Clinical notes on the electric cautery in uterine surgery / by J. Byrne.

ELECTRO-CAUTERY
IN
UTERINE SURGERY.

BYRNE.

James R. Chadwick

Boston Jan. 1874.

CLINICAL NOTES

ON THE

ELECTRIC CAUTERY

IN

UTERINE SURGERY.

BY

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INTRODUCTION.

In compliance with the wishes of many prominent members in the profession, and influenced in some degree by the flattering reception accorded my paper on galvano-cautery,* I have been induced to revise the same for publication in the shape now presented.

During the past nine months I have had ample opportunity of still farther pursuing my experimental investigations, with the hope of being able to improve and simplify, if not to perfect, such a galvanic apparatus as might be relied upon for surgical purposes.

The net practical results of these researches and some other matters of importance are briefly set forth in an appendix.

It is true, a review of my more recent experience, and a detailed account of many grave and highly interesting operations since met with, might also have been added, but the pressing demands of daily practice on my time have rendered this impracticable.

In this connection, however, it is well to state that a more extended acquaintance with the subject has but served to confirm my first views and opinions regarding the merits and claims of bloodless surgery. Besides, in no very important particular do I see any good reason to depart from the observance of certain principles originally insisted upon touching the general management of batteries, or suggestions as to the proper method of conducting cautery operations.

Consequently, though a minute history of the cases referred to, might, in one sense, render this little contribution to gynæcology more complete, it would probably serve little or no practical purpose.

It is hardly necessary, then, to remind the reader that what is here offered is a part only, and therefore an incomplete report of my clinical labors in this department of uterine surgery

Should I have succeeded in conveying that kind and amount of information merely, touching electro-cautery, which might enable any intelligent surgeon to employ this safe, and in many cases, the only means at our command for curing or alleviating the ails of suffering women, my sole object will have been accomplished.

314 Clinton St., Brooklyn, August, 1873.

* New York *Medical Record*, Decem. and Jan., 1872-3, and subsequently reprinted in *American Journal of Obstetrics* and other leading Journals.

CHAPTER I.

CHRONOLOGICAL REFERENCE TO GALVANO-CAUTERY.—THE RELATIVE MERITS OF VARIOUS BATTERIES CONSIDERED.

No surgeon, on witnessing for the first time a successful intra-vaginal operation by the galvanic cautery—for example, the removal of a cauliflower cancer or a fibrous polypus from the cervix uteri—could fail to be deeply impressed with the many advantages offered by this safe and rapid, yet bloodless, proceeding over all others now or heretofore at our command. Nor would his admiration be unmixed with astonishment and wonder to think that so attractive a means of conducting these and similar operations had not been long since universally adopted; nay, that the subject had even been denied a few pages in standard works on gynæcology; for a late edition of one of the most practical, if not the very best, treatise on diseases of women, is, in this particular, noticeably defective.*

A very little reflection, however, will soon convince him that, after all, neither authors nor any one class of practitioners in particular are much to blame; for even the laws by which galvanic electricity is governed, not to speak of its adaptation to the most delicate and difficult operations, are nowadays but seldom made the subject of scientific inquiry either by candidates for medical honors or practitioners generally. And yet, strange as it may appear, the history of galvano-cautery, though consisting for the most part of clinical fragments merely, or an occasional report of some chirurgical achievement, covers a period of over a quarter of a century. It is true, but little was heard during the first few years of the new service which the thermal power of current electricity was being made to render; for prior to 1850 almost the only surgical uses which it seems to have served, with the exception of Crussel's operation for a fungus hematodes, were the removal of nævi, and the destruction of dental nerves. It may be safely asserted, however, that we are indebted for most of what is even yet known of galvano-

* I have been lately assured by Prof. Thomas, to whose excellent work I refer, that in his 4th edition now in course of preparation this defect will be remedied.

cautery to the ingenious devices of Marshall and Ellis, in England, from 1850 to 1852, and the subsequent publication, in 1854, of Middeldorpff's more brilliant exploits in Germany. Since the latter period, many interesting reports of cases by Semeleder, Newman, Zsigmondy, Braun, Von Grenewald, Rudolph Voltolini, and others, have appeared, but there is nothing in the valuable yet only corroborative experiences of these observers to warrant a doubt that the claim of priority in originating all that is of practical value in electro-cautery, belongs of right to those first named.* To Ellis, especially, is due the credit of first suggesting the spiral cauterizer; Marshall and Middeldorpff, contemporaneously, though independently, devised the loop; while all clearly and distinctly indicated the various lesions likely to be benefited or cured by the employment of their several contrivances.

It is not a little surprising, therefore, to notice how few surgeons there are, comparatively, even among gynæcologists, who have adopted the practice, or given the subject any attention whatever, though more than twenty years have now elapsed since its claims were so attractively demonstrated. That this omission arises, in a great measure, from the want of any reliable guide to a practical study of the subject, there can be little doubt; because, as has already been intimated, any one who desires accurate information, or such definite rules and directions as will enable him to operate successfully by means of the electric cautery, will seek such aid in vain among the gynæcological records, or other medical literature of our language at least. The brief allusions met with in standard works on medical electricity and electrolytic surgery, will avail but little in a practical sense, beyond what relates to the elementary principles of electro-physics. As for practical hints, and that particular kind of knowledge so needed for conducting important cautery operations, there are but two ways in which such can be obtained: either by being fortunate enough to have repeatedly witnessed and closely observed such operations, or through laborious experimental research and no trifling pecuniary outlay. By this latter path I have been obliged to travel; and though fortified by a tolerably exact knowledge of electro-physics, and constantly aided by material for clinical study, yet many disappointments and difficulties of a perplexing nature have had to be at first contended against.

* In this country, also, many important galvano-cautery operations have been performed within the last few years by Drs. Noeggerath, Thomas, Guléke, Sims, Jacobi, and others, but few of which, however, have been published, so far as I know.

This statement is made, not with a view to herald my own industry or perseverance, but merely as suggestive of additional reasons why galvano-cautery, which is destined at no distant period to play a most important part in gynæcological practice, is so little understood, and so seldom resorted to. It is also reasonable to infer from what has been said, that many of the unsuccessful attempts to operate by galvano-cautery of which we hear, as for example when the battery is said to have "given out" at a critical moment, have been due less to imperfections in the apparatus, than to a want of experience or an inadequate knowledge of electro-physics on the part of the operator.

It will be found impossible to construct any galvano-electric apparatus which may not occasionally become defective, either by accidental displacement of some of its parts, or imperfections resulting from use. The well-ascertained laws, also, in accordance with which the electric fluid is generated and set in motion, demand the strictest observance, and will tolerate no innovations incompatible therewith, either as regards the relation of negative and positive elements to each other, and their metallic connections, or the quantity and kind of fluid or fluids by the aid of which electro-motive force is to be obtained.

Consequently, no surgeon can hope to succeed in the practice of electro-cautery unless, when difficulties arise, as in case of failing to obtain sufficient heat, he is not only competent to fully appreciate and understand the nature, causes, and extent of such interruptions, but also possessed of a certain amount of mechanical aptitude, so as to enable him to remedy the defect. Indeed, I have no hesitation in stating that these conditions are essential to success, and cannot be safely dispensed with; because, though certain rules may be laid down concerning the general management of batteries, and even specific directions given as to the proper manner of conducting cautery operations, nothing short of a tolerably exact scientific knowledge of the whole subject will suffice to overcome unavoidable obstacles.

Hence, it is not unreasonable to infer, that had these facts been earlier recognized, many of the troubles and disappointments reported in the practice of eminent surgeons might have been avoided, nor would a quarter of a century have elapsed ere galvano-cautery, instead of being understood and practised by comparatively few, had become the usual, and not the exceptional means by which certain diseased conditions might be cured or relieved.

Before proceeding to describe such a battery and instruments as I have found best suited to the requirements of surgical

practice, some reference to the several kinds of galvanic apparatus used and recommended by others seems called for. Nearly three years ago I assisted Dr. Noeggerath in removing an epithelioma from the cervix uteri of a lady whose case will be described hereafter, and the battery used on that occasion was a zinc-carbon one, such as that first invented by Bunsen in 1843. I subsequently operated with this instrument, and was much pleased with its action in both cases, though in the latter, my patient, who had a large fibro-cellular polypus attached by a thick pedicle, lost much blood, owing partly to the vascularity of the tissues, but more particularly because the wire used was, as I believe, too fine, and perhaps also in some measure on account of traction kept up on the tumor. I remarked then to gentlemen present that vascular parts could not be safely cut through except by a much thicker wire, which, I was informed, the battery, though a very large one, would not sufficiently heat.

My next few operations were conducted by means of a powerful Grove battery, the only distinctive difference being that platina instead of carbon is used as a negative element, and in every respect similar to that used by Professor Middeldorpff.

This apparatus, though beautifully constructed and costly, was soon abandoned, however, mainly because of the great trouble and care needed in working it; for, like the one first used, strong nitric acid was required for the inner or porous cell, and on account of which perplexing accidents are often unavoidable. Nevertheless, being favorably impressed by what I had already observed, and influenced by the opinions of authorities against other than constant batteries, I determined to provide myself with another 8-cell Bunsen, similar in principle to that of Dr. Noeggerath already referred to. After a few trials, however, I found it quite insufficient to heat wire of such length and thickness as would insure against hemorrhage in any but trifling operations. This defect, coupled with the danger in handling large quantities of strong nitric acid, and the suffocating nitrous fumes resulting from chemical action, not to speak of the trouble and time spent in filling, emptying, and cleaning the cells, induced me to abandon every kind of so-called constant, or two-fluid battery.

The claims of Stohrer's four-cell one fluid carbon-zinc battery were next fully considered, but on account of its huge dimensions, being less portable than any of those already tried, I hesitated, and concluded to procure the French contrivance, known as the "Grenet battery." This little apparatus is composed of eight zinc and six carbon plates, four of the former being

united and connected with three of the latter, similarly joined, the other sets of three and four zincs and carbons, each unitedly forming the negative and positive poles.

In this manner the whole is made to act as *two* powerful cells. I have operated frequently with this instrument, and can fully endorse the views expressed regarding its power and certainty of action by Dr. Garrett, of Boston, the only author, so far as I know, whose opinions as to its worth seem to have been derived from a practical knowledge of its capacity. Indeed, after an extensive practical acquaintance with this battery it is a little amusing to recall the description given of it by Meyer, in his work on "ELECTRICITY IN ITS RELATIONS TO PRACTICAL MEDICINE," as follows:—"After the battery is dipped into the fluid *as high as the upper edge of the carbon-plates*, a Y-shaped tube is fastened to the rubber tube, and to this a pair of bellows; soon the fluid is thrown into commotion, and after *four or five seconds* the platinum wire which is secured to the conducting wires going from the zinc and carbon poles, glows." None of which is correct, because neither this nor any other such battery should ever be dipped "as high as the upper edge of the carbon-plates," no bellows is needed, and the platina requires no longer time to become incandescent than when attached to any other battery that I have ever seen. I have never found it necessary to use the bellows attachment, the occasional raising and re-immersion of the battery being all that is needed to perpetuate its power. It has not, however, that "*intensity*" arrangement which many operations demand, and hence its sphere of action is too limited to be universally serviceable in practice. Moreover, the lead-lined box which contains the fluid is too large to be conveniently portable, and there is no mechanism provided for raising the battery out of the acid solution when not actually in use, and keeping it suspended so as to drain the plates, arrest chemical action, and thereby control and preserve its heating capacity.

Being, on the whole, tolerably well satisfied with this first specimen of single-fluid battery, my next desire was to obtain one of a similar nature, but, if possible, still more powerful and less limited in its sphere of action, yet as moderate in size as would be consistent with these additional requirements.

A battery combining in a very great degree all these qualities was therefore constructed at my request by Mr. Charles T. Chester, 104 Centre street, whose thorough practical acquaintance with electro-physics is so well known, and to whose politeness I am greatly indebted for many valuable hints and suggestions. This instrument is composed of eight pairs of carbon

and zinc plates, each measuring about six by nine inches, and so arranged that the whole could be made to act either as two cells when *quantity* is desired, or four cells as when greater *intensity* is needed to overcome resistance. If short and heavy, or flattened platina is to be heated, certain binding screws, marked two, are turned down, while those marked four are to be raised; and when a long and comparatively thin wire, such as is used for looping purposes, is required, this order of adjustment is to be reversed. By this useful contrivance the apparatus can be made to meet every want, and in my hands it has never failed. As an evidence of its power, moreover, I may state that five inches of number sixteen wire can be made incandescent, and as the elements can be easily raised or lowered by means of a windlass attachment, its management is simple, and as a whole is far superior, in my estimation, to the more clumsy and costly apparatus of Stohrer.

With all these attractive features, however, it also is too bulky and heavy to be conveniently portable, and consequently not so well adapted to the requirements of private as to hospital practice. The quantity of fluid required to bring it into action is three gallons, prepared by dissolving three pounds of bichromate of potassa in ten quarts of boiling water, to which, when cool, two quarts of sulphuric acid are to be added.

It will be observed from these remarks that, though double-celled batteries, whether composed of the Bunsen or Grove elements, are constant in their action, they possess no other attractive characteristic warranting a preference over the more simple and manageable single-fluid arrangements. Indeed, this supposed indispensable quality as to constancy may be conveniently dispensed with, for it is no more an essential requisite in a battery for surgical purposes, than would be perpetual motion in a time-piece.

Authorities on electro-surgery, as a rule, either caution us against the employment of these batteries, simply because they are not continuous in their action, and liable to give out at a critical moment, or furnish such an incorrect description of their *modus operandi* as to deter many from using them. They seem to entirely forget, however, or at least fail to suggest that there can be no reasonable object whatever in immersing a battery before its action is called for, or allowing it to remain so unnecessarily long, and during intervals of inspection which ought to and must occur during every important cautery operation. Another very common and mischievous fallacy is to suppose that by disconnecting one or other of the conducting cords, or otherwise breaking the current, as, for example,

by means of a slide in the cautery-handle, we thereby arrest the waste of thermal power. Breaking the circuit, however, does not wholly arrest chemical action; and as prolonged immersion, even with this precaution, seriously impairs electromotive power, no battery *of this class* should be put in contact with the fluid until heat is actually required, or allowed to remain so during operative interruptions, or one minute after it has served its purpose.

CHAPTER II.

DESCRIPTION OF A NEW BATTERY AND THE INSTRUMENTS REQUIRED FOR CAUTERY OPERATIONS.

Fig. 1 is a correct representation of a battery devised by me nearly two years ago, and employed in some of my most important operations.

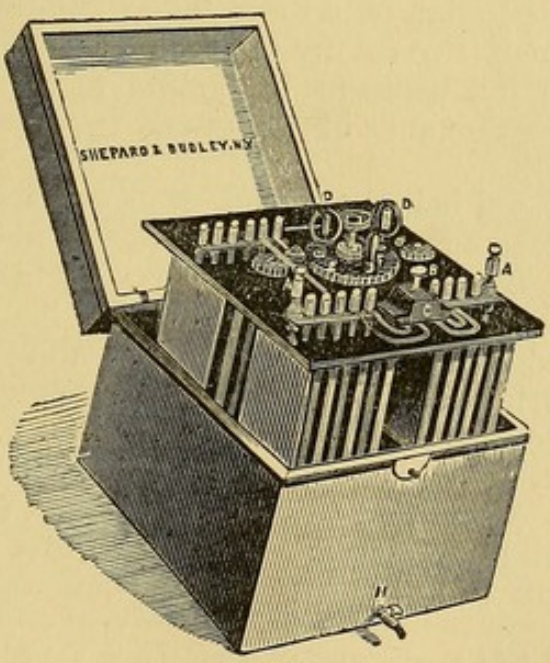


FIG 1.

It consists of twelve carbons and twelve zincs, each 3 by 5 inches, combined and arranged so as to represent four sets or cells of three pairs each. In this order the elements are securely fastened by nuts and screws to a hard rubber platform

7½ by 8 inches in surface, and one-quarter inch thick; and the combinations and connections effected by means of narrow strips of copper annealed and nickel-plated. In the centre is a cog-wheel three inches in diameter, which, on being turned by means of an upright handle, causes the two water agitators to revolve.* Near the front edge of the platform is fixed what might be properly denominated an *electrotension disc*, by the aid of which the whole character of the battery may be changed in a moment, so as to represent either two cells, as when quantity is needed, or four cells when great resistance is to be overcome, such as in heating a long thin wire.

The latter simple contrivance has rendered this battery, in my hands, equally reliable and powerful in every emergency, being capable of heating (white) from 6 to 8 inches of No. 16 wire (Stubb's gauge), or over 12 inches of No. 21, the last mentioned being the size which I always select for looping purposes. Passing through the centre perpendicularly is a square rod notched on one side for the reception of a ratchet-spring fixed to the collar of the central wheel, and by which the battery may be easily lowered into the liquid, or raised and kept suspended at any point desired. This arrangement is much preferable to that of a screw, as in Stohrer's instrument, because the small size of my apparatus as compared with the former, enables the assistant in charge to regulate its power according to the demands of the operator, with less delay and equal facility.

