

must use a metro-tome caché, let us take Dr. Greenhalgh's, with its maximum expansion, as shown in the diagram above.

But why do the lips of the os tincæ roll back when the cervix is too extensively incised? The rationale is this: The longitudinal fibres of the uterus run down from the fundus to be inserted or incorporated antero-posteriorly with the circular fibres of the cervix. These two sets of muscular fibres are antagonistic in their action physiologically. In a normal labour, the contraction of the longitudinal fibres of the body must be accompanied or followed by a relaxation of the circular fibres of the cervix, or the labour could not be finished. They are as antagonistic as are the flexors and extensors of the hand. Destroy the power of the one set of muscles, and the other will inevitably take on a tonic contraction, and draw the hand in the direction of the line of their action. In the operation of dividing the circular fibres of the cervix uteri by the metro-tome caché, if the whole diameter of the cervix be cut entirely through, we must of necessity cut the whole of its circular muscular fibres, which destroys their contractility, and removes the force that bound, as it were, in a bundle the terminal extremities of the longitudinal fibres, which then take on a tonic rigidity, retracting the divided lips of the os tincæ, and producing the deformity that, we must admit, is occasionally seen to follow the metro-tome caché method of operating.

Whether my explanation be correct or not, does not in the least affect the fact under consideration; and the young surgeon cannot be too careful, for if he should unfortunately cut too much, there is no remedy for his mistake. It is far better to cut too little, even at the risk of being compelled to repeat the operation.

SECTION III.

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In the preceding pages we have followed symptomatology to the detection and treatment of organic disease, but now we propose to ask in what particular organic structure varies from a normal condition, irrespective of rational signs? It will then be necessary to inquire into the normal conditions and relations of the uterus, before speaking of its anomalies, and their influence on conception.

Anatomists tell us that the uterus is pear-shaped, and flattened a little antero-posteriorly; that it is from two and a half to three inches long; an inch and a half wide, more or less, at its largest part; and about an inch thick; that it is divided into fundus, body, and cervix; that its cavity is from two and a quarter to two and a half inches long, the canal of the cervix being a little longer than that of the body; that the os tinæ is generally round in the nulliparous uterus; elliptical and transverse after child-bearing; and that the cervix is rounded and embraced by the vagina, which is inserted higher behind than before, thus making the posterior intravaginal portion of the cervix a little longer than the anterior. But anatomists do not tell us how far the intravaginal portion of the cervix should project into the

vagina, or what proportion it should bear to the supravaginal section, which, by the bye, is an important matter to determine. Not having time or inclination to go to the dead-house for the verification of this point, I shall describe the neck of the womb as I see it in daily investigations on the living. I assume that a normal os tinæ, whether round or transverse and elliptical, should be open, and filled with a slippery translucent mucus of slightly alkaline reaction; that the cervix should be rounded, truncated, and elastic to the touch; that the intravaginal portion should be about a fifth or not more than a fourth of its whole length, *i.e.*, from a quarter to a third of an inch anteriorly, and a fraction more posteriorly; that the canal of the cervix should be straight or curved slightly forward; and that the axis of the whole organ should stand at about right angles with that of the vagina, being neither anteverted nor retroverted to any great degree. Any woman with such a state of the uterus will always conceive in three or four months after marriage, if everything else is right.

Having laid down this ideal of what the womb should be, an ideal that has not been imagined, but drawn from actual observation in the clinique and the consulting-room, we shall proceed to the examination of the sterile, unimpregnated uterus, to see where and how it may differ from a normal conceptive state. This necessarily embraces anomalies or deviations from a normal state; 1st, of the mouth of the womb; 2nd, of the cervix; and 3rd, of the body: and this brings us at once to the third general subdivision of our subject, *viz.*, that the os and cervix uteri should be sufficiently open not only to permit the free discharge of the menstrual flow, but also to admit the ingress of the spermatozoa.

