

ART. IV.—*On the Treatment of Vesico-Vaginal Fistula.* By J. MARION SIMS, M. D., of Montgomery, Ala. [With twenty-two wood-cuts.]

VESICO-VAGINAL FISTULA—an abnormal communication between the bladder and vagina, allowing an involuntary discharge of urine—is produced generally by tedious labour. The impacted foetal head, jamming the anterior vaginal parietes against the symphysis pubis, obstructs the circulation of the parts, which results in a slough of greater or less extent, according to the degree and duration of the impaction. Almost the only hope of preventing so serious a disaster under such circumstances is the timely resort to instrumental delivery. By this means I have seen the slough confined to the vaginal mucous membrane, where, otherwise, it would unquestionably have extended entirely through the vagino-vesical septum. It occurs principally in first labours where the pelvis is small, the soft parts unyielding, and the foetal cranium large; but I have seen it in those advanced in life, who had given birth previously to many children. Authors are disposed to attribute the accident, in many cases, to the awkward use of obstetrical instruments; but, from a careful analysis of these cases, and from my own experience, I am well satisfied that for one case thus produced, their judicious application has prevented it fifty times.

Other causes produce it occasionally, such as a prolonged retention of a pessary in the vagina, a calculus or other foreign body in the bladder, abscesses, venereal ulcerations, &c. I have seen one case where the whole base of the bladder was destroyed by a corroding ulcer, which, originating in the cervix uteri, extended forward to the urethra. Whatever may be the cause of this distressing affection, it is a matter of serious importance to both surgeon and patient that it be rendered susceptible of cure.

Its diagnosis is sufficiently easy. Incontinence of urine, following a tedious labour after a lapse of from one to fifteen days, will always prove its existence. But to determine the exact size, shape, and relative position of the artificial opening requires some nicety of examination. The consequences of the involuntary discharge of urine are indeed painful. The vagina may become inflamed, ulcerated, encrusted with urinary calculi, and even contracted; while the vulva, nates, and thighs are more or less excoriated, being often covered with pustules having a great resemblance to those produced by tartar emetic. These pustules sometimes degenerate into sloughs, causing loss of substance, and requiring a long time to heal. The clothes and bedding of the unfortunate patient are constantly saturated with the discharge, thus exhaling a disagreeable effluvium, alike disgusting to herself and repulsive to others.

The accident, *per se*, is never fatal; but it may well be imagined that a lady of keen sensibilities so afflicted, and excluded from all social enjoyment, would prefer death. A case of this kind came under my observation a few years

since, where the lady absolutely pined away and died, in consequence of her extreme mortification on ascertaining that she was hopelessly incurable.

The relative position of the fistula has served generally as the basis of a classification. Thus we have :—

1st. The urethro-vaginal, where the fistula is confined to the urethra.

2d. Those fistulæ situated at the neck of the bladder, or root of the urethra, destroying the trigonus vesicalis.

3d. Those of the body and *bas-fond* of the bladder, of which, Velpeau says, “there is no fact, up to the present time, which proves indisputably that they have ever been cured.”

4th. The utero-vesical, where the opening communicates with the body or cervix of the uterus.

I have never met with one of the last-named class ; but of the others I have seen a great variety, embracing almost every possible shape and size.

The position of the patient for the operation, the speculum, the means of vivifying the edges of the fistulous opening, the suture apparatus, and the catheter which I shall describe, are, I believe, original with myself, having been suggested by the peculiarities of individual cases. The final perfection of these mechanical contrivances has been the slow work of experiment.

At the first, I had three cases, upon which I operated about forty times, but failed in every instance to effect a perfect cure, though succeeding so far as to encourage me to persevere. Now, I think I may say that almost every case of this hitherto intractable affection is rendered perfectly curable.

Before detailing my operation, it may be interesting historically to take a brief survey of the surgery of this disease up to the present time.

For the last half century, though surgeons have laboured assiduously to cure it, they have almost always been unsuccessful. Cases have, now and then, been remedied, but they were so few that no general principles of treatment could be established, and, consequently, no certainty of success, in any single instance, could be predicated.

The *suture* was, of course, the first surgical appliance that suggested itself to the mind of operators. It was used in all its various modifications without success. The great difficulty of applying the suture, and its signal failure, caused surgeons to invent a number of instrumental apparatuses, all of which are clumsy and complicated.

As a curiosity, let me here introduce a description of the apparatus of Lallemant, the distinguished professor, of Montpellier :—

“It is composed—1st, of a large canula about four inches long ; 2d, of a double hook, which is moved in the principal instrument by means of a stem, in such manner as to push it out, or to make it enter its sheath ; 3d, of a circular plate which terminates the other extremity of the canula, and which would hinder, if necessary, this latter from penetrating too deep into the urethra ; and, 4th, of a cork-screw spring, intended to draw forward the small hooks as soon as they are inserted in the posterior lip of the fistula. The canula, being passed into the bladder, allows of our pushing the two small hooks into the vagina through the vesico-vaginal septum, which latter is supported by the left fore-

finger. By making a turn of the screw, they are kept in this position; a pledget of lint, or fine linen, designed for protecting the tissues, is then placed between the front part of the urethra and the external plate of the canula; finally, we relax the spring which acts then, at the same time, by making traction on the posterior lip with its hooks, and by pressing backwards the lower wall of the urethra by means of the circular plate, or the lint, which serves as its *point d'appui*. By a mechanism which would be too long for description, we may regulate the stop of the spring in such manner that there will only result from it a moderate degree of pressure, though sufficient for bringing the two borders of the fistula in contact."—(*Velpeau*, vol. iii. p. 852.)

The apparatuses of Lewziski, of Dupuytren, of Laugier, of Fabbri, and others, are equally complicated, quite as unfit to fulfil the proper indications of treatment, and, by experience, have proved as wholly worthless.

Others have attempted to improve different stages of the operation. Thus Colombat praises his spiroidal needle for passing a whip suture in longitudinal fistulas, and M. Sanson has proposed to enlarge the urethra by a double lithotome for the purpose of carrying the finger through the urethra into the bladder, merely to depress the fistula toward the vulval opening; while Wutzer proposes, and performs in a great number of cases, the high operation of paracentesis vesicæ, confining his patient for several days on her abdomen, by means of cushions, straps, and buckles.

These are referred to as historical facts, and not for any good that could possibly result from them.

While all these formidable contrivances, and the suture, have failed so signally, *cauterization* has but little more to boast of in the way of success. Very small fistulous openings have occasionally been reported as cured by the application of the nitrate of silver, a catheter being retained in the bladder; but, in fistulas of any size, it has proved entirely abortive.

To show how utterly hopeless have been all our efforts heretofore, we may allude to the suggestion of some of the French surgeons to apply the Taliacotian method of anaplasty to this operation, which has actually been repeatedly performed by Roux, Jobert, and others; and, also, to the operation of M. Vidal, for an "obturation of the vulva," whereby the bladder and vagina become a grand compound receptacle of the urine and menstrual secretion. It is an idle waste of time to dwell longer on means so perfectly ineffectual, not to say mischievous.

But have no useful, practical suggestions been made, as yet, by any one on the treatment of vesico-vaginal fistula? Yes: two names stand out in bold relief amongst those who have devoted some time and attention to this subject. I allude to our own countryman, Mettauer, who uses leaden sutures; and to the indefatigable Jobert, who is the author of the operation of *autoplastie par glissement*. The first, by his plan, has cured several cases; while the latter has achieved a greater degree of success than any other surgeon.