The upright rod being screwed into a transverse support in the box, can be removed when the battery is not in use.

The box is divided into two parts by a central plate, suspended above, and running from before backwards; a stop-cock is provided for drawing off the fluid and washing out the battery after being used, and the whole being made of hard rubber moulded, there is no necessity for lead or other lining.

The conducting cords ought to consist of not less than 100 strands of fine copper, or, what is still better, silver wire, each cord well covered with silk or cotton in the first place, and then, as a matter of great convenience when operating, bound

* The object of this arrangement is to increase the power of the battery when, owing to continued use, as in tedious operations, the fluid may become exhausted.

It is very seldom needed, but as an example of its value under certain circumstances, I may state that half-strength fluid—that is, one part of water and one of fresh ordinary battery fluid—can be made, by agitation in this manner, to produce nearly, if not quite, an equal heat with the strongest fluid without such agitation.

together, by another covering to commence 12 inches from the binding-screw extremities, and to continue up within 3 inches of the opposite ends. The latter should each be provided with a socket and sliding ring for the reception of the cautery handles, as this is a much better and less bulky manner of making connection than by binding screws as ordinarily employed.*

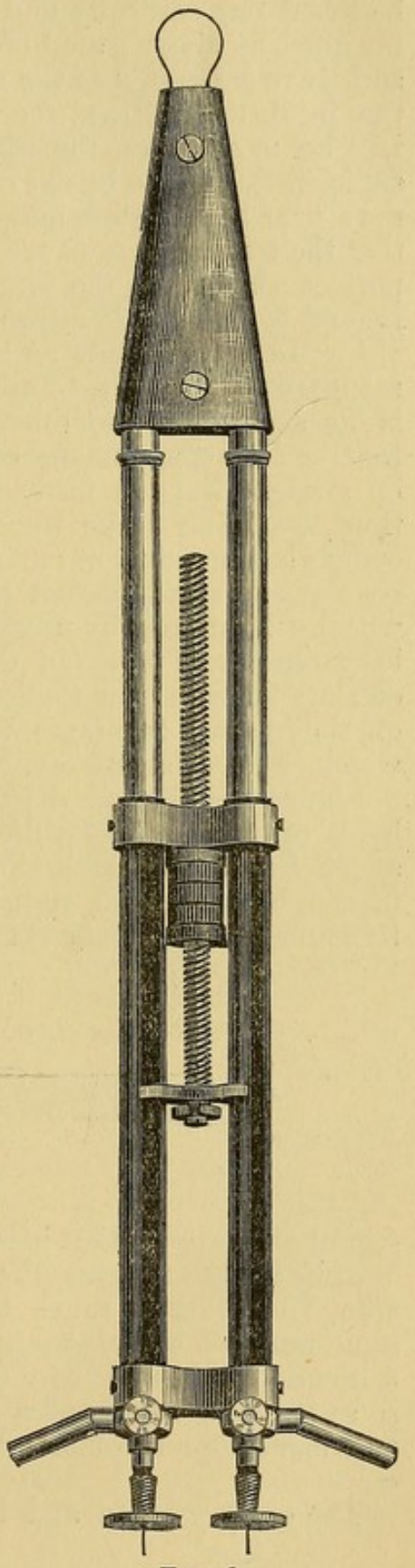


FIG. 2.

DIRECTIONS FOR PREPARING THE BATTERY.

The quantity of fluid required is six pints, prepared by dissolving twelve ounces of bichromate of potassa in five pints of boiling-water, to which, *when cool*, one pint of sulphuric acid is to be slowly added. Owing to the chemical heat generated by the admixture of the acid, the liquid must again be allowed to cool before using; otherwise, the zinc plates would suffer much waste, and the efficiency of the whole apparatus then and for the future be seriously impaired. Every battery ought to be carefully examined *each time* before commencing operations with it, so as to make sure that every part is in order, and that no displacement or contact of zincs and carbons has taken place since last in use. Before pouring the fluid into the box, the elements should

* This battery, as well as every form of electrode required, is manufactured by Shepard & Dudley, 150 William Street; and for the perfect and satisfactory manner in which my instructions have been carried out, as to their construction, much credit is due to the good taste and mechanical judgment of Mr. William R. Leonard, with the above firm.

be lifted out carefully and rested on some smooth surface, and the quantity above stated (six pints) should be measured, unless, as I have suggested to the manufacturers, a mark be placed on the inside to indicate the required quantity. The next step will be to screw on the upright rod, and suspend the battery sufficiently high to be out of the bath. The conducting cords may next be adjusted, and in doing so, care should be taken that the binding screws are turned down tightly, so as to insure perfect connection, the same exactness being also necessary in regard to the handle attachments.

Figure 2 represents an improved loop instrument originally manufactured by Mr. Charles T. Chester at my suggestion, and is far superior to any other that I have seen used or described, for the following among other reasons: The loop is tightened by straight traction instead of being wound on a roller, and thus less likely to be impaired for future service; while the opera-glass attachment enables the surgeon to keep up a more regular and steady action than would be possible by turning a wheel. Moreover, by using such an instrument as this he will be more likely to avoid the frequent and serious mistake of cutting through the tissues too rapidly, thereby forfeiting one of the main advantages justly claimed for galvano-cautery, which, I need hardly say, is security against hemorrhage.

Figure 3 is the spiral cauterizer which I have been in the habit of using successfully in cases of chronic inflammatory affections of the urethral mucous membrane, and as a more thorough, safe, and radical means of combating obstinate follicular disease of the cervical canal than any other caustic or

FIG 3

stimulating application heretofore employed or recommended. Within the last few months, however, I have devised and used what I consider a much better means of accomplishing the same purpose, by substituting for the spiral wire and porcelain, 5 inches of a heavier wire (say No. 16), flattened and doubled so as to nearly represent a long cylinder. In this manner the treatment here recommended may be very thoroughly carried out.

The cautery knife and handle are tolerably well shown in

figure 4, and, as the uses to which the former is applicable will be referred to elsewhere, no description need be here given.

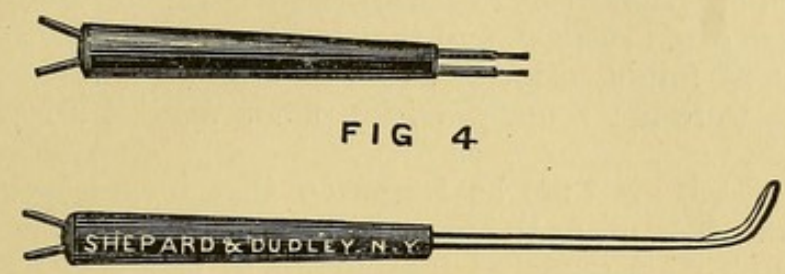
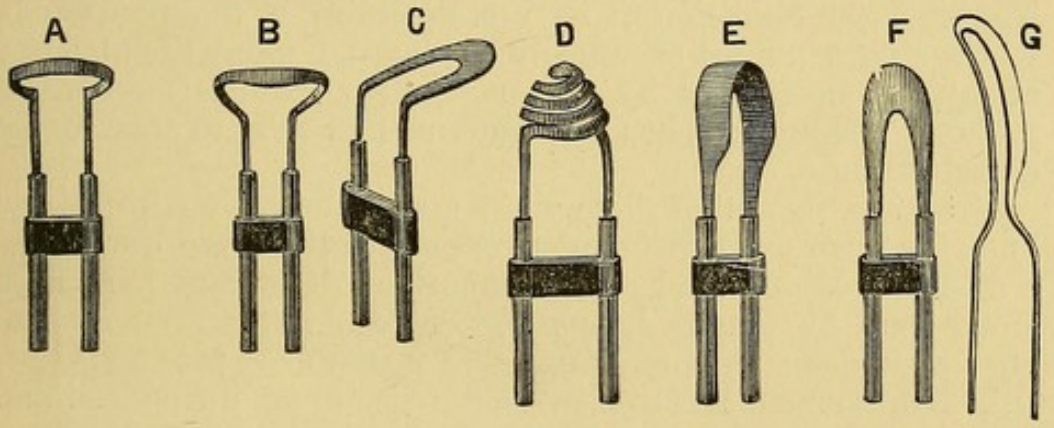


FIG 4

So also in regard to the illustrations A B C D E F G; while some will be clinically noticed hereafter, the uses which each is designed to serve can hardly fail to be understood by a moment's reflection.



It may be proper to remark, however, that the dome-shaped cauterizer D is used for the purpose of searing over surfaces from which morbid growths may have been extirpated, or stopping the open-mouths of bleeding vessels; and the little knife G is that delineated in figure 10, where one of the many useful purposes to which it may be applied is plainly indicated.

In addition to the battery and electrodes herein described, it must not be forgotten that the operator will have to be provided with certain other contrivances designed especially to facilitate cautery operations, though as to their range of usefulness by no means limited to such purposes, as for example,

A SUITABLE SPECULUM.

Ordinary devices of this nature, though answering tolerably well for a mere ocular examination of the cervix uteri, or routine topical treatment, will be of no service whatever for the purpose under consideration, because parts to which the actual

cautery is to be applied must not only be brought well into view and within perfect control, but as far as possible isolated from surrounding structures. Besides, patients, whether anæsthetized or not, are often restless, and the slightest movement at a critical moment might seriously affect the whole subsequent proceedings, were not some provision made against all such contingencies.

Moreover, it must not be forgotten that inexperience on the part of an assistant, or the most trifling variation in the position of his hand, often rendered unavoidable by fatigue, may equally interfere with the operator's design.

If a Sims speculum be used, at least two experienced and reliable assistants will be needed, one to hold that instrument, and the other to take charge of the anterior vaginal wall, yet neither can render any other kind of aid while thus engaged. The strongest objection to its use, however, is the position in which a patient must necessarily be placed, because the majority of uterine operations by galvano-cautery can be more satisfactorily conducted when the patient is made to assume the dorsal attitude.

Granting, then, that these views are in the main correct, and knowing from extensive clinical experience that we do possess a means by which most of the important desiderata here indicated may be obtained, any device combining properties so attractive, demands something more than a mere passing notice.

The instrument referred to is the speculum introduced and

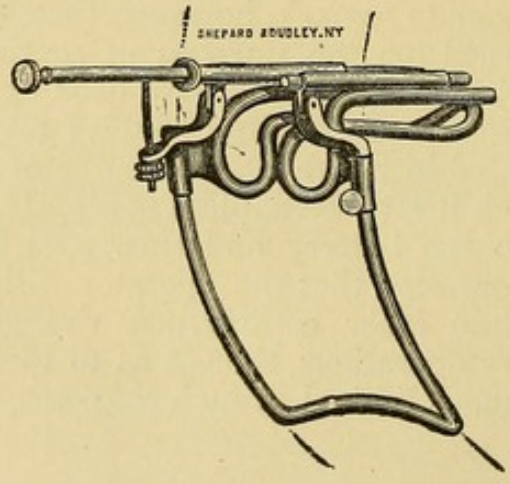


Fig. 5.

described by me about fifteen months ago, and a modification of which is here shown (Fig. 5).*

* For a full description of this instrument see *American Journal of Obstetrics and Diseases of Women and Children*, for Aug., 1871.

This speculum, it will be observed, differs none in principle from that previously noticed, and, as to the several pieces of which it is composed, they may be considered the same, *with one exception*, namely—the frame on which the lower or perineal blade moves is much wider and a little longer, thereby affording more working space and greatly facilitating operative manipulations. The fore-shortened view in the above sketch will serve to explain more clearly the points of difference between this "operating," and the ordinary speculum.

Some advantages, however, will be found by having the intra-vaginal parts of this instrument a little longer—say half an inch—and from one-quarter to three-eighths wider than the ordinary size. I have also occasionally resorted to a piece of bent spring wire, to be introduced after the speculum has been adjusted and the uterus fixed in position, for the purpose of still further separating the lateral walls. This, though by no means an indispensable requisite *in any case*, may nevertheless be made to render good service, under certain circumstances, and on this account I have given directions to have some such device supplied with each "*operating*" speculum.

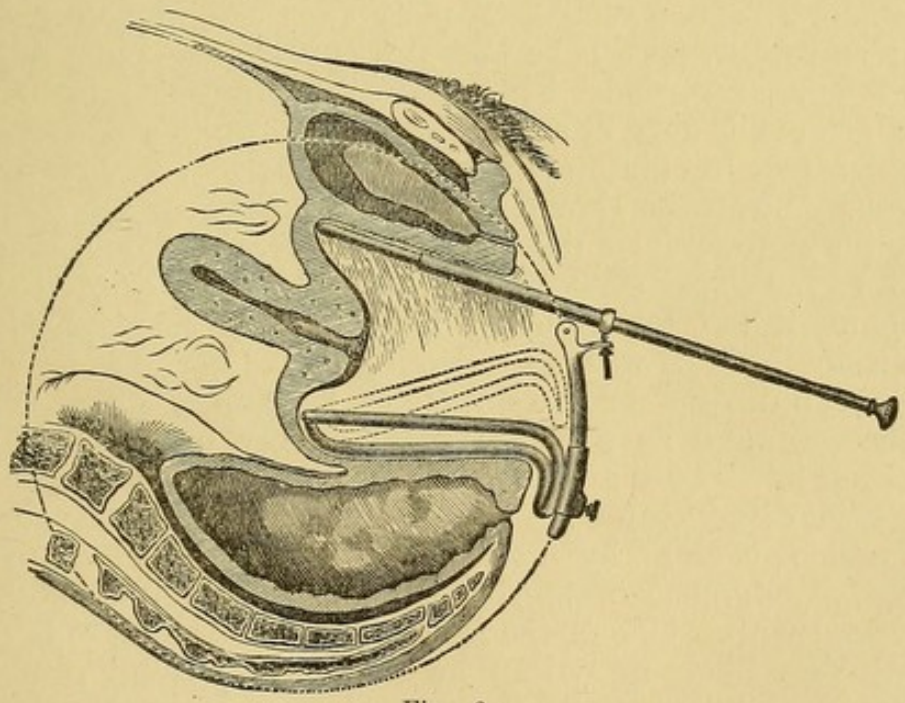


Fig. 6.

Fig. 6 is intended to illustrate more clearly the principle on which this speculum is constructed, and the *modus operandi* by which the curved vaginal canal is not merely dilated, but straightened by pressing back the perineum BELOW, while the

vesical wall is elevated ABOVE. The under blade, it will be noticed, is made to move in a circle of which the centre is indicated by its point, so that the relation of the latter to the culde-sac, when the instrument is first introduced, does not materially change, no matter to what extent the perineal blade may be pressed backward. The various directions, too, in which the upper double rod may be made to move, is a most important feature in this instrument: for, however displaced a uterus may be, more especially if anteverted, and provided no firm adhesions exist, there is no difficulty in bringing it into view, and so fixing it for examination or treatment.

The difficulties said to have been met with by some in using this instrument may, I think, be very readily accounted for; and I would submit the following as the most probable and rational explanation: In the first place, it has been found almost impossible, up to a very recent period, to get manufacturers to carry out my instructions as to its mechanism, and the consequence has been that quite a large number of imperfect instruments have found their way into the hands of practitioners. That this has been a source of serious annoyance and much disappointment there can be no doubt, for I have myself seen more than one worthless specimen; and wherever I have had the opportunity, have insisted on its being returned. This drawback, I am told by the various makers, is now at an end, and there will be no difficulty for the future in obtaining the perfect instrument. Nevertheless, every purchaser should carefully examine to see that the principle as to circular motion, etc., is carried out, and that *the width of the upper blade is rather less than that of the lower.**

Again, it not unfrequently happens that some physicians undertake to use it without reflecting on the purposes for which it has been devised, or the directions heretofore given for its application, and as a natural consequence often blunder in adjusting it. There are others, too, I am told, who seem to have been disappointed at failing to find in this contrivance an automatic speculum, by the aid of which common sense and ordinary judgment in uterine examinations might safely be dispensed with. One of the latter class, if asked his opinion of it, will very likely reply that he could not possibly get along with it, as in his hands it caused much pain to the patient, and after all offers no advantages that he can see over any one of half-a-dozen others. Akin to this class might also be mentioned another—one, I fear, never doomed to become extinct

* Say not more than one inch and a quarter, outside measurement.

in any age, and on whom the most labored and intelligible description of improved instruments and apparatus, from whatever source, would be lost or have but little effect, but yet, neither in numbers nor otherwise so entirely insignificant as to be passed by unnoticed. These self-styled conservatives do not as a rule take kindly to novelties, but, quite content to follow the path of writers and thinkers of the last generation, some one of whom they invariably set up to worship and accept as a guide for all time to come, could hardly be expected to become favorably impressed with any such innovation as that herein described.

Indeed, so inflexible are they in adhering to obsolete habits, and so utterly incapable of freeing themselves from the grasp of preconceived notions, that anything seeming to clash with either will not be entertained for a moment.

