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MANUAL

OF

GYNECOLOGY

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CHAPTER X.

VAGINAL SPECULA.

LITERATURE.

Barnes—Op. cit. *Goodell*—Op. cit. *Hart*—Structural Anatomy, op. cit. *Mundé*—Op. cit. *Sims, J. Marion*—Clinical Notes on Uterine Surgery: Hardwicke & Co., London, 1866. *Thomas*—Op. cit.

We have already seen that the segments of the pelvic floor are separable when a woman assumes certain postures; that the sacral segment can be hooked up, and that by this means we get a view of the vaginal boundaries of these segments and of the os uteri. This is the natural method of opening up the pelvic floor; or the natural specular method.

Gynecologists had used various instruments for enabling them to look into the vagina; but all of these proved unsatisfactory until Marion Sims, noting the natural postural dilatation of the vagina, introduced his famous duckbill speculum.

We take up the consideration of four typical specula, viz.:—

1. The duckbill, or Sims speculum,
2. The tubular, or Fergusson speculum.
3. The Neugebauer and its modifications,
4. The bivalve of Cusco.

We note under each its nature, the method of employing it, and the theory of its action and uses.

1. The Sims or DUCKBILL SPECULUM is shown at Figs. 80, 81, and Plate V.

Its Nature.—Each instrument in reality consists of *two specula*, which are of different size and connected by a handle; usually, however, we speak of these specula as the *blades* of the *speculum*. The real Sims' speculum is light, has each blade slightly concave on its anterior aspect, and has the blades at *right* angles to the intermediate handle.

Modifications of Sims' speculum are numerous. Indeed it seems difficult for gynecologists to resist modifying an instrument, and very rare

to find them improving it. The most widely known modification is Bozeman's; it is heavier than Sims', has the blades meeting the handle at an acute angle, and the blades more concave on the anterior aspect. (Figs. 81 and 82.)

One curious fact about almost all specula is, that they are too long.

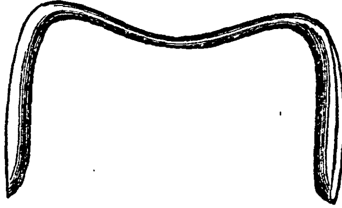

Fig. 80.
Sims' speculum.

Sims' blade is 4 inches long, though the posterior vaginal wall measures only $3\frac{1}{2}$ inches. Thus, as we wish to expose only the anterior vaginal wall and cervix uteri, a 3-inch length of blade is sufficient.

A modification of Sims' speculum, by Dr. Battey of Georgia, is worthy

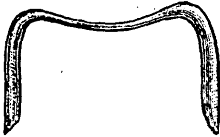

Fig. 81.
Sims' speculum.

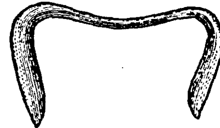

Fig. 82.
Sims' speculum modified by Bozeman.

of note. It has one short blade which meets the handle at a more acute angle. (Fig. 83.)

The Method of employing Sims' Speculum.—Under this it is important

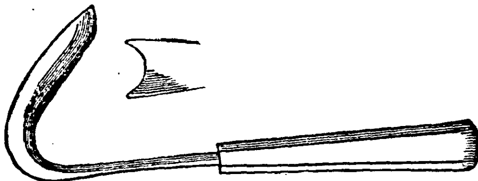

Fig. 83.
Battey's speculum.

to note: (*a*) How to place the patient, (*b*) How to pass the speculum, and (*c*) How to hold it when passed.