Thus, all that we know on the subject worth knowing is due to America and France; while German and British surgery have done comparatively nothing for the amelioration of this loathsome and troublesome disease.

Many of our systematic works pass it over in silence, or dismiss it with a few remarks discouraging all attempts at treatment. Samuel Cooper, in his great *Surgical Dictionary*, does not introduce the subject even by name; while Liston devotes less than a page to it. Alluding to the application of the heated wire, he says: "By this means a small opening may occasionally be made to heal up. But when the communication is to a large extent, but little hope remains to the patient." Fergusson, Gibson, and others say nothing about it; while Millar dismisses it as summarily as did Liston. But how could it be otherwise, when its mechanical treatment is so imperfect that no general principles could be laid down?

It is not my intention to allude to all that has been attempted by different surgeons; but it is equally a duty and a pleasure here to chronicle what has been done by our own countrymen who lay any claims to originality or credit.

The first successful case in this country is, I believe, by Dr. Hayward, of Boston. The following is his description of the operation:—

"The patient was placed on the edge of a table, in the same position as in the operation for lithotomy. The parts being well dilated, I introduced a large bougie into the urethra, and carried it back as far as the fistula. In this way I was able to bring the fistula downwards, so that the opening was brought fairly into view. The bougie being then taken by an assistant, I made a rapid incision with a scalpel around the fistula, about a line from its edges, and then removed the whole circumference of the orifice. As soon as the bleeding, which was slight, had ceased, I dissected up the membrane of the vagina from the bladder, all around the opening, to the extent of about three lines. This was done partly with the view of increasing the chance of union, by presenting a larger surface, and partly to prevent the necessity of carrying the needles through the bladder. I then introduced a needle, about the third of an inch from the edge of the wound, through the membrane of the vagina, and the cellular membrane beneath, and brought it out at the opposite side, at about an equal distance. Before the needle was drawn through, a second and a third were introduced in the same way; and these being found sufficient to close the orifice, they were carried through, and the threads tightly tied. Each thread was left about three inches in length."—(*Am. Journ. Med. Sciences*, Aug. 1839.)

Besides this case, Dr. Hayward has recently reported eight others, operated upon since August, 1840, two of which were entirely successful. He says:

"The operation was done in every instance by ligature. The result has, on the whole, been satisfactory. Anything that is calculated to remove this infirmity, or to lessen in the slightest degree the sufferings of the individuals who are afflicted with it, should be made known.

"I had never seen the operation done until I did it myself, nor could I find any description of the mode which others had adopted, that was sufficiently clear and explicit to be of much service. I had, therefore, to take such a course as I thought safe, and at the same time likely to effect the object, viz: the closure of the fissure. I do not know that others may not have operated precisely in the same way; but if they have, I am not aware of it.

"I performed the operation twenty times, but it was done on nine patients only, one being operated on six times, another five, two twice, and five once."—(*Boston Med. and Surg. Journal*, vol. xlv., No. 11. April 16, 1851.)

Dr. Pancoast, of Philadelphia, has operated successfully in two cases, by the following method:—

"The peculiarity of the operation consists, virtually, in attaching the two sides of the anormal opening firmly together, on the principle of the tongue and

groove, so as to get four raw surfaces in contact, and thus increase the probabilities of union by the first intention. For this purpose it is necessary that the margins of the fistula should have considerable thickness, and when not found in this state, they are to be thickened by repeated applications of lunar caustic; or, better still, of the actual cautery.

"Having exposed the fistulous orifice as thoroughly as possible with a Charrière's speculum, from which the sliding blade has been removed, an assistant at the same time drawing the vestibulum well up towards the front of the pubis, my first object in the operation is to split the most posterior margin of the fistula to the depth of half an inch. I next pare off the edges of the other lip of the fistula, so as to bring it into a wedge shape; first reverting it as much as possible with a small blunt hook, and trimming off the mucous membrane on the side next the bladder with the curved scissors or scalpel, and then detaching, in like manner, the vaginal mucous membrane, to the breadth of three-quarters of an inch, along the whole extent of the lip. This was a very difficult but most important part of the process. Having checked the bleeding by the use of astringent applications, my next object is to insert the raw wedge or tongue, into which one of the lips of the fistula has been converted, into the groove which has been cut in the other, and hold them in close connection. This I accomplish by the means of a peculiar suture that might be called the plastic, and in the same way that I have described its application in reference to some plastic operations in my *Operative Surgery*; and in the *American Journal of the Medical Sciences* for October, 1842.

"When the sutures are knotted firmly, the tongue or wedge will be found immovably imbedded in the groove. The sutures I leave for two weeks or more, or until they become loose. A gum catheter should be kept in the bladder to prevent the accumulation of urine. To keep the inflammation from running to a destructive height, a bladder of cold water should be applied for thirty-six hours to the vulva.

"On the second or third day, I direct the frequent injection of a solution of zinc sulph. into the vagina, in order to increase the tone of the parts. On the fourth or fifth day, I apply to the line of union a solution of lunar caustic with a camel's hair pencil. This application should be made twice in the twenty-four hours, the solution being gradually increased in strength. Union by first intention may be expected to take place under this treatment to a considerable extent; at such points as it should fail to occur, union by second intention is to be promoted by the use of lunar caustic in substance, so as to raise a bed of granulations on the raw surfaces of the lips, while they are held in contact by the plastic suture.

"In one case, there was a complete destruction of a cross section of the whole urethral structure, near the neck of the bladder; in the other, there was an elongated orifice in the *bas-fond* of the bladder, which would more than admit the end of the finger."—(*Med. Examiner*, May, 1847.)

Dr. Mettauer's operation, the peculiarity of which consists in the use of leaden sutures, is described in the *Am. Journ. Med. Sciences* for July, 1847, to which I beg leave to refer the reader for particulars.

Having thus briefly alluded to what has been done, up to the present time, for the treatment of this affection, I shall now proceed to detail my own operation.

I conceive that I may claim originality: 1st. For the discovery of a method by which the vagina can be thoroughly explored, and the operation easily performed.

2d. For the introduction of a new suture apparatus, which lies imbedded in the tissues for an indefinite period without danger of cutting its way out, as do silk ligatures.

And 3d. For the invention of a self-retaining catheter, which can be worn

with the greatest comfort by the patient during the whole process of treatment.

Of the position of the patient for the operation.—With the exception of Velpeau and Chelius, all other operators, even Jobert, recommend that the patient be placed on the back as in the operation for stone.

Velpeau* says, "A round-shaped mattress is placed under the *belly*, in such manner as to enable her to keep her thighs flexed, *while lying upon her abdomen*. An assistant keeps the vagina dilated by means of a large gutter of metal, horn, or thin wood."

Chelius† directs "the patient to be placed on her *belly* upon a table covered with a mattress, so that she may kneel near its edge, with her head and chest bent forwards, and supported with small bolsters. The operator sits between the patient's thighs, upon a seat of proper height, so that his arms should not soon tire."

In 1845, previously to the translation of either Velpeau or Chelius, I hit upon the proper plan of exploring the vagina in these cases; but to the latter is due the first published account of even a hint towards that method.