It might appear, at the first glance, that this propo-

sition had been embraced, and sufficiently discussed, in the preceding article on painful menstruation. But experience teaches us differently; for instance, how often do we see sterility where there is no symptom of disease so far as physical suffering is concerned? Menstruation may be perfectly normal, there may be no back-ache, no vesical tenesmus, no bearing-down, no leucorrhœa, indeed, no sign of diseased action; and when we come to a physical exploration, we may even find the uterus of proper size, in a normal position, and with a straight cervical canal, but the os may not be larger than a pin's head, and if to this be added induration of the cervix, the case is almost necessarily sterile; for while the os and cervix are capacious enough to transmit the outward flow, the os itself is not capable of admitting the sperm, and without this there can, of course, be no conception. This is not theoretical, and I might give numerous illustrations in proof, but one will suffice.

Mrs. X., of fine form and vigorous health, had been married many years (thirteen or fourteen) without offspring. Menstruation regular, normal; never had leucorrhœa, or any other symptom of uterine disease; and people wondered why such a fine specimen of womankind should not become a mother; and they very generally and erroneously inferred that it could not be the fault of such a physical organization. She consulted many eminent medical men, and took baths and mineral waters, and cordials, elixirs, and nostrums without number. She had submitted to be bougied till an attack of pelvic cellulitis supervening had well-nigh cost her her life. Indeed, I never saw any woman so determined on having offspring, and for that purpose she was ready to suffer anything and to take any reasonable risk. On examination, I found the uterus in proper

position, and rather under size; but as menstruation was perfectly normal, the size of the organ was not deemed of any great importance. The canal was straight, but the os was exceedingly small, and the cervix felt to the touch like a little round marble, and almost as hard.

Of course there was but one thing to be done, viz., to open the os and cervix by the bilateral operation. This lady, who had already suffered so much from dilatation, thought the operation a small affair compared to the result hoped for.

In this case, I was able to say beforehand that she would almost certainly conceive after the operation. Very often we can say to one, "Yes, you are almost

sure to conceive;" while to another we are compelled to say, "Conception is probable;" to another, "It is possible;" and to others, "It is impossible."



FIG. 65.

This diagram (fig. 65) represents the relative condition of the os and cervix. The operation was done in April, and conception occurred in December following. Here there was no dysmenorrhœa, as already remarked. And why? Simply

because there was no mechanical obstruction to the flow. The canal of the cervix was small, but straight; and its mucous membrane was not congested. Had it been a little crooked, there would probably have been pain, for it was very small. But as small as the os was, it permitted the easy exit of the menstrual flow, while it prevented the ingress of the sperm. This is proved by

the fact that she was sterile for thirteen or fourteen years, during which time she tried all sorts of remedies to overcome it, and then became pregnant in a few months after the performance of the operation.

I have seen many other similar cases, and a great many like it artificially produced by the injudicious use of potassa fusa, potassa c. calce, and even nitrate of silver.

Sometimes the os tincæ becomes wholly occluded by the prolonged use of these agents; more frequently it is partially closed, and the cervix always feels indurated. Whether the induration is due to the action of the remedy, or to the inflammation that called for its application, I shall not pretend to say; but I have generally found artificial occlusion of the os to co-exist with induration of the cervix. This produces a state of acquired sterility. I have met with it more frequently amongst those who had once borne children, though I have seen it in those who had not. A marked example of this was found in the out-door practice of the Woman's Hospital, in a young unmarried woman who had had potassa c. calce applied some months before at one of our dispensaries. When the finger was introduced into the vagina, the cervix was found in proper position, but it was perfectly round and hard, and no os was to be felt.

When the speculum was used, we found the os completely bridged over by a dense fibrous band of union, with a little opening at each extremity, which would not admit an ordinary-sized

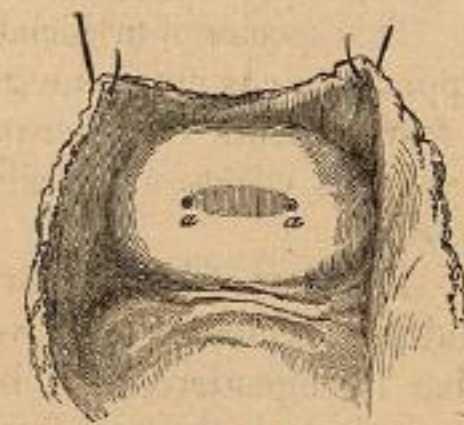


FIG. 66.

probe. Fig. 66 represents the appearance of the os in

this case, and shows the two little points *a a*, whence issued the menstrual flow.