(*a*.) *How to place the Patient.*—The patient must be placed in the Sims

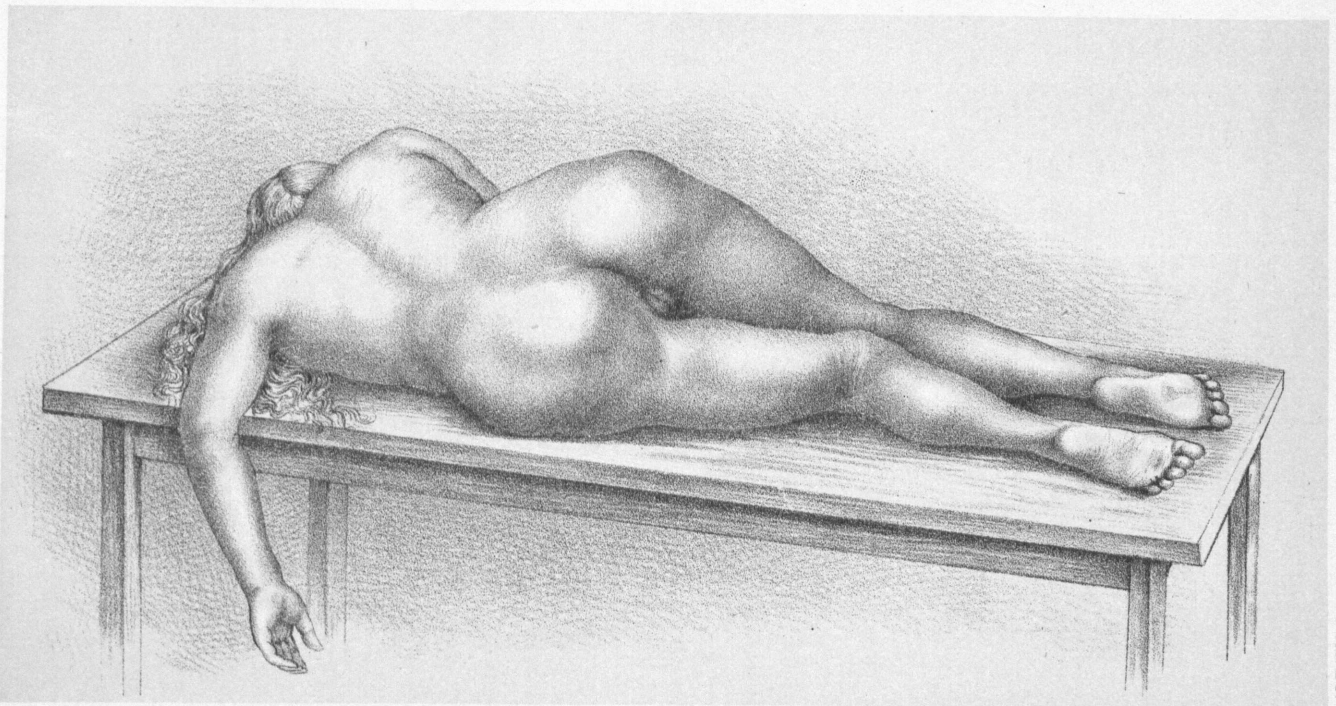

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PLATE IV — FEMALE CADAVER IN SEMI-PRONE POSTURE (DRAWN FROM NATURE.)

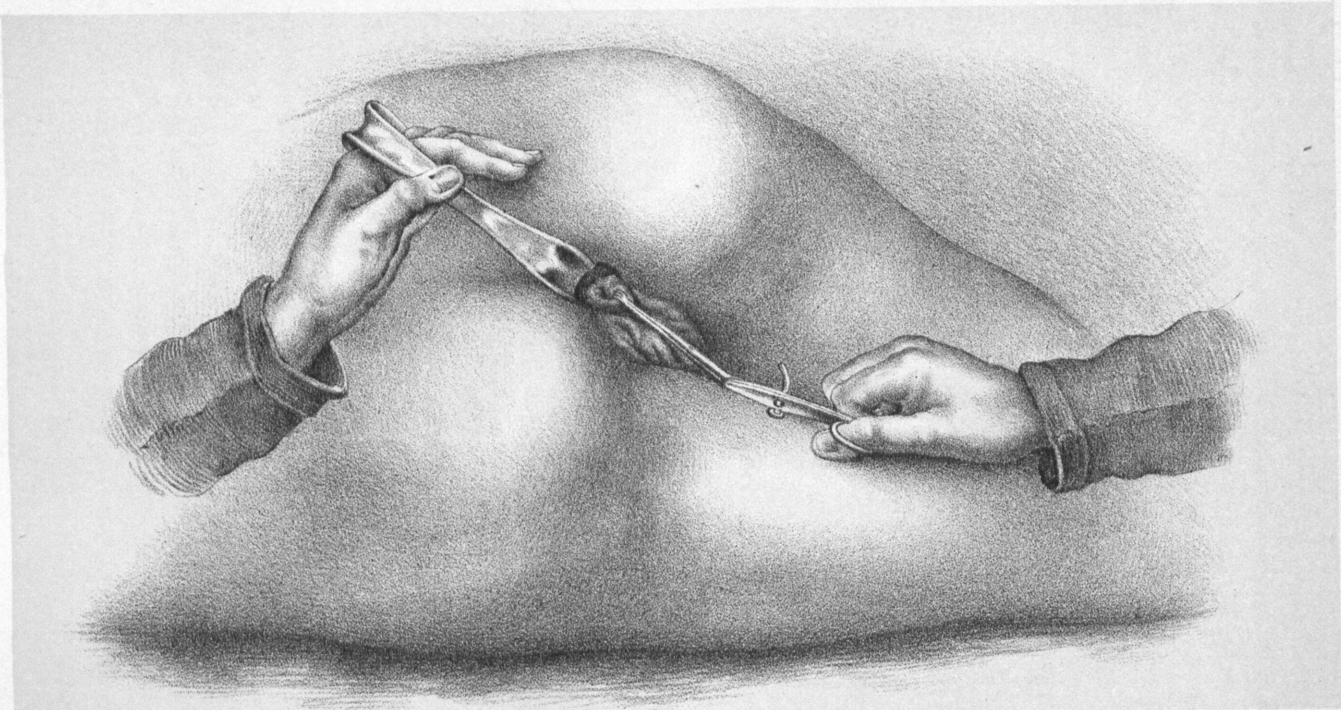

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PLATE V — FEMALE CADAVER IN SEMI-PRONE POSTURE, WITH SIMS' SPECULUM PASSED, AND UTERUS DRAWN DOWN WITH A VOLSELLA.

or in the semiprone posture. This is briefly as follows. The patient lies almost on the breast: *the lower left arm is over the edge of the couch* next the gynecologist: the hips are close to the edge: the knees are well drawn up; and *the upper or right knee touches the couch with its inner aspect.* The posterior aspect of the sacrum is therefore oblique to the horizon. (Plate IV.)

As the result of this posture—a modified genu-pectoral one—the vaginal walls separate when air is admitted; the pubic segment passing down with the viscera, the sacral one remaining behind.

