TEXT BOOK

OF

MEDICAL AND SURGICAL GYNAECOLOGY

FOR THE USE OF STUDENTS AND
PRACTITIONERS

BY

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Containing Over One Hundred Illustrations.

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THIRD EDITION, REVISED.

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PREFACE TO FIRST EDITION.

During the many years the author has been engaged in teaching in various departments of medicine, it always appeared that much valuable time was lost to the student, and important points missed, in efforts to secure such notes as would furnish him with a knowledge of the teachings of the lecturer.

When it is demanded of a teacher to so arrange his lectures that his listeners may secure the required notes, his efforts are apt to become dry and uninteresting, and often simply a species of dictation.

In the opinion of the author, lectures, to be interesting, instructive, and impressive, should assume more the form of demonstrations, than set lectures, during which important features might be made plain, knotty questions discussed, obscure points elucidated, and methods for medical and surgical treatment made clear by the aid of blackboard drawings, maps, plates, and morbid specimens, leaving the intervening material for study elsewhere.

The large and excellent text books on the market are, as a rule, too cumbersome to carry backwards and forwards to class, and in order that the student might have a convenient text book for such a purpose, and in which he might note important points dwelt upon, and in order that the lecturer might feel he was free to demonstrate the subject as seemed best, without being confined to set lectures, it occurred to the author to place his extended notes in the form of a text book of such proportions as would not be cumbersome, and yet sufficiently comprehensive as to fully cover the subject. By such means it is hoped to make class attendance less cumbersome or irksome, the material imparted more instructive, and lessen the time required by students in securing an accurate knowledge of the subject.

While undertaking the task, acknowledged by the author to be a difficult one, it occurred to him that by extending

the notes a little further the work might become a useful adjunct to the general practitioner, whose busy life prevents him securing on all occasions the time necessary for consulting larger works. For such, however, it is not intended as a work for extended research, but from its method of compilation, and from its extensive index, it is hoped that it will serve as a means for ready reference, as well as an index to the many large and excellent works on the subject.

With these objects in view, the author has endeavored to place the subject in as plain and simple a manner as possible, preferring simplicity of expression to the adornment of language. Each subdivision has been briefly described, doubtful points, or subjects open to discussion, discarded, and only such treatment recommended as has stood the test of experience, believing it better to be armed with a few reliable methods of treatment than surrounded by a wilderness of uncertainty.

In the method of arranging the various subdivision, the author has followed that adopted by Garrigue in his excellent work, feeling confident that regional classification is simpler than a pathological one.

In the description of diseases, or of surgical methods adopted for their relief, names of individuals have, as far as possible, been avoided, as being often misleading.

While expressing his own convictions, the author has endeavored to interweave into the pages of the work the opinions of those who represent the most recent and advanced thought, and of those who have been separated out for distinction in the subjects upon which they have written.

Marginal references and foot notes have been avoided, because a knowledge of the source of the literature that has been incorporated is of no advantage to the student until he has mastered the rudiments of the science, and the practitioner can find in the large works of reference all the historical or other facts which he may seek.

PREFACE TO SECOND EDITION.

In this, the second edition, the author desires to acknowledge his gratitude to the kindly reception of the first edition. The review has been conducted with the same objects in view as are enumerated in the preface to that edition. Since its publication the rapid strides made in the knowledge of the pathology of the female pelvis and the elaboration and perfecting of operative technique demanded a complete revision and for some chapters partial or entire rewriting. This revision the author has endeavored to do as faithfully as possible with the single reward in view that it may be of material assistance to the student in mastering his class and clinical work.

The author wishes to acknowledge his indebtedness to the British Whig Publishing Company for the courtesies extended to him while the work was passing through the press.

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Medical and Surgical Gynæcology.

PART ONE.

PRINCIPLES OF GYNÆCOLOGY.

CHAPTER I.

INTRODUCTORY.

The term Gynæcology is understood to designate the affections of the genital organs in the female sex other than those immediately connected with pregnancy, child-birth, and the puerperal state, but clinically it is difficult to disassociate the one from the other, as the accidents and diseases arising during that critical period are the most fruitful sources of diseases peculiar to women.

Great progress has been made in every domain of medicine. Every branch of it has felt the new impulse, but in no department has it been so marked as in this one.

In tracing the development of modern gynæcology it is difficult to keep pace with, or even estimate the rapid progress it has made. Thirty years ago it was a mere appendage to obstetrics, the teaching of it being limited to a few lectures at the end of the session; to-day it is one of the most honored chairs in every medical curriculum. The teachings and practice of to-day bring hope and comfort to many a home which in days gone by would have been the possessor of a wife or mother or daughter doomed to hopeless invalidism under the label of "weak spine," "spinal irritation," "chronic ovaritis," "cellulitis," "irritable womb," and the like.

Through its advances there has been given to surgery
the operation for the removal of pelvic tumors, and to-day
ovarian cysts are removed with a mortality far below any
other capital operation. The ingenious position of Tren-
delenberg has rendered easy the total extirpation of uter-
ine fibroids; the pathology and operative treatment of
extra-uterine pregnancy to-day snatches women from
what then would have been considered the very jaws of
death.

Vesico-vaginal and recto-vaginal fistulæ yield readily
to operation and permanent relief can with almost cer-
tainty be promised. Uterine cancer, the presence of which
until very recently signed the death-warrant of the suffer-
er, is now treated with such good results as to far surpass
the most sanguine expectations, offering at least an in-
creased term of life and sometimes the total eradication of
the disease. Chronic endometritis, once so intractable,
now readily yields to the use of the curette.

To gynæcology is due many of the advances in general
surgery. From it has sprung the scientific treatment of
appendicitis, the surgery of the kidneys and gall-bladder,
as well as that of all intestinal and visceral lesions.

While recounting the triumphs recorded, it must al-
ways be a pleasant task to acknowledge the deep debt of
gratitude which gynæcology owes to Sir Joseph Lister.
Without his scientific discoveries and brilliant teaching,
the successes of modern pelvic and abdominal surgery
could never have been won, and the announcement made
that he has been raised to the peerage, has been received
with the most lively feeling of satisfaction throughout the
medical profession, which is proud to recognise him
among its members and on which he has already shed so
much lustre.

While recognising that pregnancy and child-birth are
fruitful sources of diseases in women, it is not by any
means the greatest source. It is, therefore, the duty of

every student of the subject not to be content with a knowledge of the actual existence of disease, but to study out the etiological factors and the methods by which they may be ameliorated, lessened, or prevented.

A large factor may be found in faulty education. The chief strain of reproducing falls upon woman. She bears the burden of gestation, parturition, lactation, and of maternity, and for this great end she needs the most perfect physical development. The growth and well-being of her body should, therefore, be as carefully looked after as the growth and well-being of her mind, a *concordat* in female education not sufficiently maintained. During girlhood days too much time is spent in the school-room, or in poring over books at home, when she should be at play. Just as womanhood is asserting itself come the competitive examinations which select the brightest and most intellectual, and who are often the most delicately constructed, for promotion to the high schools and universities. Two to four, or even five years, most precious years for them, years needful for the perfect development of not only their general health but for the development of the reproductive organs and for the establishment of their functions, are spent in antagonism between brain growth and body growth. Possibly after leaving school, the worn out, rest-needing girl launches into the married state, and this young girl, wilting under the double strain of wifehood and motherhood, remains ever after an invalid with her uterine and ovarian diseases, or with nerve prostration and its protean mimicry of uterine symptoms.

Undoubtedly some of the worst forms of disease arise from specific infection by husbands, giving rise to sterility, miscarriage, oophoritis and salpingitis of every kind and degree, pelvic and intestinal adhesions, chronic ill-health, and even death.

Probably the most common of all causes is the pre-

vention of conception. By the methods adopted so much engorgement and hyperplasia and disorganization of the uterine structures and appendages are apt to take place, that their health breaks down and they become comparative invalids. It is well to remember, when considering such important factors, that history does not forget to repeat itself. In the time of Julius Cæsar, celibacy and childlessness became more and more common; criminal abortion was frequently practised; pregnancy was considered a mar to beauty, and the Roman Empire, for the want of *men*, was overrun by northern hordes. Greece, once the pride of the world, at last quailed before the Roman Eagle and became a vassal because she could not brook to have her classic tastes interrupted by family cares and family ties.

It cannot but be recognised that those who are the guardians of the public health are the guardians of the nation's prosperity and greatness, and this is doubly true in the case of the health of women who are to become the mothers of our future men, for unless their health and strength and well-being are preserved, the brain and bone and sinew of the country will, by progressive decadence, dwindle towards extinction.

CHAPTER II.

DEVELOPEMENT OF THE FEMALE GENITALS.

For a proper understanding of the malformations and diseases of the female genitals, it is necessary to be able to trace the various steps in their development.

The Wolffian Ducts are the first organs belonging to the genital sphere to appear. There is one on either side of the body and is situated between the proto-vertebral column and the lateral plates. Originally it is a solid cylindrical cell mass, but later becomes tunnelled. The

upper end connects with the Wolffian body, the lower end opens into that part of the allantois situated in the body of the embryo and communicates with the cloaca. In the female the Wolffian duct disappears more or less completely, remnants only of it being found in the broad ligaments.

The Wolffian Bodies are two long prismatic bodies, one on either side of the median line, and appear shortly after the Wolffian ducts. The lower end is fastened to the inguinal region by a ligament, which in course of time becomes the round ligament of the uterus. These bodies originate from the mesothelial lining of the body cavity, and form at first a row of pear-shaped bodies. Later they separate from it, acquire a lumen and form a row of vesicles, each of which soon connects with the Wolffian duct by absorption of the tissue between their cavities and the bore of the duct. In the female the Wolffian body is transformed into *Rosenmuller's organ* or the *parovarium* and stray tubes found between the parovarium and the uterus.

The Ovaries. The sexual glands are situated on the inner side of the Wolffian body, to which they are fastened by a fold of peritoneum, the *mesovarium*. The lower end is fastened to the Wolffian duct by a ligament which later becomes the *ligament of the ovary*. The blood vessels enter originally at the upper end of the mesovarium enclosed in a fold of peritoneum, which in time becomes the *infundibulo-pelvic* ligament. To the outer side of the mesovarium is attached the *mesosalpinx* or *mesentery* of the tube which later is called the *ala vespertilionis* (bat's wing), and contains the remnants of the Wolffian body, particularly the parovarium. The ovaries are also subject to descent. At birth they are above the ilio-pectineal line, and descend into the pelvis during the first two or three months of extra-uterine life.

The Mullerian Ducts appear soon after the Wolffian

body as an extended ridge of thickened mesothelium along the outer side of the upper end of the Wolffian body. The lower part is at first formed by a solid column of cells which later becomes tunnelled so as to form a tube. They form in the female the Fallopian tubes, the uterus, and vagina.

FIG 1.—MULLER'S DUCTS.   FIG. 2.—COALESCENCE OF DUCTS.

The Fallopian Tubes are formed of that part of the Mullerian ducts which lies above the round ligament of the Wolffian body. The cells of the wall form the fibrous muscular and mucous coats of the fully developed tube, and fringes forming the *frimbriæ* grow out around the abdominal opening.

Uterus and Vagina. The part of the Mullerian ducts below the round ligament, together with the lower end of the Wolffian ducts, forms a quadrangular cord called the *genital* cord. The walls between the Mullerian ducts are absorbed and thus but one canal is formed. The genital cord is further developed so as to form the uterus above and the vagina below. While the fusion of the Mullerian ducts is incomplete they are separated above, forming the two *cornua* of the uterus, but later form but one sac without horns. The Mullerian ducts open into the lower part of the *urachus*—that part of the allantois which is included in the body and later forms the bladder. This lower part, situated below the openings of the Mullerian and Wolffian ducts is called the *uro-genital sinus*. Originally this sinus opens into the *cloaca,* but later the septum is formed ,dividing the cloaca and thereby separating the uro-genital sinus from the rectum and the uro-

genital opening from the anus, thus forming the perineum.

The Urethra is differentiated as a special organ from the bladder, with which it heretofore formed one sac called the urachus. The uro-genital sinus which seemed to be the continuation of the bladder now appears as the continuation of the vagina and forms the *vestibule*. The vagina is next separated from the uterus by the formation of a ring and about the same time the cervix is being
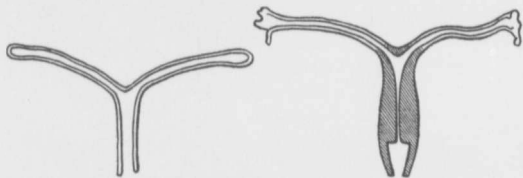
FIG. 3.—DISAPPEARANCE OF SEPTUM. FIG. 4.—APPEARANCE OF FUNDUS AND CERVI

distinguished from the body of the uterus. The vagina becomes much wider, its *columns* and *rugæ* make their appearance, and later the *hymen* is formed by a development of the posterior wall of the vagina.

The Vulva. Originally the uro-genital and digestive tracts open into one common cavity, the *cloaca*. The cloaca opens on the surface of the body by a slit called the cloacal opening. In front of this opening appears an elevation called the *genital tubercle*, surrounded by two folds called the *genital folds*. A groove is formed on the lower surface of the genital tubercle, called the *genital furrow*. The genital tubercle becomes the clitoris; the genital folds, the *labia majora;* the edges of the genital fold, the *labia minora*, a fold of which surrounds the clitoris forming the prepuce. The separation between the uro-genital sinus and the rectum is completed; the genital folds grow together at their posterior end and unite with the partition or septum between the uro-genital sinus and the rectum to form the perineum.

CHAPTER III.

ANATOMY.

THE PELVIS.

Four bones, two *ossa innominata*, the *sacrum*, and the *coccyx* take part in the formation of the pelvis. The pieces comprising the innominate bone—the *ilium*, *ischium*, and *pubis*—in early life are distinct, but later are fused into one. The space included within these bony walls is divided into two parts, the part above the ilio-pectineal line is called the *false pelvis*, and that part below, the *true pelvis*. The true pelvis is a short curved canal, whose superior *strait*, *inlet* or *brim* is bounded behind by the promontory of the sacrum, laterally by the ilio-pectineal lines, and in front by the upper margin of the pubis. The *inferior strait* or *outlet* is bounded behind by the tip of the coccyx, laterally by the tuber-ischii, and in front by the lower border of the pubic bones.

The *plane* of the inlet, when the body is in an erect position, forms with the horizontal an angle of about forty-five degrees. The *axis of the inlet* if directed upward would pass through the umbilicus, and if prolonged downward would touch the tip of the coccyx. *The axis of the outlet* if extended upward would meet the promontory of the sacrum. The bones are united with one another by four articulations, one in front between the two pubic bones, the *symphysis pubis;* two laterally between the lateral surface of the sacrum and ilium, the *sacro-iliac;* and one behind between the sacrum and coccyx, the *sacra-coccygeal.* In addition to the ligaments which bind these bones together, there are two important ones closely associated with the boundary of the true pelvis—the *greater* and *lesser sacro-sciatic* ligaments.

THE FEMALE ORGANS OF GENERATION.

The Genital Organs are divided into two groups: the *external* to which belong the *mons veneris*, the *vulva* and the *vagina;* and the *internal* to which belong the *uterus*, the *Fallopian tubes,* and the *ovaries.*
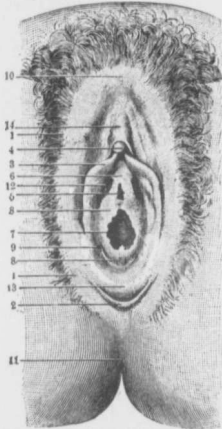
Fig. 5.—Virginal Vulva: 1, labia majora; 2, fourchette; 3, labia minora; 4, glans clitoridis; 5, meatus urinarius; 6, vestibule; 7, entrance to the vagina; 8, hymen; 9, orifice of Bartholin's gland; 10, anterior commissure of labia majora; 11, anus; 12, blind recess; 13, fossa navicularis; 14, body of clitoris.

The Mons Veneris lies in front of the pubic bones just below the hypogastric region. It is composed of stout integument, abundantly supplied with crisp hair and a thick cushion of subcutaneous adipose and areolar tissue. The hair is limited above and does not extend to the umbilicus as in man.

The Vulva forms and surrounds the entrance to the genital canal. It is made up of the *labia majora*, with the *fourchette;* the *labia minora* with the *clitoris;* the *vestibule* with the *bulbs;* the *fossa navicularis;* and the *vulvovaginal glands.*

The Labia Majora are two conspicuous longitudinal folds of integument, one on either side of the median line, extending from the mons veneris to within about an inch in front of the anus. The outer surface is covered with pigmented epidermis and scattered hairs; the inner surface is smooth, rose-coloured, more delicate in texture, and where least exposed partakes of the character of a mucous membrane. The point at which they unite in front is called the *anterior commissure,* and behind the

posterior commissure. Immediately within the posterior commissure, a crescentic fold extends transversely, the *fourchette.* The space between the fourchette and the posterior commissure is the *fossa navicularis.* Each labium includes within it areolar tissue, unstriped muscle fibre, and considerable fat, and together are the homologues of the scrotum in the male.

The Labia Minora or Nymphæ are two thin diverging folds of delicate skin on the inner side of the labia majora. Just before meeting in front, each divides into two leaflets, the outer or upper leaflet of each passing over the clitoris to unite and form the *prepuce;* the inner or lower leaflet passing beneath to form the *frenum.* They extend back to about half way between the clitoris and the posterior commissure, gradually, merging into the sides of the vaginal orifice.

The Clitoris is a small cylindrical body about an inch long situated in the median line below the anterior commissure. It is composed of the *glans*, a pointed tubercle which forms the end and is the only part visible, and the *body* which consists of two distinct *corpora cavernosa* attached to the symphysis by the suspensory ligament and by their crura to the rami of the pubes. It is supplied with erectile and muscular tissue, in diminutive similar to that of the male, and has a prepuce and frenum formed by the labia minora. The *blood supply* comes from the internal pudic, the same as in the male, and the *lymphatics* empty into the inguinal glands.

The Vestibule includes the triangular space between the clitoris, the labia minora, and the entrance to the vagina. Its smooth mucous surface is broken in the midline about one inch behind the clitoris, by the urethral opening or *meatus urinarius.*

The Vestibulo-vaginal Bulbs are two leech-shaped organs, one on either side of the vestibule and together are equivalent to the bulb in the male urethra.

The Vulvo-vaginal or Bartholin's Glands are two small round or oval bodies situated on either side of the entrance to the vagina at the posterior end of the vestibulo-vaginal bulbs. They are racemose glands, secreting a mucous fluid.
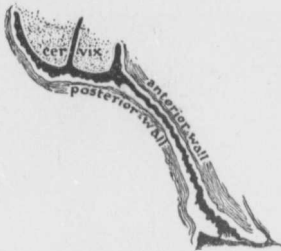
FIG. 6.—Shape and relative length of vaginal walls.

The Vagina is a musculo-membranous canal lying chiefly within the cavity of the pelvis and extending between the vulva and the uterus. It pierces the pelvic floor at its lower end and is in relation with the bladder and urethra in front and with the rectum behind. The *axis* while corresponding in general with that of the pelvic cavity, presents a double or S-like curvature. When not distended it is folded, the anterior and posterior walls being in contact so that in cross section it resembles in shape the letter "H." When distended it is in the form of a truncated cone, the apex at the vulva. The lower end dips into the vulva by a circular opening surrounded by the *constrictor vaginæ* muscle. The upper end forms a cup to receive the vaginal portion of the uterus, and in its adaptation to the parts forms a shallow pouch in front and behind, the *anterior*

FIG. 7.—Horizontal Section of the Soft Parts in the Inferior Strait of the Pelvis (Henle); *Va*, vagina; *Ur*, uretha; *R*, rectum; *L*, levator ani.

and *posterior fornices*. In the adult virgin the anterior
wall is about two and a half inches long and the posterior
about three and a half inches, but after child-birth these
dimensions are increased.
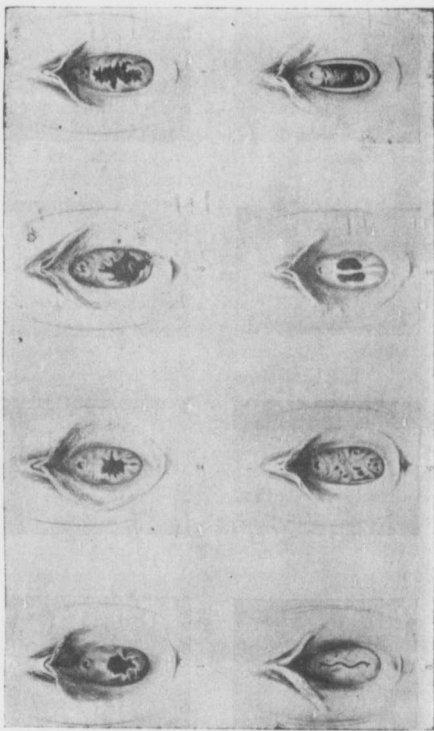
FIG 8.—VARIETIES OF HYMEN Virgin hymen, 1, commonest form (annular);
2, hymen after coitus; 3, after delivery; 4, fimbriate hymen; 5, hymen with
narrow slit; 6, cribriform hymen; 7, hymen with septum; 8, horseshoe form.

In *structure* the walls of the vagina consist of a *mucous* membrane, covered by stratified squamous epithelium and possessing numerous papillæ; a *muscular* layer made up of longitudinal and circular fibres; and a *fibrous* tunic of rich fibro-elastic tissue derived from a prolongation of the recto-vesical fascia. The mucous membrane of the anterior wall is thrown into folds or *rugæ* and a less distinct formation is found on the posterior wall. They are called the *anterior* and *posterior columns*.

The *blood supply* is derived from the vaginal, uterine, vesical, and internal pudic arteries. The *lymphatics* from from the lower fourth join the lymphatics of the external genital organs and end in the superficial inguinal glands. The lymphatics of the upper portion proceed outward with the broad ligament and joining with those from the oviduct and ovaries terminate in the lumbar glands. The *nerves* are derived from the inferior hypogastric plexus of the sympathetic and from the fourth sacral and pudic nerves.

The Hymen is a fold of mucous membrane which closes more or less completely the lower opening of the vagina. It varies much in *shape*, the most common being two lateral strips which touch one another in the middle line. Sometimes it forms a ring with a round opening, sometimes a crescent, and sometimes it is represented only by a low circular or crescentic ridge, and not infrequently the border is indented, which condition is not to be confounded with a lacerated hymen. At coition the hymen is usually torn, but at first child-birth it is so destroyed as to leave only three or four roundish prominences called the *carunculæ myrtiformes*.

The Uterus is a hollow flattened pyriform muscular organ situated between the vagina below and the intestines above, and between the bladder in front and the rectum behind. It is about three inches long, one and a half inches at its greatest width, and one inch in thickness.

Of the entire organ, three-fifths belong to the upper part
or *body* and two-fifths to the lower part or *neck*. The
body is almost flat on its anterior surface but distinctly
convex behind; the upper border is rounded and con-
stitutes the *fundus;* the lateral borders are slightly convex
and mark the attachment of the broad ligaments. The
neck or *cervix*, spindle-shaped in its general outline, is
divided into the *vaginal portion*, or that part which pro-
jects down into the vagina, and the *supravaginal portion*.
The vaginal portion is covered with *squamous epithelium*,
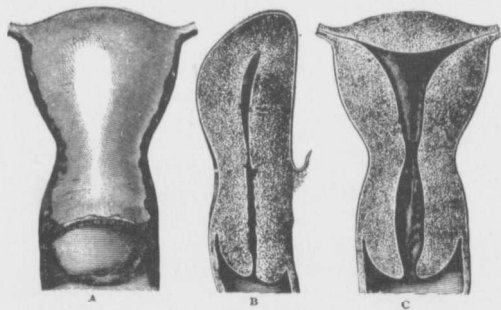
Fig. 9.—Virgin Uterus.
A. Anterior view.   B. Median section.   C. Lateral section.

the same as covers the mucous membrane of the vagina,
and at its lower end is a transverse or rounded opening,
the *os externum* or *os uteri*. That portion of the cervix in
front of the os forms the *anterior lip*, and that behind the
posterior lip.

The interior of the uterus contains a cavity, the *uterine
cavity*, about two and one-half inches long. That portion
within the body is triangular in shape when viewed from
in front, the expanded base extending between the orifices
of the oviducts and the apex corresponding with the
upper opening of the cervical canal, or *os internum*.

That portion within the cervix is fusiform in shape and on its anterior and posterior walls are found ridges separated by deep pouches which go outward and upward and form the *arbor vitæ* or *palmæ plicatæ* of the uterus.

Structure. The uterine wall is about three-eights of an inch thick and is composed of three layers, a mucous, a muscular, and a serous. The *mucosa* lines the whole cavity and consists of a *tunica-propria* covered by a layer
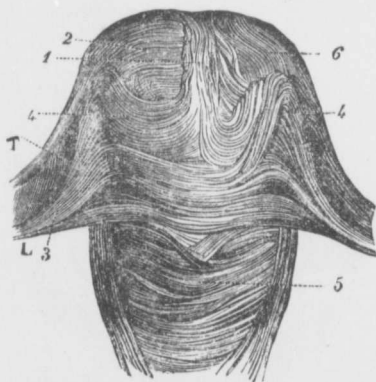
FIG. 10.—Anterior Surface of the Uterus, Superficial Layer. L, Round ligament; T, Tube; 1, middle layer; 2, transverse fibres; 3, fibres of the round ligament which have spread over the anterior surface of the uterus; 4, fibres arising from the posterior portion of the round ligament which form loose folds before they join the median fasciculus; 5, fibres of the cervix uteri; 6, oblique fibres.

of ciliated columnar cells. Numerous tubular depressions, the *utricular glands*, lined with ciliated epithelium are found in it. In the cervix the mucosa is thicker, and in addition to the tubular follicles, racemose glands lie within it. Its upper two-thirds is covered with ciliated columnar and its lower one-third with stratified squamous epithelium. The *muscular coat* is divided into three layers,

an outer longitudinal which sends prolongations into the
oviducts, and the round, ovarian and sacro-uterine liga-
ments; a middle layer of interlacing longitudinal and
circular fibres, which are in connection with the muscular
coat of the vagina; and an internal transverse layer, the
lower portion of which is especially developed to form a
sort of sphincter at the os internum. The *serous coat* is
formed by the usual constitutents of the peritoneum.

Position. The exact position of the uterus in the
living subject is a much discussed question. It may be
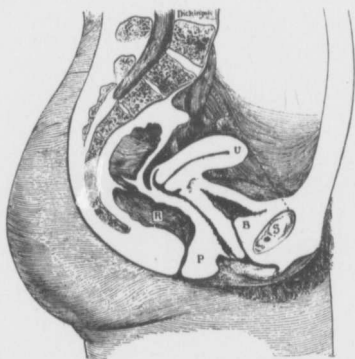
Fig. 11.—Diagrammatic sagittal section of the female pelvis. U, uterus;
R, rectum; S, symphysis; P, perineal body; B, is beneath bladder. This is
the position of the uterus when the bladder is almost empty.

said that the fundus reaches a little above the brim of the
pelvis and lies a little to the right side. With the rectum
and bladder empty, the longitudinal axis of the uterus
forms a right or obtuse angle with that of the vagina.

The Supporting Apparatus of the uterus consists of
eight ligaments composed of folds of peritoneum or mus-
cular bands, or of both, passing from the uterus. The
vesico-uterine are two small semilunar folds of peritoneum,

one on either side of the median line and passing from the bladder to the uterus on a level with the internal os.

The *sacro-uterine* are folds of peritoneum passing from the cervix to become continuous with the serous covering of the second portion of the rectum. They form the lateral boundaries of *Douglas' pouch*. Between its layers unstriped muscle fibres derived from the outer layer of the uterus extend from the upper part of the cervix to the second sacral vertebra.

The *lateral* or broad ligaments are two wide duplicatures of peritoneum, one on either side, extending from the side of the uterus to the pelvic wall, forming a partition between the anterior and posterior pouches. Each presents four borders. The *superior* or free border encloses the oviduct as far as its fimbriated end and then diverges towards the pelvic wall to form the *infundibulo-pelvic* ligament. The *inferior* border is attached below to the recto-vesical fascia and to a mass of connective tissue lying at the side of the cervix, called the *parametrium* or *parametric* connective tissue. The *internal* border is attached to the side of the uterus, and the *external* border to the side of the pelvic wall where it is continuous with the obturator fascia. This ligament has two layers, an anterior which covers the round ligament, and a posterior in which there is an opening for the insertion of the ovary. Between the layers are found the blood vessels, nerves and lymphatics, together with the *parovarium,* the *paroophoron,* and unstriped muscle fibres which pass from the uterus to the pelvic wall.

The *round ligaments,* one on each side, are attached to the upper segment of the uterus, below and in front of the oviducts. Each proceeds in a curved direction, first upward and outward, then inward and forward to the internal inguinal ring, through which it passes. After traversing the inguinal canal it emerges at the external inguinal ring to blend with the tissues of the labium

majus. The ligament consists of bundles of connective tissue and unstriped muscle fibre derived from the uterus. It at first runs under the anterior layer of the broad ligament, but afterwards has a peritoneal covering of its own which, as a rule, stops at the inner ring. Occasionally the pouch of peritoneum accompanies it through the ring, forming the *canal of Nuck,* corresponding to the processus vaginalis in the male.
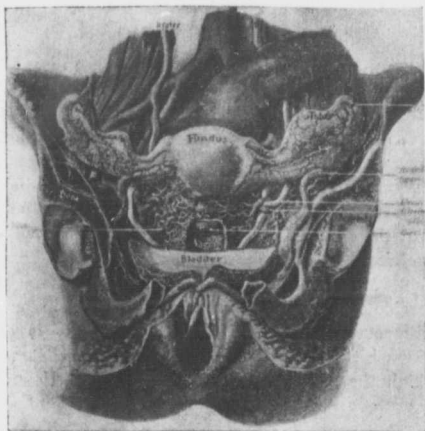
Fig. 12.—Blood-vessels of the pelvis; the anterior part of the pelvis has been removed, and the bladder and the anterior vaginal wall have been partially cut away. The uterus is drawn up and the Fallopian tubes are displaced into the iliac fossæ.

Blood Supply. The uterine arteries derived from the internal iliac pass behind the peritoneum on the posterior wall of the pelvis down into the parametrium and form loops in front of the ureters a short distance from the antero-lateral fornices of the vagina. They then pass up between the two layers of the broad ligaments following

the edges of the uterus as far as the cornua, and in their course they send off at right angles branches to the uterus. At the internal os branches in front and behind form, by an anastomosis, the circular artery.
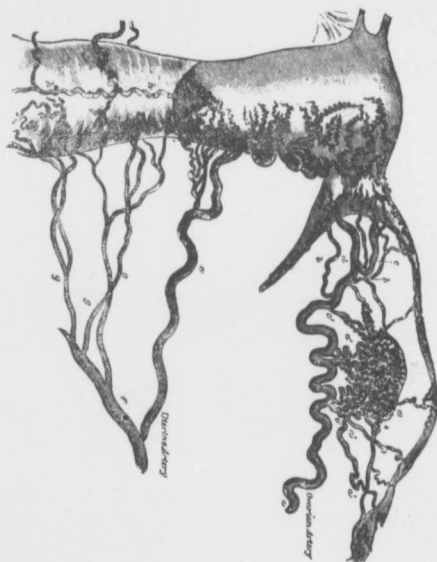
FIG. 13.—The ovarian, uterine and vaginal arteries.

The *lymphatics* commence in the endothelium, those from the cervix passing to the obturator glands, and those from the body to the internal iliac glands.

Nerve Supply. Branches from the second, third, and fourth sacral nerves join with branches from the hypogastric plexus to form a ganglion on either side of the

cervix. From this ganglion, branches are distributed to the uterus, vagina and bladder.

The Fallopian Tubes or Oviducts are two long slender tubes which extend from the superior angles of the uterus within and along the free margins of the broad ligaments for a distance of from three to five inches to the vicinity of the ovaries, where each terminates in a funnel-shaped orifice, the *infundibulum*.

Each tube is divided into three parts. The *isthmus* comprises about the inner third, and communicates with the uterus by the *ostium internum,* an opening so small as
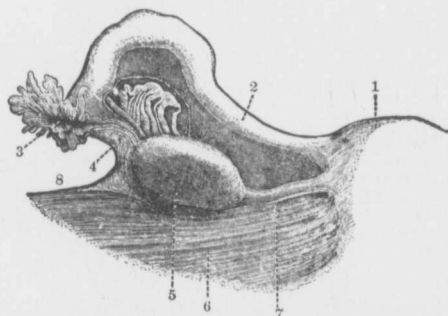
FIG. 14.—Posterior View of Left Uterine Appendages: 1, uterus; 2, Fallopian tube; 3, Fimbriated extremity and opening of the Fallopian tube; 4, par-ovarium; 5, ovary; 6, broad ligament; 7, ovarian ligament; 8, infundibulo-pelvic ligament.

barely to admit a bristle. The *ampulla* or middle part is twice as thick, curved, and follows a serpentine course. Its calibre will admit a uterine sound. The *frimbriæ* are the outermost part, and surround the outer end of the ampulla like a collar with long flaps. One of these, the *fimbria ovarica,* is attached to the free end of the ovary and forms a gutter. In the middle of the fimbriæ is the outer opening or *ostium abdominale.*

Structure. The oviducts are made up of three coats. The *mucous,* continuous with that of the uterus, presents numerous longitudinal folds which increase in size and complexity within the infundibulum, and is lined by a single layer of ciliated columnar epithelium. The *muscular* is made up of an inner circular and an outer longitudinal layer of unstriped muscle fibres continuous with the muscular coat of the uterus. The *serous* coat consists of the peritoneal investment contributed by the upper free margin of the broad ligament.

The Ovaries are two oval bodies situated by the side of the uterus, below, behind, and to the inner side of the oviducts. Each ovary appears as an appendage on the posterior surface of the broad ligament. The anterior border alone is attached, being inserted there in a hole, as it were, in the posterior layer. The arched posterior border and the broad surfaces are covered with hexagonal columnar epithelial cells, the *germinal epithelium.* The dimensions vary considerably with the individual but they usually measure one and one-half inches long, one inch wide, and half an inch thick. The smaller or lower end of the ovary or uterine pole points toward the uterus, to which it is united by a fibro-muscular band about one inch long, the *ovarian ligament.* The upper end or tubal pole after being embraced by the arching oviduct receives the lower border of the fimbriated extremity of the oviduct, and is further connected to the wall of the pelvis by the infundibulo-pelvic ligament through which the blood supply is conveyed to the ovary by means of the ovarian artery, a branch of the abdominal aorta.

Structure. The ovary is divided into an outer part, the *parenchymatous zone* or *cortex,* and an inner, the *vascular zone* or *medulla.* The cortex contains the *Graafian follicles,* and the *ova,* and occupies the outer one-third of the organ. The medulla embraces the remaining central portions of the organ into which the

blood vessels enter through the hilum. The bulk of the organ consists of peculiarly arranged connective tissue and of unstriped muscle fibre, the *ovarian stroma,* in which lie embedded the Graafian follicles. Beneath the germinal epithelium it forms a layer of greater density than the adjacent stroma, to which the name *tunica albuginea* is applied, but it is not an independent envelope. Under the albuginea is found a zone distinguished by the presence of small follicles containing an ovum, the so-called *ovisacs* or young Graafian follicles. Inside this zone is found another with much larger Graafian follicles. The medulla is composed of connective tissue and un-striped muscle fibre, but much looser in its arrangement, and in this the blood vessels are freely distributed. There are usually from six to twelve large follicles in an ovary and it is simply by their increased size that they seem to form a zone inside the smaller ones. In growing they push the surrounding tissues aside, extend deep into the interior of the ovary and at the same time come closer to the surface, until finally all tissue between the follicles and the surface is absorbed and they are then ready to burst.

The mature Graafian follicle appears as a clear elon-gated vesicle defined from the surrounding tissue by a condensed layer of ovarian stroma, the *theca folliculi,* which by some is described as composed of two layers, an outer of connective tissue, the *tunica fibrosa,* and an inner composed of cells and a fine net-work of vessels, the *tunica propria.* Within these are several layers of epithe-lial cells, the *membrana granulosa,* and on one side these cells form a protruding mass into the cavity called the *discus proliferus.* The follicle contains a fluid, the *liquor folliculi.* In the discus proliferus is embedded the ovum, about 0.3 m.m in diameter, inside of which is found a fine membrane, the *zona pellucida,* or *vitelline membrane.* The interior is filled with a semi-fluid, the *vitellus,* inside of

which there is a small vesicle, the *germinal vesicle*, and within this is found a little round body, the *germinal spot*.

On the escape of the ovum the ruptured and partly collapsed follicle becomes filled with blood. Subsequent changes lead to the conversion of the follicle into a *corpus luteum*, the chief changes in which being produced by the ingrowth and rapid proliferation of the vascular tissue of the follicular wall. The history of the corpus luteum is naturally affected by the occurrence of pregnancy, instead of being almost entirely absorbed within a few weeks, when fertilization takes place it persists until the end of gestation. It is usual, therefore, to distinguish between the *corpus luteum* of *menstruation* and that of *pregnancy*. The mode of growth is identical in both, the stimulus of impregnation leading usually to excessive development.

The Parovarium or Organ of Rosenmuller, a remnant of the Wolffian body, is situated within the two layers of the broad ligament, between the outer end of the ovary and the oviduct. It consists of a series of from six to twelve spiral tubules, lying irregularly parallel, and made up of connective tissue, unstriped muscle fibre and columnar epithelium. Additional fœtal remains in the form of rudimentary tubules are found within the broad ligament near the ovary and constitute the *paroophoron*.

URINARY ORGANS.

The Female Urethra is short, being only about one and one-half inches long, and lies beneath the symphysis pubis, firmly embedded within the anterior vaginal wall. It descends from the neck of the bladder in a slightly curved direction, the concavity being forward, to the vestibule, where it terminates in the *meatus urinarius*. It is surrounded by the *compressor urethræ* muscle and has a *sphincter* at the meatus. It is about a quarter of an inch in diameter, but owing to the elastic character of its

tissues is capable of great distension, a feature of much advantage in examination of the bladder.

The *mucous membrane* is covered with stratified transitional epithelium, and tubular glands occur near the vesical end. Two small tubes, *Skene's glands,* lie within the muscular wall and open into the urethra a short distance above the meatus.

The Bladder is placed between the pubic bones and the vagina and uterus. When empty it is situated in the true pelvis and is flattened or "Y" shaped; when distended it reaches more or less into the abdominal cavity and is ovoidal. The *base* or *fundus* is the lowest part of the organ and is connected to the anterior wall of the vagina and to the neck of the uterus by rather firm connective tissue. *Three openings* are found in it. In front is the internal opening of the urethra, and behind there are two fine lengthy slits, where the ureters open into the bladder. The triangular surface between these three openings is called the *trigone.* The anterior surface has no peritoneal covering and lies against the pubic bones. The posterior surface is covered with peritoneum down to the level of the internal os. It has three coats, a *serous,* derived from the peritoneum; a *muscular,* composed of an outer longitudinal, and an inner circular layer of unstriped muscle fibre; and a *mucous* coat which is thrown into folds when empty. This coat contains numerous *lacunæ* and *racemose glands,* and is covered with stratified transitional epithelium.

Ligaments. The bladder has four true ligaments, two *anterior,* running from the lower part of the pubis to the anterior surface, and two *lateral,* from the outer margins of the anterior ligaments to the sides of the bladder. The false ligaments, five in number, are folds of peritoneum. The two *posterior* are the *vesico-uterine* ligaments. The *lateral* extend from the iliac fossæ to the sides of the

bladder, and the *superior* extends from the summit of the bladder to the umbilicus.

The Ureters are two tubes leading from the kidneys to the bladder. They are from sixteen to eighteen inches long and about the size of a goose quill. Starting at the pelvis of the kidney, they run down parallel with each other to the brim of the pelvis and there crossing the iliac vessels slightly below the division of the common iliac
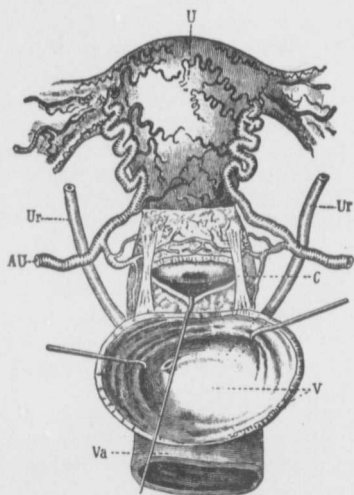
FIG. 15.—Relation of the Ureters and Uterine Arteries to the Cervix: *U*, uterus; *Ur*, ureter; *AU*, uterine artery; *C*, cervix uteri; *V*, section of the bladder at the level of the entrance of the ureters through its walls; *Va*, vagina.

arteries, enter the pelvic opposite the sacro-iliac synchondrosis. They run on the wall of the pelvis backward, downward, and a little outward behind the peritoneum to a point near the spine of the ischium. They then bend

downward, forward, and inward to converge towards the bladder. They lie outside the internal iliac arteries behind the broad ligaments, running down to their base and then under them. They cross the cervix from behind at an acute angle, about one-half inch distant, so as to come in front of and below it. On reaching the wall of the bladder they turn sharply inward and run for half an inch in its wall, finally opening with a small longitudinal slit in the interior of the bladder.

The Rectum is formed by the lower end of the large intestine and extends from the brim of the pelvis to the anal aperture. It is from six to eight inches long, and when empty is one and a half inches wide, but is capable of enormous distension. For convenience of description it is divided into three parts. The upper or *first portion* extends downward, backward, and inward to the third sacral vertebra, and is covered entirely with a fold of peritoneum, forming the *meso-rectum*. The *second* portion turns forward and extends as far as the tip of the coccyx, but is covered with peritoneum in front only, (Douglas' pouch.) The *third* portion, about an inch from its end, turns downward and backward at a right angle to the axis of the vagina to terminate in the anal orifice. It has no peritoneal covering whatever.

Structure. Besides the peritoneal covering already described, it has a muscular coat formed of an outer longitudinal and an inner circular layer of unstriped muscle fibre. At the lower end the longitudinal fibres are intimately interlaced with the *levator ani,* and *internal* and *external sphincter* muscles. The *external sphincter* is a voluntary muscle and surrounds the anal opening. It it attached behind to the tip of the coccyx, and in front it blends with the transversus perinei and the sphincter vaginæ muscles. The internal sphincter is only a thicker part of the circular layer of the rectum and surrounds the anal canal inside the external sphincter. The *mucous*

coat, thrown into numerous folds when the rectum is
empty, is covered with columnar epithelium and has
many glandular pouches.

Relations. The upper part of the rectum is separated
from the uterus by loops of small intestines ; lower down
it is in close contact with the cervix and vagina, and at
the end it forms the posterior wall of the perineal body.

The Pelvic Peritoneum is a continuation of the ab-
dominal peritoneum and covers more or less completely
the organs in the pelvis. In front it passes from the
anterior abdominal wall to the summit of the bladder,
which it covers as well as the posterior wall down to the
level of the internal os. From there it is reflected over
the anterior surface of the uterus and the fundus. It then
covers the whole of the posterior surface and extends
down behind the posterior wall of the vagina for about
an inch. It next passes over to the rectum, leaving a
pouch between the two folds, Douglas' pouch or the
recto-uterine pouch. From the side of the uterus the peri-
toneum passes out to the walls of the pelvis, forming the
broad ligaments.

The uterus and broad ligaments together divide the
pelvic cavity into an antero-inferior and a postero-super-
ior part. In the anterior compartment or *utero-abdominal
pouch,* we find the utero-vesical and round ligaments. Its
lateral parts, opposite the obturator canal, have been
called the *obturator* or *para-vesical* pouches. The pos-
terior compartment is divided into a central deep part,
Douglas' pouch, and two shallower lateral parts or *para-
uterine* pouches. The bottom of these has been designated
particularly as the *retro-ovarian shelves.* The sacro-
uterine ligaments, one on each side, form the boundaries
between the three compartments. On the side wall of the
para-uterine pouch is seen the ureter running under the
peritoneum. The ovaries project into these pouches and
besides contain loops of small intestines.

Pelvic Connective Tissue. Loose connective tissue is found everywhere underlying the peritoneum, forming one continuous layer. In some places it contains adipose tissue. Just above the symphysis there is a layer, the *pre-peritoneal* fat, continued behind the symphysis as the *retro-pubic* fat. Between the base of the bladder and vagina there is a tight layer of connective tissue and on the front surface of the vagina there is a loose layer. A large mass of connective tissue is found on both sides of the cervix, forming under the broad ligaments the *parametria*. From the parametric region a thin layer extends between the folds of the broad ligament, and from there is continued into the iliac fossa and lumbar regions.

The Pelvic Floor. Under this heading there remains to be considered three important structures, the *pelvic fascia,* the *pelvic diaphragm,* and the *perineal region.*

The Pelvic Fascia is a continuation of the iliac fascia. It is attached to the iliac part of the ilio-pectineal line, and to an oblique line on the posterior surface of the pubic bone. It descends on the inner side of the pubes and ischium about half way down, where a strong sinewy cord, the *white line,* or *tendinous arch,* extends from the spine of the ischium to the pubic bone. That part of the fascia covers the obturator internus and is called the *obturator fascia.* At the arch the fascia splits into two layers, an upper, called the *recto-vesical fascia,* which bends inward over the levator ani; and a lower, which follows the obturator internus to the edge of the ischium and pubes, keeping the name of obturator fascia. At the tendinous arch at the upper insertion of the levator ani, the fascia gives off another layer which runs on the outer surface of that muscle and is called the *anal fascia.* Together with that portion of the obturator fascia lying below the line, the anal fascia forms the lining of the ischio-rectal fossa, and is called the *ischio-rectal* fascia.

The recto-vesical fascia covers the upper surface of the levator ani down to the base of the bladder, the vagina and rectum. In front a layer forms the anterior, and on the side, the lateral true ligaments of the bladder. From the under surface of the recto-vesical fascia a prolongation surrounds the vagina, and forms a strong ring around the vaginal entrance where it joins with the deep perineal fascia. From the spine a band goes to the rectum, which follows the rectum down as a sheath and disappears around the anus. By its distribution the pelvic fascia forms an irregular fibrous layer under the peritoneal cavity, strengthening the pelvic floor and giving support to the organs found in it.

Pelvic Diaphragm. Under the pelvic fascia is a horse-shoe-shaped muscular expansion, open in front, formed by what is generally described as two muscles, the *levator ani* and the *coccygeus*. It is attached above to the posterior surface of the pubic bones, to the tendinous arches of the pelvic fascia, to the front of the spines of the ischia, and lesser sacro-sciatic ligaments. From these attachments the anterior portion goes backward and inward, on either side, some fibres to be attached to the urethra; some cross the vagina and are interwoven on its lateral aspects with its structures; some loops go from side to side between the vagina and the rectum, but the greater part joining with the fascial portion goes behind the rectum, grasping the end curve of that tube and supporting it. The posterior fibres are inserted into the side of the sacrum and coccyx.

Function. It strengthens the pelvic floor and forms a strong bed on which rests the uterus and bladder. It is the antagonist of the thoracic diaphragm, being relaxed in inspiration and contracted during expiration, as may easily be seen with the Sims' speculum in the vagina. It lifts the rectum up during defecation and exercises a similar function for the vagina during childbirth.

The Perineal Region is somewhat rhomboidal in shape and is bounded by the symphysis and descending rami of the pubes, by the tuberosities and ascending rami of the ischium, and by the lower edge of the gluteus maximus and tip of the coccyx. It may be subdivided by a line drawn across in front of the tuberosities into two parts or triangles, an anterior or *uro-genital*, and a posterior or *anal region*.

Perineal Fascia and Ligaments. The anterior or uro-genital region has beneath the skin and adipose tissue, a layer of dense connective tissue called the *superficial perineal fascia*, analogous to that in the male. Beneath this there is another layer, the *deep perineal fascia* or *triangular ligament*. It has two layers, a superficial attached at the sides to the rami of the pubes and ischium, and in front to the pubic bones, behind it is continuous with the superficial perineal fascia and with the deep layer. The deep layer is likewise fastened to the rami of the ischium and pubes. In front it is continuous with the recto-vesical fascia, behind it is continuous with the anal fascia on the lower surface of the levator ani. It is perforated by the urethra and vagina. Where the superficial perineal fascia and the two layers of the deep meet behind, they are fortified by a strong transverse band, the *ischio-perineal* ligament. In the anal region the anus forms an opening in the median line between the nates, and is there surrounded by its sphincter. Between the rectum and the ischium is a pyramidal space, the *ischio-rectal fossa*.

Perineal Muscles. Situated beneath the superficial perineal fascia there are three pairs of muscles. The *ischio-cavernosus* or *erector-clitoridis* is attached at one end to the ramus and tuberosity of the ischium, covers the corpus cavernosum, and at the other end is attached to the free part of the clitoris. The *bulbo-cavernosus* or *sphincter vaginæ* receives some fibres from the external

sphincter and superficial transversus perinei, passes forward on either side and is attached, one part into the posterior aspect of the bulb, another on the mucous membrane between the clitoris and the urethra, and another on the lower surface of the clitoris.

The superficial transversus perinei is attached to the tuberosities of the ischia and to the median raphe. The deep muscles in the uro-genital region are not well developed. They are the *compressor urethræ*, the deep *transversus perinei*, and the *constrictor vaginæ*, all situated between the two layers of the deep perineal fascia.

The Perineal Body is the name given to the tissues comprised between the genital canal and the rectum, below the point where

FIG. 16.—Dissection of the Muscles of the Perineum and Pelvic Floor. A, Anus; B, Bulb of the Vagina; C, Coccyx; L, Larger sacro-sciatic ligament; P, Perineal body; U, Urethra; V, Vagina; G, Vulvo-vaginal gland. 1, Clitoris; 2, its suspensory ligament; 3, Crura Clitoridis; 4, cunni; 7, Transversus perinei; 8, Sphincter clitoridis muscle; 5, Constrictor cter ani ext.; 9, 10, Levator ani; 11, Coccygeus; 12, Obturator ext.

it turns backward. In *shape* it is not always the same. Sometimes it is triangular, with the base down, in some it has an upper narrow and a lower broad part, and in others it is nearly quadrangular, or has the shape of a quadrant of a circle.

In structure it is composed of the posterior ends of the bulbo-cavernosus, the fibres of the transversus perinei, the external and internal sphincter ani, and the levator ani muscles, the ischio-perineal ligament, the posterior part of the superficial and deep fascia, the anal

fascia, and adipose tissue. It is covered below by the
skin, behind by the mucous membrane of the rectum,
and above and in front by the mucous membrane of the
vulva and sometimes of the vagina. This body is of
great importance, by forming the centre of the whole
perineal region, and by its muscles, fascia, and liga-

FIG. 17.—Triangular
shape of perineal
body.

ments being fastened to the surround-
ing bones, it becomes the chief support
of the whole pelvic floor.

The *blood supply* by means of the
internal pudic artery is distributed the
same as in the male. The *nerve supply*
is distributed from the *pubic* branches
of the sacral plexus and from the
pudendal branches of the small sciatic.
The *lymphatics* lead to the inguinal glands.

CHAPTER IV.

ÆTIOLOGY IN GENERAL.

The diseases which may be said to be peculiar to wo-
men are attributable to many causes, the most prominent
of which may be thus classified:—

1. Anatomical. The relations which the vagina,
uterus and appendages bear to each other in the pelvic
cavity, and the fact that there is a direct communication
with the peritoneum through these organs constitutes an
important factor. Gonorrhoeal, tubercular and other
forms of infection deposited on the vulva or lower genital
tract may find its way through the uterus and Fallopian
tubes into the general abdominal cavity.