They neither hesitate, nor, strange as it may appear, are they ashamed to declare that every structural change to which the human uterus is prone can be diagnosticated by them with the greatest facility and satisfaction by peering through a glass tube, and for all such ails their magic wand of lunar caustic is a never-failing remedy. Now, so far as this class is concerned, but little can be hoped for from anything that I might here advance; for of what benefit would be the best microscope to one who would insist on his being able to study pathological anatomy by the aid of a Stanhope lens?

Thus, then, on the one hand, through the well-known obstinacy of manufacturers and their workmen in persisting to carry out their own notions in spite of repeated protests, and on the other from neglect, incapacity, or other causes, on the part of practitioners, the instrument has yet to be better and more generally known before its great value can be appreciated.

There is no speculum with which I am acquainted that can be used in all cases without more or less discomfort to the patient, and the one under consideration is no exception in that respect. However, though the least objectionable of all others on this ground, and the most indispensable instrument to every gynæcologist (Dr. Sims'), may be employed to draw back the perinæum with but little pain in the majority of cases, it is unreasonable to expect that this proceeding could be carried to an equal extent by one which, though designed for a similar purpose, can accomplish the same only by making counterpressure on the arch of the pubes and base of the bladder. But it is neither proper nor at all necessary, except in operations of more than ordinary importance, and when patients are under the influence of an anæsthetic, to insist upon such a display of

the parts as this instrument is capable of affording; and on this point I have been quite explicit in the following directions for its use:—

"The patient having assumed the desired position—say, on her back, with knees drawn up—and the introductory digital examination having been made, the speculum, with elevating rod drawn out, is taken in the right hand, the thumb resting on the anterior concave surface of the perineal blade, while the left index finger and thumb are used to separate the labia. It is now to be inserted downward and backward in the direction of the post-uterine cul-de-sac, and, while being thus held, the projecting handle of the elevator is to be depressed and pushed forward to the extent required to bring the uterus into a proper position in relation to the outlet, when the touch of a finger to the button-screw serves to keep everything in place.

"It will now be observed that the elevator and depressor blades describe a triangle, and the vaginal canal represents a hollow cone, whose apex is the outlet.

"The perineal blade is now to be depressed in proportion to the amount of working space required, and, of course, with due consideration for the degree of elasticity or resistance in each case, when a turn of the set-screw will serve to secure it at any desired point.

"When the object is merely to make simple applications to the cervix, a very slight depression of the blade only is needed—rarely more than half an inch. Besides, forcible and continued traction cannot be easily tolerated, and ought to be reserved exclusively for the more important operations. In the case of patients under the influence of an anæsthetic, or where the parts have been subjected to parturient expansion, no particular exactness in this respect is called for. In others, however, the utmost care should be observed, lest profitless curiosity be appeased at the expense of a patient's comfort.

"Having thus obtained a full display of the uterus and adjacent parts, the projecting lever-rod may be removed, and the patient placed in any other than the back position, previous to or at any subsequent stage of an operation, should such a procedure be indicated.

"Indeed, I have quite frequently found it desirable to change the position of patients during tedious operations without removing this speculum, and in no instance have I noticed any deviation in its relation to the intra-vaginal parts from that obtained when first adjusted.

"In proceeding to remove the instrument, the steps adopted for its introduction should be reversed, the perineal blade being

first released and the elevator drawn outward, so that in closing, it may clear the cervix.

"The latter purpose—closing the blades—will be best accomplished by first making slight pressure on the projecting lever-rod, as in the act of elevating the anterior wall, when the button will admit of being rolled down with a touch of the finger, and the speculum can then be withdrawn."

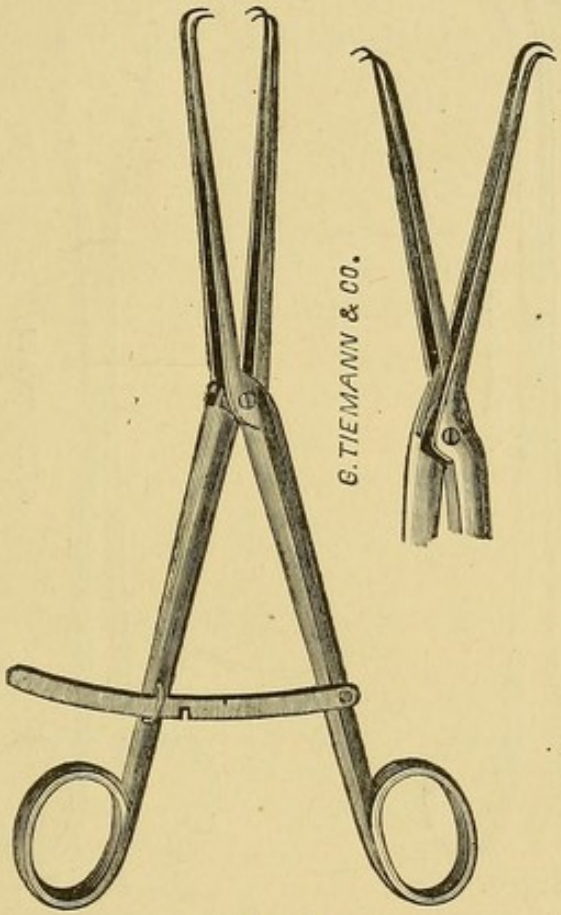


Fig. 7.

I trust, in thus attempting to explain the manner of using and the advantages possessed by my own speculum, I shall not be understood as ignoring the merits of other such instruments, especially those of Drs. Thomas and Nott, with which I have had considerable experience, and satisfactory too; and as for that of Dr. Sims, it is hardly supposable that any gynæcologist of the present day could pretend to do without it.

The distinctive features of the instrument above described, in addition to its being self-retaining, consists in its wider range of usefulness, and, unlike all other contrivances of the kind, in being capable of affording a complete display of the uterus, with ample room for all instrumental manipulation.

There are, therefore, but few, if any, intra-vaginal operations in the whole range of uterine surgery, vesico-vaginal fistulæ perhaps alone excepted, but what may be conducted with the greater facility and completeness by its aid, and *without a speculum-assistant.*

Fig. 8.

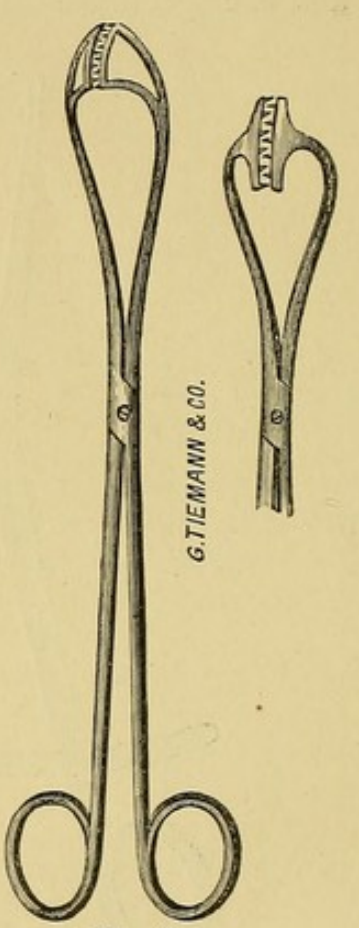


Fig. 9.

However foreign to the subject of this paper the foregoing remarks may be deemed by some, I have very little doubt but that there are many who will hereafter, at least, candidly admit both their relevancy and importance.

Fig. 7 is a reversible vulsellum devised for the purpose of drawing down the uterus and maintaining it in any desired position during operations; as, for example, amputation of the cervix and extirpation of cancroid growths. To accomplish this object it is to be introduced while closed within the cervical canal, and the tenaculum points reversed by a further approximation of its fenestrated ends when it may be fastened at any degree of expansion by the ratchet attachment (see Fig. 10). I have had many opportunities of demonstrating the

utility of this little instrument, and as it will also serve for a good ordinary vulsellum, I consider it an invaluable aid in most utero-vaginal operations. It is but proper to state, however, that the principle of its mechanism is no invention of mine, but originally suggested by examining a hinged tenaculum designed and used many years ago by my friend Dr. J. Marion Sims, though for entirely different purposes. The only original features about it, therefore, besides its adaptation to other uses, are in its having double instead of single projecting claws and reverse action.

Figs. 8 and 9 represent rake-toothed forceps employed for grasping such structures as are apt to break down readily, or yield to traction by any ordinary tenaculum or vulsellum. I have also found them especially serviceable in tearing away large masses of diffuse vegetating and other soft cancerous growths preparatory to cauterization of the subjacent tissues.

CHAPTER III.

EXTRACTS FROM CLINICAL RECORD.

Having thus, as briefly as possible, described such an apparatus and the more important of the instruments which I have found needed in operations by galvano-cautery, I shall now submit a few cases from my clinical records, selected solely on account of the intrinsic interest of each, and the instruction that may accrue from their perusal. The manner in which these cases are presented, and the accompanying illustrations, will, it is believed, render unnecessary any extended introductory remarks, or specific directions as to how such operations ought to be conducted.

In the preceding remarks it has been my aim to deal only with such questions as seemed to have a practical bearing on the subject of galvano-cautery; so that, for the sake of avoiding tedious details, many points of great interest and importance have been barely noticed, or passed over entirely.

With the same object in view, the clinical part of this paper will consist of a tabular record of operations, their subdivision into groups or classes, and such comments thereon as may serve to elucidate the more striking features of each, together with a few illustrative cases.

The whole number of cautery operations thus far occurring within my own observation has been seventy-two,* as follows :—

19 cases of epithelioma, including cauliflower cancer.
11 " encephaloid, or medullary cancer.
13 " catarrhal, inflammatory, and ulcerative affections of the cervical canal of uterus.
5 " amputation of cervix (non-malignant).
4 " fibrous and fibro-cellular polypi.
4 " sessile fibroid tumors.
2 " deep ulceration of os and cervix.
1 " intra-uterine vegetation (non-malignant).
2 " vascular tumors of urethra.
4 " granular urethritis.
3 " hemorrhoids.
1 " perineo-vaginal fistula.
1 " lipoma of scalp.
1 " lipoma of cheek.
1 " lipoma of ear.

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Of the thirty cases of malignant disease,
17 were of the uterus alone.
7 " " uterus and vagina.
3 " " perinæum and vagina.
1 was of the left labium.
1 " " clitoris.
1 " " breast.

Among the nineteen cases of epithelioma,
7 were indurated or ulcerated only, and
12 were of the vegetating or cauliflower character. Of the latter,
7 were of the cervix uteri alone.
3 were of the perinæum and vagina.
1 was restricted to the left labium.
1 of the clitoris.

The following table shows the date of operation, the parts involved, and the condition of patients UP TO DATE, in seven cases of epithelioma in its ulcerating stage of development.

There are two out of the above seven operations that demand especial notice—Nos. 6 and 7—the same patient being the subject of both, as also of a previous operation undertaken for the removal of a cauliflower outgrowth (see Table II., No. 3). At the time this lady came under my notice, my experience in

* Up to 1st December, 1872.

galvano-cautery was comparatively limited, nor did I fully realize, though not without some misgivings on the subject, the great importance of removing tissues as far beyond those apparently implicated as can be safely done.

TABLE I.

	Date of operation.	Parts removed.	Progress.
1	May 10, 1870.	Posterior lip.	Patient left hospital well, and, though lost sight of since, believed to be cured.
2	July 7, 1871.	Entire cervix.	No return of disease; health entirely restored.
3	July 26, 1871.	Anterior lip.	No return of disease; died some months after from other causes.
4	Jan. 25, 1872.	Entire cervix.	No return of disease; general health entirely restored.
5	Feb. 28, 1872.	Entire cervix.	No return of disease.
6	June 5, 1872.	Conical piece from centre of cervix.	Disease reappeared.
7	Nov. 13, 1872.	Entire cervix.	Operation at this time believed to be radically curative.

In every such instance, therefore, since met with, the removal of the outgrowth has been but the first part of each operation, except where, by traction being made on the tumor at a certain stage, a deeply cup-shaped stump could be insured. Indeed, from what I have since observed, I feel justified in believing that had this rule been observed in the above case, the result would have been entirely different.

As to the failure of a second operation in the case of this lady, my explanation is simply this: the anæsthetic used on the latter occasion was nitrous oxide gas, and owing to certain alarming symptoms manifesting themselves a few minutes after I had commenced to operate, I felt impelled, in my anxiety for the patient's safety, to stop much short of so complete and satisfactory an operation as I might otherwise have effected. However, as the patient's general health is yet good, the best results may reasonably be hoped for from the more thorough measures adopted within the last few weeks.

The following case (Table I., No. 2) bears so forcibly on the importance of effectually removing all the diseased structures at least, and at the same time so well illustrates my method of operating, that its introduction here may add to the interest of what has been said:—

Case I.—Carcinoma of Uterus, involving both intra and supra-vaginal portions of the cervix.

About the 1st of July, 1871, I was requested by Dr. George K. Smith to see Mrs. ——, aged 47, the mother of three children, the youngest of whom being 10 years old. Previous to

three years ago menstruation had always been regular; but since then and up to within the last fifteen months, symptoms such as usually usher in the climacteric period were observed. The catamenia now, and for over a year past, had lost all the

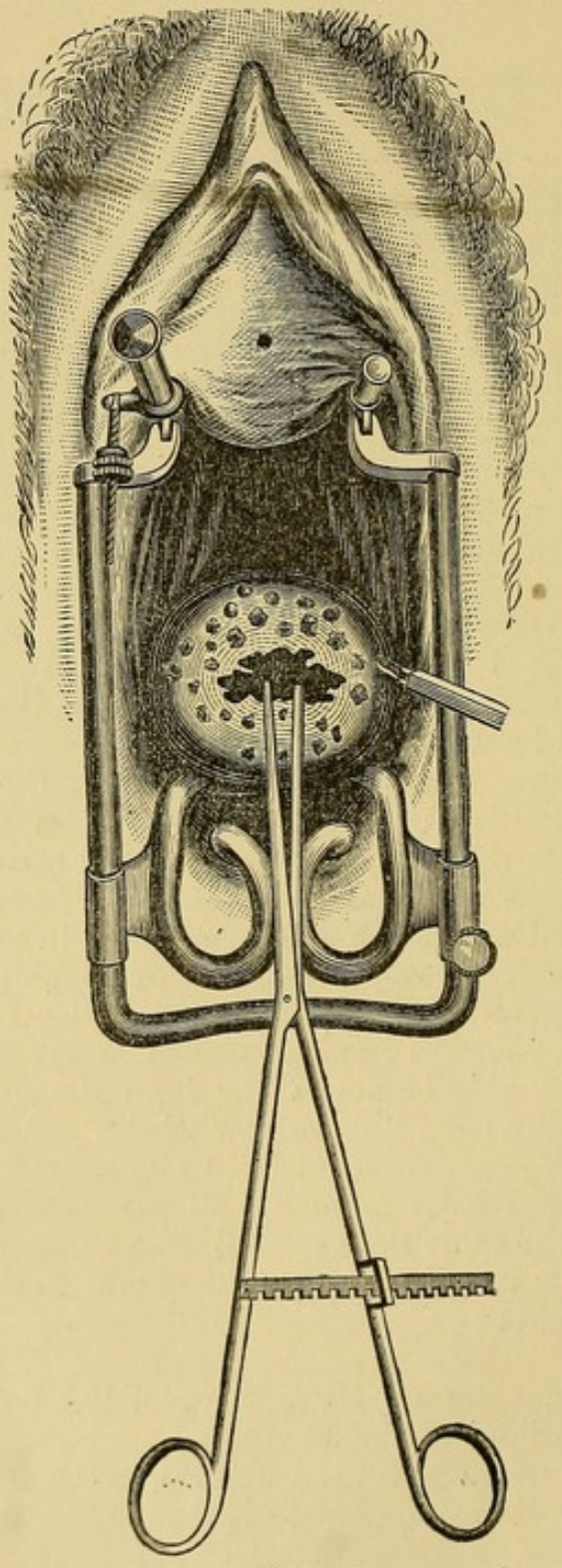

Fig. 10.

character of periodicity, and metrorrhagic hemorrhages had reduced her to a perfectly helpless condition. Her nocturnal pains were almost intolerable; emaciation had taken place to a very remarkable degree, and her anxious, care-worn, cachectic expression might alone have sufficed to indicate the nature of her malady.

By a digital examination, the cervix uteri was found much enlarged and irregularly indurated. The cervical canal was open to the extent of admitting an inch of the index finger, while the surrounding tissues, as far as could be reached within the neck, were unyielding, extremely tender to the touch, and bled freely on the slightest provocation. Depth of uterus three inches.

Owing to the absence of any circular line of depression at the utero-vaginal point of convergence, it was found impossible to apply the cautery loop in such a manner as to include more than a small portion only of the diseased structures.

This difficulty, though not encountered before, had, nevertheless, been fully considered as one of the many contingencies likely to arise, and therefore, being anticipated, was provided for.

The patient having been anæsthetized, no trouble was found in bringing the diseased part into view, and, by the aid of my speculum, ample space was afforded for any manipulation required.

The gentlemen present at this operation were Drs. G. K. Smith, Skene, Dwyer, and Bedell. The cervix was seized by a vulsellum held in the left hand, while with the cautery-knife* the cervix was slowly severed and removed without loss of blood. The same instrument, only more curved by being bent, was now applied to the deeper tissues of the cervix, which, while drawn down by a tenaculum, were cautiously sliced off piece by piece, laterally as well as upward, to the utmost extent deemed safe.

