

and knees. If urination is impossible without too much straining, the catheter is passed at proper intervals. A daily vaginal douche is given, and the bowels are kept open. Vesical tenesmus is relieved by sedatives. Silk sutures cannot be left as long in place as silver wire; they should be removed at some time between the sixth and the eighth days.

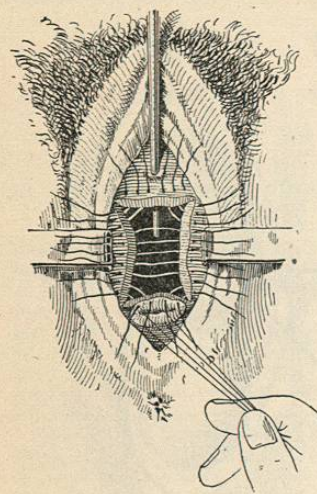


FIG. 4966.—Sutures in Place. (Simon.)

General Remarks.—The principles and methods established by these two great teachers, Sims and Simon, can be followed successfully in all cases. Succeeding operators have modified many details, or have combined into a successful procedure some of the features of each. Each operator follows his own fancy in regard to the needle or the needle-holder which he shall use, and the material of which his ligatures shall be made. Chinese silk, silver wire, iron wire, silkworm gut, and chromicized catgut are used indifferently; but in large fistulae, and those so situated that they cannot be reached easily for fastening the ligatures, silver wire is preferable.

There is no department of plastic surgery which gives so great scope for the ingenuity of the operator as that of vesico-vaginal fistulae. Each case is a problem *per se* and demands its own special and individual treatment. No case should be undertaken without careful study of all the factors that are involved in its successful treatment. The modern methods of vaginal section have led to greater freedom in incising the vagina for the purpose of reaching for operative purposes the tissues beyond, and they have demonstrated the feasibility of dissecting freely the vaginal sheath from the bladder, thus giving direct access to the bladder wall. Acting upon this principle, the author has devised the following method of dealing with vesico-vaginal fistulae, whether large or small, and wherever situated:

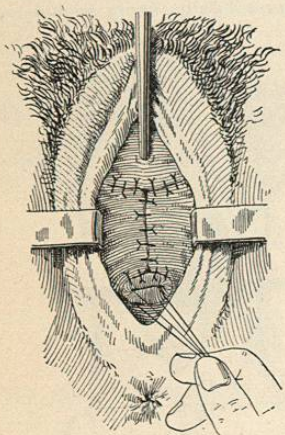


FIG. 4967.—Lines of Sutures to close the Fistula shown in Figs. 4965 and 4966. (Simon.)

The Author's Operation.—Vesico-vaginal fistula is best treated by separating distinctly the vaginal wall (and that includes the vaginal sheath, or fascia, as well as the mucous membrane) from the wall of the bladder, so that the two distinct openings can be closed separately, each in its own way. The operation consists of three distinct steps: First, incising the vagina down to the wall of the bladder by a longitudinal incision reaching, in the median line, from the cervix to the neck of the bladder. A transverse incision, reaching well across the vagina, is next made in front of the cervix; then afterward the bladder is to be separated from the vagina well out beyond the location of the fistula on whichever side of the

median incision the fistula may be located, or if the fistula is in the median line the separation should extend on both sides sufficiently far to set the bladder wall free for some distance beyond the borders of the fistula. In extensive fistulae it may be necessary to dissect the entire bladder quite free from all its attachments, not only for the purpose of bringing the fistula within the reach of surgical procedure, but also to remove all strain upon the tissues. The third step consists in denuding the edges of the opening in the bladder and closing it with one or two tiers of chromicized catgut sutures, care being taken not to pierce the vesical mucous membrane. After this has been accomplished the orifice in the vagina may be denuded and closed, and the vaginal incisions sutured. If the fistula involves the ureter, it can be easily and efficiently dealt with after the separation of the vesico-vaginal septum.

In cases that involve loss of tissue at the lower portion of the vagina, extending to one or both rami of the pubis, there may not be enough tissue between the fistula and the bone for the passage of the sutures. In such cases the tissue can be dissected up from the bone to a sufficient extent to give holding ground for the sutures, or a flap may be dissected off the vagina above and brought around to cover the opening. Jobert was a most skilful operator in the use of flaps, which he procured from other portions of the vagina, from the labia, or even from the buttocks and thighs.

In vesico-utero-vaginal fistulae, where such a course is practicable, only the anterior lip of the cervix uteri should be utilized in closing the opening; but in some cases it is found necessary to stitch the posterior lip to the anterior border of the fistula, thus turning the os uteri into the bladder. Menstruation then occurs through the bladder and conception, as a rule, becomes impossible.