I saw, in consultation with Sir Joseph Olliffe in Paris, in 1863, a lady in the higher ranks of life, who had been twice married without offspring, and whose os tincæ had been thus artificially agglutinated by the prolonged use of the nitrate of silver during her first marriage.

When this mechanical obstruction to the egress of the menses is thus artificially produced, we may find more or less suffering and general malaise attending the flow, which becomes unusually prolonged, always very dark-coloured, often of tarry consistence, and sometimes offensive. The cessation of the flow is then followed by a dark-brownish fine coffee-grounds-like mucus, which continues for a few days, and frequently irritates the parts with which it comes in contact. The mechanical obstruction at the os preventing the easy outlet of the flow, causes a partial retention of the secretions, which thereby undergo some change, that reacts upon the tissues, and produces a sort of subacute endo-metritis. Of course the only remedy is the restoration of the os and cervix to a normal state, by cutting the canal open, and keeping it so.

This species of artificial occlusion of the os by caustic applications is not, I am glad to say, very common, but I fear it occurs more frequently than it should. Fortunately its effects are easily remedied if they are recognized.

The cases of it that have fallen under my observation did not present themselves on account of the sterility that it engendered, but because of the ordinary symptoms of uterine disease from which they suffered. Several of these, when cured of the organic difficulty, were rendered fruitful again.

I have repeatedly said that the subjects of sterility are naturally arranged in two great classes; viz., those who have never borne children, and those who, having once conceived, cease, from some cause or other, to conceive again.

Very perfect illustrations of this last class may be found in those who have had the os uteri artificially sealed up by the injudicious use of the potassa fusa or potassa c. calce. Amongst the cases of this sort that I have seen, I now call to mind two ladies, who had been treated by the same physician.

They are important enough in their bearings on this subdivision of our subject, to give a few particulars. A lady, aged thirty years, married at twenty-one, had two children, the youngest six years old. There was nothing peculiar about the labours, but she was subject to leucorrhœa after the last one, for which she had general constitutional treatment, and, after a while, local applications of the potassa c. calce, nit. arg., &c. Menses rather profuse but otherwise normal, till about two years ago, they became gradually very tedious and prolonged, lasting nine or ten days, instead of three or four, as they did previously to the potassa c. calce treatment. The flow was now scanty, very dark-coloured, almost black, attended with nausea, nervous irritability, and a sense of utter prostration, together with bearing-down, weight and soreness in the rectum, and neuralgic pains at the end of the coccyx. She also had great tenderness and sensitiveness at the mouth of the vagina. The fundus was considerably hypertrophied, the cervix was also hypertrophied and indurated, and felt more like a small globe pessary than anything else; and it was utterly impossible to detect the os tincæ by the touch.

Fig. 67 shows about the size and relation of the little opening through which the menses made their tedious escape. The canal was opened by the bilateral incision. The whole cervix was of fibrous hardness, and the resistance to the knife was very great. As usual in these cases, there was but little hæmorrhage, but there was great trouble in keeping the os open. However, it remained sufficiently so. The next menstruation was normal, and in four months she conceived again, after an acquired sterility of six years, due, firstly, to granular

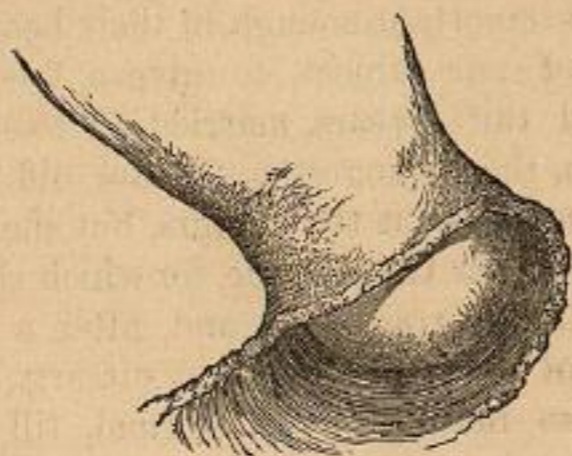


FIG. 67.

engorgement, and its attendant leucorrhœa, and lastly, to the potassa c. calce treatment and its result, occlusion of the os.