(*b.*) *How to pass the Speculum.*—Choose the blade which is of the proper size to pass the vaginal orifice; warm it, and oil it with the fingers on its convex aspect only. The concave surface must be dry to reflect light, and therefore the speculum should never be oiled by dipping it. Hold it by

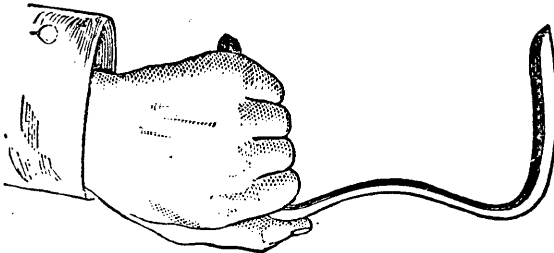

Fig. 84.
One method of holding Sims' speculum.

the other blade in the left hand, as shown at Fig. 84. Then pass the index and middle fingers of the right hand into the vagina to separate the labia; carry in the speculum between them; push it onwards, following the curve of the posterior vaginal wall, until the beak of the instrument lies on the posterior fornix. Now draw the instrument back as a whole, in a direction at right angles to the posterior vaginal wall; then turn the beak forwards, so as to bring the cervix more into view. Finally tilt the blade, so that the beak lies on a lower level than the proximal end of the blade: this keeps up the upper labium.

(*c.*) *How to hold the Speculum when passed.*—Plate V. shows the speculum passed, and a convenient way of holding it. When passed, the cervix may be drawn down with a volsella (also shown in Plate V.). Various attempts have been made to add to the Sims speculum a means of rendering it self-sustaining; the majority of these are by no means successful, and therefore we need not describe what is seldom used. The knowledge

of a simple method of effecting this in Battey's speculum is of use. This has a piece of indiarubber, with a hook at the end attached to the handle, which can be fastened in the pillow, sheet, or patient's dress; the cervix is drawn down with a volsella held in one hand, leaving the other free for minor manipulation.

Theory of Action and Uses of the Sims Speculum.—The Sims speculum is based on the effects consequent on the genu-pectoral posture. When the patient is semiprone and the vaginal orifice opened, the segments of the pelvic floor separate; and then the Sims speculum is a simple means of hooking the sacral segment well back.

The Sims speculum is, on the whole, by far the most useful speculum. It is difficult to manipulate at first, but amply repays practice. Its discovery has been one of the greatest strides in gynecology. In vaginal and cervical operative surgery, it is the only speculum that can be used.

2. The Fergusson Speculum is seen at Fig. 85. It is made in three

Fig. 85.
Fergusson speculum.

suitable sizes; and may be described as a glass tube, with a proximal trumpet and a distal bevelled end. It is made of glass silvered internally and coated on the outside with caoutchouc. The bevelling of the distal end makes a shorter anterior side and a longer posterior one. The maker's name is usually placed at the trumpet end just at the foot of the anterior side, and serves to indicate that side when the speculum is in the vagina.

Mode of Employment of the Fergusson Speculum.—The patient lies in the left lateral position with hips raised. Warm the speculum, and oil it

on the outside. Take it by the trumpet end with the right hand and pass it into the vaginal orifice previously opened up by index and middle fingers of the left; now push it in, short side to the front, until arrested. By looking along it, the practitioner can note if the cervix is in view. It is generally not so, but may be snared by the following manœuvres; carry the trumpet end well back towards the perineum and then depress the distal end first to the left and then to the right, finally turning it round if these fail. In multiparæ with lax vaginæ it is easy to pass the Fergusson; but it is more difficult in nulliparæ.

The Fergusson is a favorite speculum with many. It is useless in

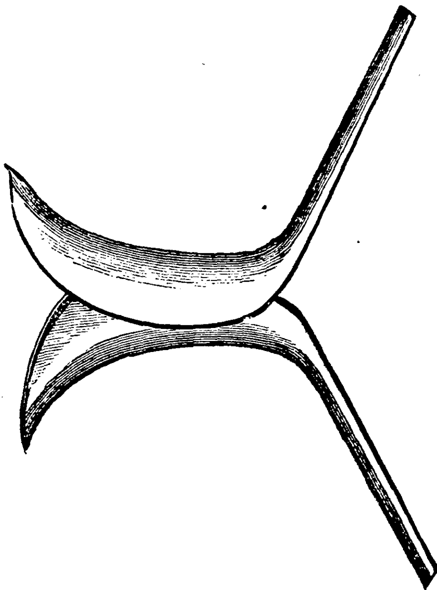

Fig. 86.
Neugebauer's speculum when passed.

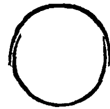

Fig. 87.
Cross section showing relation of blades; the upper is posterior.

vaginal and cervical surgery, but with it applications to the cervix can be made very well and easily. When used for making applications to the endometrium, it is advisable to pull the cervix well down with a volsella after the speculum is passed, and to use a straight sound covered with cotton wool.

3. The NEUGEBAUER is like a Sims speculum divided transversely at the middle of the handle (Fig. 86). It is also made in suitable sizes.

Mode of Employment.—Warm and oil *two* blades. Introduce one blade (the broader one) with its convexity touching the posterior vaginal wall.