In vesico-uterine fistulae, Dr. Emmet boldly slits up the cervix till he reaches the fistulous opening, thus, as he claims, reproducing the original lesion. The fistulous tract is then denuded and the entire wound closed by sutures, as in trachelorrhaphy. Uretero-vaginal fistulae are perhaps the most difficult to deal with. Landau recommends excising an oval piece from the vesical and vaginal wall, thus producing a vesico-vaginal fistula into the upper angle of which the ureter opens. Then the fistula is to be closed by sutures which, at the upper angle, shall include only the vaginal mucous membrane. If the urine is successful in forcing its way into the bladder in spite of the partial constriction of the ureter which may occur from the stitches, it will continue to do so. There is no danger of occlusion by the presence of granulations, for the flow through the ureter is constant. Another device for securing a patulous condition of the ureter is to introduce an elastic catheter from the vagina into the ureter, and then to pass the lower end out through the bladder and urethra. The uncovered portion of the catheter, as now seen through the vagina, is to be covered with the vaginal mucous membrane and the lower ureteral wall.

If a vaginal operation has failed or it seems useless to undertake such an operation, then resort must be had to

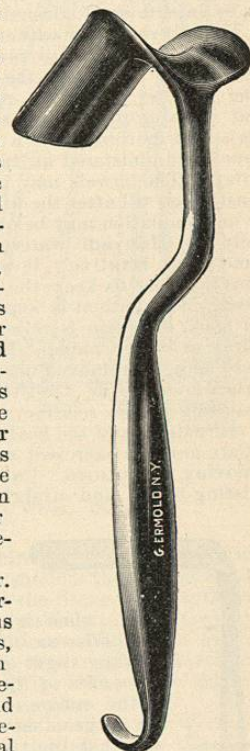


FIG. 4968.—The Goffe Speculum, made in two sizes.

ureteral cystotomy through an abdominal incision. (See also the article on *Ureters*. (Surgical.)

Occasionally a patient presents herself in whom there has been such extensive loss of tissue that all hope of closing the fistula must be abandoned. The question of closing the vagina (kolpocleisis) then arises. This is to be adopted with great hesitation. Indeed, in this country, the experience of the best operators is opposed to it. Continence of urine may be obtained, but, as has been previously stated, it is only at the risk of constant vesical tenesmus, calculus, and chronic cystitis, with all its train of direful consequences. When the base of the bladder, filled with intestines, becomes inverted and protrudes at the vulva, Emmet recommends that enough of the sides of the vagina be united, as in kolpocleisis, to give needed support, but that an opening be left at the most dependent point to allow of free drainage. By proper attention to cleanliness and the use of rubber urinals for females, which can now be procured at the instrument-makers, the patient can be made very comfortable.

VII. TAMPONING THE VAGINA.—Custom has established the use of two words to signify the placing of cotton, wool, or other similar substance in the vagina—viz., tamponing and tamponade. Tamponing signifies the complete packing of the vagina for the purpose of stopping or preventing uterine hemorrhage; tamponade is used when a limited amount of cotton or other similar substance is employed for purposes of medication.

The Tampon.—The use of the tampon originated in the idea of placing something in the vagina to facilitate the formation of a clot. It was first practised by loosely stuffing in a handkerchief, napkin, roller bandage, or a few wads of cotton. Such tampons are more or less effective in stanching temporarily the external flow of blood. But in a short time the tampon becomes saturated and hemorrhage again becomes apparent.

To Dr. Emmet we owe the thorough and efficient method of tamponing the vagina as it is now used, or should be used. His method is based on the idea of pressure. And while the stoppage of all hemorrhage depends upon the formation of a clot, the pressure thus produced carries the uterus high up in the pelvis, compresses all the pelvic vessels, thereby diminishing the blood supply, and transfers the formation of the clot from the vagina up into the uterus.

To tampon the vagina properly a Sims speculum is indispensable. As Mundé ("Minor Surgical Gynecology") very forcibly remarks: "Every practitioner who takes, and is liable to meet with, cases of uterine hemorrhage (and what practitioner is not?) from miscarriage, polypi, polypoid endometritis, fibroid uterus, or cancer, should not only possess a Sims' speculum, but should know how to use it and how to tampon the vagina so securely that not a drop can escape so long as the tampon is retained."

When the hemorrhage is free it may be necessary to tampon the cervical canal as far as the tampon can be forced into it. This will prevent the escape of blood from the uterus, and the blood, in turn, by accumulating and forming a clot within its cavity, stimulates the uterus to contract and so control the hemorrhage. There is no danger of the uterus enlarging to accommodate the clot as it increases in size, except directly after delivery, and when this is to be feared other methods of inducing contraction of the uterus must also be resorted to—*e.g.*, ergot, applications of cold, pressure through the abdominal wall, constitutional stimulants, etc.

If there is reason to believe that the hemorrhage is produced by something within the uterus,—as, for example, a retained placenta, or a polypus, which can be removed at the time,—this indication, as a matter of course, is to be acted upon first. But frequently these cases of hemorrhage occur in the night, or some other reason for delay in operating exists, or the patient may be so reduced that the first indication may be to prevent further loss of blood. Under these conditions resort must be had to the tampon.

