

of the pelvis where the fascial and muscular attachments are strongest.

The relative contraindication of a possible pregnancy later and the positive contraindication of carcinoma should always be borne in mind.

The removal of the entire healthy uterus before the menopause certainly removes the liability to pregnancy, but to support the pelvic floor it is usually still very necessary to do the less efficient anchoring up of the vagina for a purpose better served in the non-carcinomatous uterus by removal of the tubes only before the anterior fixation.

The omission to do the lower segment repair perineorrhaphy and anterior colporrhaphy (which the author admits are tedious and time consuming) at the same operation as the anterior fixation is for the reasons given above a reprehensible omission all too frequent if the essayist may judge from the cases coming to him almost daily still complaining of the marked discomforts of the un-repaired "celes" as well as the danger of dragging out the fixation tissues into dangerous bands.

ROOM 1421, PEOPLES' GAS BUILDING.

## STERILITY, ITS CAUSES AND ITS TREATMENT WITH AN ORIGINAL STEM PESSARY.

BY

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(With two illustrations.)

A MARRIAGE is said to be sterile, if no children are born after three years of married life. The growing percentage of sterility, as is now found in men, tends to relieve much of the odium, borne for so long a time by the women, and suggests the use of the term sterile marriage rather than sterile woman. Sterility in men, as is now given is a much higher percentage than was formerly supposed, this change is due to the later studies in gonorrhea and syphilis in this regard. The causes of sterility may be divided into functional, structural and pathological. Of these causes we know least about those coming under the division of morbid physiology.

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It is to this variety that I wish to direct your attention more particularly, as the instrument which I will demonstrate to you is especially adapted for the treatment of such cases. The most frequent cause of sterility offering any hope of success is a stenosis of the cervix combined with some abnormality of the secretions, or it may lie in the interrelation of the ovulation and menstruation cycles.

We may also have, as causes of sterility, an abnormally long cervix or isthmus, a short vagina, an infantile uterus, abnormalities in positions of the uterus resulting in angulation of the cervical canal.

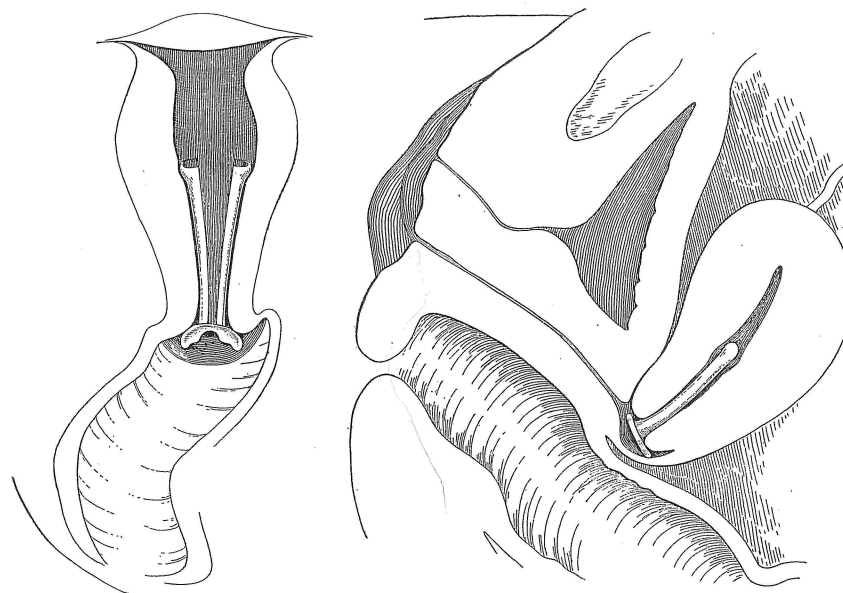


FIG. 1.—Showing relation of seminal pool to pessary and uterus.

FIG. 2.—Showing relation of seminal pool to uterus and instrument.