I do not object to the use of potassa c. calce judiciously applied, but it is well for us to know that it is all-powerful to do mischief, while we intend only to do good with it. I feel, therefore, justified in pressing this matter a little more on the attention of the reader.

Mrs. M., aged thirty-six, three children, youngest six years; some uterine trouble ever since the last labour; was treated for "ulceration" by potassa c. calce three years before I saw her in April, 1856. Her menses,

scanty, dark-coloured, of a tarry appearance, were now preceded by pain for a week.

It is a waste of time to give general or even local symptoms.

The uterus was anteverted, the fundus hypertrophied, the cervix almost as hard as cartilage, and the os was contracted to a little round point, that could not be detected by the touch.

The os was cut open; the next menstruation was painless and normal, and the enlargement of the fundus soon subsided as a consequence of the easy exit of the menses, and conception occurred a few months afterwards.

But I pass from this class of cases to another, where the os is open enough to permit the easy exit of the flow, but where there may still be a mechanical obstruction to the ingress of the spermatozoa. It is not sufficient to say that the mouth of the womb is large enough, and that it admits easily the passage of a bougie or a sound.

To illustrate my meaning I turn to my note-book. Mrs. —, aged thirty-five, two children, youngest ten years old. She had been in bad health for a long time, and was treated by a very eminent physician, Dr. Duane, of Schenectady, who sent her to me in June, 1856. The uterus was anteverted, and greatly hypertrophied, being three inches and three quarters to the fundus; the cervix was the seat of fibrous engorgement; the menses were profuse, lasting five or six days, returning in seventeen; and she was anæmic and prostrated.

A course of treatment, local and constitutional, was agreed upon, and Dr. Duane sent his patient to me again in the autumn. She was somewhat improved; the depth of the uterus was three and a quarter inches

instead of three and three quarters; and the hypertrophy and induration of the cervix were better, but there was little or no improvement otherwise.

I was at a loss what more to do for her relief, and felt very sure that her ten years of sterility was due not so much to the state of her general health as to the peculiar conformation of the mouth of the womb, which certainly prevented the ingress of the spermatozoa. Many of us think that a pregnancy will often modify the nutritive functions of the uterus in such a way as to remove engorgements, hypertrophic conditions, and even small fibroids. With my mind full of this idea, I asked my patient, rather jocularly, if she would like to have more offspring. She promptly replied, "No." "Well," said I, "it's difficult for me to determine what else to do, if you will not consent for me to rectify the condition of the mouth of the womb, so that conception may take place." She did not think it possible, and hardly believed me to be in earnest.

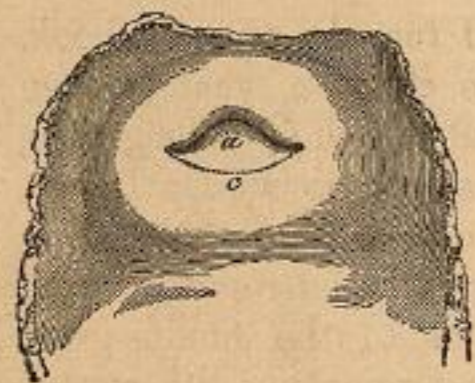


FIG. 68.

Now it may be asked what could be the trouble with the mouth of the womb, when she had had children, and when she still menstruated without the least difficulty. From the birth of the last child she had had leucorrhœa, as a consequence of granular engorgement of the cervix.