In order to obtain a correct view of the vaginal canal, I place the patient upon a table about 2½ by 4 feet, on her knees, with the nates elevated, and the head and shoulders depressed. The knees must be separated some 6 or 8 inches, the thighs at about right angles with the table, and the clothing all thoroughly loosened, so that there shall be no compression of the abdominal parietes. An assistant on each side lays a hand in the fold between the glutei muscles and the thigh, the ends of the fingers extending quite to the labia majora; then, by simultaneously pulling the nates upwards and outwards, the os externum opens, the pelvic and abdominal viscera all gravitate towards the epigastric region, the atmosphere enters the vagina, and there, pressing with a weight of 14 lbs. upon the square inch, soon stretches this canal out to its utmost limits, affording an easy view of the os tincæ, fistula, &c. To facilitate the exhibition of the parts, the assistant on the right side of the patient introduces into the vagina the lever speculum represented in Fig. 1, and then, by lifting the perineum, stretching the sphincter, and raising up the recto-vaginal septum, it is as easy to view the whole vaginal canal as it is to examine the fauces by turning a mouth widely open, up to a strong light. (See Fig. 4.) This method of exhibiting the parts is not only useful in these cases, but in all affections of the os and cervix uteri requiring ocular inspection. The most painful organic diseases, such as corroding ulcer, carcinoma, &c., may be thus exposed without inflicting the least pain, while any local treatment may be instituted without danger of injuring the healthy structures. By this method, also, a proper estimate, anatomically, can be had of the shape and capacity of the vagina; for where there is no organic change, no contraction, and no rigidity of it from sloughs, ulcers, and cicatrices, and where the uterus is movable, this canal immediately swells out to an enormous extent, thus showing its great expansibility.

* Operative Surgery, Am. edition, vol. iii. page 851.

† Chelius' Surgery, by South, Am. edition, vol. ii. page 191.

Fig. 1 represents the speculum. When introduced and held properly, it causes no pain whatever. It is well enough to have two or three of different sizes, so as to be prepared for any case. The one ordinarily used by me is about $2\frac{1}{2}$ inches from *a*, where it supports the sphincter, to its terminal extremity at *b*. Its concavity *c*, *c* serves to reflect a strong light down on the vagino-vesical septum, the seat of fistula. Its breadth from *d* to *e* is about $\frac{1}{4}$ ths of an inch, widening a little as it approaches the end, making it somewhat in the shape of a duck's bill. The handle is made strong and unyielding, because a considerable degree of leverage has to be exercised by it. The curve at *f*, being cushioned to prevent its hurting the forefinger, fits accurately over it. The whole instrument is made of German silver, the concavity being highly polished for reflecting the light.

Fig. 1.

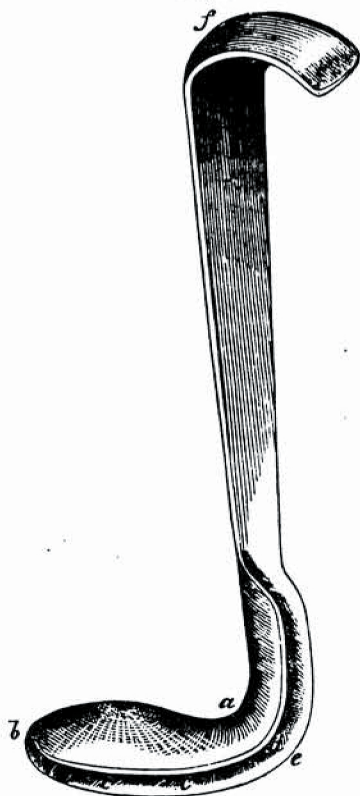


Fig. 2.



A small, slightly convex spatula, Fig. 2 (of German silver), may occasionally be needed to press the urethra downwards against the symphysis pubis, when there is a very minute fistula in the neighbourhood of the trigonus vesti-

calis; particularly if the urethral folds are very redundant. This will seldom be used, but is sometimes indispensable, not only in exploration, but in holding the healthy parts out of the way in passing sutures.

These simple instruments, with this position and a good light, are all that are necessary for obtaining an accurate view of the parts. If the vagina and outlet are ordinarily capacious, a good strong northern light, of a clear day, from a large solitary window, is all-sufficient. But if this canal has been narrowed by cicatrices after extensive sloughs, or from other causes, then sunlight is absolutely necessary for every stage of the operation from first to last. For this purpose, a small table is placed near a window admitting the sunlight. An assistant, sitting by, adjusts on the table a glass, Fig. 3, some eight or ten inches in diameter, so as to throw the rays of light into the vagina, which, passing to the right of the operator, and striking the concave surface of the bright speculum, are reflected down on the anterior vaginal paries, making everything perfectly distinct.

Fig. 3.



Fig. 4.

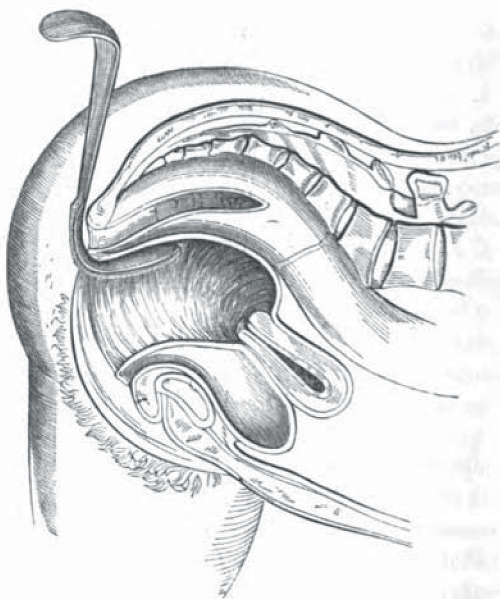


Fig. 4 shows the speculum introduced, elevating and supporting the sphincter; also the relative position of the organs, when the patient is examined as directed; the vaginal canal being distended to its greatest capacity.

Of scarifying the edges of the fistulous opening.—This was the most tedious and difficult part of the operation with me, as it has always been with others. For three or four years, I had great trouble in getting such instru-

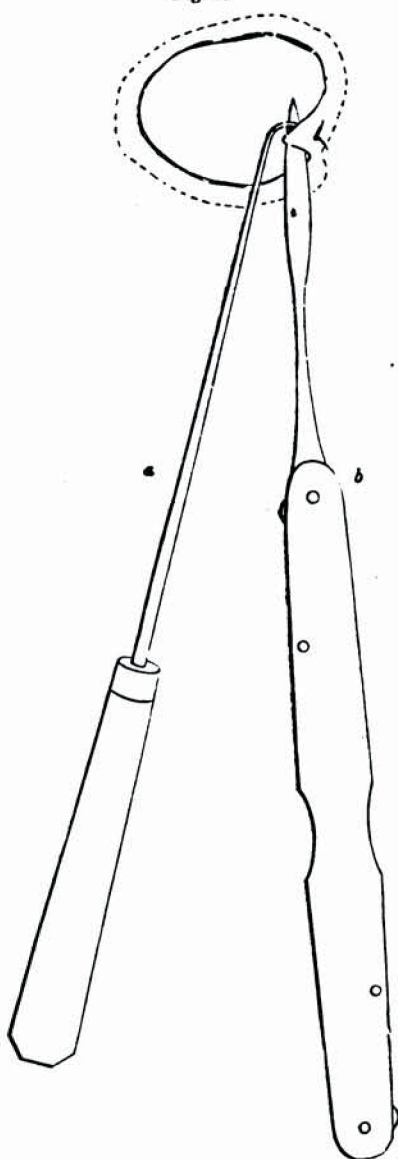
ments made as I thought indicated; but those I now use for this purpose are so simple, that they can be had anywhere. A delicate tenaculum, Fig. 5, *a*, and a sharp-pointed knife, Fig. 5, *b*, are alone necessary.

