Finally, lacerations may occur from the tearing out of tenacula, double hooks, etc.

The fact that childbirth leaves its mark upon the cervix in so many cases makes it one of the surest guides as to the existence of previous pregnancy; but the fact must not be lost sight of that operative procedures may sometimes leave marks which simulate those of parturition.

Pathology.—Lacerations may be partial or complete.

A partial laceration is a tear of the mucous membrane and muscular substance which does not extend to the vaginal surface except at the external os.

A complete laceration is a tear through the whole substance of the cervix, laying open the canal for a greater or less extent; sometimes so far as the internal os.

These injuries in turn are designated by the terms unilateral, bilateral, stellate, according to the nature of the injury.

Unilateral lacerations are seen in all parts of the cervix, but are said to be more frequent in the left and posterior portions.

Bilateral laceration is the most common form, where the cervix is divided to a greater or less degree into an anterior and a posterior lip. After forceps delivery this is especially common from the pressure of the forceps exerted at these points.

Stellate lacerations, even when not deep, may cause gaping of the external os, and open the mucous membrane to the influences which cause the unpleasant symptoms of cervical laceration. Following manual dilatation multiple tears are quite common, and the ruptures may be so numerous that after labor the cervix has the feeling of a tassel.

As being the most frequent, bilateral laceration and its treatment will be considered, as what is said concerning it will be equally applicable to the other forms.

Following in the train of these injuries come certain pathological changes as a rule, the end results of which have a far-reaching effect upon the health of the patient unless the operation for repair is undertaken in time. Healing of the cervix after labor may take place; but for the most part the tendency of the lips to separate in the bilateral form keeps the torn surfaces apart, while the process of repair here, as in the other forms, is hindered by the constant flow of lochia over their surfaces.

The danger of infection of the parametrium is considerable when the tear reaches into the vaginal vault. The rolling out of the damaged mucous membrane from the gaping lips favors a state of constant irritation, and the opening up of the connective tissue of the pelvis presents the opportunity for infection. As a result of these conditions there is a constant hyperæmia, which ends in the formation of fibrous tissue and eventually renders the affected parts as hard as cartilage. Exactly as in cervical catarrh the inflammation may proceed so far that the cylindrical epithelium of the cervical mucosa oversteps its boundaries and extends on to the mucous membrane of the vaginal surface of the cervix, displacing the squamous epithelium. This is the "erosion of the cervix."

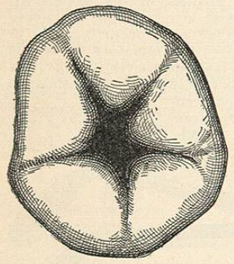

Fig. 4879.—Stellate Lacerations.

With the glandular hyperplasia comes increased secretion, while gradual occlusion of the glands by the new-forming connective tissue causes the Nabothian cysts.

The masses of cicatricial tissue so often felt about the uterus owe their origin primarily to these tears of the vaginal vault, and secondarily to the changes which take place in them as a result of infection; and in consequence of the contraction which subsequently takes place in these areas of new-formed tissue, displacements of the uterus in different directions are sure to follow. Subinvolution is very frequently seen after extensive injuries to the cervix.

In addition to the pathological changes which are found in the pelvis itself, various disturbances may take place, due not to the lacerations themselves, but to the irritation of the chronic metritis and endometritis with which they are so often combined. Furthermore, the increased weight of the subinvoluted uterus, when coupled with relaxed ligaments and a torn perineum, causes the organ to sag downward and adds to the effect of the diseased organs upon the system, the discomforts which arise from the loss of mechanical support. The unhealthy state of the mucous membrane is the cause of frequent abortions, and there is no doubt that cancer of the cervix is more common in cases which have suffered for years from these chronic inflammatory processes, of which the untreated injuries caused by childbirth were but the beginnings.

Symptoms.—The symptoms of fresh laceration of the cervix would be bleeding after the birth of the child, which could not be accounted for by a relaxed condition of the uterus or by a vaginal tear. Slight tears are always present, and it is only seldom that it is necessary to search for the point of hemorrhage at the time of labor.