Dr. Duane had cured this long ago, and there still remained, as previously stated, some hypertrophy of the cervix. This, too, he had removed, in a great measure, during the summer, by two small potassa c.

calce issues, one on each lip of the os tincæ. But there still remained the same mechanical obstruction at the os as before, which is represented by fig. 68. A crescentic-shaped os is by no means uncommon. We often see it in anteversions, and I have frequently seen it where the position of the uterus was normal. We may have it where there has never been conception, or it may occur after child-bearing, as a consequence of chronic inflammation of the cervix, with hypertrophy of the cervical mucous membrane. Here it presented no barrier whatever to an outward flow; but a glance at the peculiar projection *a* from the anterior lip, shows what a perfectly valvular closure it opposed to any inward flow. When this little tubercle *a* was hooked with a small tenaculum and pulled downwards, so as to open the canal of the cervix, and permit a view of its cavity, this hypertrophic condition was seen to extend up along the anterior face of the cervix for an inch. The curvilinear dotted line *c* shows the course of the incision by which this was removed. It was a triangular wedge, as seen in fig. 69, the apex having reached nearly to the os internum. There was but little bleeding, and this was controlled at once by the pressure of a sponge probang, and then by the application of a pledget of cotton, wet with a solution of the perchloride of iron.



FIG. 69.

The wound was healed by the time of the next menstruation; and my patient went home with the os presenting a perfectly normal appearance. Notwithstanding her feeble state of health, and the length of time since the birth of her last child, conception occurred a month after the operation. She went the full time, and was safely delivered by Dr. Duane of a fine

boy. But I am constrained to say that the pregnancy produced no good effect either constitutionally or locally. I had occasion to examine the uterus some four or five months after delivery, and its condition was about the same as at the time of conception. The case is valuable only as illustrating one of the mechanical obstacles to conception. It is not exceptional, for I have seen other similar cases.

Again, the mouth of the womb may be open enough to let the menses flow out freely, and it may be even large enough to admit easily a No. 8 or 10 bougie, and yet be absolutely closed to the ingress of the spermatozoa; and that without any excrescence or malformation. This condition is a very common cause of acquired sterility, and occurs in this way: Labour is followed by a chronic inflammation of the cervix, which becomes hypertrophied; the inflammation or granular erosion is cured, but the hypertrophic condition conjoined with induration remains, and the two indurated, thickened lips of the os tincae lie in close apposition, yielding readily to any fluid passing down, but opposing any passing up the canal. We too often overlook this cause of sterility, common as it is. We are apt to say the mouth of the womb is all right, because it admits a large bougie, and gives free vent from the uterine cavity.

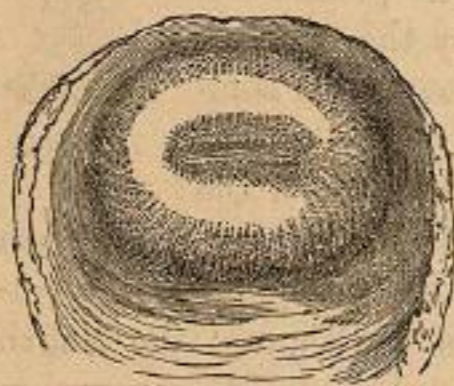


FIG. 70.

It is long enough from side to side, but antero-posteri-

Now, what is to be done with such a case? The os is a straight transverse line, with the two opposite borders crowded obstinately against each other (fig. 70).

orly it has lost its gaping, graceful oval form, and although quite as large as it ought to be, it is still to all intents and purposes practically closed. Such an os as this may be bougied till both surgeon and patient are mutually tired out, without any result whatever; and there is but one thing to do, viz., to incise the cervix as for dysmenorrhœa. It may seem paradoxical to enlarge an os that is already large enough, but the only way in which I have ever succeeded in causing a permanent receding of such compressed lips, is by a bilateral division of the circular fibres of the indurated cervix.