The best material for the tampon is plain sterilized

cotton, non-absorbent, squeezed out of carbolized water, and flattened out into discs one-half the diameter of the palm of the hand and about one-half inch thick. Non-absorbent is better than absorbent cotton, as it retains its elasticity and so, by its expansile power, increases the pressure. It is well to have, in addition, five or six tampons that have been squeezed out of alum water, of the strength of an ounce to the pint. These are the first to be used about the cervix and fornix vaginae.

The bladder must be emptied either naturally or by catheter, and, if the case is not too urgent to permit time for it, the rectum should be unloaded by enema. The patient is placed in the Sims position, the Sims speculum is introduced, and the cervix is brought well into view. All coagula and fluid blood are wiped away with absorbent cotton held in dressing forceps, and the vagina is hastily swabbed out with bichloride solution, 1 in 5,000. If the os is patulous and the hemorrhage free, it may be well to pass the applicator, wrapped with absorbent cotton and dipped in iodine, as far up as to the fundus. If a decided impression on the uterus seems necessary, the cotton can be slipped off and left in the uterus as the applicator is withdrawn; but care should be taken to leave the end of it protruding from the os. The uterus will be stimulated by this means to contract, and probably to force out the cotton. In some cases one or two small plugs can be packed into the cervix. This will assist materially in stanching the flow of blood.

One of the disc-shaped tampon balls is now placed over the os, another posteriorly to the cervix, one on either side, and one in front. These are not rolled up into balls, but are spread out and moulded to the vaginal fornix by pressing them all about with the dressing forceps in the right hand, and a stiff probang stick, or another pair of closed dressing forceps, in the left. This completes one circle or layer of the tampons. Another layer is to be placed upon this in the same way, the discs being crowded well in against the cervix until the fornix is filled out flush with the external os. Disc after disc is thus placed around the cervix in a circle and well packed down. Each disc inserted is held in place by the rammer in the left hand until the next one can be inserted; in this manner the pressure is at no time relaxed. As the walls of the vagina stretch, and the diameter of the canal increases, a circle of discs is placed around the central one; then another concentric circle is placed outside of that, and so on until the vaginal wall is reached, the pressure being always made at first toward the centre. But as the lower section of the vagina is reached all the pressure is made toward the hollow of the sacrum, the final discs in each layer being tucked in against the anterior vaginal wall. The whole process is similar to that employed by a dentist in filling a dental cavity with gold leaf. No great force is used at any time in the proceeding; but, by firmly packing down each disc of the elastic cotton, the vagina can be gradually distended, if necessary, until the tampon nearly fills the entire calibre of the pelvis.

At first, the point of the speculum should be directed well toward the back, and then, as the work of packing advances, the end of the instrument should be allowed to slip along the floor of the pelvis. Sometimes the space thus left by the speculum can be filled in with two or three extra discs. Upon finally removing the speculum great care must be exercised not to dislodge the tampon.

When the vagina is thus packed there is no possibility of any further hemorrhage. The amount of cotton used and the thoroughness with which it is packed must vary with individual cases. A slight degree of pressure is sufficient in some cases, and the extreme degree of thoroughness alone suffices in others. It is necessary in all cases to confine the patient to bed, and when the tampon is large an anodyne is required. The pressure is especially painful about the neck of the bladder, and, if this persists in spite of the anodyne, some of the discs in this region can be removed at the end of an hour or two without impairing the integrity of the tampon. When such removal becomes necessary there is usually retention

of urine and the patient has to be relieved with the catheter.

The tampon should not be allowed to remain longer than twenty-four hours. At the end of this time it has usually become soaked along one side, at least, with the bloody secretions. It is then more or less offensive and must be removed. It may be that it has done its work and is no longer necessary; in any event, it has ceased to be of use and should be replaced by a fresh one.

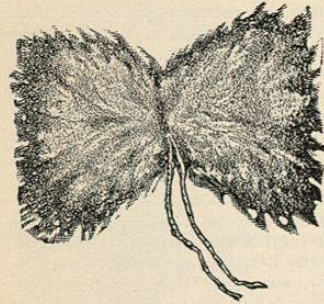


FIG. 4969.—Tampon Pledget.

It is most advisable, as recommended by Mundé, that the surgeon should keep on hand, in a well-stoppered bottle, a supply of absorbent cotton which has been soaked in some styptic solution—*e.g.*, subsulphate of iron (one part to three of water) or alum (one part to twelve)—and allowed to dry. This can be applied directly to bleeding surfaces, as in cancer, before one proceeds to the application of the tampon.