The position of the uterus may prevent the cervix from being bathed in the seminal lake. This lake and its relations to the cervix are very important; it is normally of considerable size and so placed that it will hold the seminal fluid, not allowing it to pass outward, but will favor the spermatozoa in their efforts to gain entrance, in vast numbers, into the uterus. Embryologists teach us that the spermatozoa can travel by their own propelling force about their own length per second.

After watching them for a long time under the microscope it is easy to see that they travel in no definite direction, but by the aid

of their circular motion, tend to go in the path of least resistance. The slightest obstruction will stop them, when they may start off just as energetically in a useless direction. It is likely, however, that they are attracted by the normal alkalinity of the cervix and repelled by the acidity of the vagina (experiments will demonstrate this phenomena). They will live in the uterus and tubes for several weeks (in dead women for some time). The oviducts of married women are known to frequently contain large numbers of spermatozoa. In the bat the spermatozoa are deposited in the autumn and fecundate the ova the following spring. The ova of the woman, on the contrary, only maintain their vitality for a few days and are practically never found in the discharges. The spermatozoön must make its way against the flow of discharges from the uterus and the cilia in the uterus and tubes. These cilia propel the secretions and the ova downward and outward.

If these secretions are normal in amount, reaction, and consistency (the viscosity should be no greater than blood serum), the spermatozoa will likely pass through the cervix, but if the cervix is markedly acid or the discharge thick, entrance as far as the uterine opening of the tube may be inhibited. Experiments upon animals tend to prove that fertilization takes place in the lower third of the tube. (Hypodermic injection of spermatozoa into the abdomen of lower animals has partially demonstrated this point.)

The uterine entrance into the oviduct, at best very small, must be in a fairly normal condition for a sufficient number of spermatozoa to find this very small opening. It seems likely that in the majority of cases, for conception to occur many millions of spermatozoa must enter the tubes. Two hundred millions are said to be passed at a single ejaculation, but like other seeds or single-celled animals, countless numbers are lost.

The seminal lake may be improperly developed in size or it may be practically nonexistent due to causes of development, or displacement of the uterus or again it may be so damaged by a previous child birth as to be unable to retain the semen for any length of time.

The chemical reactions of the normal secretions in the birth canal are acid at the vulva (due to lactic acid), decreasing acidity toward the cervix and alkaline in the uterus. These differences are evidently an effort on the part of nature, to prevent the entrance of microorganisms into the uterus. When these secretions become abnormal they are likely to interfere with the passage of spermatozoa and to favor the growth and passage of the many varieties of bacteria found in the vagina. These secretions of the genital tract are capa-

ble of many abnormal changes, due to infection, inflammation, etc. The cervix may become so highly acid as to inhibit the spermatozoön, the viscosity so increased that a mucous plug is produced in the cervix or again the quantity of discharges so augmented as to prevent the upward passage of semen. Seminal fluid is alkaline and this reaction is normal for the spermatozoa. Spermatozoa will not always pass in where menstrual discharges can get out 'they are squeezed out, as it were' (Cary); nor does the passage of a sound through the inner os demonstrate that it is physiologically patulous, infinitesimal conditions often acting as a positive obstruction to the spermatozoön.

The effect of menstruation upon the reaction of the genital tract is to render it more alkaline, this being favorable to impregnation and also adds another reason for the seventeen to twenty-one days non-conception period. As is well known when the menses is small in amount pregnancy is less likely to occur, though there are striking exceptions to this general observation. One case is mentioned in the literature, of a woman who conceived after not menstruating for eleven years. I have known of two cases (mother and daughter) who only menstruated every three months, the daughter also having a child. It is considered the proper thing for Turkish women to become pregnant before they menstruate the first time. A decrease in menstrual flow is likely to result from a small uterus, the uterus of hyperinvolution, a lactation atrophic uterus or some damage to the glandular layer of the endometrium, from separation of a partially adherent placenta, etc. (Small areas of adherence are undoubtedly detached by Crede's method.) Damage to the placental site would not be unlikely to cause a one-child sterility as it is about this same area (upper and posterior wall of uterus) which should afford attachment to the next fecundated ova.