Then introduce the other with its convexity touching the anterior vaginal wall and so that its edges fit within the edges of the posterior vaginal

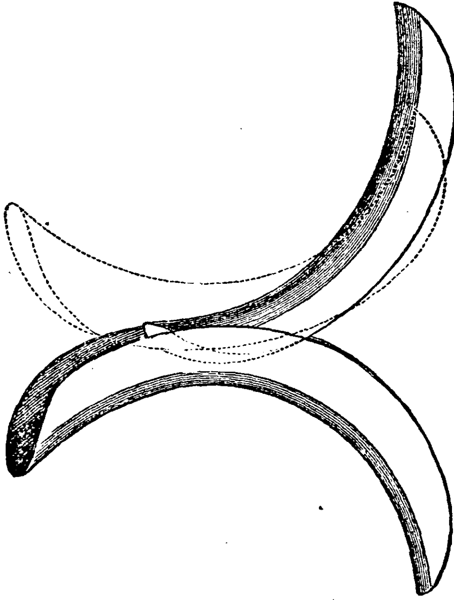

Fig. 88.
Barnes' crescent speculum.

wall blade (Fig. 87). The beak of the posterior blade is thus in the posterior fornix; that of the anterior blade in the anterior fornix. From

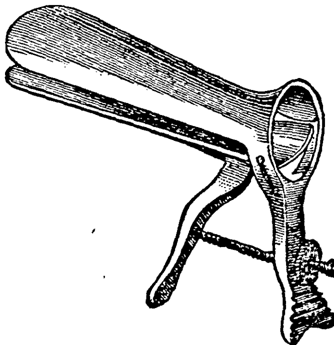

Fig. 89.
Cusco's speculum.

their contact a leverage is obtained on separating the handles, by which traction is made on the fornices and the cervical canal more or less everted.

Fig. 88 shows a useful modification of this by Barnes, known as the Crescent speculum.

The Neugebauer and Crescent specula are useful in making cervical and endometric applications, and are better specula than the Fergusson.

4. The Cusco or Bivalve speculum is shown at Fig. 89. It is composed of two blades jointed on to one another at their bases. The blades are opened to the desired distance by pressure on the thumb-piece and kept open by a screw. It is introduced with its blades right and left and then turned so that they lie anterior and posterior, that with the screw being posterior. It is then pushed onwards, and the blades opened and fixed by the screw.

Care should be taken not to catch any of the perineal hairs in the screw; and, in withdrawing it, not to pinch up the vaginal walls.

The Cusco speculum is self-retaining and useful in cervical and endometric applications.

If the patient be placed in the genu-pectoral or semiprone posture, the posterior vaginal wall hooked back with the finger and the cervix drawn down with a volsella, a useful view can be obtained without the aid of any speculum.

USES AND COMPARATIVE VALUE OF THE VARIOUS SPECULA.

The Sims is undoubtedly the best and most scientific speculum we possess. When properly used and aided by the volsella, it leaves nothing to be desired. For operative cases its use is imperative; and it is the only speculum which does not distort the split cervix. It is objected by some—on insufficient grounds—that it is difficult to manipulate, requires a skilled assistant, and exposes the patient unduly.

The Fergusson is easily passed, involves only slight exposure, and is good in very minor gynecology. It gives only a limited view of the vaginal walls. The student should note that it brings the flaps of a split cervix together and somewhat conceals the lesion.

The Neugebauer, on the other hand, opens up the cervical split, and may do this so effectually as to give the impression that there is none. The Fergusson, Cusco, and Neugebauer are all *self-retaining.*

CHAPTER XII.

THE SPONGE TENT AND OTHER UTERINE DILATORS.

LITERATURE.

Simpson, J. Y.—Op. cit. *Sims, J. M.*—Op. cit. *Landau*—Ueber Erweiterungsmittel der Gebärmutter: Volkmann's Sammlung No. 187. *Mundé*—Op. cit.

HITHERTO we have considered only the means which have placed the vagina and cervix within range of digital examination. In this section we take up the methods by which we get digital examinations of the uterine cavity—methods of the highest practical value, which, like the sound, we owe to the genius of Sir James Simpson.

We therefore consider—

I. *Means of slowly dilating the Cervical Canal by Sponge Tents, Tangle Tents, Tupelo Tents;*

II. *Means of slowly dilating the Cervical Canal by graduated hard rubber Dilators—Tait's, Hank's;*

III. *Means of dilating the Cervical Canal by incision and screw Dilators;* this last will be described under Sims', operation for pathological anteflexion.

Under each we take up.—

1. Material or instrument,
2. Purposes for which used,
3. Preliminaries to and method of use,
4. Dangers and contra-indications to use.

DILATATION BY SPONGE, TANGLE, AND TUPELO TENTS.

1. *Material.*—The sponge tent is a cone of good, unbroken, thoroughly dried sponge, impregnated with some antiseptic and then firmly compressed into small transverse bulk, its original length being preserved. When thus prepared and placed under conditions where it can absorb

moisture, it swells up and in thus expanding dilates any dilatable structure which may grasp it.

Good sponge tents of various sizes may be had from all chemists. In order to prevent the antiseptic from volatilizing, the sponge tents are covered with grease. They are provided with a tape at the base to aid their extraction from the cervix after use.