When the parts were thus quite scooped out, a deep bell shaped cavity was left, from the bottom of which to the fundus uteri measured little over half an inch. No hemorrhage occurred during the whole operation.†

The recovery of this patient was no less rapid than remarkable, and if we except a very trivial secondary hemorrhage, and some degree of irritation arising from accidental scorching of the vaginal wall, no single inflammatory, febrile, or other com-

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* The knife should be got into position before heating.

† A microscopical examination showed cancer-cells and free nuclei in abundance.

plication turned up to mar her progress. She has become strong and robust, and up to a very late period has even menstruated regularly, the flow being of course but very slight, yet unaccompanied with pain or distress of any kind. She is under constant observation, and calls at stated intervals, according to my request, for the purpose of being carefully examined. There is but little of a uterus to be felt, and the vaginal canal ends in a kind of cul-de-sac, at the bottom of which a still narrower passage may be detected, in depth about three-quarters of an inch.

The above report of this case was written in the early part of last June,* and she is still in the enjoyment of perfect health, having safely passed the climacteric period. That the successful issue in the foregoing case is due to the thorough manner in which the diseased tissues were cored out, I think there can be no doubt. It is also suggestive of the probable causes of failures and disappointments so often met with by some of our best gynæcologists, as referred to in the first part of this paper.

The following case clearly exemplifies the folly of trusting to half-way measures, and also where indurated and ulcerating conditions, however apparently limited in extent, resist judicious and active topical measures, how necessary it is to remove the whole cervix up to, and, if needed to insure success, to scoop out even beyond, the os internum.

Case II.—Carcinoma of Cervix.—Mrs. H——, aged 30; has had one child and two miscarriages; applied for advice to the out-door department of St. Mary's Hospital in June, 1871. Menstruation had been regular up to six months before this date, but since then she has suffered from menorrhagia, sometimes excessive, but always prolonged with shooting pains in the sacral and inguinal regions, and throbbing sensations in the vagina. She appeared much debilitated, and a physical examination of chest showed tubercular deposits in both lungs.

On making a digital examination per vaginam, the cervix uteri was found much tumefied, tender on pressure, and irregularly indurated.

The cervical canal in its inferior half, though open, admitted the sound with difficulty, and its most careful introduction was followed by much bleeding. Depth of uterus 3 inches. By the topical application of strong solution of iodine, and the use of quinine, iron, and cod-liver oil, the size of the cervix and its hardness seemed to lessen, while her general condition improved in a proportionate degree for a time, so that treatment was abandoned. October 4th she applied again on account of a re-

* This patient is now (Aug. 1873) quite well.

turn of her original symptoms, and on a careful examination her condition was found to be very similar to that first observed, and the uterine cervix much more enlarged and indurated. It was now decided to try the effect of actual cautery to the cervical canal as far up as the os internum, and also around the os tincæ, hoping by such active means to create healthy action and perhaps relieve congestion by producing a drain. At the end of a month the local condition seemed much better, and for two menstrual periods following this last treatment she had no menorrhagia, and her general health appeared to improve.

This improvement, however, was but temporary, for she once more, on the 25th of January, reported herself as feeling much worse than ever, and an examination fully confirmed the truth of her suspicions. She stated that she had been flowing for two weeks continuously, as was very evident from her anæmic look, and on examination the diseased parts presented a much more tumefied and inflamed appearance than on any previous occasion.

It was now decided to remove the whole cervix by galvano-cautery. The condition of her lungs rendering the administration of an anæsthetic of doubtful propriety, and being also desirous to ascertain the amount and extent of pain attending such operations, she was induced to forego etherization. The operation may be described as follows:—The uterus having been brought into view and steadied by means of my speculum, the cervix was seized with a vulsellum, and the cautery-knife, before being heated, applied posteriorly, the blade directed transversely and its edge looking upward and forward. The battery being now immersed, the knife was carried completely around the circumference of the cervix close to its vaginal insertion. In this manner a deep and somewhat oblique groove was made, which served as a bed for the loop. The latter was now made to embrace the cervix still held in the grasp of the vulsellum, the battery again immersed, and some traction being made during the passage of the heated wire through the tissues, the operation was completed. When the cervix was removed, what remained of the uterus was deeply concave, and its cavity measured less than 1½ inch. There was no hemorrhage during or subsequent to the operation, and, what is of some consequence to know, she declared that the pain experienced during this operation was no greater than she suffered repeatedly before, when any active topical application was made.

May 16th. Menstruation has appeared twice since the operation, lasting each time four days, and without the slighest inconvenience or tendency to hemorrhage. She has gained flesh, is

free from pain, and expresses herself entirely well. By a careful vaginal examination, no trace whatever of disease can be recognized either by sight or touch.

A microscopical examination of the part extirpated gave abundant evidence of carcinomatous disease.

As to the eleven cases of epithelioma characterized by exuberant outgrowths from a comparatively narrow base, the same tabular arrangement observed in the first class may be conveniently adopted.

The first case in this table possesses so many features of great interest, that any remarks beyond those embodied in the following history seem uncalled for.

TABLE II.

VEGETATING EPHITHELIOMA.

	Date of operation.	Parts removed.	Progress to date.
1	Jan. 4, 1870.	Posterior lip.	No return of disease.
2	Dec. 4, 1870.	Left labium vagina.	No return; died from other causes sixteen months after operation.
3	June 18, 1871.	A part of both lips, which the tumor seemed to involve equally.	Reappeared in ulcerating form.
4	Sept. 13, 1871.		Died from causes not attributable to operation.
5	Nov., 1871.	Labium and part of perinæum.	Little gained by operation.
6	Feb. 11, 1872.	Tumor and cervix.	Had recovered perfectly and no return of disease at last report.
7	April 26, 1872.	Entire cervix.	No return of disease.
8	March 6, 1872.	Clitoris.	Believed to be cured.
9	May 4, 1872.	Entire cervix.	Well at last report.
10	July 20, 1872.	Entire cervix, and cauterized suspicious, warty-looking excrescence on vagina.	Doing well at last report.
11	Nov. 20, 1872.	Left labium and nates.	Greatly relieved.
12	Dec. 4, 1872.	Left labium and nates.	Greatly relieved.

Case III.—Epithelioma of Cervix Uteri.—Mrs. A——, æt. 48, multipara, has always enjoyed the best of health up to within a few weeks of my being called to see her, which was in July, 1869. She complained of great back-ache and bearing-down sensations, and noticed some discharge of mucus occasionally mixed with blood. Menstruation regular and normal in character, and has always been so. By digital examination the cervix was found much tumefied, more particularly the posterior lip, and painful to touch. On inspection by speculum, there was found a slightly elevated and velvety-looking surface stripped of epithelium and extending over at least one-half of the posterior lip. Anterior half of cervix, though somewhat swollen, yet soft to the touch and paler. The local treatment consisted in warm vaginal douching and the application of iodo-glycerine to the diseased parts once and sometimes twice a week.

A marked improvement was noticeable after a few weeks of this treatment, and hopes were entertained that it might be permanent. November 9th, I was requested to see her again, when she stated that her old pains and other disagreeable symptoms had lately returned, but in a much more severe degree. Besides, there was this peculiarity, she said, about her sufferings, that she was seized about 4 or 5 o'clock every morning with severe lumbar and hypogastric pain, which lasted up to 9 or 10, but after this latter hour she felt relieved and continued comfortable until the same hour of the succeeding morning. A speculum examination now revealed a similar condition of the uterus to that first observed, when the same active topical measures were once more resorted to, but on this occasion with no improvement whatever.

The disease, for some time suspected, was diagnosed as epithelioma, and for the following among other reasons: 1st. The hereditary predisposition existed in a marked degree, and of which important fact I had had some personal knowledge; and 2d. The disease had resisted treatment, constitutional as well as local, well calculated to improve if not to cure a less serious ailment.*

About this time (December, 1869), Dr. Noeggerath exhibited at a meeting of the New York Obstetrical Society a specimen of epithelioma removed from the cervix uteri by galvano-cautery, and its resemblance to what I had observed in my own patient induced me to request a consultation with Dr. N.

This having been readily assented to, and my diagnosis concurred in, it was decided to remove the diseased part by galvano-cautery, and the operation was performed on the 4th of January, 1870.

This was accompanied by the platina loop, the shape of the tumor rendering this a work of no great difficulty, and the part excised embraced nearly the entire vaginal portion of the posterior lip.

A little glycerine and tannin was brushed over the cauterized surface, the bowels kept quiet by opiate suppositories for a few days, and in less than two weeks the patient, with no other local treatment save tepid vaginal baths, was up and about. On the 1st of February, 27 days after the operation, the healing process was found to be so nearly complete that nothing further seemed needed, and, being entirely relieved of all pain, she rapidly recovered strength.

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* This latter fact is, in my opinion, of the utmost importance in all such cases, and presents strong presumptive evidence of malignancy.

A careful speculum examination, however, was made every few weeks for some time, with a view of detecting any reappearance of the disease; but, nothing of the sort being noticed, these precautionary measures were abandoned after a few months. About a year ago this lady requested me to see her again and stated that she had lately suffered so much from pelvic pains, referable particularly to the bladder and pelvic region, that she feared there might be some return of her former difficulty.

A careful examination failed to detect anything more than a slight abrasion on the posterior aspect of the os tincæ, and a certain degree of firmness of the part from which the disease had been removed. This, however, was attributed to mere congestion of the part, and active topical applications quickly restored the parts to their natural condition.

Other measures calculated to relieve slight cystitis, which undoubtedly caused much of the pain and distress complained of, were prescribed, and the patient rapidly recovered. Six months ago (May 20th, 1872), I was requested to see her, when she informed me that she began to feel a little anxious on account of some slight mucous discharge and more or less tenesmus. It was deemed best to examine into the state of the uterus: this was found to be in a condition precisely similar to that of twelve months previously, and after two applications of iodo-glycerine to cervical canal, the improvement at last examination was so great that no further treatment was called for.

Menstruation has not yet appeared regularly, and this last attack was doubtless due to a scanty flow at a previous period. It should have been mentioned, that the outgrowth when removed was submitted to a careful microscopical examination, and all the evidences of true epithelioma were present. It is now nearly three years since the operation.*

Case IV.—The second case in the preceding class was one of extensive epithelioma, involving the whole of the left labium vaginæ, in an old lady aged 70. The entire part was removed by cautery, and in less than one month from the date of operation the surface healed and seemed to be covered over by perfectly smooth and healthy material. She continued to enjoy good health, for one of her years, during the succeeding twelve months, when symptoms indicating cancerous disease of mesentery and other internal parts rapidly became developed, and from which she succumbed 16 months after the operation. It

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* This patient is now (Aug., 1873) in the enjoyment of excellent health.

is worthy of remark, however, that the surface from which the diseased mass had been excised remained perfectly healthy up to the time of her death, nor were any of the pelvic organs concerned in the final work of destruction.

Case V.—This case having already been referred to (No. 5, Table I.) calls for but little further notice. The lady, whose age is thirty-one, a widow, who consulted Dr. J. Marion Sims, in consequence of having been informed by her physician that she had cancer of the womb, which she did not believe, at the same time giving as a reason for her opinion the fact of her having had little or no pain or uncomfortable feeling in that region; and, moreover, that after full inquiry she felt satisfied there was no hereditary predisposition to such a disease. Menstruation had always been regular, and she had had no hemorrhage, but during the menstrual intervals she had of late noticed some watery discharge of an offensive odor.

Dr. Sims recognized a large cauliflower mass springing from the whole circumference of the cervix, and spreading out so as to occupy a great part of the vaginal cavity. He advised its removal, and requested me to operate by galvano-cautery, which I did on the 18th of June, 1871. In this operation the neck of the tumor was embraced by the wire loop and its removal thus effected; but in addition to the mistake of leaving too much behind, as before stated, there was also another error committed, which on account of the clinical lesson it teaches ought not to be overlooked. The instrument shown in Fig. 2 was then new, and used on that occasion for the first time, so that I was not accustomed to this improved means of contracting the loop, and miscalculated as to the screw motion. The consequence was that the tissues were too rapidly severed, and though there was no loss of blood whatever at the time, an alarming secondary hemorrhage took place about thirty-six hours after the operation, requiring the use of tampon.

No. 4 is a case where I assisted Dr. James L. Brown in operating, and which has been reported elsewhere. This was a promising case, and its fatal termination had nothing whatever to do with the merits of the operation; death being caused mainly by imprudence on the part of the patient and other circumstances beyond the control of her medical adviser.

The patient, in whose case parts of the right labium and perinæum were removed on three occasions (Nos. 5, 11 and 12), is the wife of a physician in this city. The cautery was resorted to in this instance merely for the purpose of excising portions of a large suppurating and offensive mass, hoping

thereby to contribute in some measure to her comfort, or rather to modify her suffering.*

The extent to which the rectum, vagina, and neighboring parts were involved was such as to render the case an utterly hopeless one, and consequently nothing beyond palliative effects could be looked for from any operative proceedings.

Case VI.—On the 11th of last February I was requested by Dr. J. Marion Sims to operate by galvano-cautery in the case of a lady whose history is as follows: Mrs. ———, aged fifty, of healthy ancestry on her father's side, but several members of her mother's family have died from pulmonary affections, and one, an aunt, from cancer of breast. Menstruation commenced at 14 and has always been regular up to February, 1871. Has had seven children, and a premature confinement in 1856, from which she recovered speedily. From February, 1871, until August the catamenia were absent, but in the latter month she had a profuse metrorrhagia lasting for several days, and returning more copiously three weeks later.

On examination per vaginam, a tumor about the size of a hen's egg was found springing from the cervix and projecting into the vagina; canal of uterus of normal depth; body not hypertrophied. This tumor was removed by écraseur on September 23, 1871, and presented under the microscope the characteristic appearances of epithelial cancer. The patient seemed to improve in some respects until about the first of January, 1872, when hemorrhage returned and large quantities of blood were lost throughout that whole month.

Dr. Sims saw her on the 10th of February and discovered a large cauliflower tumor springing from the cervix and completely filling up the upper half of the vagina. The following day, February 11th, was appointed for its removal, and Dr. S. having accidentally sprained his ankle while stepping out of his carriage, requested me to see her and operate for him. The patient was found to be in a very exhausted condition from loss of blood and emaciated to so remarkable a degree that grave doubts were entertained as to the propriety of operating or risking the administration of any anæsthetic.

In such a state of things, however, some interference seemed urgently demanded, and ether having been administered, the operation was proceeded with in the following manner:—

The platina loop was with considerable difficulty made to embrace *the upper circumference of the cervix*, and when *mod-*

* Dr. Geo. M. Beard has also operated previously in this case by electrolysis, but with little effect.

erately tightened the battery was immersed; little or no contraction of the loop being effected for a few seconds, so that the superficial tissues of the part to be cut might be thoroughly cauterized. When the wire was supposed to have entered the tissues a quarter of an inch or thereabouts, firm and steady traction was made on the tumor by means of a vulsellum,* and its connections *very slowly* severed by a further tightening of the loop. By this manœuvre the surface from which the tumor had been removed presented a deeply concave appearance, and there was no hemorrhage whatever. The uterine cavity measured about one inch from the bottom of the wound. No topical application was made.

As this patient resided some miles from the city, I had no opportunity of observing her subsequent progress; but one of the gentlemen who assisted at the operation† informed me some days after, when he called to see her, that her condition was very precarious. Towards the end of May, having occasion to visit her neighborhood, I called to see her, and found her going about and able to superintend her household affairs.

The following reply to a note of inquiry has been since received from her attending physician, Dr. Fürgang, of East New York:—

"Dear Doctor: In accordance with your request I have given Mrs. ——— a very careful examination. Her pelvic organs, or what is left of them, seem to be in a perfectly healthy condition. There is nothing to the touch or sight that would lead to the suspicion of a return of her disease. The part from which the tumor was taken is a little puckered, but soft and covered with healthy-looking mucous membrane, and there is no tenderness on pressure there or in any of the adjoining parts. Her appetite is excellent, she sleeps well, and is rapidly gaining in strength and flesh."

This case calls for no further comment.

Case VII.—This was what appeared to me to be epithelial cancer of the clitoris, though my friend Dr. J. C. Nott, who was present at the operation, thought it might possibly be non-malignant, and such as Sir J. Y. Simpson has described under the term of "caruncle." The tumor was about the size of an English walnut, had all the characteristic appearances of vegetating epithelioma, and requires but a few months for its development. It was removed by means of the cautery-knife (Fig.

* Traction by the cautery instrument should, in *all such cases*, be carefully avoided, and the instrument kept steady and in the same position from the beginning to the end of the operation.

† Dr. Nichol.

3), and the patient left the hospital well, but has not since been heard from.