The tenaculum, Fig. 5, *a*, is very small; the curve being at right angles with the shaft, and not more than one-third of an inch long. If longer, it is not easily managed, nor so generally applicable to any and every part of the fistula. The shaft, some five or six inches long, is set into a firm handle. Of this size and shape, it can be used to elevate the edge of the opening with equal facility, whether laterally or otherwise; while, if curved at more than a right angle, it can be useful only in hooking up and drawing forward the anterior and posterior margins.

Fig. 5 represents the tenaculum *a*, hooking up and elevating the edge of a fistula, while the point of the knife *b* is applied, ready to separate the part so raised up. This process is continued till the edge of the opening is well vivified all round (as seen by the dotted line), sometimes removing a strip an inch or more long before it is cut or torn off. The denudation is to be from a quarter to the third of an inch wide. I have often made the mistake of not removing enough of the callous edge; but I now take good care to remove it freely, extending the scarification

up on the vaginal surface. I do not remove any of the lining membrane of the bladder, unless it is very much altered in character, and projects through the fistula into the vagina in such a way as to obstruct the easy performance

Fig. 5.

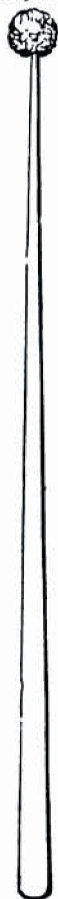


of the operation; which rarely happens, and only where there is a great loss of substance.

Where the fistula is very small, say not larger than a common-sized probe, or even as small as a number seven or eight sewing needle, the best plan to scarify is, to hook up the part with the tenaculum, pull it forward, and by a thrust of the knife transfix the entire thickness of the vagino-vesical septum; then by a circular sweep of the instrument, the whole fistulous track may be removed at once; which substitutes for the small and callous opening, a smoothly cut orifice of rather a conical shape, large enough to admit the end of the forefinger.

Where the fistula is so small, there is always an abundance of tissue, and there need be no fear of removing the parts freely; for it is easier to close properly an opening as large as the end of the finger, than a smaller one, provided there is no scarcity of texture.

Fig. 6.



Where the fistula, on the other hand, is very large, there is occasionally some trouble in determining exactly what to cut; because by the bearing down, sobbing, straining, or even voluntary resistance of the patient, the mucous membrane of the bladder may be forced out in voluminous folds, so as to render the fistulous edges indistinct, and there is danger of scarifying, either too high up on the vaginal surface, or too far in on the vesical lining. To obviate this difficulty, a properly curved metallic bougie may be passed through the urethra up to the fundus of the bladder; thus putting the parts on the stretch and carrying back into its cavity, the apparently redundant lining. The bougie curved down between the thighs may be held by a third assistant. But I greatly prefer to introduce a bit of soft sponge, of proper size, into the cavity of the bladder, which forces back the lining membrane, leaving the fistulous boundary distinct, when the scarification may be easily accomplished. The introduction of the sponge into the cavity of the bladder, or merely between the edges of the fistula, as well as its removal, is always attended with very great pain. Once introduced, I allow it to remain, till the sutures are passed and ready to be secured.

During the scarification, there is, of course, always hemorrhage; and, in some instances, it is so profuse as to compel us to desist for a short time, the patient being allowed to change her position and rest. As soon as the bleeding ceases, the operation may be resumed.

To remove the blood from the cut surface during the scarification, a probang is necessary (Fig. 6), which is made by tying a nice bit of sponge to the end of a piece of whalebone some eight or ten inches long. It is well enough to have two or three of these, which will keep one assistant pretty busy to wash clear of blood at this stage of the process. The probang can generally

be best applied by the operator, as his position allows him to see exactly where it is most needed.

I cannot lay too much stress on the great necessity of perfecting well this part of the operation; for, upon a proper and free denudation of the fistulous orifice, success or failure will mainly depend.

Sometimes one edge of the fistula is thinner than another. Velpeau and others have noticed this fact; but in not a single instance have I found (as they did) the thinner edge behind and the thicker before. Where there was any appreciable difference, the reverse was the fact in every case that I have as yet examined. This thinning of the anterior edge, where it was right at the neck of the bladder, was always a serious obstacle to the proper closure of the fistula. By giving way too soon, it almost invariably left an opening at the point of its greatest thinning. This, however, is a peculiarity belonging to individual cases, and will be dwelt on more particularly when we come to describe them.

Of the Suture Apparatus.—Sutures all serve the same general purpose, viz. the bringing and holding together parts that we wish to unite. They are variously named, according to circumstances—as the Interrupted, because it is solitary; the Continued, because a plurality of them are joined together; the Quilled, because of the peculiar method of securing it; and the Twisted, for a similar reason.

The one that I use for closing vesico-vaginal fistulæ, I have termed the clamp suture, from its peculiar method of action. Thus, if the profession allow me to introduce a new suture by its most appropriate name, we shall then have in general use, sutures named, first, according to their relation, the interrupted and continued. Second, according to the method of securing them, the quilled and twisted; and third, according to its method of action, the clamp suture.

As all sutures are but modifications, one of another, so is the clamp a modification of the quilled.

The clamp suture is composed of small annealed silver wire fastened to cross-bars, after the manner of the quilled suture. The wire is drawn down to about the size of a horse-hair, and then annealed. The cross-bars, or clamps, are very small, not more than a line in diameter, and made of silver or lead, as most convenient. If of silver, they may be tubular; when of lead, solid. They must be highly polished, and without the slightest asperity, particularly at their extremities. They act as clamps in this way. The parts embraced between them, being held in close apposition, swell upward, and overlap them; while they, by pressure, produce an ulceration in the vaginal surface, sufficient to allow of their being perfectly embedded, and after a while even sometimes hidden from view. This ulcerative process is attended, of course, with a purulent discharge, which, continuing for three or four days, diminishes, and soon ceases altogether; but not till the bed made by the clamp becomes

lined with mucous membrane. After this the apparatus would lie innocuously in the tissue for an indefinite period. I have allowed it to remain long enough for the extremities of the clamps to be covered over completely by firm granulations, which, opposing considerable resistance to their removal, had to be lacerated before this could be accomplished.

This suture is far preferable to anything before suggested for the purpose. Its introduction dates from June 1849, since which time I have had comparatively little trouble in the treatment of the great majority of cases of vesico-vaginal fistula. Properly applied, this suture never ulcerates out, having always to be removed by means of scissors, hooks, and forceps. It may be allowed to remain intact for six, eight, or ten days, or even longer. If removed too soon, the delicate cicatrix may gradually yield to the traction of the ascending uterus, or to the force exerted by the bladder in expelling its contents, and thus reproduce a small fistulous orifice to be closed by a subsequent and more cautious operation. I have seen the new cicatrix give way from another cause, and perhaps it is the chief one. The clamps, burrowing in the vaginal surface, leave a deep sulcus or fissure on each side of the new cicatrix, which, when they are removed too soon, fill up by granulation. It is a law of all granulating wounds to contract as they heal, and this contraction on each side of the new cicatrix is often sufficient to pull it gradually apart. But if the clamps are allowed to remain till their sulci are covered with mucous membrane, then there is no danger of this accident, for these chasms then gradually disappear, less by filling up with granulations, than by an absorption of their elevated edges.

