she still menstruated regularly and felt well. In this case I do not think the ovaries were affected. I at first inserted a galvanic stem, hoping that it could be worn; but it produced a constant muco-sanguineous discharge which annoyed the patient and kept her mind fixed on her uterine disorder; hence I removed it. The salts of manganese were tried for a few weeks at first, but without apparent benefit. I have no doubt that the mental and nervous disturbances were hystero-nouroses directly dependent on the imperfect performance of the menstrual function.

6. *Chronic Oöphoritis and Pachy-Salpingitis.*

There is no more distressing affection in the range of gynecology than the so-called "chronic inflammation of the uterine adnexa. Recurrent attacks of congestion, perhaps at every menstrual epoch, in course of time produce a hyperplasia of the inter-follicular tissue of the ovary, and the organ becomes dense in structure and more or less enlarged. I have always felt that an ovary so diseased closely resembles a tonsil when the latter undergoes the gradual process of hyperplasia and induration produced by a succession of attacks of "sore throat." Each attack is but slight, perhaps, but is sure to leave its trace in the shape of a persistent hyperemia and in time an increase of fibrous tissue, and as there is no cure for these enlarged tonsils but their removal, so also will chronic ovaritis persist until the offending organ is removed; all the text-books tell us this. Thomas, in his last edition, says that he has nothing to add to the unsatisfactory palliative treatment which he recommended in the preceding edition, six years before. Counter-irritation outside (tr. iodine and blisters) and inside (tr. iodine, or tr. iod. and tr. aconite equal parts, to vaginal vault), iodoform and glycerin tampons, hot douches, narcotic suppositories, comprise this treatment; and while I, for my part, certainly *relieves* many cases by it temporarily, I quite as certainly feel compelled to admit that the *restitutio*

ad integrum, the restoration of the ovarian tissue to its norm, a *cure* in fact, is not achieved.

The same applies with perhaps more force to the results of a chronic catarrh of the Fallopian tubes, that is, to the hyperplastic, inflamed condition of those organs which I have ventured to designate by prefixing *Pachy* to *Salpingitis*. The tubes have lost their flexibility and softness; they are hard, rigid, and double or more their natural diameter, not through dilatation of their canal, but through hyperplasia of their walls. Hence the term "*Pachy-salpingitis*," in distinction from *hydro-* or *pyo-salpinx*.¹

In addition to the disease of the ovaries and tubes, there is generally more or less exudative or adhesive inflammation of the neighboring peritoneum (*peri-öphoritis*), which more or less distorts the relations of the organs. I think that chronic *öphoritis* is generally accompanied by *pachy-salpingitis* (more or less), wherefore the two conditions go together. The symptoms produced by these pathological conditions are sufficiently distressing to render life a burden to the sufferers, and to lead them finally, in the absence of relief from any other treatment, to agree to the alternative of removal of the diseased organs or death. Unquestionably, *salpingo-öphorectomy* is the only sure cure for this disease, and in the hands of *Lawson Tait*, the operation seems almost devoid of danger. Few other operators, however, have been so successful as he; and besides, there are many cases in which the pathological changes are not yet so marked, in which the sufferings are confined to the menstrual periods, and in which there may still be hope of conception and a possible ultimate cure. Such instances are recorded, and it hardly seems fair to deprive a young married woman, for instance, who ardently longs for offspring, of all such hope (not to mention the immediate risk of the operation), by removing her uterine appendages so long as the case still presents the least reasonable expectation of conception. Let this event once occur, and there is every

¹ *Kaltenbach*, in a recent number of the *Centralbl. f. Gyn.*, No. 48, Oct. 24th, 1885 (received after I had written the above), calls attention to a hypertrophic condition of the Fallopian tubes not hitherto appreciated, as the result of chronic purulent *salpingitis*. He states that this hypertrophy of the muscular tissues of the tubes is often dependent upon stenosis of these organs, and is usually difficult to diagnose.

possibility of the gestation going to term, and after that, if you will, "*le déluge.*"

Now, I have seen much benefit follow *persistent* treatment by blisters over the ovarian regions (two a month), and the other measures mentioned, and I have always felt it my duty to thoroughly exhaust these remedies before resorting to oöphorectomy, always excepting those cases in which at the outset, when first seen, the condition was such as to render delay in operating useless or dangerous (hydro- or pyo-salpinx; recurrent dangerous peritonitis, etc.).

In such cases where delay seemed justifiable (and they are the majority, in my opinion), I have found the above palliative measures greatly assisted by a steady use of a mild current of galvanism, passed through the affected organs by means of a large ball in the vagina (positive pole), and a large flat sponge (neg. pole), over the diseased side of, or the whole abdomen. Each sitting to last at least half an hour, and the current not to exceed twelve cells, with no interruptions or shocks.