Case VIII.—Vegetating Epithelioma Involving the whole Cervix.—For a full report of this interesting case, of which the following is a synopsis, I am indebted to Dr. C. H. Giberson:—

Mrs. ———, aged 32, the mother of two children, and a widow for ten years; eldest child healthy, but the younger, now ten years old, has spinal curvature. She says a married sister died at 36, of "what was called cancer of the womb." Has had almost constant hemorrhage for the past thirteen months and seems to grow steadily worse, until now (April 15th, 1872) she is very anæmic and much depressed in spirits.

Examination revealed cauliflower growth involving the entire vaginal cervix, and extending slightly into utero-vaginal attachment on either side.

April 23d, she was examined by me and the condition found to coincide with the above description. April 26th the tumors and cervix were removed by cautery, much in the same manner as that detailed in case No. 6, but with this addition, that after all that could be embraced within the loop had been taken away, suspicious spots on the vaginal duplicature were excised by means of the cautery-knife. When the operation was completed the uterine cavity measured 1½ inch.

May 10th. Wound presents a healthy granulating appearance.

June 1st, five weeks after operation, healing process going on rapidly; uterus measures two inches in depth, the increase being due to filling up of deep cavity made by cautery.

June 20th. Dr. Byrne examined her and found a small granulating surface and looking well. Iodo-glycerine applied to surface. First menstruation since operation appeared June 8th, and lasted moderately three days.

July 31st. Uterus 2¼ inches deep, os small, no leucorrhœa vaginal and uterine surfaces smooth and soft, very slight point to right of os of granular appearance. General health good, but complains of shooting pains in lower abdomen.*

September 30th. Third menstruation, lasting three days, has passed over without trouble.

October 12th. Considerable pain and slight occasional flow during the past ten days until yesterday, but vaginal examination shows no ulceration and no induration perceptible.

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* The increased depth of the uterus, as noticed at this examination, is due to a filling up of the excavation by *healthy* granulation, and is not peculiar to this case.

Since the above report (October 12th) the patient is doing well, but it is evident that her case is a less promising one than could be hoped for, and hence I have thought proper to present it as a darker side of the picture.

She has no cachectic appearance, however, but on the contrary looked to me so much stronger and healthier, when seeing her in the street two or three weeks ago, that I hardly recognized her. Nevertheless I look forward to her future history with much interest and some little misgivings.

Case IX.—Vegetating Epithelioma Involving the whole Cervix.—Mrs. ———, aged 45, has had seven children and two miscarriages; the last living child seven years old. Menstruation has always been regular up to six months ago, when the flow became excessive, and the interval less and less, until now (April 18th, 1872), it is almost continual. On digital examination the whole of the cervix uteri was found very much enlarged and greatly indurated, but soft and spongy on its presenting surface, tender to pressure, and bleeding on the slightest touch. The body of the organ was not enlarged and the vaginal walls intact.

When brought into view the os was observed to be surrounded by what appeared like luxuriant granulations, though the unstripped parts of the cervix were in color somewhat paler than normal. The case was diagnosed as one of epithelioma in the early sprouting stage, and she was admitted into St. Mary's Hospital for operation May 4th. The patient was anæsthetized and the entire cervix removed by the cautery, but the method pursued being so entirely similar to that of other cases already detailed, no further description is here called for. There was no blood lost during the operation, nor was there any secondary hemorrhage. Vaginal bathing with tepid water and carbolic acid was commenced on the third day after operation and continued for two weeks; sixteen days after the operation a speculum examination was made, and the surface from which the disease had been excised was almost entirely covered with healthy membrane, and the patient feeling well and anxious to see her family, was permitted to leave the institution. She has not since been heard from.

Case No. X., being very similar to the above, offers no points of special interest to warrant a full report on the present occasion, and sufficient time has not yet elapsed to say anything of results, further than that they are not less promising than in any of the preceding cases.

Case No. XI. is that of the patient whose condition has been noticed (No. 4), and this second operation, like the former, was

resorted to merely for the purpose of taking away such parts of the suppurating excrescences as could be safely spared.*

With regard to the eleven cases of carcinoma in which, like the above, operative measures were resorted to for the purpose of affording temporary relief merely, the limits of this paper will not permit of their being referred to at any length. In seven of this latter class the disease had attacked both vagina and uterus to such a degree as to almost obliterate the one, and utterly degenerate the other; yet in no single instance did the removal and destruction of such diseased tissues as could be safely reached fail to relieve in a very remarkable degree, and add to the comfort of these afflicted sufferers.

This single statement, it seems to me, supported as it is by actual observation, ought to satisfy those who question the utility of any operation in such hopeless conditions. It is surely no principle of conservative surgery to ignore palliative measures, even where disease is admittedly incurable; and yet, among the numerous victims of this terrible destroyer, how many a valuable life that might have been safely prolonged and robbed of much of its wretchedness has been allowed to ebb away in loathsome torment!

It is true, until very recently, non-interference in uterine cancers has been justifiable and eminently proper, owing to a want of the means whereby such ailments could be safely ameliorated, but I am fully convinced by past experience that this want no longer exists. However transitory, therefore, the relief may often be, I doubt the wisdom of those who in the face of facts would still persist in thinking that their whole duty had been performed by quoting a hackneyed axiom in the pathology of these diseases, which says: "When the patient's constitution has really become infected, these diseases, if extirpated, invariably return and conduct the person who is affected by them to inevitable destruction." †

But it should not be forgotten that in very many instances, the prolongation of life but for one month may be of the highest consequence to a family about to be deprived of a mother's influence and watchful care, even though that mother be a helpless invalid.

Furthermore, in order to determine as to the propriety of operations for the relief of such patients, there are, or ought to be, but two questions worthy of consideration, namely: Have

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* Two operations were resorted to in this case, within the last month, tearing away, each time, large masses of suppurating vegetations and thoroughly cauterizing the subjacent surface.

† Müller on Cancer, etc. London, 1840, page 28.

we the means whereby such a course may be undertaken without risk to life, or in any way adding to existing evils? And secondly, Have we good grounds, *i. e.*, clinical data, for hoping to ameliorate the sufferer's condition thereby? Apropos of these considerations I submit the following case:—

Case XII.—Carcinoma of Uterus and Vagina. Operation Palliative.—Mrs. ———, widow, aged 30, has two children, and always enjoyed perfect health until some time in the month of January last. About this time menstruation, previously regular, appeared in great excess and lasted over eight days. This was followed by a copious watery discharge for two weeks, when metrorrhagia again appeared and hemorrhage on the latter occasion continued for ten days. A watery and whitish discharge as in the previous interval continued up to the first week in March, when, after a hard day's work as chambermaid in a hotel, she was seized with violent expulsive pains, and almost fatal hemorrhage. She cannot remember how long the flooding lasted then, but on its ceasing she applied for admission and was received into one of the New York hospitals, where she remained for a few weeks without having had anything done for her. On Friday, the 10th of May, she applied at the College of Physicians and Surgeons in 23d street, and was examined by Professor Thomas, who at once discovered extensive carcinoma of the uterus, involving the vaginal walls anteriorly and posteriorly, and accordingly pronounced her case as utterly hopeless, which it certainly was. Under these circumstances she applied for admission to St. Mary's Hospital, May 13th, 1872, with a letter from Dr. Chas. S. Ward, who stated that he recommended the patient to see me, in hopes that I might be able to do something towards relieving her temporarily by galvano-cautery.

When admitted, she said she had not ceased flowing for several days past, and her wretched and bloodless countenance bore fearful testimony to the truth of this statement, for she was unable to move one step without support, and it was found necessary to administer stimulants freely before she could be safely removed to bed.

By digital examination I found the condition precisely as Dr. Ward had stated, and as the loss of blood was frightful, nothing could then be done beyond tamponing the vagina. This succeeded in arresting the hemorrhage; but on its being removed the following day it was evident that something of the kind would again be necessary, and a fresh tampon was applied. This latter was allowed to remain in 48 hours, and its removal not being followed by any return of hemorrhage,

I decided to try what could be done by the cautery at the earliest possible moment.

The operation, which took place on Saturday, May 18th, may be described as follows: The upper half of the vagina being packed with a large encephaloid-looking mass adherent on all sides, it was found impossible to loop more than a portion of it, so that after removing all that could be taken in this way a much larger proportion yet remained. The soft brain-like character of the outgrowth preventing the heated wire from acting as a hæmostatic, considerable blood was lost, and it was therefore determined to complete the operation as quickly as possible. This was done by grasping the more projecting parts of the mass by a strong polypus forceps and forcibly tearing them away piece by piece, until the greater part of the spongy excrescence was twisted off from the uterine cavity as well as the vagina. The cautery-knife was employed to trim off and scoop out whatever remained, and the dome-shaped cauterizer thoroughly applied to the whole subjacent surface. It was now found that the hemorrhage had entirely ceased, but as a security the uterine cavity and vagina were carefully tamponed and the patient put to bed.

Her daily record for the succeeding two weeks contains nothing of sufficient importance to warrant minute details. The tampon was removed 48 hours after the operation, and no hemorrhage whatever appearing, the vagina was ordered to be washed out twice daily with a mixture of carbolic acid, glycerine, and water.

No peritoneal or other inflammatory trouble followed this operation, and very many of her former pains and distressing symptoms were entirely relieved. Her appetite and sleep returned, and in three weeks she was strong enough to sit up and walk through the ward.

The purulent discharge following the use of the cautery continued for 15 days, after which appeared a slight, serous-looking, but yet entirely inodorous drain.

June 15th, the parts operated upon were carefully examined and found to be smooth, but uneven and somewhat hard to the touch, but, as far as the eye could reach, seemed to be covered with some kind of membrane, and manipulation provoked no hemorrhage. A steady improvement has been observed in her appearance from day to day, and now feeling comparatively strong and being anxious to visit her friends she was permitted to leave the hospital. I regret to add that I have not been able to trace her whereabouts since.

Cases, of which the preceding one may be considered

a type, might also be related, had I not already far exceeded the proposed limits of my remarks. I deem it proper to state, however, that in three out of the ten cases of pelvic encephaloid cancer operated upon, the disease, though limited, included the whole uterus, and these were by far the most unsatisfactory of this class. In one case, a patient of Dr. Sims, I operated twice, and though in the second effort he, Dr. S., scooped out large quantities of the diseased mass from the uterine cavity by means of his currette, preparatory to the application of the cautery, and despite a very complete charring of all the denuded surfaces within reach, the bleeding excrescences were rapidly reproduced. This lady, who resides in another State, though not improved by what had been done, was certainly made no worse, and in accordance with advice returned to her home.

Altogether, from what I have observed in these three cases, I believe but little if any advantage can arise from the use of the electric cautery in carcinoma of the body of the uterus, when this organ has been the starting-point of the malady, and when the cervix has already been destroyed by the disease in its upward march.

The next case to which I shall refer is one of interstitial fibroid or perhaps what might more properly be designated diffuse fibrous hyperplasia of the right half of the uterus.

Case XIII.—Interstitial Fibroid.—Miss ——, aged 22, sought advice on account of menorrhagia, in March, 1869, which had existed for about 12 months previously. At this time her friends stated that she seemed to be increasing in size, and that a hard swelling had been noticed towards the lower and right side of her abdomen, but no examination was made until August of the same year. At this period a large globular and firm tumor was found occupying the right iliac fossa, and a digital examination per vaginam discovered the os uteri dilated to its utmost capacity and this same body presenting. The margin of the open cervix was traceable only to the extent of one-half its circumference, the remaining or right half being continuous with the intra-uterine tumor. Menorrhagia was very profuse, and each catamenial period was likened to a severe and prolonged labor, being attended with violent expulsive pains of an intermittent character. In September, 1869, an attempt to draw down the tumor was made with a view of removing it, but its sessile character was such as to render the effort impracticable.

In December, 1869, Professor Barker saw the case in consultation with her attending physician, Dr. Schapps, diag-

nosed a recurrent fibroid, and discouraged any attempts for its removal. Up to November, 1871, the tumor continued to increase in size upward as well as within the vagina, and extended from two inches above and to the right of the umbilicus down to the vulva. The pelvic cavity was now completely filled up with this firm irregularly-lobulated mass; defecation was seriously impeded, and the frequent use of a catheter was called for to empty the bladder, which could only be entered by a long flexible one and with much difficulty. Menhorrhagia was not so excessive as formerly,

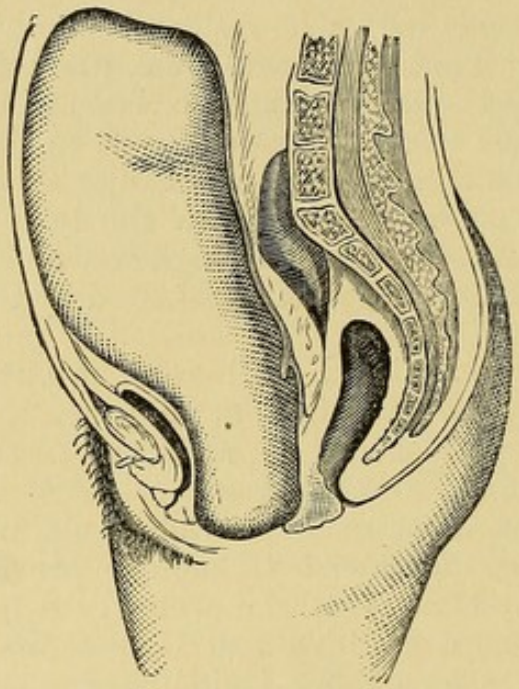

Fig. 11.

but the violent expulsive pains already referred to still recurred with each catamenial period. She was now in a most deplorable condition from long suffering and loss of blood, and at this period in her history I saw her for the first time at the request of Dr. Schapps. By placing the patient on her side and drawing back the perinæum, a sound could be passed into the uterine cavity, and plainly felt through the abdominal wall above and to the left of the umbilicus, and the depth measured at least ten inches. The vaginal mass was firm and elastic to the touch, and numerous large-sized blood-vessels were observed ramifying on its surface. An attempt to remove this intra-vaginal part by galvano-cautery was now proposed and consented to. The operation, which took place November 15, 1871, may be described as follows: A strong semi-circular needle, seven

inches in length exclusive of handle, with eye $\frac{3}{8}$ of an inch from point, and carrying a heavy thread, was made to penetrate the tumor posteriorly as high up as could be reached, and was pushed forward until the point could be felt behind the pubic arch, provision being made to protect the urethra from injury. A slight additional force enabled me to reach the thread by means of a tenaculum, and the needle was withdrawn, while one end of the thread was brought down anteriorly. A strong platina wire being attached to the cord, was next drawn through and made to take the place of the latter. At this stage some trifling hemorrhage was observed. A connection was now made to the battery, and by very slow traction, occupying at least fifteen minutes, the tumor was split down longitudinally, and thus divided into two nearly equal halves, and without loss of blood. The left half of the mass was now looped, and its removal effected with comparatively little difficulty. An effort was next made to dispose of the remaining portion by the same process, but after repeated trials this method was found to be impracticable, principally on account of its more irregular and conical shape. Recourse was now had to the cautery-knife, with which the whole was removed piecemeal, and all irregular projections within the pelvic cavity being trimmed off, the operation, which lasted two hours and a quarter, was thus completed.

The patient's recovery from the effects of the operation was rapid, and unattended by the slightest inflammatory symptoms or irritative fever. Relief from the more distressing symptoms was complete; her appetite and strength rapidly returned, and though no attempt at spontaneous enucleation of the upper segment of the tumor took place, an occurrence faintly hoped for, yet her general health continued to improve, and for a period of over six months her life was one of comparative comfort.

In the early part of June, however, Dr. Schapps informed me, that though the abdominal part of the tumor had not apparently increased, the pelvic growth had to some extent reappeared, and the menstrual expulsive pains returned with much severity.

On the 15th of last August I was urgently requested to see her, on account of great difficulty having been found by Dr. Colt, Dr. Schapps being then in Europe, in empyting the bladder by catheter, following an unusually severe and long-continued attack of her periodical expulsive pains. Her suffering was described by her mother as equal to a severe labor, and she was hourly expecting a return of the same agony, which, in her now emaciated and anæmic condition, it was thought impossible

she could survive. The tumor was to be seen bulging out between the vulva, and a flexible catheter was passed into the bladder with much difficulty. On the night of the 17th she was seized with the dreaded pains, and during one violent paroxysm a large part of the tumor was forced through the vaginal outlet, lacerating in its passage the perinæum and one side of the vulva.

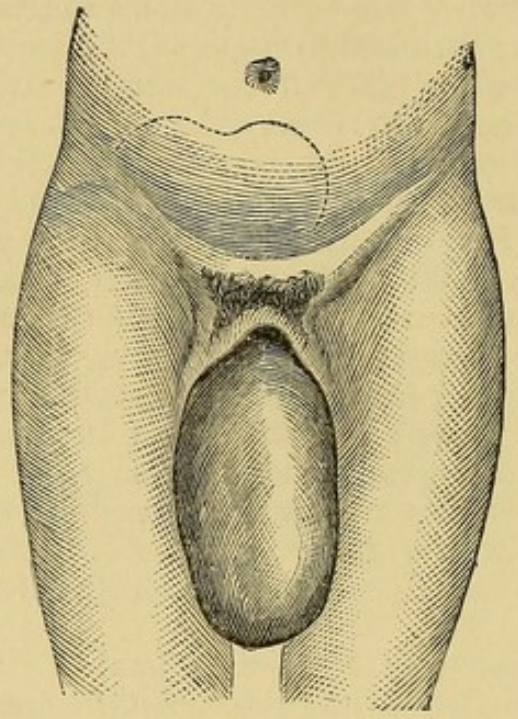

Fig. 12.