**2. Abnormalities produced by hereditary congenital
deficiencies of development.** The defective heredity is
probably not generally immediate but a gradual declen-
sion, for the most part on the maternal side, tending, by

continuous degeneration, to induce in the progeny feeble
sexual formation. For instance, the first stage may be
found in a woman having a uterus of moderate develop-
ment, but contracted at its opening, and which becomes
lacerated in her first confinement. The offspring, pos-
sessing a feebly developed uterus, becomes pregnant by
chance, it may be long after marriage or after an opera-
tion; or she may have a congenitally contracted upper
vagina; or a tendency to infantile pelvis, with absence
of sexual appetite. She becomes the mother of one child
who has yet a feebler unimpregnable uterus, with
atrophic ovaries and deficient and most likely painful
catamenial discharge.

3. Abnormalities produced by congenital or subse-
quent arrest of development owing to the effects of
bacterial action. The eruptive fevers, as measles, scarlet
fever, small-pox and probably syphilis also, by the action
of their toxines, directly conveyed to the embryo by
absorption from the maternal blood, destroy the vitality
and power of growth of the germinal genital cells. After
birth and at any time previous to full development, these
causes, and along with them tuberculosis, may effect and
destroy the vitality of the growing cells. The destruction
of vital force in the special germ cells produces arrest of
development, and as a result congenital deficiencies and
arrest of development are found in the ovaries, oviducts,
uterus, vagina, hymen, or vulva. Should the development
of the genital ridge be deficient or arrested the ovaries
are so undeveloped that they are unable to arrive at their
successive monthly maturity, whence arise amenorrhœa
and sterility. If the growth of the upper part of the
Mullerian ducts ceases, the oviducts are minute or de-
fective. By the absence of fusion, complete or partial, of
the two Mullerian ducts in the genital cord, the uterus is
double or bifid. From arrest in one duct and develop-
ment in the other, the unicorn uterus results, and, after

the normal fusion, cessation of vital growth may cause
the uterus to be diminutive. In a similar manner there
may be two vaginæ, or one defective in size, or no vagina
at all.

A uterus, normal in length, but with feeble develop-
ment and deficient in strength, may have a feeble cervico-
corporeal junction and which, as a result, is likely to fall
and be converted into the position of anteflexion. Co-
incident with this there is usually deficiency in the size of
the opening. Owing to such a condition, the secretions
collect within the cavity, are difficult to expel, and as a
result there will arise cervicitis and dysmenorrhœa. In
a strong uterus, with a deficiently developed os, there is
liability to laceration at parturition, and if the laceration
be double, eversion of the lips and granular erosion are
likely to follow. If the fresh raw surfaces of a laceration
absorb septic germs, pelvic cellulitis results. Should the
perineum be deficient in development or rigid, laceration
of it is likely to take place, and when septic infection
occurs in connection with a lacerated cervix, subinvolu-
tion of all the genital structures, as a rule, results. With
subinvolution comes the various forms of uterine mis-
placements. With subinvolution and misplacement, aided
by special microbes, as those of gonorrhœa or of the
puerperal septic infections, comes endometritis. Wtih its
extension to the tubal mucous membrane, comes salping-
itis and ultimately by overflow of its contents through the
fimbriated extremity, arises localized peritonitis or abs-
cess formation. Thickening of the tunic of the ovary
succeeds local inflammatory action and, as a consequence,
there follows painful ovulation and various forms of
degenerative changes in the ovaries.

4. **Hereditary constitutional defects in which certain
classes of cells morbidly proliferate forming tumors,**
examples of which will be found in the formation of

dermoid, parovarian and ovarian cystoma, myomatous tumours and carcinoma.

5. The training and effects of education. The long confinement in-doors during school hours, frequently with impure air; the absence of exercise of arms and legs, tending to stagnation of circulation; the stooping posture; the increased attraction of blood to the brain and great call upon the mental powers; improper exercise; the personal competitions culminating in place examinations; all have their deleterious effect and tend to develop mental at the expense of physical power, and producing as well, constipation, anæmia, irritable hypersensitive nerves and derangement of the menstrual function.

6. Personal habits. That care, so necessary at each menstrual epoch, is not as scrupulously observed as it should be, and at times injurious consequences, of a temporary or permanent nature, result. Of all the injurious influences to which is attributable the great mass of disease now so prevalent, the greatest is the custom of the alteration of the form of the body and of the position and relations of the internal organs by compression of the lower thorax and abdomen by means of corsets. The influence is markedly accentuated by the attachment of the skirts and petticoats around the waist and abdomen. In pregnancy the corsets are often worn tight so as to conceal the condition. Society often demands the exposure of the neck, arms and shoulders to the suddenly varying temperatures of heated ball-rooms, corridors, verandahs, and gardens, while closely associated with these are, improper diet, irregular meals and late hours. The influences of absence of marriage, of late marriage, and of ineffective marriage, which includes artificial prevention of pregnancy, are highly deleterious.

7. Infectious diseases. The effects of syphilis are seen in hereditary, congenital and in simple forms. In the former, malformations are present at birth; in the latter

the results, similarly caused, may not manifest themselves
for varying periods after birth. The mother may directly
transmit measles, scarlet-fever, and small-pox to the
fœtus. To gonorrhœa is to be ascribed a series of pro-
gressive diseases, which are as liable to be as virulent as
they are continuous. Septicæmia, induced primarily by
the entrance into the system through the blood vessels or
lymphatics of micro-organisms, may, if it does not prove
at once fatal, produce wide-spread damage. Tuberculosis
in the genital organs may occur by the arrival of the
tubercle bacillus by the intestines, by the blood, or
through the vagina.

8. Childbirth. Injuries occurring during childbirth
are frequent causes of pelvic disease. Tears of the per-
ineum destroy the integrity of the pelvic floor, giving rise
to cystocele, rectocele incontinence of feces, hemorrhoids.
Lacerations of the cervix uteri retard or check involution
and so tend to endometritis, menorrhagia displacements,
cystic degeneration and malignant disease. An imperfect
antiseptic technique leads to sapremia, septicemia, pelvic
cellulitis, salpingitis and pelvic peritonitis. The per-
nicious, though almost constant custom of permitting
a puerperal patient to remain in the dorsal recumbent
position for an indefinite period permits the accumulation
of decomposing lochial discharges to collect in the pos-
terior vaginal cul-de-sac. In this position too, the heavy
uterus falls backwards and downwards, putting its liga-
ments on the stretch thus strongly predisposing to retro-
displacements.

CHAPTER V.

EXAMINATION IN GENERAL.

GENERAL OUTLINES OF DIFFERENTIAL DIAGNOSIS.

When a patient presents herself for advice and treatment, the first essential to a full understanding of her case, is a complete history. The subject naturally resolves itself into two parts, the *history of the patient* and the *physical examination*.

THE HISTORY OF THE PATIENT.

The first interview between the patient and the doctor is an important one, and it is a very good rule to allow the patient time and opportunity to state her case fully. Not only what is said, but the manner in which it is said, will give the physician an insight into her disposition and character and will enable him to treat her more intelligently and successfully. The investigation may be conveniently carried out by observing and making note of the following points.

A printed form for case-taking, while not essential, is of great advantage. It saves time and suggests objects for inquiry, which might be overlooked, and, besides, is of great advantage in the subsequent study of the cases.

FORM FOR CASE TAKING.

PRESENT COMPLAINTS AND THEIR DURATION.

1. *History.*

Family History
Previous Diseases

MENSTRUATION.
- First appearance
- Regularity
- Duration
- Amount and character
- Pain, before, during or after
- Confined to bed
- Last appearance

PAIN.
- In head
- In back
- In abdomen
- In legs
- During coitus
- In sitting
- In standing
- In walking

	Date.	Pregnancy.	Labor.	Puerperium.

LABORS.
- At full term
- Premature

VAGINAL DISCHARGE
- Amount
- Character
- Persistence
- Duration

- Urination
- Defecation
- Digestion

- Appetite
- Cause of illness (supposed by patient)

2. *Status Præsens:*

General Condition
Condition of the Nervous System
Constitution
Breasts

Abdomen

Vulva

UTERUS.
- Position
- Size
- Mobility
- Shape
- Depth of Cavity
- Secretion

Perineum
Vagina
Broad Ligaments
Tubes
Ovaries
Douglas' Pouch
Bladder
Urethra
Rectum
Complications

CERVIX
- Position
- Shape
- Length
- Density
- Secretions
- Internal Os
- External Os
- Lacerated

3. *Diagnosis:*

4. *Treatment and Progress:*

The age of the patient has a direct bearing on many matters, such as menstruation and child-bearing, and will often throw much light on the nature of the disease. Cancer rarely occurs before the thirtieth or fortieth year, and more often about the time of the menopause.

Social condition and occupation has often a material bearing upon the disease from which the patient suffers.

It is of the utmost importance to know whether she spends her time in sedentary pursuits, or, as a shop-girl, kept standing or walking about all day long; or as a charwoman, whose daily round is one of severe toil and often hardship. Information as to whether the patient is single, married, a widow, or separated from her husband, is often a necessary factor in deciding important questions.

Leading symptoms in the case. An important point is to enquire what brought her to seek advice. In the majority of cases it will be found that actual pain in some part or other is the leading symptom. In other cases pain may be entirely absent, or only present under certain conditions. Others may speak of a swelling in the abdomen as the leading feature. It sometimes happens that the patient complains only of some trivial deviation from health, yet, if her case be gone into systematically and carefully, important information will be forthcoming, which will enable us to suspect the nature of the trouble.

Menstrual history. At the outset, in order to arrive at a correct opinion as to the condition of the menstrual function, it is necessary to ascertain the normal character of menstruation in the individual, for there are among women wide individual differences consistent with health. The points to which attention should be directed are:—

1. *The age of commencement.* Menstruation usually commences between the ages of thirteen and fourteen years, but it is often seen earlier than that time and occasionally does not appear until later. Climate, race, and accidental causes often bring about a marked difference in the time.

2. *Rhythm of the flow.* It sometimes happens that after the first period or two, the patient sees nothing again for some months, perhaps for a year or more, and after that time, recommences and continues regularly. With most women the flow comes on every twenty-eight

days, but in some it appears at shorter intervals, and in
some at longer intervals than normal, while in others the
menses do not appear with any regularity. On careful
enquiry it will be found that the peculiarities are natural
to the individuals and that the irregularity must be looked
upon as regular for them.

3. *Duration of the flow.* In the majority of women the
period lasts four or five days, but here again considerable
variation is found, within physiological limits. In some
it lasts only a day or two; in others the flow continues
seven or eight days, without the presence of any abnor-
mal condition.

4. *The daily amount.* In this also there is consider-
able room for variation, some soiling but few napkins
throughout the whole period, while others have to change
very frequently. Enquiry as to how often the napkins
have to be changed and the degree of soiling at each
change, will give a fair estimate of the amount lost.

5. *The attendant symptoms.* In some patients there is
no pain and no discomfort, but as a general thing, as the
flow approaches, there is a sense of fulness, congestion,
disturbance and weight in the pelvic organs; often there
is pain in a greater or less degree. Sometimes it is
accompanied by general disturbance, characterized by
frontal, occipital, or general headache, and by nausea and
vomiting. The time at which the pain begins varies in
different individuals. In some the pain will begin a day
or two before the flow, in others a few hours before,
while in others it comes on with the flow.

6. *Leucorrhœa.* In a healthy woman there is no dis-
charge, but some women have almost naturally a little
discharge of a whitish character for a day or two after
the flow ceases. Discharge of a thick glairy mucous in
large quantities is however pathological.

7. *Abnormal variations.* The menses, previously nor-
mal, may have become too frequent or quite irregular;

the duration or daily loss may have increased or diminished; or pain, previously absent, may have become a prominent symptom. In any case we should ascertain how far the condition deviates from her previous normal condition; what the change has been and the time at which it set in. At the menopause the menses are often irregular; occasionally they stop for a month or two and even longer, then a regular period or two follows, after which they cease altogether. Sometimes they suddenly cease and the patient sees nothing more; in others again, the menopause is ushered in by considerable floodings. It must always be borne in mind, especially in the case of flooding, that women are particularly liable to malignant disease at that time.

Both for future reference and as a guide to the advisability of examination by means of the sound, enquiry should be made, as to the date of the onset of the last period and the time at which the last period closed.

The obstetric history. It is most important to have the obstetric history of the patient, the history of her labors and miscarriages, if any, because a very considerable amount of illness which presents itself, is the result of impregnation and of disease following upon delivery or abortion. Ascertain the number of the children, the character of each labor, the date of last delivery, whether there have been any premature labors or miscarriages, and, if so, whether any particular cause can be assigned for the occurrence.

Illness during pregnancy and after delivery. Ascertain whether the health continued good during pregnancy. Unusual symptoms at that period are to be carefully enquired into. Illness after delivery is usually of a febrile character and the cause in nearly every case is attributable to septic mischief.

Previous illnesses. Asecertain from the patient the nature of previous illnesses and whether associated with

the pelvic organs or not. Many of the troubles complained of will be found to date from illness occurring at or soon after delivery or miscarriage.

The history of the present illness. Ascertain, first of all, the date at which the present illness began, also the cause assigned for her illness. Of the particular symptoms to which attention should be drawn, pain stands first, because it is one of the most common. The *site* of the pain must be noted, whether it be continuous or spasmodic, and its *character,* whether it be sharp and cutting or dull and aching, and also whether it be associated with *tenderness.* Pain or tenderness is a symptom of a very considerable number of diseases to which women are especially liable, such as pelvic peritonitis, parametritis, disease of the cellular tissue of the pelvis, hæmatocele, hæmatoma, inflammatory diseases of the appendages, metritis, adhesions left from previous inflammations, and finally tumors in the uterus, tubes or ovaries. The pain is sometimes periodical, that is, associated with the monthly periods, and, when so appearing, becomes one of the most prominent symptoms of dysmenorrhœa. Ascertain where the pain is situated, whether it extends into the hips, down the thighs, or for a considerable distance over the abdomen; also when the pain begins, whether before the flow or with the flow, and if before the flow, the length of time before.

Menorrhagia and metrorrhagia are often symptoms of severe trouble, and any deviation from the normal flow, particularly if extensive, is to be carefully enquired into. It may arise simply as the result of some constitutional disturbance, as anæmia, chlorosis, purpura, but is often a prominent symptom in pelvic hæmatocele and hæmatoma, extra-uterine pregnancy, fungous endometritis, mucous polypi of the cervix, fibroids or myoma of the uterus projecting into the uterine cavity, subinvolution after confinement, and malignant disease of the uterus.

Amenorrhœa. During pregnancy, as well as during lactation, amenorrhœa is the rule, but the menses sometimes persist during the early months of pregnancy and even later. Many women will continue to have their periods regularly during nursing, commencing sometimes a month after delivery, and it is quite possible for a woman to become pregnant during lactation, even if the menses have not appeared. It is necessary to remember these facts, because patients are apt to be misled in consequence, and, even when far advanced in pregnancy, are not aware of their condition. .

Local swelling or tumors. We should ascertain from the patient if any swelling, either in the abdomen or in the genitals, has been noticed, where the swelling first appeared, if persistent or variable in its character, the site where it was first noticed and the direction in which it has grown.

Urinary symptoms. Note the character of the pain, if present, and the time at which it occurs, whether during, previous to, or following micturition. Note also the frequency of micturition and whether it takes place more often at night than during the day. Inquire if there be difficulty in getting the water to pass, or whether the water constantly runs away or is passed involuntarily on coughing or straining. The character of the urine may be partly learned from the patient, but should always be tested by a proper urinalysis.

Intestinal symptoms. Ascertain the frequency with which the bowels are relieved and if defecation be painful, difficult or associated with tenesmus. Note the condition of the tongue and inquire as to the digestion, and whether nausea and vomiting be present; and, finally, ascertain what *previous treatment,* if any, has been adopted, how long it has been carried out, and with what results.

PHYSICAL EXAMINATION.

In the majority of cases correct inferences cannot be deducted from verbal statements alone, and a physical examination becomes essential. The chief exception to this rule is in the case of young girls. It is most often for irregularities of menstruation and for leucorrhœa that young unmarried women seek relief, and as these disorders, in their case, are frequently dependent upon the general health, hygienic measures and drugs will often accomplish all that is necessary. In fact only when such measures have been faithfully tried and proved ineffective, or when there is clear evidence of pelvic disease, is an examination justifiable. Most examinations may be satisfactorily made with the patient, if at her home, lying in her bed or on a lounge, or if the examination is to be conducted in the office, upon a conveniently arranged couch or chair.

Position. The two chief positions are the *dorsal* and *Sims'*. Of less importance are the *genu-pectoral,* the *erect,* and *Trendelenberg's*.

In the *dorsal position* the patient lies upon the back; the head slightly raised; the knees drawn up and widely separated; and, if necessary, the heels fixed in some kind of holes or stirrups. It is the best position for digital and bimanual examination, and is often employed for ordinary treatment, on account of its convenience.

In *Sims' position* the patient is placed on the left side; the left side of the face rests on a cushion; the left breast touches the table, and the left arm is placed behind the body. Both knees are drawn up, the right being a little nearer the head and in front of the left. This position allows the introduction of one or two fingers high up behind the uterus, permits the use of Sims' speculum, and does not require such a degree of exposure as the dorsal.

In the *Trendelenberg position*, the knees are raised high above the head so that the body slants upward from the shoulders. It is rarely used for diagnostic purposes, its chief advantage lying in the additional facilities it offers the surgeon in operations upon the pelvic organs.

In the *genu-pectoral position* the patient rests upon her knees, the upper part of the chest, the right side of the face and the right forearm. It is sometimes used to replace a retroverted uterus or prolapsed ovary.

The *erect position* is used to discover a prolapsed uterus, a cystocele or rectocele.

Examination under anæsthetics. Nearly all examinations can be made with a full knowledge on the part of the patient, and it should be a rule to examine first in that manner, but it is sometimes impossible, under such circumstances, to obtain satisfactory results. Occasionally palpation is so painful that the patient cannot endure the slightest manipulation, and, even when no pain is present, it is often found that as soon as the hand touches the abdomen, the muscles, more especially the recti, at once become so tense that it is impossible to feel anything that may be beneath them. Under such circumstances the use of an anæsthetic is not only justifiable, but absolutely necessary, to make a correct diagnosis.

Methods of examination. Three methods, under ordinary circumstances, are made use of: The *visual*, the *manual* or *digital*, and the *instrumental*.

Visual inspection of the external genitals will often reveal many facts, such as atresia of the hymen, swelling of the vulvo-vaginal glands, the presence of papillary growths, venereal ulcers, discharges, urethral caruncle, a lacerated perineum, or prolapse of the vaginal walls.

Digital examination per vaginam. The fingers, especially the index fingers, are instruments of the greatest value in acquiring information, the sense of touch

replacing that of vision. The partly closed hand, with the index finger extended, is passed along the inner side of the thigh and, on reaching the vulva, abnormalities of the labia may be detected. The index finger is gently pushed between them into the vagina, examining at the same time for any peculiarity of the hymen, obstructions, prolapsed organs, or gaping from relaxation or laceration. The vaginal walls are palpated to detect abnormalities in them, or of the rectum, or of the urethra or bladder. The finger end next reaches the cervix and is swept around to examine the fornices. By palpation, the size, shape, and consistency of the cervix and the shape of the external os are made out. The fingers pushed up behind will detect a retroverted uterus or displaced ovary, and, when pushed up in front, will feel an anteflexed uterus or the trigone of the bladder.

Digital examination per rectum is best performed in Sims' position. Besides evidence of disease of the rectum obtained by this method, it is a useful method to employ in the case of virgins with sensitive hymen or small vagina. Sometimes the uterus and appendages are better felt from the rectum than from the vagina, and, in case of abdominal tumors, valuable information is to be obtained thereby. Abnormal conditions of the coccyx, such as ankylosis or fracture, can be detected at the same time.

Bimanual examination. In order to secure the required information it is often necessary to make use of both hands. With one index finger impinging on the os, after the method already described, the other hand is placed above the pubes and the finger tips pressed down with increasing firmness until the fundus is felt and the organ made to lie between the examining fingers of the two hands. If the body of the uterus is not found, it should be sought for either in front of or behind the

cervix. By this method, the outline, size and shape of the uterus can be made out. By pressing well down beside the uterus, the tubes and ovaries may be palpated, and the method is of the utmost advantage in the diagnosis of pelvic tumors.

Instrumental examination. The *vaginal speculum* is an instrument, by the aid of which we are enabled to look into the vagina and to treat various pathological conditions found. Of these there are a great variety, but the number may be reduced to three types, the cylindrical, the pluri-valve, and the single blade. The cylindrical speculum, as represented by Ferguson's, once so popular, is now seldom used, as the exposure is too limited and the space within it too cramped.

The *bivalve speculum* consists of two blades, joined at one end, and looks and opens something like the bill of a duck. The lower blade is usually a little longer than the upper one. It is introduced closed, either in the dorsal or Sims' position, and is then expanded by a screw or lever. As the blades are expanded, the cervix settles down on the lower or posterior blade and thus comes into view. There are several varieties, of which Cusco's, Brewer's, and Higbee's form fair samples. It is a very satisfactory instrument, both for inspection and treatment, and can be used without an assistant. The tri-valve (Nel-

Fig. 18.—Higbee's Bivalve Speculum.

son's or Mott's) has two narrow blades, in place of the anterior blade of the bi-valve.

The single blade, or Sims' speculum or retractor, is practically a flattened blade, made somewhat concave on the vaginal surface, and to which a slender handle is attached. For convenience, two blades of different sizes, one at each end, are attached to the handle. When in-

serted it shows the uterus and the anterior wall of the vagina in their normal position and relations, its object
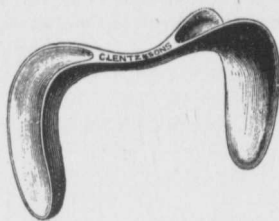
being to pull back the perineal body and the posterior vaginal wall. Besides this advantage, it readily permits of treatment, and is the speculum chiefly used for operations upon the uterus and vagina. If the cervix does not read-ily come into view, the

FIG. 19.—Sims' Speculum.

failure is owing to its being obscured by the anterior vaginal wall. To overcome this difficulty, a flat blade, shaped like a spatula, or fenestrated, and called a *depressor,* is made use of. To overcome the necessity for having an assistant when using Sims' speculum, many ingenious modifications have been devised to make it self-retaining, but in every case their application is troublesome and often unsatisfactory.

The uterine sound is an instrument made of a more or less flexible metal, usually copper, with a slightly bulbous extremity, and at a distance of two and one-half inches from the extremity, is another bulb, indicating the length of the normal uterus. It should first be bent to correspond
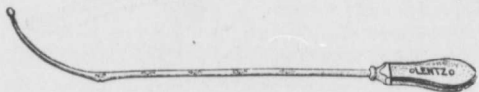
FIG. 20.—Simpson's Sound.

with the supposed curve of the canal, as found by biman-ual examination. When introduced, it indicates the length and direction of the uterine cavity, and its relation to any mass pressing into or occupying that space. The mobility of the body of the uterus may be determined also, as well as the relation which it bears to a tumor or

other mass adjacent to it. It is a very useful and, when properly used, harmless instrument, but in handling it, it must never be forgotten that it is capable of perforating the uterine wall, and that it is being introduced into a cavity from which absorption easily takes place. In its introduction much difficulty is often experienced by the point catching in the folds of mucous membrane in the cervix, or by the opposition made by flexion. The difficulty may be overcome by embedding the curved point of a tenaculum in the tissues of the anterior lip and making counter-traction, the effect of which will be to straighten out the canal.

The probe is a much thinner and very flexible rod used exclusively for exploring the inside of the uterine cavity.

Uterine dressing forceps, of which a great variety have been devised, are invaluable for wiping out the cervical

FIG. 21.—Bozeman's Dressing Forceps.

mucous while making inspection, for disinfecting the vaginal fornices, and for carrying medicated material to the intended point of application.
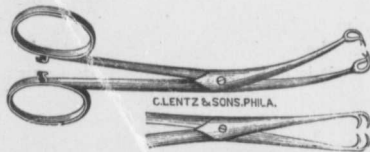
FIG. 22.—Vulsellum Forceps.

The vulsellum is a pair of forceps, each blade of which ends in a double hook. It is used for seizing and pulling

tissue, and is thus useful in steadying the uterus, while introducing the sound or dilating the cervical canal.

Examination of the interior of the uterus. When bimanual and speculum examinations make it evident that the disease is seated within the uterus, an exploration of its interior is essential. Usually the cervical canal presents an effectual barrier to exploration, either by finger or instrument, and some method of dilation must therefore be used. This may be done *slowly* by means of tents, or *rapidly* by graduated dilators, or dilating forceps.

Gradual dilation, by means of tents, has now fallen into complete disuse, except in isolated cases. From the fact that it is impossible to render them aseptic and from the necessity for the use of two or three to obtain sufficient dilatation, their use exposes the patient to great danger. For diagnostic purposes and as part of treatment, dilation is best accomplished rapidly by instruments. For the lower degrees of dilation, Hanks' hard rubber or steel dilators, which come in a set of six, embracing twelve numbers, are very serviceable. Commencing with the largest that will enter the canal, they are passed in, one after another, until the required degree of dilation has been secured. For a higher degree of dilation, some of the steel branched dilators may be used. A very satisfactory instrument, perhaps the best, is Goodell's modification of Ellinger's, but being rather thick in the blades, it may be found impossible to insert them when the cervical canal is small. Under such circumstances it is best to commence with a pair of lighter blades, such as that known as Wylie's. After insertion, the handles are to be gradually compressed and, as the parts yield to firm, slow pressure, what is gained may be held by the screw or ratchet. The use of this instrument, as well as of the graduated dilators, will be facilitated if the cervix be steadied with a vulsellum.

The curette is an instrument used for scraping off or removing pathological or other structures from the inside of the uterus. Although mostly used as a therapeutic

Fig. 23.—Hanks' Dilators.

Fig. 24.—Goodell's Dilator.

agent, sometimes it is used to secure a specimen for gross or microscopical examination. There are two varieties in use, one sharp and stiff, the other dull and somewhat flexible.

From the frequent association of urinary symptoms with uterine diseases, the best methods for examing the urethra and bladder should be known to all practitioners. Some knowledge of the condition of the lower part of the urethra may be gained by inspection, some bladder and urethral affections may be recognized by examination w i t h the finger, but for the determination of the exact condition of the lining membrane of the urethra, an endoscope is necessary. By inserting to its full length a simple tube, similar to an ear speculum, the field being illuminated with a head mirror, the whole urethra may be fairly well inspected as the tube is being withdrawn.

The most satisfactory urethral endoscope is that known as Skene's. By means of it, not only the neck of the bladder and urethra may be inspected, but applications by means of cotton or a spray may be made to any part of the canal. The bladder can be explored digitally by first gradually dilating the urethra with Simon's instruments until the largest has been passed, after which the finger can usually be inserted into the bladder.
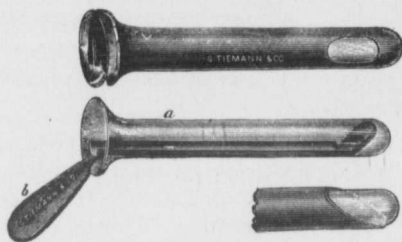
FIGS. 25, 26, 27.—Skene's Endoscope.

Dr. Howard A. Kelly has extended and simplified the technique of the examination of the bladder and ureters, which permits of direct visual inspection of the female bladder and ureteral orifices, and which renders it possible to complete the catheterization of both ureters within a few minutes after the introduction of the speculum.

FIG. 28.—Double Urethral Dilator.

The following instruments are required: A urethral dilator; a series of specula with obturators; a head mirror with some form of artificial light; a pair of delicate mouse-toothed forceps; an evacutor for withdrawing residual urine; a ureteral searcher, and a ureteral catheter. The hips are somewhat elevated, and, after the

necessary degree of dilation, a proper sized speculum is
introduced and the obturator withdrawn. By means of
reflected light from the he;d mirror, it is possible to
examine fully the interior of the bladder. Residual urine
obstructing the view may be removed with the evacuator,
or, if very small in amount, by little balls of absorbed
cotton held in the mouse-toothed forceps. After a little
practice the sites of the ureteral orifices can be located.
Dr. Kelly suggests the following valuable aid for locating
them: "A point is marked on the cystoscope at a distance
of five and one-half centimetres from the vesical end, and
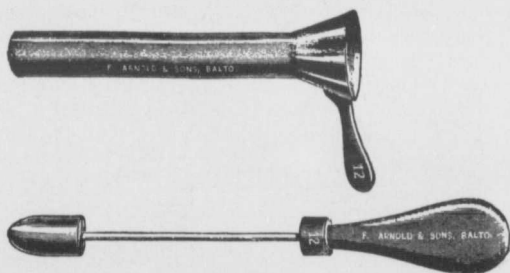
Figs. 29, 30.—Speculum and Obturator (2-3 natural size).

from the point two diverging lines are drawn toward the
handle, with an angle of sixty degrees between them.
The speculum is introduced up to the point of the V and
turned to the right or left, until one side of the V is in a
line with the axis of the body. By elevating the endo-
scope until it touches the floor of the bladder, the ureteral
orifices will nearly always be within the area covered by
the orifice of the speculum."

The searcher is next employed, and if what is seen is
really the orifice, it will at once pass readily into it. The
ureteral catheter may then be substituted for the searcher
and the urine collected, as it passes from the kidney.

Examination of the abdomen. In a certain number of cases inspection of the abdomen is important. The practiced eye can distinguish the pointed prominence caused by a tumor or pregnancy, and the flat enlargement, owing to the presence of ascites or super-abundant adipose tissue; and when present, pigmentation, striæ albicantes, and a protruded navel are readily observed. By palpation,
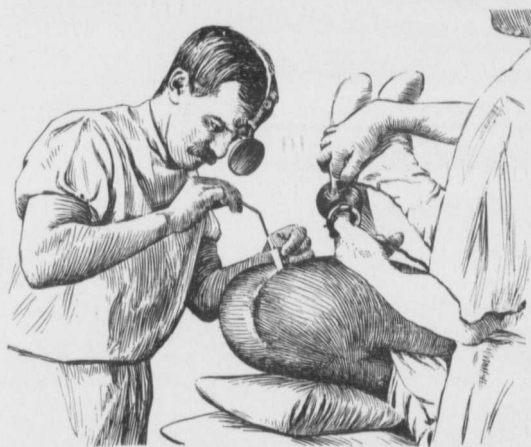
Fig. 31.—Cystoscopic examination of bladder and direct catherization of ureters.

the practised touch will show the size, consistency, and relations of a tumor, its mobility, and its smoothness or irregularities.

Percussion permits of defining, with greater accuracy, the height to which a tumor rises, and the extent and mobility of the area of dullness.

Auscultation is of value only in the differential diagnosis of pregnancy from other varieties of abdominal tumor.

CHAPTER VI.

GYNÆCOLOGICAL THERAPEUTICS.

To be successful in the treatment of diseases of wo-
men, pelvic disorders are not to be looked upon as isolated
conditions, but must be viewed, in a large number of
cases, as arising out of an existing or pre-existing consti-
tutional state, or faulty régime of the patient. Thus the
circulation and the digestive and other important systems
may influence or be influenced by the pelvic organs, and
when deciding upon a line of treatment, the general
condition of the patient must never be lost sight of.

General hygiene is an important factor. The mind
should be as far as possible free from anxiety and strain,
yet at the same time actively employed in some healthy,
intellectual pursuit, and the body stimulated by exercise
suited to taste and circumstances. The strictest attention
should be paid to the menstrual period, and every girl
should be taught how to take care of herself during the
performance of that important function. Regularity in
the action of the bowels and attention to their daily
evacuations, regular attention to the calls for micturition,
attention to the functions of the skin, and regularity of
meals and sleep, both as regards time and duration, are
also of great importance. The clothing, while not being
too heavy, should be of such texture and material, and so
distributed as to keep every part of the body equally
warm. Exercise in some form or other is often bene-
ficial, but should never be excessive. What the particular
form of exercise shall be, must depend upon the taste or
occupation of the individual. Each condition with which
we have to deal will suggest points applicable to it.

In the pelvis, as elsewhere, pain and disordered
functions are indications for rest, and in no department of
medicine is rest more essential than in this. In the

majority of patients their sufferings are due to fulness of
the vessels within the pelvis, and to overcome this rest in
the recumbent position is absolutely necessary. But rest
to be complete must be not only local and general, but
physiological as well.

A very large number of gynæcological patients suffer
from anæmia, and often from anorexia. Careful attention
must be given to the diet, and when so prescribing, pre-
cise orders should be given in regard to the time, the
quality and quantity of meals, as well as to a proper
variety.

Drugs. *Purgatives.* In no class of diseases are
purgatives more useful. Constipation, acting locally, may
seriously displace the pelvic viscera, or by pressure pro-
mote congestion and discomfort. In many cases of
chronic pelvic disease, a course of purgatives, such as
sulphate of magnesia, cascara sagrada, aloes, with an
occasional dose of calomel, will greatly relieve the patient,
and where there is systemic portal congestion, morning
draughts of Carlsbad salts, or Hunyadi Janos, Apenta, or
Franz Josef mineral waters will, by their mild laxative
action, afford much relief. In acute pelvic inflammation,
saline purgatives are highly beneficial. Enemata of warm
water, and rectal injections of glycerine, are useful
adjuncts or alternatives.

Tonics. Nearly all kinds may find a place in the treat-
ment of pelvic disease. Unless contra-indicated, *iron*, in
some form, is one of the most active, and when adminis-
tered gives the best results when combined with a
purgative. *Arsenic* is valuable when leucorrhœa is present
in anæmic girls with a chronic catarrh of the vagina or
cervix. Combined with iron, it acts well in anæmia and
chlorosis with scanty catamenia. *Quinine*, aside from its
specific effect, has a special tonic action on the uterine
muscles, and is therefore useful as an adjunct.

Sedatives, especially the stronger ones, should be administered with great caution, for often the condition for which they are prescribed is a recurrent one, and the repeated administration may lead to the abuse of these agents.

Special Gynæcological Drugs. *Ergot* is used for two main purposes, to encourage uterine contraction and to lessen uterine hemorrhage. On this account, it is administered for passive uterine hemorrhage, in uterine fibroids, fungous endometritis, subinvolution, and in uterine congestion. In chronic hemorrhage, or when it is given for lengthened periods, it should be combined with acids and purgatives.

Gossypium, in the form of fluid extract, or decoction freshly prepared, is an emmenagogue and parturient. It has a tonic influence on the uterus, relieves pain, and often seems to act better than ergot in arresting passive hemorrhage.

Hydrastis Canadensis, in the form of fluid extract or tincture, has a decided ecbolic action and, if taken regularly, will check chronic hemorrhage, and besides has a decidedly sedative effect.

Hamamelis has been accorded a high place in the scale of uterine hæmostatics where passive engorgement exists.

Cannabis Indica, in the form of extract, is extremely useful in cases of menorraghia with pain, in dysmenorrhœa, and in some cases of fibroids. It is apt to affect some women peculiarly, and at first must be given cautiously and in small doses.

Viburnum prunifolium is an anti-spasmodic, relieving painful contraction of both voluntary and involuntary muscles and is, therefore, useful to prevent abortion in cases where uterine contraction precedes the death of the fœtus. A large group of anti-spasmodics and sedatives may be used for the relief of pelvic pain, among which

may be mentioned some of the coal tar derivatives, such as *phenacetine.*

The *Bromides* allay the pain and restlessness due to increased local tension, as in congestion of the ovary. They tend to lessen hemorrhage of a passive type, and are excellent remedies to anticipate the headache and nausea which precede dysmenorrhœa.

Chloride of Ammonium acts upon the portal system and thus tends to relieve pelvic congestion. It is useful in simple congestion, subinvolution and chronic metritis.

Chloride of Calcium, given thrice daily, in doses of ten to twenty grains, often acts like a charm in some cases of menorrhagia.

Resolvents are often called for in chronic inflammation, to promote absorption of long standing inflammatory exudation. The most important of these are, iodine in the form of iodide of potassium, sodium or ammonium; mercury in the form of bichloride, and gold in the form of chloride of sodium and gold.

The local therapeutic effects to be derived from the application of *heat* and *cold* are well known.

1. *External application. Cold,* locally applied, is a depressant, checking the vital action and diminishing the blood supply, and hence is useful in hyperæmia or congestion of the pelvic organs. It may be applied in the form of ice-bags, or by means of a Leiter coil. *Heat,* in the form of hot baths, is mainly sedative. relaxing the skin and its glands, dilating the peripheral vessels, and thus relieving congestions of internal viscera. It is therefore useful in congestive dysmenorrhœa, and, by its power of relieving muscular spasm, is serviceable in spasmodic dysmenorrhœa and in cases of uterine, tubal and other pelvic and abdominal colics. *Hot foot* and *sitz baths* act somewhat similarly and are particularly useful in relieving pelvic congestion produced by sudden arrest of the catamenia. *Mustard,* added to such baths, increases

their effects. *Poultices* and *fomentations,* both as to their utility and action, may be considered as local baths. If a sedative effect is required, opium, in the form of laudanum, may be added; if a stimulating effect is required, turpentine. Heat may also be applied, locally, by means of *hot water cans* and *rubber bags.*

2. *Internal application. Hot water* has a far more extensive field of usefulness in the pathology of women's diseases than any one agent. Hot water may be made to enter the vagina while in a bath, by means of a speculum, but the usual method employed is by means of a *douche apparatus.* In all cases, the flow into the vagina should be continuous, hence, for the purpose, an elevated douche-can, or some syphon arrangement, is better than the ordinary hand-bulb syringe. The vaginal nozzle should be of some smooth material, easily made aseptic, and, during administration, the patient should lie flat on the back with the pelvis raised on a *bed-bath.* For merely cleansing the vagina, tepid water will suffice, but its effect may be increased by adding a dram of bicarbonate of soda, borax, or boracic acid, to the pint. For the relief of congestion, water, at a temperature of 100° to 105° F. is indicated, but for the arrest of hemorrhage, a higher temperature is required. By the addition of medicinal agents the douche can be rendered antiseptic, anodyne, astringent, or sedative. Cold water applied to the vagina is unsafe and should not be made use of.

Counter irritation to the skin may be applied in a variety of ways by such drugs as mustard, turpentine, iodine, croton oil, or cantharides.

Applications to the vagina may be made in various ways. *Douches* are a convenient way of applying medicaments. If for antiseptic purposes, bichloride of mercury, 1 to 4000 to 1 to 2000, and carbolic acid 1 to 200, may be used, but their prolonged or frequent use is to be avoided, owing to the dangers from absorption. Weak

solutions of potassium permanganate and of sulpho-
carbolate of zinc may also be used, but are not so
effectual. If required for astringent purposes, plumbi
acetate, zinc sulphate, alum, and tannin are the best.

Medicated pessaries may be used for their local effect,
as well as their remote, and when for the latter, double
the usual dose should be administered.

Pessaries of glycerine, combined with gelatine, will
relieve vaginal congestion and encourage secretion. If
so desired, drugs may be added to such pessaries, and it
is in this form that ichthyol has its most useful sedative
and absorbent application, particularly in subinvolution
associated with endocervicitis and granular erosion. The
drugs most often used as sedatives are cocaine, morphia,
extract of belladonna and extract of henbane; as astrin-
gents, alum and tannin, and, when so employed, may be
combined with cocao-butter or gelatine. For this pur-
pose, gauze, too, saturated with various ingredients, is
readily applied.

Tampons made from wool or absorbent cotton, rolled
and tied in sizes most convenient for the work required
of them, may be used to advantage as conveyers of
medicinal agents, such as boric acid, ichthyol in glycerine,
lysol, aristol, balsam of Peru, aqueous solutions of alum,
and other agents; and, when so medicated, serve a good
purpose for stimulating, sedative, or astringent applica-
tions. They are also used as temporary means of support,
for exerting pressure, and to soften and stretch organized
bands within the pelvis. Tampons may be also employed
to plug or to tightly pack the vagina for the arrest of
hemorrhage and to maintain an aseptic condition.

Direct application of drugs may be made, through a
speculum, to any affected area of the vagina by means of
a pledget of absorbent cotton held in the jaws of a pair of
uterine dressing forceps. Nitrate of silver, in various
strengths, solutions of sulphate of copper, tincture of

iodine, carbolic acid, argyrol, liquor ferri perchloride, ichthyol, glycerite of tannin and such like, are all useful therapeutics agents in appropriate cases.

Applications to the uterus. The same drugs used for the vagina may also be used for the vaginal portion of the uterus, and are to be applied in the same way. To apply substances to the cervical canal, it must be exposed, and by the aid of a Burrage's speculum and cotton holder, the mendicament is directly applied. Until very recently, it was the practice to make applications of many of the remedies mentioned to the cavity of the uterus, but it has now fallen into disuse, and in cases, where previously
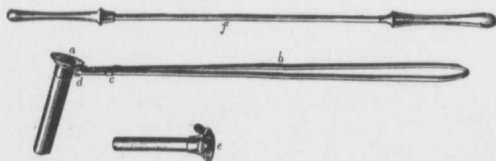
FIG. 32—Burrage's Cervical Speculum. *a*, tube; *b*, handle; *c*, movable clasp; *d*, small tube at right angles to main tube; *e*, smaller cervical tube to replace *a*; *f*, obturator fitting the two tubes.

employed, the practice of to-day is thorough curettage and cleansing and draining of the canal. When that has been thoroughly done, it is all that is necessary.

Intra-uterine injections are much more dangerous than vaginal. Large uterine injections of warm water, medicated or otherwise, may be used for cleansing and disinfecting the uterus, and for checking hemorrhage. If the cervix has been thoroughly dilated, a curved glass single current tube is preferable, but if the cervical canal is not so wide, a metal double-current uterine tube should be used, such as Boseman's, a Cusco's or other speculum having been previously introduced, and while administering the flow should be carefully watched.

Vesical injections are much used in the treatment of diseases of the bladder. For large injections, a fountain

FIG. 33.—Intra-uterine Douche.

syringe with a hard or soft catheter attached and a two-way stop-cock which allows the bladder to be alternately filled and emptied, acts very well. When simple irrigation is required, Nott's double current catheter proves very serviceable. A simple, yet very effectual vesical douche may be made by attaching to one end of a rubber tube a small funnel, or the barrel of a large glass male syringe, and to the other an ordinary glass catheter. The fluid is poured into the receptacle, held at the required distance above the patient, and, when sufficient has entered, the receptacle is lowered, which permits the fluid to be syphoned out.
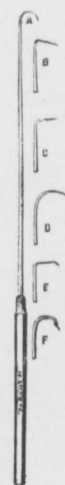
Curetting. In the treatment of diseases of the uterus this minor operation is often demanded. It requires the administration of an anæsthetic, although some can undergo the ordeal without it. The cervical canal is first dilated carefully with steel dilators to such a size as will readily admit the curette. The cavity

FIG. 34.— Tenacula.

FIG. 35.—Wire-loop Curettes.

FIG. 36.—Sharp Curette.

of the uterus is next flushed through a Burrage's spec-
ulum, or by means of an intra-uterine douche, with a 1 to
2000 solution of bichloride. The cervix being grasped
with a vulsellum or tenaculum, to steady the uterus, the
sharp curette is introduced and the entire cavity carefully
scraped, the persistence and vigor with which this is
done being governed by the conditions present. The
anterior and posterior walls, the lateral sulci where
these two come together, the fundus, and the recesses of
the cornua are scraped in turn. The cavity is next
irrigated with the warm bichloride solution, and dried
with a little cotton on a holder. Should circumstances
demand it, the cavity may be touched over with carbolic
acid, tincture of iodine, or iodized phenol, after which it
is again to be dried with cotton. If deemed advisable, the
uterus may be drained by the introduction of a strip of
iodoform gauze, or it may be packed with the same
material. As a rule, good drainage is all that is necessary
after thorough curettage.

CHAPTER VII.

POST-OPERATIVE TREATMENT.

There are certain well-defined principles which may be followed in conducting the after-treatment of a patient upon whom an abdominal section has been performed, the observance of which is of the greatest importance, and the neglect of which may be attended with serious results. After operation the patient is to be removed to her bed, previously made warm, and hot-water bottles carefully placed on each side. One-thirty-second of a grain of strychnine is at once given, and repeated every four hours for the first twenty-four hours; every six hours for the next twenty-four hours, and after that, only if required. It is extremely difficult to lay down definite rules regarding food and drink, as patients respond differently under the same management, and the greatest ingenuity is often required. During the first twelve hours it will be found preferable to give nothing except small quantities of toast water, or warm water, from one to two teaspoonsful every ten or fifteen minutes; or ten to fifteen drops of sherry in two or three teaspoonsful of soda water, testing the ability of the stomach to retain and absorb it. This frequency of administration is not only tolerated, but is very comforting to the patient, relieving the thirst and diminishing vomiting as well, when present. Ice, as a rule, while grateful to the mouth of the patient, is not as well borne as warm water, and the patient is never satisfied; besides, the injection into the stomach of cold water is apt to cause nausea. The distressing thirst, so often complained of after operation, may be relieved by frequent injections, into the rectum, of half a pint of normal salt solution, and with some it is the practice to inject high up into the sigmoid flexure a

quart of this solution, before the patient leaves the operating table. After the first twelve hours small quantities of chicken broth or beef tea, half an ounce every half hour, may be allowed, the time between administrations being extended as the amount given is increased. Albumen water, into which the juice of a ripe orange has been squeezed, is often well tolerated and very comforting. Milk, as a rule, is not a good substance to give by the mouth. It is not easily digested in the stomach, and the thick curds formed are either ejected, or act as an irritant in the intestinal canal. Peptonized milk has not this objection, and, as a rule, is well retained, but many patients object to the peculiar taste. Weak oyster-broth has often been retained with much satisfaction, when other nutriment has been rejected. Small quantities of ginger ale sometimes act as a sedative to the stomach, relieve thirst and flatulence, and are often eagerly demanded by the patient. At the end of the third day the dietary may be increased and administered every two hours. Milk may now be given, combined with limewater. Such articles of diet as gruel, light thin porridge, custards, rice, sago, tapioca, thin strips of bread and butter and poached eggs may be gradually added to the list until the eighth or ninth day, when some solids may be introduced.

The arms, legs, and chest may be sponged with warm alcohol, or with soap and water, and subsequently convalescence is promoted by frequent sponging and by rubbing the body with alcohol. If there is much restlessness, or if the patient suffers severe pain, a small hypodermatic of morphia, one-sixth to one-quarter of a grain, may be administered, but the routine employment of it is to be condemned. It is much better to encourage the patients to control themselves and to endeavor to endure the pain. It delays healing, checks secretion and elimination, as well as the peristaltic action of the bowels, functions so

much required at this critical time, besides it places the patient in such a mood as to be an unsafe monitor of untoward or alarming symptoms.

Purgatives. It is imperative to obtain a movement of the bowels at as early a period as possible, and it is astonishing to note the great change for the better which takes places when this has been satisfactorily accomplished. If, at the end of forty-eight hours, a good satisfactory movement of the bowels has been obtained, and the pulse below one hundred, the patient is convalescent. If, on the other hand, the bowels remain unmoved, in spite of efforts to open them, and tympany appears, with rising pulse, it is a serious matter. On the second day after operation, an effort may be made to move the bowels, some administering grain doses of calomel every hour until five doses have been given; others recommend teaspoonful doses of Rochelle or Epsom salts every two hours until three doses have been given. Medicines by the mouth for this purpose are, however, often contraindicated, causing nausea or the upsetting of the stomach. The most satisfactory method consists in the administration, on the second day, of an enema of warm water and soap-suds, introduced as high up as possible, by means of a rectal tube or large catheter. If the enema is not effectual it may be repeated once or twice at intervals of two or three hours. *Flatulence,* or accumulation of flatus in the bowels, is often a distressing symptom, but generally may be effectually relieved by adding spirits of turpentine to the enema, aided by light massage over the region of the colon. A few drops of tincture of capsicum or of essence of peppermint, in water, will often give material relief. The patient should be *catheterized* shortly after operation, and, if necessary, every six hours afterwards, but she is to be encouraged to attempt to void the urine voluntarily, provided it can be done without much straining. Nearly every patient is restless and suffers

more or less pain, which may be relieved by some slight change in position, or by putting a soft pad under the head and shoulders, or under the bends of the knees.

Shock following prolonged, or any operation, can best be treated by keeping up the dry heat to the body and by hypodermatics of whiskey or brandy and strychnine. The routine practice of injections of strychnine, commenced at once after operation, will often prevent the appearance of the symptoms of shock.

Hemorrhage. Indications of collapse, with a falling temperature and rapidly rising pulse, points to this grave danger, and no time must be lost in re-opening the wound and seeking for the mischief, and stimulating treatment afterwards pursued by every effort known. Great benefit will be derived from rectal injections of normal salt solution, but more particularly from injections of the same solution into the pectoral region by means of a small aspirating needle attached to an ordinary enema syringe. Large quantities can thus be injected, if rigidly persisted in. The vomiting, due to the anæsthesia, should be over at the end of eighteen or twenty-four hours, but sometimes it persists longer and becomes a most trouble-some symptom. When vomiting continues after the third day, especially when the fluid is expelled without much apparent force, peritonitis is to be feared. Under the circumstances nothing is to be given by the mouth whatever, but rectal enema of peptonized milk or beef tea and the white of egg may be given instead. To allay thirst and dryness of the mouth it may be frequently rinsed out with cold water.

As a rule the patient should not be allowed to sit up in bed until the eighteenth day. At the end of the third week she may be allowed to get out of bed, and at the end of the fourth week, allowed to walk, but before doing so she should be furnished with an abdominal bandage, to

prevent any opening of the incision, to be subsequently followed by a hernia.

The after-treatment of plastic operations for the repair of the perineum or cervix resolves itself into rest and cleanliness. The patient should remain in bed for two weeks, and after that should take another week in getting up and about. If a gauze tampon has been introduced into the vagina, it should be removed after forty-eight hours, and a warm sterile water douche given daily.

Two aloin, strychnine and belladonna granules may be administered on the second evening after operation, followed by a rectal enema in the morning.

FUNCTIONAL DISEASES.

CHAPTER VIII.

DISORDERS OF MENSTRUATION

Abnormal changes in the menstrual flow are to be regarded only as symptoms which have their origin often in opposite conditions and require discrimination in their treatment. The menstrual flow may be absent (*amenorrhœa*); or scanty; it may be painful (*dysmenorrhœa*); or it may be profuse (*menorrhagia*). When the hemorrhage is profuse at other times than at the menstrual period, it is termed *metrorrhagia*.

AMENORRHŒA.

Amenorrhœa, or absence of the menstrual discharge, is termed *primary,* when the patient has never menstruated, and *secondary,* when menstruation has previously occurred.

Primary amenorrhœa may be divided into (*a*) *primary permanent amenorrhœa,* the most marked cases being those in which the ovaries, or uterus, or both, continue in a rudimentary condition, or are altogether absent, while the external genitals are normally formed. (*b*) *Primary temporary amenorrhœa* may be due to chlorosis occurring in girls under the age of puberty. Menstruation occurs later than normal, and, when it does set in, the flow is scanty and of short duration. (*c*) *Delayed puberty.* Here the general and sexual development is complete, yet the girl fails to menstruate. It is often caused by over-

work, combined with insufficient food, by change of climate or habits at about the expected period, or by too long confinement during school hours, combined with an over-taxed brain.

Secondary amenorrhœa may be due to constitutional derangements, as anæmia, chlorosis, diabetes, Bright's disease, malaria, cancerous cacfiexia, tuberculosis, or acute illnesses, or it may be due to the influence of the nervous system, such as severe mental shock, alarm or sudden fright, or by the nervous system generally being overtaxed. Among other causes may be mentioned obesity, change of climate, sea voyages, and sudden or prolonged exposure to cold, particularly at the menstrual period; or it may be due to acquired atresia of the cervix, or of the vagina. Removal of both ovaries does not always lead to complete amenorrhœa, some women continuing to menstruate for years after their removal. There are different explanations given, among which may be mentioned, the existence of a supplementary ovary, by a portion of the ovary being left in the pedicle, and by the law of "persistence of habit."