Symptoms of cervix lacerations, as they are seen at more or less remote periods from the time of their occurrence, are quite variable. Sometimes there is pain on coitus, or, if a displacement is present in addition, the symptoms may refer more to the altered position of the uterus than to the injury itself. The extent of the injury is also no guide as to the seriousness of the symptoms. At times there is bleeding without apparent cause, and the menstrual periods are apt to be painful and accompanied by excessive flow. Leucorrhœa, often blood-tinged, is almost constant, and there is a feeling of general malaise. Reflex symptoms, neuroses of the stomach, eyes, bowels, and even hysteria may be present, while pain over the sacrum or in the lower abdomen is a frequent complaint.

Diagnosis.—The sense of touch enables one to form the best opinion as to the extent of a cervical laceration; for the introduction of a speculum, except in the knee-chest position, is apt to roll apart the lips and so obscure the exact condition. This is especially true in the bilateral tears. However, by seizing the upper and lower lips with tenacula and pulling them together, a good idea of the extent of the damage may be obtained.

When cysts are present in great numbers the feeling may be that of cancer, but inspection generally reveals the true state: the presence of small bead-like cysts, and of an inflamed, bulging mucous membrane, sometimes showing the plicæ palmatæ. Occasionally the condition presented may simulate hypertrophy, but by the drawing together of the lips the true state of affairs at once becomes apparent.

Palliative Treatment.—In the past, immediate repair of the cervix after labor has been recommended by some writers; but the consensus of opinion to-day is that operative procedure is not best until after the puerperium. The reasons for this are plain. After labor the cervix is bruised and some portions may slough. Also the tissue is so stretched and œdematous that correct coaptation of the parts is next to impossible, and with the rearrangement of the muscle fibres and subsequent contraction the sutures would become too tight and cut out. It is surprising to see how what appear like considerable lacerations at the time of delivery almost disappear when involution has taken place. Occasionally it may be necessary to insert a suture to control bleeding from the circular artery, but, as a general thing, a firm packing of the uterus and vagina, or even of the vagina alone, will cause the hemorrhage promptly to cease.

The larger number of patients with lacerations present themselves for treatment months or years after the injury has occurred. For this oftentimes the patients themselves are at fault more than their physician, as they defer the

examination after the labor and wait until discomfort, pain, or repeated miscarriages force them to seek relief.

Not every case of cervical tear demands operation. For the severe lacerations and their unpleasant symptoms operation offers the only lasting cure. For the slighter injuries, the writers believe that the degree of the existing endometritis and the density of cicatrix must be the guides.

When operation is contraindicated or refused, it may be possible to relieve the discomforts to a certain degree. The subinvolution and endometritis may be relieved by hot douches and by depletion with glyceride of tannin, ichthyol, and glycerin and boroglyceride. The patients should be carefully instructed in using the douche, both as to quantity and as to temperature. It should be taken while the patient is lying on her back, with the hips elevated, and at least twice daily. Not less than eight quarts of water should be used at a temperature as hot as can be borne. To this may be added disinfectants, or astringents, as alum or tannin. The reservoir should be just high enough above the patient for the water to flow very slowly, and at the end the reclining position should be maintained for from twenty to thirty minutes.

Cysts if present should be punctured and the exuberant mucous membrane painted with tincture of iodine, carbolic acid, or silver nitrate as often as may be demanded.

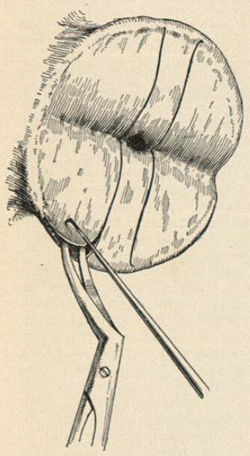

Fig. 4880.—Denuding the Cervix.

Considerable relief is often obtained by these measures, and they often prove a valuable preparatory treatment for many operative cases.

Unfortunately the price of this relief is constant treatment, and with its cessation the old symptoms soon return.