In March, 1859, a lady, twenty-seven years old, consulted me on account of acquired sterility. She had had one child five years before,—no conception since. As she and her husband were both in vigorous health, she wished to know the cause of what was to them a source of great unhappiness. She had been told by her family physician that there was no reason why she should not conceive. On the contrary, I said that conception was utterly impossible, with the mouth of the womb as it was, and explained the necessity of a surgical operation. Being satisfied of its painlessness and its safety, she submitted to it at once. The cervix was hard and gristly, but the incisions produced the desired result of giving the os an elliptical shape.

It required nice care to prevent a contraction of the os to its former condition. Fortunately all went on well, and in less than twelve months from the date of the operation the mother was safely delivered of twins, which, she said, made up amply for her lost time.

In fifteen months after this she gave birth to another child, which proved that the mouth of the womb remained properly open.

I might go on to enumerate various other changes

that take place in the appearance and form of the os, as a result of accident, inflammation, engorgement, or hypertrophy, any and all of which may in some sort interfere with the passage of the spermatozoa to the cavity of the uterus. Many of these we will recognize and remedy, while great numbers, even when fully understood, will baffle our efforts.

We all know that a protracted labour with impacted head often produces sloughings of the vagina, which result in fistulous openings into the bladder or rectum; but sometimes we have the impaction in the superior strait before the head has passed through the cervix, and then we may have a sloughing of some part of the cervix without necessarily a fistulous communication with the bladder or rectum. Sometimes we see the anterior lip destroyed; again the lateral portion of the cervix; again the posterior lip; and a few years ago, Professor Isaac E. Taylor, of the Bellevue Hospital Medical College, showed me the entire cervix that had been thrown off by slough, in consequence of impaction. In almost all the cases, the cicatrizing process produces malformations of the os that mechanically prevent conception. I might give an immense number of illustrations of these unfortunate cases, drawn from the records of the Woman's Hospital, but one will suffice.

Fig. 71 represents the appearance of a case that was in the Woman's Hospital in 1856; the anterior lip of the os tincæ was entirely destroyed, but the posterior being intact, projected slightly forwards, so as to hide the small opening leading to the canal of the cervix. There was a minute vesico-vaginal fistula which was easily cured, but the mouth of the womb remained contracted, puckered, and over-lapped by the posterior lip in such a

way as to form a complete barrier to a subsequent conception.

Professor Fordyce Barker, of the Bellevue Hospital Medical College, sent me a case in 1858, in which the whole cervix had sloughed off without injury to the



FIG. 71.

vagina; and the cicatrizing process had here produced a complete obliteration of the os. When the finger was passed into the vagina, we could feel the womb as if it were sitting on this canal, seemingly attached to it by a narrow neck, but not projecting into it at all. Here, not only the os but the canal of the cervix was obliterated. It was no easy matter to make an opening through this dense isthmus of fibrous tissue up to the cavity of the organ. But I fortunately succeeded, and kept the canal open with an intra-uterine stem for two months, and the patient left the Hospital; but she returned in two or three months afterwards, just as she was when I first saw her. The operation was repeated a second and even a third time, and the canal was eventually obliterated a second and a third time.

But other deformities of the os tincæ may occur of a less formidable character, still resulting in complete sterility. As so often said, any organic condition

whatever that tends to prevent the passage of the spermatozoa, necessarily prevents conception. Wishing to impress this point on the young surgeon, I shall continue clinical illustrations of my meaning.

A lady, aged twenty-six years, had had two labours at full term, the last six years ago. This labour was violent and very rapid, lasting only half an hour. The child was large, and the head was probably forced through the neck of the womb before it was sufficiently dilated, and the os was, consequently, lacerated from side to side. This healed slowly, but she remained sterile afterwards.

Fig. 72 represents the appearance of the os: the anterior half of the cervix was twice as thick as the posterior, while the posterior lip of the os over-lapped the anterior, closing it valvularly and perfectly. The



FIG. 72.

cervix was indurated, and the cicatrices resulting from the laceration and subsequent healing could be distinctly seen extending laterally from the os to the insertion of the vagina. This lady was anxious for more offspring; and I proposed to cut off the posterior over-lapping lip of the os, as indicated by the dotted line *a*, which would straighten the canal and open the door to the entrance of the spermatozoa, that is, if the healing process could be managed so as to prevent undue contraction. However, she was frightened at the idea of an operation, and would have nothing done.