Many such a patient has lain down on my examining table complaining bitterly of the pain "in her side," and within ten minutes has been absolutely free from pain, and has left the office feeling perfectly well, and this relief has often lasted for hours, or days, sometimes until her return to me two days later. And in course of time the relief from pain has been almost or quite complete, and I have discharged the patients, both they and I feeling that they had been greatly benefited, although I frankly told them that I nor no one else could *cure* them by such treatment, and that relapses were not improbable.

In addition to this anesthetic influence of the constant current, I can positively affirm that I have gradually felt the diffuse "thickening" in the broad ligaments diminish, become less hard, more movable, and less tender to the touch. I cannot remember ever seeing the swelling of chronic oöphoritis and salpingitis disappear entirely under palliative treatment. But my patients and I were satisfied with the relief which, for a time at least, delayed the dreaded operation.

CASE VI.—Mrs. C. O. S., 27 years; married twice, the second time four years ago; no children, but two miscarriages two years before, both during the same year. After first miscarriage, was confined to her bed with fever, and pelvic and abdominal pain for

several weeks; this occurred again after the second miscarriage, when she was more seriously ill. Since then she has been confined to her bed during each menstrual period by profuse hemorrhage and severe pelvic pain, has become thin and pale, and is scarcely ever free from distress in the hypogastric region, chiefly on the right side. She had heard a great deal of the present operative tendency, and was in dread of having some disease which would require the removal of her ovaries and womb, more or less, according to the popular idea of these organs. She was extremely anxious for a child, and was willing to do anything but deprive herself of that hope.

I found the uterus immovably ante-latero-verted, the fundus to the left, the cervix drawn toward the right, and adherent there; in the right broad ligament, a well-marked very tender swelling, which was evidently the inflamed and swollen ovary and tube; in the left broad ligament a much smaller and less tender mass. The diagnosis was perfectly plain, and the prognosis equally so. It was a case for removal of the uterine appendages, if the patient was to be relieved from her suffering which certainly prevented her from enjoying life, and was gradually making her a chronic invalid, I told her so. She asked in reply whether nothing could be done to give her relief, so that she could at least be free from intermenstrual pain and suffer a little less at the periods, and whether it might not be possible for her to conceive at some future time. She said she had come to me because she had heard that I would give her a chance of being relieved before insisting on a capital operation; and she wanted to take that chance if it existed. I told her that I could give her no hope as to a cure (except by operation), little of relief, and still less of conception, but that I was willing to try what palliative treatment would do if she would give me at least three months. To this she assented, and I began a regular course of galvanism every other day, iodoform and glycerin tampons after each sitting, two blisters a month over each ovarian region; hot vaginal douches. Tonics (chiefly iron, which she greatly needed), malt; and at the period at first one or two suppositories of extract of opium, according to the pain, and hot applications to abdomen. These latter remedies were used only during two periods. The patient began to improve within a month, the intermenstrual pain diminished; she said she could feel the relief each galvanic sitting gave her. It certainly was not the iodoform which did it, although that may have helped a little. Her appetite improved, she gained flesh, and could walk quite long distances without feeling tired or experiencing pain. There was apparently little change in the local condition, except that the swelling was less tender and softer, perhaps a trifle smaller. The uterus remained immovable. But the general health of the patient improved so much, partly in consequence of the freedom from pain, that after five months of treatment she returned to her home in the western part of the State, with directions to continue the galvanism if she felt the need of it. This, her husband in-

formed me by letter last September, was not the case, since his wife continued "amazingly well," and was growing stout; they were just going on a trip abroad, and would call to see me on their return.

CASE VII.—Miss K., 36 years, governess, had for a number of years noticed an increasing pain in the iliac regions during menstruation, which finally became almost constant. During menstruation the pain was so severe as to confine her to her bed for the first three days; it was not only colicky, but sharp darting, which latter quality she minded far more. She was not conscious of ever having had pelvic inflammation. Besides she had a profuse yellow discharge. Examination showed an intact hymen; the uterus in normal position, but almost immovable; in each broad ligament an oval, irregular swelling, most distinct on the left side, exquisitely tender to the touch; its outlines indistinct. A specular examination revealed an erosion of the cervix, and yellow discharge escaping from the external os. Diagnosis, chronic ovaritis, and pachy-salpingitis; chronic endometritis. Prognosis, incurable except by removal of appendages. *Perhaps*, remediable temporarily by local treatment outlined in previous case.