Operative Treatment. — In considering the subject of operative treatment, the first question is to decide in what cases to advise operation. Every deep laceration is not in need of repair, and many comparatively slight ones demand more than palliative treatment. Generally speaking, it is the condition of the cervix and uterine body more than the extent of the tear which decides the treatment; but, as has been said, the more extensive the laceration, the greater likelihood of endometritis, ectropion, and the widely known "erosion." Instances are seen of widely gaping lips, which are soft and without the slightest sign of inflammatory disturbance. Such as these do not need operative interference. For the small laceration with much uterine catarrh and enlarged tender cervix, showing the effect of the irritating discharges, curetting of the uterus and depletion may prove sufficient. If the cervix is much hypertrophied and studded with cysts, curetting, the excision of a wedge from each side and uniting by the method of Emmet, or Schroeder's operation is to be advised. (See Amputation of Cervix, in the section on Hypertrophies.) Where very extensive disease is present, amputation is the best procedure.

As the climacteric approaches, repair is more necessary than in younger women, for it is well known that the lacerated cervix seems to be the starting-point for malignant disease.

Operation.—Emmet was the first to put the operation for the repair of the cervix before the medical profession, and his operation, with a few modifications, has stood the test of time and is applicable to most cases, although in atypical lacerations modifications must be introduced to suit the requirements.

The operation is performed either in the Sims' or in the lithotomy position. The bowels should be thoroughly

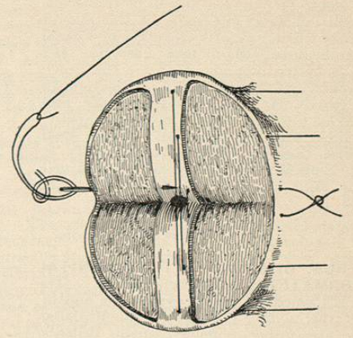

Fig. 4881.—Sutures in Position.

moved the day before, and on the morning of the operation an enema should be given at least two hours before the time set for operation. The patient is given a hot douche of borax water, which clears away the mucus, and the hair on the genitals is clipped close. Under ether the external genitals are scrubbed with green soap and gauze, and douched with sublimate solution, 1 in 3,000. In case of very foul uterine discharges, it may seem best to curette the uterus and wait for a few days before operating upon the cervix.

The vagina is held open with specula, the cervix is seized with the double hooks, and the direction of the canal and the extent of laceration are determined with the sound. The cavity of the uterus is then curetted as a preliminary step.

With the tenaculum the posterior lip is seized in the centre and denuded, as shown in Fig. 4880. All the diseased mucous membrane and the cicatricial tissue which always forms in the apex of the tear, must be removed, only the mucous membrane in the line of the cervical canal—a strip from one-fourth to three-eighths of an inch wide—being left. The anterior lip is treated in the same way. If the hemorrhage is considerable, it can be readily stopped by packing a sponge against the cervix for a few moments.

For the denudation the scalpel is best, as it causes less trauma. Scissors can be used and the hawk-billed scissors of Skene are often useful in clearing away scar tissue at the apex of the wedge.

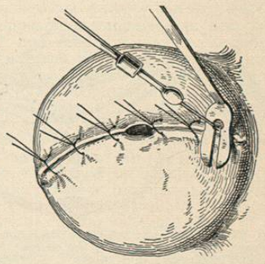

Fig. 4882.—Lips Approximated and Sutures Tied.

Suture material of chromicized catgut, silkworm gut, or silver wire may be used. Chromicized catgut has the advantage that it is unnecessary to remove the sutures. This is especially advantageous where an operation for lacerated perineum is to be performed at the same time.

The manner of suture is also best illustrated by the figure. The first suture should be well up in the apex,

and each should pass from the vaginal surface under the whole denuded area and through the edge of the mucosa which has been left to form the new canal. Usually from three to five sutures on each side are sufficient. Sometimes, on account of the large amount of scar which has to be removed, it will be found necessary to cut away one strip of the mucous membrane which was left to form the new canal. This can be done without fear of atresia. It is generally better in operations upon the cervix not to pack the uterine cavity, as the removal of the gauze may tear out the sutures. Stellate and atypical lacerations must be repaired in a manner suited to each case. Where small tabs exist, they are often advantageously removed, especially if the cervix is enlarged, and the two adjoining edges denuded and sutured.