The term *functional amenorrhœa* is used to define that form of amenorrhœa in which a patient with average health ceases to menstruate without any apparent objective cause, local or constitutional, and may continue so for an indefinite period. Besides the causes of amenorrhœa cited there are certain cases in which menstruation occurs at irregular intervals for which no definite reason can be assigned.

Symptoms. Besides the absence of the periodic flow, which is, of course, the chief symptom, there are other symptoms to be taken into consideration, and which are for the most part those of the primary disease causing it.

When a case of amenorrhœa presents itself, it should definitely be settled whether it is primary or secondary. Primary amenorrhœa, in which the menstrual flow has

never occurred, leads to questioning whether the uterus, tubes, and ovaries be present in their entirety. If present, it becomes necessary to ascertain whether atresia of the cervical canal, vagina, or vulva exists. If the prodromic symptoms of a menstruation be absent, it points to congenital deficiencies, or defects, or may be simply an expression of general backwardness of development. If the prodromic symptoms have been present, and repeated at lunar intervals, with no menstrual flow, suspicion of atresia is excited.

If the case be one of secondary amenorrhœa, pregnancy and lactation must be excluded.

The most important condition from which it must be carefully diagnosed is pregnancy, normal or ectopic. Every sign of pregnancy, particularly the early ones, must be thought of and carefully brought to bear upon the case. Upon this point the practitioner must always be on his guard. Designing women often consult the physician for amenorrhœa, when they know they are pregnant, hoping that something will be done to bring on their courses and thus interrupt gestation.

Acute suppression arising out of exposure to cold, wet feet, damp garments, and the like, are usually associated with both constitutional and local symptoms such as fever, rather severe headache, pains in the back and pelvis and extending down the thighs; irritability of the bladder and bowels, and a general sense of pelvic uneasiness, tightness or pain.

Treatment. In a case of primary amenorrhœa the first question to be considered is that of causation. The crucial point is the presence or absence of the menstrual molimen. In the absence of these, in a girl not more than sixteen or seventeen, the physician may well hesitate to make a local examination, preferring to wait with the hope that nature and a little attention to general treatment will overcome the difficulty. If, however, menstru-

ation does not appear within a reasonable time, a biman-
ual, abdominal, and rectal examination should be made to
disclose the possibility of faulty development. If on the
other hand the patient has periodical menstrual moli-
mena to a considerable extent the case is either one of
mal-development, with functionally active ovaries, or one
of atresia of the genital tract, and an examination should
be made at once.

In cases where there has been an arrest of develop-
ment sufficient to preclude the possibility of menstruation
it is obvious that interference of any kind for the purpose
of establishing it is useless. When the ovaries are active
but the uterus too imperfectly developed to respond, and
the recurring symptoms severe, there is usually no relief
except in the removal of the ovaries. Should amenorr-
hœa be believed to be the outcome of defective develop-
ment of the uterus at the time of puberty, remaining
more or less as a pubescent or infantile uterus, it may be
stimulated to renewed growth and activity by the use of
a galvanic current, the negative pole in the uterine cavity
and the indifferent pole over the lower abdomen, turning
on from fifteen to twenty milliamperes. In less pro-
nounced cases the Faradic coil will prove of benefit, one
pole in the vagina behind the cervix and the other over
the hypogastric region. Primary amenorrhœa, due to
congenital atresia, can only be treated by operative inter-
ference. In the amenorrhœa of young girls, whether
primary or secondary, attempts at forcing its appearance,
such as hot foot and hip baths and the administration of
the so-called emmenagogues, are worse than useless. It is
not uncommon for the menstrual function to be delayed
for one or more years or to be irregular, or suspended,
for the first few years after its commencement. The
treatment must vary according to the suspected cause
and the underlying morbid condition, if any seem to exist.
Iron in some form, often happily combined with arsenic,

is of much service. Not infrequently cod liver oil appears to do more good. Attention should be paid to the regularity of the bowels. Constipation and amenorrhœa are often closely associated. Plain nourishing food, plenty of fresh air and exercise, are essential elements. The over study of the school girl, the long standing or constant sitting of the shop girl, or typewriter, should receive earnest attention, and in cases where the patient's health is man.testly below par it is the wisest plan to remove her from school or employment for a lengthened period.

Secondary amenorrhœa due to constitutional causes must be treated by attention to the particular cause in each individual case. In chlorosis the great indications for treatment are fresh air, light food, iron and laxatives, with intervals of rest.

Amenorrhœa from malaria calls for the administration of *quinine* and change of climate. Rheumatic amenorrhœa sometimes calls for the *salicylates*. *Cimicifuga* and *guaiacum* are excellent remedies for rheumatic amenorrhœa, but especially for delayed or painful menstruation. *Pulsatilla* is indicated when the menses have been stopped by mental shock or fright. *Apiol* is one of the most safe and efficient emmenagogues, and may be given in capsules containing five or six drops, three times a day, for a few days preceding the expected flow.

Aloes indirectly stimulates the internal genitalia, and is one of the best adjuvants to other treatment when constipation exists. *Strychnine* is a good muscle and nerve tonic, and will assist the action of iron. *Iron* is the hæmatic tonic, and stands first. It has an emmenagogue action, increasing the blood supply of the pelvic organs, and may be administered in any one of the recognized forms, such as the dried sulphate, the carbonate, the muriated tincture, either plain, or in the form of elixir or glycerole. The citrates, tartrates, lactates, peptonates, or other mild preparations are useful, but not so rapidly

efficient. The therapeutic effect of any of these can often be improved by the combination of a small dose of liquor potassœ arsenicalis or liquor arsenici hydrochlor. Blaud's pill, composed of sulphate of iron and carbonate of potash, or the modified pill which contains arsenious acid as well, often gives excellent results.

Functional amenorrhœa as a rule requires no treatment. In such cases one is tempted to make use of the so-called emmenagogues, such as rue, savin, cantharides, and the like, but they will be found useless, and not infrequently injurious.

Where there is a sudden stoppage of menstruation from cold, exposure or shock (*acute supression*) the treatment should be directed towards restoring the circulation to its normal condition by hot water bags applied to the abdomen and the lumber region, pediluvia with mustard and water, and warm vaginal douches. Internally diaphoretics and diuretics, combined with a mild laxative, are to be administered.

Among the various combinations the following are the most generally serviceable.

R. Aloin, grs. xii;
    Pil, Ferri Carb., drams iss;
    Myrrh, dram ss;   M.
    Ft. pil No. XL.
Sig.—Take two pills, three times a day, after meals.

R. Ferri Sulphat, Exsiccat., grs. xl;
    Quiniæ Sulphat., grs. xl;
    Strychniæ Sulphat., gr. i;
    Ext. Gentian, q.s.   M.
    Ft. pil No. XL.
Sig.—Take one pill after meals.

R. Ferri Sulphat., dram i;
    Potass. Carb., dram i;
    Quiniæ Sulphat., dram ss;
    Ext. Nux. Vom., grs. iv;
    Aloin, grs. iv.
    Ft. pil No. XL.   M.
Sig.—Take one to two after meals.

R. Tinct. Ferri Mur., drams v;
    Liq. Arsen. Mur., dram i;
    Acid Mur., C.P. dram i;
    Syrup Simplicis, ad., oz. viii.   M.
Sig.—Dessertspoonful, in wine glass of water, after meals.

Potassium permanganate or *binoxide of manganese*
is sometimes very efficacious, when administered for a few
days preceding menstruation, but the former often has
a distressing effect upon the stomach.

Vicarious menstruation is a condition closely allied
to amenorrhœa. It means a condition of the female
system in which there is a regularly recurring discharge
of blood from other parts of the body besides the uterus,
menstruation being at the same time wholly or partly
suppressed. The sanguineous flow may come from the
nose, bronchial tubes, stomach, intestines, or rectum.
Generally it comes from the mucous surface, but it may
take place from the skin or at the site of a wound.
The treatment applicable is that adapted for amenorrhœa.
Usually when the health has been improved, the probable
causation removed and the menstrual function estab-
lished properly, the vicarious hemorrhage will cease.
Cases are on record when the ovaries had to be removed
to prevent death from the repeated hemorrhages.

MENORRHAGIA AND METRORRHAGIA.

The first of these two words is used to express an
excessive menstruation; the second, for a flow of blood
not only at the menstrual time but between menstrua-
tions. Neither condition is a disease, but a symptom of
some well-defined pathological condition. Women vary
greatly within the physiological limits in the amount, the
duration, and the frequency of menstruation, and it is
thus difficult sometimes to say where normal menstrua-
tion ceases and menorrhagia begins. Menorrhagia may
occur as an excessive flow of blood during the normal
number of days, or an ordinary flow extending over an
excessive number of days.

Causes. Hemorrhage associated with abortion, chorio-epithelioma, inversion of the uterus, extra-uterine pregnancy, placenta previa, retained membranes, and the like, are not to be considered as having a place under this heading. Women of hemorrhagic diathesis bleed more freely at the menstrual epochs. Hæmophilia, scrobutus, and purpura act in the same way. Chlorosis, as a general thing tends to amenorrhœa, but in some cases it leads to menorrhagia and metrorrhagia. Many other conditions dispose to it, as long-continued mental depression and other nervous disturbances, luxurious living and sedentary habits, residence in tropical climates, malaria, tubercle, the acute exanthemata, lead and phosphorus poisoning, and Bright's disease.

It may be associated with disorders of the circulation, such as mitral incompetence or stenosis; congestion, from any cause, of the portal circulation; renal or splenic disease; abdominal tumors, or even overloaded bowels. The chief local pelvic causes are ovarian, uterine, and peri-uterine congestions and inflammations; tubal inflammatory diseases; the earlier stages of chronic metritis; subinvolution; chronic endometritis; cervical lacerations; displacements; uterine fibroids and polypi.

One of the most common causes is the presence of fungosities within the uterine cavity. Malignant diseases of the uterus are almost invariably followed by menorrhagia and metrorrhagia. Many women firmly believe that the menopause must be attended by an excessive menstrual flow. Such is not the case. After the menopause has once been establishd, post-climateric hemorrhages are almost invariably due to a local lesion, such as senile catarrh, cancer, the presence of mucous or fibrous polypi, or calcification of the uterine blood vessels.

Treatment. The treatment of menorrhagia resolves itself into that appropriate for the attack, and that for the

menstrual interval.   Rest in bed, in the recumbent position, should be insisted on, light non-stimulating diet, the rectum unloaded and the bowels kept open. Chronic constipation, particularly when associated with congestion of the portal circulation, is to be overcome by a pill of podophyllin and nux vomica at night, followed, in the morning, by a teaspoonful of some saline, such as effervescing granular phosphate of soda, magnesia sulphate, or a wineglassful of Hunyadi Janos water.

The medicinal hemostatics to be used must depend upon the provoking cause. In moderate, persistent, erratic hemorrhage, particularly where the fault lies in the heart's action, or in a retarded venous circulation, *digitalis* is one of the best remedies. It operates by increasing the arterial tension and thus improves the atonic circulation. *Ergot* is singularly well adapted to conditions of the uterus in which they are well developed, but relaxed muscular fibres, with dilated and engorged blood vessels. The more soft, flabby, relaxed and engorged with blood the uterus is, the more pronounced will be its effects, hence it is particularly indicated in chronic hyperæmia, active or passive; in chronic metritis, in its first stage, and in subinvolution. Hamamelis, in the form of fluid extract, is a most useful remedy. For sudden outbursts and for active and profuse hemorrhage it is inferior to ergot, but for a slow long continuous flux, or hemorrhage passive in character, it is the remedy *par excellence*. The fluid extract of ergot and hamamelis make an efficacious combination. *Hydrastis Canadensis* is a vaso-constrictor in congested states of relaxed mucous membrane and for uterine hemorrhage, due to endometritis, myomata, or incomplete involution, it is very valuable. It also combines well with ergot. A neat way of administering is in the form of *hydrastine*, given by the mouth or hypodermatically in a ten per cent. solution.

The following combinations have been found very serviceable:

R.   Gallic acid, dram i;
      Ergot, Fluid Extract, oz. ss;
      Acid Sulph. Aromat, drams iiss:
      Elixir Simplicis, ad., oz. viii.   M.
Sig.—A tablespoonful in some water every four hours.

R.   Ergot, Fluid Extract, oz. ss;
      Hamamelis, Fluid Extract, drams iii;
      Tinct. Hyoscyam, drams iiss;
      Elixir Gentian Co., oz. i;
      Aquæ, ad., oz. viii.   M.
Sig.—A tablespoonful in some water three times a day after
    meals.

Tincture Digitalis, drams iiss, may be combined with either of these, should the indications call for it.

Strychnine besides its stimulating action on the heart has a decided stimulating power over the contractile fibres of the uterus and in hemorrhage from a relaxed uterus acts better than any of the ecbolics. *Stypticin* in doses of one to two minims of a ten per cent. aqueous solution, given hypodermically, is highly useful in climateric hemorrhage, subinvolution, diseased appendages, and fibroids other than the submucous variety. Unlike ergot it does not cause uterine contractions, and has a certain sedative action. *Styptol* in grain doses three times a day has a similar action. Fifteen drops of a 1 to 1000 solution of adrenalin has also been used with some success.

The action of medicinal agents should be supplemented in severe cases by local applications. Hot water may be injected into the vagina, and when the patient has become deeply anæmic from loss of blood, normal salt solution may be injected into the rectum. The best non-operative means is the vaginal tampon. The vagina and cervix may be tamponed with absorbent cotton after the hot water irrigation and allowed to remain there for twenty-four hours.

During the intervals, the judicious and thorough use of the curette is one of the best means of promptly and safely curing many of these cases. Local galvanization of the uterus is a therapeutic agent worthy of the highest consideration in uterine hemorrhage dependent upon chronic affections of the endometrium. Faulty conditions of the blood from anæmia, chlorosis, or defective hygiene, are to receive special care. *Iron,* in the form of the *muriated tincture,* forms an excellent means for checking excessive menstruation dependent upon marked anæmia; however, in most cases it is to be utilized only during the menstrual interval. *Arsenic* is a most valuable hæmostatic in the menorrhagic conditions of young girls. as well as of women nearing the menopause. At such times, if too profuse, too frequent, or continues too long, it is best met by administering three to five drops of liquor potassæ arsenicalis three times a day. It seems to be indicated when iron is contra-indicated, and may be given during the time of the flow as well as during the interval. A generally favorite prescription is known as the combination of the sulphates.

> R. Magnesiæ Sulph., drams vi;
>   Quiniæ Sulph., grs. xxv;
>   Ferri Sulph. Exsiccat, grs. xl;
>   Acid Sulp. Aromat., drams iiss;
>   Aqua Menthæ Pip., ad., oz. viii. M.
> Sig.—A tablespoonful in a wine glass of water after meals.

> R. Pulv. Ferri Redact., grs. xl;
>   Quiniæ Sulph., grs. xl;
>   Acid Arseniosi, grs. i;
>   Extract Gentian., qs.   M.
>   Ft. pil No. XL.
> Sig.—One pill after each meal.

Precocious menstruation is a regular lunar flow of blood from the genitals every four weeks, occuring in children below the age of puberty. As a rule, both the external and internal genitals and the breasts are abnormally developed in such children, and sometimes they

show sexual appetite. Nothing can be done for them except to keep up their strength, and such other treatment as will make up for the loss of blood, until they have reached the proper period. It is not to be forgotten that precocious menstruation is at times a manifestation of some morbid condition of the uterus, or its appendages, such as tumors or affections of the endometrium.

DYSMENORRHŒA.

Dysmenorrhœa means simply painful menstruation and is applicable to all varieties of suffering associated with the performance of the menstrual function. Theoretically a woman should know no difference in her sensibilities during the menstrual and inter-menstrual periods. Unfortunately the effects of civilization and the complex associations of modern life have changed the conditions surrounding menstruation to such an extent that the woman who menstruates without pain or reflex or other disturbances is very exceptional. These disturbances, called the menstrual molimen, consist of a certain amount of pain in the pelvis, back, or down the thighs; nervous disturbances, as headache, depression, disinclination for exertion, mental hebetude, and reflex disturbances of various kinds, some being more prominent than others in a given individual. One or more of these constitute for a given individual her normal menstruation and are almost invariable constant in their appearance and severity.

Any decided increase in these symptoms constitute what is known to-day as dysmenorrhœa. Thus the pain may come on a day or two, even a week in rare cases, before the appearance of the flow and is continued throughout; or it lessens or disappears with the appearance of the flow; or later as the flow is well established. In other cases the pain is cramp-like and intermittent,

lasting but a short time, to appear again after an interval, and is most often continuous throughout the whole period. The nervous symptoms may be the ones most aroused such as an almost unendurable headache, extreme lassitude or excitability. Not infrequently the two are combined. Associated with these there must be added alteration in the character of the flow. It may be scanty or profuse. It may be intermittent or it may be thin, clotted or membranous.

From a clinical standpoint it may properly be divided into the following varieties:—The *neuralgic*, the *congestive* or *inflammatory*, the *obstructive*, and *membranous*. To this classification the *ovarian* has been added by some authorities. It differs from the others more in location than in kind, and it can scarcely be said to deserve recognition separate from the inflammatory.

Spasmodic dysmenorrhœa is a term applied to the neuralgic form, in which there is spasm of the circular fibres about the os internum.

Neuralgic dysmenorrhœa. This variety does not depend upon any appreciable organic disorder of the uterus or of its appendages. Ordinarily, on the most careful physical exploration, no alteration in size, shape, position, consistency, or vascularity of the pelvic organs or structures will be noticed. The sentient nerves of the endometrium appear to be in a state of hyperæsthesia—a neuralgia in the ordinary sense of the term.

Causes. There are many agencies which, at times, so alter the healthy state of the nerves as at one time will produce a gastralgia, at another an occipital or facial neuralgia, and similarly in neuralgic dysmenorrhœa there is present a local neurotic state, provoked to the excitation of pain by the stimulus of the physiological congestion incident to the oncoming menstruation. The causes which generally induce it are: The neuralgic diathesis, hysteria, chlorosis or plethora, malaria, gout, rheumatism,

luxurious and enervating habits, and habits deteriorating the nervous system.

Symptoms. It is by far the most frequent variety, and **is** found oftenest in those who are subject to the various neurotic diseases. The pain may show itself before the flow has been established and disappear as soon as it comes on, or may continue with varying intensity throughout the duration of the menstrual discharge. The pain is located in the uterine or ovarian regions and radiates towards the iliac, abdominal, lumbar, or sacral region, or down the thighs. The discharge may be scanty or profuse, and the severity of the pain seems to be in inverse proportion to the quantity of the flow. The diagnosis is made by the exclusion of the other varieties. The pain felt in the uterus has nothing expulsive in its character, the flow is steady and not interrupted, no clots are discharged by spasmodic efforts, and physical examination discovers no obstruction. These facts will distinguish it from obstructive dysmenorrhœa. It is differentiated from the congestive form by the absence of constitutional disturbance and by its being habitual and not exceptional, by the absence of the ordinary signs of endometritis and of ovarian and peri-uterine inflammations.

The *treatment* resolves itself into that which is appropriate for the time of the flow, to relieve pain, and that for the interval, to remove the cause and prevent its repetition. If the rheumatic or gouty diathesis exists, it may be combated by administering half dram doses of the ammoniated tincture of guaiacum, by twenty drop doses of the wine of colchicum, or by five to ten grains of soda salicylate, three times a day. In anæmic and neurasthenic cases ferrugineous and nerve tonics such as iron, nux vomica, phosphorus, quinine, cod liver oil, malt extracts, and the hypophosphites should be given, and the strictest attention to general hygiene observed. If

plethoric, a strict plain dietary should be demanded, and administration of such purgatives and saline medicines as will favor the portal circulation and deplete the system generally.

Malarial toxæmia should be treated by quinine and change of residence. A sea voyage will often accomplish excellent results. Local faradization with the secondary current is useful, but often the best results are to be obtained from the galvanic, with the positive pole intra-uterine. For relief at the menstrual period the use of opium and chloral should be forbidden, except under extreme necessity. Phenacetine in five to ten grain doses often gives almost immediate relief. Tincture of cannabis indica, in doses of ten to fifteen drops every four hours while the pain is severe, is also beneficial, and should be tried before resorting to opium or chloral. Phenacetine combined with salol (grs. iii) or with codeine (gr. ss) or with heroin (gr. 1-12), or a combination of acetanilid, caffeine citrate and camphor monobromide act rapidly as sedatives. Bromide of ammonia combined with aromatic spirits of ammonia will often relieve the nervous symptoms. Apiol, in five drop capsules, given three times a day for a few days before the flow is expected and continued more often during the flow, has done excellent service, especially in the amenorrhœic forms of dysmenorrhœa. Tincture of pulsatilla, given three times a day for at least three days preceding the painful period, is indicated in the neurotic types of the disease, especially in young women. Tincture of cimicifuga, given three times a day during the whole interval and more frequently at the menstrual period, is useful in the neuralgic and rheumatic forms. viburnum prunifolium, in the form of fluid extract, often gives good results when administered in half dram doses for a few days before the expected period and continued during it. This treatment may be supplemented by hot vaginal douches and the introduc-

tion of one-fourth grain suppositories of extract of bella-
donna.

Congestive or inflammatory dysmenorrhœa. At each
menstrual period an active congestion occurs in the
mucous membrane of the Fallopian tubes and uterus, as
well as in the ovaries, and probably to a less degree in the
pelvic tissues. When any abnormal influence renders
this excessive, it naturally produces pain in the nerves
lying between the distended vessels, and, acting through
the sympathetic system, reflex disturbances in remote
parts. As a result of repeated hyperæmias, month after
month, the hyperæmia passes into congestion, and not
infrequently on into inflammation, and there exists then
that form of dysmenorrhœa to which the name conges-
tive or inflammatory has been applied. This form may
be (*a*) *primary* in which the pain has been felt almost
since she began to menstruate. The actual etiology in
this variety is difficult to explain. Disregard for the
rules for health at the time of the establishment of the
function, slight congenital deformities such as flexions,
and hereditary influences may be mentioned as possible
causes. (*b*) *Acquired* in these cases the patient has men-
struated until recently with little or no pain when she
has observed that rather suddenly the pain has become
quite severe. Its origin may often be traced to some
sudden disturbance of the vaso-motor system such as
catching cold, severe chill, some physical or emotional
shock at a menstrual period, sudden suppression and the
like. It is most frequently found in the parous woman,
and accordingly frequent parturition and subinvolution
are etiological factors. Plethora, heart disease and dis-
turbed portal circulation predispose to it. (*c*) *Secondary.*
This variety is really a symptom of definite organic
disease of one or more of the pelvic organs. The
disease has the effect of intensifying the menstrual con-
gestion, and it, in turn, aggravates the symptoms pro-

duced by the disease, thus the pain is of two-fold origin. Of the commoner diseases of the uterus which are productive of secondary dysmenorrhœa there may be mentioned chronic endocervicitis, especially when there is laceration and hypertrophy, chronic endometritis and metritis, displacements and fibroids; to this may be added tubal and ovarian disease and chronic pelvic inflammation.

Symptoms. In the acute variety the dysmenorrhœa is often associated with febrile disturbances particularly when it has arisen suddenly. The pain is constant, not paroxysmal, and is described as a dull aching throbbing pain, felt in the pelvis, back, and down the backs of the thighs. It commences from a few hours to a day before the flow is established, improves somewhat with the full establishment of the flow, and gradually eases off during the last day or so. Practically speaking the pain is continuous throughout the period. Associated with the pain are rectal and vesical tenesmus. The discharge may be scant at first, or perhaps for most of the period, but in the large majority of cases it is rather profuse, and sometimes in the form of small clots. Local examination reveals no pelvic disease. The uterus is usually tender, large in the acquired type, and in the primary too, if the form of dysmenorrhœa has been prolonged over a lengthened period. In the secondary variety the pain is often much exaggerated, local tenderness, a history of previous disease, or evidences of the presence of the existing disease on examination, and in the inter-menstrual period there will be local pains, painful locomotion, fatigue on exertion, and evidences of ill-health.

Treatment. As in the neuralgic form, the source of the trouble must be sought for and combated along the lines laid down for the treatment of that particular form of disease. In the primary form thorough rest in the recumbent position should be insisted upon. General or local plethora must be relieved, displacements and ver-

sions overcome, and if any local inflammation be dis-
covered, it should be the subject of treatment. Should
the attack be accidental and due to hyperæmia merely,
as from exposure to cold and moisture, the patient had
better be put to bed, hot applications applied over the
hypogastric and lumbar regions, and a hot vaginal douche
administered every four hours. A saline purge is to be
given, and a febrifuge mixture composed of the following
administered :

> R.   Tinct. Aconit., dram ss;
>   Liquor Ammoniæ Acetatis, oz. iss;
>   Spirit Æther, Nit., drams v;
>   Aquæ, ad., oz. iv.   M.
> Sig.—Dessertspoonful in some water every two hours.

The pain may be relieved by phenacetine or by small
repeated doses of Dover's powder, or by some of the
combinations previously referred to.

Should local inflammatory conditions be discovered to
be the cause of the dysmenorrhœa, a small cotton tampon,
impregnated with boro-glyceride, with or without the
addition of a few drops of fluid extract of belladonna, and
inserted behind the uterus, will often give marked relief.
A five per cent. solution of ichthyol in glycerine applied
in the same way will act in a similar manner.

Local applications of heat and vaginal douches will
also act as valuable adjuvants. The internal administra-
tion of bromide of ammonia, or of tincture of cannabis
indica, combined with liquor ammonia acetatis, spirits of
ammonia aromatic and peppermint water, will have a
decided sedative effect, and tend to relieve the congested
state.

> R.   Ammoniæ Bromid., oz. ss;
>   Spts. Ammoniæ Aromat, oz. i;
>   Liq. Ammoniæ Acet., oz. i;
>   Aquæ Menth. Pip., ad. oz. viii. M.
> Sig.—Tablespoonful in some water every four hours.

In this form of dysmenorrhœa the removal of the
ovaries should not be considered without very serious

consideration especially when no serious pelvic disease exists. Not infrequently appropriate treatment and the rest cure bring about relief, and the patient besides will not be compelled thereby to take the chances of the complications that sometimes arise with the establishment of an artificial menopause. In addition oophorectomy does not always cure the malady.

Obstructive dysmenorrhœa. If after the blood has collected in the uterine cavity any obstruction exists to prevent its escape into and through the vagina, spasmodic pains are excited which often amount to uterine tenesmus, and are very similar to the expulsive pains occurring during normal labor. To this form of painful menstruation the name obstructive or mechanical dysmenorrhœa has been applied. The obstruction may exist in the cervix or os.

The special *causes* of obstructive dysmenorrhœa are congenital or acquired contraction of the cervical canal, such as is found in the elongated and conoid infra-vaginal cervix, with pin-hole os, or that form arising from chronic inflammation, especially inflammation resulting from the vicious use of strong caustics. Flexions of the uterus especially when the angle formed is sharp, will produce it, more particularly when associated with version. Sometimes a small polypus comes down to the os internum and resting upon it, acts upon the principle of the ball valve, and by so doing produces the worst features of obstructive dysmenorrhœa. A fibroid in the parenchyma of the cervix, by producing tortuosity of its canal, will cause a similar effect.

The *symptoms* are characteristic. After menstruation has continued for some hours, and sufficient blood has collected in the uterus to distend it, spasmodic pain occurs in the pelvis, increasing into a more or less violent expulsive effort, like the contractions attending a miscarriage. This, in time, causes the passage of a certain

amount of blood, the pain then ceases and the patient is relieved, until further distension and obstruction occurs, when the process by which the uterus empties itself is repeated. These symptoms are so marked and decided that little difficulty will be experienced in a diagnosis, but before a decision is arrived at, a careful physical examination should be made, to discover the cause and thus place the matter beyond doubt.

Treatment. The best recognized treatment of ordinary cases of cervical constriction, whether acquired or congenital, is dilatation by means of graduated dilators, or more forcibly by means of Goodell's or some other steel dilator. When the constriction does not exist within the cervical canal, it is usually the result of some severe inflammation following the use of caustics, or of a cervical laceration, and in such cases it may be found necessary to lay open the os by cutting with a knife or scissors. In order to keep the cervix or os patulous, the dilators may be introduced from time to time, but the method is painful and often unsatisfactory. The difficulty may be overcome by at once inserting a glass or aluminum intra-uterine stem pessary and retaining it in place by means of tampons frequently changed. In cases of severe flexion the production of what has been termed "artificial abortion" has given excellent results. After thoroughly dilating the cervix and straightening the canal the uterus as well as the cervix is thoroughly packed with gauze. Soon uterine contractions are established and the uterus and utero-cervical junction softened. In this way it simulates an abortion, a condition which, it is admitted, usually cures obstructive dysmenorrhœa. If there is a polypoid or submucous fibroid obstructing the canal it should be removed.

Membranous Dysmenorrhœa. . This variety consists in the expulsion from the uterine cavity, at menstrual periods, of organized material, which is found to consist of structures resembling the lining membrane of the

uterus. It may consist of a sac representing the tri-
angular cavity of the body of the uterus, with its three
openings, or it may come away piecemeal, in shreds, or as
strips of mucous membrane. When more or less complete
it is soft, comparatively thick, and with many perfora-
tions, the sites of the utricular follicles. Under the
microscope the cast is found to consist of the lining mem-
brane of the uterus hypertrophied in all its elements,
almost exactly as in pregnancy, hence it has been termed
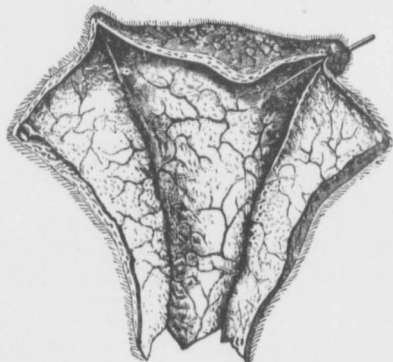
FIG. 39.—A Dysmenorrhœal Membrane laid open.

"menstrual decidua." There are many views held as to
its etiology, but the two main ones are, *first*, that it is an
exfoliation of the entire mucous membrane of the uterine
body due to irritation transmitted to it, the result of some
ovarian disease.   *Second*, that it is an exudation, thrown
out over the uterine wall, the result of endometritis, and
constituting a cast of the uterine cavity (*exfoliative
endometritis*).

Membranous dysmenorrhœa may be confounded with
early abortion, blood casts or fibrinous moulds of the
uterus, or with exfoliation of the vaginal mucous mem-

brane. From the first of these, the differentiation may be accomplished by the progress of the case, the repetition of the process, and the entire absence of the symptoms of pregnancy, while the microscope will show the absence of villi of the chorion and of the large irregular decidua cells. Blood clots and vaginal exfoliations will also be readily recognized by the microscope.

Symptoms. With the commencement of the menstrual flow there are steady pains which increase as it progresses until they become violent and expulsive, like those of abortion. Under these the os gradually dilates and the membrane is forced out into the vagina, associated with a considerable quantity of dark blood. There is commonly a tendency to menorrhagia, which however, soon disappears, but for some time after it has passed off there are symptoms of endometritis and purulent and sanguineo-purulent discharges.

Treatment. The uncertainty of the pathology of this disorder has led to a great variety of treatment. For the pain which attends the attack, a hypodermatic of morphia may have to be administered, and occasionally the pain is so severe as to demand the administration of a little chloroform or sulphuric ether, particularly when morphia is not well tolerated. Hot applications and vaginal douches, so useful in all forms of dysmenorrhœa, are also applicable here. If uterine or ovarian disease be detected, it should be treated in accordance with general rules. The largest number of cases successfully treated has followed repeated dilatation and curetting of the uterus, in conjunction with applications of chloride of zinc or carbolic acid, and packing with iodoform gauze. This line of treatment may alternate with galvanization, ten to twenty milliamperes, the negative pole intra-uterine. All varieties of constitutional treatment have been tried and abandoned.

Ovarian Dysmenorrhœa. In a number of cases, by no means small, no disordered condition of the nervous

system will be found to account for habitual dysmen-
orrhœa, and exploration of the pelvis will fail to discover
uterine or peri-uterine disorders. By a careful bimanual
examination in such cases, a globular slightly compressed
mass, about the size of a walnut or small egg, will often
be found in Douglas' cul-de-sac, or on one or both sides
of the uterus, low down and in close proximity to it.
These are the ovaries, enlarged, tender, prolapsed, and
revealing a condition known as chronic ovarit's. The
pain in this form of dysmenorrhœa precedes the flow by
several days and diminishes as it is established. It is of
a dull character, extends over the nates, down the thighs,
and is particularly liable to be accompanied by nervous
manifestations and depression of spirits. The breasts
often sympathize, becoming painful to the touch. It must
not however be supposed that in all cases of enlarged,
tender, or prolapsed ovaries, ovarian dysmenorrhœa wi'l
be found, nor in every case of ovarian dysmenorrhœa
that the ovaries will be found in this condition.

The *treatment* of this class of cases is perhaps the
least satisfactory of all classes of dysmenorrhœa. In a
young girl, in whom ovarian disorder has advanced only
to congestion, recovery may rapidly take place, but in a
woman further advanced in life, and in whom chronic
enlargement of the ovaries has occurred, associated with
tenderness and prolapse, the prospects for cure are slight.
Sterility in these cases is the rule. It is just in such
conditions that bad habits are to be contracted by the use
of alcohol, morphia, chloral, or chloroform, and their
administration should be avoided as much as possible.
Hot applications, warm sitz baths, and warm soothing
vaginal injections should be employed. Internally there
is no remedy so efficacious as the bromides—ten grains
of bromide of ammonia or soda every four hours, com-
menced a few days before the flow and continued until its
close. For the immediate relief of pain, phenacetine,
exalgine, cannabis indica, or monobromate of camphor

may be employed. Locally, in addition to the hot applications and douches, a boro-glyceride tampon, impregnated with a few drops of fluid extract of belladonna and inserted behind the uterus, soothes and relieves the local irritation and congestion. When unmistakable evidences of organic ovarian disease exist, the operation for the removal of one or both ovaries is advised as the only means of giving relief.

In treating the subject of dysmenorrhœa, all the varieties generally indicated by authorities have been included, because, by the adoption of this method, a more thorough investigation of the subject is secured, and a recollection of them at the bedside will often aid in the classification and treatment. It must not, however, be supposed that every case of dysmenorrhœa will be subjected to strict limitations, on the contrary, many, if not most cases, give evidence of one or more disturbing elements. As for instance, a retroversion occurring in a weak nervous woman with impoverished blood might cause a dysmenorrhœa, due in part to mechanical obstruction, in part to neuralgia, in part to congestion, and, perhaps to some extent, to a secondary endometritis. In view of this fact, it is well to have in memory some general plan of treatment which may be resorted to in cases not readily susceptible of classification. Hot, wet or dry applications to the abdomen and lumbar region, hot vaginal douches, and rectal enemata have a place in the treatment of every form. Medicated vaginal tampons and suppositories aid in allaying congestion, in soothing the pain, and in supporting the uterus and adnexa, and may safely be used in almost every case. The administration of a saline purgative will empty the bowels and relieve portal or pelvic congestion ; and for the relief of pain and as a sedative to the nervous system, a judicious selection from the drugs already referred to will often accomplish much of the desired effect.

CHAPTER VIII.

STERILITY AND NYMPHOMANIA.

Sterility is another functional disorder of the uterus, and implies an inability for impregnation during normal reproductive life. It is sometimes *congenital*, the result of faulty development. It is said to be *acquired* when it arises from disease after an uncertain period of fertility. A marriage may be unfruitful from causes pertaining to the male or to the female. More women than men are sterile, in the proportion of six to one. Impregnation becomes impossible from absence or a very incomplete development of the vagina; from atresia of the vagina, or from an imperforate hymen. Sterility may occur from a condition of the vulvar orifice, called vaginismus, in which all attempts at coition cause extreme suffering (dyspareunia), the sphincter vaginæ and muscles of the pelvic floor being, at the same time, thrown into a spasmodic state. It may arise from inability of the semen to enter the uterine cavity owing to atresia or stenosis of the os, or to flexions, displacements, or tumors of the uterus. The vitality of the sperm may be destroyed by excessive acidity of the vaginal mucus. There may be incapacity for proper ovulation, which includes any condition of the ovary which impairs the ovule, such as chronic ovaritis and cystic degeneration; from imperfect development of the ovule, the result of debilitating diseases as anæmia, scrofula, tuberculosis or syphilis. Gonorrhœa, it matters not how contracted, is a very common cause. Sterility may be owing to organic changes in the Fallopian tubes, which prevents the safe passage of the ovum through them; to pelvic peritonitis, which prevents an instinctive application of the fimbriæ to the ovaries; to inability, after fecundation, to continue gestation; or,

finally, to want of physical adaptation of the parties, "sexual incompatability." Married life may be sterile for years, yet when either party obtains a new companion fertility may follow.

Treatment. While judicious treatment occasionally gives favorable resuits, it often terminates in disappointment. Success in the management of sterility depends largely upon a correct diagnosis, and the special treatment of all varieties consists in the removal of the cause, if practicable. In all cases of long continued sterility, after having thoroughly examnied the female without finding a satisfactory cause, investigation should commence with the male. If the uterus is absent or small, less than an inch or an inch and a half in length, all efforts to ensure fertility would seem hopeless. An ill developed uterus may be stimulated to growth if the patient is young and healthy. Excessive acidity of the vagina may be overcome by the use of alkaline waters internally, and by vaginal injections of weak solutions of carbonate of potash prior to coitus.

Nymphomania. When the sexual feeling in the female is excessive or perverted it is called nymphomania. There is a mental perversion, attended by an uncontrollable sexual passion, which, in its most severe form, is often associated with or dependent upon certain varieties of insanity with or without gross brain disease. Although observed in children and octogenarians, it occurs most frequently at the beginning and at the end of menstrual life. There is the greatest perversion of the sexual act, gratification being sought not only in masturbation, but also with others of the same sex. In many instances the disorder is a reflex manifestation arising from irritation of the genital organs, or from certain diseases of the uterus and appendages. The exciting causes may have their origin in the intestines, especially in the rectum, such as by the presence of

worms or hemorrhoids. Inflammation of the vulva, vagina, urethra, bladder, or the irritation of diabetic urine may give rise to it. Nymphomania may also result from frequent masturbation as well as cause it.

Treatment. The best results are obtained by moral suasion. Occupation of the mind and free physical exercise in the open air, early rising, cold bathing, regularity of the bowels, a plain non-stimulating diet, and the internal administration of the bromides, are the best remedies. When local disease is suspected, it is to be sought for and treated. Clitoridectomy and oorphorectomy have been tried and have failed to effect a cure, and such operations are indicated only when incurable disease of the external genitals or ovaries respectively perpetuate the condition.

DISEASES OF SPECIAL REGIONS.

CHAPTER IX.

DISEASES OF THE VULVA.

Malformations. 1. *Absence of the vulva.* By an arrest of development in the first month of fœtal life, the external genitals and anus may be absent, the skin covering the region uninterruptedly. If the anus is formed life may be continued without the external genitals, the urine being evacuated through the navel.

2. *Hypospadias.* In consequence of insufficient closure in the median line, the lower wall of the urethra may be split more or less deeply. If the defect extends very deeply so as to divide the different sphincters of the urethra the patient cannot retain the urine.

3. *Epispadias* is characterized by a lack of union of the upper wall of the urethra. It is generally combined with a similar defect in the anterior wall of the bladder (extroversion). Epispadias, like hypospadias, has been cured by plastic operation, such as stitching together flaps derived from the mucous membrane of the vestibule, or by uniting two lateral denuded surfaces in front of the open urethra.

4. The *clitoris* is sometimes split in two lateral halves, with or without cleavage of the urethra. It may be absent, or very small, or, on the other hand, as large as a medium sized penis.

5. The *prepuce* is frequently adherent to the glans, and in may cases this conditions gives rise to reflex neuroses and even epilepsy and nymphomania.

6. The *labia minora* may be *absent*, or it may be *multiple*, each being split lengthwise in two or three flaps.

7. The *labia majora* may likewise be split by longitudinal clefts, or may extend so far back as to reach behind the anus so that there is no apparent perineum.

8. *Hemaphrodism.* By this term is meant a congenital malformation of the sexual organs, in which the germinal gland of each sex (testicle in the male and ovary in the female) is found in one and the same individual, together with more or less perfect organs belonging to both sexes. Anatomically and clinically it may be divided into two chief varieties, the *true* and the *spurious*, or *pseudo-hemaphrodism. True hemaphrodism* may be divided into three forms: *bilateral*, in which an ovary and a testicle are found on each side; *unilateral*, in which an ovary or a testicle is found on one side, and on the other both an ovary and a testicle; and *lateral*, in which an ovary is found on one side and a testicle on the other. *Pseudo-hemaphrodism* is that condition in which the sexual glands belong to one sex, either masculine or feminine, while the passages leading from them, as well as the external parts, approach more or less the other. There are two great varieties of this malformation. *Androgyne*, in which a man simulates a woman both in general conformation and local appearance of his sexual organs; and *gynandria*, the far less frequent condition, in which a woman simulates a man, the resemblance being confined almost entirely to the external sexual organs. The clitoris is elongated two or three inches and possessed of more or less erectility, and perhaps the labia partially united so as to have the appearance of a scrotum.

The diagnosis of the sex is often difficult. A periodical bloody discharge has even been observed to take place from apparently normal male genitals, especially from males suffering from hypospadias.

The *treatment* is practically *nil*. A hypospadiac urethra may be restored, a blind vaginal pouch closed, but usually nothing can be done to restore the parts to their normal state. A hypertrophied clitoris should, of course, be removed.

Hernia. Two kinds of hernia find their way into the labia majora, the *anterior* or *inguino-labial* and the *posterior* or *vagino-labial.*

The *inguino-labial,* or that kind corresponding to an inguinal hernia in the male, is not uncommon. The hernia comes out through the inguinal canal, follows the round ligament, and descends into the anterior part of the labium majus. It may contain intestine, a portion of the mesentery or omentum, an ovary, the bladder, or even the entire uterus. It may be mistaken for a tumor of the round ligament or a hydrocele, or for an abscess, cyst, or tumor in the labium, but by paying attention to the general rules laid down in the surgery of hernia a diagnosis may be readily made.

Treatment. A properly fitting truss will very often give the required relief, but the wearing of it is occasionally uncomfortable or irksome to the patient. This class of hernia is particularly suitable for what is commonly known as the *radical operation,* and Bassini's method, modified so as to apply to the female inguinal canal, is very readily performed and gives excellent results. In cases where the opening is large or direct, buried silk-worm sutures, uniting the conjoined tendon with the deep part of Poupart's ligament, will give the necessary and permanent support, acting in the same manner as silk worm sutures when buried in the aponeurosis, after cœliotomy, to prevent ventral hernia.

Vagino-labial is a much rarer form of hernia. The escaping abdominal viscera descend in front of the uterus, along the vagina and bladder, between them and the

levator ani muscle, and form a swelling at the posterior end of the labium majus. It usually contains a part of the small intestine.

Treatment. It is difficult to hold this form of hernia back, but, as it may become very large, the attempt should be made with vaginal pessaries or inflatable rubber bags.

Hydrocele consists in a collection of fluid in that part of the round ligament which lies in or below the inguinal canal. This fluid may be contained in the process of peritoneum which at times surrounds the ligament outside the internal inguinal ring (canal of Nuck), and in this way may communicate with the abdominal cavity ; it may be in the surrounding connective tissue, or in the ligament itself. Great care should be observed in making a diagnosis of this rare malady. The sense of fluctuation, with entire absence of symptoms of inflammation, the absence of resonance on percussion or other signs of hernia, the existence of translucency, and the gradual development of the tumor without pain or constitutional excitement, would be reasons for suspecting it.

Treatment. It is unsafe to inject these tumors, the same as in the male, on account of the uncertainty of the diagnosis. By open incision the diagnosis may be properly made and appropriate treatment pursued. The incision is made over the tumor in its long axis, the sac opened and the contents carefully examined. After the fluid has been evacuated the wall may be touched over with strong carbolic acid, the cavity packed with iodoform gauze and allowed to heal by granulation. Should the sac communicate with the general peritoneal cavity, it should be drawn down and closed off by a circular catgut ligature, or by one of the methods recommended for the radical cure of hernia.

Hæmatocele of the canal of Nuck and hæmatoma of the round ligament are even more rare than hydrocele.

The former consists of a collection of blood within the process of peritoneum, and the latter in the interior of the round ligament, as they lie in the inguinal canal. They may be diagnosed from intestinal hernia by the points referred to when speaking of hydrocele, and from hernia of the ovary by its immobility and absence of sensitiveness. The treatment consists in making an incision into it, turning out the contents and packing with iodoform gauze.

Injuries. The vulva may be the seat of bruises or wounds in consequence of a fall upon some blunt or sharp instrument, or from blows or kicks, which, if slight, readily respond to ordinary treatment. Should the injury be so localized or of such violence as to injure the reticulated plexus of large veins, known as the bulbs of the vestibule, one of two effects will be produced. If there be corresponding rupture of the skin a free and sometimes alarming hemorrhage will occur, known as *pudendal hemorrhage*. If the skin remains intact, the blood pouring out into the areolar tissue surrounding the wounded plexus will soon form a coagulum, constituting a bloody tumor which has received the name of *pudendal hematocele*.

Causes. The *predisposing causes* are pregnancy, varicose condition of the veins, and large pelvic tumors; the *exciting causes* are muscular efforts, blows, or incised or punctured wounds. In pudendal hemorrhage a physical examination will at once reveal the condition, and the control of the flow will not be difficult if managed on the general principles laid down for the treatment of hemorrhage. The clotted blood which forms a pudendal hæmatocele may occupy the tissue of one labium or the areolar tissue immediately surrounding the wall of the vagina. When a considerable sized vessel has been ruptured the tumor may reach the size of an orange; at other times it is quite small, perhaps not larger than a walnut. Care must be observed not to confound it with .

abscess, pudendal hernia, inflammation of the vulvo-vaginal glands, or œdema. The physical characteristics, mode of devolpment, and rational signs of such affections are so different from pudendal hæmatocele that a careful examination will always settle the point with certainty.

Natural course after formation. Should the tumor be left to itself, it may be absorbed in a short time; in five or six days it may burst and discharge; the clot may become encysted and remain indefinitely; or it may create suppurative inflammation and formation of an abscess.

Treatment. A small tumor may be let alone, or treated with a cooling astringent or absorbent application. When the tumor is large, or experiment has demonstrated that it will not undergo absorption, it is advisable to make an incision into it and evacuate the contents. If bleeding points appear they may be secured by forcipressure, and the cavity afterwards packed with iodoform gauze. When the cavity is large, or the hemorrhage abundant, buried catgut sutures may be inserted through the walls of the tumor so as to include the veins from which the hemorrhage occurs. After approximation of the walls by these ligatures, and a gauze drain introduced, super-ficial sutures may be inserted in the marginal mucous membrane. As soon as pus is formed, whether large or small, it must at once be evacuated, the cavity carefully washed out with bichloride solution and drained with strips of iodoform gauze.

Phlegmonous inflammation. The areolar tissue of the labia majora is frequently the seat of inflammation and abscess. The disease is excited by irritating vaginal secretions, vulvitis, direct injury, and the peculiar blood state which results in the development of furuncles and carbuncles.

Diagnosis. It is usually easy to distinguish this disease, but care must be taken to diagnose it from hernia

of the intestine or ovary, and from hæmatocele, œdema, and vulvitis. The ordinary symptoms of inflammation and the exquisite sensitiveness of the swelling will serve as a valuable aid.

Treatment. The first stage is best managed by cold sedative and astringent applications, such as acetate of lead and opium lotion. If suppuration is inevitable it should be met by hot fomentations and hot bichloride absorbent cotton poultices. Early evacuation of the pus as possible is advisable, because the tissues obstinately resist natural evacuation, and the accumulation of pus is likely to point in another direction.

Cysts and abscesses of the vulvo-vaginal glands. The long excretory ducts of these glands, situated on each sid of the ostium vaginæ between the vagina and the ascending branch of the ischium, sometimes become occluded by adhesive inflammation arising from acrid vaginal discharges, particularly that of gonorrhœa, from the presence of pruritus or other irritating causes. As a result the secretion of the gland is retained, forming a cystic tumor which may attain the size of a walnut or even larger. The contents of the cyst is usually the normal secretion of the gland, colorless, like the white of an egg. Rarely it is yellowish or chocolate colored. Suppurative inflammation of the gland with the formation of an abscess may occur as the result of direct infection of the gland, or from infection of a previously existing cyst.

Diagnosis. When cystic distension exists, the locality of the round or ovoid mass rolling slightly under the finger, without tenderness, will assist in making a diagnosis. Pudendal hernia and hydrocele of the round ligament are two important conditions from which they must be diagnosed. Hernia is reduceable and gives a distinct impulse when the patient is requested to cough, and it does not feel so elastic as in the case of cysts.

Cysts grow slowly, the percussion sound is dull, whereas the appearance of a hernia is rather sudden and, if an enterocele, is resonant on percussion. When inflammation has been set up there are the usual symptoms present, the mouth of the duct is red, and the finger pressed over the site of the gland will discover a hard, painful, and perhaps fluctuating tumor, about the size of a small hen's egg. It may be known from phlegmonous inflammation of the labium by its distinct globular and limited outline, the former affection being diffuse.

Treatment. The cyst may be incised within the free edge of the labium and, after evacuation of the contents, the sac wiped out with tincture of iodine or a ten per cent. solution of chloride of zinc, and then packed with iodoform gauze. It is desirable to remove a portion of the sac wall after having incised the cyst. This operation, although tedious, is certain in its results, and is the best to follow under ordinary circumstances. The total removal of the cyst is often a difficult and sometimes bloody operation, and had better not be attempted, unless prepared for such emergencies. Pozzi recommends, after withdrawing the contents, to distend the sac with warm parafine, and when hardened, to dissect the whole mass out. After the removal of the sac, by whatever method employed, the cavity is closed by a deep row of sutures placed through the edges of the wound and passing down through the bottom of the cavity, and a second row placed at half the depth. After insertion they are to be tied in the order in which they were placed. When inflammation sets in, it is to be treated in the same way as for abscess of the labia, and as soon as fluctuation is distinct the pus should be evacuated by a long incision, the cavity irrigated with bichloride solution and drained with iodoform gauze.

Tumors. The vulva is subject to the formation of a variety of tumors. The *condylomata acuminata* or

papillomata may be due to gonorrhœal irritation, or simply to the hyperæmia and discharge from the parts occurring during a vulvo-vaginitis or normal pregnancy. They are found chiefly on the labia minora, or at the posterior commissure, and may extend more or less deeply into the vagina.

The *condylomata lata,* occurring on the inside of the labia majora, on the perineum, or around the anus, are always due to syphilitic infection. The treatment of the acuminate and papillomatous varieties consist in touching them frequently with nitric, or glacial acetic acid, cutting them off with curved scissors, and touching their bases with caustic or with the actual cautery; or they may be effectually removed by puncture with the negative electrolytic needle. Compresses soaked in the tincture of thuga occidentalis mixed with equal parts of water will, in some cases, cause atrophy of these growths.

Lipoma have their origin either in the labium majus or in the mons veneris. They are rare, but when they occur, sometimes attain large dimensions.

Myoma, fibroma, myxoma, and *mixed growths* have their origin ordinarily in the labium majus. Their tendency is to grow in the direction of the least resistance, and hence it is not unusual for them to become pedunculated, and sometimes they reach as low as the knees. The treatment of these tumors is surgical and, when operated upon with care, is devoid of danger.