If Sims' speculum is essential to the placing of the tampon, Sims' screw tampon extractor is quite as important for its removal. By means of this instrument the first few pieces of cotton are removed without the use of the speculum. The external parts are separated by the left hand, and the screw, guided along the finger, is screwed into the discs, and they are removed one by one till the pressure is somewhat removed from the perineum. Then the speculum is introduced a short distance, and, as fast as the cotton is removed, it is slid farther and farther in until, with the final emptying of the vagina, it will have reached the farther end of the canal. In removing the tampon pledgets great care must be exercised not to overlook one, especially about the cervix or interior of the uterus. When so overlooked they are apt to be the cause of septic infection, occasioning a chill, rigors, and a rise of temperature.

Tamponade.—The tamponade is not so formidable an affair. It is in constant every-day use for the treatment of all kinds of uterine difficulties. It is employed for various purposes, the most important of which have been enumerated by Mundé under eight different heads, as follows: (1) As a carrier for the application of medicinal agents to the cervix and vagina; (2) as a means of retaining certain substances introduced into the uterus in their proper position—such as pledgets of cotton, tupelo tents, stem pessaries; (3) as a means of retaining the uterus or a prolapsed ovary in position; (4) as a mechanical support and stimulus to the pelvic vessels and as an alternative to the pelvic tissues by means of pressure; (5) as a protective to the ulcerated, inflamed, or swollen cervix or vaginal walls, to prevent friction and an increase of irritation;

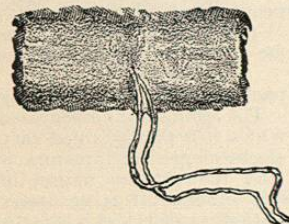


FIG. 4970.—Cylindrical Pledget.

(6) as a means of dilating or separating the vaginal walls—a substitute for a hard or distensible dilator—in constriction of the vaginal canal after operation for vaginal atresia or stenosis in vaginismus, and in spasm of the levator ani muscle; (7) as a hæmostatic (I have already considered this subject under the head of **Tampon**, but there is another use of the tamponade or tampon that I deem worthy of special mention, and therefore shall consider it as the 7th, *viz.*, to hasten expulsion in unavoidable miscarriage); (8) as an absorbent of vaginal and uterine

discharges, which are thus prevented from touching the external or sound parts, and as a protection of the sound parts from caustic substances applied to the uterus or cervix.

This procedure has its special indications in the application of caustics, such as chloride of zinc, to malignant disease of the cervix or vagina. One or two tampons saturated with the caustic are applied directly to the diseased area, and are then kept in place by one or two dry tampons, after which the healthy portions of the vagina and the external parts are protected by tampons wrung out of a saturated solution of sodium carbonate and packed in the canal in such numbers as to fill the rest of the vagina.

As a carrier of medicinal agents the tamponade has come into almost universal use. The best material is the sterilized non-absorbent cotton or wool. The absorbent cotton, plain or borated, is extensively used. But when saturated with glycerin or moistened with the vaginal discharge it packs together too solidly, and has no elasticity. The absorbent cotton is used mainly as a mop in the dressing forceps for cleansing and drying out the vagina, and as a vehicle, when wound on an applicator, for making intra-uterine applications or for painting the vaginal vault.

Other materials besides cotton are used at times by the medical practitioner. Chief among them are tow, marine lint, wool, oakum, sponges. Of these the sponge is the least desirable. On the other hand, the cotton fulfils every purpose, is easily procured, is cheap, and, in fact, is the most generally used.

If some disinfectant, as carbolic acid, boroglyceride, or iodoform, is always used in the material with which the pledgets are loaded before being applied, the cotton needs no further preparation than to be made up into tampon balls ready for use. These tampon balls should not be made with too great nicety as regards looks. They pack together better and so retain their place in the vagina better if they are somewhat irregular in outline. The best way is to pull or tear off the cotton from the end of the roll, without unrolling it or removing it from its wrapper, in little masses of varying size, about two inches long and an inch thick, and without folding in the edges any more than enough to secure it all with the string. When this string has been made fast to it the tampon will be ready for use. (Fig. 4969.) The purpose of the string is to enable the patient to remove the tamponade herself. It should be long enough to project well out of the vagina, and strong enough not to break when traction is made upon it. For this purpose the neatest and simplest material to use is Clark's white cotton thread, No. 12 or No. 14. When used double it is sufficiently strong to withstand any strain that may be required. A convenient way is to cut off the thread about fourteen inches long; then catching it by the middle point, pass the two strands around the pledget, slipping them through the loop and drawing it up tight enough to hold the cotton securely. It is time-saving to make up a supply of these at convenient moments or to have the nurse do it. A number of these pledgets are saturated with the medicament from day to day, according to the number to be used, and kept securely covered to avoid evaporation.