Ovarian function and metabolism have much to do with menstruation as is shown by the general relationship of the menstrual cycle to the ovulation cycle and it is my opinion that a lack of this proper relation is a frequent cause of sterility. One evidence of the passage of an ovule in the middle of the month is pain and an increased discharge at this time; menstrual molimina without blood. If for example, the ova is habitually given off at the wrong time of the menstrual cycle the decidua will not have been changed into the decidua of pregnancy (this change should occur while the fertilized ova is still in the tube) and the ova will be unable to attach itself by the process of erosion, which we now know occurs. (This erosion or burrowing into the superficial, deep layers and blood-ves-

sels of the uterus means that the mucous membrane must be in exactly the right state to admit of it.) In other words, the soil must be prepared before the seed is planted. Therefore, the ova may have been fertilized and reached one of the preliminary stages in the tube (mulberry mass, etc.). It may remain alive and unattached to the uterus for a short time, but in this now highly specialized cell, protection must be soon at hand or it will be swept from the uterus by the secretions or blood. It would seem likely from a survey of embryological facts that an accurate timing of these cycles is highly desirable as far as impregnation is concerned.

That conception does occur at about the same interrelation of these two cycles or when certain events in them correspond is highly probable, when we reflect upon the accuracy of the old rule of predicting labor (count back three months and add seven days). In this rule there is an admitted error of from two to four weeks, and yet how frequently this method gives us a nearly exact date of labor, what a small percentage of women go much over or under their expected time. There is something more than chance in these facts. At least one need not stretch his imagination very much to reason that a slight deviation between these two cycles would be a strong factor in producing sterility where no other cause could be found and that to institute a treatment to alter the relation of their events would be rational.

The ovary in the fetus undergoes a change in position similar to the descent of the testes, though not so marked, but if not complete their relationship to the tubes may be interfered with. The ovaries contain many ova (70,000) which are formed at the fetal stage of the baby or not later than the second year of life, some embryologists believe that sex is determined at the time the ova are formed. (The old embryologists maintained that Eve's ovaries contained two hundred million ova—the preformation theory.) However, there are many more ova in the ovary than are ever discharged; undoubtedly many are lost in the abdomen owing to the indifferent method of their passage into the tube. Among other factors a normal amount of abdominal fluid must be present and this it would seem could be affected by many intraabdominal conditions (intestinal inflammations, adhesions, blood and lymph supply, etc.). There is said to be a current set up in this fluid by the cilia of the tube and the ova are swept by the current in this fluid, into the fimbriated extremity of the oviduct.

Other causes of sterility are, diseases of the endometrium resulting from sub- or hyperinvolution, secondarily from venous stasis, due to

displacements, lacerations of cervix, etc., and infections. Of the latter the different groups of the gonococcus (the gonococcus is no longer considered to be one organism but a group of organisms) produce different grades of morbidity in the uterus and tubes. That these various causes can do so by closing the uterine ostium of the oviduct and yet not always cause serious damage to the tube seems probable. Such a condition would be interesting in association with this pessary, as one can apply medication to the locality of these openings through it, or in favorable conditions inspections of them or their areas could be attempted, by passing an electric light through the instrument, it serving, for the time being, as an endoscope.

The eugenists tell us that 75 per cent. of men have gonorrhea before they are thirty (in other words it is more common than measles). They also tell us that 90 per cent. of blindness is due to this disease, so that it is rather difficult to figure out its relation to sterility. However, in examining, say 100 cases of this disease in women at the Crittenden Hospital over a period of two years or more, I was impressed with the small per cent. who became pregnant, although exposed.