Elephantiasis vulvæ. This disease, seldom seen except in tropical climates, is a chronic hypertrophic disease of the skin and subcutaneous connective tissue, characterized by an increase in the size of the affected part, and accompanied by inflammation of the vessels and lymphatics, swelling, œdema, thickening, induration, more or less pigmentation, fissures and warty growths. The affection is probably due to the presence of a thread-like worm and its ova—*filaria sanguinis hominis*—introduced

into the system by the bite of the mosquito. Its location is generally found on the labia majora, the clitoris and the nymphæ. In tropical climates the disease begins as an acute lymphangitis, with marked local constitutional symptoms, gradually subsiding, leaving the vulva slightly enlarged and œdematous. Subsequent attacks occur, with varying intervals, causing eventually the vulva to become permanently and enormously enlarged..

Treatment. All medicinal treatment has thus far failed; the same may be said of the galvanic current, the only rational one being surgical.

Lupus, sarcoma and *cancer* are fortunately rare. They occur usually upon the labia minora or majora and spread thence in various directions. The prognosis of cancer, which is usually of the epitheliomatous variety, is un-favorable, unless seen very early and completely extir-pated. Sarcoma presents itself as a tumor springing from either the labia majora, the labia minora, or the clitoris, and is diagnosed mainly by its rapid growth and so'ft feel. In cases of difficult diagnosis, resort should always be made to the microscope.

Neuromata are of more frequent occurrence, and are either situated about the meatus or clitoris, or at the posterior commissure. They are usually nodules, not larger than a pea or bean, and exquisitely sensitive to the touch. They should be removed by thorough deep incision with scalpel or scissors.

Varicose tumors. Such tumors may occur in the vulva as the result of pressure from a pathological or physio-logical growth in the pelvis. The distended veins are readily recognized, and can hardly be mistaken for any other condition. In most cases they are connected with pregnancy, but may occur independently of it. They may burst spontaneously and if the skin holds, a hæma-toma is formed. If the skin breaks, a serious if not fatal

hemorrhage may follow, especially when associated with pregnancy, at which time they are often of large size.

Treatment. When varicose tumors appear during pregnancy they should be supported by a vulvar compress, and the patient cautioned against heavy lifting or straining. In the non-pregnant state operative interference is not called for unless the tumor becomes large enough to produce alarming symptoms not relieved by simple treatment. In the majority of cases the varicose tumor is situated in the labium majus, and the operation is similar to that employed for the radical cure of varicocele in the male. The veins are exposed by a longitudinal slit in the labium; a catgut ligature applied at the distal and proximal ends; the intervening portion dissected out, and the divided ends brought together, after which the wound is closed by a continuous catgut suture.

Urethral caruncle. Just at the edge of the meatus urinarius, and sometimes along its wall for some distance, little vascular tumors develop which render the canal very irritable. They consist of hypertrophied papillæ, are extremely vascular, and are richly supplied with nerve filaments, facts which account for two corresponding clinical observations, namely, that they bleed very freely and readily, and that they are almost as sensitive to the touch as a neuroma.

Symptoms. The patient complains of pain, accompanied often with hemorrhage during sexual intercourse, in passing urine, in walking, or by contact of the clothing. Inspection shows at the meatus a florid vascular growth, varying in size from that of a cherry stone to that of a pigeon's egg. Sometimes, instead of one, quite a number may be found of small size extending around the meatus. Care must be taken not to confound it with prolapsus urethræ.

Treatment. In single large caruncles an almost positive promise of relief may be held out from its removal by

means of the thermo-cautery. When a number of small fungous growths surround the meatus and extend up the urethra, cure is extremely difficult, as after their removal the morbid process rapidly produces more. When the urethra has been invaded it should be thoroughly stretched and the growths brought into view, when they may be removed by scissors, or scraped from their attachments by a curette, after which their bases should be touched by the thermo-cautery. Special attention should be paid to any disordered condition of the urine or disease of the bladder. The nervous hyperæsthesia engendered during the growth of these tumors is apt to continue, and an irritable condition of the urethra and neck of the bladder are likely to follow for some time after their removal, hence it is well to notify the patient of these probabilities.

Urethral venous angioma is a disease affecting the urethro-vaginal tubercle, and occasionally the urethro-vaginal wall. It sometimes attains a large size and projects between the labia. Absence of sensitiveness will diagnose it from urethral caruncle which it closely resembles in appearance, but the treatment is identical with that condition.

Prolapsus urethræ. This accident consists, when acute, of prolapse of the urethral mucous membrane alone, but if it is of long standing there will be in addition a proliferation of the underlying connective tissue. It is not an uncommon condition, and may exist for some time without symptoms, but usually it creates difficult and painful micturition, pruritus vulvæ and leucorrhœal discharge. It may be confounded with urethral caruncle and venous angioma, but can be recognized by remembering that it produces a projection which completely encircles the meatus, while the former do so only in part. Neither pain nor hemorrhage can be depended upon for diagnosis, as prolapse may develop such symptoms very decidedly.

Treatment. Acute cases may be treated by replacing the protruding mass, and by the subsequent application of hot water, by rest in bed and by efforts to prevent rectal and vesical tenesmus during the evacuation of these organs. Tannic acid, or other astringent bougies, may be introduced into the urethra. These means failing, recourse may be had to linear cauterization of the prolapsed membrane by means of the thermo-cautery. Excision of the redundant tissue is frequently necessary and, after removal with the knife or scissors, the urethral mucous membrane should be stitched to the margin of the orifice with fine sutures.

VULVITIS.

Vulvitis is the name applied to inflammation of the skin and mucous membrane covering the vulva. It appears in three different forms, *simple, purulent,* and *follicular.* To this classification there has been added by some, the *phlegmonous, venereal,* and *gangrenous* forms.

Simple vulvitis is by far the most common form of inflammation. It is usually produced by the irritation of acrid vaginal discharges, by the presence of pediculi, by pruritus, or from the lack of cleanliness especially on the part of obese women.

At the commencement there is local irritation tenderness and pain or a feeling of smarting. The parts are red and swollen and dry at the beginning of the attack but soon become bathed in a profuse, serous, non-purulent secretion with an offensive odor.

The *diagnosis* is made by the red eroded appearance of the vulva, which often extends down to the anus and to both nates, especially in stout women.

Purulent vulvitis. This variety of the affection may be either a non-specific form or a true gonorrhœa in which case it is termed *gonorrhœal vulvitis.* It may result from simple vulvitis, specific or simple vaginitis, uncleanliness,

friction from exercise, eruptive disorders, onanism, chemical irritants, or excessive venery.

Diagnosis. The parts are red, swollen, hot, and at first dry, but soon a free flow of pus takes place which bathes the whole surface. Later on superficial ulcers will be found scattered over the parts affected, and at times the inflammation will extend to the submucous and sub-cutaneous connective tissue, producing abscesses (*phleg-monous vulvitis*), and in rare cases patches of membrane will be seen adhering to them (*diphtheritic vulvitis*). The glands of Bartholin may be involved, leading to suppuration and the formation of abscess. At times the meatus urinarius becomes affected, producing a reddish margin around it, acompanied by painful micturition, and a sensation of heat and scalding. This is particularly the case when it is of gonorrhœal origin. The pus which is discharged gives forth a disagreeable odor, and is exceedingly irritating when brought into contact with other parts.

Follicular vulvitis. By this form of vulvitis is meant inflammation of the muciparous, sebaceous, and piliferous glands. In ordinary purulent vulvitis these, as compon-ent parts of the diseased membrane, are implicated in the morbid action, but sometimes the glands alone are affected by disease, when the name follicular vulvitis or vulvar folliculitis has been applied. The causes are about the same as those of purulent vulvitis, and the general symptoms those of local inflammation, but it is diagnosed by the peculiar appearance it gives to the vulva, the labia majora and minora being studded with small round red protuberances, from the size of a millet seed to that of a hemp seed. Often a hair comes out from the middle of one of these elevations, and from the opening a drop of pus may be pressed out. As a rule the inflamed follicle bursts, and shrivels up, but exceptionally the disease ends in induration and the production of small hard nodules.

Diagnosis. The signs and symptoms are usually clear enough, nevertheless it is sometimes difficult to distinguish one variety from the other. It is especially important, but often impossible to determine whether the inflammation present be of a gonorrhœal nature or not. The history of the case is generally wanting or misleading. The diagnosis, however, may be based upon the violence of the local inflammation the presence of the purulent discharge associated with i n f l a m m a t i o n of the urethral orifice and the presence of two bright red spots marking the orifices of the d u c t s of Bartholin's glands. The presence of gonococci in the secretions confirms the diagnosis.
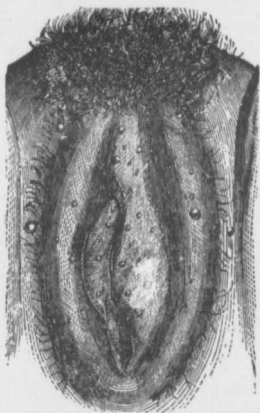
Fig. 40.—Follicular Vulvitis.

Treatment. Prophylaxis consists in scrupulous cleanliness and in tne prevention and removal of every cause likely to produce it. In schools and institutions, it is of great importance that each person should have her own basin and towel. Sponges, as far as possible, are to be avoided; certainly they should not be used in common. In acute vulvitis the patient should be confined to bed and the diet of a light unstimulating character. She should sit for fifteen minutes in a warm hip bath, to which has been added bicarbonate of soda or permanganate of potash, and after this a compress wet

with liquor plumbi subacetatis dilute, or a solution of
boric acid (2 per cent), or of salicylic acid (1 to 6000),
applied frequently. In the more chronic form, astringent
and antiseptic applications will also be required, such as
solutions of acetate of lead and opium, tannin, carbolic
acid (1 to 60), sulphate of copper (1 per cent), corrosive
sublimate (1 to 3000).

In chronic cases, particularly in the intertrigo of fat
women, dusting powders will be found useful:

> R. Boric acid, zinc oxid., aa. drams ii;
>   Pulv. amyli, drams iv;
>   Pulv. rad. iridis florentinæ, oz. i.   M.

Ointments are indispensable in some cases, especially
when the surface has to be protected:

> R. Zinc oxid., drams ii;
>   Carbolic acid, dram ss;
>   Vaselin alb., oz. ii.   M.

If there be much local irritation, thymol (2 per cent),
or cocaine (5 per cent), may be added.

In the severer forms of purulent vulvitis, particularly
the gonorrhœal variety, the vigorous use of antiseptics
must be insisted upon. The vulva may be painted for
two or three days in succession with a 20 per cent.
aqueous solution of argyrol, or a 10 per cent. solution of
nitrate of silver.

In follicular vulvitis the pustules should be opened
and the parts fomented with an antiseptic compress. In
acute inflammation of Bartholin's glands, a warm sub-
limate compress should be constantly applied and, as
soon as the abscess shows any tendency to point, it
should be freely opened, well washed out and drained
with iodoform gauze.

There is a variety of vulvitis which has been styled
gangrenous. It begins on the vulva as a white blister

which soon changes to an ulcer; it next assumes a diphtheritic aspect and becomes gangrenous. It is a disease however almost entirely confined to children.

Diabetic vulvitis. An inflammation of the vulva caused by the decomposition of diabetic urine from the presence of the torula saccharomyces. Intense and constant itching is the most important symptom. The entire vulva has a reddish copper color and is excoriated from constant scratching.

Eruptive diseases. The skin and mucous membrane making up the vulva may, like the same structures in other parts, be affected by eruptive disorders of various kinds. The following will include those most commonly met with:

Prurigo presents large scattered papules, very irritating, and generally have their apices bereft of cuticle.

Lichen shows more numerous papules resting upon a thickened and somewhat indurated cutaneous base. For such conditions the use of one of the following formulæ often proves very serviceable:

> R. Menthol, drams ii;
> Ol. Olivæ, drams iv;
> Chloroform, dram i;
> Lanolini, oz. ii.   M.
> Ft. unguentum.

> R. Acid Salicyl, dram ss;
> Creosote, gtt. xl;
> Glycerini Amyli, oz. iii;
> Lanolini, oz. i   M.
> Ft. unguentum.

Eczema produces a red heated surface, covered with little vesicles which, breaking down, give forth a serous fluid forming scales or crusts. Sometimes there are successive crops of vesicles, and in many cases of diabetes and vesico-vaginal fistula, this affection constitutes an exceedingly annoying and even painful complication. In the acute stage, cold or warm compresses and subace-

tate of lead lotions are generally all that is needed. When the discharge is profuse and watery the surface should be powdered. In more chronic cases Hebra's unguentum diachylum, white precipitate ointment (grs. xx. to oz.), or the following will often prove very serviceable :

> R.   Boric acid, dram i;
>   Plumb. acet., grs. x;
>   Bismuth. subnit, dram i;
>   Vaselin alb., oz. i.   M.
>   Ft. unguent.

The vulva may also be the seat of *acne, erythema,* and *erysipelas,* but as these diseases offer nothing peculiar in this region they are to be treated the same as in other parts.

Herpes progenitalis is a mild inflammatory affection, consisting, as it does in other parts, of vesicles, or a group of vesicles upon an inflamed base, their appearance being preceded by a burning and itching sensation. The vesicles soon rupture and form scabs or shallow ulcers, each the size of a single vesicle. Sometimes it is accompanied with much œdema of the vulva and may lead to enlargement of one or more of the inguinal glands.

The disease is apt to be confounded with eczema but eczema has a tendency to spread at the edges, herpes appears in successive crops. It may be confounded with a *chancre* in the erosive stage but it is single, its base is indurated, the margins of the ulcer sloping, and has a deep dull red coppery color. Its floor is smooth and shiney without the small granulations found in herpes. The secretion is thin, scanty and not auto-inoculable. The inguinal glands enlarge but they are not specially tender and seldom suppurate.

Chancroid gives a history of rapid development and is usually multipl.e The ulcers are highly inflamed, tender to the touch and have "punched out" undermined margins. The bases are not indurated, are at first smooth,

but soon become granular and discharge a profuse puru-
lent and auto-inoculable secretion. The inguinal glands
when they become infected are intensely inflamed and
tend to undergo suppuration.

Treatment. In the early stage salicylic acid (5 per
cent) with vaseline or dissolved in alcohol, or a 10 to 20
per cent. solution of ichthyol or resorcin in glycerine, will
tend to abort the attack. A cooling sedative lotion of
sugar of lead and laudanum will often give much relief
from the smarting burning pain. Later the following
ointment may be applied:—

> R.   Menthol, dram i;
>   Ol. Olivæ, drams iii;
>   Bismuth, subnit, drams ii;
>   Lanolini, oz. ii.   M.
>   Ft. unguent.

Pruritus Vulvæ. This affection consists in irritability
of the nerves supplying the vulva which induces the
most intense itching, and desire to scratch and rub the
parts. At first the irritability and tendency to scratch
are slight and give little annoyance, but the disorder is
aggravated by the counter-irritation which it demands
for its relief. The itching is so extreme that it irresistibly
drives the patient to scratch herself, and by constant
repetition the skin becomes tender, its nerves sensitive,
excoriations and inflammatory conditions follow, all of
which contribute to the morbid condition. The misery
produced in such cases cannot be exaggerated; the pa-
tient is tormented night and day, society becomes dis-
tasteful to her, and she gives way to despondency and
depression. The itching is generally intermittent, in
some cases occurring at night, and in others only at
certain periods of the day. It is not always confined
to the vulva, the irritation often extending up the vagina,
to the anus, and down the thighs. The predisposing
causes are, uterine, vaginal or urethral disease; preg-

nancy; habits of indolence, luxury or vice; uncleanliness; or over-exercise in one of sedentary habits. In nearly every instance of pruritus one of the following conditions will be found to exist as the apparent cause at least: Contact of irritating discharges, such as from acute and chronic endometritis and vaginitis, from the discharge of cancer, from incontinence of urine, or from diabetes; local inflammation as vulvitis, urethritis, or vaginitis; local irritation, as eruptions of the vulva, animal parasites, onanism, vegetations on the vulva, or vascular urethral caruncles. However produced, very soon secondary influences arising from excoriations, ulcerations, increased discharges, the result of scratching, superadd themselves as auxiliary agents and keep up the disorder.

Treatment. The first effort must be made to discover the disease of which the pruritus is a symptom, and remove it by appropriate means. But this alone will not be sufficient, for, while eradication of the mischief is being attempted, palliative means must be vigorously adopted for the sake of present relief. Perfect cleanliness should be secured by means of three or four sitz baths daily and the vagina syringed with pure or medicated water. The irritated surfaces should be protected by unctious substances or inert powders, such as bismuth or zinc oxide, combined with lycopodium or starch. In case the discharge comes from the uterus, after a thorough vaginal douche, the upper end of the vagina should be tamponed with cotton moistened with a weak sugar of lead or boracic solution. If it is the result of a local inflammation it should be treated as elsewhere recommended for such conditions. Temporary relief can be obtained by covering the parts with a lotion composed of the following:

> R. Plumb. acet., drams iss;
> Acid Carbolic, dram i;
> Tinct. Opii, oz. i;
> Aquæ ad., oz xvi.   M.

R. Hydrarg. bichlor., grs. xvi;
    Tinct. Opii, oz. i;
    Aquæ ad., oz. xvi.   M.

Relief may also be obtained by a strong solution of
bromide of potash, or by painting the parts several times
a day with glycerine mixed with chloroform or acid
hydrocyan, dil. (1 to 8), or with morphine (3 grs. to the
oz.), or at longer intervals with a ten per cent aqueous
solution of cocaine. Ointments often give marked relief
such as:

R. Chloral. Camphor, aa., dram i;
    Vaselin alb., oz. ii.   M.

R. Acid hydrocyan. dil., drams ii;
    Plumbi acet., grs. xl;
    Olei cacao, oz. ii.   M.

R. Acid Tannic, dram ss;
    Ext. Belladonnæ, grs. x;
    Vaselin, oz. ii.   M.

Hyeræsthesia of the vulva consists in an excessive
sensibility of the nerves supplying the mucous membrane
of some portion of the vulva. Sometimes it is confined
to the vestibule, at others to one labium majus, at others
to the meatus, while at other times they may all be simul-
taneously affected. It is not a true neuralgia, but an
abnormal sensitiveness of the nerves. There is no inflam-
matory action and examination reveals nothing; the
slightest friction, however, excites pain and nervousness
and any degree of pressure is absolutely intolerable. The
disorder is comparatively rare and the treatment of it
most unsatisfactory, even complete destruction of the
mucous membrane of the sensitive area with caustics, or
its removal with the knife, has failed to produce a per-
manent cure.

Vaginismus. Vaginismus consists of hyperæsthesia
of the vulvo-vaginal orifice and neighboring parts, accom-
panied by abnormal and painful contraction of the
muscles of the pelvic floor. It is not a disease in itself,

but a symptom of various morbid conditions of the vulva, vagina and the surrounding parts, among which may be mentioned urethral caruncle, erosion, inflammations or fissures of the vulva or hymen, rectal fissures, cervical lacerations, and uterine and ovarian displacements.

Treatment. The cause of the local irritation is to be removed and the general health improved. Gradual dilatation may be practised by introducing a series of dilators, a large dilator being used and allowed to remain for a longer period each succeeding day. Forcible dilatation, under an anæsthetic, may be practised, after which a good sized glass or hard rubber dilator is to be inserted and allowed to remain for several hours.

Kraurosis vulvæ is a disease characterized by a peculiar atropic shrinking of the integuments of the external genitals and perineum, resulting in the obliteration of the normal folds. The tissues affected become dry, shrink, lose their normal elasticity and become so brittle that the most careful examination may cause deep fissure. The surface assumes a whitish, macerated, shining appearance. This disease does not yield to any remedy.

Coccygodynia. Under this name are united different and partially unknown pathological conditions, the common feature of which is intense pain at the coccyx, whence it may radiate into the perineum, hips, uterus, or bladder. Sometimes there are palpable diseases or deformities of the coccyx, such as caries, ankylosis, luxation, or abnormal length. At other times it is combined with disease of the uterus, ovaries, or rectum, while in a third class it is of a purely neuralgic nature. It is usually found in women who have borne children, but it occurs also in virgins. It often appears after tedious labor, accompanied by rupture and straining of the muscles and ligaments. It may be due to violence from without, as from kicks, falls, or other injuries, while sometimes it appears to be

due to a reflex neurosis. Severe pain is felt on sitting, and it may be so great that the patient can sit only on one half of the nates, near the edge of the chair, and the pain is aggravated in sitting down or getting up. The condition is easily recognized by introducing the index finger into the rectum, while the thumb rests on the skin over the coccyx. The slightest movement causes severe pain and sometimes it may be possible to feel the diseased condition of the bone.

Treatment. Before any plan of treatment is adopted care must be taken to discover whether the disorder is secondary to uterine disease or anal fissure. If such should be the case, the primary disorders and not their results should receive attention. If the disease be primary, blistering, hypodermatic injections of morphia and the persistent use of the galvanic current will often effect a cure. While they are being employed, three grain iodoform rectal suppositories may be used, together with general treatment to improve the nervous system. Should these means do no good, resort must be had to one of the radical methods for cure. The first operation consists in making an incision down upon the coccyx, lifting the exposed extremity of this bone, and then with a pair of scissors severing the muscles. It has been recommended to perform the operation subcutaneously, with an ordinary tenotomy knife, but is is by no means so easy a matter as one would suppose, besides, open incision clears up any doubt there may be in the diagnosis and, if found necessary, leads to the performance of the second method, which consists of the complete severance of all attachments, and the removal of the whole coccyx, by a pair of bone forceps, or by disarticulation with the knife.

CHAPTER XI.

LESIONS OF THE PELVIC FLOOR.

The pelvic floor, also known by the somewhat in-
definite name of perineum, comprises the tissues which
together occupy the space between the bones of the pelvic
outlet. It is composed of a pair of broad thin muscles
(levatores ani), which are the chief support of the pelvic
viscera, and an arrangement of fasciæ and muscles, the
components of which act as accessories. Until very
recently the perineum was considered as a thick wedge-
shaped body, designated as the "perineal body," which,
acting as an inverted keystone of an arch, materially
aided in the support of the uterus. It is now more
accurately regarded as a moveable centre of attachment
for the muscles and pelvic fasciæ which enter into the
formation of the pelvic floor, as well as for the attachment
of the lower portion of the rectum and vagina. By a
study of its anatomy and the result produced by the more
or less complete laceration of it, its functions can be more
readily estimated. Briefly, it may be said to assist in
sustaining the anterior wall of the rectum, preventing a
prolapse of this canal, which, should it occur, would have
a tendency to drag down the upper vaginal concavity and
destroy the equilibrium of the uterus. In the same way
it assists in sustaining the posterior vaginal wall which
otherwise would allow of a rectocele. The anterior
vaginal wall, and with it the bladder, is in part supported
by the posterior vaginal wall, and a sagging of this
would tend to the production of a cystocele. It affords
by its presence in the act of defecation counter-pressure,
by which the fecal mass is turned backward to follow the
curve of the canal, before it is ejected. The perineum
may lose its tonicity or efficiency from the following
causes :—

1. *Constitutional feebleness.* In girls of weak delicate fibre, the perineum will, without any assignable cause, be found incapable of performing its functions. Such cases are not commonly met with, but when they occur, the examining finger reveals not only abnormal relaxation of the perineum, but of the vaginal walls as well.

2. *Feebleness, the result of prolonged over distension.* When a prolapsed uterus remains for a long time between the labia, the perineum, by over distension, loses its power, and, after restoration of the uterus, remains permanently enfeebled. This condition is likewise produced by the presence of large fibrous polypi, or by the wearing of large globular pessaries.

3. *Subinvolution.* During utero-gestation the perineum undergoes physiological hypertrophy, which continues until delivery. Involution may fail to take place, and it will thus remain large, lax, and wanting in contractile power. Subinvolution often affects the vagina and perineum simultaneously, and, as a result, the anterior vaginal wall and bladder sag downward for want of support, and the posterior vaginal wall and rectum protrude over the ineffectual perineal barrier.

4. *Senile atrophy.* Complete uterine prolapse is by no means rare in old women. As the decadence of advancing years shows itself, the perineum, hitherto strong, becomes inefficient and inactive.

5. *Laceration.* Injuries due to the passage of the child · during labor are exceedingly common, and a large proportion of female diseases take their origin thus. Rupture of the perineum furnishes one of the most fruitful sources for the absorption of septic elements; and thousands of women suffer throughout their lives from uterine displacements, engorgements, and vesical and rectal prolapse, from injuries inflicted upon it during parturition.

From what has been said it will be readily understood that certain diseases, disorders, or conditions are apt to be

associated with, or to be the direct outcome of lesions of the pelvic floor. They may be thus enumerated:—

1. *Prolapse of the vagina.* When the tone of the wall of the vagina has been impaired and it pouches into its own canal, so as to fall downward toward the vulva, the condition is called *prolapsus.* From a study of the anatomical relations, it will be readily seen that prolapse of the vagina, without simultaneous displacement of one or more of its surrounding viscera, must be considered as exceedingly rare, and that it must of necessity be associated, to some extent, with rectocele, cystocele, or uterine prolapse. Among the causes of prolapse may be mentioned violent efforts of the abdominal muscles, repeated parturition, senile atrophy, rupture of the perineum, previous distension by tumors, and subinvolution of the vagina and perineum. The displacements may be of two forms, acute, or that form which comes on as a result of violent effort, which, with great suddenness, forces the contents of the abdomen down upon the p e l v i c viscera, and is generally accompanied by sudden descent of the uterus. The ordinary or chronic form is that which, by slow and

Fig. 41.—Cystocele and Rectocele.

steady action of one or more of the causes enumerated, little by little forces the folds of the vagina downward, toward or through the vulva.

2. *Cystocele,* or prolapse of the bladder, consists of descent of the bladder toward the vulva, so as to impinge
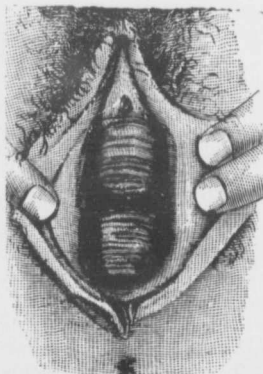
upon the vaginal wall. When the anterior wall of the vagina ceases to afford the required support, the bladder descends and forms a small pouch in the vagina, which gradually increases until it forms a decided tumor and protrudes between the labia. Residual urine retained in this species of diverticulum decomposes, cystitis and vesical catarrh are established, all of which further annoy the patient by the new set of symptoms produced.

3. *Rectocele,* or prolapse of the rectum, occurs in a similar manner, and the pouch thus formed soon becomes filled with fecal matter. The feces becoming hard, and in consequence irritating, create mucous inflammation and discharge, accompanied by tenesmus, obstinate constipation, and hemorrhoids.

4. *Enterocele,* or prolapse of the intestine, consists in decent of a portion of the small intestine into the pelvis, so as to encroach upon the vaginal canal. Loops of intestine, finding their way to the bottom of Douglas' pouch, gradually stretch this serous prolongation and, advancing between the rectum and vagina, push the posterior wall of the latter before it so as to form a tumor at the vulva.

Treatment. Should the accident have occurred suddenly, reduction should at once be accomplished, and the recurrence of displacement prevented by appropriate means. Sudden cases of vaginal prolapse, cystocele or rectocele are, however, very rarely met with, and it is mostly those which have slowly and gradually established themselves that demand treatment.

The methods adopted for overcoming such cases are :—

1. By the use of *local astringents* and by the persistent insertion of medicated astringent *tampons.* These methods will often restore the tone of the vaginal walls and bring about a complete cure, but they can only be effectual in slight cases; in those of graver character they will prove insufficient.

2. By *supplementary supports.* Numberless forms of
special supports have been invented for the purpose of
affording relief, with more or less success. The vaginal
pessary does little or no good here. In many cases no
pessary which rests upon the walls of the vagina can be
retained within the distended canal; in others none can
be found capable of resisting the downward pressure;
while in all, increase of dilatation and atony is affected
by them. In some cases an exception will be found to
this rule in Cutter's cup pessary, or some similar instru-
ment, supported by an external attachment. Gehrung's
pessary, while it does not cure cystocele, gives much
comfort to the patient, and may obviate the necessity for
operation, when such is considered inadvisable.

3. By *surgical procedures.* Of these there are three,
any one of which may prove effectual. If a ruptured
perineum seems to produce the want of support, peri-
neorrhaphy may be all that will be necessary. Should
this not be sufficient, colporrhaphy should be performed
on the anterior or posterior vaginal wall, as one or the
other seems most at fault, and should the condition be
still further aggravated, an anterior colporrhaphy and
posterior colpo-perineorrhaphy may be resorted to, to
retain the prolapsed structures.

Colporrhaphy or elytrorrhaphy is an operation re-
sorted to with the idea of constricting the vagina so as to
diminish its calibre and, by this means, remove the
traction, exerted by its fall, upon the rectum, bladder and
uterus.

Anterior colporrhaphy. *Sims' method.* The patient is
placed in the dorsal position, and the knees separated by a
Clover's crutch. A vulsellum is inserted into the anterior
lip of the cervix; a tenaculum hooked into the mucous
membrane of the anterior wall of the vagina, just below
the urethra, and a Sims' large speculum introduced.
Two tenacula are next hooked in near the lateral sulci,

and the amount of tissue to be removed is estimated by approximating them. By making a snip with a pair of scissors on each side, the greatest width of the surface to be denuded may be thus marked out. The whole surface to be pared is put on the stretch and, with a pair of scissors curved on the flat, a strip of mucous membrane, about one-third of an inch wide, is raised in the form of the letter "V," the apex being just below the urethra, the arms passing up on each side so as to include within them the amount of redundant tissue. The two extremi-

FIG. 42.—Clover's Crutuh.

ties of the arms pass back laterally as far as the cervix, and by a removal of additional strips of mucous membrane at right angles to the extremities of the arms, they are made to approximate each other in front of the cervix. Commencing at the apex of the triangle, catgut or silkworm sutures are passed beneath the denuded surface on one side, and then crossed over and passed beneath the denuded surface on the other side. After insertion the lateral denuded surfaces are approximated and the ligatures tied, care being taken in this, as well as in all similar operations, not to draw the sutures too tight lest they cut their way out.

Hegar makes his denuded surface in the form of a lozenge or rough ellipse, with the long diameter in the long axis of the vagina, and advises the excision of all the redundant anterior wall. Closure of the wound may be carried out by through and through sutures of silkworm passed beneath the denuded surfaces, or by means of deep and superficial layers of interrupted sutures, or by two or more layers of superimposed continuous sutures.

Stoltz's method consists in making a circular denudation, embracing the larger portion of the prolapsed vaginal wall, and then passing a thick silk suture, with a needle at either end, just outside the edge of the wound, beginning at the point nearest the cervix and emerging on either side just below the meatus. The stitches are not entirely buried, but are made to emerge and enter again at short intervals, and when the denuded portion h a s been pushed up they are carefully tied.

Posterior colporrhaphy consists in the denudation of an elliptical surface on the posterior wall, similar to that described, but it is seldom resorted to alone. When indicated, it is generally c o m b i n e d w i t h perineorrhaphy, forming the operation

Fig. 43.—Stolz's operation for cystocle and Hegar's operation for rectocele.

known as colpo-perineorrhaphy, or simply perineorrhaphy.

PERINEORRHAPHY.

By this term is meant restoration of the perineum. This operative procedure is not limited to the cure of laceration the result of parturition, but is appropriate to the restoration of a perineum which has lost its power and functions from any of the causes previously mentioned, and when performed for such is to be conducted upon exactly the same principles as those which apply to the operation for laceration.

Varieties of laceration... In its simplest form the laceration extends through the mucous membrane of the vagina, the integument, and the junction of the bulbo-cavernosus with the transversus perinei muscles, as well as through a few fibres of the levator ani and corresponding fasciæ. It may be more extensive, and prolonged backwards, so as to involve the structures as far as the sphincter. These forms have been designated as *incomplete* rupture. The rupture may extend through the sphincter ani, to which the name *complete rupture* has been given; or it may extend still farther and involve more or less the recto-vaginal septum.

Instead of any of these, the laceration may be a sub-

FIG. 44.—Laceration of Sphincter and recto-vaginal wall.

cutaneous separation of the muscles of the pelvic floor, at, or near their junction in the median line. The evils

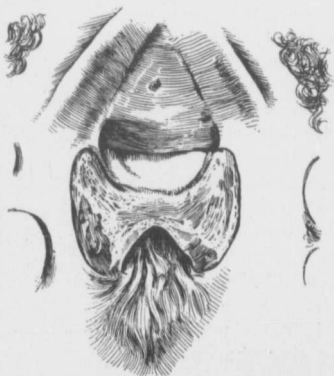resulting from partial rupture are by no means insignificant, but they are more tolerable than those which follow complete rupture. When the sphincter ani is torn through, and still more markedly when the rectal wall is ruptured, incontinence of feces and rectal gases occur to such an extent as to embitter the life of the patient.

The consequences of rupture of the perineum may thus be presented: Subinvolution of the vagina, prolapsus vaginæ with cystocele or rectocele, prolapsus uteri, incontinence of feces and prolapsus recti. It is the opinion of many that a laceration which does not sever the sphincter may unite without surgical treatment, but is it doubtful if complete restoration ever occurs by immediate union. Repair is occasionally effected by granulation, and often is very efficient, but never perfect on account of the tendency to formation of unnatural adhesions, cicatricial bands, and cicatricial tissues, with the consequent contractions, retractions, distortions and indurations.

A great variety of operations have been devised at various times for the restoration of the lacerated or weakened pelvic floor, and the complications which usually accompany it. All have the same objects in view, viz.,—the narrowing of the vaginal canal, the shortening of the relaxed posterior vaginal wall, and the reuniting, or strengthening, of the muscles and the fascia which form the chief pelvic support from below.

Emmet's Operation. This operation as devised by Dr. T. A. Emmet fulfils the requirements better, or at any rate as well, as any of the other operations which have been introduced. In fact many operations described differ from it only in minor details.

Incomplete rupture. The patient is placed on the operating table in the dorsal position and the legs held up in the semi-lithotomy position by some suitable appliance. The first part of the operation consists in denud-

ing the surfaces to be united, the extent to which this is
to be carried out depending upon the extent of injury and
prolapse of the vaginal wall. The top of the rectocele is
caught up with a tenaculum, or bullet forceps, and other
tenacula are inserted on each side at a point where the
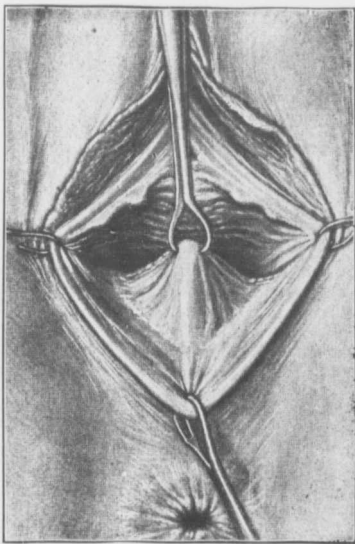
FIG. 45.—Perinerrohaphy. Tenacula inserted mapping out surface
to be denuded. (Gynæcology and Abdominal Surgery. Kelly and
Noble).

new commissure is to be formed. In lacerations this
point is usually the lowest caruncula myrtiformis. A
fourth tenaculum is inserted in the median line in front
of the anus. By drawing in divergent directions on all
four tenacula at the same time a rhomboidal part of the
mucous membrane of the vagina is put moderately on

the stretch, with two triangular-like surfaces, apex upward, extending outward and upward one in each lateral sulcus of the vagina. With a scalpel this "M" shaped space is mapped out, the incision going deeply through the vaginal mucous membrane. Grasping the tissues with a pair of tissue forceps scissors are made to remove from
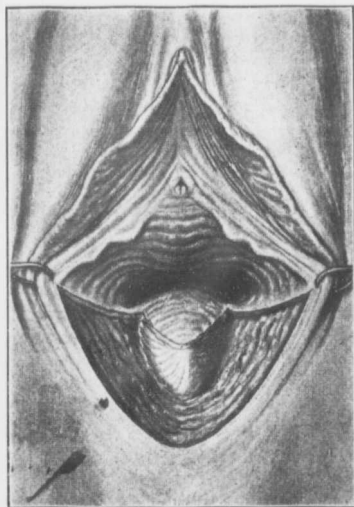
FIG. 46.—Denudation completed showing the lateral triangles and central flap of undenuded mucous membrane. (Gynæcology and Abdominal Surgery. Kelly and Noble).

one lateral point around to the other the strip of skin at the juncture of the skin and mucous membrane, taking with it all cicatricial tissue. The vaginal mucous membrane included within the incision made with the scalpel is next removed in successive strips until the denudation is complete (Fig. 46).

The two sides of the denuded triangle in one lateral sulcus are now united by catgut sutures threaded in small full-curved needles, three or four sutures being usually sufficient. If there is likely to be much tension the last one inserted may be a silk worm ligature. The triangle in the opposite sulcus is similarly sutured.
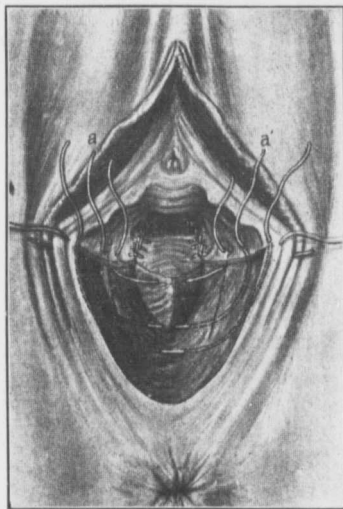
FIG. 46.—Sutures inserted and those in the triangles tied.   (Gynæcology and Abdominal Surgery.   Kelly and Noble).

Some surgeons prefer to put in the last ligature uniting the margins of the triangles first. In this way the margins are better coaptated and the subsequent ligatures more easily inserted. (Fig. 47). In this illustration three additional sutures of catgut, one of which is marked "a," are passed as shown. The object being to more thoroughly coaptate a widely relaxed vaginal outlet.

A full curved needle threaded with silk worm gut is entered through the skin at the upper and outer angle of the wound just inside the point at which denudation first commenced. It is made to enter laterally deep into the tissues, after which it is curved up under the raw surface to the tip of the central flap under which it is passed. The needle is next made to traverse a similar course on
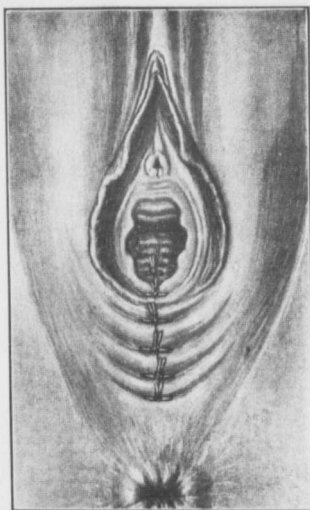
FIG. 48.—Operation completed, showing the "crown suture" and perineal skin sutures tied. (Gynæcology and Abdominal Surgery. Kelly and Noble).

the opposite side and emerge through the skin at a point corresponding to the point of insertion. This suture is sometimes called the "crown suture." Half an inch nearer the anus another suture is passed from the perineal skin side and made to travel under the denuded surface lower down, after which a third and fourth, if neces-

sary, are placed in the same order. The first suture is
then drawn up and tied, the effect of which is to bring
together the upper angles of the denuded surface and
form a new commisure with the tip of what was the end
of the rectocele interposed between them. The remaining
sutures are next tied in order (Fig. 48). The wound is
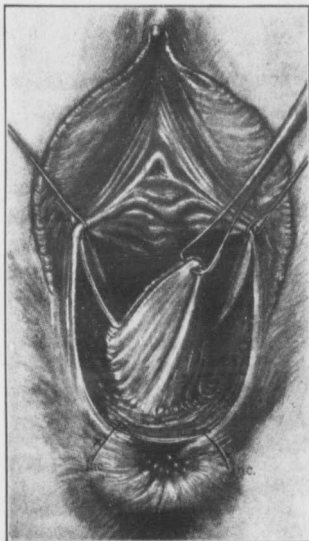
FIG. 49.—Points of pitting indicating the location of divided ends of
sphincter ready to be exposed. Perineal denudation complete.
(Gynæcology and Abdominal Surgery. Kelly and Noble).

then dressed with borated iodoform powder and with
strips of iodoform gauze laid over the vaginal and perin-
eal sutures, and a pad and "T" bandage applied. It will
probably be necessary to catheterize the patient every six
hours for a day or two, after that she usually can pass the

urine voluntarily. On the second evening a mild laxative may be given and a soap and water enema the next morning, after which the bowels should be moved daily with an enema. The external sutures may be removed on the ninth day and the patient allowed up at the end of two weeks.

Complete laceration. The two varieties, laceration of the sphincter ani alone, and that involving the recto-vaginal septum as well, may conveniently be considered together. When the sphincter ani has been ruptured, the several ends are drawn outward and backward by the retraction of the muscles, until they lie on either side nearly on a line with the posterior walls of the rectum, and are often easily recognized by a pitting or depression at these points (Fig. 49).

The denudation is the same as for the incomplete operation as far as the vaginal introitus is concerned. The important point here is to prepare the recto-vaginal septum and sphincter ends for union. The denudation should begin on one side at the pitted point, marking the retracted end of the sphincter, and should follow the border of the recto-vaginal wall as far up as the laceration extends, then down the opposite side ending at the pit over the retracted end of the sphincter on the other side.

Fig. 50.—Recto-vaginal sutures inserted.

The denudation of the perineal skin must follow in a general way the direction of the scar tissue, this denudation uniting at the anus with the sphincter denudation, and above with the vaginal denudation. Denudation completed catgut sutures are inserted to close in the rent in the recto-vaginal wall, being passed from the rectal to the vaginal side, then across and through the wall on the opposite side to the rectal side again, the highest one first, and so on down. The divided ends of the sphincter are next drawn out from their bed and coaptated, end to end, by a catgut matrass suture. A silk worm suture is next passed through the margin of the anal wound, through the torn end of the sphincter muscle on one side, then through the recto-vaginal septum and out through the torn end of the muscle and anal wound on the opposite side. A second silk worm ligature is passed in a similar manner a little farther forward. These ligatures, when tied, reinforce the catgut ligature, and help to hold the sphincter ends in apposition until the healing process has united them firmly. The remainder of the sutures are united precisely the same as in the operation for incomplete laceration.

FIG. 51.—Sphincter ends united and showing sutures in place. Gynæcology and Abdominal Surgery. Kelly and Noble).

Flap-splitting operation. The operation referred to is that introduced by Lawson Tait, and recommended after him by Sænger. After the patient has been placed in the lithotomy position, the left index finger of the operator is introduced into the rectum, a blade of a pair of sharp-pointed scissors is inserted in the median line of the

perineum, where the cicatricial tissue meets the skin, and is made to cut to the left in a curved line along this margin, to the upper border of the perineal cicatrix. The scissors are again inserted in the median line and made to cut to the right, so that when complete the incision assumes a "U" shape. The upper vaginal flap is then drawn upward, in front of the vestibule, by means of tissue forceps, and the lower rectal flap downward, by similar means, increasing, if necessary, this new formed quadrilateral surface by splitting the septum farther up.

FIG. 52.—Flap-splitting operation for incomplete laceration of the perineum. Lines of incision.
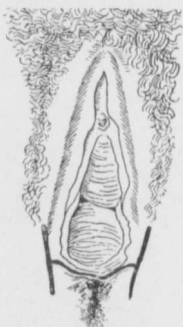
FIG. 53.—Flap-splitting operation for complete laceration of the perineum. Lines of incision.

A curved needle, pushed through the skin, outside the wound, at the anterior end of one incision, is made to pass under the cut surface, and is so directed that it will pass through, or just in front of the commissure formed by the two flaps and emerge through the skin on the other side at a point corresponding to the point of entrance. A similar suture is inserted half an inch farther back, and made to traverse the tissues of the rectal flap lower down. One or two more are similarly inserted farther back, according to the size of the denuded surface.

The first ligature is then tightened, after that the remainder. Instead of passing the sutures through the skin, Tait recommends their being passed just within the edge of the wound. The almost inevitable puckering of the vaginal flap is corrected, by short interrupted catgut sutures passed from one mucous surface to the other, through its whole width.

In complete laceration, the scissors are made to enter the recto-vaginal septum forming the isthmus and, after splitting it and making the anterior incisions, the scissors are re-entered, and an outward and backward incision is made on each side, so as to reach and denude the retracted ends of the sphincter ani. The rent in the septum, if any, together with the margins of the sphincter, are approximated in the same manner as already described, after which the sutures are introduced precisely as in the incomplete form.

FIG. 54.—Flap-splitting operation for lacerated perineum—Appearance of wound and introduction of sutures.

CHAPTER XII.

DISEASES OF THE VAGINA.

MALFORMATIONS OF THE HYMEN.

The hymen is a small crescentic membrane which separates the vulvar cleft from the vaginal canal, and may be considered as the portal to the vagina. There are many conformations of the hymeneal membrane all of which may be perfectly normal and physiological (Fig. 8).

Absence of the hymen. The hymen may be entirely wanting, or only a trace of it may be present, even though the genital organs are perfectly normal, but such a condition is exceedingly rare.

Atresia hymenalis, or imperforate hymen is a malformation in which the hymen forms an imperforate diaphragm. This condition prevents mucus, cast-off epithelial cells and menstrual blood from passing away by the natural channel, and permits of its accumulation above it. In childhood no bad effects will be noticed, except in rare instances arising from accumulation of mucus. After puberty, the constant repetition of the menstrual period causes an accumulation of blood in the vagina (*hæmatocolpos*), which, by reason of absorption of the serum, shrinkage of the corpuscles, and admixture of the mucus, becomes converted into a thick, dark brown, tarry mass. The girl possessed of such an abnormality has the symptoms of menstruation every month, but no blood is seen. The increase of menstrual blood causes pain, which becomes aggravated each month, and with it occurs the formation of a tumor gradually growing in size from below, upward. If the symptoms of menstruation have persisted for several months, probably enough blood will have accumulated to distend fully the vagina, and to cause a bulging of the imperforate hymen. The

cervix may next become dilated and distended, the two forming one globular mass, on the top of which may be felt the undilated body of the uterus. The body of the uterus itself may take part in the dilatation (*hæmato-metra*), so that on making a bimanual examination there will be found, lying between the vulva and the hypogastric region, a globular, tense, very slightly fluctuating body, corresponding in outline to the distended uterus, a wave of fluctuation being transmitted from the fundus uteri to the protruding surface at the vaginal orifice. The Fall-

opian tubes may, in their turn, form large tumors, filled with blood (*hæmatosalpinx*), t h e blood contained in them being not always pressed out from the uterus, but coming sometimes from the mucous membrane of the tubes themselves.

A *diagnosis* can very easily be made, when the history, symptoms and subjective signs are taken into consideration. The tumor formed may nearly fill the pelvic cavity and, by

FIG. 55.—Atresia of the vaginal outlet.

pressure, produce vesical and rectal symptoms. It may form a tumor in the perineal region, as large as a fœtal head, which flattens out the frenulum, and is continuous with the skin on the distended perineum and labia of the vulva, in front of which will be found the meatus. The dangers arising from such a condition are self evident. Spontaneous rupture through the hymen is very rare, hence, if left alone, it may lead to rupture of the vagina, uterus, or tubes, and even operative interference is not without its dangers.

Treatment. When the tumor is small and confined to the vagina, a crucial incision, or one made by cutting

along the insertion of the hymen, is to be made, the cavity irrigated with a warm alkaline solution, such as soda bicarbonate, or liquor potassæ, and subsequently with a 1 to 2000 sublimate solution. To prevent septic absorption, the cut margins may be touched over with the thermo-cautery, and some strips of iodoform gauze introduced to allow for free drainage. When the accumulated mass occupies the uterus, the dangers arising are those of rupture of the tubes and sepsis. To avoid the former, the utmost delicacy in manipulation must be observed, and no attempt at rapid evacuation made by pressure on the tumor or otherwise. To avoid the latter a large opening should be made and the accumulated fluid carefully washed away, the cavity irrigated and free drainage established. If hæmatosalpinx can be made out before operation, it is best to remove the distended tubes first, together with the ovaries. The subsequent treatment will consist in irrigation with antiseptic solutions and in maintaining free drainage until involution has been well established.

MALFORMATIONS OF THE VAGINA.

Atresia and Stenosis. The term *atresia* signifies an imperforate condition, and in its strict import is limited to complete closure of an aperture or canal. Any obliteration or occlusion so extreme as to remove the case from the class of strictures, and yet is not complete, is styled *stenosis*. Some authorities use the term atresia to signify both conditions, marking the divisions by the terms *complete* and *incomplete*.

The vagina, in fœtal life, is created from the approximation and amalgamation of the Mullerian ducts upon the median line, and to arrest of development of these parts a great variety of congenital malformations are attributable. There may be no trace of the vaginal canal, the ducts of Muller seeming to have failed entirely to

develop; there may be a distinct fibrous cord marking
the site which it should have occupied, some slight
development appearing to have occurred; development
may exist for some distance up the canal, failure having
taken place above; or one duct may have developed in
part above and another below, giving two cul-de-sacs,
separated from each other by impervious tissue.   Not
rarely the whole canal is ill developed, and the hymen
guarding its outlet a closed unyield-
ing membrane—a condition often
combined with an infantile uterus.
The vagina may be divided by a
more or less complete longitudir al
partition into two halves, each of
which corresponds to one Mullerian
duct—a condition often combined
with double uterus.   Double vagina
may be combined with atresia on
one or both sides, and if one side is
pervious, the condition may be over-
looked for a long time.   While con-
genital defective development is

FIG. 56.—External appear-
ance of double vagina.
a, b, vaginal orifices.

one of the frequent causes of atresia and stenosis, it may
occur as a result of injury from mechanical, chemical, or
pathological agencies.   A vagina once fully developed
may close entirely from adhesions of its walls, or its
calibre may be diminished by absolute removal of its
component structures in consequence of sloughing pro-
duced by impaired vitality, by prolonged or difficult
labor, by chemical agencies locally applied, or by syphili-
tic or other extensive ulceration.

Symptoms.   The condition will demonstrate its ex-
istence only by incapacitating the vaginal canal for the
performance of its functions.   Should it occur in one too
old, or too young, to require such functions from the
vagina, it may attract no notice.   Amenorrhœa alone, or

combined with those symptoms of retained menstrual
blood already described when speaking of imperforate
hymen, or inability to perform the act of coition, will
probably first bring the sufferer under notice. On mak-
ing a physical examination, the entrance of the finger
into, or up the vagina, will be found difficult or impossi-
ble. Investigation will prove that it is not due to
vaginismus, or adhesions of the labia. The introduction
of a sound into the bladder, and the finger into the rec-
tum, may discover the canal running up as a fibrous cord,
or no trace of it whatever may be found. Double vagina
can generally be very readily made out, but when there
is atresia on one side the diagnosis may not be so easy.
In this there will be a menstrual discharge from the open
side and retention in the other half, forming a hæmato-
colpos or hæmatometra. From mere occlusion of the
vagina there is no immediate or direct derangement, but
in those cases where there is retention and accumulation
of menstrual blood in the portion of the canal above the
stricture, or in the uterus, the danger assumes the same
proportions, or even greater than in imperforate hymen.

Treatment. The possibility of removing the abnormal
state will depend upon the extent and completeness of the
obliteration, or upon the destruction of tissue. General
narrowness, due to arrest of development, may be suc-
cessfully treated by the introduction of graduated dila-
tors, and the treatment kept up until it has reached the
normal size. When atresia occurs from the presence of a
membrane above the hymen (*septum retro-hymenale*), it
is to be treated on the same principles as for atresia of
the hymen.