George Haven.
Ernest Boyen Young.

UTERUS, DISEASES OF: CONGENITAL MALFORMATIONS. — Development. — The uterus is formed by the approximation and fusion of the middle portions of the Müllerian ducts. The upper portions remain distinct, constituting the Fallopian tubes, while the lower unite and form the vagina. A vertical partition separates at first those parts of the ducts of Müller which go to make up the uterus and vagina, but this subsequently disappears, and the two canals become one. At a later period in the course of development, at the lower end of the middle third of the tube thus formed, the cervix appears, dividing the genital canal into uterus and vagina. The tissues at the summit of the middle third and between the points of origin of the Fallopian tubes likewise thicken, and the fundus uteri comes into existence. The insertion of the round ligament separates the upper from the middle third.

It is interesting to note that in the lower animals development regularly stops short at various points in the scale of progression, which ultimately ends in the formation of that which in the human female is a perfected genital canal, so that what in the latter are termed abnormalities, in the lower animals are the normal characteristics. At birth the cervix is longer and thicker than the uterine body, and this state of affairs persists throughout childhood. At puberty rapid growth occurs, and this condition is reversed, the cervix then appearing as an appendage to the body. By the twentieth year the genitalia have reached their full measure of development.

General Etiology.—Congenital malformations of the uterus are owing to a non-appearance of the elements

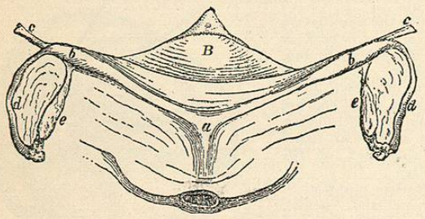

Fig. 4883.—Rudimentary Uterus, Posterior View. (After Veit.) *a*, Fused but solid portion of the uterus; *b*, *b*, uterine horns; *c*, *c*, round ligaments; *d*, *d*, tubes; *e*, *e*, ovaries; *B*, bladder.

which go to make up this body, to an arrest in their development, or to their complete destruction by nutritive disturbances, pressure changes, etc.

Classification and Nomenclature of Varieties.—The whole subject of congenital malformations of the sexual passages has been thrown into much confusion by the varying methods of arrangement and classification adopted by different authors, and still more so by the complicated and pedantic terminology that has been employed. The same name has been given to different conditions, and the same condition has received different

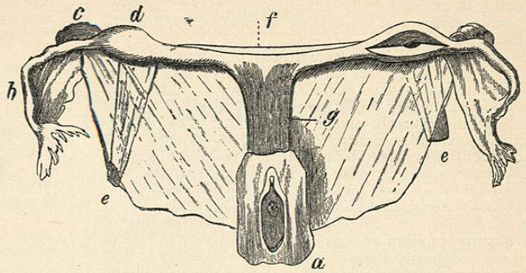

Fig. 4884.—Uterus Rudimentarius Bipartitus or Bicornis. (After Rokitansky.) *a*, Vagina; *b*, tubes; *c*, ovaries; *d*, enlargement of the horn; *e*, round ligaments; *f*, point of union of the two horns; *g*, cellular tissue traversed by muscle fibres which simulate the uterus in form.

designations. The classification and nomenclature which follows is that of Müller; it is at once the simplest and the most comprehensive.

I. Complete Absence of the Uterus: Defectus Uteri.—*Anatomy.*—Complete absence of the uterus, a condition rarely met with in viable subjects, is by no means uncommon in monstrosities incapable of life. Whenever encountered, other evidences of a serious blow to the progress of development are almost always present in some portion of the genital apparatus. The individual, in voice, habit, and general conformation adheres to the female type, but the organs which characterize the woman may, alone or in combination, be entirely wanting, or else may exhibit all grades of rudimentary development. Thus, with absence of the uterus it may be impossible to discover any trace of ovaries, tubes, vagina, or mammary glands; yet these structures may be present, though in a sufficiently undeveloped condition to render the proper performance of the functions severally peculiar to them a matter of doubt or of impracticability. Still, though this is true only of those in whom life is possible, the remaining organs characteristic of the female may be nearly perfect in their construction, and some, though rarely all, may correspond entirely with the normal type. The external genitals have been observed to be either normal or poorly developed, and in adults occasional absence of the pubic hair has been noted.