This prospect was made known to the lady, who at once chose the palliative course, saying that she could have the operation done later if it still appeared necessary.

She was treated without interruption for over three months, with marked benefit. Her intermenstrual pain left her entirely, with the exception of an occasional reminder; during the periods she no longer had the cutting, darting pain; the "cramps" she said she could easily endure. The endometrium I dared not touch, hence the endometritis could be reached only by hot vaginal douches. Still, the discharge was diminished, at least apparently, being washed away by the douches. The patient went to the country last July, feeling very well satisfied with the result, considering that her case was incurable, except by operation.

Now, of course, I know very well that all this palliative treatment is mere trifling, if ultimately the radical operation must be performed. And I also know that the relief is more than likely to be only temporary, and that a cure is not to be expected. But, on the other hand, many cases are still remediable by treatment; in others, the near approach of the menopause offers a prospect of spontaneous permanent relief; and further, conception *may* take place during the palliative treatment, since none of us can deny the possibility of that occurrence so long as we cannot by physical examination prove the absence of ovulation and the impermeability of the tubes. Hence I believe it to be not only justifiable, but proper to temporize in favorable cases, and to defer the radical operation.

until it is found indispensable. Of course, the decision much depends on the calm judgment of the physician, and the consent of the patient, in such case, not upon general sweeping assumptions. I know that many of these cases can be relieved for a time by galvanism, and that is what I set about to demonstrate.

7. *Chronic pelvic cellulitis and peritonitis.*

8. *Pelvic neuralgia, local and reflex.*

9. *Pelvic lymphadenitis and lymphangitis.*

I shall discuss these three pathological conditions together, because the symptoms which they produce and their treatment are to a great extent identical.

By "chronic" pelvic cellulitis and peritonitis I mean the condition frequently remaining after an acute attack of peri- and para-uterine inflammation, where for months and even years the fixation or immovable displacement of the uterus, the rigid vaginal roof, the thickened and contracted broad ligaments, furnish undoubted proof that such an inflammation once was present. The patient herself may not be aware of, or remember the fact, for pelvic peritonitis (rarely cellulitis), in its minor degrees, is often a very latent affection, and may produce no symptoms other than diffuse pelvic pain, while the patient is on her feet. I have found the whole vaginal roof solidified, and the uterus immovably fixed, without the least history of a pelvic inflammation.

As evidences of preceding pelvic *peritonitis*, we have chiefly the rigid vaginal roof, the immovable uterus, either in its normal position, or, if displaced, generally retroverted, with adherent fundus; the contracted retro- or ante-uterine ligaments. The symptoms are diffuse pelvic pains, chiefly at the time of menstruation, and most severe in the ovarian regions. For the ovaries are often inclosed in filmy or dense adhesions, or with the tubes are dislocated and shrunken. These diffuse pelvic pains are frequently very intense; they keep the patients at home, more or less in the recumbent position, and prevent their taking exercise or being long on their feet. It seems that in the erect posture, or when intra-abdominal pressure is exerted, as during coughing or defecation, the adhesions are strained.

Treatment for these old pelvic adhesions is very unsatisfactory. Iodine applications to the vaginal vault, glycerin and

iodoform tampons, hot douches, rest, sexual abstinence—these are the routine measures, which certainly, in course of time, do some good. But for the relief of the pain and, to a slight extent, the softening of the adhesions, I know of nothing like the galvanic current, mild, painless, frequently given and long continued. The anesthetic influence is particularly marked. I will relate but one case :