If, in complete congenital closure or absence of the
vagina, the uterus be found to be absent also, no attempt
should be made to make a vagina, as it is hardly justifi-
able to expose the patient to the dangers of operation
merely in the hope of forming an organ of copulation,

besides the artificially formed vagina is apt to close again.
The situation is entirely different when there is a uterus,
with attempts at menstruation or retention of the men-
strual flow. Under such circumstances operative inter-
ference is imperative. The patient is placed in the dorsal
position and the legs elevated by Clover's crutch. A
transverse incision is made midway between the urethra
and anus. The operator works his way slowly and very
carefully up between the bladder and rectum, insinuating
his way with fingers and closed blunt scissors, keeping
at the same time a metal catheter in the bladder. The
left forefinger in the rectum will locate the position of the
cervix and indicate the direction in which the operator
must work to reach it. After reaching the cul-de-sac and
the cervix exposed, tne opening is stretched, accumula-
tions removed if present, observing the same care as
heretofore expressed, and the parts carefully irrigated.
A few strips of iodoform gauze may be introduced into
the fornices, after which a hollow glass tube covered
with gauze, and proportionate in size to the new formed
vagina, is inserted and held in position by a "T" bandage.
The tube should be worn for a month at least, during
which it should be taken out daily and the parts irrigated.
Subsequently the plug should be worn for an hour each
day during a whole year. If absence of the vagina is
combined with absence of the uterus, put active ovaries
present, they should be extirpated.

In double vagina, if the septum interferes with
coition, it may be split lengthwise and the margins
touched with the thermo-cautery. Double vagina, with
unilateral or bilateral atresia and retention of the men-
strual fluid, may be mistaken for hæmatocele, or a uterine
myoma, unless the history of the case is carefully taken
into consideration. Unilateral atresia may be treated by
introducing a speculum into the open half, and opening
into the other by means of scissors or thermo-cautery. In

double atresia one side may be opened first, as in atresia of the single vagina, and afterwards the septum incised.

Faulty communications. As a result of arrest of development other conditions are sometimes met with. There may be complete atresia, or absence of any opening on the cutaneous surface leading into the intestinal or uro-genital canal, while under the skin is found a common cloaca, into which open the bladder, vagina and rectum. In other cases the vagina and urethra apparently open into the rectum, being cases of persistent cloaca. The partition between the rectum and the uro-genital sinus may have been formed, but the urethra seems to open into the vagina—a condition due to persistent uro-genital sinus.

VAGINITIS.

Vaginitis is the word commonly used to designate inflammation of the vagina, but some authors, however, have substituted the word *colpitis* or *elytritis*.

Under this term is comprised so many different conditions that it is necessary to admit certain divisions and subdivisions of the subject. Thus the intensity of the symptoms and the length of time which the disease lasts, classifies it as *acute* or *chronic*. It is called *primary* when it appears first in the vagina; *secondary* when the inflammation invades the organ from another part.

Taking the chief features of the disease into consideration, vaginitis may be classified as *simple, gonorrhœal,* and *granular,* and to this classification may be added the *diphtheritic, aphthous, cystic, adhesive, vesicular,* and *emphysematous,* as forming less important varieties.

Ætiology. Any influence which injuries the vaginal epithelium or changes the nature of the normal secretions, such as long continued friction from foreign bodies, or chemically irritating discharges or injecta, diminishes the resisting power of the vaginal mucous membrane. If accompanied by lack of drainage, and the consequent

accumulation of secretions, bacteria multiply, infection follows, and vaginitis results. Among the *predisposing causes* may be mentioned anæmia; chlorosis; constipation; any of those causes which tend to produce unhealthy conditions of the skin; pregnancy; abdominal tumors, or other conditions which tend to produce pelvic congestion. Masturbation; pin worms; pessaries; tampons; chemical irritants; retained secretions; pathological secretions from the uterus, urethra, or vulva, or infection introduced from without, such as gonorrhœal pus, may be enumerated among the *exciting causes*. The exanthemata are held accountable for a small share of the cases.

In the *acute* stage of simple vaginitis, hyperæmia and enlargement of the papillæ take place, with small celled infiltration of the epithelial structure. The epithelium on the summits of the papillæ is shed, but between them it is thickened. The discharge in some cases is thin and slightly acid; in others it is alkaline and thick; in others purulent. In the *chronic* form the deeper layers of the membrane become infiltrated, with loss of epithelium in some places, giving rise to ulceration. When caused by chemical irritants, such as strong solutions of iodine, a sort of vesication may occur, with exfoliation of large layers of epithelial tissue having the appearance of a false membrane. In the *gonorrhœal* variety the changes are similar to those mentioned, but more pronounced. The papillæ are larger and more vascular, the vestibule and inner surfaces of the labia participate in these changes, while the discharge from the first is muco-purulent. Later the discharge becomes thinner and more distinctly purulent, and may give rise to infection of the urethra, vulva, and vulvo-vaginal glands.

Granular vaginitis differs chiefly by the more pronounced enlargement of the papillæ and by more extensive exfoliation of the epithelium covering them, causing the surface to resemble a mass of granulations.

Diphtheritic vaginitis has not infrequently been observed in young girls, characterized by the appearance on the vaginal mucous membrane of a diphtheritic membrane. It is, when found, usually an accompaniment of scarlet fever and similar to that seen in the throat in severe cases, the organism at work being the streptococcus. Sometimes a true diphtheria makes its appearance, the organism being the bacillus of Lœffler.

Senile or *adhesive vaginitis* is a disease of old people. In them the papillæ are smaller and the epithelial layer thinner. The inflammation is usually found more in patches, the secretions scanty, the surface smoother, and often ecchymotic in spots. The opposed surfaces tend to agglutinate, and by this means the lumen of the fornices, or even of the whole vagina may become obliterated.

Cystic or *follicular vaginitis* consists of an inflammation in the follicles occasionally situated about the vaginal fornices, causing the retention of their contents and the formation of small cysts.

Aphthous vaginitis arises from a development of the *oidium albicans* on the congested or more or less eroded vaginal surfaces, giving rise to whitish patches.

Vesicular vaginitis gives rise to round vesicles situated on inflamed areas, which, after bursting, leave sharply defined raw surfaces about the size of split peas.

Emphysematous vaginitis is an inflammation of the vagina characterized by the development of fluid and gas in the small spaces and canals of the connective tissue and lymphatics at the upper end of the vagina. They project like little bladders on a raised hyperæmic base, produce a crackling sensation when felt, and collapse when punctured. Pregnancy favors the development of this form.

Symptoms. Acute vaginitis is indicated first by a dull pain in the pelvic region, and a sensation of heat and fullness in the vagina, accompanied by a slight rise of tem-

perature and a feeling of malaise. There is a discharge
which is at first scanty, but rapidly increases in amount,
and often possesses a disagreeable odor. Micturition and
defecation become painful, conditions which may soon be
followed by severe urethral and vesical symptoms, such
as frequent urination accompanied by burning pain and
vesical tenesmus. Urethral and vesical symptoms indi-
cate with fair certainty that the causative agency is one
of gonorrhœa, particularly if accompanied by pain or
tenderness in the inguinal region. Digital examination
shows the vaginal orifice to be sensitive, the canal hot and
swollen, and at a later period roughened. If the urethra
be involved, it will be found thickened and tender, and
pressure along its course may cause a drop of pus to
exude from the meatus. Pus from this quarter is said
to be conclusive evidence of gonorrhœa also, as gonococci
thrive best upon its mucous membrane. If the bladder
becomes infected, pressure on the vaginal wall will reveal
the fact by the marked increase in the pain produced.
Inspection will show the vulva acutely inflamed and
covered with a muco-purulent or purulent discharge.

The chief *diagnostic points* between the acute simple
and gonorrhœal forms lie in the history and clinical symp-
toms observed in the case. In the gonorrhœal form the
history of the case is significant. The inflammation is
violent; the discharge profuse and purulent, the urethra
is involved which is not the case in non specific forms,
and there is a marked tendency to spread to neighboring
organs. Vulvitis is a constant complication and the ducts
of the vulvo-vaginal glands are as a rule infected. The
positive proof of the specific nature of the disease is
shown by the presence of gonococci in the discharges.

The symptoms of chronic vaginitis are similar, but
less pronounced. In some cases symptoms of importance
are absent altogether, and nothing, except a leucorrhœal
discharge, calls the patient's attention to her condition.

It may follow the acute stage, but more often is, from the first, a subacute or chronic process, such, for instance, as that form which develops in consequence of d'scharges from the direction of the uterus, or as the result of senile changes. The more acrid and abundant the discharges become, the more likely will they produce vulvitis and pruritus. Touch and sight reveal the roughened surfaces and, if of the gonorrhœal form, vegetations are not uncommon. With the symptoms described, a vaginitis should not be confounded with any other lesion, but it is not always easy to distinguish one form of vaginitis from another. The presence of the gonococcus may establish the presence of one form, but its absence is not adequate proof of the absence of such infection. Corroborative evidence in its favor is found, however, in other directions, the prominent points of which have already been related when speaking of vulvitis.

Treatment. Simple acute vaginitis is readily controlled and cured by keeping the patient at rest, by freeing the bowels with mild cathartics, and by the copious use of douches, consisting of a strong aqueous solution of boric acid, borax, or of bicarbonate of soda, at a temperature of 105° to 110° F., every four hours, the vagina being stretched by means of a wire speculum to permit of its application to every part. If the tenderness is so great as to exclude the use of such an instrument, a soft catheter may be used, aided by hot alkaline fomentations applied to the external genitals. If there is a suspicion that it is of a gonorrhœal type, or in cases in which the simple form does not readily yield, the fluid used for douching should contain instead of alkalies, bichloride of mercury 1 to 5000. If the disease shows a tendency to become chronic, more energetic local measures become necessary. Through a Sims' speculum, the vaginal walls are to be carefully cleansed with green soap and warm water, then wiped over thoroughly with a solution of

bichloride 1 to 1000, or a twenty per cent. solution of
argyrol followed by another washing of warm saline
water. After carefully drying with absorbent cotton, the
vagina is to be lightly packed with plain or borated ab-
sorbent cotton, or the surfaces kept apart by the intro-
duction of three or four thicknesses of gauze. This
treatment should be repeated daily, until the disease is
conquered. No patient should be pronounced cured until
the gonococci are shown to be absent by repeated
bacteriological examinations. In the chronic form, the
same careful cleansing is to be carried out but, instead
of the bichloride, the entire surface is to be painted with
a five per cent. solution of nitrate of silver, after which
gauze is to be inserted as before and allowed to remain
for twenty four hours. This treatment should be given
every three or four days, and in the intervals warm
borax douches night and morning. Treatment by dry
powder, such as equal parts·of bismuth and chalk, or
tannin and chalk, and kept in place by a cotton tampon,
often proves serviceable when there is a tendency for the
discharge to linger. The powder and tampon should be
removed every day, the old powder being douched out
just before the treatment is repeated. Suppositories of
tannin, oxide of zinc, or acetate of lead may be similarly
used, with equally good results. In the senile and vesi-
cular forms, mild antiseptic douches are indicated, sup-
plemented by strips of lint smeared with a two per cent.
carbolized oxide of zinc ointment and introduced within
the vagina.

Neoplasms. Cysts are rather frequently found in the
vagina of adults or, as congenital formations, in new born
ch..dren. They are usually single, globular or oblong,
and for the most part sessile, but may become peduncu-
lated. They vary in size from that of a pea to a goose
egg, but may, excèptionally, reach the size of a fœtal head
at full term. The contents may be serous, yellowish,

purulent, or thick and chocolate colored. These cysts may have different origins. They may be formed by condensation of the peri-vaginal connective tissue around an extravasation of blood, or they may be simple retention cysts. Remains of an ununited duct of Muller or of the canals of Gartner may give rise to them. If small they may not give rise to any symptoms, but are discovered accidentally during delivery, or an examination. They may be diagnosed from a cystocele or rectocele by the introduction of a catheter into the bladder, or the finger into the rectum.

The *treatment* consists in making an incision over the tumor and enucleating the entire cyst wall, if possible. When unable to do this, removal of as much of the cyst wall as possible is to be accomplished and the remainder cauterized and packed with iodoform gauze.

Fibroma and fibromyoma are rare. Their most common seat is in the upper part of the anterior vaginal wall. Originally they are globular, sessile tumors, but when their weight increases they have a tendency to become pedunculated, and may even protrude through the vulva. When they are small they are easily diagnosed by their elastic hardness, but when large they may be mistaken for a uterine pedunculated fibroid. If, however, the os can be reached, it will be undilated and no pedicle will be found passing through it.

Treatment. If sessile, it may be removed by making an incision over its longest diameter and, after enucleating it, the cavity closed by rows of superficial and deep catgut sutures. If pedunculated, the pedicle may be secured by ligature and the mass cut away.

Mucous polypi are very rare. In shape and structure they are similar to the mucous or glandular polypi found in the cervical canal.

Primary carcinoma is also a rare disease. As a rule it is secondary, either propagated by continuity from

neighboring organs, or appearing as metastatic deposits from carcinoma in remote parts. As a primary affection it occurs in the form of epithelioma and submucous carcinoma. Epithelioma usually begins as a circumscribed projecting nodule on the posterior wall of the vagina, which soon breaks down on the surface and assumes the form of a raised, ulcerating, cauliflower-like mass, with everted edges. The submucous or diffuse variety commences as a flat area of infiltration, under the normal vaginal membrane, which spreads along and around the vagina, until the latter feels like a narrow opening through a mass of hard unyielding tissue. Ulceration and excavation sooner or later take place, with corresponding softening of the parts. The *symptoms* are at first confined to a thin irritating discharge, which before long becomes offensive, bloody at times, and containing some tissue debris. Pain, radiating from the vagina, is soon experienced, and later the symptoms are those which characterize infection of the neighboring organs. The *treatment* consists in extirpating the diseased tissues, whenever possible, and thoroughly cauterizing the wound. When it is no longer possible to remove all the tissue, the surface may be curetted, and a solution of ferric chloride applied once a week, if it is tolerated that often. Astringent and antiseptic douches will help to diminish hemorrhage, destroy the odor, and prevent septic absorption.

CHAPTER XIII.

GENITAL FISTULÆ.

· **Genital fistulæ are abnormal avenues** for fecal or urinary discharge, by means of which some portion of the intestine or urinary tract communicates with the genital tract.

Fecal fistulæ are formed by a communication between the rectum or the small intestine, and the uterus, vagina, or bladder.

Urinary fistulæ are formed by the bladder discharging into the uterus or vagina; by an opening from the urethra into the vagina; or by a ureter emptying into the uterus or vagina. They have been designated as *vesico-vaginal, urethro-vaginal, vesico-uterine, vesico-utero-vaginal, uretero-vaginal, uretero-uterine,* and *uretero-vesico-vaginal.*

Vesico-vaginal fistula is a communication between the bladder and vagina, and is by far the most common form. These fistulæ may originate from protracted labors, in which the bladder has been compressed between the head of the child and the symphysis pubis sufficiently long to produce a localized necrosis, and the necrotic tissue thus formed, coming away after a period of a few days, establishes the fistulous tract. They may also rise from direct injury to the tissues from the use of forceps, or from injury sustained during surgical operations in the neighborhood of the bladder, particularly hysterectomy. Other agencies may create them, such as pessaries, stone in the bladder, or the presence of other foreign bodies. The vaginal walls may be perforated by cancer, or by syphilitic or other ulcers, or by the formation of an abscess in the parietal tissues. Lastly, certain diseases, producing deficiency of nutrition, may cause localized sloughing of the vaginal walls.

Symptoms. The chief symptom is indicated by a more or less constant dribbling of urine from the vagina, accompanied by a disagreeable ammoniacal odor. By the passage of this irritating excrementitious material through a canal and over tissues not intended by nature to tolerate it, inflammatory action, pruritus, eruptions and execessive irritability are produced, and the vagina sometimes becomes covered with urinary concretions, and the vulva and thighs red and excoriated. If the fistulous orifice be a large one, even a superficial examination by touch will reveal the nature and extent of the lesions, but the opening may be so small, or so hidden behind the projecting cicatrix, that it cannot be discovered. For their detection a Sims' speculum should be employed, with the patient in the genu-pectoral position, injecting at the same time, if necessary, an infusion of India ink, cochineal, madder, indigo, or plain milk.

Treatment. A fresh fistula, even if of considerable size, may be much diminished, and sometimes closed altogether, by the use of warm vaginal douches, and by the internal administration of drugs to render the urine normal, such as salol, or benzoic or phosphoric acid, or benzoate of ammonia. When a fistula has been discovered soon after parturition, it should be treated by such methods, as it is too early to resort to suture. The once favorite method of treating all varieties of these fistulæ by cauterization has now, very deservedly, fallen into disuse under the influence of improved surgical methods.

Closure by suture at the seat of the fistula. This is the most reliable and satisfactory of all methods. The best time for operating is eight or nine weeks after confinement, at a period when the patient has regained her constitutional vigor, for in no operation in surgery is this more vigorously demanded. The *preparatory treatment* consists in the use of the same measures as have just been mentioned, namely, warm vaginal douches, the ad-

ministration of drugs to render the urine unirritating, and the careful removal of incrustations. If cicatricial bands exist they are from time to time to be cut with a knife or scissors, and the vagina stretched by the introduction of a Bozeman's dilator.

Sims' operation. This operation may be divided into three parts; paring the edges of the fistula; passing the sutures; and approximating and coaptating the denuded surfaces. The patient is placed in Sims' position and a large broad-bladed speculum introduced into the vagina. The edges of the fistula are caught up with a tenaculum and, with scissors, the edges pared all round, to the extent of producing a raw edge one-third of an inch wide, and bevelled from the vesical mucous membrane outward to the vagina, care being taken not to implicate the former in the incision. Two sorts of sutures should be used in approximating the denuded margins, silkworm for the deep, and fine silk for the superficial stitches. Beginning at the most remote portion, a slightly curved needle is entered half an inch from the edge of the incision and brought out on the denuded surface, just under, but not including the edge of the vesical mucous membrane. After drawing the suture partly through, the needle is introduced again into the raw surface opposite, just under the vesical mucous membrane, and made to emerge half an inch from the edge of the wound. The other sutures, five or six to the inch, are introduced similarly, and one at, or just beyond each angle of the wound. The sutures are then brought together and tied snugly, approximating the tissues without strangulation, after which the margins may be more carefully coaptated by superficial sutures. The ends of the sutures having been cut off, a loose iodoform gauze pack is placed in the vagina. A self-retaining catheter, preferably of soft rubber, may be introduced, after carefully washing out the bladder. Many surgeons prefer to trust to frequent

catherization for a few days, believing that the constant presence of the catheter keeps up continued vesical tenesmus and lessens the chances for immediate union. If the vaginal pack becomes wet or soiled, it should be removed, otherwise it may be left in place for two days, when it should be taken away, and the vagina allowed to remain empty.

When the operation was first perfected by Sims, silver wire, introduced by silk carriers, was used exclusively, but it is found that silkworm serves equally as well.
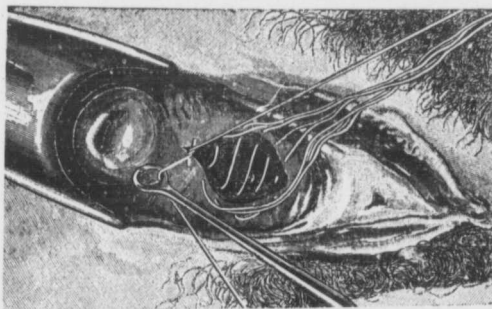

FIG. 57.—Operation for vesico-vaginal fistula, denudation complete, and sutures in place.

Two other operations are generally described for the closure of vesico-vaginal fistulæ, namely, Simon's and Bozeman's, but as they differ mostly in the matter of technique, and in the method of procedure, it is not considered necessary to describe the various steps.

There is a *flap-splitting operation*, known as Blazius' method, and recently renewed by Lawson Tait and others. No tissue is cut away, but an incision is made parallel to the vaginal and vesical mucous membrane, on the white line of the cicatrix, to the depth of three-eighths

of an inch. The vesical and vaginal flaps thus formed are separated and, in the cleft formed, a circular suture is introduced, which, when drawn up, approximates the raw surfaces all around.

When the fistula is so large that it is impossible to bring the vaginal walls together the loose flaccid bladder made be dissected away from the rigid unyielding vagina. The bladder thus freed may now be closed by two tiers of catgut sutures and the vagina, if thought best, left to close up by granulation, the wound being protected by iodoform gauze. Artificial openings between the bladder and vagina, due to malignant disease, are hopeless and syphilitic ulcerations are usually attended with such extensive destruction of the septum that little or nothing can be done to remedy it.

Urethro-vaginal. In this variety the wall of the septum being very thin, the denudation must be extended over the nearest part of the vagina and the edges brought together from side to side over a metal catheter. If the tension is great, it may be relieved by making an incision on each side parallel to the line of union.

Vesico-uterine. From its anatomical relations, fistulous communication can only take place between the bladder and uterus at the cervix, except under rather rare circumstances. These fistulæ are produced in the same manner as vesico-vaginal fistulæ, and form small round holes opening through the anterior lip of the cervix. It, too, may be diagnosed by injecting milk or colored fluid into the bladder. Sometimes a probe can be brought from the bladder, through the fistula, into the cervical canal.

Treatment. This kind of fistula has an unusual tendency to spontaneous healing, and efforts of nature in this direction may be aided by cauterization. If that does not succeed it may be closed by operative procedure. After having split the cervix in the median line, so as to

reach the fistulous tract, and denuding its surfaces, sutures are introduced through the uterine and vesical walls, after which the incision in the cervix is closed the same as in trachelorrhaphy.

Vesico-utero-vaginal. In this variety the fistulous tract passes from the bladder through the anterior lip of the cervix and ends in the vagina. They are subdivided into superficial and deep, according to whether there is partial or complete sloughing of the anterior cervical lip. In the superficial form, good results may be obtained by simple denudation and suture, but the deep are rarely amenable to treatment by this method. It has been recommended to bring the posterior lip of the cervix in apposition with the vaginal edge of the fistula and, after dissecting out the dense cicatricial tissue, stitch the two together. The os uteri therefore will open directly into the bladder. This operation has been termed *vesico-hystero-cleisis*.

It will be readily seen that the operation has serious objections, such as the prevention of conception and the dangers of serious cystitis. Both tracts will be subject to irritation and descending infection, producing in the genital tract endometritis, salpingitis and peritonitis; upon the urinary tract ureteritis and pyelitis. In such cases the best method of operation is to separate the uterus from the bladder, dissect away all cicatricial tissue, and then suture the fistula, afterwards closing the wound in the vaginal wall.

Uretero-vaginal. A uretero-vaginal fistula is situated on the anterior wall of the vagina, a little below and outside of the vaginal portion of the uterus, and is formed between the ureter and vagina. The causes are, difficult parturition, perforation of a pelvic abscess, prolonged use of pessaries, and vaginal and abdominal hysterectomy.

Diagnosis. By placing the patient in the dorsal position and exposing the vaginal vault, the fistulous opening may, with a litle patience, be found, though it be only the size of a pinhead, or smaller. With a probe or ureteral catheter, it is usually possible to enter the· ureter for some distance and see the urine coming out drop by drop. A catheter or sound passed into the bladder will reveal the absence of the probe there. Milk introduced through the urethra will not escape through the fistula. Cystoscopic examination will positively clear up the diagnosis. With the ureteral catheters introduced no urine will come from the catheter on the affected side, while on the opposite side it will issue drop by drop.

Treatment. All uretero-vaginal fistulæ should be operated upon as soon as circumstances will permit, on account of the great liability of the kidney to become infected. Three operations are available, closure of the fistula, implantation of the ureter into the bladder, and nephrectomy.
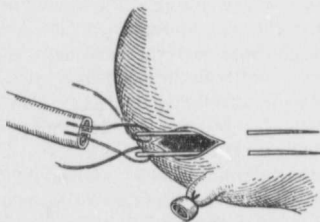

FIG. 58. — Re-imp'antation of divided ureter into bladder. (Ashton s Gynæcology)

1. **An elliptic incision** is made around the fistula, the ureter exposed, and a sound passed into its orifice. After freeing the ureter for about one third of an inch, an opening is made into the bladder, just above the end of the ureter, and, after removing the sound, the free end of the ureter is turned into this opening and held there by two or three fine sutures passing through the vesical and ureteral walls, but sufficiently superficial as not to encroach upon

the lumen of the ureter. The vaginal incision is then closed carefully.

2. **If a vesico-vaginal fistula** does not already exist, one is made by the excision of an oval flap around the ureteral opening. The end of a very fine gum elastic catheter is then passed into the renal end of the ureter, and the other end into the urethra by way of the fistulous opening in the bladder. The genu-pectoral position is now assumed and the edges of the fistula deunded. A series of fine sutures are passed through the flaps, at right angles to the ureter, and tied. The catheter must remain in position for at least eight days, and the bladder kept empty for a portion of that time by a self retaining catheter or by frequent catheterization.

3. **Implantation of the ureter in the bladder.** (Uretero-cystostomy). After opening the abdomen, the ureter is dissected out low down, and an opening made in the posterior wall of the bladder by cutting down on closed forceps introduced through the urethra. A flexible catheter is introduced into the ureter and pulled out through the urethra. The ureter is then fastened to the wall of the bladder by fine sutures, after which the flaps of peritoneum are made to cover over and close off the point of entrance, fine silk sutures being also introduced for that purpose. If there is difficulty in selecting the proper point for opening into the bladder, it may be partially filled with boric acid solution, which is at once to be evacuated after the point has been selected. Finally a self-retaining soft rubber catheter is to be inserted through the urethra by the side of the ureteral catheter after which the abdominal wound is closed.

Uretero-uterine fistula. In this variety the urine flows from the os, as in the vesico-uterine, but the methods adopted to differentiate between vesico-vaginal and uretero-vaginal and vesico-uterine will be sufficient to make a diagnosis. This form of fistula is exceedingly

rare, and if abdominal implantation cannot be performed, relief may be obtained by turning the cervix into the bladder, by artificial closure of the vagina (colpo-cleisis), or by excision of the corresponding kidney (nephrectomy).

Indirect methods for the relief of urinary fistulæ, in otherwise desperate cases, have been devised. They consist in the closure of the genital canal, at a point below the site of the fistula, so that the portion of the vagina above becomes a part of the bladder, menstruation, if present, taking place into this viscus. Three varieties have been devised:—Antero-posterior closure of the vulva (episio-cleisis); complete vulvar closure with the formation of an artificial recto-vaginal fistula; and the obliteration of the vaginal canal transversely (colpo-cleisis). The great majority of such attempts have been unsuccessful, besides carrying with them the serious objection referred to earlier.

Colpo-cleisis. In performing colpo-cleisis care should be taken to preserve as much of the depth of the vagina as possible, and therefore closure should not be made at a lower point than necessary. A ring of mucous membrane is marked out on the vaginal wall, and with a sound in the bladder, the anterior surface is denuded, and with the finger in the rectum, the posterior surface. Sutures are passed by means of two short half-curved stout needles, one at each end, the anterior needle being passed from above downward, under the denuded surface of the vesico-vaginal wall, and the posterior needle similarly, under the denuded surface of the recto-vaginal wall, and, after all are inserted, they are carefully tied.

FECAL FISTULA.

Fecal fistulæ are abnormal avenues for the escape of the contents of the small or large intestine, either by the vagina or by the bladder. Implication of the small

intestine is comparatively rare, and that of the bladder extremely so. The fistulous communication may take place between the rectum and vulva, *recto-labial;* between the rectum and the perineum, *recto-perineal;* between the rectum and the vagina, *recto-vaginal;* or between the ileum or sigmoid flexure and the vagina, *ileo-vaginal,* or *entero-vaginal.*

The size of the opening varies. It may be so small as to be found with difficulty, or large enough to admit a finger. It may be situated anywhere between the intestine and vagina, but it is most commonly found either immediately above the sphincter ani or at the fornix. The *causes* of fecal fistulæ are in many respects similar to those determining urinary fistulæ, but the most common by far is child-birth. The *symptoms* are plain. The escape of flatus and, when the bowels are loose, of their fecal matter through the vagina, readily indicates the condition, but when the fistula is very small there may be some difficulty in locating it. Distension of the rectum with water will often bring the opening into sight.

Treatment. Many small fecal fistulæ have a decided tendency to close naturally, and this happy result should be facilitated by scrupulous cleanliness, sitz baths, rectal and vaginal injections, laxatives, and by an occasional light cauterization.

Recto-labial and *recto-perineal fistulæ* are best treated as a fistula-in-ano. In both varieties the rectal opening will be found just within the external sphincter ani. The vulvar opening in the labial variety will be found on the inner side of the labium majus, and that of the perineal cavity in close proximity to the fossa navicularis. Incision is to be made the full length of the perineum down to the fistulous tract, and the exposed tract thoroughly eradicated. The wound is then united by means of ligatures placed similar to a median rent of the perineum involving the sphincter ani.

Many operations have been devised for the cure of recto-vaginal fistulæ:—

1. The *flap-splitting method* described for the cure of vesico-vaginal fistula often gives good results when the opening is small.

2. Make a broad denudation on the vaginal side and extending from the sound tissue deep down into the fistula similar to the operation for vesico-vaginal fistula. Deep and superficial sutures are passed from side to side.

3. Make a vertical incision in the median line, extending half an inch above and below the fistula, and dissect the vaginal from the rectal wall on each side, for a distance of half an inch. Unite the edges of the rectum by a continuous buried catgut suture inserted from the vaginal side, and afterwards the vaginal flaps by silkworm or chromic catgut.

Entero-vaginal fistulæ, when the opening is lateral, may be closed by denudation and suture like other fecal fistulæ.

In *ileo-vaginal fistulæ* and in fistulous openings between the bladder and intestine, the only plan of treatment is to open the abdomen, find the fistulous tract, sever the adherent intestine if possible, and, by means of Lembert sutures, close the opening in both viscus.

CHAPTER XIV.

DISEASES OF THE URETHRA AND BLADDER.

Malformations of the urethra. The urethra may be entirely absent, due chiefly to arrest in development of the vagina at a point where it should form the main portion of the posterior wall of the urethra.

The lower and anterior portion of the urethra may be absent (hypospadias).

Atresia of the urethra is a comparatively uncommon affection. There are two forms mentioned. One is produced by imperfect development of the vaginal process, or of both the clitoral and vaginal segments, the urethra being open up to the bladder and there closed. The second form occurs when the clitoral and vaginal processes are both defective. In such cases there is no trace of a urethra, except an imperfect vaginal wall, which extends obliquely downward and closes the bladder. The symptoms which arise from malformation of the urethra are incontinence of urine in the one class of cases, and retention in the other. When the urethra is deficient in part, and the bladder perforate, urine constantly escapes. Atresia of the urethra and the consequent retention of urine causes hydrops of the bladder, ureters, and kidneys. Distention of these organs occurs *in utero,* and such malformed children are usually born dead, or die soon after birth. The evil effects of this malformation is sometimes naturally obviated by the occurrence of another developmental anomaly—fistula of the urachus and escape of the urine from the umbilicus. In making a diagnosis of these deformities, reliance cannot be placed on objective symptoms alone, and a physical examination of the parts becomes necessary. The general relative appearance of the external organs must be observed,

aided by attempts at passing a sound into the bladder and by the introduction of the finger into the rectum and, if possible, into the vagina.

Atresia of the urethra can only be cured by operation. When there is entire absence of the urethra with the existence of vesical fissure, or when there is persistence of the sinus-uro-genitalis with partially developed urethra, the production of an artificial canal has been suggested.

Malformations of the bladder follow the general rule, and are thus in most instances due to some defect in the normal process of development. *Fissure* is the most frequent and prominent anomaly. It consists in partial or complete absence of the anterior vesical wall, and is usually accompanied by malformations of other organs. It may be a simple fissure of the lower part of the bladder, with an opening about three quarters of an inch in breadth. A higher grade is that in which the fissure is near the umbilicus, the lower part of the pelvic cavity and the pubic symphysis being closed, and the lower part of the bladder, urethra, and external genitals normal. The highest grade (*exstrophy*) is that in which the whole anterior wall of the bladder seems absent, the inferior abdominal region much shorter than normal, and the umbilicus nearer the base of the pelvis. The abdominal walls are divided, and the resultant fissure is filled up by the bladder wall. The mucous membrane is puffed out and red, and gradually merges into the skin of the abdomen. On each side of the lower portion of the everted bladder are situated the orifices of the ureters. As a rule the urethra is absent, and the clitoris is either divided, or there may remain but a trace of it, or it may be entirely absent.

Various explanations have been offered to account for these malformations. Some attribute it to defect in the allantois at an early period in embryonic life; some to a failure of the pubic bones to unite; some to atresia of the

urethra, followed by over distension, the distended organ pushing aside first the recti muscles, later the cartilaginous pubic bones, and finally bursting. Double bladder may be considered as extremely rare. In such cases the double allantois, instead of forming one passage, forms two, with a ureter opening into each.

Treatment. In the severer form no plan offers any relief except a plastic operation, and this is often only palliative. Even under the most favorable circumstances not much more can be done than to diminish the annoyance which comes from the flow of urine over the surrounding external surfaces. The operation which has given most satisfaction consists in dissecting a flap from the central part of the abdominal wall, immediately above the fissure, and large enough to close in the bladder completely. After vivifying the edges of the bladder wall, the abdominal flap is turned down and the edges stitched to it. A lateral flap is next taken from each groin, and brought together with their raw surfaces in contact with the raw surfaces of the central flap, and stitched to it. Implantation of living tissue taken from animals, such as the bladder, has been resorted to with but little success. The best operation yet devised consists of extraperitoneal transplantation of each ureter into the corresponding side of the rectum, taking with the ureter enough of the bladder wall to preserve the ureterovesical musculature.

Irritable urethra. A case will occasionally be met with, in which will be found pain and tenderness of the urethra, frequent desire to urinate, and pain in doing so, while a careful examination will fail to find any lesion. It very commonly follows catarrh of the bladder, or it may be the result of exposure to cold, or of some temporary or accidental irritation of the bladder. It may be very effectually treated by dilating the whole urethral canal with dressing forceps, or some form of dilator, the

operation being repeated several times. An application of equal parts of carbolic acid and glycerine to the whole canal will materially aid in effecting a cure, although urination will be painful for several days after.

Urethritis. Urethritis is of three varieties, *acute, chronic,* and *gonorrhœal.* Acute urethritis, though not a very frequent disease, is a very distressing one, and often difficult to relieve. In many cases it will be found to depend upon a specific cause, yet, like vaginitis, it is sometimes difficult to mark the difference. Simple urethritis comes on gradually, and is often preceded by symptoms of uterine or vesical disease, while the gonorrhœal variety comes on rather abruptly, and is preceded or attended by acute vaginitis and vulvitis. In both varieties there is painful urination, and a sharp, scalding sensation produced by the urine passing over the tender surface. The desire to urinate is not so frequent, or so urgent, as in cystitis, and in some cases the urine is retained for a long time, dread of pain on the part of the patient causing retention. During or immediately after micturition, in some cases, a few drops of blood escape, which may be recognized by its being exuded separately, and not intimately mixed with the urine, as is usually the case in hemorrhage from other portions of the urinary tract. Examination will show the meatus swollen, reddened, and the urethral mucous membrane somewhat prolapsed. The urethra is felt as a firm, tender cord, and, by pressure from above downward, a purulent fluid can be pressed from the meatus, in which, if the gonococcus is found, reveals the nature of the urethritis.

Cystitis, a disease apt to be confounded with urethritis, may be differentiated by using the catheter, and withdrawing the urine direct from the bladder for the purpose of examination. In the female, gonorrhœal urethritis frequently passes into the chronic stage, in which there are no subjective symptoms, the diagnosis

depending wholly upon physical examination. A drop of thin milky pus may be obtained by pressure upon the urethra from behind forward, and the endoscope reveals the usual appearances of inflammation.

The *treatment*, whether specific or otherwise, is conducted on the same general plan. It consists essentially in rest, a mild diet, the use of alkaline drinks, hot vaginal douches, warm sitz baths and saline laxatives. Much benefit may be derived from douching the urethra with water as hot as can be borne. When the more acute symptoms have subsided, injections of sulphate of zinc (1 to 500), or of nitrate of silver (1 to 4000); or argyrol 20 per cent. aqueous solution, will often prove useful. The injection may be made with an ordinary urethral syringe, a pipette, or a reflux catheter specially adapted for urethral irrigation. In subacute or chronic cases, great benefit may be derived from douching the urethra two or three times a day, with hot water followed by the use of some astringent solution, while internally, oil of santal wood in ten minim capsules, or salol in five grain doses, may be administered.

Follicular urethritis. Sometimes the follicles about the orifice of the urethra and with them two specially named glands, Skene's glands, situated in the floor of the urethra near the meatus, become inflamed followed by the discharge of mucous and pus. When their orifices become closed small cysts are formed.

The treatment is the same as in the foregoing. When cysts have formed they must be slit up with a bistoury.

Vesico-urethral fissure is a fissure, closely resembling a crack in the lip, or fissure of the anus, situated at the juncture of the urethra and bladder, about two-thirds of it being in the urethra and the remainder extending into the bladder. When seen through a cystoscope it looks like a tear in the mucous membrane, when distended it resembles an indolent ulcer with red and inflamed edges.

The *symptoms* are those referable to disease of the urethra and bladder. There is almost constant desire to urinate, accompanied by a sensation of burning at the neck of the bladder. Very acute pain occurs during and immediately following micturition, subsiding for a time only to return with the accumulation of a small quantity of urine.

Treatment. In all cases of painful urination which resist treatment it will be best to introduce an endoscope and look for the very distressing condition, and, if found, treat at once by stretching and cauterizing the base with nitrate of silver, or the galvano-cautery, and afterwards dusting over with calomel, bismuth or iodoform.

Granular erosion. This very troublesome, but fortunately rare affection may result from urethritis, or it may appear without any previous disease. The mucous membrane is found covered with young, imperfectly developed epithelium, the papillæ hypertrophied and extremely sensitive, giving rise to most excruciating pain during micturition, and afterwards keeping up a most distressing tenesmus. In the treatment, mild measures do not accomplish much. The best results will follow dilatation of the urethra and painting the mucous membrane with a solution of nitrate of silver, a dram to the ounce, or of carbolic acid dissolved in glycerine.

Strictures of the urethra are far less frequent in the female than in the male. They are for the most part acquired, narrowing being extremely rare. The causes of cicatricial contraction are chronic urethritis, most frequently gonorrhœal; injuries during childbirth, or other forms of traumatism; caustic applications; and ulcers of syphilitic or tuberculous origin. The most satisfactory method of treatment is by gradual dilatation, as practised in stricture of the male urethra, by means of dilators, similar to those used for dilating the urethra for diagnostic purposes.

Prolapse of the urethral mucous membrane, urethral caruncle and venous angioma have already been considered when speaking of diseases of the vulva, (Chap. X).

Urethrocele consists of a sacculation of the middle portion of the urethra. It is formed, most frequently, by a bagging of the inferior wall, the upper wall deviating little, if at all, from its normal position. The symptoms are, for the most part, due directly or indirectly to the retention of a certain amount of urine in the sac. The residual urine becomes ammoniacal by decomposition, and finally purulent. The sac wall becomes inflamed and eroded, followed by general urethritis and perhaps cystitis. The sacculation is susceptible to the touch and ocular inspection, and when the pouch is large it protrudes from the vulva.

Treatment. If the sac be of the diverticular variety, with little urethritis, it may be wholly excised and the resulting fistula closed by suture. In the presence of much urethritis the sac should be left unclosed, to facilitate drainage and the use of remedical applications. After the parts have been restored to a comparatively healthy condition, the fistula may then be closed.

Irritable bladder. Under this heading may be grouped those conditions, either extrinsic or intrinsic to the bladder, which are not sufficient to induce organic disease, but which keep it in a constant state of irritability. The symptoms are such as to lead to a diagnosis of cystitis, but a careful examination shows the bladder to be normal and we are forced to ascribe the symptoms to simple irritation of the peripheral nerves, either from direct or reflex causes. Probably the most painful form of irritable bladder is that following plastic or abdominal operations. Following cœliotomy, the urine is generally of high specific gravity, has a heavy sediment, consisting usually of amorphous urates and phosphatic crystals, and is capable of producing great vesical irritability.

After such operations too, the urine is frequently diminished in quantity, so as to suggest the possibility of nephritis or obstruction of one or both ureters, a condition capable of aggravating the bladder already irritated by the heavily charged urine. Irritability of the bladder will often be found to be present, as a reflex manifestation, in diseases of the appendages, in dislocation of the bladder, in urethral caruncle, in prolapse of the rectum or of the uterus, and it often accompanies hysteria or other severe emotional disturbances. The diagnosis can only be settled by making a chemical and microscopical examination of the urine; the former reveals nothing abnormal, the latter a field laden with amorphous urates or phosphatic crystals.

CYSTITIS.

Cystitis in the female is of frequent occurrence. It may be either *acute* or *chronic, local* or *general,* and may vary also greatly in intensity and duration, lasting from a few days to many weeks. The most frequent *cause* is the introduction of septic matter into the bladder by means of catheters, bougies, or other instruments. Cystitis, caused by extension of an inflammatory process, is a frequent result of vaginitis or urethritis, particularly of the gonorrhœal type. Mechanical injuries, retention and decomposition of urine, local chemical irritants, calculi and foreign bodies, are all potent causes of vesical inflammation.

In the early stage of acute cystitis the mucous membrane is red and congested, but otherwise normal. Later the walls of the bladder become thickened and the mucous surface covered with pus, fibrin, and exfoliated epithelium, with, occasionally, small bleeding areas, where the epithelium has become detached. In the chronic form the changes are still more noticeable; the muscular and fibrous coats are greatly hypertrophied, the

bladder cavity much decreased by the thickening and contraction of its walls, and the normal folds stand out as prominent ridges, and may even assume a polypoid form. Hemorrhages occur into the mucous membrane and appear as dark ecchymotic spots, which later change to slate color from partial absorption. As a rule when cystitis arises from habitual over-distension, the bladder walls are thin and parchment-like. In these cases the diphtheritic and croupous type of inflammation is most likely to occur. The entire mucous membrane becomes extensively involved, and is covered with a layer of fibrous material, or false membrane, which may be thrown off as a complete cast of the bladder. In more severe cases of diptheritic cystitis, the membrane is composed, not only of necrotic mucous membrane, but also of the muscular coat. In some cases the diphtheritic process becomes localized and deep erosions or ragged ulcers result.

The urine is usually intensely alkaline and heavily laden with mucous and urinary salts, especially the phosphatic, and are often deposited as fine incrustations on the ulcerated areas. Microscopically, there will be found a large number of leucocytes, or red corpuscles, pavement epithelium, isolated, or in clumps, and often large numbers of crystals of triple phosphates. As a result of the hypertrophic thickening of the bladder walls, the vesical orifices of the ureters may be partially occluded, and dilatation of the ureters, pyonephrosis or hydronephrosis may result.

Symptoms. The symptoms will vary according to the cause, extent, severity and stage of the inflammatory affection. In the acute stage, pain often severe, is felt above and behind the pubes, and radiating into the groin and down the thighs. The desire to void urine is almost constant, and the act is attended by sharp lancinating pain at the base of the bladder. Following urination there is

usually a sensation as though a few drops of urine yet remained, a condition sometimes so urgent as to cause the patient to remain for hours on the chamber. There is often a dull pain in the perineum, and pressure over the pubes will increase the pain or tenderness there. Frequency of micturition is an invariable symptom, the frequency depending upon the degree or stage of inflammation. Hematuria is not uncommon in the early stage, and at times there appears to be little less than pure blood voided; but as the process becomes older it entirely disappears. In the acute form, the quantity of urine passed may be normal, or slightly increased, the color unchanged, and possessing feeble acid reaction. After standing a few hours it becomes alkaline, and precipitates a diffuse sediment containing epithelium, mucus pus, and blood, in greater or less amounts. Sometimes the urine becomes ammoniacal and extensively offensive.

The attack is often ushered in by a chill, followed by a rise of temperature, which soon subsides, but in more severe septic or diphtheritic cases, the symptoms from the onset indicate a very grave condition. The patient falls into a typhoid state, with dry tongue, headache, vomiting, subsultus and delirium. Urination is sometimes obstructed by fragments of membrane, causing overdistention, or the ureters may be obstructed, producing total suppression and death from uræmia. In chronic cystitis the symptoms referable to the organ itself, and its contents, are similar to those described, but of a milder type.   The urine contains pus, mucus, and exfoliated epithelium in large amount. On standing, it precipitates an extremely tenacious sediment, is neutral or alkaline in reaction, and sometimes fetid. A careful examination with the endoscope will reveal the evidences of inflammation and the pathological changes present.

Treatment. Especially important is the prophylaxis of vesical inflammation. A large proportion of cases arise

from the introduction of pyogenic organisms into the bladder, hence too much care cannot be exercised in cleansing and sterilizing all instruments used for examination or treatment. The first essential is rest in bed until the acute symptoms have subsided. The diet should be unstimulating; fluid and semi-fluid foods, such as milk, eggs, and light broths, are most suitable. Saline laxatives should be administered, and care taken to keep the large intestine free from fecal accumulation. Warm vaginal douches and enemata are very soothing, and hot sitz baths, with hot local compresses, will relieve the tenesmus and vesical fulness. To allay the fever, and to render the urine unirritating when acid, the administration of the following mixture will be found useful, especially when combined with copious alkaline draughts:

> R.   Potass. Citrat., oz. ss;
>   Spts. Æther Nit., oz. i;
>   Tinct. Aconit., drams iss;
>   Aquæ ad., oz. viii.   M.
> Sig.—Tablespoonful in some water every four hours.

When the urine is alkaline it may be rendered acid by the administration of benzoate of ammonia, in ten grain doses, every three or four hours. Salol is particularly useful in ammoniacal decomposition, giving five to ten grains every four to six hours. The same may be said of urotropin in five grain doses and boric acid, in ten to fifteen grain doses. To control pain, opium, belladonna, hyoscyamus, or chloral may be used with caution, and when prescribed should be given by the rectum. The first three mentioned are best administered in the form of suppositories, while chloral gives the best results when dissolved in two or three ounces of starch water, and administered as an enema. One of the most suitable preparations of opium to be given by the mouth, is Dover's powder, but bromide of soda, in twenty grain doses, and repeated every four to six hours, often acts

more kindly for the relief of pain and tenesmus. Canna-
bis indica will often subdue the pain quite as effectually as
opium, and with less injurious after effects. Irrigation
of the bladder may be resorted to when the acute symp-
toms have subsided, or earlier if it is of septic origin.
The most useful solutions for that purpose are three per
cent. boracic acid, one-tenth to one-half per cent. nitrate
of silver, one-tenth to one-third per cent. permanganate
of potash, one-half per cent. creolin, or one to ten
thousand bichloride.

In chronic cystitis special attention must be paid to
the general health, opium is to be avoided if possible, the
bromides or cannabis indica being used instead to relieve
tenesmus. Alkaline reaction of the urine should be cor-
rected as in the acute stage and, if the urine be purulent,
benzoic acid will be found of most service. Of the bal-
samic preparations there is none better than pure oil of
santalwood, administered in ten minim capsules every
four hours. The treatment consists mainly in local
measures, in the form of vesical irrigation by means of
some simple form of irrigator. The quantity to be in-
jected at one time must depend upon the character of the
solution and the degree of vesical irritability; in some
cases an ounce is all that will be retained. The maxi-
mum volume should rarely exceed two to four ounces,
the process being repeated several times until the bladder
is thoroughly cleansed. The temperature of the fluid
should be from 100° to 105° F., and the irrigating process
repeated twice daily. Besides the solutions already
mentioned, other remedies have been found very service-
able, such as salicylate of soda, a dram to the pint;
methylene blue, one to two grains to the ounce, especially
in purulent cases; ichthyol in water, one-half to one per
cent., especially in gonorrhœal cystitis. In rebellious
cases a two per cent. solution of resorcin may be em-
ployed. Iodoform, in the form of an emulsion (iodoform

thirty parts, glycerine forty parts, mucilage of acacia sixty parts), has been highly recommended, from two drams to an ounce being injected once a day and allowed to remain in the bladder for half an hour, after which it is to be withdrawn by thorough irrigation.

When the disease is confined to local areas, particularly of the base of the bladder, as in erosion and ulceration, applications may be made directly through a cystoscope by the aid of long forceps and a pledget of cotton. Here the stronger solutions of silver, or of copper, grs. v to xv to the ounce, may be used with pronounced benefit. The irritable ulcer at times agonizingly painful may be touched with orthoform in the form of solution or powder.

When treatment fails and the pathological process grows worse, it may be necessary to secure constant drainage of the bladder by means of dilatation of the urethra, by the formation of a vesico-vaginal fistula, or by the use of a self-retaining catheter. The most satisfactory method for draining the bladder is by the formation of a vesico-vaginal fistula. A sound is first passed into the bladder, and the vesico-vaginal wall steadied with a tenaculum and incised, after which a pair of blunt-pointed scissors is entered and the opening enlarged. To prevent the fistula from closing, the vesical and vaginal mucous membrane should be stitched together. This operation is frequently referred to as "Emmet's button-hole operation." Instead of the knife or scissors, the Paquelin cautery may be used.

Tuberculosis of the bladder is rare. In most instances it is secondary to pulmonary or renal tuberculosis, or is a local expression of a general tuberculous condition. The symptoms are similar to those of cystitis. Should the patient give evidence of tuberculosis elsewhere, or has a cystitis which resists ordinary treatment, a suspicion of vesical tuberculosis should be entertained. A

cystoscopic examination may reveal patches of miliary tubercles. Red patches on the mucosa, surrounded by smaller similar patches, are highly suggestive. The finding of the tubercle bacillus in the urine forms a reliable index, provided the upper urinary tract can be eliminated.

Vesical Calculi. Stone in the bladder is a far less common affection in the female than in the male. They are oftener of the phosphatic variety, roughened areas of the bladder wall being liable to become encrusted, and serve as the starting point for calculous formation. The stone usually lies free in the cavity; rarely it is encapsuled. When suspected the diagnosis can readily be made by the sound, by a cystoscopic examination, by digital exploration through the urethra, or by conjoined abdominal and vaginal palpation.

Treatment. Calculi may be removed by way of the urethra, or by vaginal or suprapubic cystotomy. Small calculi may be removed through the urethra, after dilatation by means of slender forceps. Larger, friable stones may be crushed with a lithotrite, and the debris washed out through a urethral speculum. When cystotomy is required, the vaginal operation is generally preferred as the simplest and safest.

Foreign bodies introduced by accident, or intentionally, may be found in the urethra or bladder. The diagnosis may be made in the same way as in calculus, and their removal accomplished through the urethra.

Neoplasms of the female bladder are of infrequent occurrence. They include *papilloma, myxoma, fibroma, myoma, sarcoma, epithelioma,* and *carcinoma.* The most constant symptom of vesical neoplasm is hematuria. Growths at the vesical neck give rise to frequent and painful urination, and may interrupt the flow of urine at micturition, or cause retention. As a rule cystitis sooner or later results, followed possibly by ureteritis and pyelo-

nephritis. An examination of the urine will show it to contain pus, blood, mucus, epithelial scales, neoplastic shreds and phosphates. The diagnosis is made by conjoined abdominal and vaginal manipulation, by the cystoscope, or by direct examination through a speculum.

Treatment. Small non-malignant growths, not pedunculated, may be twisted off and removed through the urethra. If the tumors be sessile and spread out over the mucous surface it is best to resort to the curette. If the hemorrhage is free, or persistent, the bladder may be irrigated with hot water, and the vagina tightly packed with gauze. If the tumor be too large for removal through the urethra, vaginal cystotomy should be performed. If the tumor be malignant, it may be curetted and lightly cauterized, which will have the effect of greatly alleviating the patient's suffering. If the urination be painful and a high grade of cystitis present, the vaginal incision should be left open to allow for free drainage.