Etiology.—Defectus uteri is dependent either upon an entire absence or upon a complete destruction of the median portions of Müller's ducts.

Diagnosis.—The recognition of the abnormality under discussion is surrounded with the utmost difficulty, and it is never warrantable to assume positively in a given case, even after negative results have been obtained from careful abdomino-rectal palpation, assisted by a sound in the bladder, that no traces of a uterus exist; for even upon the post-mortem table errors have arisen, and the rudiments of a bilobed uterus have been mistaken for the Fallopian tubes, or a hollow rudimentary uterus for the vagina.

Treatment.—No treatment will, of course, be of any avail.

II. Rudimentary Uterus: Uterus Rudimentarius.—*Anatomy.*—Between defectus uteri and uterus rudimentarius there is often no very great hiatus in the scale of development, for the more decided forms of the latter malformation may be almost indistinguishable from complete absence of the womb. Thus the presence of a slight indefinable thickening on the posterior surface of the bladder, or at the junction of the imperfectly developed broad ligaments, or again, of a solid, fibrous

mass, the size of a hazelnut, located at the point normally occupied by the womb, may be all that there is to indicate an attempt at uterine formation.

If development has proceeded a step farther, a solid, narrow, flat, laterally extended band composed of muscular tissue, with the tubes ascending and the round ligaments descending from it, may be encountered; or a fibrous mass without a neck, and solid, but still having the general conformation of the uterine body, has been observed, from the upper angles of which the round ligaments originate and extend downward into the inguinal canal.

In the uterus bipartitus, which exemplifies the next stage in progression toward the typical organ, two separate, round, solid, vertically placed bodies, composed of muscular and connective tissue, lie between the bladder and the rectum. Occasionally these two bodies unite toward their lower extremities, forming a mass not unlike the cervix in shape, which is in immediate relation below with a rudimentary vagina, while above they still remain independent, like two diverging horns, and are usually solid, but may present a slight hollow enlargement lined by mucous membrane at or near the point of origin of the round ligaments. To this latter abnormality the name uterus rudimentarius bicornis has been given, although some prefer the term uterus rudimentarius bipartitus.

With uterus rudimentarius, which is not confined to monstrosities, but occurs also in viable subjects, the external genitals, vagina, tubes, ovaries, and mammæ may exhibit the same variations in structure which have been alluded to in speaking of defectus uteri.

Etiology.—The cause which produces the rudimentary conditions just described operates during the very earliest stages of fœtal development, and as the exact time of its appearance and the degree of its activity vary, so a variation in results, though always within certain limits, will be observed.

In defectus uteri the elements from which the uterine body is to be formed are wanting or have been obliterated, but in the present instance they have appeared, but have been more or less destroyed, at divers periods of their development, by nutritive disturbances of differing intensities. It should not be forgotten, however, that there may be growth of even the lowest rudimentary forms.

Physiology and Symptoms.—Although in absence of the uterus and in atrophy of the organ the general conformation peculiar to the female and her desire for the opposite sex are preserved, yet there is such an imperfect development of other organs that the functions characteristic of woman do not come into play at all. The condition of the ovaries will determine the existence of ovulation. Menstrual molimina may, but menstruation cannot, occur, and vicarious hemorrhages are rare. Sexual intercourse is possible when the vagina is not too seriously involved, and even then the urethra may be utilized for this purpose. Conception is, of course, impossible.