But it may be said, "Your views of conception are

entirely too mechanical." The act of copulation is purely mechanical. It is only necessary to get the semen into the proper place at the proper time. It makes no difference whether the copulative act be performed with great vigour and intense erethism, or whether it be done feebly, quickly, and unsatisfactorily; provided the semen be deposited at the mouth of the womb, everything else being as we would have it. Thus far I accept the charge of mechanical views.

To illustrate the principles of the operation above suggested, here is a case in point. A widower in the prime of life, in good health, the father of children, married a young wife, who at the end of five years remained sterile. The fault was not with the husband, as shown by his previous marriage. The wife's menstruation was regular, lasted two days, and not painful to any great degree, except when she was exposed to cold during the advent of the flow. She suffered slightly from constipation and hæmorrhoids, but her great trouble was leucorrhœa, with pruritus. An examination showed that there was no granular erosion of the os, and that the irritating secretion was a pure utorrhœa.



FIG. 73.

Fig. 73 represents the anatomical peculiarities of the os and cervix and the course of the canal. The position of the uterus was normal. The intra-vaginal portion of the cervix was irregularly developed, the anterior

segment being not more than one-fourth as long as the posterior. In other words, the os tinæ was found, as it were, on the anterior face of the cervix instead of being central, as at *a*, in a line with the long axis of the cervical canal. The os was very small, but by means of a sponge-tent it was ascertained that the anterior face of the cervix at *c* was the seat of a granular condition of the cervical membrane evidently giving rise to the morbid secretion that irritated the external parts.

This lady did not consult me on account of her sterility, but solely for the relief of her physical sufferings. Conception would be absolutely impossible in such a case as this. I have seen many like it, and they are of necessity always sterile. Such malformations are evidently congenital.

Three months of treatment here produced no sort of improvement, either of utorrhœa or pruritus. Sponge-tents and caustic to the granulations at *c* combined with a tonic invigorating course were wholly useless.

The question then arose, "What else can surgery do for her relief?" The only way that I could see to cure the utorrhœa, was to open permanently the mouth of the womb, so as to allow a free outlet to the secretions, which seemed to become acrid, by undergoing some change while pent up in the pouch formed in the canal of the cervix.

Two plans of operation were suggested to my mind. The first to divide the os and cervix bilaterally, and the other to remove the whole of the posterior lip to *b*. The first plan might relieve the utorrhœa on the principle that we adopt in curing a sinus by making a capacious outlet for its contents, whereby it is kept constantly drained; but I felt very sure it would never

relieve the sterility, because the redundant posterior flap would always naturally over-ride and over-lap the anterior portion, and prevent the upward passage of the spermatozoa; and because I had on several occasions tried it under like circumstances without success, and I feared that there would be no permanent cure if the sterile condition were not overcome.

I did not then know of the plan of splitting open the posterior lip backwards, as illustrated in fig. 63, page 169, or I would, in all probability, have adopted it at the time. I determined, however, on amputation, or exsection of the posterior portion of the cervix up to the dotted line *b*, as being the best method of both insuring a good outlet for the leucorrhœa and a good inlet for the semen. The operation was done in April, 1857, with the assistance of Dr. Emmet and Dr. Scudder, then house-surgeon at the Woman's Hospital. The patient left us in a fortnight, which was entirely too soon after such an operation, for we were thus deprived of using all means to prevent an undue contraction of the os by the granulating process. However the utorrhœa and the pruritus were eventually cured. A conception in due time, and a natural labour at full term, have proved, as far as one case can, the correctness of the principles of the operation adopted for the relief of this and analogous cases.

I might go on to enumerate various other modifications in the size, form, and relations of the os tinæ; but we have had enough of this to impress upon the mind of the young surgeon the importance of imitating nature as much as possible, if we expect to attain the object of our efforts.