CASE VIII.—Mrs. A. M., 26 years, married five years, childless, came to me from Athens, Ga., because a year previously I had cured her sister of an anal fissure which, I was informed, had baffled her family physician. Mrs. M. had a history of pelvic inflammation four years before, since which time she had been an invalid, scarcely ever free from diffuse pelvic pains, ovaralgia, sacralgia, bearing-down. She also had an anal fissure. She had consulted an eminent gynecologist of this city, who had advised oöphorectomy. I found the uterus retroverted, immovably adherent, vaginal roof solid, cervix low in vagina, vagina short, left ovary prolapsed, adherent, very tender, right ovary not distinctly palpable. I first cured her fissure by dilatation, thinking that possibly some of her pelvic pain might be reflex from the fissure. But while defecation became painless, the peculiar ovarian and suprapubic pain, and the bearing-down persisted. So I began to use iodine to the vaginal vault, and iodoform and glycerin tampons. But the patient either did not bear the iodine well, or the pressure of the tampons distressed her. In fact, I found that she could never wear more than one small glycerin tampon with comfort. I tried local galvanism, the large sponge first over the abdomen and then over the sacrum, the negative ball in the vagina ; ten to sixteen cells, half an hour every other day. A plain glycerin tampon at end of each sitting. After fifteen sittings the patient had improved so much that she could walk a mile or more, and scarcely ever had any pelvic pain ; she wanted to return home, but before discharging her I yielded to her solicitation to enlarge the external os, which one of her former physicians had told her was contracted, and was the cause of her sterility and dysmenorrhea. I did not agree with this view, but as the patient harped on this point, and appeared determined to have it done, I thought no harm could come by making a shallow cervical incision into the lips of the os, and trimming off the flaps, of course avoiding traction of the uterus, which was still immovable and retroverted. There was scarcely any pain now on pressure in the vaginal vault, and there seemed no danger of relighting the peritonitis of four years before. I enlarged the external os, carefully avoiding traction or dilatation (I had never dared introduce the probe), and as a result set up a furious pelvic peritonitis which kept the patient in bed for six weeks, and put her precisely where she was before she came under my care. As soon as she was able to come to my office, I recommenced the galvanism, and after about a month's treatment she was as well as ever, and was discharged last March,

wearing a small soft-rubber Albert Smith pessary, which she thought gave her some support in walking. I gave her directions about the continuance of the galvanism, and have not heard from her since. Hence I infer that she is doing well, as she was of the kind of patients who would be sure to let me know if my treatment had not proved effectual.

CASE IX.—Perhaps the most satisfactory case of benefit from local galvanism in chronic peritonitis was that of Mrs. S. B., 27 years of age, nullipara, married five years, who, since a miscarriage four years before, which was followed by a very severe attack of pelvic peritonitis, had suffered from frequent attacks of pelvic pain, which was localized chiefly in the left ovarian region, and had had several exacerbations of peritonitis. She had grown rapidly stout, her menstruation was irregular and scanty (sometimes skipping four to five months), and she remained childless. I found the uterus immovably fixed, the vaginal vault rigid and tense, the left ovarian region exquisitely tender. Careful passage of a probe produced dangerous reaction, so that I never dared repeat it. Hence I have never been able to benefit her sterility. But frequent local galvanization gave such relief, each sitting being immediately followed by absence of pain, that for several months she insisted on a daily sitting. In course of time she improved so much that only once in a while now does she call on me, when her left side feels badly, and I am glad to say that I can immediately relieve her.

In chronic pelvic cellulitis, we find more distinct effusions than in peritonitis; a hard immovable lump in the broad ligament, one or more small immovable nodules behind or to either side of the cervix, or a flat callosity apparently attached to the pelvic wall. The cervix is generally pushed to the opposite side by the callus, and is then more or less immovable. The lumps may be very tender themselves, or their direct pressure produces pain in one of the large nerve trunks which supply the leg. Thus sciatic and crural neuralgia are frequently met with as the result of callosities in the cellular tissue over the sacral foramina, the sacro-ischiatic notch, and along the anterior pelvic wall. Here the routine treatment by iodine, etc., is decidedly more beneficial than in chronic peritonitis; but galvanism most quickly relieves the pain, and I have known it do so permanently in several instances.

CASE X.—Mrs. E. E. R., 30 years, multipara, was seized with a severe acute cellulitis after imprudent exposure at the menstrual period. Blisters, poultices, and hot injections after the usual time gave relief, and the exudation, which was entirely in the

right half of the pelvis, seemed in a fair way to be absorbed, when suddenly an excruciating neuralgia of the right sciatic nerve made its appearance. The pain could be at once excited by pressing on the lowest point of the now very small exudation in the pelvis. The patient suffered so much that I was obliged to give her two or three hypodermics of morphine daily, and I looked about me for some other remedy to relieve the pain, and perhaps cure the neuralgia permanently. It occurred to me to use galvanism, and I had my portable sixteen-cell battery sent to her house. I introduced the leather-covered ball into the vagina, connected it with the negative pole, and placed a large sponge with the positive pole over the right hip. To my great surprise and disappointment, the current increased the pain so much that I had to stop it. Feeling at a loss what to do for the neuralgia, I asked Dr. E. C. Seguin to see the patient with me. He agreed with my opinion that the sciatica was caused by the pressure of the exudation on the nerve at its point of exit, and advised reversing the current so as to connect the positive pole with the internal electrode. The effect was instantaneous, and in five or six applications the pain was permanently relieved, and never returned.

This taught me to apply the positive pole to the tender spot, since the negative pole was too caustic and powerful, and increased the pain.