Accidents of this sort have happened repeatedly in my hands, from a too early removal of the suture apparatus. Great judgment, which experience alone can give, is necessary to determine the length of time that the sutures ought to remain intact, for no positive rules can be laid down that will answer invariably in every case.

I have also seen serious mischief result from leaving the clamps too long embedded in the parts. Their burrowing and ulceration may extend entirely through the vagino-vesical structure, thereby substituting new fistulous openings for the original one. This complication is by no means incurable, but only prolongs the treatment, and postpones ultimate success.

In two or three instances I have witnessed a still more serious accident from an undue pressure of the clamps, viz. a strangulation of the enclosed fistulous edges, which unfortunately resulted in a sloughing of the tumefied parts, and a consequent enlarging of the opening. In no instance, however, has this accident rendered the case hopeless, or even caused me to feel any concern either for the immediate safety of the patient, or for ultimate success in treatment.

After the scarification is completed, the patient is allowed to rest for a few

minutes, before the introduction of the sutures; an operation which is somewhat tedious, but not difficult. The number of sutures will depend on the size of the fistula. Less than two will not suffice for the smallest opening; while the great majority of cases will require three; and, occasionally, we meet with one sufficiently large to demand four.

The needle which I use is represented by Fig. 7. It is awl-shaped, and spear-pointed, with the eye near the point. The shaft is about six inches long; the part near the handle is made malleable, allowing it to be bent into any desirable shape for the purpose of preventing the hand, as it grasps the handle, from obstructing the view of the operator.

To illustrate the method of suture, let us suppose a case, where the fistula is oval, transverse, occupying the *bas-fond* of the bladder, about half way between the urethra and os tincæ, in the mesial line, and large enough to admit the end of the index finger. This, in shape, size, and position, is altogether the most favourable case that can occur, both for a neat performance of the operation, and for certainty of success. Such a fistula will require three sutures.

Fig. 8 represents them introduced at proper intervals; the two outside ones passing within a fourth of an inch of the angles of the fistula. The middle one is first applied. The needle, armed with a silk thread, is entered about half an inch anterior to the scarified edge of the fistula; pushed deeply into the vesical septum, without transfixing it; brought out just at the edge of the mucous lining of the bladder; carried across the opening; made to enter the opposite side at a point corresponding with its direction anteriorly, observing the same precautions in its course; while it is brought out on the vaginal surface about half an inch beyond the scarified part.

The passage of the needle through the anterior edge of the opening is easy enough; but the loose and yielding nature of the posterior, renders some support necessary before it can be made to appear on the vaginal surface. For this purpose a blunt hook (Fig. 9, *a*) is placed flatwise, just beyond the spot at which we intend the needle to come out, thus making a fixed point for it, when it passes with great ease.

Fig. 7.



Fig. 8.

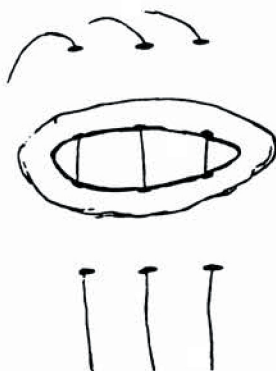


Fig. 9, *b*, shows the needle armed and passed as directed: the spear-point having emerged at its proper place on the distal side of the fistula, is supported by the blunt hook, *a*, over which it rests.

As soon as this is accomplished, the blunt hook is laid aside, and a small tenaculum (Fig. 10, *a*) used to hook up the ligature which lies close by the side of the needle, *b*. There is sometimes a little delay in doing this, particu-

Fig. 9.

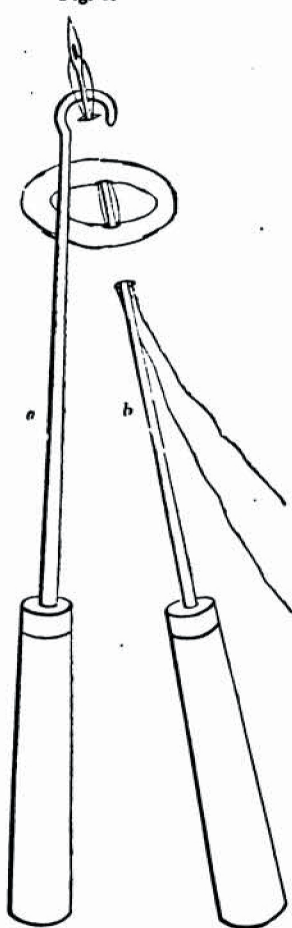
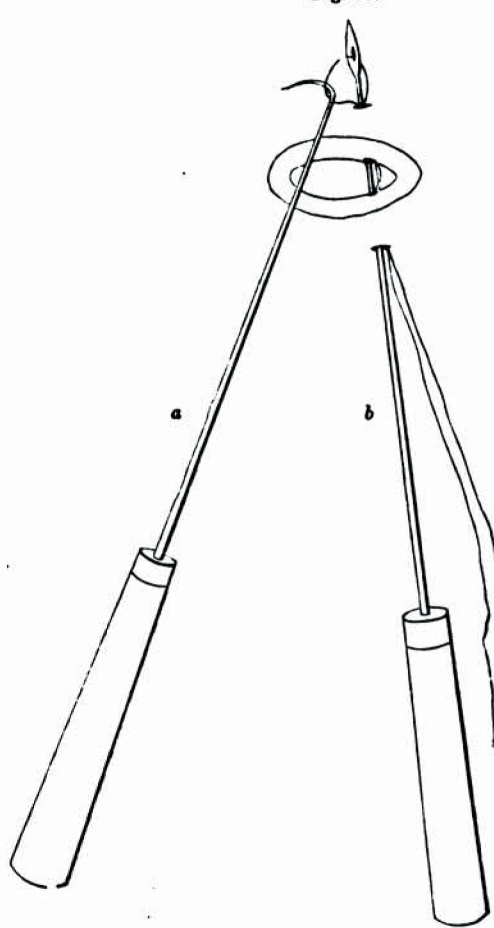


Fig. 10.



larly if the parts are too contracted, or the light not good. In this case, the needle should be pushed an eighth or a fourth of an inch further on, and then retracted as much, when a little loop of ligature will be left, into which the tenaculum can be passed. (Fig. 10.) After this, the needle is to be withdrawn entirely, leaving the ligature *in situ*, with its distal end or loop securely on the hook. The hook is then drawn out, and with it, of course, the ligature,

the two ends of which are now hanging from the vulva. The other ligatures are passed in like manner, observing the precautions already laid down.*

In pulling on the distal end of the ligature, another expedient is necessary to prevent the cutting and pain, which would inevitably attend its passage over the posterior edge of the fistula. For this, a crescent-shaped fork (Fig. 11) mounted on a shaft of convenient length, is passed up, which, pushing the ligature above its furthest point of exit, serves the purpose of a pulley; when it (the ligature) can be easily drawn backward or forward by traction on either end, without inflicting the slightest injury on the part, or pain on the patient.