The old-fashioned kite-tail tampon was made by tying a number of pledgets one after the other on a string. This was easy of removal, and in that respect was a suc-

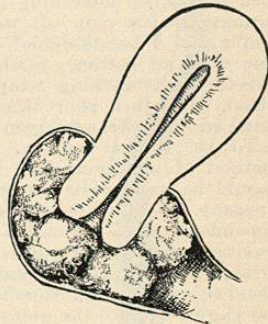


FIG. 4971.—Proper Application of Cotton Pledgets. Ordinarily only two are necessary, *viz.*, the one posterior to the cervix and the one next to it. (After Mundé.)

cess; but it was apt to get badly tangled and was awkward to handle.

Foster's lamp-wick tampon was a great improvement on this, and is an excellent device. The ordinary old-fashioned lamp-wick, as it comes wound in balls, is the material used. It is cheap, elastic, and absorbent; is readily introduced and has the merit of being as easily removed by the patient. Usually a single strand of the wicking is tucked into the vagina through a speculum; but when the ostium vaginae is capacious several coils of the wicking may be gathered into wads and inserted one after the other without breaking the strand. When enough has been introduced the wick is cut off at the vulva, leaving the end thus protruding. To remove it the patient pulls on the projecting end and thus unwinds the mass within the vagina, drawing it through the vulva in a single strand.

Medicinal Agents.—Glycerin is the medicament most generally used on the tamponade, and with it are combined alum, ichthyol, fluid extract of eucalyptus, boroglyceride, carbolic acid, boracic acid, according to the indications. The tampon pledget may be dusted with a dry powder, bismuth, alum, tannin, or iodoform, or it may be smeared with an ointment. One or two medicated pledgets are to be inserted, and these are held in place by one or more dry ones.

It is important to bear in mind, in using the tamponade, that the patient must be informed that she has a specified number of pledgets of cotton in her vagina, and instructed how to remove them. The custom is to remove the tamponade at the expiration of twenty-four, thirty-six, or at the most forty-eight hours. No sudden traction should be made upon the thread lest it break. It must be drawn steadily downward toward the perineum, and when any astringent has been used on the pledget it is well to instruct the patient or nurse to pass her finger into the vagina alongside of the cotton and allow a little air to enter as the pledget is withdrawn. Otherwise the cotton acts like a piston in a pump, and may drag down the tissues above, even to the extent of retroverting the uterus. Passing in the syringe tube alongside of the cotton and injecting a little water will also prevent this unpleasant occurrence.

When several pledgets have been introduced it is a good plan to tie a knot in the string of the one to be withdrawn first, two knots in the second, and so on. Unless some distinction of this kind has been made the patient cannot know which string to draw first, and is apt to make traction on the uppermost pledget as on the lowest.

In the vast majority of cases of peri-uterine trouble and inflammation of the appendages the nearest point of approach to it in the vagina is the part posterior to the cervix. The nearer the medication can be applied to the seat of the disease the more efficacious it will be. The logical deduction of these premises is that the medicated tamponade in the vast majority of cases should be placed behind the cervix, as shown in Fig. 4971.

In spasmodic and inflammatory conditions of the bladder, in acute ovaritis, or in tenderness of the uterine ligaments, the tamponade frequently affords relief by supporting and steadying the uterus, even when it is in normal posture. The most common application of the tamponade as a pessary is that made to retain the uterus in a normal position when first reduced from a retrodisplacement. The uterus, under these circumstances, is apt to be tender, and the surrounding tissues are too sensitive to tolerate a hard pessary. Indeed, where the circumstances will permit, a cure can be attained much more readily by persevering with the tamponade than by resorting to a pessary.

When the retroverted uterus is bound down by adhesions, the frequent applications of the glycerin tamponade, by its pressure and alterative action, will produce a stretching and absorption of the adhesions, and gradually allow replacement of the organ.

In partial or complete prolapse of the uterus a large astringent tamponade will often give more relief than

any other support. If the vaginal and uterine supports are much relaxed, it may be necessary to retain the tamponade by a T-bandage. In rectocele and cystocele the tamponade is most serviceable. The astringent puckers up the vaginal walls, and ultimately restores their tone to a greater or less extent.

In 1878 Taliaferro, of Georgia, described a method of using the tamponade for the relief of subinvolution, areolar hyperplasia, descensus, and other dislocations of the uterus, with adhesions, chronic pelvic peritonitis, and cellulitis. His method simply introduced the element of pressure into the treatment already in use, thus stimulating circulation and hastening absorption in the same way that a snug roller bandage hastens the absorption of an exudation in the tissues of the leg. He places the patient in the knee-chest posture, and elevates the perineum with Sims' speculum. A few medicated pledgets are then packed into the fornix vaginae with long dressing forceps, and upon them a solid column of tightly packed loose balls of wool or cotton is built, down to the floor of the pelvis. This column is flat antero-posteriorly, but reaches from side to side the full width of the vagina; or it may be varied in shape to make pressure where most desired.