The following case is an instance of relief of a distinct reflex neurosis, as well as a transmitted sciatica, depending on the pressure of an old cellulitic callus, by the galvanic current.

CASE XI.—Mrs. C. S., 38 years, married twice, one child by first husband eighteen years ago. Since then a sufferer from gradually increasing attacks of hemicrania (migraine), several times a month, most intense just before the menstrual period; and from frequent acute pain in the right thigh and leg. Examination showed a deep bilateral laceration of the cervix, and on the right side of the pelvis a small, hard, tender lump, connected with the angle of the right tear, and evidently an old cellulitic callosity. Pressure on this immediately brought on the sciatica in the right leg.

I at first tried the local iodine treatment (this was before I had become sufficiently impressed with the value of local galvanization in these cases, although after I had seen its benefit in Case X.), but the pain was increased thereby. I then began with galvanism, the positive pole internally, and improvement soon showed itself in the sciatica. But curiously and unexpectedly, at the first menstrual period after the treatment was commenced, the hemicrania was much less than usual. Daily sittings were held, except during menstruation, for over two months, with constantly increasing relief of both sciatica and hemicrania, until the former had entirely disappeared, and the latter showed itself only slightly

just before the period, and not at all in the interval. The galvanic sittings were then gradually reduced in number, and finally, the little button of exudation having been entirely absorbed, to make the cure permanent, I sewed up the rent. Since then, now about four years, the patient has remained entirely well, with the exception of an occasional attack of migraine which may very well be attributed to her sedentary and luxurious habits.

I do not think that acute or subacute exudations are proper cases for local galvanization, at least I do not believe that absorption would be greatly aided by this treatment, although Apostoli is enthusiastic in his advocacy of electricity for that purpose. I have always been afraid of exciting new exudation by too much handling of fresh cases. It is chiefly for old, hard exudations, which seem to resist spontaneous absorption, that I recommend galvanism.

There is a class of cases in which galvanism has also done me good service, which are, I think, often mistaken for chronic cellulitis, namely, chronic inflammation of the lymphatic glands and vessels of the pelvis. These cases are not so uncommon as one might be led to suppose from the complete omission of all reference to the disease in nearly all the text-books. Only Courty ("Diseases of the Uterus," etc., 1883), devotes a chapter to it. I have devoted some attention to the subject and have stated my views thereon in an article in the *JOURNAL OF OBSTETRICS* for October, 1883.

The difference to the touch between small nodules of plastic exudation in the cellular tissue, and inflamed and enlarged lymphatic glands, is that the former are immovable, irregular in shape, very hard and only moderately tender; whereas the inflamed glands are freely movable (unless cellulitis is also present, when the differential diagnosis may be impossible), very tender, and are generally several in number, and of a regular ovoid shape. The glands are found normally behind the cervix, and toward the lateral pelvic wall on either side, two or three only in each locality.

The lymphatic vessels, when inflamed, have a doughy, bunched, irregular feel, like a bundle of angle worms, are movable and very tender, and are likewise felt behind and to either side of the uterus. If behind, a rectal examination shows them very plainly.

As is the case with the lymphatics in other parts of the

body, their inflammation is generally secondary to some focus of irritation in the cervix, or in the cavity of the uterus, such as a cervical erosion or laceration, or a uterine catarrh.

The usual treatment is first to remove the primary irritation, and then, if still necessary, allay the lymphangitis. The usual counter-irritants (iodine) and alteratives (iodoform, glycerin, hot douches, etc.) may answer the purpose. But I have twice seen permanent relief follow only persistent local galvanization. One illustration will suffice.

CASE XII.—Mrs. G., 24 years, nullipara, was sent me by Dr. Chas. Denison, of Denver, Col. She complained chiefly of severe and constant sacralgia, dating from an attack of pelvic peritonitis four years before. I found the uterus retroverted, firmly adherent and immovable; the left ovary prolapsed and adherent; behind the uterus a number (five or six) of small, very sensitive nodules, which could be very clearly mapped out through the rectum, and were evidently situated in the retro-cervical cellular tissue. These were evidently inflamed lymphatic glands. No pain was experienced on examination except when these nodules were touched, or the attempt was made to lift up the uterus. I found the patient exquisitely sensitive to all manipulations, for, on passing the sound and gently testing with it the possibility of elevating the fundus uteri, she was seized with so severe pelvic pain that I was obliged to give her a hypodermic of morphine; in consequence of this, she was nauseated, and I was obliged to have her put to bed and to keep her at my house over night.

Naturally I refrained from further active measures, and confined my efforts entirely to mild counter-irritant applications (iodine, iodoform, and glycerin) to the posterior vaginal vault, and to relieving the sacralgia by the galvanic current.