Having now given directions for passing the ligatures, let us suppose that we have introduced the three, or as many as we want. The difficult part of the operation is over, and we have only to substitute the annealed silver wires for the silk ligatures; which is the work of but a few minutes. Take a piece of the wire twelve or eighteen inches long, making a small crook at one end so as to fasten it securely to one of the ligatures. Fig. 12 shows the wire crooked and hanging to the end of the thread; the other end of the thread being pulled on till it comes out, leaving the wire in its place. In

the same way we replace the remaining silk ligatures with silver wire; both

Fig. 11.

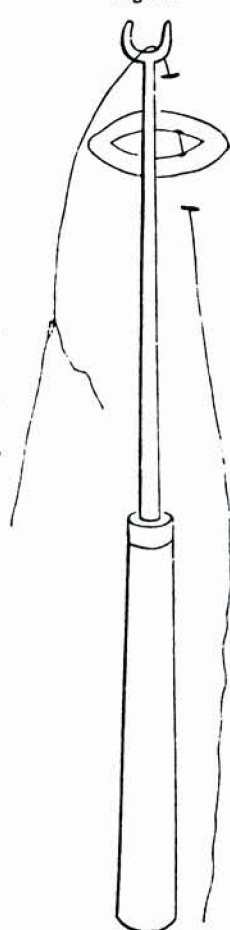
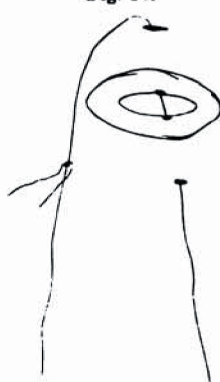


Fig. 12.



* The ligatures cannot always be introduced with as little trouble as in the case just supposed. For instance, when the loss of substance is very great, the fistula is so wide that the needle cannot be made to traverse both sides of it at once; hence, it becomes necessary to hook up the ligature as soon as the needle has pierced the anterior border of the opening; when it is withdrawn, re-threaded with the distal end of the same ligature, and passed through the posterior edge. In re-threading the needle, care must be taken to pass the thread through the eye from its upper or concave surface; otherwise, when it is withdrawn, it will be found still hanging to the main thread that is stretched across the fistula, instead of slipping easily from its free end: which is a very awkward accident, inasmuch as the patient is subjected unnecessarily to the pain and delay of having it introduced again.

ends of which project from the vulva, the proximal directed downward, and the distal held upward.

The next step is to secure them by means of the clamps. In Fig. 13 the wires are represented passed, the two ends of each brought out of the vulva;

Fig. 13.

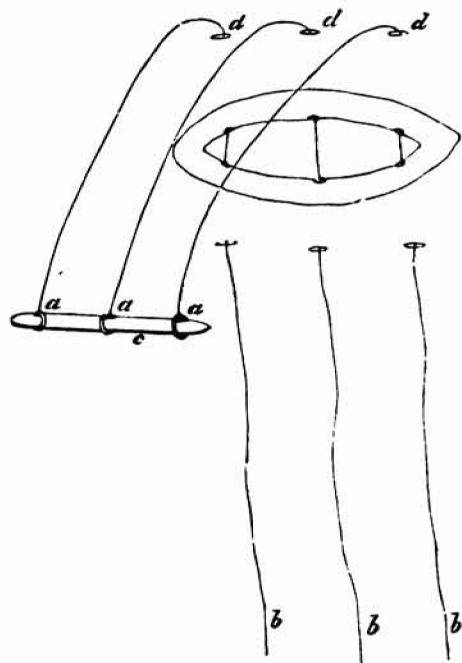


Fig. 14.



the distal *a, a, a*, to the left; the proximal *b, b, b*, to the right. The distal ends are passed through small oblong holes made in the silver or leaden bar *c*, to suit the distances between the points of suture at *d, d, d*. The wires may be fastened to the bar or clamp *c*, by being turned twice around it, or by being passed through a perforated shot and bent over it. This done, we now pull upon the proximal ends *b b b*, and, as a matter of course, the bar *c* is carried into the vagina, up above the fistula, and made to occupy a bed right over the orifices *d d d*. Here, the crescent-shaped fork is supplanted by a modification of it, Fig. 14, broad enough to serve the purpose of a pulley for all three of the wires. The next step is to pass another bar or clamp on the

proximal ends of the wires, and to push it along them into the vagina, till it occupies a position in front of the fistula, corresponding exactly with the one behind it.

Fig. 15 shows the two clamps, one on each side of the fistula, and every-

Fig. 15.

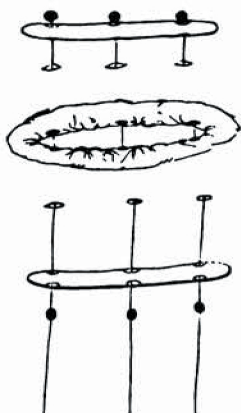


Fig. 16.



thing ready for closing it. The proximal clamp is pushed up by the crescent-shaped fork, while the wires are held firmly. This brings the denuded edges of the fistula into such close contact that it would be difficult to enter a common sized probe between them. The force necessary for tightening the clamps will depend upon the judgment of the operator; not enough will allow the parts to gape, while too much, which is the most frequent fault, will produce the bad effects formerly alluded to.

A simple and perfect contrivance now serves to hold the clamps in their proper places. A small bird shot, perforated, is passed along each wire close against the proximal clamp; when, the wires being held securely, they are gently but firmly compressed by means of a long strong pair of forceps (Fig. 16), whereby they are made to perform the office of a knot in preventing the clamp from slipping off the wire. The wires are cut off about a fourth or eighth of an inch from the shot, and then bent over, which effectually prevents their slipping off.

Fig. 17.

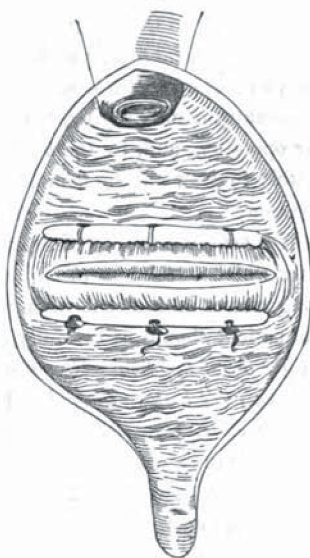


Fig. 17 shows the appearance of the fistula and suture apparatus after the

operation; the edges of the opening in apposition; a clamp on each side of it; the flattened shot against the proximal clamp; the wires cut off and bent over the shot, which protects the recto-vaginal surface against their sharp ends, as well as prevents their slipping.

The operation, which may have lasted some twenty or thirty minutes, or, under any circumstances, not more than an hour, is now over; and our patient is ready for bed, complaining only of fatigue from the constrained position.

There is one peculiarity about the instruments, which greatly facilitates the operation. For instance, the tenaculum, the needle, the blunt hook, and the crescent-shaped fork, have their shafts made malleable, so that they may be bent in a direction to keep the hand of the operator below the axis of the vaginal canal, which preserves the line of vision unobstructed.

Of the Catheter.—Surgeons have always felt that something more was necessary to cure a case of vesico-vaginal fistula, than merely closing it mechanically. The urine has been the great cause of failure. To prevent its percolation through the closed opening has been regarded, heretofore, as almost insuperable. The catheter was tried by all, but its frequent introduction had a direct tendency to disturb the healing process, and to hasten the mischief it was intended to obviate; while all attempts to secure it permanently in the bladder by any external contrivance has proved abortive.