Diseases of the ureters. The ureters are liable to ascending diseases from the bladder, to descending diseases from the kidney, or to diseases which begins primarily in the ureter itself. One or both ureters may be affected. A serious affection of both ureters is incompatible with long life, as sooner or later secondary changes occur in the kidneys. As a result of ureteritis, of whatever form, the ureter of the affected side becomes enlarged and may be palpated through the antero-lateral wall of the vagina in its upper third, where it gives to the finger the sensation of a rigid cord, or the feel of a round lead pencil. It is extremely sensitive upon pressure, and when so compressed produces a strong desire to urinate. An enlarged ureter can readily be felt by the rectum, from the broad ligament up as far as the pelvic brim. Further examination may be made, and much information derived, from the use of cystoscopy and the ureteral catheter and probes.

The treatment should consist in curing the cause which produces ureteritis; co-existing cystitis should be managed in the usual way, morbid urinary conditions corrected and the urine rendered antiseptic by salol. Frequent vesical douches and high rectal enemata of warm water should be employed. With the use of Kelly's speculum ureteral injections may be repeated at suitable intervals, provided the operator has acquired the necessary technique for the introduction of these instruments.

Injuries to the ureters. In the chapter descriptive of genito-urinary fistulæ the injuries and management of uretero-vaginal fistulæ were considered. Owing to their close relation to the genital organs, and the readiness with
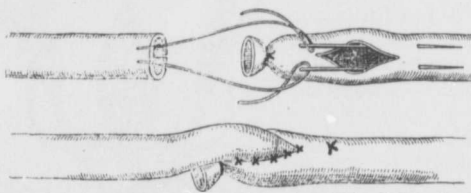
FIG. 59.—Lateral anastamosis for divided ureter.   (Ashton's Gynæcology).

which they may be displaced by inflammatory conditions and new growths, the ureters are liable to be ligated, injured, or completely severed in their course to the bladder during abdominal operations. If but one ureter has been ligated hydronephrosis will occur. In this condition the kidney may remain indefinitely, or absorption and rapid atrophy may take place, and no other immediate trouble follow. When both are tied death from uræmia will ensue in from eight to ten days.

Division of a ureter, partial or complete, without ligature, will entail grave complications by flooding the abdominal cavity with urine. If the injury is discovered before closing the abdomen immediate steps should be

taken to remedy the condition. Formerly, after such an accident, the proximal end was implanted in the loin, or vagina, with the establishment of a permanent fistula. Later primary nephrectomy was recommended as the best remedial measure. In recent years, however, experimental work has demonstrated the great possibilities in ureteral surgery and developed the operation of ureteral anastomosis of which there are three principal methods, (1) lateral, (2) oblique (3) end to end. These are now the operations of choice wherever feasible.

CHAPTER XV.

DISEASES OF THE UTERUS.

MALFORMATIONS.

All the important anomalies of the uterus result from arrest of development, and the nature of these anomalies depends, in a great part, upon the time at which the development was arrested. By bearing in mind the history of the normal development of the uterus, the many abnormal forms will be more readily understood. If the arrest of development occurs at a very early period, there will be simply a rudimentary bundle of muscle to indicate its situation, and in extraordinary cases there may be entire absence of the organ. If there is arrest of fusion of Muller's ducts before the twelfth week, a more or less duplex uterus must result. If there is arrest of fusion in the two canals after the twelfth week, a bicornate or septate uterus will result. If the disturbance of development occurs at a later period, the uterus will retain a fœtal or infantile form, without longitudinal separation
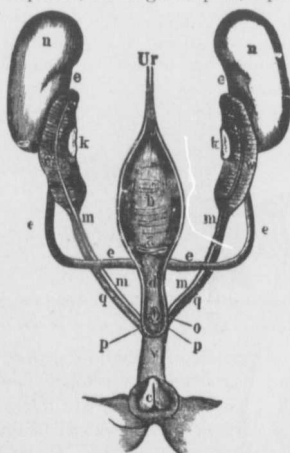

Fig 60.—Development of the genito-urinary tract in the female.—*n, n,* kidneys; *e, e,* ureters; *a,* their orifices in the bladder; *w, w,* Wolffian bodies; *g, g,* their efferent ducts; *p, p,* their openings into the urethra; *k, k,* ovaries; *m, m,* ducts of Muller; *o,* their common orifice; *v,* urogenital sinus; *Ur,* urachus; *c,* clitoris.

or distinct indication of the duplex manner of its formation.

For convenience of description, malformations can thus be divided into those due to arrest of development during the first half of intra-uterine life ; and those due to arrest of development after the first half of intra-uterine life.

Malformations from arrest of development during the first half of intra-uterine life. *Absence of rudimentary development of the uterus.* Complete absence of the uterus is an extremely rare occurrence, but rudimentary development is not uncommon. There may be a small, solid, muscular body, without a cavity, or a partial excavation, or it may consist of a membranous sac. The
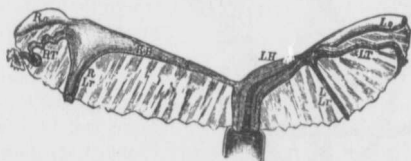

Fig. 61.—Uterus unicornis with rudimentary horn. LH, left horn; RH, right rudimentary horn; Lo, and Ro, left and right ovary; L Lr, and R Lr, left and right round ligament; LT, and RT, left and right tube.

vagina is usually absent, or consists of a shallow depression. Usually the tubes and ovaries are ill developed, and menstruation absent, but in cases where they are developed, periodical activity occurs in them, which, being unrelieved, causes much suffering.

Uterus unicornis results from an arrest of development, or from failure to appear, on the part of one of Muller's ducts. The developed side is situated entirely on one side of the axis of the pelvic cavity, and it inclines quite strongly towards the corresponding pelvic wall. There is no uterine fundus, the uterine body ending in a cone-shaped projection, in which is inserted the Fallopian tube.

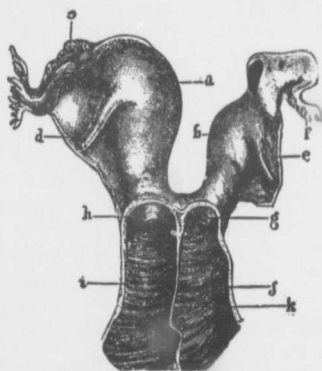*Uterus bicornis* and *uterus didelphys* result from the want of union of Muller's ducts immediately below those portions which normally form the Fallopian tubes. The want of union may be confined to the neighborhood of the tubes, leaving a slight depression in the fundus, or it may extend lower down, dividing a large part of the uterus.

Fig. 62.—Didelphic Uterus and Divided Vagina: *a*, right segment; *b*, left segment; *c, d*, right ovary and round ligament; *f, e*, left ovary and round ligament; *g, j*, left cervix and vagina; *k*, vaginal septum; *h, i*, right cervix and vagina.

Uterus duplex. The double uterus results from a want of union of Muller's ducts as far as the vagina, in consequence of which two uteri have developed. One Fallopian tube is attached to each uterus, and the vagina and cervix may, or may not be double.
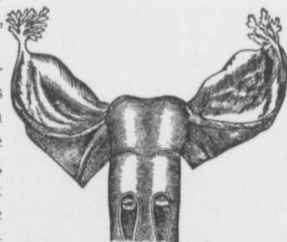
Uterus septus, or two-chambered uterus, arises from an imperfect union of Muller's ducts. The uterus is of normal shape, but the septum has not been obliterated. The vagina is apt to be similarly divided. When the

Fig. 63.—Uterus Duplex.

septum has been partially absorbed it is called *uterus subseptus.*

The diagnosis of these deformities usually requires the aid of an anæsthetic. With the thumb in the vagina, and the finger in the rectum, the structures between them
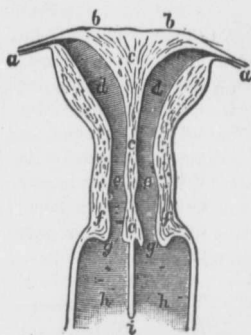

FIG. 64.—Two-chambered uterus.

may be palpated, especially if the uterus is drawn down with a vulsellum, toward the vaginal outlet. A sound introduced into the uterine cavity will also aid materially in arriving at a correct conclusion. In such cases treatment is of no avail, except as far as relieving painful or distressing symptoms. Where there is absence or rudimentary development of the uterus, removal of the ovaries may be demanded in order to secure relief.

Atresia uteri. Just as has been shown that the hymen or vagina may be closed, the uterine canal itself, although more rarely, may be the site of atresia. The mucous membrane of the vagina may cover the whole vaginal portion, without forming any external os, or the cervix may form one uninterrupted muscular mass without bore. In such cases the vaginal portion may be well developed, or totally absent. In a bicornate uterus, one horn may be closed. When-

FIG. 65.—Atresia of the cervix uteri.

ever the genital canal is closed the symptoms due to retention, such as amenorrhœa, painful menstrual disturbances, and the formation of a

tumor will be present, hence the remarks made upon the symptoms, diagnosis, and treatment of atresia of the hymen and vagina are applicable to atresia uteri. When the atresia is situated in the uterus, however, the vagina can be exposed to its full extent and, in so doing, the uterus will be found to form a round elastic tumor above it.

Diagnosis. In pregnancy there will probably be a history of menstruation, and there will be present some of the well known signs. A fibroid forms a hard, nodular tumor, and often causes menorrhagia. Hematocele appears suddenly, forms a broader mass, which pushes the uterus forward, and with these there will be a history, possibly, of previous menstruation. If the uterus is double the atresia is found much more frequently on the right side. In such cases the tumor will form in one uterus, while the other may perform the menstrual function quite normally.

Treatment. If the uterus is single, an opening should be made through the cervix with a trocar, or blunt-pointed forceps, and enlarged if necessary, and the contents evacuted with the same care as already described when speaking of the treatment of atresia of the hymen, after which the uterine cavity must be irrigated with an antiseptic solution, and some strips of iodoform gauze loosely inserted, and brought out through the new formed os. Later on the interior of the uterus may be curetted to combat endometritis and to hasten involution.

If the accumulation is found in one half of a double uterus it is still an advantage to enter, if possible, through the cervix; but often there is no choice, and the tumor must be punctured at its lowest point in the vagina. If the swelling cannot be reached from the vagina, cœlio-tomy should be performed, and the affected horn or whole uterus removed.

Arrest of development during the second half of intra-uterine life. *Fetal and infantile uterus.* Some adult women have a uterus which corresponds in size to the uterus of a fœtus toward the end of pregnancy, or that of a young child. Other organs may be normal, but often the condition is combined with other abnormalities, especially of the ovaries.

Pubescent or congenitally atrophic uterus is one characterized by its small weight, often not exceeding an ounce, the cervix and body having about the same length. Sometimes the body of the uterus is well developed, but the cervix is small, pointed or conical. In such cases the uterus has not been aroused to that degree of activity characteristic of the time of puberty and assumed its normal proportions, but has remained in the condition of a prepubescent uterus. In exceptional instances, the whole vaginal portion may be lacking, while the rest of the vaginal apparatus is well developed. In these cases the vagina passes directly into the uterine cavity by a small constricted canal. Anteflexion of the uterus is often congenital, and simply a continuation of the shape of the uterus found in the fœtus and in young children. The uterus may congenitally be bent to one side, the two Mullerian ducts not having kept pace with one another.

CHAPTER XVI.

DISEASES OF THE UTERUS CONTINUED.

INJURIES.

On account of its position, the unimpregnated uterus is little exposed to injuries from without, but is frequently the seat of injuries produced through the vagina. In gynæcological operations the uterus is occasionally wounded. Some uteri are so soft that they are easily penetrated by the sound or dull wire curette. When strict antiseptic precautions have been observed, and injection of an irritating fluid omitted, no evil consequence will probably follow a small puncture of the uterus. If there is prolapse of the intestine, cœliotomy should be performed, the intestine drawn up and the opening closed in the uterus.

Laceration of the cervix. By far the most common injury to the uterus is that sustained by the cervix dur-

ing child-birth when it may be ruptured, or lacerated. The important pathological bearings of this accident upon disorders of the uterus have been appreciated only of late years. The credit of having recognized the significance of the lesion, and of having furnished a safe and efficient means for cure, belong to Dr. T. A. Emmet.

FIG. 66.—Unilateral laceration of the cervix.

Causes. The rapid forcing of the presenting part of the child through an imperfectly dilated cervix, brought about by early rupture of the membranes, or unusually severe and protracted expulsive efforts, is the cause, in a

large proportion of instances, of laceration. More or less important parts in the causation of this injury are played by rigidity, faulty development, cystic disease, cicatricial induration, and hyperplasia of the cervix. The unskilled use of obstetric forceps may also be a cause of the accident.

Lacerations are called *partial* when the tear in the canal does not reach the mucous membrane of the vagina ; *complete,* when the whole thickness of the cervix is torn. Complete laceration may be *unilateral, bilateral,* or *stellate.*

Bilateral lacerations are by far the most common, and they almost always extend from side to side, rarely from before backward.

Unilateral lacerations may occur in any part of the cervix, but are more common on the left side, owing, it is said, to the frequency of the first position of the vertex.
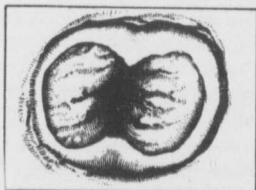

Fig. 67.—Bilateral laceration of the cervix, with eversion of the cervical mucous membrane.

S t e l l a t e lacerations, while sometimes not deep, are often of considerable extent. In regard to frequency, it may be said that but few women confined at full term escape without sustaining some injury to the cervix, be it ever so slight, but the proportion of rents likely to produce pathological symptoms, may be put down as somewhat less than fifty per cent.

After laceration, the torn surfaces, bathed in the lochia, rarely unite, and in that condition will act as a source of irritation, prevent proper involution of the uterus, and will eventually induce enlargement and thickening of the uterine tissues. In some cases the flaps become enormously hypertrophied by the formation of new connective tissue, so as to resemble small fibroid

tumors, and have been mistaken for such. Relaxed liga-
ments with uterine displacement—especially when it is
associated with a lacerated perineum—and congested
ovaries and tubes, in their turn follow. Occasionally
nature seems to make an effort to repair the laceration
by the formation of a large amount of granulation tissue
filling up the angles of the rent. In process of time this
granulation tissue becomes converted into a hard dense
cicatrix, compressing terminal nerve filaments, a condi-
tion thought by many to be the cause of the reflex symp-
toms so commonly met with in long standing cases. When

the lacerated cervix does not
cicatrize, the separated lips
evert, the mucous membrane
lining the cavity is rolled
out (ectropion), its epithe-
lium is gradually rubbed off,
and a hyperplasia of cysts
and papillæ take place, giv-
ing rise to a profuse, dis-
colored, glairy discharge.
This hyperæmic and hyper-
plastic condition often ex-
tends upward to, and often
beyond the internal os, and

FIG. 68.—Multiple stellate lacera-
tion of cervix.

cervical and corporeal endometritis result, so that men-
orrhagia may be present. Attention has been called to
the frequency with which epithelioma of the cervix has
been found in conjunction with laceration, and it is
undoubtedly a fact that a very large proportion of such
cases are preceded by such traumatism.

Symptoms. The symptoms which attract the atten-
tion of the patient will probably be a dull pain in the
back, sacrum, and lumbar regions; bearing down or
dragging in the pelvis; pain in the ovarian regions, hips
and thighs; leucorrhœa; menorrhagia; and occasionally

sterility, or habitual miscarriages. Accompanying these
there will generally be found progressive loss of health,
and a most decided state of anæmia. Neuroses of the
eyes, head, stomach, and bowels are also frequently met
with; to which hysterical symptoms may even be added.
On passing the finger into the vagina, the laceration is
easily recognized. In the angles of the rent hardened
tissue is felt, pressure upon which produces pain, which
often radiates into the pelvis and down the thighs. The
surface may feel rough and granular from the large folli-
cles, or velvety and soft from erosion. Examination by
speculum does not give much information, further than
to bring into view the granular or eroded surface, the
white or yellowish discharge with which it is covered,
and the hypertrophied condition of the cervical flaps.

Indications for operation. The mere existence of a
laceration does not call for radical operation. The indi-
cations for that measure depend entirely upon the depth
of the rent, the degree of eversion and amount of erosion
and hyperplasia of the torn lips; the intensity of the
symptoms depending upon it, and by the improbability
of these symptoms being permanently cured by other
than radical treatment. The treatment of laceration im-
mediately after their occurrence has been strongly advo-
cated by some, but such a procedure has not gained in
favor with the majority of obstetricians, owing to the
difficulty in estimating the extent of laceration, the
relation of the parts, and the ability to bring them to-
gether properly.

Preliminary treatment. Some have thought it advis-
able to cure erosion, when present, before operating, but
such a procedure does not seem necessary. If there is
extensive cystic degeneration, it may be treated for a
time by local applications, but generally both these con-
ditions can be managed at the time of operation. Prepar-
atory curettage of the uterine cavity has also been

advised when endometritis exists, but this too is unnecessary as it can be done just as effectually before beginning the denuding process.

Trachelorrhaphy may be performed by placing the patient in the dorsal position, the legs elevated, and kept in position by Clover's crutch, and a Sims' broad-bladed speculum inserted . A very convenient speculum for that and other operations on the uterus, when the patient is in the dorsal position, is one known as Edebohl's. It is so curved at the junction of the handle and the blade that it will not slip out, and, by suspending a sufficient weight to the handle, the necessary retraction is made on the perineum, and the necessity for an assistant to hold the speculum done away with. Some prefer operating in

FIG. 69.—Edebohl's Speculum.

Sims' position, claiming that it gives much more room for manipulation and for the passage of the needles. However the choice of position and speculum is largely a matter of education and habit. The best needles to employ are heavy triangular or bayonet-pointed, straight, h a l f - curved, or curved slightly at the point (Emmet's). For suture material silver wire, silkworm, silk and catgut have all been used at different periods. If the perineum is to be closed at the same time, it is best to use some material which will be absorbed. Unless contraindicated from some good cause, it is preferable to use catgut under all circumstances, as it fulfils all the requirements and besides most patients have a great dread of what they look upon as another operation for the removal of the stitches.

After deciding upon the amount of denudation necessary, the edge of one lip is seized with a tenaculum, and a flap raised from the surrounding tissue with scissors or scalpel, the cutting process being continued until the

angle is reached, where it may be necessary to go quite deeply to remove all the cicatricial tissue. After the angle has been passed, denudation is made in a similar manner on the other lip, and completed by uniting it with the previous incision. If a second laceration exists on the opposite side, it is to be denuded in the same way. Hemorrhage can usually be controlled by hot water, but if very troublesome a stitch may at once be passed through both lips of the cervix, above the angle, and tied so as to compress the circular artery. The sutures are next introduced, the first being passed through the upper angle of the rent, and each successive one through the whole depth of each lip, until all the sutures needed for

Fig. 70—Surfaces denuded and sutures passed. Fig. 71.—Same with sutures tied.

that side have been inserted. Next the sutures on the opposite side are similarly inserted, if the denudation has been bilateral, after which they are tied, the highest one first. No. 3 catgut will be found quite strong enough for this and similar operations. Should any point of approximation require a material which will resist absorption for a longer period a suture of "10 day chromic" catgut may be used.

Complete amputation of the cervix may, under certain circumstances, be preferable to trachelorrhaphy and it is important to know which of these operations to select in a given case. Amputation should be chosen in deep

stellate lacerations, in bilateral lacerations with a large enlongated, and, perhaps hypertrophied anterior lip, and a small narrow posterior one; in tears associated with a great loss of tissue; in cases complicated with cervical induration or sclerosis, and in cases of extensive cystic degeneration. A cervical canal, the seat of cystic degeneration, though hidden from view by the operation, still remains a focus of local irritation, keeping up the reflex symptoms and chronic changes in the uterus. In a sclerosed cervix the local irritation, due to the sclerosis, will continue, even though the denuded edges unite.

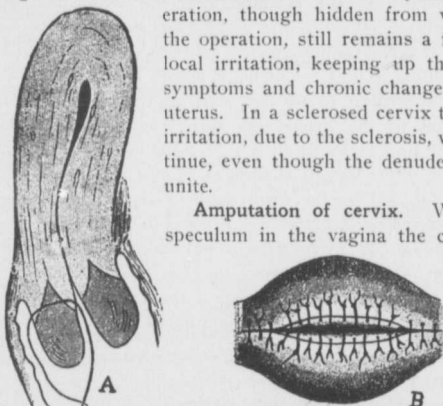**Amputation of cervix.** With a speculum in the vagina the cervix is

Fig. 72.—Amputation of the cervix with double flaps. *A*, sectional view, showing lines of incision for formation of flaps and method of suture; *B*, front view of cervix, operation complete.

drawn to the vulvar orifice and divided with a pair of scissors at each lateral cervix into anterior and posterior lips. With a sound in the bladder as a guide the anterior lip is removed by two transverse incisions, one on the vaginal and the other on the cervical canal side, cutting upwards as well so as to form two flaps. Similar incisions are made in the posterior lip. The anterior and posterior flaps in the anterior lip are united with catgut sutures, next the posterior flaps. With these completed two or three sutures are inserted at each lateral margin after the manner of suture in bilateral trachelorrhaphy.

CHAPTER XVII.

DISEASES OF THE UTERUS CONTINUED.

METRITIS.

According to the etymology of the word, metritis means inflammation of the uterus, but the classification of the various pathological conditions included under that heading is not so easily disposed of. When considered according to the progress of the disease, it is designated by the terms *acute* and *chronic;* when classified according to location, it is divided into *cervical* and *corporeal;* when looked at from an etiological standpoint, it is designated by the term *septic, puerperal, non-puerperal, gonorrhœal, exanthematous, traumatic, congestive* and *constitutional;* or when from a pathological standpoint, *glandular, interstitial, polypoid, fungous, ulcerating.*

For convenience of description the various forms of endometritis may be classified as follows:

1. Acute metritis and acute endometritis.
2. Chronic cervical endometritis.
3. Chronic corporeal endometritis.
4. Chronic metritis, or subinvolution and sclerosis.

ACUTE ENDOMETRITIS AND ACUTE METRITIS.

By the term acute endometritis is meant acute inflammation of the endometrium, and by the term acute metritis, inflammation of the walls of the uterus, but as inflammation of the endometrium can scarcely occur without the uterine walls participating to some extent, nor can inflammation of the walls occur without participation of the mucosa, the description of the two, as distinct diseases, would be useless, at least from any other than a pathological standpoint. When the inflammation affects the mucous membrane more than the

walls, it is termed endometritis; when it produces extensive changes in the walls, it is called metritis.

Causes. The most potent cause arises from bacterial invasion from infected hands and instruments during parturition, abortions, operations and examinations; during uterine and vaginal douches; from retained decidua after abortion; or from invasion of .the gonococcus. Infection may arise secondarily from foreign bodies left in the uterus or vagina, such as stem pessaries, tents and tampons. Violent congestion of the uterus, such as occurs in acute suppression of menstruation, and the prolonged congestions growing out of flexions and versions, are prominent factors in these lesions. Retained menses, arising from stenosis, catching cold, and other influences, such as over-exertion, excessive coitus, or traumatism, acting during the menstrual congestion, increase the natural hyperæmic condition to such an extent as to interfere with its natural subsidence, and tend to engorgement and inflammation. Specific germs of the exanthemata appear to be capable of inducing mild inflammatory changes upon the mucous membrane of the entire uterus, seeming to act upon it as upon other mucous tracts (the conjunctivæ for instance during measles), and in a similar manner tend to disappear with the subsidence of the disease.

Pathology. In acute endometritis the extent of the lesion will depend upon the virulence and activity of the infecting element, and will vary from a mild injection of the endometrium to a deep and wide spread infiltration with the products of inflammation. The material found bathing the infected surfaces will also depend upon the same influence, being in mild cases merely a muco-purulent fluid, in others purulent, or even bloody. The normal red color of the endometrium is deepened proportionately, and may be almost livid; the mucous membrane is thickened, softened, even pulpy at times, and easily torn

from its attachments. The interglandular spaces show an increase of round cells, which, in extreme cases, are so abundant as to give the whole surface the appearance of granulation tissue. The epithelium is infiltrated, and even destroyed in certain places, and the cilia in general may be said to have shared a like fate. The implication of the muscular coat (metritis) is slight, except in some cases of gonorrhœal infection. There is swelling of the muscular fibres, increase of cell formation in the interspaces, and infiltration with a serous or sero-purulent fluid, by which the uterus becomes more or less enlarged. Minute extravasations of blood are apt to be found in spots, particularly near the mucous membrane.

Symptoms. The symptoms of acute endometritis depend upon the extent and gravity of the disease and therefore may vary within wide limits from those of mild infection to those of the greatest virulence. In the simple form they may be comparatively insignificant. There will be a sense of fulness in the pelvis, more or less pronounced, if there be arrest of the menstrual flow, accompanied by frequent micturition and rectal tenesmus. In more severe cases the symptoms are more decided. There will be dull deep seated pelvic pain, backache, and aching down the thighs, increased by motion or by the evacuation of the bladder and bowels. Slight febrile reaction will also be present. In septic cases a chill, more or less pronounced, ushers in the general disturbance, accompanied by a rapid and decided rise of temperature. Should the inflammation extend to the peritoneal covering (perimetritis), the phenomena of local peritonitis will be directly added; if it extend through the Fallopian tubes the evidence of salpingitis will appear, and from either of these general peritonitis may arise, or other extreme symptoms indicative of general septic absorption.

The chief physical signs are tenderness over the pubes, and tenderness of the uterus, elicited by bimanual and vaginal pressure. The cervix will be found patulous, softer, larger, and redder than natural, particularly about the external os, and exuding from it a tough, glairy, opaque secretion. When the uterine walls are affected, particularly in septic inflammation, the entire organ is enlarged and softened, and there will be noticed flowing from the os a thick, ichorous, bloody discharge, which may have the odor of decomposition.

Prognosis. In the simple form life is rarely endangered, but in the septic forms it commonly is, either through general peritonitis, or from general septic infection. The integrity of the organ is always endangered to an extent proportionate to the severity of the inflammation; slight, if any, in the milder forms, but decidedly pronounced in the graver ones. The dangers result in part from the chronic changes in the uterus itself, and in part from the implication of the adnexa.

Diagnosis. In the non-puerperal uterus this lesion is indicated by tenderness of the organ, and by discharge from the cervix, taken in conjunction with the comparative suddenness of an attack developed in connection with an acute suppression of menstruation, with a prior vaginitis, or with some such cause as an operation upon the cervix, or the introduction of a sound. After abortion or labor it is commonly indicated by a chill, followed by rise of temperature, and temporary arrest of the lochia, with its subsequent reappearance, and on reappearance often has an odor of decomposition. The organ soon becomes tender and subsequently loses its firmness. Such cases may be confounded with typhoid or malarial fevers. If malarial, quinine will control it absolutely; if typhoid, differences in the rise and fall of temperature will assist in making a diagnosis. In all cases when in

doubt, it is wiser to assume the presence of septic infection. Localized mastitis is another source of error, but a careful examination of the breasts will readily correct that.

Treatment. From what has been said of the etiology of the disease, it will be readily understood that the treatment will vary according to the nature of the case. The milder forms are best treated by rest in bed, purgations by means of salines, by mild febrifuge treatment, and by hot vaginal douches supplemented by hot fomentations, and counter irritation over the abdomen. If there is no serious objection to physical examination, local depletion may be accomplished by free scarification of the cervix, followed by a warm vaginal douche. As soon as the more acute symptoms have subsided, boro-glyceride tampons may be placed against the cervix daily. When it arises as a result of vaginitis, particularly that form met with in gonorrhœal infection, it will probably be necessary to irrigate the uterine cavity with a solution of bichloride (1 to 3000), dilating the cervix sufficiently for that purpose, if it is not already patulous. In the septic forms prompt and energetic measures are demanded. If the result of negligence in failing to keep up proper aseptic precautions during operations or examinations, the cavity of the uterus should be freely irrigated with bichloride solution and packed with iodoform gauze. Should a wound exist, the lips had better be separated and kept apart by strips of the same material. Should the case be one of septic inflammation following abortion or labor, radical surgical measures should be promptly applied. The cavity of the uterus should be explored and debris, if any found, removed, and the uterus tightly packed or drained with gauze. The vagina may then be packed loosely, first around the cervix and then down to the introitus. The packing of the vagina should be removed at the end of twenty-four hours and warm sterile douches

given. At the end of forty-eight hours the uterine packing may be removed and, if no fever be present, the cavity of the uterus need not again be entered, but if the temperature is still elevated the cavity should be irrigated and fresh gauze inserted. Even though the case appears desperate, the cleansing and draining should be continued for not infrequently it yields in the end. If the infection is probably or certainly of streptococcic origin the anti-streptococcus serum may be used hypodermically, 10 to 40 c.c. a day. The gravest surgical perplexity arises in connection with further operative procedure. The removal of the infected uterus, either through the vagina or by cœliotomy, offers the surest relief, could the shock of so grave an operation be controlled. Patients infected with a general sepsis rarely withstand any grave abdominal, or even pelvic operation, and although many successful cases have been reported, it is still looked upon by many as justifiable only under desperate conditions.

ENDOCERVICITIS.

Endocervicitis is recognized by various synonyms, such as cervical endometritis, cervicitis, cervical catarrh, trachelitis, and erosion of the cervix. Inflammation of the cervix exists independently of like lesions in the body of the uterus, its position exposing it to disease to a far greater extent than the deeper portions of the organ, and as such requires separate consideration. In acute processes, especially those derived from gonorrhœa and septic infection, the two parts of the organ are so often involved together, that it seems unnecessary to consider the lesions of the two separately. The appearance presented by the cervix in acute inflammation has already been referred to. The mucous membrane of the canal is swollen and softened, and its cavity filled with a viscid muco-purulent secretion. The appearance presented by the deeper portion of the cervix is also, in all respects,

similar to that met with in the body of the uterus. This does not apply, however, to the chronic forms of the disease; the inflammation being of a lower grade of intensity, more strictly confines itself to the cervix, without involving the deeper parts of the uterus.

Causes. Chronic endocervicitis may arise from a variety of causes. Impoverishment of the blood from chlorosis or some other form of malnutrition, producing lowered vitality, strongly predisposes to the disease. Infection from the vagina, such as from gonorrhœal or purulent vaginitis, from the entrance of foreign bodies or septic germs into the vagina, from examinations, operations, coitus, masturbation, pessaries, and vaginal douches, may infect the cervix directly. Laceration of the cervix is by far the most frequent cause, and along with it may be mentioned displacements of the uterus, operations upon the cervix, strong local treatment, and attempts at abortion.

Pathology. Endocervicitis is characterized by hyperæmia, thickening of the cervical mucous membrane, and hypersecretion of the glands. The mucus may be unaltered, or it may be thicker than normal and excessive in quantity. If the congestion is long continued, exfoliation of the epithelium progresses faster than its replacement by the development of new cells, so that the membrane becomes covered with young epithelium, giving it a reddish color (*simple erosion*). This disturbance not only involves the mucous membrane of the canal, but extends outward from the os, about half the thickness of the walls of the cervix, giving rise to the condition once described as ulceration. As the process advances the mucous membrane becomes thickened by proliferation of the areolar tissue, so that it becomes too large for the surface which it covers, and is thus thrown into a multitude of minute folds, rugosities or wrinkles. To this condition the name *papillary erosion* has been

gi\en, as the small folds look like papillæ. The glandular pockets formed by these folds reach down to and between some of the bundles of muscular fibres. These pockets, as well as mouths of the glands, may become closed and filled with secretions, forming cysts of all sizes up to that of a pea, and give rise to that condition called *follicular erosion.* When the hyperplasia is extensive, the thickened mucous membrane overfills the
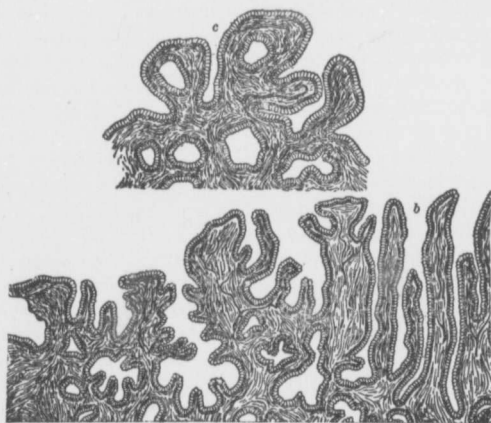

FIG. 73.—Erosion of the cervix,—*a, c,* simple papillary; *c,* follicular slightly enlarged.

cervical cavity, dilates the external os and rolls out into view, giving the cervix the appearance as if the vaginal portion were partly clothed with cylindrical epithelium. This condition is called *eversion* or *ectropion.* When the structures are more actively affected, or to a greater depth, other changes are produced. The mucous membrane throws out large projecting folds which may or may not develop into mucous polypi or polypoid masses. The occluded and cystic pockets and Nabothian glands

may project on the surface, and, if numerous, may occupy half the thickness of the cervical walls, and produce a condition known as *cystic degeneration.* As a result of these changes all of the glandular structure may be finally destroyed, and sclerosis, resembling senile atrophy, result.

Symptoms. When mild, and of short duration, the case may be free from all symptoms except a vaginal discharge. This discharge, however, is in some degree characteristic; it is not continuous, nor, in the absence of vaginal implications, abundant. It is viscid and jelly-like and transparent, opaque, or yellowish according to the amount of purulent admixture. In the presence of cervical laceration, it is mixed with a more muco-purulent discharge, and is at the same time more constant. In deeper seated implication of the cervix there will be, in addition to the discharge, dull lumbo-sacral pain, and perhaps, reflex nervous symptoms. On making a digital examination, a softened ring is felt around the os, and, if extensive cystic degeneration with eversion exists, the cervix will be felt enlarged, soft, and elastic, with perhaps isolated distended follicles, like buried shot under the surface.

Laceration of the cervix, with extensive erosion, may simulate carcinoma, but by examining under the microscope a small strip removed by the knife, it can be readily differentiated. A profuse serous and blood-stained leucorrhœa is almost always characteristic of cervical carcinoma, and so are the hard exuberant cauliflower excrescences springing from the vaginal aspect of the everted cervix.

Treatment. As the disease consists mostly of an inflammatory degeneration of the cervical mucous membrane, efforts should be directed to produce an alterative influence upon that membrane; and as it is often associated with a depraved condition of the system, further

efforts must be made to affect favorably the general
health. Every function of the body should be regulated
by proper means, and vegetable tonics, mineral acids,
and preparations of iron administered, and daily exercise
and good healthy nourishing food provided for. Particu-
lar attention should be paid to the proper regulation of
the bowels, for which a ferrugineous tonic with a
cathartic may be prescribed, as in the following:—

> R. Magnesiæ Sulphatis, oz. ii;
>   Ferri Sulphatis, grs. xvi;
>   Acid Sulphuric, dil., dram i;
>   Tinct. Gent. Co., oz. i;
>   Elixir Simplicis, ad., oz. xvi.   M.
> Sig.—Two tablespoonsful in half a tumbler of ice water each
>   morning.

> R. Sodæ et Potass. Tart., oz. ii;
>   Vini ferri amari, U.S.D. oz. ii;
>   Acid Tartaric, drams iii;
>   Elixir Simplicis, oz. iv;
>   Aquæ ad., oz. xvi.   M.
> Sig.—Two tablespoonsful in half a tumbler of water each morn-
>   ing on rising.

Locally the source of irritation must be removed, and
the effects counteracted by mild antiseptic and astringent
applications. Endometritis and vaginitis, if present,
should be treated, and uterine displacements corrected.
Of local applications, the most important is the vaginal
douche. The water may contain permanganate of potash
(1 to 3000), carbolic acid (1 to 100), or bichloride (1 to
5000), when for antiseptic purposes; and if required for
an astringent effect, sulphate of zinc, three grains to the
ounce, sulphate of copper, two grains to the ounce, or
acetate of lead, five grains to the ounce. Vaginal tam-
pons, saturated with boro-glyceride, or glycerite of
tannin, or a ten per cent. solution of ichthyol, may be
introduced by the patient every night and removed the
next morning before taking the douche.

Local applications, such as a ten per cent. solution of
sulphate of copper, or crude pyroligneous acid, may be

made through a speculum, twice or three times weekly. In some cases the application of a 20 per cent. aqueous solution of argyrol, or of strong carbolic acid, or tincture of iodine is very serviceable, followed by the application of a boro-glyceride tampon. In all cases the os should be well dilated, the mucus wiped away, and the application made freely to the entire cervical cavity and to the vaginal portion, by means of an applicator, or by forceps wrapped with cotton. When the cervix is much indurated and studded with retention cysts, scarification is very useful. It acts by depletion and allows the escape of the inspissated mucus. The puncture should be permitted to bleed a little, but if the hemorrhage is too free it may be checked by absorbent cotton firmly pressed against the cervix. Subsequently tincture of iodine, or carbolic acid, should be applied, and a small boro-glyceride or ichthyol tampon placed under the cervix to maintain the antiseptic and alterative action.

In cystic degeneration, the cysts must be laid open, and carbolic acid or tincture of iodine applied. In very chronic cases, where there is extensive degeneration of the mucous membrane it is best to get rid of the trouble once and for all by amputation of the cervix.

CHRONIC CORPOREAL ENDOMETRITIS.

Like the cervix, the body of the uterus is liable to chronic inflammation of its lining mucous membrane.

Causes. It may follow at once upon an attack of acute endometritis, or metritis; or it may be brought about by causes which delay or disturb involution after abortion or labor; by disturbed menstruation often repeated, especially when complicated with stenosis of the cervix, ovaritis, and such like; by mechanical interference with the uterine circulation, arising as a result of such conditions as uterine displacements, pelvic tumors, exudates, or other morbid processes in or about the pelvis; by

direct infection, either by means of the hands, instruments, or foreign bodies, or by ascending septic inflammation of the vulva or vagina. Anæmia and debility are believed to be predisposing causes at least. In such, the flow being irregular, and often scant, the uterine hyperæmia is insufficiently relieved each month, and hyperplasia of the endometrium results.

Pathology. To the naked eye the mucous membrane is swollen and soft. In color it resembles quince jelly, with here and there lighter areas, and again spots even darker. It is much thicker than normal, easily stripped from its attachments, after which it is seen that the muscular coat participates in the congestion. The surface of the mucous membrane is irregular, presenting alternate projections and depressions. These projections or fungosities may be quite large, of a round and elongated form, or they may be veritable polypi, sessile or pedunculated. In other cases small cysts, resembling somewhat similar bodies met with in the cervix, are present. When atrophy of the mucous membrane has resulted, the surface is smooth and glistening, and when there are extensive atrophic changes, is thin and transparent.

Corporeal endometritis presents in three forms which may appear separately, or be combined in one and the same patient. They are *interstitial,* the *glandular,* and the *polypoid.*

In the *interstitial* form the interglandular tissue is transformed into cicatricial tissue which compresses the glands, causing their partial and sometimes complete obliteration. In other places they are converted into cysts, in number proportionate to the degree of connective tissue development. In extreme cases, of long duration, the mucous membrane becomes atrophied, and is converted into a thin layer of sclerosed connective tissue. Embedded in this sclerotic tissue, here and there are cyst

cavities, the remains of constricted and degenerated glands.

There are two forms of the *glandular* variety, one in which the glands are increased in their dimensions (*hypertrophic*); and another in which there is actual increase in the quantity of gland tissue (*hyperplastic*). In the former, the utricular glands no longer appear as a series of straight tubes, but are twisted, elongated and arranged spirally. In the second form there is not only increase in the number of the glands, but they are distorted, and here and there present lateral prolongations or diverticulæ.

Chronic *polypoid* or *fungous* endometritis is a combination of the interstitial and glandular varieties, with marked cystic formation, together with great increase of the vessels, both in number and in dimensions, and an increase of the interglandular structure. In some cases the whole mucous membrane is thickened, in others only portions, while in others the glands are chiefly affected and project as polypoid masses. The great increase in vascularity accounts for the clinical behaviour of this variety, menorrhagia being the striking symptomatic feature. In connection with this last form of endometritis, there is a variety resulting from the retention of portions of the decidua, after abortion chiefly, but occasionally after labor at term, *endometritis decidualis.* The retained tissue presents itself as projections from the general surface of the mucous membrane, and is soft and easily detached. Microscopically, it is differentiated by the presence of degenerated decidual tissue, surrounded by a mass of small cells. Clinically it presents symptoms of the polypoid form by the profuse menstrual flow.

Symptoms. The symptoms of endometritis vary to a great extent, according to whether the case be a severe one or not. They may scarcely attract attention, or they may be so pronounced as to render life a burden. *Menorr-*

hagia is by far the most common symptom. The flow may be profuse and clotted, persisting at times longer than normal, and at others continuing during the larger part of the intermenstrual period, particularly in the fungous or polypoid form.

Leucorrhœa is nearly always present between the periods, although in old cases it may be so slight as not to attract the patient's attention; after sclerosis of the mucous membrane has resulted it may be absent altogether. The discharge consists of a thin clear mucus, or muco-pus. As it appears at the vulva it is milky white, creamy, or greenish in color, owing to its having mingled with cervical and vaginal discharges. When mixed with blood it acquires a pink, brown, or smoky tint.

Pain of some kind is rarely absent. Lumbo-sacral pain is a prominent feature, and it may radiate down the thighs. Dull, persistent, deep seated pelvic pain is also present, extending perhaps to the perineum. If the organ is enlarged and anteverted there will be frequent micturition and vesical distress; if retroverted there will be mechanical constipation, with pain along the sciatic nerves. Unusual or prolonged exercise, especially jolting over rough surfaces, increases the pain. To the local discomforts, neuralgic pains may be added, such as occipital, intercostal, lumbo-abdominal, and facial neuralgias; coccygodynia, gastralgia, meteorism, and similar reflex symptoms may also be present.

Sterility is a common accompaniment, owing to the several obstacles to impregnation, and to proper decidual growth. Sometimes the ovum does not reach the uterus, or it may be destroyed by the secretions, or by forming no attachment to the endometrium.

Physical signs. Palpation shows nothing but a symmetrical enlargement of the uterus. Generally it is tender on pressure, particularly when the cervix is touched. In the absence of complicating diseases of the

adnexa, of the utero-sacral ligaments, or of the peritoneal surroundings, the uterus is freely movable. The introduction of the uterine sound is ordinarily, though not invariably, attended by pain, and in most cases a sensitive spot is met with at the internal os. The canal may measure from three to four inches in length, but the sound conveys little information as to the state of the endometrium, unless it be by the induction of bleeding in the hemorrhagic forms, in which case it is often profuse.

Diagnosis. Pregnancy has been mentioned as a condition with which the lesion may be confounded, but a proper examination and consideration of the signs and symptoms will readily determine which condition is present. It may be mistaken for commencing *fibroid* disease. If the disease be interstitial, and more particularly if it be subperitoneal, conjoined vaginal and rectal examination will reveal inequalities on the outer surface. If the growth be wholly submucous, it may be detected by the introduction of the sound. The hemorrhagic form may be confounded with *obortion*, but the early history and a careful examination of the discharges will suffice for differentiation. The diagnosis of certain forms of corporeal and cervical inflammatory lesions from *carcinoma* is a matter of pressing urgency, for, to be of any service, diagnosis must be made early. Here the free use of the sharp curette and a careful microscopic examination of the scrapings will assist materially in clearing up the difficulty, and should never be omitted in doubtful cases.

Prognosis is usually favorable as far as life is concerned. Taken early, all forms yield readily, but after extensive changes have taken place permanent cure is uncertain. Of all forms, polypoid is the most obstinate, and it also is the form which appears to tend most frequently to carcinomatous degeneration. Every form tends towards the induction of inflammation of the adnexa and peritoneum.

Treatment. Cases with profuse menorrhagia, unaccompanied by tumors or diseases in the adnexa, pelvic peritoneum, or connective tissue, but with considerable thickening of the mucous membrane, fungous endometritis, and in general all cases that have resisted long continued local treatment, should be submitted to thorough intra-uterine curettage. After completing the operation, it may be considered advisable to touch the surface over with strong carbolic acid, or tincture of iodine, or iodized phenol, and to pack the cavity lightly with strips of iodoform gauze. Subsequently the treatment should be along the lines already enunciated in conjunction with the treatment of acute metritis. Subsequently, an effort must be made to keep up the free drainage through the cervix already established, which may be done by occasionally passing a dilator and introducing a few strips of gauze into the cervical canal. Boro-glyceride or ichthyol tampons may be inserted by the patient once a day, and allowed to remain for twelve hours. After their removal, the vagina should be douched with hot water, and again before reinsertion of the tampon. If the disease does not seem to yield, thorough curetting had better be repeated, and in the intervals, when dilating the os, the endometrium may be lightly touched over with a twenty-five per cent. solution of ichthyol, or with stronger preparations, if thought advisable, such as tincture of iodine, carbolic acid, or a twenty-five per cent. solution of chloride of zinc. Success in treatment will largely depend upon a removal of the conditions which cause and perpetuate the disease. Retroversion, retroflexion, and prolapse of the uterus may need correction. Inflammation of the cervix, ovaries, or of the tissues surrounding the uterus should be treated. Special care should be taken at each menstrual period; a few days spent in bed will often do much to check menorrhagia or dysmenorrhœa,

should one or the other be present. Throughout the whole intermenstrual period the mode of living should be one of extreme quietude, both mental and physical.

Senile endometritis. This is an atrophic form of endometritis occurring in old women, characterized by a thin purulent discharge often stained with blood, and is usually profuse, offensive and irritating to the parts. During its progress stenosis or atresia of the lower uterine canal may take place, causing retention of the secretions and formation of a cyst known as a *senile pyometra* or *hydrometra.* The objective *symptoms* often resemble those of cancer of the body of the uterus, accordingly a careful microscopic examination should be made of the material removed by a thorough curetting of the whole uterine cavity. The *treatment* consists of curetting the endometrium completely from the uterine wall and touching it over with some caustic as carbolic acid, iodine or a solution of nitrate of silver.

CHRONIC METRITIS.

Chronic metritis may be defined as an inflammation in the muscle wall of the uterus leading to an increased connective tissue formation, or as an increased tissue formation dependent upon long continued congestion. Owing to the difference in the pathological changes found in the various stages of the disease, or as the result of different etiological factors, the synonyms *chronic hypertrophic metritis, interstitial* or *cirrhotic metritis, areolar hyperplasia, subinvolution* and *sclerosis* have been applied.

The altered condition of the uterus will vary with the period at which the patient comes under observation, whether early or late. In the early stages the organ is enlarged, hyperæmic and soft—hypertrophic metritis. Later it may decrease in size, though it is still large, and then becomes hard indurated and anæmic—interstitial or cirrhotic metritis. This variety is sometimes called

areolar hyperplasia, in that there is an increase of connective tissue and loss of muscular tissue.

Etiology. Chronic metritis may result from three entirely different causes:—(1) *Puerperal* arising from interference, from any cause, with retrograde metamorphosis of the puerperal uterus after abortion or labor at term, such as puerperal metritis, retained secundines, septic innoculation, laceration of the cervix, over-exertion after confinement, or suppression of milk. Acute diseases occurring during the period of involution have a similar effect.

After parturition the muscular fibres undergo fatty degeneration, by which the organ rapidly diminishes in size, so that, at the end of the eighth week, the uterus will have returned to its normal state. Untoward influences may retard or check this process, and the uterus will accordingly remain large, flabby, and softer than natural. As a result there is hyperæmia, serous infiltration, and a large increase of embryonic elements. (*Subinvolution*). Later an increase of adult connective tissue between the bundles of muscular fibres arises, which in time compresses the blood vessels, and leads to uterine anæmia with atrophy of the muscular tissues. The uterus becomes harder than natural, and remains for a long time enlarged, but in time begins to diminish in size as a result of contraction of the connective tissue, and in a few cases becomes smaller than normal.

(2). *Menstrual.* During each menstrual period the uterus, being to some extent an erectile organ, is enlarged and distended with blood. If from some cause it does not return to its normal intermenstrual quiescent state, chronic congestion with hypergenesis of its tissues will follow, and, as a result, the organ will increase in size month after month, until the circulation becomes finally constricted, and in a hardened state the uterus will remain enlarged until after the menopause.

(3). *Congestive.* Displacements of the uterus at first result in passive congestion. Fibroids keep up constant nervous irritation that induces hyperæmia. Cardiac disease and abdominal tumors interfere with the return of blood through the vena cava and produce blood stasis, any of which, when continued for a length of time, will induce hypergenesis of connective tissue in the uterine walls.

Symptoms. After labor or abortion, the first symptom may be a return of the discharge soon after the patient gets up, or the menses may return abundantly in three or four months, while the child is still nursing, or there may be complete menorrhagia. It is not to be forgotten, though, that some women menstruate regularly throughout the whole period of lactation. In all cases, after the disease has been well established, there will be a dull dragging pain through the pelvis, much increased by locomotion; pain on defecation or coition; and painful menstruation, commencing several days before the flow appears and lasting during the whole period. There is often noticed pain in the mammæ before and during menstruation; darkening of the areolæ of the breasts, if lactation is not present; nervous disturbances; and rectal and vesical tenesmus. As felt bimanually the uterus, in the earlier stage of subinvolution, is enlarged, but more in its long diameter than in its transverse; is slightly softened, somewhat tender, and probably situated low down in the pelvis. The cervix is more or less enlarged and softer than normal. The os is purplish in color, and firm, unless cervical endometritis is present. In cases of long standing, the uterine tenderness diminishes, the walls become hard, the cervix paler in color, and, as sclerosis supervenes, the body becomes somewhat flattened. It might be mistaken for pregnancy in the early stages, but the early symptoms of that condition are entirely wanting.

Treatment. The sooner treatment is adopted the better, before the stage of induration is accomplished. Cases discovered a few weeks after delivery or abortion should be again put to bed and perfect quietude insisted upon. Any causes which may have been etiological factors such as retroversion or retained secundines, should be removed. Hot vaginal douches three times a day are decidedly beneficial. Internally, fluid extract of ergot given alone, in half dram doses, three times a day, or combined with fluid extract of hydrastis, in ten drop doses, will have a decided effect in promoting involution. Two or three drams of blood may be removed from the cervix by scarification, three times a week, and a tampon saturated with boro-glyceride placed against the cervix and allowed to remain for twelve hours.

In the early stages of menstrual subinvolution, uterine displacement, or other causes which keep up the menstrual congestion, should be corrected. During each menstrual period perfect quiet, with rest in bed, should be enjoined. During the stage of infiltration both forms yield readily to treatment. The appropriate measures to be adopted for such are cleansing the uterine cavity, removing exuberant and diseased tissue, and checking its reproduction by direct applications, aided by enforced depletion and efficient drainage—the methods for which are identical with that already enunciated in conjunction with the treatment of endometritis. The application, twice a week, of fifty to sixty milliamperes of the galvanic current, with the negative pole intra-uterine, will soften the uterus and promote absorption. Pelvic massage will also stimulate the circulation and promote absorption.

Operative interference is often of much advantage for the purpose of removing redundant issue, and to alter the circulation and the nutrition of the uterus. If the cervix is lacerated, trachelorrhaphy should be performed. Where there is decided circumferential enlargement of

the cervix and the canal dilated, a wedge-shaped piece may be cut out of one or both sides, and the surfaces brought together as in trachelorrhaphy. When this enlargement takes the shape of an elongation as well as thickening, amputation should be performed.

Puerperal Atrophy, called also *superinvolution,* is the direct opposite of subinvolution. In this form of atrophy the process of degeneration and absorption after labor passes beyond the physiological and the uterus shrinks below the normal size. In this way it resembles senile atrophy of the menopause. This condition is sometimes only temporary but in the majority of cases is permanent.

CHAPTER XVIII.

DISEASES OF THE UTERUS CONTINUED.

ACQUIRED ATRESIA, STENOSIS, HYPERTROPHY.

Besides the result of a congenital defect, the uterus may become closed later in life, producing a condition known as *acquired atresia.* This condition may be brought about by adhesions forming after child-birth or abortion, or by cauterization with strong caustics or the actual cautery. Sometimes it is simply due to old age, especially when the patient suffers from prolapse. As a result of acquired closure, there may be hematometra or pyometra; the treatment for which consists in overcoming the atresia by puncture, and subsequent evacuation of the contents of the uterus, after the manner previously described.