Tents are also made from the ordinary sea tangle (laminaria digitata) (Fig. 98) and from tupelo wood (nyssa aquatilis). It is alleged that the

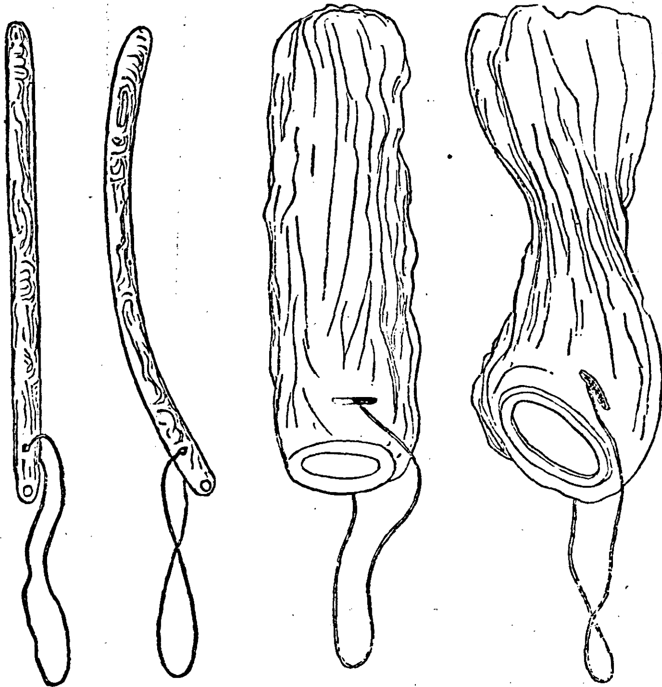

Fig. 98.

Shows on the left a straight and a curved laminaria tent and on the right these tents after expansion. Note how one has been gripped by the os internum (Mundé).

tupelo extends more rapidly than either tangle or sponge. Fig. 99 shows its power in this respect. Tangle tents may be had hollow; this facilitates the imbibition of moisture but weakens their expanding powers.

2. *Purposes for which used.*—Sponge tents are used as follows:

(1.) To restrain hemorrhage in cases of abortion and at the same time dilate the cervix for further interference ;

(2.) To dilate the cervix and uterine cavity and enable the practitioner to ascertain and remove the cause of pathological uterine hemorrhage, whether due to endometritis, sarcomata, polypi, or incomplete abortion;

Fig. 99.

Diagram to show relations between size of tupelo tent, before and after expansion. The dotted outside line indicates the size of the tent after expansion (Mundé).

(3.) To correct pathological flexions of the uterus, to dilate a stenosed cervix.

Tangle and Tupelo tents have the same scope as the sponge tent.

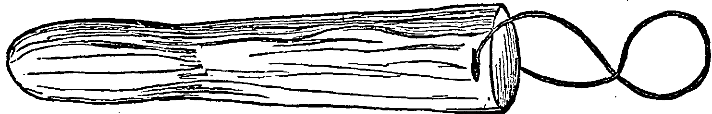

Fig. 100.

Expanded tupelo tent with constriction at os internum (Mundé).

These do not, however, expand so well and thoroughly. Their special advantages are due to their smaller size, and the fact that several may be passed into the same cervix. They are specially useful, therefore, in

cases of narrow cervix and flexions Tupelo tents are highly praised by Landau and Mundé, but are still on trial.

3. *Preliminaries to and Method of Use.*—Tents should not be passed during an ordinary menstrual period, although they often require to be used when pathological bleeding is going on. They should always be passed at the patient's own house ; and she should be kept strictly in bed during their use, and for some time after. Before their use, the vagina should be thoroughly washed out with warm carbolic lotion (1–40). Schultze, in passing tangle tents for flexions, first ascertains the uterine curve with the sound ; if blood follows its use, he postpones the introduc-

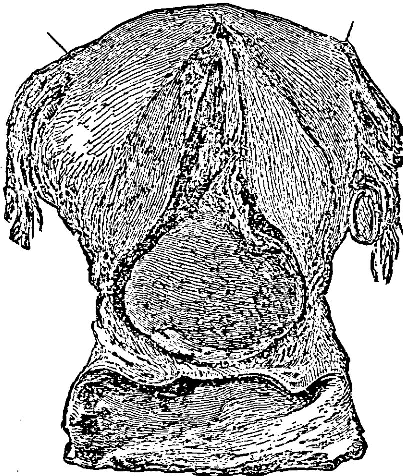

Fig. 101.

Sponge tent polypus of Sir James Simpson ($^1/_1$). The figure shows a drawing of the uterus, which contained a polypus—obtained from a patient of Sir James Simpson's, who died from the hemorrhage it caused. It was this preparation which suggested to him the sponge tent.

tion of the tent for forty-eight hours, in the meantime applying pure carbolic acid to the endometrium. Before using the sponge tent it is advisable to remove most of the grease covering it.

Sponge tents may be passed in various ways.

(1.) The patient is placed in the genu-facial, or better, in the semiprone posture. Sims' speculum is passed, the anterior lip of the cervix laid hold of with a volsella and drawn down. The sponge or tangle tent, held in forceps, can then be passed into the cervix (Fig. 102).

(2.) The tent is fixed on the spike of an appropriate instrument and is then passed just as the uterine sound ; *i.e.*, with the patient placed in the left lateral position, the index and middle fingers carried into the

vagina and placed on the anterior lip of the cervix. The tent, fixed on the spike, is passed along these fingers and its point made to enter the cervix. The handle is then rotated and carried to the perineum.