I passed an olive-shaped electrode into the rectum, connected it with the positive pole, and placed the negative sponge on the abdomen. At times I placed the sponge against the sacrum, for the purpose of including the sacral nerves in the current. Rapid improvement followed; the pain soon left entirely, and I could distinguish a decided diminution in size and tenderness of the retro-uterine nodules. The lady came every day at first, and later every other day, from Brooklyn, where she was staying with friends, and returned without the least discomfort, although it was winter. After about twenty sittings she expressed herself so much relieved that she felt she could safely return home. I have not heard from her since, but believe she or Dr. Denison would have informed me if her pain had returned.

I have no experience with a plan recently published by Dr. Baird, of Texas, who first arrested the exudation and relieved pain in a tedious case of pelvic cellulitis by the faradic cur-

rent; and then, when pus had formed, evacuated it by the aspirator, injected salt-water, and galvanized the abscess-cavity, with the result of speedy contraction and cure. I think the practice exceedingly ingenious and plausible.

10. *Obstructive and Neuralgic Dysmenorrhea.*

In certain cases of dysmenorrhea, no physical cause is apparent for the pain except a comparatively slight constriction or distortion of the uterine canal; the sound passes readily, without hindrance, but causes excruciating pain, every point of the endometrium from external os to fundus being excessively hyperesthetic. There may be a slight uterine catarrh, but not sufficient to account for the hyperesthesia. This is the neuralgic variety.

In other cases, there is a slight obstruction at the internal os to the passage of the sound, merely a momentary obstacle, certainly not sufficient to prevent free, painless exit of the menstrual blood. But we may infer that the congestive swelling of the tissues at the menstrual period may produce a temporary obstruction to the escape of the blood, and thus cause pain.

In both of these varieties, local treatment by forcible dilatation and intrauterine applications of carbolic acid may give temporary or even permanent relief. But I have known these measures to fail; and then I have found great benefit from intrauterine galvanization, using the negative pole internally, and not exceeding ten cells, in order to avoid a decided caustic effect. I have thought that the sedative influence of the current, together with a mild electrolytic effect, might give relief. And I certainly have succeeded in widening and toughening the uterine canal, and in relieving the dysmenorrhea so long as the treatment was continued. I regret to say, however, that in several aggravated instances of the neuralgic or spasmodic variety the pain reappeared soon after the cessation of the galvanic treatment.

CASE XIII.—Mrs. A. B., 28 years, nullipara, married four years, has been suffering from most excruciating dysmenorrhea since marriage, for which persistent local treatment by intrauterine applications, tents, and forcible dilatation, conscientiously employed by her family physician in the town where she lived, had been unsuccessfully employed.

I found absolutely no cause for the dysmenorrhœa except a slight endometritis, as shown by an eroded appearance of the lips of the os externum. The sound entered readily, but caused considerable pain. Ovaries normal. As the usual remedies had been ineffectually tried, I forbore to experiment with them again. There was absolutely no indication for incising or dilating the uterine canal. I decided to give galvanism a trial, and began with a very mild current, using the utmost caution in introducing the sound electrode. After the first two sittings, so severe an attack of uterine colic came on that I had to give a hypodermic of morphine and send her home in a carriage. I then omitted the intrauterine electrode, and used only the ball applied to the cervix. After several sittings of this kind, which gave no pain, I returned to the sound electrode, and was pleased to find no pain follow. Only once after this did the uterine colic recur. After several weeks of this treatment, the menstrual period came on, and was absolutely painless. The treatment was therefore continued through a second intermenstrual epoch, at greater intervals, with a similar result at the second period. I was in favor of continuing the galvanism, but she was anxious to return home, and we agreed that the treatment should be kept up there. I do not know whether this was done, as I have not heard from her since. I cannot, therefore, be sure that the relief was permanent.

11. *Erosion of the Cervix.*

Usually the erosion is due to a uterine catarrh, and to cure the former it is first necessary to remove the latter. These erosions (I do not refer to those complicated with laceration) are generally very difficult to heal; week after week, and month after month, iodized phenol, iodoform, nitrate of silver solutions, and finally nitric acid, are applied, and still the erosion remains. I have found the negative pole of the galvanic battery, applied to the erosion by means of a metal ball, uncovered, sufficient current being used to produce a mildly caustic effect, to have a beneficial influence toward starting cicatrization. Only a few such applications should be made, and as soon as the erosion begins to heal from the edges, finely powdered iodoform, or a solution of nitrate of silver (3 i. to $\frac{3}{4}$ i.), should be substituted.