Stenosis of the cervix is an abnormal narrowing occurring in some part of the cervical canal. It is most common at the external os, where the opening may be found so small as not to admit the finest uterine sound (pin-hole os). Less frequently it is found at the internal os, while sometimes the whole cervical canal is involved in the stenosis. In acquired stenosis the prominent symptom is obstructive dysmenorrhœa, produced by the difficulty which the menstrual flow meets with in passing through the cervix. If not relieved it may give rise to chronic endometritis and chronic metritis.

Treatment. At one time all sorts of metrotomes and scissors, for the purpose of overcoming the obstruction, were in use, but these have now been abandoned as unnecessary. With the patient under an anæsthetic, the cervical canal is entered by means of a fine dilator (Hanks') and the process of dilatation proceeded with. When sufficiently dilated, a glass or hard rubber stem

pessary is inserted into the cervical canal and retained
there for two or three months.

Hypertrophy of the uterus. An increased size of the
uterus is commonly due to subinvolution or chronic
metritis, but it may be also due to simple hypertrophy,
independent of inflammatory action. General hyper-
trophy is a very exceptional condition, the cervix being
the part usually affected.

Hypertrophy of the cervix is divided into intra-vaginal
and supra-vaginal.

Intra-vaginal hypertrophy consists in an increase in
the size of the vaginal portion of the uterus. If congen-
ital, the enlargement takes place chiefly or exclusively
from above downward resulting in an elongated cervix.
If acquired, the cervix is not only elongated, but
thickened, and is frequently thicker near the end than
at the base.

Treatment. Slight degrees of elongation may be suc-
cessfully treated by dilatation, which enlarges the os and
shortens the canal. If it is more extensive, amputation of
the cervix may be called for.

Supra-vaginal hypertrophy consists in the increase,
especially elongation, of that portion of the cervix situ-
ated above the utero-vaginal junction. This condition
is due to prolapse of the vagina, while the body of the
uterus remains in place, the prolapsed vagina pulling
down the cervix and thus elongating it. The symptoms
are those of prolapse of the vagina, with perhaps the
appearance of a hypertrophied cervix at or near the vulva.
The body of the uterus will be in its normal position. A
sound introduced will pass up through the elongated
canal for several inches.

Treatment. In the lesser degrees the uterus may be
pushed up, and the cervix supported by a cup-shaped
pessary attached to an abdominal belt. In more serious
conditions recourse must be had to operation. Simple

amputation of the cervix may be sufficient; if not, recourse may be had to supra-vaginal amputation of the cervix, an operation in reality similar to amputation of the cervix already described, only the incisions are made higher up.

Schroeder's method for supra-vaginal amputation. An incision is made through the mucous membrane at the utero-vaginal junction, and the cervix separated carefully all around, for some distance up. A ligature is passed on each side, around the uterine arteries, to control them, as in the operation for vaginal hysterectomy. The anterior uterine wall is next cut through, and the anterior vaginal mucous membrane stitched to the mucous membrane of the cervical canal. The posterior wall is next severed and the posterior vaginal mucous membrane stitched in a similar way, thus uniting the mucous membrane of the cervical canal all around to the vaginal wall.

Hegar's operation differs from Schroeder's in that the excised piece forms a cone, the length of which may be an inch to an inch and a half above the utero-vaginal junction.

When either of these operations is performed it is with the idea of maintaining the integrity of the corpus uteri. When the elongation is very extensive it is better to do an abdominal hysterectomy, cutting the elongated cervix off sufficiently near the vaginal vault to allow for the stump being sutured to, and permanently held, in the abdominal wound. In all cases anterior colporrhaphy and perineorrhaphy must be performed to assist in supporting the hypertrophied and prolapsed vaginal walls.

CHAPTER XIX.

DISEASES OF THE UTERUS CONTINUED.

DISPLACEMENTS.

Even in perfectly normal conditions the uterus is liable to vary greatly in its relations to the pelvic cavity in which it lies. These relations are modified by its own functional activities, as well as by the distention and evacuation of the adjacent viscera. With this wide range of physiological mobility, it is kept in place by the surrounding connective tissue, by folds of peritoneum as it is reflected over its walls, and by special ligaments, all of which have already been described in an earlier chapter. When it fails to retain its equilibrium, either by excessive movement beyond its normal range, or by losing the power to recover its normal relations, its displacement becomes pathological.

Classification. Five kinds of displacements are recognized:—*Version,* or displacement involving a change in the axis of the uterus. *Flexion,* or deformity involving an increase or alteration in the normal slight anterior curve of the uterine axis. *Prolapse,* or displacement of the uterus in the axis of the pelvic outlet. *Torsion,* or twisting of the uterus on its long axis. *Inversion,* or sinking of the upper part of the uterus into its own cavity, or completely down through its canal, into the vagina.

ANTEVERSION.

The uterus is said to be anteverted when its position is so changed from the normal one that the fundus approaches the symphysis pubis, and the cervix points towards the upper portion of the sacrum. The *cause* of anteversion of the uterus is usually an increased weight of the organ, produced by subinvolution, hypertrophy, fibroid tumors of the anterior wall—conditions generally

accompanied by relaxation of the ligaments and supports, which permit the anteverted uterus to sink down into the cavity of the pelvis.

Symptoms. From pressure of the uterus upon the bladder, there will be frequent desire to urinate. In the erect position, there will be a bearing down sensation, and on attempting to walk, an uncomfortable dragging feeling. By digital examination, the body and fundus of the uterus will be found close to the symphysis pubis, touching it, or even below it, and the cervix pointing towards the middle or upper portion of the sacral excavation.

FIG. 73.—Gehrung's pessary.

Treatment. As in many cases the displacements depend upon subinvolution or hyperplasia, the first attempts at treatment must be for the restoration of the organ to its normal size, after which it will likely return to its normal position without further interference. It would be useless to attempt the introduction of any instrument for the mechanical support of the organ, without such previous treatment, and, as the symptoms are generally relieved after the condition which produced them has been overcome, the large number of pessaries once found in the instrument shops have now disappeared, as being wholly unnecessary in the treatment of this deformity. There is one pessary, Gehrung's, which is still held in favor for anteversion. It is double-horse-shoe shaped, and is inserted by slipping it sideways into the vagina, and then turned so that both bars rest between the symphysis pubis and the anterior aspect of the uterus. Operative measures of various kinds, such as fixation of the cervix to the anterior wall of the vagina,

and shortening of the anterior vaginal wall, have been proposed and carried out, but they have not been received with much favor.

ANTEFLEXION.

Anteflexion is an exaggeration of the normal anterior curve of the uterus. The body of the uterus may be bent down upon the cervix, or the cervix may be bent upwards towards the body.

Causes. Congenital. In early life the normal anteflexion of the uterus is very pronounced. As puberty approaches, the body of the organ develops very decidedly, and tends to become more erect. In some, however, as puberty approaches, such erection of the organ fails to occur, and anteflexion is the result. Failure of the genital organs to develop symmetrically, or as fast as the pelvis develops, favors the formation of anteflexion. The short sacro-uterine ligaments draw the upper portion of the cervix backward, while the short, ill-developed vagina holds the lower end of the cervix forward, as in the normal condition in young children. The cervix is thus bent forward into the vaginal axis and, accordingly, is apt to be elongated, conical, and with stenosis of the os, while the ill-developed fundus is forced over the bladder by downward pressure.

Changes in the uterus. Inflammatory changes in the uterine walls, or their relaxation, or atrophy of the tissues at the internal os, favor exaggerations of the normal anteflexion.

Changes in the ligaments. Shortening of the sacro-uterine ligaments may take place from contraction following parametritis posterior, or from peritoneal inflammation about them. When such occurs the ligaments drag the upper part of the cervix toward the hollow of the sacrum, while the body of the uterus becomes bent in an exaggerated degree by the superincumbent structures.

Significance. In unmarried and sterile women ante-flexion is by far the most common form of displacement. The views held concerning this condition have of late been changed materially, and the exaggerated ideas once held of the clinical importance of anteflexion have been almost entirely abandoned. Recent investigations have shown that, in minor degrees, anteflexions are practically of no importance, neither causing pain nor preventing conception; and when of a more marked character they produce only two possible bad results, namely, dysmenor-rhœa and sterility.

Symptoms. As has been explained, the symptoms are not very marked. Aside from dysmenorrhœa and sterility, an uncomplicated flexion produces no symptoms. Certain complications may, however, be present, which, even in the minor degrees of flexion, may produce symptoms such as chronic catarrh of the uterine mucous membrane and spasmodic contraction of the circular fibres at the internal os. The first may produce congestive dysmenorrhœa; the second the obstructive or neuralgic variety. Digital examination will find the cervix well back in the pelvis, and pointing forward almost in the axis of the vagina. The angle of flexion can easily be felt, the cervix lying under, and the body of the uterus over, the finger. By bimanual and rectal examination, it is possible to determine the condition of the ligaments and the extent of adhesions, if any. The sound often gives material help in determining the exact position of the fundus, and to facilitate its introduction, it may have to be bent pretty sharply towards the point. There is a condition known as anteflexion with retroversion, in which, from child-birth, debility, or other causes, the uterine ligaments have become relaxed, and allow retroversion to take place after flexion has become permanent. In such cases the anteflexed uterus falls into retroversion in Douglas' cul-de-sac.

Treatment. The minor degrees of anteflexion require no treatment. Catarrh of the endometrium, engorgement of the uterus, congestion of the ovaries and tubes, if present, should be treated on accepted principles. Parametritis posterior, and adhesions from recent peritoneal inflammation, are benefitted by vaginal tampons. To overcome the two prominent symptoms, dysmenorrhœa and sterility, stenosis of the os must be overcome, the flexion straightened, and the canal kept open. This can be done by dilatation of the cervix, under an anæsthetic, and if no inflammatory condition exists to contraindicate it, by the subsequent introduction of a glass or metal stem pessary, to be worn for two or three months. It may be held in position for the first few days by a gauze tampon, and subsequently by a Thomas' cup pessary. If, from satisfactory reasons, it is deemed inadvisable to introduce the glass stem, repeated dilatation with Hanks', or other small dilators, may be employed at the home of the patient. In old cases, with well pronounced endometritis, accompanied by rigidity of the uterus and dysmenorrhœa, thorough dilatation of the cervix, curettage and cauterization of the endometrium should be first performed. The use of pessaries of any kind whatever have been abandoned, the best results being obtained from mechanical treatment. Should impregnation occur, a complete cure may with certainty be promised.

Advantage has been taken of the knowledge of this fact by imitating the effects produced upon the uterine walls as the result of abortion. After dilating the cervix thoroughly, and the canal straightened, the uterine cavity, as well as the cervical canal, is thoroughly packed with gauze. Under the stimulus of the gauze uterine contractions are aroused and effects are produced upon the uterus and cervix similar to an abortion.

RETROVERSION AND RETROFLEXION.

The uterus is said to be retroverted when the body of the organ is turned backward. According to the degree to which the tilting is carried, the os points downward, or forward against the symphysis, and the fundus turns upward, or backward towards the sacrum. Retroflexion is that displacement in which the body of the uterus is bent backward, the cervix remaining in its normal position. As in most cases of retroflexion some degree of retroversion is present, the os will change its direction also, and in well marked cases, the fundus will be found lying in the lowest part of Douglas' pouch, and the os looking toward the lower margin of the symphysis.

Causes. When the utero-sacral ligaments are relaxed, the cervix is liable to be carried too far forward, and the fundus is then likely to fall backward. When the round ligaments are relaxed and fail in their functions of keeping the fundus directed forward, retroversion is favored. Along with changes in these ligaments, there is apt to be relaxation of the broad ligaments, and of the structures which enter into the formation of the floor of the pelvis, the result of over-distention, subinvolution, or laceration. If the bladder and rectum are prolapsed to some extent, as they are apt to be under such circumstances, the sub-involuted uterus, having lost much of its support, descends somewhat into the pelvis, and a backward tilting of its body is the inevitable result. Changes in the uterus, causing induration of the uterine tissue, and destruction of its normal flexibility, such as that produced by subinvolution, chronic metritis, and tumors in the walls, render that organ liable to be affected by the influences that press the fundus backward, and it will thus suffer retroversion. It may occur as a result of a strain, or fall, or other jar to the body, especially if the

accident occurred at a time when the fundus was tilted backward by a distended bladder, and, remaining in that position, is pressed into a persistent state of retroversion or retroflexion by the superincumbent pressure. Habitual over-distention of the bladder will keep the fundus directed towards the promotory of the sacrum, and a permanent retroversion will thus be acquir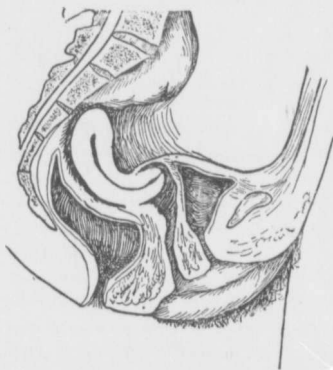ed. A permanent backward displacement is, in some cases, the result of peritonitis leading to adhesions which bind the posterior surfaces of the uterus to the rectum and to the posterior wall of the pelvis. Backward displacements may arise from congenital defects, or from subsequent want of symmetrical development between the pelvis and genital organs. Congenital shortening of the sacro-uterine ligaments, combined with retarded development of the vagina, will draw the cervix forward, and hold the fundus backward.

FIG. 74.—Anteflexion with retroposition.

Symptoms. Of all the displacements, retroversion and retroflexion are the most common. When the displacement has persisted for some time, the patient will complain of a bearing down or sinking sensation in the pelvis when standing or walking, and pain in the lower part of the sacrum and coccyx, perhaps extending down the back of the thighs along the course of the sciatic nerves. Sterility, leucorrhœa and profuse menstruation

are often prominent symptoms. If the ovaries are pro-
lapsed, the pain will be more acute. The function of the
rectum may be disturbed, preventing an easy escape of
its contents, or causing frequent desire for defecation,
accompanied by mucous dejections. Reflex symptoms
are often present, characterized by hemicrania, frontal
and occipital headache, intercostal neuralgia, gastralgia,
nausea and vomiting, or there may be a general depressed
nervous condition. The examining finger will find the
body of the uterus horizontal, or tipped backward, more
or less, into the hollow of the sacrum, with the cervix
pointing upward, toward the anterior wall of the vagina,
in retroversion; or in the axis of the vagina, with an
angle at the junction of the cervix and body, in retro-
flexion.

Bimanual palpation will show the body absent from
its natural position, and the use of the probe will indicate
the direction of the uterine canal. If the ovaries and
tubes are prolapsed, they will be found lying on either
side or immediately behind the body of the uterus.

Treatment. The treatment consists in the restoration
of the displaced organ to its normal position, and its
retention there. Elevation of the retro-displaced uterus
may be accomplished by the fingers, posture, and instru-
ments. The usual method is to put the patient in Sims'
position, insert the index and middle fingers of the right
hand into the vagina, and press the body upward, after
which the index finger is passed in front of the cervix and
pushes that part backwards, while the middle finger
remains in the posterior pouch. If this method fails,
particularly when the case is one of impaction, the patient
may be put in the genu-pectoral position, and, after
admitting air into the vagina by means of a Sims'
speculum, efforts are made, by the aid of a depressor or
cotton on a holder introduced into the rectum, to dis-
lodge the fundus from the sacral excavation. If these

manual and postural methods fail, the reposition may be attempted, with the patient in the dorsal or Sims' position, by means of a large blunt sound or Sims' or Emmet's repositor. The uterus having been replaced, it should at once be retained in its normal position by a properly fitting support, or, if considered inadvisable to use such, by tampons, or gauze packing inserted behind the uterus. It may not be possible to completely restore the uterus at the first attempt, in which case the attempts are to be repeated at suitable intervals, the advantage gained at each attempt being kept up by the insertion of tampons.

Fig. 75.—Hodge pessary.

Pessaries. There is much diversity of opinion on the use of pessaries generally, but, notwithstanding the progress made in treatment of displacements through surgical aid, pessaries seem to be, to some extent, a necessary evil. As has already been stated, in anterior displacements pessaries are but little used; and in prolapse, especially when there is descent of

Fig. 76.—Albert Smith Pessary.   Fig. 77.—Thomas' retroflexion pessary.

the vaginal walls, it has been shown, when speaking of rectocele and cystocele, that they cannot be well retained, and hence are of little or no benefit. In retroflexion they are still found to be of much use, but to obtain beneficial results, two indispensable conditions must be observed:— First, that the uterus should be returned to its normal position; second, that the pessary should be properly fitted, and should, without injury or discomfort to the wearer, retain the uterus in its normal position.

Varieties. The cardinal principle upon which most pessaries for retro-displacements are constructed is that of leverage, first introduced by Dr. Hodge. It acts on the principle of the pushing down of a short anterior lever, and the consequent tilting upward of a long posterior lever, and all pessaries for retro-displacements, with few exceptions, are based on this idea. The instrument devised by Hodge is of equal width at both extremities, and with two curves. Albert Smith modified this form by narrowing and pointing the lower extremity, in order to enable it to rest upon the symphysis—an innovation which has proved a permanent one—and nearly all pessaries are constructed after that plan. According to the length and width of the vagina, the depth and width of the posterior vaginal pouch, the firmness or relaxation of the posterior vaginal wall and perineum, the pessary will have to be broader, longer, or more or less curved. If there is retroflexion, with considerable relaxation of the posterior vaginal wall and uterine ligaments, a pessary with a sharp posterior curve will usually be required. For this form of displacement Dr. Thomas has added a bulbous enlargement on the posterior crossbar, whereby the body of the uterus is prevented from tipping and bending backwards.

Contra-indications. An immovable, non-replaceable uterus is always an absolute contra-indication to the use of a pessary, whether the cause be recent or remote. Also the presence of fibroid or ovarian tumors, pelvic inflammatory diseases and relaxed vaginal outlet.

Insertion. The patient being placed on the back— some prefer Sims' position—a suitable pessary is selected, and smeared with some unguent. The anterior cross-bar is taken between the index finger and thumb of the right hand, and the pessary held vertically, while the index finger of the left hand is made to draw back the perineum. The pessary is now passed between the labia, through

the introitus vaginæ, and, as it is about to impinge upon
the cervix, the index finger retaining the perineum is
passed inward, and catching the posterior bar, draws it
downward and backward under the os. The right hand
continues to push the pessary onward, and at the same
time rotates it from the vertical to the horizontal posi-
tion. The anterior bar must then be depressed down-
ward and backward to settle the pessary in its place, and
while so doing the left finger should make sure that the
cervix is in its proper place.

A pessary properly fitted should produce neither pain
nor discomfort, but sometimes, after it has been worn for
a few months, abrasions are formed by pressure, and they
may even become imbedded in the vaginal wall. In this
way urinary and rectal fistulæ have been formed. After
introduction, it is well to allow the patient to walk about,
to make certain that it gives no discomfort, after which
she should be re-examined to ascertain that the pessary
remains in position. The patient should be advised to
take a tepid vaginal douche every day and to return from
time to time for examination.

When the fundus and body of the uterus are adherent
from inflammatory adhesions, or cicatricial contractions,
attempts to replace the organ will usually fail, and an
effort must then be made to soften and gradually detach
or stretch them. This may be done by careful bimanual
and rectal manipulation, by uterine massage, and by
vaginal packing with tampons or gauze, with the patient
in the genu-pectoral position. It is not to be forgotten,
however, that such manipulation may open up a purulent
accumulation, break open a pyo-salpinx, a pus tube, or
light up afresh some latent infection which has never
been suspected in the case.

Operative treatment. When a pessary fails to cure
the displacement, or when the uterus cannot be held in
place, an operation may be performed to accomplish this

purpose. The operative measures are : (1) External and internal shortening of the round ligaments. (2) Ventro-suspension.

Extra-peritoneal shortening of the round ligaments. *Alexander's operation.* This consists in making an incision over the external inguinal ring on each side, dissecting out, picking up, and drawing out the round ligaments, until the fundus points towards the anterior abdominal wall. The ligaments are then made fast in the wound by buried sutures, which pass through the pillars of the ring and the ligament, after which the redundant part is cut off, and the external wound closed. Various modifications of this operation have been devised but the principle of the operation remains the same.

(1) An incision is made parallel to Poupart's ligament down to the aponeurosis of the external oblique muscle. The external ring is thoroughly defined, after which an incision about one third of an inch long is made through the aponeurosis, just below the internal ring. A blunt hook is passed through the opening, the ligament caught up and its double fold drawn out through the aperture to nearly its full extent, or to a point at which it is felt that the cornu of the uterus has been reached. After sliding back its fold of peritoneum it is prevented from returning by passing a ligature loosely through the loop formed in the ligament. The ligament of the opposite side is next found and exposed in the same manner. The loop formed by the double fold of the ligament is transfixed and tied with a catgut ligature and the ends threaded into a blunt needle. The needle is made to enter the upper opening in the inguinal canal, traverse the canal and emerge through the external inguinal ring, bringing with it the ligature and the double fold of round ligament. The original opening through which the ligament was first drawn out of the canal is closed, and the loop folded down on the aponeurosis in

a direction corresponding with that of the inguinal canal, the loop-end looking towards the anterior superior spinous process. The loose ends of the ligature are now utilized in suturing the ligament in its new position after which the wound is closed.

(2) An incision about an inch and one-half long is made over the internal inguinal ring down to the aponeurosis of the external oblique. A puncture is made as
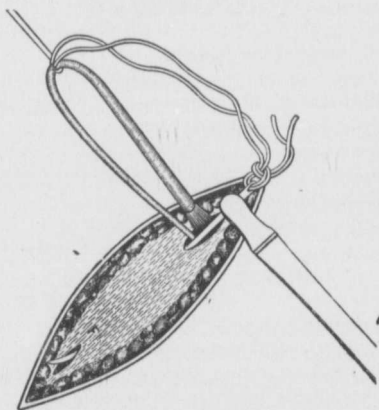
Fig. 79.—Modification of Alexander's operation for extra-peritoneal shortening of the round ligaments. (Ashton's Gynæcology).

before, this time as near as possible over the internal ring. The ligament is caught up with a hook, the double ligament drawn out and a silk ligature passed through the loop. The loop of the ligament is held taut while a silk worm suture is passed from the skin surface on one side, through the base of the ligament and on to the skin surface on the other side. An aneurism needle is passed from without inward through the aponeurosis of the external oblique

muscle, entering about one and a half inches external to the opening through which the loop has been drawn and emerging within half an inch of the same on the same side. After threading the ligature passed through the loop of the round ligament the aneurism needle is withdrawn, bringing with it the ligature and double fold of the ligament. In this way the ligament is woven into the aponeurosis. The silk worm ligature is next tied, the ligament ligated in its new position, and the wound closed.

Intra-peritoneal shortening of the round ligaments. *Wylie's method.* After opening up the abdominal cavity, the round ligaments are brought into view and denuded on their inner surfaces. Each round ligament is then doubled on itself, and the loop retained in position by the introduction of ligatures, after which the abdominal wound is closed. There are various other methods for intra-peritoneal shortening of the round ligaments but they are all too recent for a final estimate.

Webster picks up a loop of round ligament on each side and carries them through the broad ligament, beneath the Fallopian tubes, securing them to the posterior surface of the uterus and to each other. Baldy cuts off the round ligaments and carries the free ends through the broad ligaments, fastening them after the manner of Webster. Gilliam devised a procedure which consists of picking up the ligament near its uterine end and carrying a loop of it through a stab wound in the lower part of the rectus muscle on either side and there securing them.

An operation for the shortening of the utero-sacral ligaments has also been devised, the object being to draw the uterine attachment of that ligament in close contact with the sacrum, thus throwing the retro-displaced uterus into anteversion.

Vaginal fixation. Vaginal hysteropexy. With the patient in the dorsal position, and an Edebohl's speculum inserted, a median incision is made in the anterior vaginal wall, from the neck of the bladder to the cervix, after which the bladder is carefully separated from the uterus and vagina as far as the peritoneal reflection. The anterior surface of the replaced uterus is drawn freely forward by means of bullet forceps, and stitched to the incision in the anterior vaginal wall. This operation has now been practically abandoned.

Intra-abdominal hysteropexy. (1) *Ventral fixation*— This operation consists of opening the abdomen and making a firm attachment of the fundus of the uterus to the peritoneum, or, if the peritoneum be pushed aside, directly to the fascia of the linea alba. When scarification of the fundus is made the attachments become more firm. From carefully prepared statistics, it has been shown that women subjected to this operation are less apt than others to become pregnant. Inertia uteri and serious or insuperable objections to labor may be produced if the fundus and anterior wall of the uterus are imprisoned below the point of attachment between the uterus and abdominal wall. Owing to these difficulties the operation is only applicable for those who have passed the menopause, or in whom the menopause has been established by the removal of the ovaries.

After the abdomen has been opened and adhesions, if any, broken up, the fundus of the uterus is brought up as close to the symphysis as will not interfere with the functions of the bladder. A silk worm suture is passed through all the tissues of the wound on one side, then through the uterus about half an inch below the summit of the fundus, including sufficient uterine tissue in breadth and depth to secure a good hold, and then up through the tissues on the opposite side. A second suture is passed in a similar manner a little higher up.

The ligatures are then drawn up so as to bring the fundus in firm apposition with the abdominal wall and tied, after which the abdominal wound is closed.

Ventral suspension, as the term implies, consists of merely suspending the uterus to the abdominal wall by a band of new formed tissue, the so-called *central ligament.* This admits of free mobility of the uterus within limits corresponding to the length of the band. In this operation while the retaining sutures pass through the uterus in the same way they include the parietal peritoneum only. A curved needle armed with moderately fine silk is passed through the parietal peritoneum, entering half an inch from the edge of the wound and emerging half an inch further outward, and, after passing through the uterus, is made to pass, but in the opposite direction, through the peritoneum of the other side. The ligatures are then drawn up, tied and cut short, after which the wound is closed.

Latero-versions and latero-flexions are either congenital or acquired. In either case they occur through shortening of the broad ligament on the side towards which the body tips. The only real importance of these displacements, particularly flexions, is the production of sterility. The diagnosis can be readily made by bimanual examination and by the sound. No treatment, unless that of persistent tamponading of the vagina to stretch the contracted ligament, offers any reasonable chance for success.

PROLAPSUS.

Prolapsus is a displacement of the uterus in the axis of the pelvic outlet. Three degrees have been described. In the first degree there is simple descent in the axis of the pelvic outlet, the cervix touches the floor of the pelvis, the fundus is proportionately below its normal level, and the uterine axis slightly inclined backwards. Neither the

bladder, rectum, nor the vagina is necessarily involved. In the second degree, the external os approaches the vaginal orifice, the body of the uterus is retroverted and lies in the sacral excavation, and usually the anterior vaginal wall, together with the posterior wall of the bladder, accompanies, if it does not precede the prolapse. In the third degree, the cervix protrudes from the vulva more or less (*procidentia*), even to the extent of the entire extrusion of the uterus. The anterior vaginal wall and posterior wall of the bladder, down to the meatus urin-
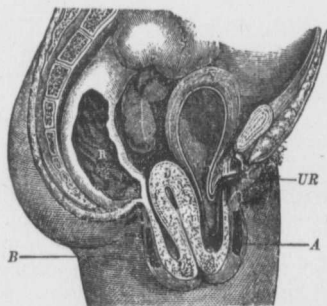
FIG. 80.—Procidentia uteri.

arius, protrude from the pelvic cavity, and in a very large proportion of cases the posterior vaginal wall and the anterior wall of the rectum are prolapsed to the same extent.

Causes. Of the indirect causes, laceration, overdistention, or subinvolution of the perineum after parturition is the prime element in the weakening of the pelvic floor that eventuates in displacements of the pelvic contents. Varying conditions of the vaginal wall arising from over distention or lack of tonicity, and relaxation of the ligaments persisting for some time after parturition, increase as well as facilitate the tendency to descent.

Absorption of adipose tissue, such as that which occurs in those suffering from wasting disease, also lessens the natural support and renders its descent more easy. Among the conditions which operate more directly may be mentioned enlargement of the uterus. If, after parturition involution is not complete, or if the organ is hypertrophied as a result of chronic metritis, or enlarged from development of neoplasms in its walls, the increase in its weight, favored by some of the indirect causes mentioned, is almost certain to end in prolapse. One of the most common causes is frequent parturition. A large majority of cases of prolapse occur in women who, after one or more severe child-births, are unable to remain at rest for a sufficient length of time to allow the pelvic organs to regain their normal tone.

Complications. In extreme cases, not only has the uterus descended, but the bladder and rectum will be found displaced, and the ovaries will have descended into the pelvic cavity to the depth of Douglas' pouch. In its descent a chronic metritis may take place, by which the walls are thickened and indurated, and the endometrium expanded and vascular. One of the most common complications is laceration and eversion of the lips of the cervix, and often accompanied by a lacerated perineum. Hypertrophy of the cervix is also a common occurrence, in consequence of the irritation produced by the laceration. When prolapse is complete the vaginal walls become smooth, dry, and are deprived of their rugosities, and in cases of long standing the epithelium in places takes on the appearance of the epidermis. Imperfect evacuation of the distended bladder leads eventually to cystitis, and the rectum may be the seat of irritation and of undue accumulation of fecal matter.

Symptoms. In cases which develop gradually there may be no decided symptoms at first, but soon backache and a bearing down, dragging sensation about the vulva, with a disagreeable feeling of weakness or want of sup-

port, is noticeable. Difficult urination and defecation, and even the symptoms of cystitis, are often prominent. The diagnosis of prolapse of the uterus is exceedingly easy. The examining finger will readily determine that the cervix is lower in the pelvic cavity than it should be, or that it is protruding through the vulva. Bimanual examination will indicate that the fundus is absent from its normal position, and either retroverted, or low down, at or near the pelvic outlet. Accompanying prolapse in the second degree will be found cystocele, and in the third degree both cystocele and rectocele.

Treatment. The treatment of prolapse is either palliative or radical. Minor degrees of recent origin may be treated by astringent injections and by tampons inserted into the vagina in the genu-pectoral position, and later by the insertion of a retroversion pessary. In the more advanced degrees of prolapse, mechanical and palliative means will be found of doubtful benefit, but treatment by means of them may be made when operations are inadmissable. A large soft rubber ring, or pessaries inflated with air, or made of elastic wire, will sometimes retain the uterus in the pelvis by distending the upper part of the vagina. In most cases of complete prolapse, it is necessary to use a supporter composed of a cup and stem pressing against the vaginal portion of the uterus and fastened below to an abdominal belt. The wearing of it is, however often very annoying and frequently causes excoriations and ulcerations.

Operative treatment. This consists in applying methods for the diminution of the size of the uterus, for restoring the tone of the uterine ligaments, and for the repair of the uterine supports. These may be accomplished by amputation of the cervix if it is much hypertrophied; by repair of a laceration in it; by thorough curettage and by the restoration of a weakened or lacerated pelvic floor, all of which can be completed at

one sitting, after which the ligaments will probably regain their tonicity.

Should these be considered insufficient and the prolapse not complete operation on the ligaments, or ventro-suspension, may accomplish all that is required. In patients beyond the menopause, or in those in whom the condition is due to atropic changes, a permanent cure rests only in complete hysterectomy, vaginal or abdominal, narrowing of the vaginal canal and the construction of a strong perineal support. At times even this is insufficient, particularly when there is great hypertrophy and prolapse of the vaginal walls involving the bladder and rectum. In these exaggerated cases it is better to do supra-vaginal hysterectomy, leaving the stump stitched in between the layers of the abdominal wound.

INVERSION OF THE UTERUS.

By inversion is meant a more or less complete turning inside out of the body of the uterus. There may be simply a folding in of the fundus, or a projection of the fundus through the dilated cervix, or a complete inversion of both uterus and cervix.

Inversion comes under observation at three different periods: Immediately after the occurrence of the accident, or that form appearing during or immediately after child-birth; second, about six weeks after labor; and third, that which occurs after a lengthened period, often many years. Leaving out the first form, which belongs more to the subject of obstetrics, two classifications may be made:—*Inversion during involution* and *inversion after involution.*

The predisposing causes are, an enlarged uterus and a relaxation or an inability on the part of some portion of the uterine wall to contract, such as exists at the placental site after labor, or at the place of origin of a sessile intra-uterine fibro-myoma. When such conditions exist, un-

usual uterine contraction may take place, by which the weakened area is depressed and inverted, and the first stage of inversion is initiated. Subsequently a species of peristaltic movement, proceeding from above downwards, is set up in the uterine muscular coats, until inversion becomes more or less complete.

Symptoms. The chief symptom for which a patient presents herself, is repeated hemorrhage, which may already have undermined the constitution by its frequent recurrence or profuseness. To this symptom are added leucorrhœa, dragging pains, and difficulty in walking. Physical examination will reveal the peculiar condition present. When involution has not taken place, or is not complete, the peritoneal cup formed by the depressed fundus contains all, or a large portion of the uterine appendages, and may also contain loops of intestine. The inverted uterine body projects into the vagina as a large soft, more or less spongy mass upon which can be discovered small depressions corresponding to the origin of the Fallopian tubes, and from the surface of which blood seems to slowly ooze. Inversion after involution has neither intestine nor uterine appendages in the cup, except the ends of the Fallopian tubes and the ovarian ligaments. The inverted body is firm, pear-shaped, and hangs out of the cervix like a fibroid polypus. The mucous membrane resembles granulation tissue, and from it hemorrhage takes place, but not to such an extent as in the previous form.

FIG. 81—Incomplete inversion of uterus.

FIG. 82—Complete inversion of uterus.

FIG. 83.—Polypus simulating complete inversion of uterus.

Diagnosis. Prolapse of the uterus and hypertrophy of the cervix might be mistaken for inversion. In the former the os is found in its normal place, through which the sound readily enters, and the tumor is broader above than below, the reverse being the case when inversion is present. A fibroid polypus with a large pedicle might cause an error in diagnosis. In inversion the uterus is darker and softer than a fibroid, and the sound introduced between the body and cervix discovers no opening into the uterine cavity. A fibroid can be slightly twisted on its long axis without twisting the cervix; in the case of inversion this cannot be done. With a fibroid, bimanual and rectal examination reveals the fundus of the uterus at, or near its proper place. In inversion there is an absence of the fundus, and a cup-shaped depression occupies its place.

FIG. 84—Fibrous polypus.

Treatment. Inversion should, if possible, be reduced as soon as recognized. The methods for reduction are *manual, instrumental,* and *operative.*

Manual. The fingers of one hand, formed so as to make a cone, are inserted into the vagina and the tip of the cone pressed against the summit of the inverted uterus, or alternately against one uterine cornu and then the other, while the other hand exerts counter-pressure, or with the fingers attempts to dilate the ring through the abdominal wall.

Emmet describes a method of reduction in the following way:—The hand is passed into the vagina, and, with the fingers and thumb encircling the portion of the body close to the seat of inversion, the fundus is allowed to rest in the palm of the hand. This portion of the body is firmly grasped, pushed upward, and the fingers immediately separated to their utmost; at the same time the

other hand is employed over the abdomen in the attempt
to roll out the parts forming the ring, by sliding the
abdominal parietes over its edge. This manœuvre is
repeated and continued. At length, as the diameter of
the uterine cervix and os is increased by lateral dilatation
with the outspread fingers, the long diameter of the body
of the uterus becomes shortened and the degree of inver-
sion proportionately lessened. After the body has
advanced well within the cervix, steady upward pressure
upon the fundus is applied by the tips of all the fingers
brought together.

Instrumental. Ingenious minds have devised instru-
ments by which a steady pressure can be effected upon
the inverted fundus, while counter-pressure is exercised
upon the cervical ring. By the use of such instruments
reposition of the organ has been effected in less than
twenty-four hours. A more simple method consists in
packing the vagina with gauze in such a manner that the
fundus will be pressed upward, in the direction of the
axis of the superior strait, while the dilated wall of the
vagina makes traction upon the cervix.

Operative. The only operative measure for the re-
duction of the inverted uterus is that proposed and
carried out first by Dr. Thomas. It consists in opening
the abdominal cavity, stretching the ring with a kind of
glove stretcher, while the hand introduced into the vagina
forces the fundus through the ring, and up into its normal
place. Should efforts by this method fail, resort may be
had at once to hysterectomy to relieve the distressing as
well as dangerous condition. Amputation of the inverted
uterus, preferably by the elastic ligature, is also recom-
mended when other less radical methods have failed. If
all efforts of taxis, elastic pressure and the like have
failed removal of the uterus is the final resource.

CHAPTER XX.

DISEASES OF THE UTERUS CONTINUED.

BENIGN NEOPLASMS.

Cysts in the cervical canal are of common occurrence and are erroneously called ovules of Naboth. Like other cysts lined with epithelium, they originate from glandular formation, and are thus a species of adenoma. The contents are liquid, semi-liquid, or form a jelly-like mass. The treatment consists in opening them, and touching the interior with tincture of iodine.

Myxoma. Glandular polypus. All so called polypoid tumors of a jelly-like consistency, and half translucent to the naked eye, appear under the microscope to be made up mainly of myxomatous tissue. They are found most frequently in the cervix, and are usually sessile at first, but have a tendency to become pedunculated and protrude through the os as bluish or purplish red lobules. The symptoms which usually attract attention are leucorrhœa and hemorrhage, and, on examination, a small tumor will, perhaps, be seen protruding through the os. The treatment consists in removal with the curette if intra-uterine, and by torsion if cervical.

FIBROMATA.

To those tumors of the uterus which have the same structure as the uterus itself, the names of *fibroma, myoma, fibrous tumor* and *fibroids* have been given, and from the fact that they are generally of the mixed variety, composed of muscle fibres and fibrous connective tissue, the corresponding terms *myo-fibroma* or *fibro-myoma* have been applied. They are usually benign, that is to say, incapable of becoming general and infecting the organism, but they are not so harmless as the older authors

considered them to be. The knowledge of the *origin* of
these tumors is still very imperfect. Notwithstanding
that they are composed of the same histologic elements
as the walls of the uterus—connective tissue and un-
striped muscle fibre—they are independent growths,
neither being derived from, nor having any physiological
connection with, normal uterine structure. Klebs asserts
that they have their origin
in a proliferation of the
connective tissue and
muscular layers of certain
vessels. Another author-
ity asserts that they are
due to a round cell found
along the capillaries,
which by growth obliter-
ates them; the cells then
become fusiform and pro-
duce nodules.

FIG. 85—Interstitial   FIG. 86—Subserous
fibroids.   and submucous
                         fibroid.

The tumor may consist of one mass, or of several
distinct masses, developed side by side, and enclosed in a
single capsule, or many tumors with individual capsules
may be scattered throughout the uterine walls. They
vary in size from a tumor the size of a pea to a growth of
immense proportions. The majority have their origin in
the body of the uterus and most often are situated in the
posterior wall; least frequently they spring from the
cervix. They are classified according to the relation
which the tumor bears to the uterine tissues.

The *interstitial* develop within the uterine walls, and
are surrounded on all sides by uterine muscular tissue.
It is probable that most, if not all fibroids, are originally
interstitial.

The *sub-mucous* develop immediately or just below the
mucous membrane, and project into the uterine cavity
without becoming pendulous (*sessile*).

The *polypoid* have their origin under the mucous membrane, on the surface of the muscular wall, from which they project more and more, as they grow, until they become pendulous.

The *sub-peritoneal* or *sub-serous* develops upon, or near the external surface, under the peritoneum, and either project upon the surface, or become pedunculated.

The *intra-ligamentous,* an important sub-variety, grows
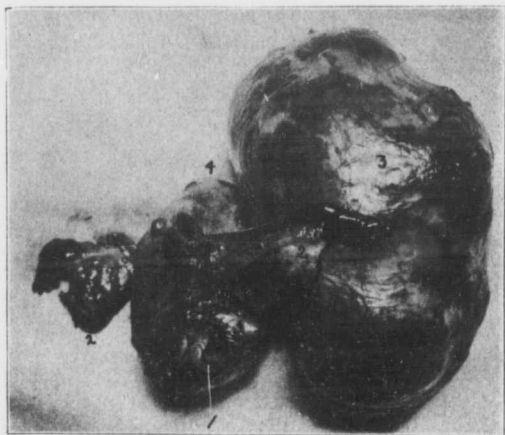
Fig. 87.—Large pedunculated fibroid of uterus. 1, cervical canal; 2, 2, ovaries; 3, fibroid; 4, fundus of uterus. (From the pathological laboratory, Queen's University).

from the side of the uterus, or from the supra-vaginal cervix, pushing apart the peritoneal folds of the broad ligament. The tumor is thus outside of the peritoneum. It may grow so large as to fill the whole pelvis, with a dense unyielding mass, pushing the uterus to the opposite pelvic wall, destroying all anatomical relations and compressing important anatomical structures and organs. Sometimes they enlarge in a upward direction carrying

with them overlying pelvic structures such as the ureters. Sometimes these tumors grow from the pos-
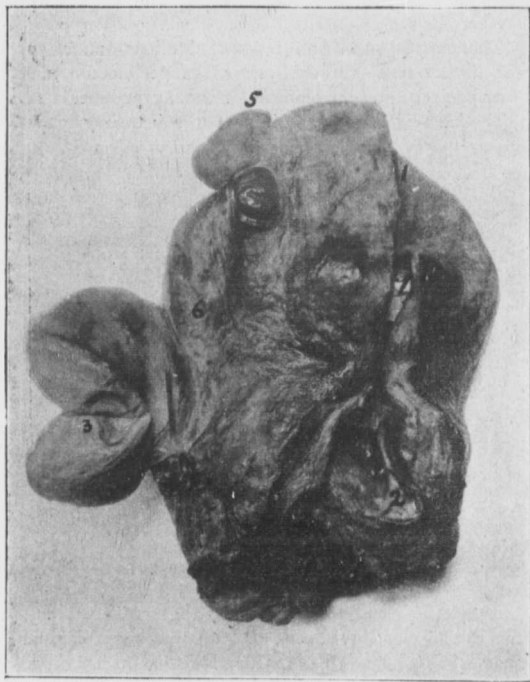
Fig. 88.—Fibro-cystic tumor of uterus. 1, Incision in the wall of large cyst. 1, 2, Interior of cyst. 3, Small cyst. 4, Uterine cavity. 5, Multiple fibro-myoma. 6, Fundus of uterus. (From the pathological laboratory, Queen's University).

terior aspect of the supra-vaginal cervix, passing beneath Douglas' pouch, and pushing the peritoneum above

it becomes a retro-peritoneal tumor. Sometimes they grow from the anterior aspect of the cervix, pushing up the vesico-uterine fold of peritoneum, and with it the bladder, so that this viscus is sometimes found spread out on the anterior face of the tumor as high as the umbilicus.

Structure. To the naked eye these tumors are composed of dense tissue, shiny, or rosy white, elastic, giving a very clean surface on section, and, when examined under the miscroscope, exhibit varying proportions of connective tissue and muscle fibre irregularly interwoven. Their vascular supply is relatively scant, but they are apt to be surrounded by vascular and hypertrophic uterine walls. In tumors of considerable size, . large arteries are sometimes found under the peritoneum, or in the capsule, and when such a condition exists the peripheral veins are sometimes the size of the jugular, and adherent on all sides to the muscular bundles which hold them wide open. When this arrangement is well marked and the tumor hollowed out by vascular lacunæ due to dilatation of the capillaries, there exists what Virchow calls *"telangiectatic myoma,"* or "myoma cavernosum," the portion degenerated resembling a sponge soaked in blood. Polypoid tumors sometimes contain large blood vessels, but when removed the contractility of the walls usually brings about rapid hæmostasis.

Alteration and degeneration. At the menopause most of the fibromata undergo a *progressive induration* and *diminution in volume,* and in such a state often persist without causing any morbid reaction. Very rarely they undergo *calcification* by a deposition of carbonate of lime. During sexual activity they may undergo changes dependent upon physiological processes. During *pregnancy* a marked increase in size is sometimes noticed, due principally to changes in the circulation causing œdema of the growth. *Œdema* occurring in tumors existing in a non-pregnant uterus is frequently the forerunner of gangrene.

Fatty degeneration is very rare, and where *suppuration* exists, it is for the most part the outcome of gangrene, or from infection from the intestine or other channel.

Cystic degeneration is a peculiar process of liquefaction characterized by a primary serous infiltration and associated with myxomatous softening of the growth, accompanied by an œdematous swelling of the connective tissue, followed by more or less disintegration. When advanced, these changes result in the formation of spaces filled with fluid, the walls of which are formed by the non-disintegrated portion of the tumor. At first the muscular bundles prevent the formation of large cavities, and give to the cyst wall a peculiar uneven appearance, like the columnæ of the heart. Subsequently, however, these also become disintegrated and large spaces are formed.

The contained fluid varies in color, from a pale amber to a dark brown, the changes in color being due to extravasation of blood. The fluid, as a usual thing, coagulates spontaneously, and chemical and microscopical examinations show it to contain serum-albumen and fibrin, with more or less mucin, blood, and detritus from degenerated tissue.

Sarcoma may develop in a fibroid and it is thought by some authorities that the sarcoma of the uterine parenchyma always originates from degeneration of the benign fibroid.

Cancer may also develop in the endometrium.

Symptoms. Small subserous tumors sometimes exist without causing any symptoms. *Hemorrhage,* either menorrhagia or metrorrhagia, is common to nearly all the fibromata. In the polypoid and submucous varieties it is the most noticeable symptom. In the interstitial variety it is less frequent, while in the exclusively subserous it is very often absent. More or less profuse *leucorrhœa,* and intermittent *watery discharges* are also present in the

majority of patients. A symptom of equal importance is *pain*, at times of an intermittent character, and most intense during menstruation. It may arise from painful uterine contractions due to the presence of polypoid tumors, or to retention of secretions; from pressure of a polypoid or submucous growth at or near the internal os; or it may be due to pressure upon the surrounding pelvic tissues, or upon the bladder, rectum, or sciatic or gluteal nerves. Pressure on the rectum may cause obstinate *constipation;* pressure upon the bladder, *vesical disturbances;* and on the ureters, retention of urine in the pelvis of the kidneys, with subsequent renal changes. Pregnancy is not infrequent, and should it occur the tumors are apt to grow more rapidly, but after parturition they may completely disappear.

Course. Fibromata in most cases run a benign course. They grow slowly and seldom cause death directly. As has been already stated, they often undergo progressive induration and diminution after the menopause. If polypoid they may be expelled by the vagina. Multiple, interstitial, or submucous tumors may attain a great size, but when a large number start simultaneously, intermediate pressure tends to cut off the blood supply and arrest growth. Submucous and interstitial tumors may become gangrenous, followed by suppuration, and when such a course is pursued death may follow from peritonitis, septicæmia, or pyæmia. Sub-peritoneal polypoid fibroids are apt to become more and more pedunculated, predisposing, from torsion of the pedicle, to strangulation, or complete separation, or, by becoming entangled with the bowel, producing intestinal obstruction.

Diagnosis. If the tumor is large enough to be palpated through the abdominal wall the hard consistency and probable irregular outline may be detected. By bimanual examination the general enlargement and irregu-

larity will be more fully made out. The tumors are found to be continuous with the uterus and movable with it. The sound, in a large majority of cases, shows an increased length and irregularity of the uterine canal.

Tumors which cause symmetrical enlargement of the uterus, without any irregularity of surface, may be mistaken for *pregnancy*, retained *menses* (hæmatometra), *malignant disease*, or *subinvolution*. A fibroid uterus is harder to the feel than in *pregnancy*, and the os, although sometimes slightly dilated, is not softened or deepened in color, and there is absence of the familiar signs of pregnancy. A large polypoid growth often dilates the cervix, and may be felt presenting at the os. In *hæmatometra* the retained discharges give the uterine walls a tense elastic or fluctuating feel, and, on examination, the internal or external os will be found impermeable, and perhaps the menses will have never appeared. In *malignant disease*, the age of the patient will assist in making the diagnosis. The peculiar offensive discharge is characteristic, and if in doubt curetting and examination with the microscope will make the condition clear.

Subinvolution generally produces cervical, as well as corporeal enlargement, the body is flatter, the antero-posterior diameter being not so much increased as when fibroids are present. Interstitial multiple tumors cause the uterus to enlarge more or less irregulárly, and make the canal to become so tortuous that a probe can with difficulty be passed, or even not at all. When the tumors are near the outer surfáce, the probe may enter readily the full length of the canal, but bimanual examination will disclose the hardened projections on the outer surface of the uterus.

Retro-uterine hæmatocele and hæmatoma may be differentiated by bimanual examination and by the use of the sound. In such cases the uterus will likely be found in front of, or at one side of the tumor, or it may be

pushed up behind the pubes, where it can be moved independently of the mass.

A small subserous tumor, if pedunculated, may be mistaken for a *diseased ovary.* The former is usually firmer to the touch than is the ovary, has a smoother surface, and is not sensitive on bimanual pressure, and the pedicle may be palpated.

A tumor partially extruded from the os may be mistaken for *cancer,* especially when the former is gangrenous. In both cases there is profuse vaginal discharge, but with care the cervix may be shown to surround the protruding mass. *Fibro-myomata* of the pelvic variety may resemble pelvic exudations, but if the tumors are not adherent they can be displaced by the examining fingers, they do not encroach so closely upon the pelvic wall, and are generally harder to the touch. *Intra-ligamentous fibroids* are distinguished by their close connection with the uterus, and their unyielding feel to the touch. *Cervical fibroids* are usually easily recognized by the protuberance in the lip affected, and the flattened appearance of the opposite lip.

Treatment. The great majority of fibroid tumors of the uterus demand immediate removal. A few years ago, owing to the high mortality, the treatment usually advised was palliative and expectant and operation recommended only when great danger was imminent, or serious complications threatened the life of the individual. There are some cases, however, in which immediate operation at least is not absolutely necessary. In a young woman with a small fibroid, and particularly if she is anxious to have children, operation may be deferred and the case watched. If the woman is reaching the menopause, or menstruation has ceased, and no serious symptoms likely to arise from its size, position, or otherwise, interference here, too, may be deferred. If the growth is situated in the lower segment of the uterus,

such as the intraligamentous or retroperitoneal, or in the vesico-uterine space, even if small in size, they should always be removed as they will sooner or later produce serious pressure upon the surrounding parts, and if the woman become pregnant it is likely to act as a barrier to delivery.

The treatment is divided into:—1. Symptomatic; 2. Tentative; 3. Radical.

Symptomatic. For the control of *hæmorrhage* rest in bed while the hæmorrhage continues, and the use of hot vaginal injections of normal salt solution will aid materially. In more difficult cases resource may be had to the vaginal and cervical tampon. Intra-uterine tamponade medicated with astringents, or otherwise, may be necessary. When the hæmorrhage does not yield to ordinary treatment curettement of the uterine cavity may be resorted to.

Under the heading of *drugs* for internal administration may be mentioned ergot, hydrastis, gallic acid, calcium chloride, sulphate of zinc and aromatic sulphuric acid.

For *pain* the hot vaginal douche two or three times a day, and the introduction for twelve hours of a cotton wool tampon, saturated with a 10 per cent solution of ichthyol three or four times a week, will give relief.

Pressure symptoms can often be relieved by dislodging the tumor by upward pressure through the vagina, with the patient in the genu-pectoral position.

(2) *Tentative.* The hypodermatic use of *ergot* has, in some cases, caused a cessation of growth in interstitial tumors, and even their extrusion, and is therefore applicable for the treatment of such growths, as well as the submucous variety. The effect of ergot is to cause compression of the blood vessels by producing more or less marked contraction of the muscular structure of the tumor. The drug should be used in the form of ergotine,

from one to two grains being injected into the fleshy part of the thighs or buttocks twice daily, the dose being governed largely by the uterine pain produced. Instead of hypodermatic injections, dram doses of fluid extract of ergot, or two grain capsules of ergotine may be given by the mouth three times daily, or if it disagrees with the stomach, it may be mixed with four ounces of water, and administered by the rectum.