(3.) The patient is placed on her left side and athwart the bed. Pass the volsella, draw the anterior lip of the cervix down. The volsella is not always needed. Place the tent between the index and middle fingers of the left hand with the thumb at its base, carry these fingers into the vagina

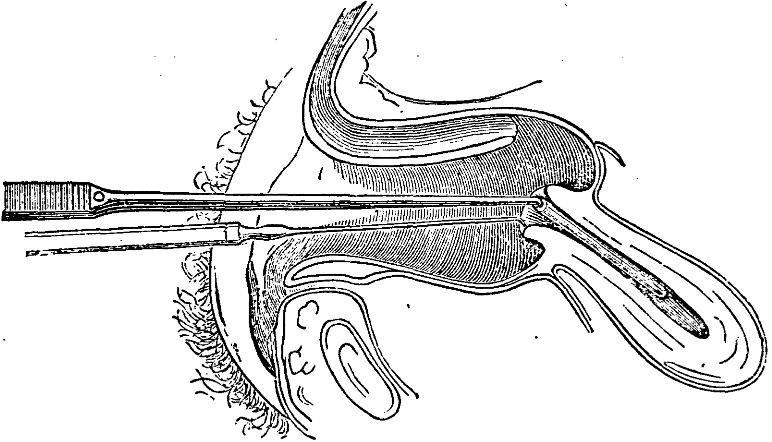

Fig. 102.

Sims' diagram illustrating passage of tangle tent. Patient is semiprone, Sims' speculum passed, and cervix steadied with tenaculum. The tent is passed with forceps.

with their dorsum on the posterior vaginal wall, make the point of the tent enter the cervix and push it on with the thumb.

Another way is to use the volsella as above described, but to fasten it to the bed. Then pass Sims' speculum, holding it with the left hand, so that the tent held in the right hand can be passed into the cervix just as one would thread a darning needle.

Tangle and Tupelo Tents.—The same instructions as for sponge tents hold good. Tangle tents, however, when used to correct flexions must first be moulded as follows: Ascertain the curve of the uterus by bimanual and sound, select a suitable tent and dip it for a few seconds in boiling water, then mould it to uterine curve and pass it as already explained.

Tents require to be left in the cervix for a period varying from 12 to 15 hours, and the vagina should be frequently douched with carbolic lotion

during this time. At the end of this period the tent requires to be removed. During the removal no great force should be used. Sometimes the removal is difficult, owing to constriction by the os internum or irregularities in the mucous membrane.

The cervix is generally now sufficiently dilated to admit of digital examination of the endometrium. If not, another tent should be employed.

4. *Dangers of Sponge and Tangle Tents and Contra-indications.*—The practitioner must keep prominently before him that the use of a tent may prove by no means a harmless measure. Cases of death from septicæmia after the careful and proper use of *one* tent have occurred. The patient runs a risk proportionate to the number used; and, therefore, it is not advisable to use more than two consecutively unless under special circumstances. They are not to be used if acute or subacute pelvic inflammation, ovaritis (acute or chronic), carcinoma cervicis, or pelvic hæmatocele be present.

The reason why sponge tents may prove dangerous is only too apparent. The uterine mucous membrane is a lymphatic surface absorbing

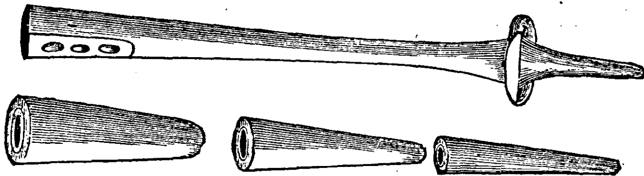

Fig. 103.
Tait's dilators.

most rapidly. We cannot insert sponge tents with Listerian precautions; and in addition we have the expanding pressure of the tent forcing septic matter into the mucous membrane. Thus it is quite evident that the consecutive use of two or more sponge tents is dangerous.

To sum up briefly, tents are highly useful in necessary cases—no means at the disposal of the gynecologist gives him in proper cases such valuable help; but he should not forget the risks occasionally arising from their use —risks which should make him cautious but not timid.

DILATATION BY GRADUATED HARD RUBBER DILATORS—TAIT'S, HANK'S.

Tait's dilators consist of graduated vulcanite cones (Fig. 103) which can be screwed into a suitable handle. The proximal end of the handle is

perforated for elastic bands which, passing in front and behind, are attached to a suitable belt around the patient's waist. Thus the elasticity of the India-rubber causes the cone gradually to pass up into the cervix, dilating it as it goes. By this apparatus, Tait claims to avoid septic infection and to dilate rapidly.

The obvious objection to this apparatus is the amount of watching it entails and the absence of the pelvic curve on the handle.

In cases, chiefly of abortion, where the os is dilatable, Hank's dilators

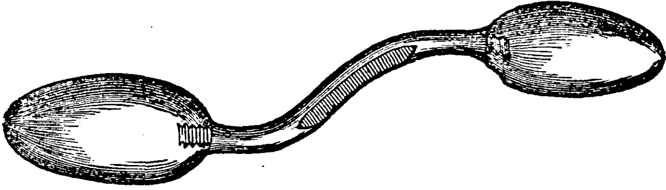

Fig. 104.

Hank's dilator. ($^1/_1$)

seem serviceable. They have the oval shape seen at Fig. 104, are graduated in size and screw into the sigmoid handle. They can be used manually to dilate the cervix until the fingers can be passed through.

CHAPTER XIII

THE CURETTE.

LITERATURE.