Its size, shape, and general appearance will be understood by reference to the above illustration; and the dotted lines indicate the form and position of its upper pelvic and abdominal portion.

The protruding part measured 9 inches in length, and from 14 to 15 inches in circumference. For a space of two or three inches from its lower end sphacelated discoloration was observed, and the odor of decomposition was strongly marked. Numerous large blood-vessels were seen ramifying on its surface, the upper two-thirds of which was of a deep red color, from interruption in its circulation; while in consistence it presented the firm character of an ordinary fibroid.

THE OPERATION.

The patient being anæsthetized, powerful traction was made below, while steady pressure was kept up on the supra-pelvic extremity of the tumor; but after continued efforts it was found impossible to bring it down more than one inch beyond the po-

sition it had already attained, owing in part to its connections within, but principally on account of its larger dimensions above. A double ligature of strong whip-cord was now passed from behind forward through the centre of the tumor, immediately outside the perineal commissure, steady traction being all the time kept up, and the mass ligated in the usual manner, the principal object being to insure full control of the stump during and after excision. As the vascular appearance of the parts forbade the use of any ordinary-sized platina wire, a piece six inches in length of No. 16 (Stubb's gauge) was fastened by binding screws between the two conducting cords of the battery, and curved so as to adapt itself to the contour of the tumor. This was now applied *while cold*, to the under surface, half an inch below the ligature; and all being in readiness, the battery was next immersed, and the heated wire slowly carried around the tumor, as in circular amputation, thus effecting a deep fissure, and completely sealing up the superficial vessels. The battery was now raised and the wound examined, but no disposition to hemorrhage was observable. The wire was next applied to the under surface of the tumor as in the first instance, the battery reimmersed, and by a slow and steady see-saw movement the whole mass was cut through. Though the ligatures had by this time become quite loose from traction, there was no bleeding from the stump; nevertheless, in order to guard against secondary hemorrhage, the whole surface was well seared over a second time, and the dome-shaped cauterizer pressed into every suspicious point.

The stump was then returned within the vagina, and an anodyne suppository of belladonna and morphine ordered, but no dressing to the wound was used or deemed necessary.

As space will not permit a detailed record of her progress after the operation, I will merely add that, though suffering from two extensive bed-sores, she improved rapidly and without the slightest symptom of local inflammation or irritative fever. The ligatures were allowed to remain for three or four weeks, with the hope of effecting some reduction in the upper tumor by drainage; but their presence giving rise to a good deal of annoyance, and for other obvious reasons, they were taken away.

Case XIV.—Case of Sessile Intra-Uterine Fibroid.—Mrs. D., aged thirty, widow, has had five children and one miscarriage. Menstruation was always regular up to two years and a half ago, when her periods commenced to be prolonged and the flow excessive. She states that she has been under obser-

vation at Bellevue Hospital for about three months previous to her admission into St. Mary's, which was on the 15th of April, 1872. Her metrorrhagia had been for some time past almost

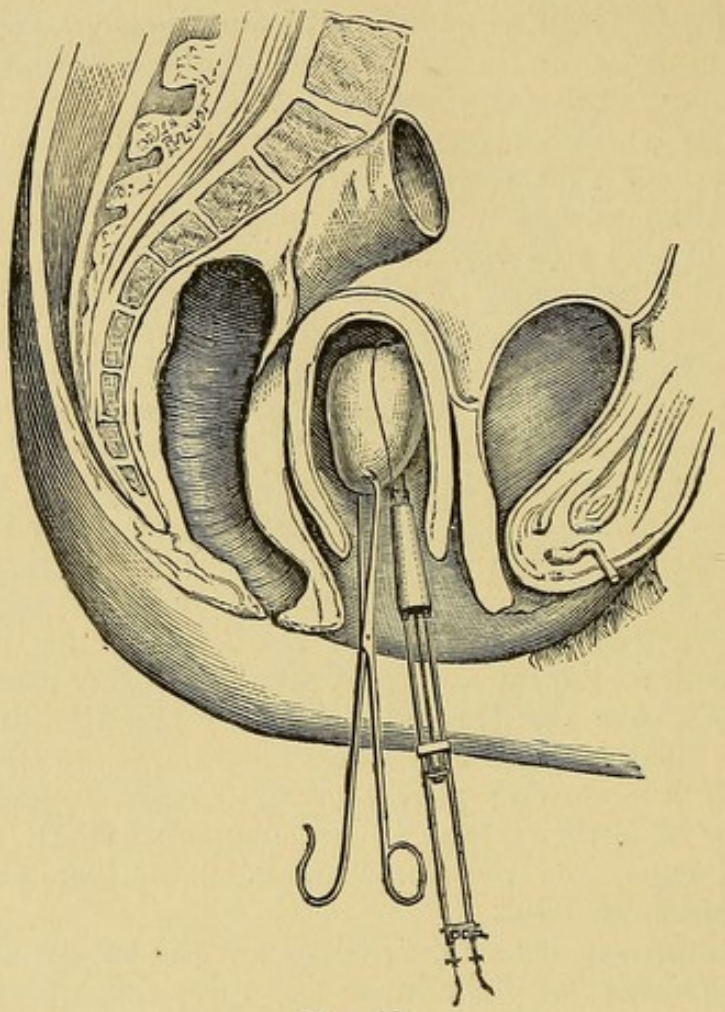

Fig. 13.

continual, and as she was very much reduced from loss of blood, it was deemed best to prescribe rest, nourishment, and local astringents, before submitting her to the ordeal of a thorough examination. On the 1st of May, her condition having greatly improved, an investigation was made with a view to diagnosis and with the following result: Above the pubis and a little to the left was noticed a firm globular tumor in size about that of a four months' pregnant uterus, somewhat tender to the touch, and slightly movable from side to side. A digital examination revealed the presence of an intra-uterine tumor presenting within the os, which was soft and dilated to the extent of a silver dollar. The growth resembled an ordinary fibrous polypus, and it appeared to be free and detached from

the uterine wall as far as the finger could reach, but owing to its large size (being about that of a human heart, which in shape and consistence it resembled), and as in its upper half it seemed to fill the entire cavity, the true character of its connection could not then be made out. I had not the good luck at this time to be made acquainted with the simple and ingenious device of Prof. Thomas, by the aid of which I have no doubt I might have been able to estimate the extent of its attachment.

The case was therefore diagnosed as one of intra-uterine fibrous polypus, and most probably pediculated. It should also be stated that manipulation with the sound failed to give any clear idea of the nature of its attachment.

On the 4th of May, the patient being anæsthetized, the cautery loop was passed into the uterine cavity and over the tumor; but as the latter was now found to be much less movable than at first supposed, this step in the operation was attended with the utmost difficulty. I soon noticed that the wire could not possibly be made to embrace the outgrowth sufficiently far up to remove it entire, and now for the first time the real character of its attachment admitted of little doubt.*

A strong vulsellum forceps, being once more carefully passed through the loop and into the cavity, was opened, and the apex of the tumor laid hold of. Firm traction to the extent of partially inverting the uterus was then steadily maintained, while the loop was passed up as far as possible and tightened. The conductors were next attached and the battery immersed, when by a slow movement of the screw in the loop-handle the part embraced was cut through and removed. Space being now afforded for the introduction of two fingers, it was found that but little more than one-half of the tumor had been taken away. A repetition of the proceedings just described resulted in the removal of the remaining half, the surface from which it was taken being slightly elevated at its circumference, and seemingly about 2½ inches in diameter.

No blood was lost during the operation beyond what would necessarily come from handling the parts, nor was there any secondary hemorrhage. The uterus was injected daily with a weak solution of carbolic acid and vinegar, and the after-treatment in other respects consisted of beef-tea, milk punch and tonics, with an occasional anodyne suppository. Two weeks after the operation there was a trifling bloody discharge when

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* The attachment of the tumor is not quite correctly represented in the above sketch, the upper portion being less spread out and proportionately narrower than the actual condition observed would warrant.

the uterine cavity was explored by a polypus-forceps, and a portion of slough removed. A strong solution of iodine was then freely applied and no further bleeding occurred. On the 30th of May, twenty-six days after the operation, the cavity of the uterus measured a little over three inches, and as the patient seemed to be daily improving, she was pronounced out of all danger. She left hospital on the 3d of June.

Case XV.—Fibrous Polypus of the Uterus.—Kate ——, aged forty-five, unmarried, had always enjoyed good health and

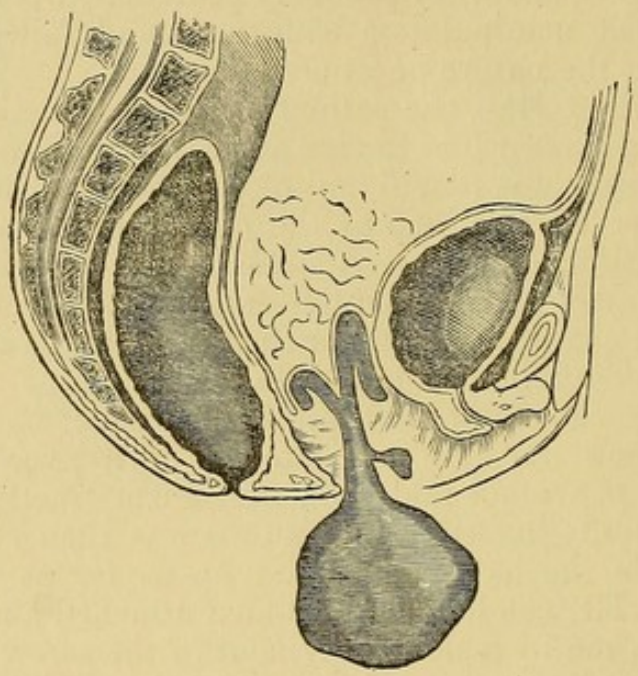


Fig. 14.

menstruated regularly up to June, 1870. About this date she says the intervals between her courses began to be prolonged, and the flow scanty, but that towards the end of December she was taken with "flooding," which lasted two weeks. Throughout the year 1871 she had attacks of metrorrhagia, sometimes lasting for ten and even fifteen days, and for the cure of which she stated she had taken "a power of medicine." She noticed some increase in the size of her abdomen, but it did not engage her attention to any extent; and on the 30th of December, 1871, she was seized with severe hypogastric pain and "bearing down," when a large tumor made its appearance outside of the vulva. Dr. P. J. Dwyer was now called to see her, diagnosed a fibrous polypus, and recommended her to be sent to St. Mary's Hospital for operation.

On examination the tumor was found to be firm and lobulated, and in size about twice that of a closed hand. Its pedi-

cle, which measured about four inches in length, was round, and about one inch in diameter at its smallest part, which appeared to be midway between the tumor and its uterine attachment. Affixed to the pedicle, about an inch and a half from the tumor, was a small pediculate fibroid outgrowth.

On attempting to pass a sound into the uterus, which appeared fully dilated, it was found impossible to carry it beyond one inch anteriorly and less than half that distance either behind or in a lateral direction. A finger passed into the rectum came in contact with a firm body as far as could be touched, and conjoined pressure over the pubes failed to convey any very definite idea as to the form or position of the fundus. Nevertheless, partial inversion of the uterus was diagnosed, and accordingly, *instead of proceeding to sever the pedicle near what seemed to be its uterine insertion, the point selected was half an inch above the little secondary outgrowth. When the heated wire had passed through and the tumor was removed, the uterus was found to have reverted itself and the cavity measured over three inches in depth.* Two weeks after the operation the patient was discharged cured.

Case XVI.—Large Fibro-cellular Polypus of the Cervix; First Noticed Five Days After Parturition.—Mrs. M——, aged 28, was delivered of her third child April 6th, 1870. During gestation nothing occurred to excite her suspicions, and her general condition was in no way different from that observed in two previous pregnancies. In this third labor, which lasted but a few hours, she was attended by a midwife, and no difficulty occurred further than that the after-birth was slow to come away. Yet she was sure no undue traction had been made on the cord.

Three or four hours after delivery she was seized with very severe expulsive after-pains, which lasted for three days, then subsided, and her condition for the following two days was, on the whole, comfortable.

On the fifth day, being without a nurse, and having no one to care for her children, she ventured to get up and walk about; but no sooner had she done so than a large substance, which she thought was her womb, protruded from the vagina. She immediately returned to bed, and so remained until I was requested to see her, which was on the 14th (eight days after confinement). During these three days there was a constant passive hemorrhage, and she appeared very weak and anæmic; but she complained of no pain, and the greater part of the tumor had retreated within the pelvic cavity soon after assuming the recumbent position. In shape it was ovoid, or rather

pyriform, about the size of a uterus at from three to four months' gestation, and of firm consistence, except at its lower surface, where it yielded readily to pressure from below upward, but immediately recovered its convexity on the pressure being removed, thus giving a very distinct impression of its being hollow. Several abraded spots were observed on its sides and inferior surface, from which blood oozed, and the whole was of a deep flesh color.

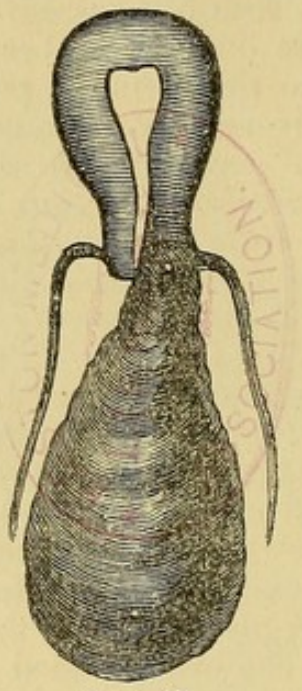


Fig. 15.

In accordance with my advice, she was brought to St. Mary's Hospital April 16th, 1870, when a careful examination was made, with the hope of deciding as to whether this was really a case of inversion of the uterus or a polypus. On introducing two fingers within the vagina and making traction on the prolapsed mass with the other hand, it was found that there was no cervical rim, but, on the contrary, the vaginal surfaces and that of the tumor were continuous, except at one small spot anteriorly, which was depressed. Here an effort was made to introduce a probe or sound, but unavailing. By examination per rectum and pressure above the pubes, I failed to satisfy myself of the presence of a uterus above, and for the time being desisted from further efforts at diagnosis. At this juncture, the case being one of unusual interest, I requested Drs. Thomas, Noeggerath, and James L. Brown to see her with me. The same steps towards forming a diagnosis were again resorted to, and

after repeated efforts Dr. Thomas managed to get a probe into the cavity of the uterus from the bottom of the little concavity in front, and thus all doubts as to the position of that organ and the character of the tumor were at an end. It is but proper to state, however, that before the cavity of the uterus was reached all present felt certain of having detected, by bimanual examination, a body which it did not seem possible could be any other than the uterus. Nevertheless, had every attempt to reach the cavity of the uterus failed, and no other evidence of its existence above been found than that afforded by the rectal and supra-pubic touch, the true nature of the case must still have remained doubtful; because, supposing this to have been a case of inversion, it is very easy to imagine how a subperitoneal fibroid might have swung into the position vacated by the inverted uterus, and thus deceive the very best diagnostician.

Again, though, as Dr. Thomas observes,* the presence of a body in the uterine region may warrant a more or less forcible introduction of a probe when, owing to the agglutination of tissues by inflammatory action, the aperture may have become closed, it should not be forgotten that under such circumstances but a small amount of force would be needed to effect a passage into cellular tissue or elsewhere in this immediate neighborhood.

At all events, this case, if not unique, is so interesting and instructive that no apology is needed for occupying so much space with its history.

The operation for the removal of this polypus was also no less profitable than interesting, because, in addition to errors committed in operating, and, of course, carefully avoided ever after, all my subsequent experiments towards devising a more powerful and yet portable battery than had been generally used heretofore, were prompted by what was observed on this occasion. In the first place, though the battery employed was one of huge dimensions, the thickness of the wire which it was capable of heating was quite insufficient to thoroughly cauterize the tissues in its passage through the pedicle; secondly, I contracted the loop too rapidly; and lastly, to make the matter still worse, traction was made on the tumor, so that, like ripping a seam in cloth, while some of the fibres were cut, many were barely touched with the heated wire.

The consequence of all this was, that my patient narrowly escaped death from hemorrhage. One large artery had to

* Diseases of Women, 3d edition, p. 412.

be ligated, and the vagina was tamponed with oakum soaked in persulphate of iron.

On account of this latter objectionable application, of which I can conceive nothing more filthy and abominable under all circumstances as a uterine or vaginal styptic, the cut surface was slow to heal, yet the patient was discharged well within a month from the date of her admission.

She has since given birth to her fourth child, and is in the enjoyment of perfect health at present.