Desault used a large gum-elastic catheter, "fixed to an apparatus resembling a truss, by means of a movable silver plate, provided with an aperture for its removal." Tying it to the hairs of the vulva, and other equally useless expedients have been resorted to.

According to Chelius, the operation of paracentesis vesicæ was practiced by Wutzer, who, he says, had the greatest success in the treatment of this disease, having cured three cases out of eighteen. He compliments the efforts of his countryman by saying, "That he has importantly contributed to perfecting the operation, and, by the addition of paracentesis vesicæ, in order more completely to draw off the urine, has advanced considerably farther than his predecessors."

Wutzer gives specific directions for puncturing the bladder above the pubes: after which a tube is to be introduced, and "fixed immovably by means of wing screws in the cleft of a previously well fitted belly girdle, after which, the patient should be carefully conveyed to a bed previously prepared, *placed on her belly, upon suitably cut out leather cushions, and properly buckled in it with suitable leather straps.*" I allude to this method of Wutzer, merely to show what desperate efforts have been made to prevent the urine from escaping through the fistula during the process of treatment.

With me, as with others, this has been the most serious obstacle to the success of the operation; for, if a single drop of urine finds its way through the

fistulous orifice, it is sure to be followed by more, and thus a failure to some extent is almost inevitable.

Knowing that something to draw off the urine continually was absolutely indispensable to success, and seeing that all other operators had failed to secure a catheter in the bladder by any justifiable external means, I conceived the idea of contriving for this purpose, a self-retaining instrument. A sponge tent was the first thing suggested to my mind. I supposed, if a long narrow piece of sponge could be safely introduced into the bladder, that it would absorb the urine as fast as secreted, which, by capillary attraction, would pass along the sponge, and escape without coming in contact with the fistula. Accordingly, a piece of fine sponge some three or four inches long, narrow in the middle, larger at each end, with a strong silk thread passing through its whole length to prevent its being torn, or broken, was first used. (Fig. 18.) Concealed in a bi-valve catheter, it was readily introduced, the middle portion *c*, enveloped in gold beater's skin lying in the urethra, the small flat end *a*, occupying the cavity of the bladder, while the larger extremity *b*, hung out between the labia. It acted the part of a syphon admirably, every drop of urine passing through it; but unfortunately for my patients (two of whom were experimented on with it), it became encrusted and perfectly saturated with calculous deposits, rendering its removal painful, difficult, and even dangerous. This expedient, promising so much in theory, and performing so ill in practice, was necessarily abandoned.

Fig. 18.



Fig. 19.



Following up the idea of a self-retaining apparatus, I next hit upon the following contrivance. I took a piece of gum-elastic bougie (No. 5 or 6), some four or five inches long, and made a longitudinal split an inch long entirely through it, beginning about a fourth of an inch below the rounded end. (Fig. 19.) A piece of silver wire, a little

longer than the catheter, was passed along it and fastened neatly at its vesical or split extremity. Traction on the lower end of the wire caused the sides of the split to open (Fig. 20), which allowed the urine to pass off freely, while the bulging at *a a* held it securely in the bladder. This seemed, at first, to promise success, but after trying it in various cases for about twelve months, it, like its predecessor the sponge, had to be laid aside. There were several

Fig. 20.



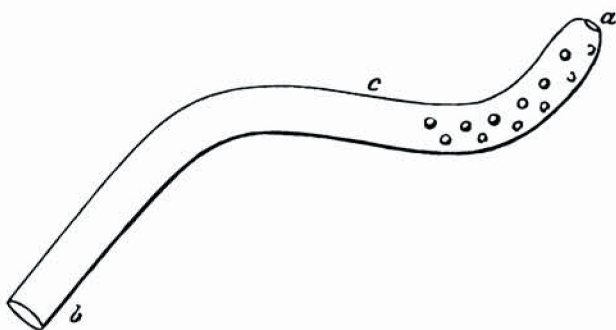
reasons for its failure. If made of a larger catheter than a No. 5 or 6, it would not open and close with regularity, and hence, would press unequally and injuriously on the fistula; whereas, when made of a No. 5 or 6, its calibre was not large enough to permit a free discharge of the mucopurulent secretion which always attends the use of silken sutures; and this compelled its removal, at least two or three times a day, for the purpose of cleaning it out. Hence, its frequent introduction, with the consequent disturbance to the parts from the opening and shutting of the split end, interfered with the healing process to such an extent as to make it necessary to give up its use entirely.

Foiled in this, I devised another instrument on the self-retaining principle. It was a large silver catheter, curved in opposite directions, giving it a sigmoid form (Fig. 21). The end *a* was carried up behind the symphysis pubis, the part *c* lay in the urethra, while the extremity *b* hung down between the nates.

This was the first successful approximation to what was really wanted. When the patient lay on the back, the end *b* was lower than the base of the bladder, which made it literally a syphon; when she turned on either side, it had a semi-rotation that still kept the end *a* upward, while the outer extremity hung downward over the thigh, inviting the easy passage of the urine.

To insure a free discharge of the muco-purulent secretion along with the urine, I made a long narrow slit on each side instead of the holes, as here represented. To see how the instrument would

Fig. 21.



answer, I introduced it into the bladder of a patient having a very large fistula. Feeling well satisfied with its performance, I attempted to remove it and found

it impossible to do so. Folds of mucous membrane had projected into the fenestra, and thus locked it up in the bladder: they were disengaged by the finger passed up through the fistula. The two long openings were then closed and several round ones made, about the size of those represented. They were larger than in ordinary catheters, on account of the abundant tenacious secretion before alluded to.

I operated on a case, and applied what I then supposed to be a faultless instrument. Everything progressed well for five or six days, the catheter remaining in the bladder intact for that length of time; but now it became necessary to remove it for the purpose of cleaning out the mucus and urinary concretions that were obstructing the free egress of the water. But here I was foiled. I could pull it down for, perhaps, an inch, when it suddenly stopped; then by letting it go, it would slip back into the bladder with a sort of jerk. It evidently seemed to be fastened there by some means that I could not exactly comprehend. Every reasonable effort to remove it proving abortive, I, at last, pulled it out by main force. On its removal, the secret of its retention was explained by the shreds of mucous membrane (some an inch long) hanging from each orifice on the under and lateral surfaces of the catheter. The long-continued presence of an instrument in the urethra, which was entirely too large for it, irritated and inflamed the lining membrane, and caused it to throw out granulations. These, with the granulations of the fistula, shot little granules through the holes in the catheter, which spread out into button-shaped knobs on its inner surface, thereby preventing its removal. The injury done to the part, and the pain inflicted on the patient, may very well be imagined.

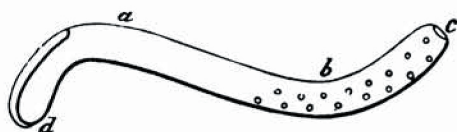
This instrument was variously modified (always keeping in view the self-retaining principle); but it was not reduced to its present simple form until about three years after this. I will not detain the reader longer with a statement of the troubles and disappointments that were encountered before I got it perfected, particularly as it will be necessary, in giving the history of individual cases, to speak of these amongst the causes of failure in some of the operations.