Various methods have been devised by which the patient might be enabled to apply the tamponade herself. These methods are all to a greater or less degree deficient. Few women have sufficient dexterity and knowledge of the parts to enable them to apply a tamponade, in their own vaginae, with any degree of efficiency, either through a special contrivance or a bivalve speculum. The idea is a delusion. If the tampon is to accomplish any beneficial results it must be applied carefully and intelligently, and with an eye single to the object to be accomplished in each individual case.

VIII. VAGINISMUS.—Vaginismus is a painful, involuntary, spasmodic contraction of the constrictor muscles of the vagina, firmly closing its canal and ostium. It may be due to structural changes in the hymen or the carunculae myrtiformes, contact with which, or even the fear of contact, causing such violent contraction that coitus is precluded and even a digital examination becomes impossible unless the patient is anesthetized. In such cases it is difficult to locate the source of the spasm. It is common in young, nervous, or hysterical women and is wont to declare itself at the first consummation of the marital rights; or it may develop during one of the following attempts at intercourse, being then due, in all probability, to the inflamed and sensitive state of the remnants of the hymen. It is produced sometimes by an irritable spot in the fossa navicularis, by urethral caruncles, by a vaginal or anal fissure, by the presence of an ulcer in the vagina, or by uterine or ovarian disease. Change of position in bed or washing of the genitals may cause an attack of vaginismus; it may also result from a lascivious dream, the patient awaking in pain from the spasm. In extreme cases convulsions and syncope may follow persistent attempts at coitus; and, on the other hand, nervous irritation with slight spasm may be induced by association with an impotent or partly impotent man.

In most cases the subjects of the disease are women who have been recently married, or women in whom, although perhaps married for several years, sexual intercourse has never been accomplished. In some instances, however, vaginismus first occurs after coitus has been enjoyed freely for months or even years, the symptom suddenly developing in consequence of an infection with gonorrhœa.

Sterility is almost the invariable result of vaginismus, and yet a few cases have been reported in which impregnation occurred without intromission.

In vaginismus superior—so called by Hildebrandt—the contraction occurs at some distance above the vaginal entrance, a sort of hour-glass contraction. In a few instances the contraction is voluntary; that is, the woman at will can prevent complete introduction of the penis, or, after it has entered, she can grasp and retain the or-

gan. Hildebrandt narrates the case of a woman in whom this power was developed to such a degree that she was able voluntarily to grasp the penis below the glans so firmly as to make its withdrawal impossible. The levator ani was the constricting muscle.

The diagnosis of vaginismus is not difficult. The labia majora and minora may be gently drawn apart, but the

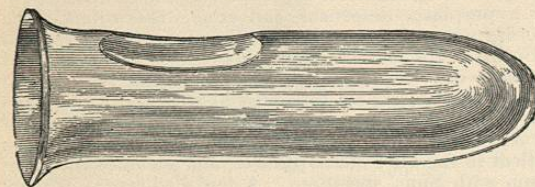


FIG. 4972.—Sims Glass Vaginal Dilator or Plug.

moment an effort is made to pass the finger into the vagina the pain, the spasm, and the wriggling of the patient may forbid any further examination without an anæsthetic. If the finger should overcome the resistance and find entrance, it may be so tightly grasped by the contracting muscles as to be benumbed. Frequently the patient is so hysterical that it is useless to make any attempt at an examination without the aid of an anæsthetic. As a rule, the anæsthesia must be very profound to permit of a thorough examination. In such cases it is best not to undertake the examination until arrangements have been made for operative interference, if such should prove to be necessary.

The treatment of vaginismus consists in absolute rest of the genital organs, all attempts at coitus being strictly forbidden. The hyperæsthesia of the parts may in some cases be relieved by hot sitz-baths or by applications of nitrate of silver (ten grains to the ounce), of a solution of chloral (four per cent.), or of carbolic acid (1 in 40). A four-per-cent. solution of cocaine is generally effective, but it must be used with caution. Ointments of belladonna or ichthyol sometimes afford relief. In fissure of the vagina or anus the base must be divided or touched with the thermo-cautery. Ulcers should receive appropriate attention, urethral caruncles removed, and irritable caruncula myrtiformes snipped off. It may be necessary in some instances to excise the entire hymen and adjacent tissue. The edges of the wound thus made are then stitched with chromicized gut to secure primary union. As a matter of course an anæsthetic is necessary. In fissure of the neck of the bladder the urethra should be dilated to an extreme degree, the base of the fissure touched with a pencil of nitrate of silver or with the actual cautery, and a self-retaining catheter applied and left open for continuous drainage. In cases of obstinate spasm it becomes necessary to dilate the ostium vaginae and its canal beyond the constrictor muscle. Such dilatation may be forcible and abrupt or gradual. The former is accomplished by introducing the thumbs into the vagina, the patient being anæsthetized, and separating the vaginal walls until the resistance is overcome by the rupture of some of the underlying structures, of which the most important is the sphincter vaginae. Another method is to use a bivalve or trivalve or quadrivalve speculum as a dilator. The instrument is introduced closed into the vagina and then, after the blades have been opened, it is forcibly withdrawn.