This case is suggestive of many pathological theories and speculations; but the limits of this paper will not permit me to say more than that I believe the formation of this polypus commenced in the cervical canal before or soon after conception; that its growth took an upward direction; and, as the development of the uterus was proportionately greater and more rapid than that of the tumor, there was thus ample room afforded for its safe accommodation during gestation.

Case XVII.—Amputation of Cervix Uteri for Hypertrophy and Procidentia, resulting in Permanent Elevation of the Uterus.—Mrs. ——, aged 35, has had five children, the youngest 3½ years, and one miscarriage about three years previous to my seeing her, which was on December 16th, 1870. Complained of severe and constant back-ache, bearing-down pains, leucorrhœa, and vesical tenesmus. Menstruation regular, though somewhat painful, and occasionally in the intervals more or less muco-sanguineous discharge, especially after long standing or fatiguing exercise. On examination per vaginam, the uterus was found low down, immediately within the vulvar outlet, and the cervix much enlarged, irregular in form, and tender. Os tincæ sufficiently open to admit the point of finger, but not further dilatable on account of the swollen condition of surrounding tissues.

The vesical wall was dragged down to such a degree as to constitute cystocele when the patient stood erect. The finger, on being withdrawn, was covered with a sanious mucus. The speculum being now introduced, the appearance of the organ was such as might be expected, the cervix fully two and one-half inches in diameter, purplish-red, and lobulated. The sound passed to the extent of four inches, and in such a direction as to show some degree of anteversion with slight flexion; but by conjoined manipulation it was evident that the great depth of the uterus was due to the increased size of its cervix, and that there was little or no corporeal hypertrophy.

After a few months' treatment, consisting principally of warm vaginal douches, iodo-glycerine to cervix, a Hodge's

pessary, etc., the uterus improved greatly, and she stopped visiting the out-door department of the hospital for some time.

Jan. 4, 1872, she applied again for advice, and stated that her former improvement did not continue long.

Her general physical condition was now much changed for the worse, and she had had several attacks of protracted menorrhagia since last seen. The depth of the uterus was four inches, and except that the most gentle introduction of the sound caused hemorrhage from the cervical membrane, the parts presented an appearance very similiar to that first observed.

She was advised to come into hospital for operation, and did so on Feb. 2, 1872, when it was decided to remove the whole cervix close to its vaginal insertion, by galvano-cautery, and subsequently, when the parts would heal, to take away portions of the anterior vaginal wall by Dr. J. C. Nott's clamp-ècraseur.

Operation.—By means of the small cautery-knife (G) a circular fissure was made around the base of the cervix so as to form a bed for the wire-loop. The latter was next adjusted and the part to be removed securely embraced, while *slight* traction was made by means of vulsellum. (See Fig. 10.)

The battery connection being now effected, the loop was *slowly* contracted, so as to occupy not less than eight or ten minutes in passing through, thereby avoiding hemorrhage. When the cervix was lifted out the stump was found to be deeply concave; and as there was no appearance of blood, neither tampon nor other dressing was applied.

During the three days subsequent to the operation, no special treatment was needed, as the patient felt no inconvenience whatever from what had been done

About the fourth day—which I find is the rule in such cases—a copious discharge of healthy pus began to flow, and during the ensuing week the vagina was douched twice a day with tepid water and castile soap, and at a later period with a solution of sulphate of zinc and water (ʒ i. to Oi.). An examination made on the 2d of March (four weeks after operation) showed the parts to be entirely healed, and the surface from which the cervix had been removed, *smooth* and covered with healthy membrane.

March 9th.—The patient was placed on the table, and anæsthetized previous to operating on the anterior wall, as above stated, my friend Dr. Nott and the members of the hospital staff being present, when, to the surprise of all, the following condition of things was observed: *There was no bulging of the vesico-vaginal septum, and the uterus was with difficulty*

reached by the finger, as if the vaginal canal had been stretched in an upward direction. The uterus was not alone elevated, but no reasonable amount of traction, by means of a vulsellum, could move it from its lofty position. No further operations being indicated, she was soon after discharged cured.

This remarkable degree of fixation of the uterus, following amputation of its cervix by the electric cautery, is a clinical fact worth bearing in mind, especially as neither fever, pelvic or abdominal pain, nor, in fact, any other symptom indicative of inflammatory action, followed the operation. However, there cannot, I think, be a doubt but that it was due to some local inflammation of a subacute form in the areolar tissue and lymphatics of the broad ligaments, resulting in a tightening or abnormal inelasticity of the uturine supports.

Case XVIII.—Intra-pelvic Fibroid.—Third Operation on Same Patient.—The young lady whose case has already been fully given (Case XIII.), having entirely recovered from the severe ordeal undergone in August last, and having suffered much of late from vesical tenesmus, occasional retention of urine, and other distressing effects of pelvic impaction, was induced to submit to a third operation on first of the present month (December). This consisted in the removal of all that part of the tumor within the lower pelvis, the presence of which was the cause of all the suffering now complained of, and the excision of which at an earlier period did not seem warrantable on account of her weak condition.

The part now referred to may therefore be considered as the stump from which the large mass was taken on the former occasion. It does not seem to have increased in size during the last three months, though its presence has become more and more painfully felt of late. The upper two-thirds of the pelvic cavity was tightly packed, but the inferior portion towards the vaginal outlet was less crowded, principally on account of the globular form of the stump. The latter was perfectly smooth, and presented no appearance of having ever been an open granulating surface or being covered with cicatricial tissue.

In reflecting over the measures suggested to my mind for accomplishing its removal, either of two methods appeared practicable,—to repeat the operation first resorted to, by splitting the mass into two parts, and then looping either half; or to attempt its removal in one piece by a loop thrown around the whole circumference of the tumor.

On account of the great length of time occupied, however, not to speak of the almost insurmountable trouble and difficul-

ties experienced on a former occasion, the first of these plans offered but little attraction; and though it seemed at first impossible to devise any means by which a smooth globular mass might be embraced by a wire noose, I decided to make the effort.

The method practised may be described as follows: A large-sized hard rubber crochet-needle, rounded at the end, was heated and slightly bent so as to accommodate itself to the curve of the sacrum and posterior contour of the tumor.

A small hole was drilled transversely near its distal extremity, and at right angles with the direction of its curve, and through which a stout platina wire was passed half its length. The free ends of the wire were now passed through two copper tubes, each $\frac{3}{16}$ of an inch in diameter and eight inches long, and bent to nearly the same form as the rubber rod (Fig. 16).

An anæsthetic having been administered, and the patient placed on her left side, the two tubes with the rubber rod between were carried behind the tumor and as far up as deemed safe.* The rubber support being now intrusted to an assistant, and maintained steadily in position, one of the copper tubes was carried around half the circumference of the tumor, the wire being pushed up, piece by piece, from below, and when the centre anteriorly had been reached, was so held until the opposite half had been encircled in like manner. Two small pieces of wood, each one inch and a half in length, flat-oval, and having two holes running through longitudinally for the reception of the copper conductors, were one after the other slipped up so as to unite, yet insulate the latter.

This being accomplished, the free ends of the platina wire were next passed through a modification of the loop instrument as shown in Fig. 2, and the copper conductors firmly fastened in the socket. All being now in readiness, the battery connections were made, when the heated wire cut through the rub-

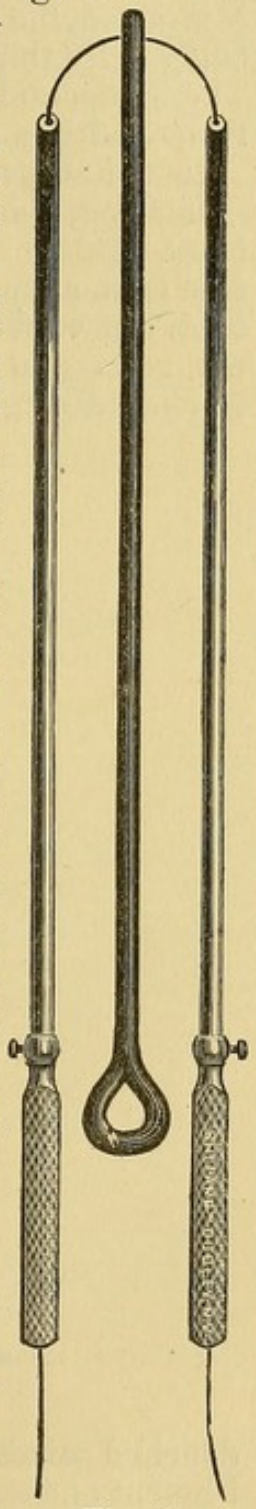


Fig. 16.

* Fearing that some abnormal position of the Douglas *cul-de-sac* might exist, the part selected for looping was some distance below the fornix vaginæ.

ber support and embedded itself in the substance of the tumor.*

The rubber rod was now withdrawn, and the loop *very slowly* contracted, the time occupied in cutting through the whole mass being fully thirty minutes, exclusive of necessary interruptions. There was no hemorrhage from the stump, but the vagina was tamponed as a precautionary measure.

Reaction after the operation was, in this instance also, quite satisfactory; and though her pulse for several days did not get below 110, she expressed herself as feeling very comfortable and free from abdominal pain or tenderness. The vaginal dressings were removed on the third day, and the parts well bathed with tepid soap and water, to which was added carbolic acid. Copious discharges of healthy pus now appeared, the vagina was

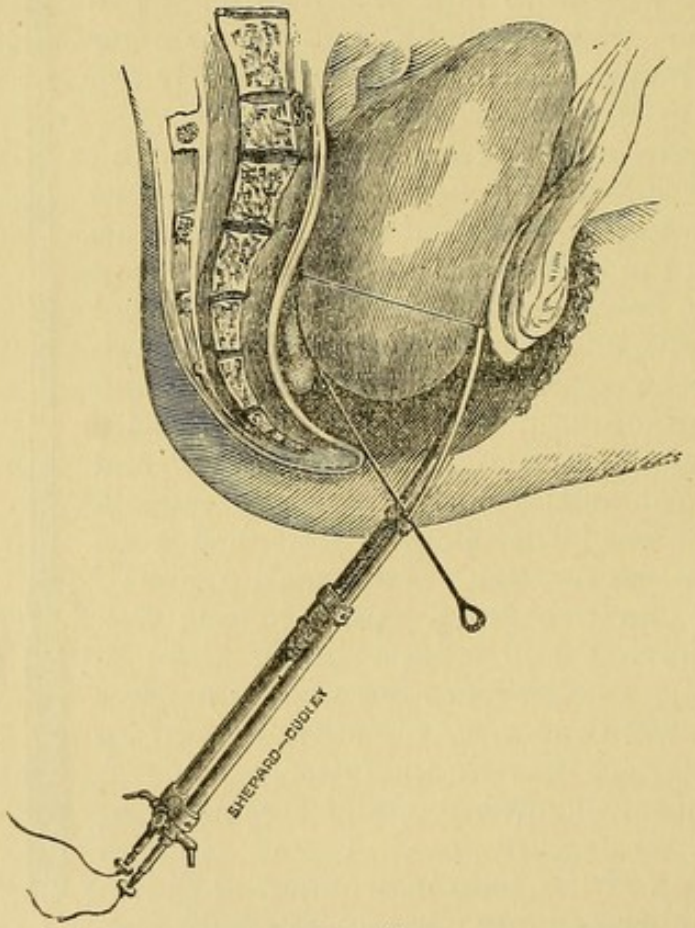


Fig. 17.

douched several times a day, she enjoyed and retained her nourishment and stimulants, and everything progressed favorably up

* On account of the length of wire required to encircle the tumor, two batteries were connected and used until a part of the mass was cut through, after which one was found sufficient.

to the night of the 10th, nine and a half days after the operation. On that night the weather suddenly became intensely cold, and being nervously apprehensive that urine might accumulate in the bladder so as to require the use of a catheter, she persisted in getting out of bed a number of times to pass water.

At an early hour of the morning of the 11th, Dr. Schapps saw her, was told she had several chills, and recognized well-marked symptoms of incipient tetanus. This condition of things rapidly became worse, and though every means at our command was promptly applied and persevered in, no amelioration of her spasms was effected thereby, and she died at four A. M. on the 14th.

Autopsy.—An incision was made from the ensiform cartilage to the symphysis pubis, and the integuments dissected from the latter preparatory to its removal. This being effected, a careful inspection of the abdominal and pelvic contents *in situ* was thus afforded. There was almost a total absence of adhesions, or any evidence of recent or remote peritoneal inflammation. The ovaries were small and shrivelled, but healthy, and the tubes, with their peritoneal attachments, were free and in other respects normal.

The utero-ovarian plexus of veins on right side was in a varicose condition, and one fully as large as the jugular issued from the outer circumference of this varix, and passed directly upward to a point opposite the gall-bladder, where it entered the ascending cava. The fundus uteri was cup-shaped, as if partially inverted; the bladder was healthy; and the peritoneal surfaces all over remarkably pale and free from lymph deposits. The anterior vaginal wall, of which the uterus seemed to be a continuation, was next slit up to within an inch and a half of the fundus, when the partial inversion referred to became still more manifest, and was exactly central, each tubal opening being the lateral boundary of the depressed part.

*The tumor was now found to be not interstitial, but connected to the uterus by two separate attachments: one, the pedicle proper, springing from the right wall below the Fallopian opening, in diameter about two inches, and short; the other covering a great portion of the opposite side, and extending down the cervix to its junction with the vagina.**

This latter connection was evidently secondary, and the result of inflammatory action at some remote period. The vaginal surface of the tumor, from which a part had been excised, was covered with healthy granulations, and the healing process re-

* This adhesion of the tumor to the left side of the uterus undoubtedly resulted from the first attempt made at enucleation in September, 1869.

markably far advanced considering the short time that had elapsed since the operation. The post-mortem tumor was not weighed, but appears to be not quite twice the size of that removed by the last operation.

CHAPTER IV.

CONCLUDING REMARKS.

As this paper has already far exceeded its proposed limits, and for other equally cogent reasons, my history of cases must close for the present. I have purposely endeavored to confine my remarks to a plain statement of such facts and occurrences as seemed to have a bearing on the value of the electric cautery in uterine surgery, including a description of the apparatus and instruments required, and rules for their practical application.

It is possible that the discursive manner in which my reports of cases and operations are given may be considered too inexact and disjointed; but I would state in explanation, that this paper is written less with a view to instruct students than for the information it may convey to active members of the profession; so that the dry daily record and minute details of cases, however useful and necessary to the one class, would be neither attractive nor profitable to the other.

Independently of this feature, however, I am fully aware that my clinical report, as a whole, is neither so full, nor by any means so complete, as could be wished; because, in addition to certain diseased conditions and operations therein described, and which in reality constitute but one-fourth of the whole number observed, there are many others of great practical interest that might also be related did time and other circumstances permit.

Prominent among the latter might be mentioned chronic catarrhal, inflammatory, and ulcerated states of the intra-cervical mucous membrane—as a class, the acknowledged opprobrium of gynæcological surgery, but yielding readily and in most instances to one application of the electric cautery.* Nor in-

* In order to make such applications properly, the cervical cavity should be first well dried out by means of compressed sponge or cotton. The cervical cauterizer should then be introduced as far as may be judged proper, *and while cold.* The battery is next to be immersed, and during cauterization the instrument should be rolled half around and back, so that the parts may be equally and well brought under its influence.

deed does recourse to such radical measures for these obstinate ailments demand the use of any anæsthetic; for patients have repeatedly declared that no more suffering attends or follows such treatment than is observed when any other active topical application is made. So also in regard to inflamed and granular states of the urethral membrane, always a source of intense suffering to the patient, and, so far as my own experience goes, but rarely even alleviated by the most judicious methods of treatment ordinarily employed.

Yet these painful affections also, when not seriously complicated with vesical lesions, have, in several instances lately met with, disappeared no less rapidly by the same proceeding.*

I regret that, on these points, nothing beyond this mere reference to the facts can be ventured at the present time; but an early opportunity may be taken to submit some clinical illustrations of what may be reasonably hoped for in such cases.

With regard to the value of galvano-cautery as a means of excising epitheliomatous outgrowths from the uterus, I think sufficient clinical material has been presented to demonstrate, beyond all reasonable doubt, its great superiority over every other method at our command.

My reports also indicate pretty conclusively the boldness and freedom with which we may, by this agent, safely encounter disease, however intimately connected with vital parts, the security it affords against hemorrhage, and, what appears to me of even more consequence, the very remarkable immunity it would seem almost to guarantee against peritonitis, cellulitis, pyæmia, and other fatal sequelæ of intra-pelvic operations otherwise effected.

As to the curability of cancroid diseases of the uterus by such radical measures as I have adopted and described, or the degree of permanency thereof reasonably to be hoped for, I have but little to add to the remarks already embodied in my reports. The statistics are, perhaps, as yet too limited, and, in most of my cases, the time that has elapsed since operative treatment is insufficient to warrant any very decided opinion one way or other.