The urethra in some women is less than an inch long, while in others it may be an inch and a half; besides, it may be so small in some, that a No. 5 catheter is as large as can be borne with any degree of comfort, while others will take a No. 9 or 10, and retain it easier than one smaller. Thus, it is evident, that almost every case may require its own catheter, peculiar in length, diameter, and curvature.

Fig. 22 is a correct representation of the self-retaining catheter, and exactly of the size and shape that is most generally required. It may sometimes be curved a little more. The end *c* is introduced and lodged up behind the symphysis pubis; the part from *a* to *b* lies in the urethra; while the outer extremity *d*, hangs down immediately below the meatus urinarius; this downward projection at *d* serves the double purpose of preventing it from slipping

into the bladder, and of preserving its parallelism. If this part is too straight, running in the direction of the axis of the main channel from *a* to *b*, the instrument, after a few hours' use, will revolve on its own axis, and the end *c*

Fig. 22.



may be turned to one side, or even so far round as to impinge on the fistulous opening. Should this accident happen, the instrument is not well suited to the case. It is either too long, too short, too crooked; or, what is more likely, not curved down enough below the meatus.

When well fitted to the case, it can be worn with great ease to the patient; and never turns, nor slips out, it matters not whether she lies on the back or side. It is perfectly self-retaining, being held in the bladder by an internal pressure against the symphysis pubis, and by an external pressure on the outer end exerted by the labia overlapping it, and hiding it entirely from view. The holes should be small, about as represented in the drawing.

Thus, I have, as briefly as possible, described the mechanical apparatus absolutely necessary for the successful treatment of vesico-vaginal fistula.

Of the After-Treatment.—The operation finished, the patient is placed in bed, and the catheter introduced into the bladder. A moment will suffice to show the urine leaking from its outer extremity.

A large anodyne should now be given, such as morphia, laudanum, paregoric, or whatever we may know will best agree with the patient. The bowels are to be kept perfectly quiescent, till the success or failure of the operation is ascertained. I have often kept them locked up for three and four weeks without any bad consequences whatever to the general system. In but two instances, that I recollect, have I ever permitted them to be opened under ten or fifteen days from the time of the operation. This is very easily done. Previously to the operation some light laxative medicine must be given: after it, the diet must be of a constipating character. I generally direct my patients to live on tea and crackers, allowing coffee if preferred, and prohibiting meats, fruits, saccharine substances, and all articles of food made of Indian, or common corn meal. Formerly, I allowed as little water as possible; but latterly, since the introduction of silver sutures, and the perfection of the catheter, I have not thought its interdiction necessary. To assist the diet in producing constipation I order some form of opium in as large doses as can be borne, at least twice in the twenty-four hours. Old fistula cases are generally used to opium; and where they are not, they soon learn its beneficial effects. It calms the nerves, inspires hope, relieves the

scalding of the urine, prevents a craving for food, produces constipation, subdues inflammatory action, and assists the patient, doomed to a fortnight's horizontal position, to pass the time with pleasant dreams, and delightful sensations, instead of painful forebodings, and intolerable sufferings.

There is not the least necessity for the patient's assuming the erect posture, even for a moment: thus, by diet, opiates, and quietude, a perfect state of constipation can be kept up as long as we could possibly want it in any case. All this facilitates the healing process, which is effected by the "first intention;" or, if it fail, it does so only at one or two points, which may be subsequently closed.

The catheter is to be removed as often as necessary to keep it clear of concretions and mucus, which, in a few cases, may be twice a day; in some, once; while in others, it may be allowed to remain two or three days, or even longer. It is to be carefully watched, and must not be permitted to remain long enough to become obstructed. I have seen a failure result from a neglect of this precaution.

The patient's comfort is greatly promoted, by washing the vulval opening twice a day, or oftener, with warm or cold water, as may be preferred.

For this purpose a common bed-pan is placed under the nates, as she lies on the back: when the water may be thrown into the os externum, over the mons, vulva, and inguinal regions, by means of a syringe holding some six or eight ounces. The water has sometimes to be thrown with considerable force to remove the urinary deposits from the nates and genitals.

The patient may lie on the back, or on either side, changing her position whenever she pleases; but in no instance is she allowed to raise up in bed.

Some women are more cleanly than others in protecting themselves and clothing from the urine. Most of them prefer old cloths to absorb it, which are changed as frequently as necessary for comfort.

On the third or fourth day after the operation, I usually examine the sutures to see if all is right. This must be done with as little exertion on the part of the patient as possible. On the sixth or seventh, I examine them again, and if they are doing no mischief, it is much better not to remove them till the ninth or tenth day. The removal of the clamps is occasionally troublesome, but by a little care it can be done with sufficient ease to both patient and operator. The flattened shots are first clipped off, then by a blunt hook, the anterior clamp is readily elevated from its bed and removed; after which, the posterior one, with the wires attached, may be hooked up, pushed backwards, disengaged entirely, and then lifted out with the forceps.

This accomplished, place the patient in bed again, and continue the use of the catheter, with the recumbent position, for several days longer, to prevent any strain or traction on the delicate new cicatrix.

By allowing the patient to get up too soon, and evacuate the contents of the bladder spontaneously, there is danger of rupturing the cicatrix, but by persevering with the catheter and position, till it has time to become well or-

ganized, there is no danger. This will take usually fifteen days from the performance of the operation.

In other parts of the body, most surgeons have witnessed the sudden disruption or gradual yielding of a freshly cicatrized wound, which had been submitted to undue motion, or too strong distention. A case of this kind recently occurred in my practice. A negro woman (aged 27) had a small tumour on the dorsal aspect of the right thumb, involving the skin. It was removed by two transverse elliptical incisions; the edges of the wound were brought together and dressed with collodion, while the thumb was bandaged to a straight splint to prevent any motion in the joint or traction on the cicatrizing wound. It healed by the first intention; the dressings were removed on the seventh day, but the splint was continued on the palmar aspect of the thumb for seven days longer. It was then laid aside, as I supposed the cicatrix to be strong enough to resist the flexure of the thumb. Everything went on well for three or four days longer, when the patient, who was a cook, suddenly lifting a boiling pot from the fire, was alarmed by the snapping asunder of the cicatrix on the back of the thumb, which made a noise so loud as to be heard all over the room. The cicatrix had burst open through its whole extent; the blood flowed freely and the woman was greatly frightened. It was dressed precisely as before; it healed up as kindly; and by preserving the same precautions for a longer time, the cicatrix remained permanently organized, the skin in the neighbourhood yielding, and accommodating itself to the motions of the thumb as perfectly as it ever did before any loss of tissue. If such an accident as this can occur after eighteen days of cicatrizing, we need not be surprised at the gradual or sudden yielding of a cicatrix in the vagino-vesical structure in a shorter space of time.

I have now completed what I have to say in a general way on the subject of the operation for vesico-vaginal fistula. It remains to detail individual cases, which will prove the curability of the disease, and also illustrate the varieties and complications to which it may be liable. The cases that occurred to me early and which were given to me for the sake of experiment, will show the difficulties that had to be overcome, the many disappointments that had to be borne, and the ultimate success that crowned my efforts after the perfection of the mechanical contrivances; which, as it will be seen, was the work not of a day, and the result, not of accident, but of long, laborious and persevering application.

But this communication has already reached to such an extent that I must postpone the relation of my cases to a future opportunity.