Mundé—The Dull Wire Curette in Gynecological Practice: Ed. Med. Jour., XXIII., p. 819. *Noeggerath*—Am. J. of Obst., IV., p. 3. *Recamier*—Memoire sur les Productions Fibreuses et les Fongosités Intrauterines: Univ. Med., 1850. *Sims, J. Marion*—Clinical Notes on Uterine Surgery: London. *Simon*—Die Auslöffelung breitbasiger weicher sarkomatöser und carcinomatöser Geschwülste aus Körperhöhlen: Beiträge zur Geburtshülfe von der Gesellschaft in Berlin, 1872. *Thomas*—Op. cit.

The curette is an instrument, provided with a cutting or with a dull edge, which can be introduced into the uterine cavity previously dilated by tents (although this is not always necessary) for the purpose of scraping off or removing abnormal endometric granulations, sarcoma of the mucous membrane, carcinoma of the cervix, or the remains of an incomplete abortion. This instrument has had a somewhat chequered career. Originally introduced by Recamier, whose instrument was stiff and sharp, it did good work in some cases, but fell into disrepute, undoubtedly deserved, after the record of certain instances where its use had caused perforation of the uterus. Marion Sims and Simon recommend a modified instrument which, owing to its stiff unyielding nature, has found little favour with the pro-

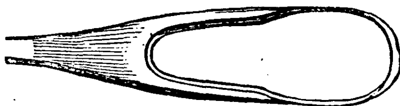

Fig. 105.

Loop of Recamier's curette.

fession. Thomas then introduced his flexible dull wire curette, which, popularised by Mundé in an able article, has taken its place in the gynecologist's armamentarium as a useful instrument, to whose employment there is attached no more risk than attends most intrauterine manipulations.

There are four varieties of curette—(1.) Recamier's (Fig. 105); (2.) Simon's (Fig. 106); (3.) Thomas' (Fig. 107); (4.) Sims' (Fig. 108).

Thomas' instrument is 9 inches long, and has a handle 3½ inches long. The metal portion (5½" long) is made of soft copper wire, $\frac{1}{6}$ inch thick near the handle, and $\frac{1}{12}$ inch thick half an inch from the end, where it forms a loop (Fig. 107) flattened on the scraping edge. Russell Simpson,

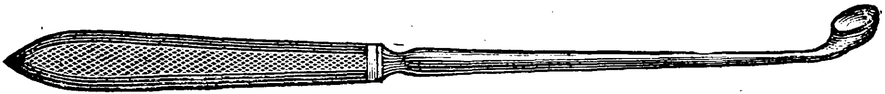

Fig. 106.
Simon's spoon. (⅔)

Fig. 107.
Thomas' dull wire curette, with knob added by Russell Simpson. (⅓)

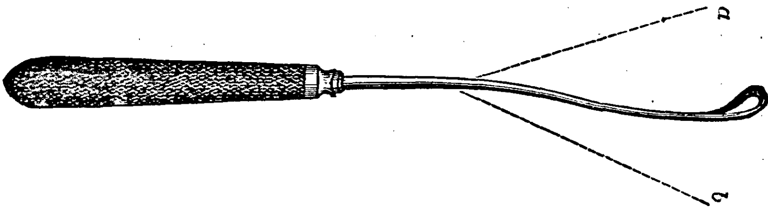

Fig. 108.
Sims' curette, with flexible shank: *a* and *b*, extent of flexibility.

of Edinburgh, has modified it usefully by adding a knob 2½ inches from the point. This enables one to use it with more precision.

Cases in which the Curette is useful.—Recamier's is useful in the same class of cases as Thomas'. Simon's is specially good in carcinomatous cervix, but not in endometric conditions. Thomas' is good in hyperplastic endometritis, sarcoma of the mucous membrane, and, above all, in incomplete abortion.

It is evident, from what has been said, that the curette aids immensely in intra-uterine diagnosis. By it portions of abnormal intra-uterine conditions can be removed and submitted to microscopic investigation.

How to use Thomas' Curette.—Place the patient semiprone, pass Sims' speculum and draw down cervix slightly with volsella. Then pass in the curette, curved if needed (no previous dilatation with tent being required), and gently pass it over the mucous membrane, pressing against

it while the loop is being brought down. Do this systematically over the whole anterior and posterior uterine surface, remembering its shape (Fig. 14, A).

Curetting may be done single-handed when the volsella and Battey's speculum are used, as described at p. 117; or in some cases Fergusson's speculum may be employed, and the cervix then drawn well down with the volsella.

After the curetting is finished, apply pure carbolic acid to the endometrium as given under endometritis.

Cautions and Dangers.—The same precautions should be used as given under sponge tents. The dangers have proved in the authors' hands slight, a minor attack of pelvic peritonitis being the worst.

eminent ovariotomists allege, therefore, that the spray at present considered necessary for Listerism is hurtful in all peritoneal operations; and that it causes, for the reason already given, high temperatures and kidney complications. This has not been absolutely proved, but is worthy of the careful attention of all operators. Even if sustained, it does not invalidate the high claims of Listerism on general surgery.

During perineal, vaginal, and cervical operations the use of the *douche* is invaluable. For this purpose a large douche apparatus filled with carbolic lotion, 1–40, with long indiarubber tube and small narrow nozzle is employed. It is placed somewhat above the level of the part to be operated on, and under the charge of an assistant plays a small jet on the surface. Apart from its valuable antiseptic action, it clears away blood from the cut surfaces, enables the operator to pare the fistular edges very exactly, and altogether is a most valuable help. It can be suitably warmed; and the excess of fluid flows into any receptacle, such as a foot-bath or large tray on which the legs of the table are placed. Instead of carbolic lotion, boracic or thymol lotion can be substituted.