Gradual dilatation without anæsthesia may be accom-

plished in many cases by means of the Sims glass plug or dilator (Fig. 4972). The parts are benumbed by the application of cocaine and the dilator is introduced. It is retained for an hour night and morning. The pain caused by its introduction soon ceases and may be mitigated by anointing the plug before introduction with a medicated ointment. The presence of the plug helps to obtund the sensibility. Day by day an instrument of larger size may be substituted until the vagina is overstretched.

When the dilator cannot be borne by the patient, an operation is the only recourse. With the patient anæsthetized the surgeon introduces two fingers of the left hand into the vagina and then firmly stretches the parts. With the scalpel he next makes an oblique incision about two inches long through the vaginal tissue on each side, extending from half an inch inside the ostium to the raphe of the perineum. More pressure is then made to distend further the vagina. Finally, the vagina is firmly packed with sterile gauze and a T-binder applied. Should there be little or no hemorrhage, the glass plug may be inserted at once; otherwise the gauze is left in place until the following day when it is removed and the glass dilator substituted. This instrument is then to be worn for a short time every day for several weeks, *i. e.*, during the healing of the wounds. The constitutional treatment, which should always accompany the local measures, consists in tonics of arsenic, strychnine, and glycerophosphates, in outdoor exercise, and in change of scene. Complete sexual rest should be enjoined.

J. Riddle Goffe.

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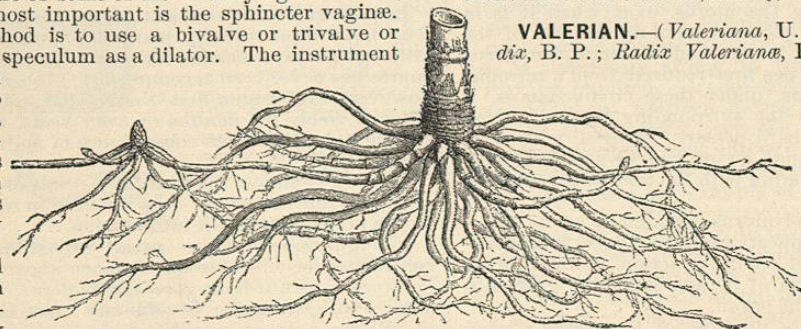


FIG. 4973.—Valerian Rhizome and Roots, about two-thirds natural size.

VALERIAN.—(*Valeriana*, U. S. P.; *Valeriana Radix*, B. P.; *Radix Valeriana*, P. G.) The dried rhizome and roots of *Valeriana officinalis* L. (fam. *Valerianaceae*).

This perennial herb, native of the temperate parts of Europe and Asia, is a familiar object in our gardens, where it is grown partly as an ornament, partly for medicinal purposes. It is largely grown as

a drug in England, Holland, and other parts of Europe, though the product of wild plants is said to be superior. It should be collected and dried in the autumn. The rhizome is from 2 to 4 cm. (about 1 to 1.5 in.) long, and 1 to 2 cm. (about 0.5 to nearly 1 in.) thick, upright, subglobose or obconical, truncate at both ends, light-brown or yellowish-brown, internally whitish or pale-brownish, with a narrow circle of white wood under the thin bark; roots numerous, rather coarse, brittle, brown, with a thick bark and slender, ligneous cord; odor peculiar, becoming stronger and unpleasant on keeping; taste camphoraceous and somewhat bitter.

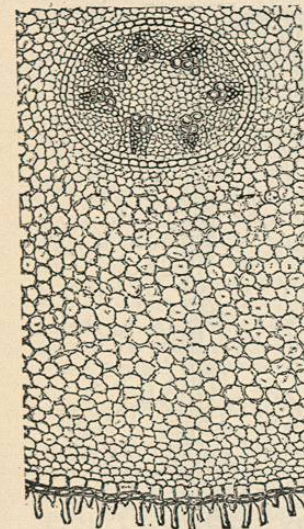


FIG. 4974.—Cross Section of Valerian Root. (Baillon.)

Small, stunted rhizomes, grown upon dry, stony soil, are commonly superior to those of finer appearance.

The important constituents of valerian are: from one-half to two per cent. of volatile oil, and variable amounts of valerianic acid, of a camphor-like body very similar to borneol, and of resin. Both the volatile oil and the resin are mixtures, containing the camphor and valerianic acid. The oil consists chiefly of the terpene *valerin*. The proportion of these different substances varies greatly,

according to the age of the drug after collection, the percentage of the oil thus usually decreasing, that of valerianic acid increasing.

Oil of valerian suitable for medical use is described in the Pharmacopœia as follows: "A greenish, or yellowish, thin liquid, becoming darker and thicker by age and exposure to air, having the characteristic odor of valerian, an aromatic, somewhat camphoraceous taste, and a slightly acid reaction. Specific gravity about 0.950. It is readily soluble in alcohol." Valerianic acid is also liquid, but thicker than the oil, colorless, of a strong valerian-like, but also sour and cheesy, odor, and a sour, burning taste. It is an active acid, forming salts with the metals and alkaloids, several of which are in use.