12. *Uterine Displacements.*

Tripier has reported particularly good results in old uterine dislocations from the faradic current applied to the relaxed ligaments, in retro-deviations, one double pole being placed in

the bladder over each vesico-uterine fold, and the other pole within the uterine; in ante-deviations, the extrauterine pole being in the rectum. Or, if the bladder and rectum do not bear this manipulation, the pole may be placed over the abdomen or sacrum, respectively. I have had no experience with this treatment, having, I confess, but little confidence in the power of electricity to restore tone to ligaments (which are but slightly muscular in their composition) so relaxed and elongated as are generally those of the uterus in old displacement. And in recent dislocations a proper mechanical support will often succeed after a time, by giving the ligaments an opportunity to regain their tone.

I think that in flexions more may be expected from the faradic current than in versions, for it seems more possible to stimulate the tissue of a bent muscular organ like the uterus to a healthy action than to shorten and strengthen flabby folds of peritoneum.

In recent cases of prolapse of the vaginal walls, such as we not unfrequently see in young women after their first confinement, where the relaxation is slight and merely the result of a momentary loss of tone, where there is, in fact, a subinvolution of the vagina, the faradic current, applied by the long metal finger electrode mentioned, has done me good service. But, I have always thought best to insert astringent tampons after each electric sitting, and of course attribute some of the contraction of the parts to the latter applications.

13. *Fibroid and Ovarian Tumors.*

Both varieties of electricity have been employed in the treatment of uterine fibroids. Apostoli, in a recent paper presented to the International Medical Congress at Copenhagen, in 1884, lauds very highly the faradic current, by which he produced uterine contractions and gradual shrinkage by compression and mal-nutrition of the tumor. Bayer (l. c.) reports a case of fibro-myoma, in which the long-continued use of galvanism produced a gradual marked diminution of the tumor. Neither of these authors states whether the diminution was permanent. Everett, of Ohio, has also published a favorable experience with the agent. The object of this superficial application of electricity is to pass as strong a current as can be borne through

as large a portion of the tumor as possible. Hence large external sponges and an intrauterine or intrarectal electrode are necessary, and, of course, many sittings are required to bring about a result.

We need many more observations on this method, not only as to the possibility of often reducing fibroid tumors (myomata being softer, would naturally be more easily diminished than fibroids), but also as to the permanency of the reduction. The treatment is certainly safe, which is more than can be said of the electro-puncture of these tumors, as practised some years ago by Kimball and Cutter, who operated in fifty cases, four of whom died, while a number were reported benefited. Their method was to thrust one or two large gutter-shaped daggers through the abdominal wall into the tumor, with the other electrode placed on the skin near by or at some distance. The danger of peritonitis is obvious.

Dr. Freeman, of Brooklyn, has recently reported several cures of smaller fibroids by electro-puncture. He drove a small gold needle several inches deep into the tumor through the vagina, the patient being under an anesthetic.

One of the cases he reports as cured was that of a lady, whom the doctor brought to my office for my opinion. The fibroid was a retro-uterine sub-peritoneal one, of the size of a fist, immovable and insensitive. I told him that I could do nothing for it, as I did not think the symptoms it produced justified operative interference. In answer to his question as to what I thought of electro-puncture, I replied that I had heard of it, but knew of no well-authenticated cases of cure.

His later report of the cure of this case by that method, however, induced me to try it in a case of large subperitoneal fibroid, which I happened to have in my service at Mt. Sinai Hospital. I forced (and it required all the strength I dared exert) a stout steel insulated needle through the vagina into the tumor on two occasions, connected it with the negative pole, and placed the other electrode (a large flat disk of copper covered with red flannel) on the abdomen. Up to twenty-four cells were used with no reaction. I used no anesthetic, the patient complained dreadfully, and left the hospital before the result of the treatment could be ascertained. Of course, this trial was too brief to be of any consequence. The frequent

anesthesia required for this treatment, if it is to be given a thorough test, might be somewhat of an obstacle.

I certainly shall give the method further trial, particularly in cases where the fibroid can be reached from the vagina, and especially if the needle can be introduced through the uterine canal without wounding the peritoneum. Electro-puncture would seem to be indicated chiefly in sub-peritoneal tumors, and superficial electrolysis in intramural growths.