VAGINAL SYRINGES AND DOUCHES.

For the purpose of applying antiseptic and astringent lotions to the vagina and split cervix, for hot-water injections, and for merely cleansing purposes, the vaginal syringe and douche are employed.

Vaginal Syringes.—Fig. 114 shows the well-known Higginson syringe.

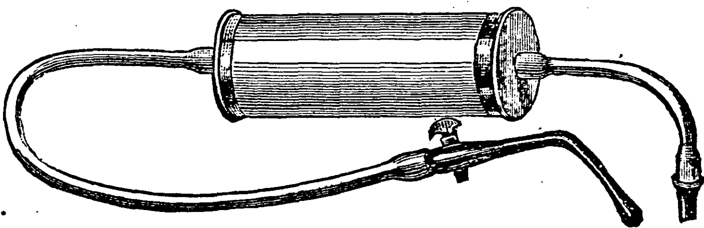

Fig. 114.
Higginson's syringe.

Valuable as this is, it is difficult for ordinary patients to manage single-handed. For them we should therefore recommend the

Vaginal Douche.—A convenient form of this is shown at Fig. 115. It can be hung up after being filled, and by the gravitation thus afforded a gentle flow is obtained. The overflow from the vagina is received into any suitable receptacle on which the patient sits.

For patients in bed its use is equally easy. The nurse or attendant should be instructed to make the patient lie on her back, the hips being well raised with a pillow. The pillow itself should be covered with a

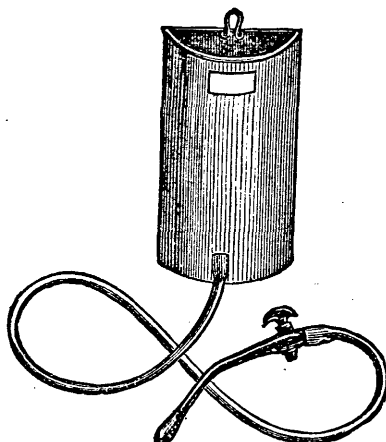

Fig. 115.
Vaginal douche.

waterproof or folded blanket. An ordinary basin is then slipped below the hips to receive the overflow.

According to some, the force of the jet of water given by the Higginson is specially valuable—why is not very evident.

The great advantage of the douche is its simplicity. Half of the women who buy a Higginson do not know how to use it, and find it troublesome even when they do know.

The material for injection is varied. Hot water, as hot as the patient can bear it, is invaluable in inflammatory conditions.

Hot carbolic lotion (equal parts of boiling water and 1-20 lotion) is admirable in abortion cases, for cleansing purposes.

In leucorrhœal conditions; injections of alum (ʒ j. to Oj.), sulphate of copper (ʒ ss. to Oj.), sulphate of zinc (ʒ ss. to Oj.) are good.

The general formula for these is—

℞. Aluminis, vel
Cupri Sulphatis, vel
Zinci Sulphatis............ ʒ j.

Fiat pulv; mitte tales xij.

Sig. To be used as directed.

The patient is told to dissolve one powder, or half of one, in a pint of water, to place this in the douche and use it as already explained.

It is a good plan to make the patient first douche with hot water and then finally, in the dorsal posture, to finish up with the special lotion. After it is finished the dorsal posture should be maintained for ten minutes, and the last of the injection expelled by sitting up.

CAUTERY.

The ordinary cautery may be employed in the treatment of the pedicle in ovariotomy. Details on this are postponed till that is considered.

Fig. 116 shows the well-known Paquelin's cautery. In this very elegant and useful instrument the vapour of benzoline is pumped through a slender,

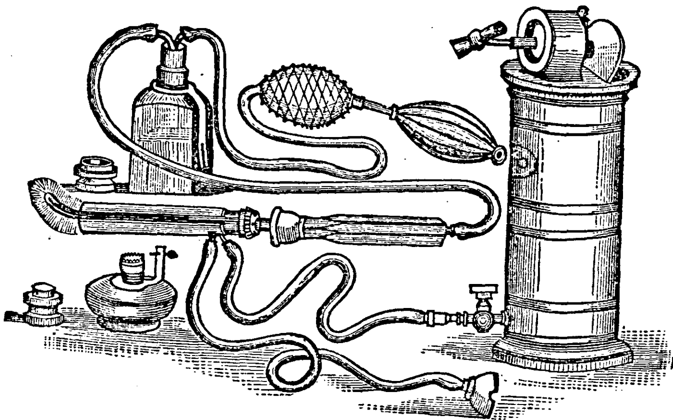

Fig. 116.

Paquelin's cautery and Wilson's antithermic shield. The shield is seen covering the rod. The water apparatus is to the right. A spirit-lamp is also figured (Mundé).

hollow cone of platinum, the latter being previously heated in a gas flame or spirit lamp. It speedily becomes red or white hot by the combustion of the vapour, and can then be used.

Note as to its use—(1) To be careful with the benzoline, as it is exceedingly inflammable ; (2) To heat the platinum cone first (in outermost zone of the flame) before pumping in the benzoline. If the vapour is pumped in before the platinum is hot enough to ignite it, the cone is cooled by its cold stream.

The cautery should be used at a dull heat. When white hot it causes bleeding, because it thoroughly burns the tissues and thus leaves no char to act as a hæmostatic.