The intoxicating action of valerian on cats, which seem to have an irresistible craving for it, is well known. In very large doses, several drachms several times a day, it may produce, in man, dizziness, disturbance of vision, hallucinations, or active delirium. Nausea and vomiting are also likely to occur from such doses. It appears to be eliminated by the kidneys, which it stimulates slightly.

Its medicinal action is that of an antispasmodic, like musk, asafetida, chamomile, lavender, etc., as well as ether and the bromides. Like most essential oils, it is also a general and digestive stimulant in moderate doses.

Valerian is frequently given to patients suffering from emotional unbalance, hysterical and "nervous" (in the popular sense) disturbances, headaches, and other pains due to the same causes, as well as wakefulness, with considerable benefit. It is also given in some more serious and obstinate diseases, as chorea or epilepsy, especially petit mal, with occasional benefit.

The most advantageous way of employing valerian is to give either one of the galenic preparations of the drug, or the oil.

The dose of the root is 1-2 gm. (gr. xv.-xxx.), of the official fluid extract an equal number of cubic centimetres or of minims. There is also an official tincture,

strength one-fifth, and an ammoniated tincture, of the same strength in aromatic spirit of ammonia.

Henry H. Rusby.

VALERIANIC OR VALERIC ACID ($\text{HC}_2\text{H}_5\text{O}_2$).—Valerianic acid is the active constituent of valerian, whence it was first obtained for study. It is also the chief active constituent of cyripedium, and is found in various other aromatic drugs, such as angelica. Besides these natural sources, it is readily obtained by the chemical change of many organic substances, and is very largely manufactured by the oxidation of amylic alcohol with bichromate of potassium. Thus we have in the market a natural and an artificial acid. The natural acid is obtained by the distillation of valerian with water. The distillate is a mixture of volatile oil of valerian and valerianic acid, and a portion of the oil can be converted into the acid. This acid is divisible into the normal valeric and the iso-valeric acids. The artificial acid produced from amylic alcohol is combined with sodium, from which it is then freed by sulphuric acid. This form is therefore more prone to impurity. If strictly pure, it is the practical equivalent of the natural acid. Valerianic acid occurs as a colorless, transparent, thin, oily, volatile, combustible liquid, with a strong odor, much like that of valerian, and an acrid, burning taste. It is soluble in both alcohol and water, the artificial pure iso-acid being much less soluble in water. The specific gravity of the pure natural acid is 0.940. Acetic acid has been used as an adulterant.

Valerianic acid shares the antispasmodic properties of oil of valerian, but is usually distinctly inferior to it. Its stimulating effect is spurious, it being distinctly weakening. It is capable of poisoning by cardiac and respiratory paralysis, the latter indicated by convulsions. It is used in hysteria and mania, in doses of three to ten minims. It is largely used for the administration of certain bases in the form of valerianates, and the valerianates of ammonium, quinine, iron, and zinc are official.

Henry H. Rusby.

VALERIDIN.—A synonym for sedatin (*q. v.*).

VALIDOL, menthol valerianate, a menthol ester of valerianic acid, is a clear oily liquid of mild aromatic odor and a not unpleasant cooling taste. It contains about thirty per cent. of menthol.

Neustatter gave the remedy in five cases of scintillating scotoma, with prompt disappearance of the flashing and the accompanying headache. Cipriani has employed it as an expectorant in bronchitis, as an anti-emetic in the vomiting of tuberculosis, and in pharyngeal or nasal catarrh as a spray or local application.

Goldmann recommends it in the treatment of nervous headache, migraine, neuralgia, and neurasthenia, and as a stimulating stomachic. Applied externally in hemicrania and such conditions, it exerts a sedative and analgesic action. Dose ten to thirty drops on sugar or in capsule.

W. A. Bastedo.

VANILLA.—U. S. P. (*Fructus Vanilla*, P. G.) The fruit of *Vanilla planifolia* Andrews (fam. *Orchidaceae*) peculiarly cured and dried.

The vanilla plant is an epiphytic climber, with fleshy stems and foliage, native of the forest regions of eastern Mexico. It is very extensively cultivated there, as well as in many parts of the Old-World tropics. As grown in these different regions it exhibits distinct varieties, and the products differ considerably in quality and in commercial value. The Mexican variety is still generally preferred in the United States, but the Bourbon article, as improved during recent years, is fast overtaking it in popular estimation.

Natural pollination of the flowers is so scanty that artificial pollination by hand labor is an important industry. Green vanilla fruits are very similar in appearance to green bananas, but relatively only about one-third as stout. They are gathered just when they begin to turn yellow. If left longer, they are apt to split at the