A few words in relation to treatment, and this instrument. Dr. Carstens demonstrated to us years ago that a stem pessary when made of the proper material, used aseptically and in suitable cases, was very unlikely to do any harm. This seems quite reasonable when you remember the protecting secretions, their reactions and movements, and we must admit that in multipara the cervical canal is frequently patulous, though no harm results. This pessary is designed in an attempt to fulfill the following ideas: to hold open the internal and external os, to be grasped by the internal os and so kept in place, and yet not to impinge upon the true cavity of the uterus (where implantation occurs). Also to offer a very large and free opening into the body of the womb so that the spermatozoa may progress freely over mucous membrane alone, coming in contact with no foreign substance which might be inhibitory to them, the posterior wall of the cervix (where the spermatozoa normally pass) being free from the instrument and the pleca palmata being largely uncovered and able to perform their function. The part of the instrument against the end of the cervix is so thin and small as to be nearly impalpable and as far from the seminal lake as is possible. The instrument is made in different sizes as to length and diameter and is to be fitted to the uterus as indicated.

Alterations in the secretions of the cervix and uterus can be studied through it and the appropriate treatment used. Applications can

be made to the mucous membrane of the body of the uterus, and it can be used as an endoscope which remains in position, if desired.

Electrical treatment, which now has recovered from the blow dealt it by the charlatans, can be carried out with ease and thoroughness to the uterine cavity and perhaps the nutrition of the ovaries and tubes affected in this manner.

Apostoli has reported eighty cases of sterility cured with the electrical current alone. The negative pole in the uterus will usually bring on menstruation ahead of time and thus is the ovulation cycle effected, or if desired the flow can be made more profuse by using the current just before an expected period. Many combinations with this method of treatment are possible. Cureting the uterus is frequently useful as a treatment for sterility or the dilation that accompanies it. However, it may be an added cause of sterility if the decidua is so damaged that it is not properly replaced. Cicatricial tissue may be formed, or in rare instances the cavity of the uterus obliterated.

Plastic operations to restore the pelvic diaphragm are very useful, the indications being to do away with the vaginal inclined plane looking downward, to restore the seminal lake (put lateral stitches in vaginal wall) and the normal H shape of the vaginal walls. Likewise to replace the uterus in its normal position, etc. Third- and some second-degree lacerations of the perineum must be repaired with the function of the seminal lake in mind and the stitches so placed.

The usefulness of ovarian extracts, corpus luteum, etc., are problematical though they seem to have a good effect.

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## TRANSACTIONS OF THE OBSTETRICAL SOCIETY OF PHILADELPHIA.

*Meeting of May 6, 1915.*

*The President, DANIEL LONGAKER, M. D., in the Chair.*

DR. T. W. BUSCHMANN (by invitation) presented a

### REPORT OF CASES SHOWING DISPROPORTIONATE INVOLVEMENT OF THE TWO KIDNEYS IN THE TOXEMIA OF PREGNANCY.\*

DR. BARTON COOKE HIRST.—This study of the kidneys separately in toxemia seems to be a new subject to most of us. Anyone charged with the care of such a patient would feel that she needed the interruption of gestation. A woman with dim vision, edema and all the urinary changes seen in this case would seem to be in imminent danger, unless her pregnancy were terminated. When the case was presented to the section of the fourth year class I said, undoubtedly this woman must be relieved by terminating pregnancy even though it involved the destruction of the fetus and I had set a day for the operation. Meanwhile Dr. Buschmann had made his examination with the cystoscope and by catheterizing the ureters and had reported the result. It never occurred to me that there might be a difference in the condition of the kidneys. It seemed to me in view of the normal condition of one kidney that we might well take a chance on a little delay and upon the continuance of treatment which otherwise I would not have considered justifiable. As Dr. Buschmann has shown the delay was justifiable. Our attention must be arrested by this report and in such cases in the future we must make a study of the condition of each kidney separately and not be content with the gross findings of the urine from the bladder. I hope that accumulated clinical experience will show that if we find one kidney good, delay in operation and the continuance of palliative treatment may give a fair chance of saving fetal life. In regard to the cystoscopy and catheterization of the ureters in this case: Dr. Buschmann has provided himself with the best type of German cystoscope which he finds very satisfactory. I have been accustomed to an American type of cystoscope and find myself more at home with the use of it, though I am obliged to confess that the German cystoscope has a better light and a better lens than the one I use. Feeling that we ought to be able to make as good an instrument in this country I asked the Wapplers to make an instrument

\* See original article page 624.