Diagnosis.—It is not difficult to confound absence of the uterus with atrophy of the organ, when development has been arrested at a very early stage. Even on the most careful examination mistakes have been made by the most skilful among diagnosticians. In any doubtful case, to determine the presence or exact condition of the womb, the patient should be thoroughly anæsthetized, and the bladder and rectum should be empty. A sound or a silver catheter is introduced into the bladder, the finger of one hand is passed into the rectum, and the other hand is placed upon the abdomen; the entire length of the catheter or sound can now be felt between the hands if no uterus, or only an extremely rudimentary one, is present. Any solid mass lying in the median line between the rectum and the bladder is probably a rudimentary uterus. The tubes usually occupy a somewhat lateral position, but may be mistaken for uterine cornua. The ovaries, by their sharply defined boundaries, size, shape, mobility, and situation can be more or less easily recognized.

The more advanced forms of atrophic uterus are not difficult to map out, and, in any event, examination is often facilitated by palpation through the posterior bladder wall, if the urethra has been dilated by previous attempts at cohabitation.

Treatment.—If menstrual molimina occasion severe suffering, castration is a justifiable procedure. The rudimentary uterus has also been extirpated.

III. Absence or Atrophy of the Cervix Uteri: Defectus Cervicis Uteri et Cervix Uteri Rudimentaria.—*Anatomy.*—Numerous grades of this deformity may be encountered. The entire cervix is absent, or a solid fibrous mass or band replaces the normal structure. When its formation is more perfect the internal os is alone closed, or the external os may be thus affected, or both may be occluded, while the cervical canal between is partially or entirely patent. Atresia of the external os only, marks the slightest degree of this maldevelopment. The uterus above may be perfect in structure or rudimentary. The vagina is normally developed, though occasionally the upper part of the canal may participate in the cervical atresia.

Since obstruction is the essential accompaniment of absence or atrophy of the cervix, hæmatometra is the natural pathological sequence when menstruation occurs.

Etiology.—In the more pronounced types of the deformity under discussion, and especially if other portions of the genital canal participate in the existing maldevelopment, it is probable that there has been at best only an abortive attempt at cervical formation. But when the uterus, vagina, etc., are normal in structure and the cervix presents no very aggravated form of atresia, we must regard as the important etiological factor some

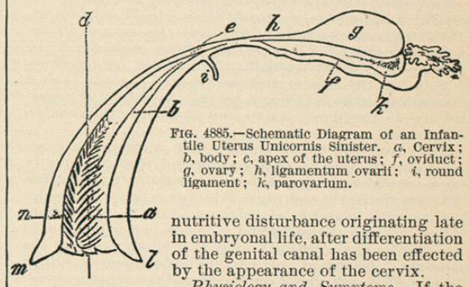

Fig. 4885.—Schematic Diagram of an Infantile Uterus Unicornis Sinister. *a*, Cervix; *b*, body; *c*, apex of the uterus; *f*, oviduct; *g*, ovary; *h*, ligamentum ovarii; *i*, round ligament; *k*, parovarium.

nutritive disturbance originating late in embryonal life, after differentiation of the genital canal has been effected by the appearance of the cervix.

Physiology and Symptoms.—If the ovaries and uterus are not arrested in development, menstruation will occur when puberty has been reached and hæmatometra appears, accompanied at first with menstrual molimina, and later by almost continuous pain, by pressure symptoms, and by threatened rupture of the Fallopian tubes. If the uterus and ovaries are rudimentary, there will be no menstruation, and therefore no blood stasis. Sterility is an invariable accompaniment of any form of cervical atresia.

Diagnosis.—Careful combined manipulation, performed as described in speaking of atrophy of the uterus, will reveal an absence or marked rudimentary condition of the cervix, while the failure to pass a sound or probe, or to find an opening in a neck apparently of normal structure, will at once denote the existence of one of the less marked forms of cervical atresia.

If hæmatometra exists, fluctuation can be detected through the rectum, and perhaps through the obstructing membrane, if it be not excessively thick and resistant, as is likely to be the case when the upper part of the vagina is involved in the atresia.

IV. The One-horned Uterus: Uterus Unicornis: Uterus Unicornis sine ullo Rudimento Cornu Alterius.—*Anatomy.*—When the uterus is one-horned the cervical is larger than the corporeal portion, and the latter consists of a long, tapering, arched, or bow-shaped