It may not be presuming too much to say, however, that, judging from the apparently complete restoration to health in the great majority of patients so treated, though the condition of some was in the highest degree discouraging at the outset, I

* A similar proceeding to that advised for cauterization of the cervical canal should be adopted. The bladder must be completely emptied, and the urethra dried by cotton, before introducing the instrument. An anæsthetic is indispensable in these urethral cases.

cannot hesitate to believe firmly that their ultimate history will warrant the most favorable conclusions in this regard. However, should future observation and more mature experience tend to dispel these hopes, and though cases now so full of promise should be found hereafter to have relapsed, it would nevertheless be some consolation to reflect that, in addition to having been instrumental in procuring respite from a painful malady, in no single instance had life been jeopardized by efforts made in behalf of these sufferers. Indeed, this latter remark is substantially applicable to some of the most hopeless forms of carcinoma when treated by galvano-cautery, as may be inferred from a perusal of case No. XII., and which is but one of several instances met with; for out of thirteen such cases operated upon, ten were beyond all doubt greatly relieved; and though three only were not improved, none were made worse.

The examples of carcinomatous disease of the uterus, either detailed or referred to in this paper, include nearly every variety described or met with, whether as regards their stage of development, the distinctive characters of their primary elements, or the tissues implicated. Hence it is needless to observe that, so far as the manifestly incurable cases were concerned, the parts involved or removed, the amount of relief afforded, and especially the extent to which life seemed thereby prolonged, varied in proportion to circumstances.

As to those of a less grave nature, they too, as may naturally be presumed, were of different forms and degrees of development, and consequently the steps and limits of operations proportionately varied.

Considering, therefore, all the facts observed in thirty operations, their subsequent progress, and inferences naturally deducible therefrom, the conclusion seems obvious that the electric cautery, when properly employed, is attended with less danger, immediate or remote, and promises better results than can be claimed for any other method of surgical treatment yet devised for such ailments.

It would be interesting, and perhaps profitable, to notice some important points touching the distinctive morbid features characteristic of each case or group; but having neither space nor desire to indulge in pathological hair-splitting or the discussion of questions irrelevant to the subject under consideration, what has been already said must suffice for the present, and may be accepted as a brief résumé of my opinions and convictions. Before disposing of this section of my paper, however, and in conformity with its aim and spirit, I would venture to submit,

or the guidance of others, the following aphorisms pertinent to the operative management of this class of cases:—

1. In all cases of induration, destructive ulceration, and outgrowths of the cervix uteri of a malignant nature, or believed to be so, and therefore warranting excision by galvano-cautery or other means, such operations should never be limited to the apparent line of demarcation between sound and healthy tissue, but must include the whole vaginal cervix at least, and even more if need be. (See Case I.)

2. When the shape of a part to be excised is such that a loop cannot be made to embrace it, a circular furrow for the reception of the wire may first be made by the cautery knife.

3. The wire-loop, knife, or other instrument should never be brought to a white heat when passing through superficial tissues or cellular growths. (See Cases XVI. and XVII.)

4. Traction on the part to be excised should be carefully avoided until the wire has passed well into the submucous structures.

5. The contraction of the loop should in all cases be very slow and gradual, *yet interrupted*, so as to insure a thorough cauterization of each stratum as passed through.

6. Towards the close of such operations, and as the circle of wire becomes small, let the amount of electricity be proportionately lessened.

7. Apply the knife to the spot intended to be cut *before heating;* and, if possible, be always provided with a duplicate of this little instrument.

8. Shun the use of persulphate of iron as a utero-vaginal styptic dressing, when possible, and, should any such agent be needed, substitute solutions of alum, or acetic acid, dilute or strong, as circumstances may warrant.

The history of a very remarkable case of fibroid tumor has been described at such length, and the three operations undertaken for its removal in part so fully detailed, that but little need be said in addition to what is contained in the reports.

If, up to this time, proof has been wanting to convince the skeptical, and all who, on purely theoretical grounds, denounce certain forms of galvanic apparatus, because, as they say, their action is not sufficiently constant, these three operations amply furnish it. Others, too, who may have imagined, heretofore, that the galvanic cautery in surgical practice must necessarily be limited to small epitheliomatous or pedunculated tumors, fistulous openings, and birth-marks, will find for the first time how much wider its range of applicability may be extended.

That a highly vascular mass, fifteen inches in circumference and situated within the pelvic cavity, has been successfully cut through and removed without loss of blood or subsequent inflammatory complications, is a circumstance in the history of galvano-cautery as suggestive as it is worthy of record.

The unfortunate occurrence that brought about a fatal issue in this case after the third operation, namely, exposure to cold, however deeply to be regretted, has nothing whatever to do with the merits of the operation, because up to the time of this accidental misfortune the patient was in a much better condition, and promised a more rapid recovery than at a like period after either of the two previous operations.

The report of an operation for the removal of an intra-uterine sessile fibroid (Case XIV.), exemplifies another and I believe safer means than that of enucleation, by which the removal of these tumors may sometimes be effected.

Avulsion or enucleation of intra-uterine fibroids is admittedly a hazardous, and at best a most difficult undertaking, because, though encouraging results have occasionally attended the efforts of some surgeons in this direction, the operation is one from which those who are best qualified to appreciate its dangers and difficulties will be most apt to shrink.

I am not aware that any successful attempt has been heretofore made to sever the connection of such an intra-uterine growth as that described in my case, by means of the electric cautery ; and though the proceedings therein adopted may be found impracticable in some instances, a persevering effort, when it is deemed possible, would, I think, in a conservative sense, be proper and advisable.

The interest that attaches to the case of fibrous polypus springing from the fundus uteri (Case XV.) is due more to the diagnostic lesson it conveys than to the means by which its removal was effected ; because an error in diagnosis, regarding its real point of departure from the uterus, would in all probability have been fatal to the patient. When this tumor was exhibited at a meeting of the New York Obstetrical Society, two examples of this fatal error in cases precisely similar were related,—one as having occurred in the clinic of Professor Scanzoni within the last two years, and the other in the practice of a prominent New York surgeon. In both cases the fundus uteri, being mistaken for the base of the pedicle, was extirpated, and the patients died in consequence.

Dr. Graily Hewitt,* referring to this subject, says : "When the polypus has a large basis of attachment, the fundus may be

* Diseases of Women, first American from second London edition, page 529.

so drawn downwards that what appears to us the pedicle of the polypus is really the uterus itself. A specimen was not long ago exhibited at the Pathological Society, and referred to Dr. Marion Sims, Dr. John Ogle, and myself for examination, in which such a tumor had been excised, and a circular piece, comprising the fundus uteri, had been removed with it."

I have thought proper, also, to introduce another example of polypus (Case XVI.), the clinical features of which are no less peculiar and instructive than that last referred to. However, as certain inferences deducible from what was noticed in this case have been suggested elsewhere, and important principles, applicable to galvano-cautery, based on facts then observed, have been defined in aphorisms 3 and 4, no further remarks seem called for on the subject.

Case XVII. presents some interesting points for reflection, a few of which have already been glanced at in the report. I think this, as well as other similar cases met with, goes far towards establishing a fact in the clinical history of such ailments, as well as certain principles applicable to their management, of great practical value.

Thus, however successful Dr. James Henry Bennet, and others who accept his pathology and therapeutics of inflammatory and congestive uterine diseases, may have been in "melting down" voluminous cervices by potassa cum calce and other corrosive substances, the most thorough, and by no means superficial, destruction of such parts by the electric cautery, and subsequent copious purulent discharges, cannot be relied on as a remedy for nutritive hypertrophy of the cervix uteri. Moreover, I feel justified in concluding, from my own observation, that amputation of the cervix by galvano-cautery, as compared with local depletion, caustics, and escharotics, offers the quickest, safest, most painless, and by far the most successful treatment for this very numerous class of cases. Whether the explanation already given in regard to the elevated position and immobility of the uterus noticed in this case is the correct one, or likely to aid us in establishing some principle for our future guidance, will, of course, depend on further experience and the opinion of others.

This much, however, I may add: the circumstance, though probably noticed by others before, appeared so novel to me that I could not well avoid recording it, and the explanation and inferences are offered for what they may be deemed worth.

In concluding this brief summary of my clinical experience in galvano-cautery, I would simply remark that those who con-

fine their appreciation of this invaluable agent in uterine surgery to its blood-saving properties, omit to take into consideration its most attractive and important attributes. These consist, first of all, in the peculiar manner in which this hæmostatic effect is produced on the vessels, and which I surmise is in no way analogous to that effected by ligature, torsion, écrasement, or styptics. Secondly, as there are no disorganized blood-clots or other effete material to become absorbed into the circulation, blood-poisoning, as I have before observed, need not be apprehended as a sequel of cautery operations.

In other words, it would appear that not only are the blood vessels securely sealed up, but the lymphatics as well, and hence the immunity from hæmatoxic and inflammatory complications.

NOTE.—In the first part of this paper I was induced to promise, on behalf of instrument manufacturers, that certain defects in the construction of my speculum, of which I justly complained, would henceforward be remedied, and that the instrument would no longer continue to be made in defiance of every principle as explained in my original description of it. I regret to say now, however, that these promises and expectations have not been fulfilled. I have quite recently seen as worthless a specimen as it is possible to imagine exposed for sale in one establishment, and I am informed and believe that others equally useless are constantly being disposed of elsewhere.

Under these circumstances, I cannot let this opportunity pass without warning the profession against the purchase of these imperfect instruments. *When the outside measurement of the anterior blade, transversely, exceeds one inch and a quarter, the speculum cannot be used without considerable pain to the patient, and therefore ought to be rejected.* As to those who have already purchased these instruments, their only remedy is to insist on being supplied with such as are perfect, both as to principle and workmanship.

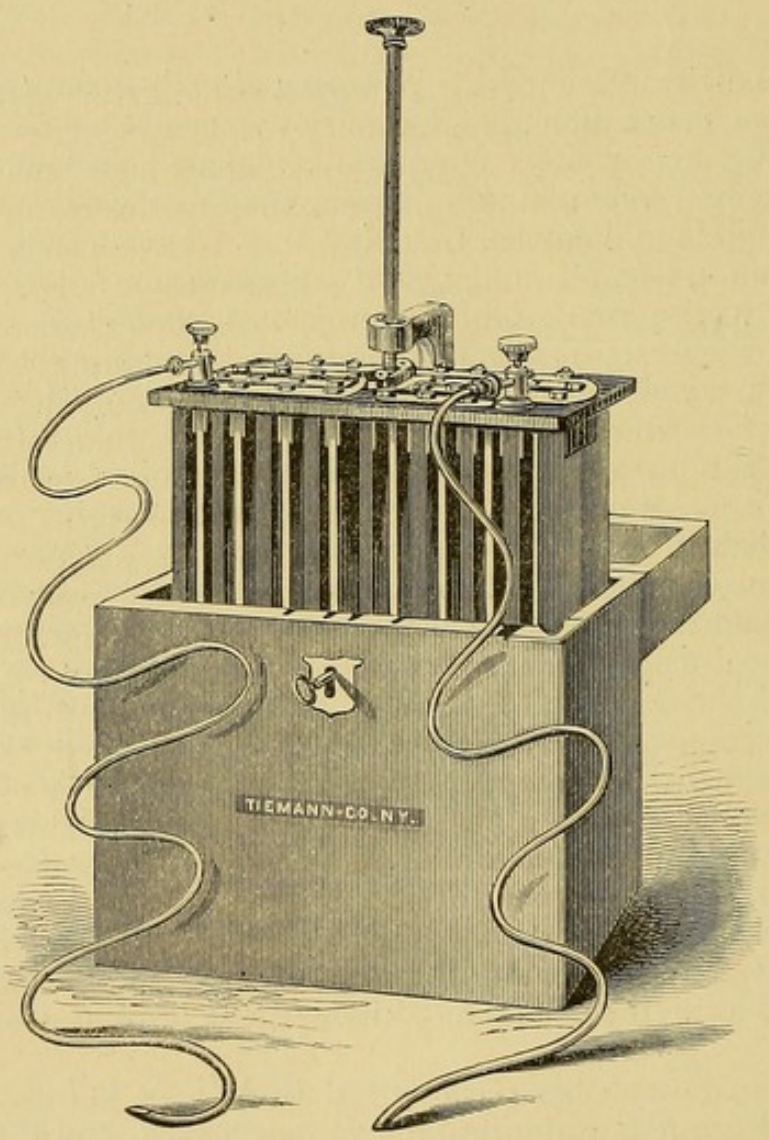
APPENDIX.

From the description of my battery already given (page 11), its peculiar construction, and capacity for heating the various instruments, and yet its comparatively small size and portability, it would seem almost unreasonable to desire anything more complete and compact in that line. I have also, I think, demonstrated, beyond doubt, that it possesses, not only thermal power to a very remarkable degree, but sufficient constancy of action for every surgical emergency. The simple mechanism, too, by which great volume may be obtained when demanded, or increased intensity of the current called forth in a moment, is not by any means its least attractive feature, and cannot fail to be appreciated by every practical surgeon.

Nevertheless, from the success met with in my experiments thus far, and encouraged by certain unexpected results, apparently depending in a great measure on the arrangement and combination of elements, I was induced to continue my investigations with the hope of obtaining great power within a still smaller compass. My battery already described, though more portable and easily managed, and withal, less costly to construct, yet more reliable than almost any other of its class heretofore devised, cannot be procured without considerable outlay, exclusive of the necessary platina instruments and electrodes. It is needless to observe, then, that something more is obviously required if we expect to render the practice of galvano-cautery acceptable as well as attractive to the great bulk of the profession.

I have long since been convinced that there is but one way by which this great desideratum can be reached, and that is, by a still further reduction in the size of the battery, and the omission of every mechanical contrivance, however useful, that can be safely dispensed with. In other words, what is urgently needed is an apparatus, simple in its construction, easily manipulated, of small dimensions, and yet perfectly reliable as well as amply powerful and constant in its action for all practical demands. If, added to these important qualities, it might also be procurable at a comparatively trifling ex-

pense, and thereby within the reach of all, surgeons would no longer be excusable for failing to provide themselves with the necessary galvanic outfit, or disregarding a means whereby many grave ailments might be either cured or alleviated, and often too where operative interference by any other method would be neither safe nor justifiable.



It is no little gratification, then, to be able to announce that I have succeeded, to my entire satisfaction, not only in contriving such an apparatus as that indicated, but also in repeatedly demonstrating, in the presence of many prominent members of the profession, its great power and adaptability to various surgical requirements. A brief allusion, therefore, to certain phenomena on which the construction of this little deflagrating battery is based, as well as the accompanying

illustration, may serve as an appropriate supplement to the foregoing "notes."

Lest the surprise, and indeed I might say, doubt created in the minds of some, by the description of a previous effort in this direction, might now assume the form of open incredulity, the following facts, which any one who chooses to take the trouble may verify, are submitted:

First. I have found, for example that much greater thermal effects can be obtained from 120 inches of surface represented by a number of small plates (3×5), combined and connected in a certain manner, than can possibly be produced by 378 inches when elements four times the size are employed, the intensity arrangement being the same in both cases, and each battery consisting of two of these compound open cells, *immersed in one vessel.* While the one composed of large elements would heat a short thick wire tolerably well, and bring to a red heat about 5 inches of finer wire, that made up of smaller plates would heat the heavy wire much better, while at least 8 inches or more of the thinner would rapidly become incandescent.

Secondly. A battery of two cells, also in one fluid, each representing about 70 inches of negative surface in the aggregate, opposed to a like amount of zinc or positive metal, the elements measuring 5 inches by $1\frac{1}{4}$, and each cell made up of 8 carbons and 8 zincs of the same size, alternately arranged in two rows, will give better thermal results for most surgical purposes than either of the preceding. (Fig. 18).

Moreover, should anything still more efficient be desired, the best combination for all emergencies, and one by which from 12 to 15 inches of heavy looping wire as well as every platina instrument needed may be rendered incandescent, would be 18 carbons and 18 zincs, each $1\frac{1}{4}$ inch by 5 inches, and divided into three sets or open cells, instead of two, as in the preceding. However, as such a battery would be a little expensive, mainly on account of its more complex connections, and as the one previously noticed has been found quite sufficient for every case met with during the last six months, I have no hesitation in recommending it as comparatively inexpensive, and well suited for general use.

To what extent it may be possible hereafter to carry this principle of concentrating and utilizing galvanic forces, I am not as yet fully prepared to say, though certain galvano-metric experiments now in progress may ere long warrant an approximative estimate. This much, however, I do know, that a battery having the same number of elements as that shown in fig. 18, but each no more than one-half the size, will insure

sufficient power, both as regards quantity and intensity, for every minor cautery operation.

Various theories explanatory of these startling phenomena, and based on well-known principles in electro-physics, might be offered; but as such discussions would serve no practical end here, I have decided to limit my statements to certain facts which I have not been able to find recorded elsewhere, and which, if at all noticed by physicists heretofore, have certainly been underrated. Furthermore, in order to make myself clearly understood, I have endeavored to record these observations in terms as plain and concise as possible. While advanced scientists will perceive in these cursory remarks some material for profitable reflection, others not *au courant* in the literature of electro-physics, and they are doubtless the majority, will find enough to stimulate inquiry, and thereby, it is to be hoped, contribute to our present stock of knowledge on this very interesting subject.