Of electricity in ovarian tumors I shall say but little, since it is absurd to consider a treatment the result of which can be at best but uncertain in the face of the magnificent successes of ovariectomy. Many of us may still remember the claim of Dr. Frederick Semeleder, of Mexico, some eight years ago, that ovarian cysts were curable by electrolysis (that is, *electro-puncture*), and may also recall his experiments with the method here, and his disastrous results. I made it my object at that time to collect all the cases in literature of electrolysis for ovarian tumors, and to compile the cures and failures, and published a full article on the subject in the "American Gynecological Transactions" for 1877, Vol. II. I collected fifty-one cases, of which only twenty-eight might credibly be considered cured; nine died, and fourteen were utter failures. The ratio of mortality and failure was forty-five per cent, or double the mortality from ovariectomy even in the hands of our less successful operators of to-day. That settled the question of electrolysis!

Some enthusiasts have claimed to cure ovarian tumors by superficial electrolysis, and I doubt not that *small solid*, or nearly solid tumors might be reduced in that way.

Counter-indications.—It may be well to say a word about the conditions where it would be unsafe to use local electrization. I think that the rule to avoid it in all cases of acute or subacute inflammation of the pelvic organs will about cover the ground, although there may be exceptions to that rule in instances of mild subacute cellulitis and ovaritis.

The cases which I have related in this paper are merely used as illustrations, and have not been selected as exceptional instances.

The conditions in which the two varieties of the electrical current act most beneficially may be summarized as follows:

FARADISM.

Deficient development of uterus and ovaries.
Amenorrhœa.
Subinvolution and menorrhœgia.
Superinvolution.
Uterine displacements.
Uterine fibroids (interstitial).

GALVANISM.

Hyperplasia uteri.
Chronic ovaritis and pachy-salpingitis.
Chronic cellulitis and peritonitis, and lymphadenitis.
Pelvic neuralgia, local and reflex.
Dysmenorrhœa, neuralgic and obstructive.
Erosions of cervix.
Subinvolution.
Uterine fibroids (sub-peritoneal).

The conclusions to be drawn from the experience detailed in this paper are the following:

1. Electricity locally applied is a valuable agent in gynecological practice, and should be more widely used than it is.
2. It does not require special knowledge or experience as an electrologist to be able to use the agent safely and beneficially in gynecological practice.
3. The remedy, if properly used and on correct indications, cannot do harm.
4. It should be used only in chronic conditions, and if it is the galvanic current, should give no pain.
5. The conditions in which the faradic current is indicated are chiefly those characterized by deficient development or want of tone of the sexual organs, such as imperfect development of uterus and ovaries, superinvolution, subinvolution, amenorrhœa, uterine displacements, interstitial fibroids. The object of the faradic current is to stimulate the organs to increased growth or activity, and to produce muscular contraction.
6. The conditions in which the galvanic current is indicated are those in which it is desired to promote absorption of adventitious products, chiefly the result of previous inflammation; to allay pain, to excite reparative action, and occasionally to act as a caustic. The rapidly interrupted galvanic current, however, also excites muscular contraction.
7. Perseverance in the treatment is essential to success.
8. Acute and subacute inflammatory conditions, as a rule, counter indicate local treatment by electricity.
9. The pathological conditions in which electricity proves useful are those in which other treatment often fails or cannot be borne by the patient.
10. In organic diseases, a permanent cure, or a restoration

of the diseased organs to perfect health, can usually not be accomplished by electricity, but great relief from pain and certainly temporary improvement in otherwise intractable cases can be achieved by it, without danger and with comparatively little discomfort to the patient.

A REVIEW OF SOME COLLECTED CASES OF FIBROMATA OF
THE CERVIX UTERI.
WITH TABLES.

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(Concluded from page 1271.)

V. Treatment.

BEFORE discussing the means to be employed in the treatment of fibrous tumors of the cervix uteri, it would be well to consider what time is best suited for operative interference, and the circumstances which would influence us in our choice.

I. It is almost an axiom in gynecological practice, that all operations upon the uterine body should be performed during the intermenstrual cycle, and surgeons are warned, before attempting an operation even of the least magnitude, or to go further, before employing certain methods of examination (notably the use of the uterine sound, which is to some an indispensable aid in diagnosis) that the question of pregnancy should be settled beyond dispute, or if there is the smallest element of doubt, that nothing should be done until time and increased facilities have decided the question. These are good and safe rules to follow in routine practice, but among the exceptions may be noted the necessity which may arise for removing a fibrous tumor of the cervix during menstruation. As far as this is concerned, however, no definite principles can be laid down, for menstruation may have long ceased to occupy a distinct and limited period, and the flow of blood from the uterine vessels may be almost, if not quite continuous. Although even under these circumstances it would be best to wait for the time of the usual intermenstrual epoch, yet the gravity of the symptoms may often call for immediate sur-