Electricity. While the use of this agent in skilled hands may be of benefit in certain varieties of fibroids and under certain conditions, its use is so surrounded by contra-indications as to practically bar it from general consideration.

Besides the administration of ergot to diminish the blood supply, an operation for *ligature of the uterine arteries,* for a similar purpose, is recommended as giving beneficial effects on many tumors, the pedunculated and subperitoneal excepted. With the patient in the dorsal position an incision is made on either side of the cervix, and the connective tissue pushed away until the uterine artery can be felt pulsating. A pedicle needle, armed with a ligature and guarded by the finger, is passed from behind forwards through the broad ligament, above the artery, and after the withdrawal of the needle, the ligature is tied. The artery on the opposite side is tied in the same way, care being observed in each case to avoid the ureters. While the operation has not become popular, the few reported cases go to show that it may sometimes do good.

Salpingo-oophorectomy. It has been stated that at the menopause, uterine tumors may undergo retrograde changes, and that the symptoms produced by them may gradually disappear, when menstruation has ceased. With this end in view, salpingo-oophorectomy is performed to bring about the menopause prematurely and, if the case has been properly selected, will likely produce

the desired effect. For success it is important that every portion of ovarian tissue be removed and the tubes amputated close to the uterine cornua.

(3) *Radical,* or the extirpation of the growth or growths.

The following conditions indicate positively radical interference;—a very large growth; a tumor otherwise hard becoming soft or œdematous; subserous tumors with broad bases; tumors undergoing cystic degeneration; tumors producing pain or causing ill health, exhaustion, hæmorrhage, or pressure symptoms; tumors undergoing suppuration; polypoid, submucous pedunculated, or cervical tumors.

The operations are (1) *Myomectomy,* or removal of the tumor or tumors by excision or enucleation, leaving the uterus otherwise entire. (2) *Hysterectomy* or *hysteromyomectomy* indicating the removal of the uterus more or less completely with the tumors.

These operations can be performed by one of two routes (1) through the vagina; (2) by the abdominal route.

<center>VAGINAL MYOMECTOMY.</center>

Cervical fibroids when pedunculated and small may be twisted off. If larger and the pedicle thick the mucous membrane may be incised all around, close to the cervix, and the remainder of the pedicle cut through, after which the mucous membrane is stitched over so as to close in the stump. When sessile, or distinctly submucous, the capsule should be incised and the tumor enucleated. After trimming the margins the crater-like excavation is closed in by deep buried and superficial sutures.

Pedunculated submucous fibroids in the vaginal stage can be removed in the same way as the pedunculated cervical. In cases where the attachment of the pedicle is high up, or difficult to reach, or where there is fear of hæmorrhage, a pair of light forceps may be clamped on

the pedicle at its attachment to the uterine wall and the pedicle cut through with scissors. The forceps, carefully surrounded with gauze, are allowed to remain in *situ* for some hours.

When the tumor is lodged in the cervical canal, with an undilated external os, or where it is in the cavity of the uterus, it will be necessary to dilate the canal sufficiently to expose the tumor. When the tumor is small, or the cervix easily dilatable, this can usually be readily done with good dilators and forced divulsion. Under more difficult circumstances, and with a considerable sized tumor, it will be necessary to cut up the anterior wall of the cervix, separating the bladder, if necessary, as is done in vaginal Cæsarian section. After the exposure of the tumor it is seized with a vulsellum, the capsule split, or cut around, and the tumor gradually enucleated. Care must be taken not to pull too strongly on the tumor for fear of producing inversion of the uterus. Hæmorrhage is never a serious complication as the uterus usually contracts down sufficiently after enucleation to check it. If such is not the case it can readily be controlled by an intra-uterine tampon. The incision in the cervix should be repaired and the bladder reattached to the cervix.

The enucleation of submucous myomata may be accomplished in a similar way but the operation has a limited field of usefulness. It should be confined to small tumors occupying the lower uterine segment.

Morcellement. During the process of enucleation it is sometimes found that a tumor is so large as to prevent its removal in the manner described. In such cases the tumor may be reduced by the process described as morcellement. This consists in cutting out sections of the mass with scissors or knife, and so working up on one side until the tumor can be drawn down and the remaining portion enucleated. It frequently can be accom-

plished by dividing the tumor in halves, or quarters, and removing one section at a time.

VAGINAL HYSTERECTOMY.

This operation is contra-indicated when the tumor is larger than a four months' pregnacy, or if it be adherent, or intraligamentous, or if there be marked disease of the appendages or the vagina very narrow.

The patient is placed in the dorsal position, and the
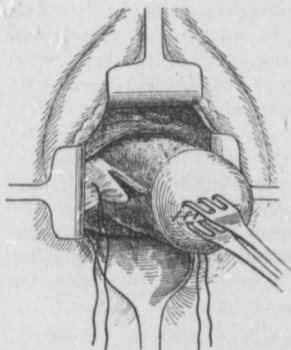
Fig. 88.—Vaginal hysterectomy. Separation of cervix from vaginal vault. (Ashton's Gynæcology).

knees kept apart and the thighs flexed on the pelvis by means of Clover's c r u t c h . A large Edebohls' speculum is inserted into the vagina, and by means of scissors and a sharp curette, exuberant tissue is cut or scraped away. The uterus being next curetted, and the interior p a c k e d with a little iodoform gauze, the cervix is closed with a f e w sutures. After again thoroughly cleansing the vagina and fornices, a strong vulsellum is introduced into the lips of the cervix and the uterus drawn down. Except when the cervix can be brought outside the vulva, lateral retraction will be of advantage to give the operator more room and light. A pair of scissors is made to cut through the mucous membrane around the cervix, at a distance well clear of the disease. By means of the finger, or by the handle of a scalpel, or by closed blunt-pointed scissors, the mucous membrane is elevated from the cervix all around, the

uterus being drawn forward and backward to facilitate
the manipulations. In front great care must be observed
not to open into the bladder, and if there is any doubt,
the introduction of a sound through the urethra will serve
as an excellent guide. When the mucous membrane has
been raised from the cervix as high as the peritoneum,
that membrane is perforated behind and in front, and a
few layers of gauze, secured at one end by means of a
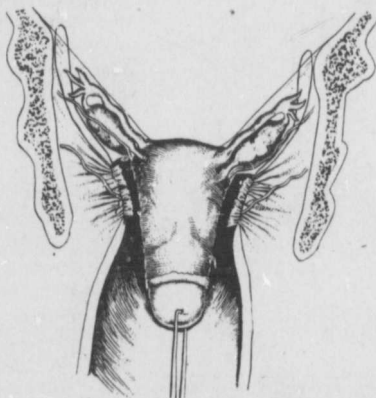
FIG. 89.—Vaginal hysterectomy by ligature.

ligature, pushed into Douglas' cul-de-sac, to keep the
bowels out of the way. The uterus is next well drawn
down and the division and closure of the blood vessels
of the broad ligament proceeded with. For this purpose
a variety of plans have been devised, but the principle
ones may be described under two headings, by *ligatures,*
and by *clamps.*

By ligatures. The material for ligature may be either
good reliable catgut or silk. A pedicle needle armed with
the ligature, and guided by the index finger, is introduced

behind the broad ligament, close to the uterus, and passed through and made to emerge in front of the ligament as high up above the uterine artery as possible. Another ligature is passed in the same way on the opposite side, and, after being carefully tied, those portions of the broad ligaments included within the ligatures are divided. The uterus may now be pulled still farther down. If the first ligatures have not secured enough of the broad ligaments to bring the body of the uterus fairly into view, others may be placed on each side higher up. The uterus being now drawn well down, the tubes and ovaries may be felt. A ligature is passed over the infundibulo-pelvic ligament, and after being carefully tied, is divided. The corresponding ligament on the other side will then be very readily ligated, and, after division, the uterus will be free.

Fig. 90.—Inversion of fundus of uterus and ligature of upper part of broad ligament. (Ashton).

If there is much difficulty in bringing the tubes and ovaries into reach they may be left behind, the last ligature passing over the tubes, as they lie in the free margins of the broad ligaments. If the tops of the broad ligaments are beyond easy reach of the finger, or the uterus considerably enlarged, inversion of the fundus, either in front, or behind through the opening in Douglas' cul-de-sac, will always bring them within reach.

After removal of the uterus the gauze packing is withdrawn, and steps taken for the management of the vaginal wound, for which various methods have been adopted. The broad ligament stumps may be drawn down with bullet forceps into the vagina, and a full-curved needle introduced through them on either side, entering anteriorly through the vagino-peritoneal margin, and emerging posteriorly in the same manner, and the liga-
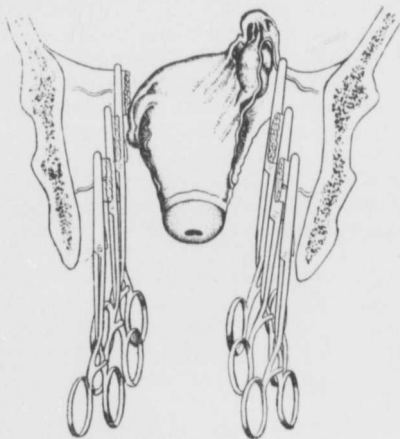
FIG. 91.—Vaginal hysterectomy with clamps.

ture tied. The opening in the vaginal wall is now closed with a few sutures. Some surgeons recommend that simply the peritoneum should be sutured to the vagina, others that the vagina alone should be sutured, while others leave all the structures to fall into apposition and unite as best they can. The vagina may now be packed with iodoform gauze. When the vaginal wound has been left open, a few strips of gauze should be put in the slit, particularly when drainage is necessary.

The clamp method. The first steps in this method are the same as have already been described. The peritoneum is opened in front and behind, and if it be convenient to do so at this stage of the operation, may be attached to the margins of the vagina. A clamp is now placed on the base of the broad ligaments, one on either side, and the ligaments divided close to the uterus. The uterus is now drawn lower down, and the remaining part of the ligaments included in a second pair of clamps, and also divided. The handles of the forceps are securely tied to prevent them from springing open, and wrapped with gauze, after which the vagina is lightly packed as before. The clamps are allowed to remain in place for thirty six to forty eight hours, after which they may be removed. Instead of incising the mucous membrane around the cervix, the thermo-cautery is sometimes used, and as the uterus is being separated from the bladder, the tip of the cautery knife is kept almost constantly in close contact with the uterus. By this method the operation practically becomes a bloodless one.

In cases where the size of the tumor is such as to prevent easy access to all the details of the operation the uterus, after being exposed, may be bisected with scissors in antero-posterior section and one section removed at a time.

2.—THE ABDOMINAL ROUTE.

Cœliotomy. The incision. The operation for opening the abdominal cavity has been known by various terms, *gastrotomy, laparatomy,* and *abdominal section,* but lately the term *cœliotomy* has been introduced, which, while more fully expressing the meaning to be conveyed, is classically correct. The incision should be made in the line of the linea alba, between the umbilicus and symphysis. After incising the skin and adipose tissue, the aponeurosis is reached, and after carefully dividing this

structure the recti muscles are brought into view. These are next separated in the median line, exposing the sub-serous areolar tissue. After cutting through it, and the peritoneum brought into view, the latter is picked up between two pairs of forceps and incised with the point of a scalpel. It is best to make the first opening not more than two and a half inches long, as subsequently it may be enlarged, should circumstances demand it. Care must be taken not to incise too low, lest the prevesical space be opened or the bladder wounded.

Closure of the incision. Strict attention should always be paid to the proper closing of the wound in the ab-dominal parietes. The methods vary much, but they all aim chiefly at avoiding the subsequent occurrence of ventral hernia. Three leading principles should be ob-served in order that good results may follow. The apposition of the raw surfaces should be as broad as possible. Each divided structure should be placed and kept opposite its fellow, peritoneum with peritoneum, muscle with muscle, fascia with fascia, fat with fat. The sutures should not be removed too early. The material used for suturing may be divided into absorbable and non-absorbable agents, the chief among the former being catgut and kangaroo tendon, and among the latter, silk-worm gut and silk.

Methods. Suture in mass or *through and through suture.* For this class of suture either silk-worm or silk may be used, but the former is the one almost universally adopted. The needle is inserted into the skin at the upper angle of the wound, about three quarters of an inch from the margin of the incision, and, as it passes through each layer—fascia, muscle and peritoneum—they are separately picked up, so as to make certain of their being included in the suture. The needle is carried through on the opposite side in reverse order. The sutures are placed about three to the inch, and, after all are inserted, the

ends are gathered up so as to bring the wound together
carefully, and are then tied. Some operators make the
sutures include only the structures overlying the peri-
toneum, the latter being left intact.

Buried or tier suture. For this purpose catgut or
kangaroo tendon is used. By means of a continuous
suture the peritoneum is first closed. Next the muscular
layer is drawn together, next the fascial layer, and finally
the skin.

Combined method. By this is meant the combination
of suture in mass and of the buried suture. When the
through and through sutures are being inserted a few
silk-worm sutures are passed through the aponeurosis
only, and when tied, are left as buried sutures.

ABDOMINAL MYOMECTOMY.

This operation is indicated in pedunculated subperi-
toneal tumors; small intramural and subserous tumors
when the growth can be removed with slight traumatism,
and the uterine wound closed with interrupted or contin-
uous catgut sutures. Even larger subserous or inter-
stitial tumors may be removed by this method providing
there be no coexisting pelvic disease, and the woman has
not passed the menopause, or is desirous of bearing chil-
dren.

The operation consists, when the tumor is *peduncu-
lated,* in cutting through its peritoneal covering and turn-
ing it down like a cuff. The base of the pedicle, if small,
is excised, if large, ligated with catgut before excision;
after which the peritoneum is united over the stump.
When the pedicle is very large the tumor is best removed
by making peritoneal and muscular flaps, which, after
enucleation, can be brought together.

In the *subserous* variety an incision is made over the
most prominent part of the growth and, with a blunt dis-
sector, the tissues are pushed off and enucleation ac-

complished. Contraction of the uterus consequent upon removal of the tumor, aided, if necessary, by a temporary gauze tampon will usually control the hæmorrhage. The excavation is to be closed by deep and superficial sutures.

HYSTEROMYOMECTOMY.

This operation, often referred to as hysterectomy, is subdivided into two, (1) *partial* or *supra-vaginal hysterectomy* and, (2) *complete* or *panhysterectomy*.
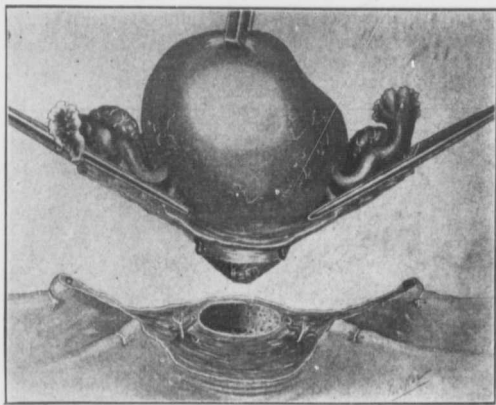
Fig. 92.—Supravaginal hysterectomy. Uterus amputated showing clamps and ligatures. (Text Book of Diseases of Women, Webster).

Supravaginal hysterectomy. In all cases previous to the abdominal incision the uterine cavity, or as much as can be reached, should be curetted and painted over with some strong antiseptic.

The patient in the Trendelenberg position and the abdominal incision completed, the hand is inserted and a general estimate made of the conditions existing. If

necessary the abdominal incision is enlarged and the
myomatous uterus delivered by means of the hand and a
strong vulsellum. The space behind the uterus is
packed with gauze sponges to keep the intestines clear
of the field of operation. The important ligatures used
for this, as well as all similar operations, are of medium
sized silk or carefully prepared catgut. The infundibulo-
pelvic ligament on one side is ligated and a pair of forceps
applied to the broad ligament in close proximity to the
uterus. The round ligament is next ligated near the
uterus. The broad ligament is divided between the liga-
ture and forceps, and the round ligament on the uterine
side of the ligature. This part of the operation is repeat-
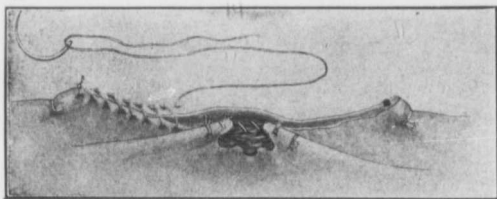
Fig. 93.—Round ligaments stitched to stump and peritoneum closing
over raw surfaces. (Text Book of Diseases of Women,
Webster).

ed on the opposite side which allows the tumor to be
more fully delivered. A transverse incision is made
through the peritoneum covering the anterior surface of
the uterus, a short distance above the vesical reflection,
joining on each side the divided layers of the broad
ligament. This flap of peritoneum, together with the
bladder, is pushed down out of the way. In this way
the uterine vessels are exposed and may now be ligated
close to the uterus.

The body of the uterus is now put on the stretch and
a circular amputation made through the cervix with a

knife, leaving, when the amputation is completed, a crater like depression in the stump. The canal is next cauterized, and the flaps of the stump united by catgut sutures. Each round ligament is stitched to the top of the stump, after which the peritoneal layer from the bladder in front is united to the peritoneum on the posterior surface of the cervix thus completely covering over the otherwise raw stump. The raw edges of the broad ligament on each side are united by a continuous catgut suture, enclosing within its folds the stump of the infundibulo-pelvic ligament.

Kelly's modification of the operation consists in the ligation of the ovarian vessels and round ligament and division of them on that side. The anterior peritoneal flap is made and stripped down, which exposes the uterine vessel on the divided side. This is ligated and, with the organ drawn to the opposite side, is divided. The uterus is cut across above the vaginal junction, and the opposite vessel divided between two clamps. The uterus is rolled still further over and the round ligament clamped and divided. With still more traction the ovarian vessels come into view. They are clamped and when cut the whole mass becomes free. All clamped vessels are then tied and the rest of the operation completed as previously described.

Total Hysterectomy. The first stages are identical with those already described as far as the exposure and ligature of the uterine vessels. This having been completed the bladder is carefully separated from the rest of the cervix and pushed downward until the upper end of the vaginal wall is exposed. The uterus is then drawn upward and backward and the vagina opened by a transverse incision made through the anterior fornix. The incision is then continued around the vaginal vault, keeping close to the cervix, until the uterus is completely freed. The anterior and posterior vaginal walls are

united by catgut sutures. The ends of the round liga-
ments are next stitched to the vaginal vault. The anterior
fold of peritoneum from the bladder is stitched with cat-
gut to the peritoneal fold of Douglas' pouch. The mar-
gins of the broad ligament are next united after the
manner described.

Doyen's method differs considerably in technique.
After the tumor is lifted out of the abdominal incision
and drawn forward over the pubes a pair of long curved
forceps, previously passed into the vagina, is made to
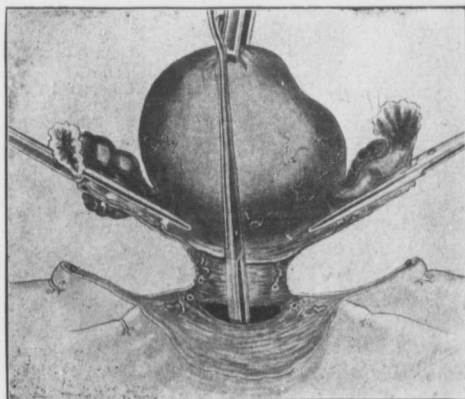
Fig. 94.—Total hysterectomy.   Opening anterior vaginal fornix.
(Webster).

project into Douglas' pouch and make an opening up
through into the pelvic cavity close behind the cervix.
While held in this position the posterior attachment of
the vagina to the cervix is under view and can be
divided with scissors. The position of the uterus being
changed the cervix is separated from the bladder and the
vesico-uterine fold of peritoneum broken through. The

cervix is now seized with the vulsellum and drawn upward and backward and the arteries on each side ligated and divided. The broad and round ligaments are next clamped and divided which permits tne removal of the uterus. The remainder of the operation is the same as already described.

The description of the above operations are applicable in a large majority of cases but many cases, nevertheless, present peculiar and at times almost unsurmountable difficulties. For instance, the peculiar shape or size, or position of the myomatous tumor, or a pelvic impaction may prevent any approach to the important blood vessels. In such cases operative interference must be approached along lines peculiar to the existing condition, such as enucleation of large tumors which form the impassable barrier, or the bisection of the mass. Such operations are, however beyond the the scope and limitations laid down for a work of this size.

CHAPTER XXI.

DISEASES OF THE UTERUS CONTINUED.

MALIGNANT NEOPLASMS.

CANCER OF THE UTERUS.

Primary cancer of the uterus occurs most frequently between the ages of forty and fifty, although earlier periods of life are not exempt. It was formerly thought that cancer was limited to the cervix, but later experience has shown that cancer of the body, although not so frequent as cervical cancer, is not rare.

Cancer may arise from any portion of the uterine mucosa, viz. :—from the *cylindrical epithelium* of the corporeal or cervical glands; from the surface epithelium of the interior of the uterus, or from the *pavement epithelium* outside of the external os. From a pathological standpoint then there are two varieties of carcinoma. One type is that in which the squamous cells of the cervix have multiplied in an atypical manner and have invaded the deeper tissues. The other type is that in which the cylindrical cell gland acini of the interior of the cervix, or corpus uteri, multiply in an atypical manner and invade the interglandular stroma. The two varieties are therefore called (1) *Pavement cell carcinoma, or squamous carcinoma.* (2) *Cylindrical cell carcinoma, or adenocarcinoma.*

Cancer of the cervix. The great predisposition of the cervix to the development of cancer has been noticed

by all observers. More than one third of all cases of cancer in women occur in the cervices of multiparæ, and the frequency is explained by the fact that the cervix is so often subjected to irritation, laceration, erosion, and infection. It first makes its appearance in one of the two forms referred to.

Squamous cell carcinoma is not only the most frequent variety but is one of the easiest to diagnose. Unfortunately in many cases it develops so insidiously that when the patient is first seen an extensive invasion of the tissues has occurred.

The tumor exhibits two well defined types. (1) The *papillary* (vegetative, or cauliflower cancer). In this variety there is at first seen a rather sharply circumscribed granular surface, or surfaces, feeling somewhat infiltrated. On these a pedunculated or sessile mass, friable and easily bleeding, develops with extensive infiltration of the tissues beneath. These papillary or cauliflower growths may remain for some time as small wart-like vegetations, or they may grow rapidly and eventually occupy the entire vaginal vault, completely hiding the cervix. Soon however this cauliflower mass begins to break down and, disappearing, leaves a deep irregular ulcer on the cervix.

(2) The *nodular* (infiltrating). This variety is usually characterized by more or less hypertrophy of the cervix, associated with a nodular or more or less diffuse induration of the invaded portion, while the surface has a somewhat livid and glazed appearance. As the disease progresses necrosis of the central portion occurs producing a deep ulcer with ragged infiltrated margins.

In either form the necrosis and ulceration gradually spread until the cervix is completely destroyed and the dome of the vagina occupied by a deep crater like cavity.

Gradually the vagina becomes invaded and by further extension the disease invades surrounding and more distant structures.

Adeno-carcinoma starts primarily in the cervical canal, developing from the cylindrical epithelium covering the mucosa, or from the glands of the cervix. It

FIG. 95.—Cylindrical epithelioma of the cervix.

develops slowly and insidiously. The nodular masses of infiltration do not usually break down and ulcerate until the disease is well established. In some cases the entire cervix may be completely involved, and the disease extended laterally, before there is the slightest evidence of any destructive change taking place. Before ulceration occurs the cervix is hypertrophied, hard and nodular and the mucous membrane paler than normal. After ulceration is well established it is not uncommon to have the cervical tissues completely shelled out before the mucous membrane of the vaginal surface is destroyed, so insidious is the progress of the disease. After the tissues break down the general characteristics of the ulceration are similar to those of the squamous variety.

Extension. At an advanced period of the disease, the characteristics peculiar to each form are lost in the destruction caused by its extension. Extension to the vagina may be found at the outset. It may occur rapidly in the papillary form, and may even reach the vulva. The body of the organ is very soon involved in the case of tumors of the cervical cavity, and, in the nodular form, it may be infected from the first. The pelvic connective tissue may be invaded from the cul-de-sac, the cervix, or

the fundus, by which the uterus becomes imprisoned, as if set in plaster of Paris, and the broad ligaments become thickened and shortened. The ureters, instead of being pushed aside, become assimilated by the neoplasm, and ulceration and fistulæ may result; or they may become compressed producing hydro-nephrosis and allied conditions of the kidney. The rectum is seldom involved, except in far advanced cases, when the vagina may be found opening both into the bladder and rectum. The peritoneum resists the ingrowth by the production of adhesions, and is seldom opened. The ovaries and Fallopian tubes may all become affected, and, lastly, there may be metastases to distant organs, as the liver, kidneys, stomach, and lungs.

FIG. 96.—Epithelioma affecting both lips of cervix, vagina and bladder.

Symptoms. The onset of the disease is insidious, and may exist for some time while the patient preserves every appearance of health. The earliest symptoms are in no way characteristic. The attention is often first attracted by a small loss of blood at other than the regular periods, or appearing at variable times after the menopause, especially after some exertion, or after coitus. Leucorrhœa, without any special characteristics appears, together with some diffuse pelvic pain. Such symptoms should always excite suspicion in one who has passed for some time the climateric period, and a local examination

insisted upon. Digital exploration recognizes the indur-
ation, or the papillary and ulcerated condition. The
speculum demonstrates the livid aspect of the tumor, the
yellowish surface of the ulceration and the fungous
vegetations if present.

As the disease advances, hemorrhages become more
frequent. The vaginal discharge becomes reddish and
has a peculiar, characteristic, as well as disgusting odor,
and so abundant and acrid that it causes distressing
erythema of the thighs and pruritus of the vulva. The
local pain now becomes more or less severe, with radia-
tion of it in different directions. By digital examin-
ation the vaginal pouches may be found invaded, the
uterus more or less fixed by extension of the morbid
processes, and the cervix changed by the advancing
disease.

The third stage, or that known as the cancerous
cachexia, is indicated by digestive disturbances, anorexia,
constipation, and by the skin assuming a peculiar pale
yellow tint, and by becoming harsh and dry. At this
time there may be present cystitis, intolerable neuralgia,
phlegmasia dolens, and genital fistulæ, while local exam-
ination will reveal wide extension to the adjacent parts.
Successive attacks of subacute uræmia may co-exist with
these, or the uræmia becoming chronic, the patient
gradually sinks into a semi-comatose condition, and
quietly dies. Peritonitis, by extension or perforation,
may bring about speedy termination, or septicæmia,
especially in neglected cases, may alone be the immediate
cause of death.

Diagnosis. In this disease, perhaps more than in any
other, the necessity for early diagnosis is imperative to be
of much benefit. The early stage can never be diagnosed
with certainty without microscopical examination of an
excised piece from the suspected part. As already stated,
when speaking of endocervicitis, it may resemble follicu-

lar erosion, but it differs from it in having somewhat elevated and indurated edges. The raw surface in both conditions may bleed with equal readiness, but if papillary projections are already present, in cancer they break down much more readily. It may be mistaken for a submucous fibro-myoma protruding from the os, but if carefully examined, a healthy ring of cervical tissue will be found encircling the neoplasm.

When the disease begins in the cervical canal, early diagnosis may be extremely difficult. It may have made considerable progress, and yet there may be nothing abnormal in appearance. The chief clinical distinction between beginning cancer and endocervicitis will be found in the fact that the discharge in the latter condition always retains its mucus consistency, while in cancer the discharge is mostly of a watery consistency, and has an offensive odor.

Cystic degeneration of the cervix is recognized by the cysts having a pearl-like color and contain a clear whitish tenaceous fluid. They are readily evacuated with a bistoury and show no tendency to bleed.

Ulceration the result of chancre and chancroid is rarely found on the cervix.

Tuberculosis is almost invariably secondary to tuberculosis elsewhere, or from infection from another part of the genito-urinary tract.

A nodule may be suspected to be malignant if it is hard and protuberant, the exterior of a bluish color, and the patient over thirty five years of age. Advanced stages of cancer of any part of the cervix are readily diagnosed by the symptoms already mentioned, but in such instances it is usually impossible to recognize from what part of the cervix it originated.

The *prognosis* is not very good, even with operative interference. Could the disease be discovered in its earliest stages, total extirpation might give better results

than they usually do. When the pelvic connective issue or lymphatics are invaded, or the entire thickness of the cervix involved, a permanent cure cannot be held out.

Treatment. Treatment of cancer may be divided into *radical* and *palliative*.

Radical. Radical operation, to be successful, presupposes conditions which will allow of the total removal of all disease. There must be complete absence of extension to any surrounding organ or gland, to the peritoneum, broad ligament, bladder, rectum or vagina. The uterus must be freely movable and unassociated with severe pelvic pains. When these conditions exist operation should at once be proceeded with.

Operation consists in complete removal of the uterus by the vaginal or abdominal route. They in no particular way differ from those already described for the removal of the myomatous uterus and thus the description of them will not be repeated.

It is important that ligatures and incisions should go as wide afield of the uterus as possible. For this purpose what is known as the combined operation has been introduced. The lower part of the operation is done through the vagina and the upper by the abdominal route. Previous to operation every precaution should be observed to prevent secondary infection by implantation. The uterine canal must be thoroughly curetted washed out and cauterized and the cervical canal closed by a few sutures.

Palliative treatment. When the disease has progressed to such an extent as to make radical treatment inadvisable, only palliative treatment is left. Among the various remedies and forms of treatment, curettage, with subsequent cauterization by means of the thermo-cautery, is one of the best. Another efficient treatment consists in packing the crater formed after curettage with a fifty-per-cent solution of chloride of zinc, the vagina and

bladder being protected by gauze moistened with a solution of bicarbonate of soda. If there is a tendency to hemorrhage after the removal of the slough, or practically at any time, it may be checked by vaginal tamponade, either alone or combined with some styptic, such as perchloride of iron. Local antiseptic treatment must be constantly kept up. Injection of a one-per-cent solution of creolin is valuable both as a hæmostatic and antiseptic. Peroxide of hydrogen, or a weak solution of permanganate of potash, has a decided cleansing and deodorizing effect. Equal parts of iodoform and charcoal will relieve pain and counteract the objectionable odor. Suppositories made from chloral and tannin (aa. gr. xv.) will relieve pain, lessen hemorrhage and counteract the offensive odor.

Narcotics will invariably become necessary at some time during the course of the malady, and it has been claimed that when opium is freely used, the progress of the disease is to some extent retarded. So far no drug has been found that will cure cancer, although from time to time new specifics have been praised. Condurango bark, chian turpentine, methyl blue, have all enjoyed a short lived celebrity. Not much more can be done than to sustain the general health as far as possible, and treat complications as they arise.

CANCER OF THE CORPUS UTERI.

Carcinoma of the body of the uterus occurs much less frequently than that of the cervix. It tends to occur later in life and has on the average a slower rate of growth. While cancer of the cervix occurs far more frequently in the multipara than in nullipara, the reverse is the case with cancer of the body.

The disease here presents itself in the form of *adenocarcinoma*, and may occur as a circumscribed outgrowth from any part of the uterine cavity, or it may involve the

entire endometrium from the start. In either case the
outgrowth consists at first of small delicate papillæ
which gradually increase in size and eventually become
fungoid in character. The fungoid masses eventually
break down or slough, leaving a foul ulcerating surface
which gradually is transformed into a crater-like cavity.
As the disease advances the uterine wall becomes infil-
trated and nodules, yellowish white in color, and soft in
consistency, appear under the peritoneum. The progress

FIG. 97.—Medullary cancer of body of uterus.

of the disease is much slower than the same occurring
in the cervix, and a much longer time elapses before it
becomes inoperable from a surgical standpoint.

Symptoms. Hemorrhage is the primary symptom,
and, as in cancer of the cervix, it is usually accompanied
by a serous discharge, of a reddish color and disagreeable
odor, and with this there is often a discharge of small
shreds of tissue from the broken down parts of the fun-
gosities. Symptoms of uterine inflammation are often
noticeable, but, as the disease becomes more advanced,

the pain takes on a paroxysmal character which is remarkable and also pathognomonic. These crises have none of the characteristics of colic, and are peculiar from their appearance, at almost regular hours, once or twice a day. Bimanual examination shows the organ to be increased in volume. It remains movable for a long time, but finally becomes imprisoned by adhesions. The cervix is found free from disease, but often is much softened and partly open. The sound reveals an increase in the capacity of the uterus, and the presence of irregular masses. The general health fails as the neoplasm develops and terminates in cachexia.

Diagnosis. In the early stages this may be very difficult. The hemorrhage, the serous discharge, the increase in the volume of the uterus, and the results of intra-uterine exploration, constitute the clinical elements of the case, while the microscopical examination of portions removed by the curette clearly differentiates between cancer and metritis without malignant neoplasm, or between carcinoma and sarcoma.

Treatment. When seen sufficiently early the only treatment is total eradication of the uterus by hysterectomy. When the disease is limited to the uterus operation results in from 60 to 75 per cent. of cures, a marked contrast to the prognosis in cancer of the cervix.

Sarcoma is a comparatively rare form of malignant disease of the uterus. It may occur at any period of the sexual life of the woman over twenty years of age, but is most often found just before, or just after the menopause. There are three well defined forms of sarcoma.

Fibro-sarcoma. This form occurs in tumors or masses, and has a striking resemblance in growth and structure to fibro-myomata. Like them they occur as submucous, interstitial, or subserous tumors, and have their origin also in the parenchyma of the uterus, but instead of being limited by a loose capsule, it is, as a

distinctive characteristic, deeply rooted. The vast weight of authority is in favor of the view that they are malignant transformations or degenerations of the ordinary fibro-myomata. Histologically they show a proliferation of round, and in places fusiform cells, more or less replacing the normal tissues of the uterine wall. When they have a pedicle it is apt to be fibrous, intimating that it has come from a degenerated fibro-muscular polypus. They give rise sometimes to metastatic growths in distant parts of the body. They tend to become infected, to slough, or to become gangrenous. Occasionally cystic degeneration takes place, giving rise to *cysto-sarcoma*.

Diffuse sarcoma. Sarcoma of the endometrium closely resembles the typical form of carcinoma of the same structure. The term is used to designate a new growth proceeding from the connective tissue of the uterine mucous membrane, consisting mostly of small closely packed round cells, though sometimes spindle-shaped, and producing soft villous or lobulated tumors of an encephaloid aspect. The tissue does not break down as readily as that of epithelioma, but is apt to fill the uterus and present at the cervix. The uterine walls are gradually invaded, and become a mere shell filled with the encephaloid mass. This form is found most frequently in young women.

Sarcoma botryoides, or grape-like sarcoma (papillary sarcoma of the cervix) is a variety which appears in the cervix, and as such is characterized by its grape-like form. Clinically, it is extremely malignant. The mass is soft in consistence, and grows to a large size, often filling the vagina. The disease spreads along the mucous membrane into the uterus, and to the vagina, and finally invades the pelvic connective tissue and peritoneum.

Symptoms and course. All forms run a more rapid course than the corresponding carcinomata after the symptoms first attract attention. Fibro-sarcoma gives

rise at first to the same symptoms as fibro-myoma, and
it is stated that when a tumor, previously existing as a
fibro-myoma, begins to grow at the menopause, it is
undergoing sarcomatous transformation. When post-
climateric growth occurs, two symptoms soon appear.
One is pain, owing to tension or invasion of the peri-
uterine connective tissue, the other is marked deteriora-
tion in the general health. If the neoplasm has developed
from a submucous fibro-myoma, there will be severe
hemorrhage, and pain from the efforts of the uterus to
expel the tumor. As it advances in growth, in addition
to occasional violent hemorrhage, it may cause a sanious
hydrorrhœa, and the discharge will sooner or later take
on an offensive odor. Owing to the intense anæmia,
sapræmia, and marasmus, death is readily produced.
Death may occur from peritonitis, intestinal obstruction,
or from pressure on the ureters. In the diffuse form the
symptoms are not distinguishable from carcinoma affect-
ing the same structures.

Diagnosis. With the exception of the rare form,
sarcoma botryoides, it cannot positively be diagnosed
without microscopical examination. The clinical symp-
toms must be carefully observed and are those of cancer
of the uterus. There are two points deserving special
attention; first, the rapid growth, at or about the meno-
pause, of a tumor previously known to exist; and second,
a more marked anæmia and deterioration of health than is
ever found associated with the same stage of growth of
a benign tumor, or even of cancer.

The *treatment* is, as in other forms of malignant
neoplasms, palliative or radical. If the uterus is movable,
and there is no metastasis or invasion of the vagina, total
extirpation of the uterus is at once to be undertaken.

Chorio-epithelioma malignum. In 1888 Sanger of
Leipsic described two cases of soft spongy tumors de-
veloping in the uterus after abortion, with metastases in
the lungs etc., and fatal in a short time. He believed

them to belong to the sarcomatous group and called it *malignant deciduoma*. Since then similar cases have been described and with them much difference of opinion expressed as to their pathology. Accordingly it has been described by various names, such as *deciduomatous sarcoma, sarcoma-deciduo-cellulare, syncytioma, syncytio malignum*.

The term *chorio-epithelioma malignum* is the one now usually applied to the condition, the tumors being recognized as malignant proliferations of the epiblastic elements of the chorion, viz.;—syncytium and Langham's cells.

Chorio-epithelioma may be described as a very malignant disease of the uterus, occurring primarily after abortion, labor, cyst-mole or hydatidiform degeneration of the chorion, with the development of tumor-like masses, recognized as malignant proliferation of the epiblastic elements of the chorion.

Symptoms. The disease is characterized by repeated bleeding after abortion, cyst-mole, or labor, and which leads the patient, or the physician, to believe that something remains within the uterus. The uterus may perhaps be curetted with but little, or only transient, relief. Very soon a new hemorrhage begins, if not at once. The uterus rapidly enlarges; the discharge profuse, more watery, and often foul smelling. Physical examination of the enlarged uterus will perhaps admit the exploring finger into the uterine cavity, and will detect masses of soft tissue. Smooth secondary nodules may be felt on the tubes. Metastases by the venous route very early take place, most commonly to the lungs, and give rise to symptoms referable to the newly infected part. Anæmia, emaciation, and cachexia very rapidly follow and even though the disease be removed by early operation, death in a few months is tne usual termination. In order to make clear the diagnosis microscopic examination will be necessary.

CHAPTER XXII.

DISEASES OF THE FALLOPIAN TUBES.

Malformations. The tubes show a number of developmental anomalies, but they are of little importance except in the study of the etiology of tubal gestation. Accessory fimbriated extremities are not uncommon. There may be an accessory uterine orifice, or the whole duct of the tube may be duplicated. In connection with imperfect development of the whole sexual apparatus, the tubes may also be non-developed; they may possess an abnormally small calibre; they may be without any lumen; or they may be entirely absent. On the other hand, the tubes may show an abnormally great development, with corresponding patency of the canals. They may be congenitally displaced backward and downward into Douglas' pouch, or they may be wound in a spiral, or abnormally contorted.

SALPINGITIS AND ITS COMPLICATIONS.

The important position taken by inflammation of the uterine appendages has but recently been generally admitted. To thoroughly understand the close association of inflammation of one organ with that of the other, the common embryonic origin of the uterus and tubes, and the close association of the ovaries, must be borne in mind. The various coats of the tubes and ovaries are continuous with each other, a fact which explains the possibility of ascending salpingitis following endometritis, just as ascending pyelitis may follow chronic cystitis. The ovary, which is connected with the tube by the tubo-ovarian ligament, and almost in direct contact with the ampulla, may also be easily infected by continuity. In addition, these organs are intimately bound together by important vascular and lymphatic vessels.

Salpingitis, or inflammation of the Fallopian tube is nearly always secondary to an infection of the uterus or peritoneum. In a vast majority of cases the disease begins as an endometritis and from this source the tubes become involved by direct continuity of surface. The nature and severity of the disease will in this way vary with the character and cause of the inflammation of the uterus, whether it be of the congestive type, or of constitutional origin, or whether it be the result of gonorrhœal infection or infection following parturition or abortion or other forms of direct infection, or from surgical interference or exploration.

Secondary infection from the peritoneum is comparatively infrequent, but cases are occasionally met with in which a salpingitis has had its origin from an inflamed vermiform appendix, or from some other diseased area.

Varieties. The disease occurs primarily in one of two forms, *catarrhal* or *purulent.*

Catarrhal salpingitis is caused by the congestive and constitutional forms of endometritis. It is not nearly so common as the purulent, usually runs a mild course, and is not followed, as a rule, by grave pelvic lesions. It may either be *acute* or *chronic.*

Acute. In this form the tube is swollen cylindrically, sometimes to the size of the little finger, and owing to its lower border being attached to the broad ligament, becomes more tortuous. The lesions are especially marked in the mucous coat, being thickened, infiltrated with round cells, and moistened with abundant mucous secretion. The normal folds are swollen, and in places are agglutinated, enclosing spaces between them, giving the appearance of glandular formation. The epithelial cells, as a rule, maintain their integrity, and the fibro-muscular coat is but slightly affected, there being only a hyperplasia of its substance. The fimbriated extremity is at

first patulous, but later the fimbriæ may become con-
tracted and close it up. The uterine ostium generally
remains patulous, through which the excess of mucus is
discharged. In some cases a few drops of mucus escape
through an unclosed fimbriated extremity, giving rise to
a slight localized peritonitis.

Chronic. The inflammation here too is chiefly limited
to the lining of the tube, but not infrequently the muscu-
lar and peritoneal coats may be slightly involved with
increase in the size of the oviduct and adhesions to the
surrounding structures. The abdominal and uterine
openings, may remain patulous or become occluded.
When both the abdominal and uterine openings of the
tube become occluded the secretions are then dammed
up and the tube becomes distended, forming a cystic en-
largement, known as a *hydrosalpinx.* In rare cases the
inflammation may be hemorrhagic in character, and blood
is mixed with the secretions, forming what is known as a
hematosalpinx.

Purulent salpingitis. This form is the outcome of the
septic and gonorrhœal varieties of endometritis, the
disease extending directly to the tubes and producing
in them the same form of infection. Sometimes but one
tube is affected. It may be either *acute* or *chronic.*

Acute. The inflammation begins in the mucous lining
of the tube and almost immediately extends to the muscu-
lar and peritoneal coats. It is very rapid in its course and
in a few days the tubes may be swollen to the size of the
thumb, twisted and tortuous, and the fimbriæ so agglu-
tinated as to close the abdominal orifice. On section it
is found to be filled with a creamy pus, the cavity often
resembling a string of beads owing to contraction. The
pus can easily be evacuated through the uterine cavity,
as the ostium internum is not occluded like the ostium
abdominale. The mucous membrane is of a grayish tint,

and under the microscope a transverse section shows
thick reduplications, forming a system of primary and
secondary folds enclosing irregular cavities that look like
glands. This thickening is due to the infiltration of
migratory cells in the connective tissue. The ciliated
cells are destroyed, and the epithelial cells are changed
in shape. The whole thickness of the wall is also infil-
trated with round migratory cells, and the blood vessels
are dilated. In the beginning the disease is usually con-
fined to one side, but if left unchecked, is apt to affect the
other. Usually some exudate appears on the serous sur-
face, forming adhesions with the surrounding surfaces,
but the greatest amount of localized peritonitis and ad-
hesion is set up by an occasional exudation of pus from
the abdominal end, which, when frequently repeated, has
the effect of agglutinating the pelvic organs, omentum,
and intestines into a matted mass. When the abdominal
and uterine ends of the tube become closed the pus ac-
cumulates in its cavity forming a *pyosalpinx*.

Chronic or *interstitial salpingitis* represents an advanced
stage of the purulent form. Both tubes will be found
involved, and the lesions include the whole thickness of
the walls, so that they become thickened, hardened, and
purplish in color. Sometimes the induration is general;
at times it is more marked in places, giving the tube a
peculiar nodular appearance. The mucous membrane is
dark blue in color; the villi are enlarged, united, and in
part destroyed by small celled infiltration. False glands
and cystic spaces are thus produced at some distance
below the surface. The external orifice is always obliter-
ated, but the uterine orifice is more or less pervious. The
mesosalpinx may be expanded by the enlarged tube, or it
may be folded up by adhesions, or infiltrated by inflam-
matory products. The ovary, which often preserves its
integrity in the catarrhal form, is usually affected. It

is generally displaced, fixed by adhesions in Douglas' pouch, or to the sides of the pelvis, or it may suppurate independent of the tube. The peritoneal adhesions, which may also involve the omentum and intestines, are dense and strong, and are sometimes so firm that they cannot be broken up without laceration of the peritoneal surfaces, or even of the walls of the viscera. Organized

FIG. 98.—Salpingitis with pelvic peritonitis and adhesions posterior to the uterus.

bands may extend between the surfaces in all directions, so as to make it difficult at times to determine the relations of the parts after the abdomen has been opened.

Symptoms. As *acute catarrhal salpingitis* usually occurs in patients already exhibiting symptoms of endometritis, it is difficult to decide with precision to which lesion the symptoms are due. Pain situated in the neighborhood of the appendage, or in the lumbar region, and radiating upward to the epigastrium and downward to the thigh, is generally present. A bimanual examination elicits tenderness and fulness on one side of the uterus, and some pain when that organ is moved or displaced by the finger. Leucorrhœa is present to a greater or less extent, and when the menstrual flow appears it is usually very profuse. General constitutional symptoms may appear, such as a feeling of malaise, neuralgic pains scattered over the body, and a slight rise of temperature and pulse. Should mucus escape through the outer opening, there will be an exacerbation of the symptoms,

characterized by increased pain in the iliac region, local tympanites, nausea and perhaps vomiting, and other symptoms of a mild form of local peritonitis.

In the *chronic stage* the symptoms are even less marked and the disease may be entirely overlooked unless hydrosalpinx develops. It is practically impossible to make a positive diagnosis of this form of salpingitis and it is only possible to infer from the history, symptoms, and physical signs that the inflammation is not purulent in character.

When the salpingitis is of the *purulent form* the *symptoms* may be similar to those just described, but they are likely to be more pronounced in character, and slower in subsiding. Should gonorrhœal pus make its escape through the outer ostium, the peritonitis may not be much more severe than that already described, but when the case is one of mixed infection, an extensive pelvic peritonitis will be set up, accompanied by great tympanites, high temperature, rapid pulse, extensive pelvic pain and tenderness, and as a result, there will be an abundant peritoneal and cellular effusion which becomes hard and solid, like plaster of Paris, and which may partly or entirely fill the pelvis. The symptoms may last for a few days, and after confinement to bed for a few weeks, the patient may, as far as her symptoms are concerned, entirely recover for a few weeks, months, or even years. Sooner or later, however, perhaps after some unusual exertion or exposure to cold, more particularly at the menstrual period, a recurrent attack of peritonitis will make its appearance with the same suddenness as before. In many cases the symptoms do not subside entirely, but remain in a semi-quiescent state, the patient suffering more or less from the milder form of symptoms in the intervals. When the attack results from direct infection during abortion or operative procedure, the symptoms of a general infection will probably predominate, indi-

cated by chills, high pulse, exacerbation of fever, the temperature rising and falling three or four degrees once or twice daily, being highest in most cases in the afternoon or early morning. Other symptoms of a general peritonitis may rapidly follow, such as abdominal distension, labored respiration, a weak thready pulse, persistent vomiting, and cold clammy perspiration, all indicating that death is near.

A *vaginal examination* will reveal an enlarged and tender uterus surrounded by highly sensitive infiltrated tissues, in which a hard mass may or may not be found. In severe cases abdominal palpation may reveal a tender exudate extending from the enlarged uterus, but when the symptoms have been mild, there may be nothing but deep-seated tenderness.

The symptoms of *interstitial salpingitis* are those of an ailment which has extended over a considerable length of time, with more or less severe attacks of pelvic inflammation occurring at varying intervals. There may be a history of but a single attack of pelvic peritonitis, but that is exceedingly rare. There will more likely be a history of recurrent attacks, with intervals of good health, or of semi-invalidism during which the patient is incapacitated by pain or discomfort from the ordinary duties of life.

Between the attacks the symptoms of endometritis are seldom absent. There will likely be a burning pain in one or both iliac regions, radiating into the lumbar, gluteal or sciatic regions. Painful micturition and defecation, dysmenorrhœa and intermittent or constant leucorrhœa are often present. In the earlier stage, when pus is present, there is apt to be an afternoon rise of temperature, possibly a degree or two, but after the disease has lasted for a length of time, and septic influences disappear, the temperature will probably remain normal throughout the day. Along with these symptoms there

may be those of a general nervous disturbance, such as nausea, indigestion, neurasthenia and hysteria.

A *bimanual examination* will reveal an enlarged, hard, tender mass behind or beside the uterus, with more or less immobility of that organ, or the uterus may be fixed in one side of the pelvis by bands of adhesions, and surrounded by a thickened and hard mass. The discharge issuing from the cervix may be thick tenacious mucus or muco-pus. The uterus itself will be found in a condition of subinvolution, or of chronic metritis.

Prognosis. *Catarrhal salpingitis* frequently ends in restoration of the tubes to a practically normal condition. When the disease, however, has existed once, it is apt to be reproduced by the accompanying endometritis ; or a purulent salpingitis may be established. *Purulent salpingitis* may endanger life, owing to the escape of pus through the ostium abdominale and the consequent local or general peritonitis or abscess formation. There is, as a rule, sterility, or a strong tendency to the occurrence of ectopic gestation. *Interstitial salpingitis* usually condemns the patient to more or less chronic invalidism. In some cases it involves all the dangers of pyosalpinx, while in others there may be a gradual improvement of both the local and general symptoms, a recovery from septic conditions, and a final restoration to comparative good health.

Treatment. As the disease is usually an extension of endometritis, much may be done to prevent its occurrence. Acute metritis following labor, abortion, or operation, should, as soon as diagnosed, be treated on thoroughly active and antiseptic principles, and the same advice is applicable in cases of gonorrhœal infection. It may be necessary to curette the uterus, after which it may be touched over with strong carbolic acid, and the antiseptic treatment subsequently kept up by vaginal or intra-uterine douches.

The treatment of *catarrhal salpingitis* is identical with that of endometritis. Absolute rest in bed is necessary, and measures taken to relieve congestion, and favor drainage of the uterus and tubes. Hot fomentations should be continually applied over the abdomen and vulva, and a hot water bag beneath the lumbar region. A sharp saline cathartic, such as sulphate of magnesia or soda, Rochelle salts or phosphate of soda, should be at once administered, and repeated sufficiently often to keep the bowels relaxed, and in the intervals a mild febrifuge mixture may be prescribed. If much pain is present it may be relieved by phenacetine, Dover's powder, or small doses of morphine, or by the introduction of an anodyne into the vagina or rectum by means of a suppository. Warm vaginal douches should be administered every four to six hours, while the patient lies on her back upon a bed-bath. As the acute stages are subsiding the fomentations may be withdrawn, and the lower abdomen painted over with tincture of iodine. The douches, are, however, to be continued, the temperature of the water being gradually elevated to the maximum degree which the patient can endure without much discomfort.

The same treatment is applicable to *purulent salpingitis* at the outset, with the addition of intra-uterine douches every eight to twelve hours, if the os will permit the entrance of the instrument. In case that it will not, it may be advisable to dilate the cervix for that purpose. When severe peritoneal symptoms are present, vaginal and intra-uterine douches, and all manipulations likely to interfere with absolute rest, should be avoided until they have subsided. If there is decided rise of temperature, especially when intermittent, quinine, in five grain capsules, will act better than any other febrifuge treatment. After the subsidence of the symptoms of an attack, prophylatic treatment should be continued, and every effort

made to prevent the recurrence. For this purpose the patient should avoid all worry, excitement, fatigue, or over-work, resting, if possible, for a few hours every day. Antiseptic vaginal douches and mild counter-irritation over the abdomen should be continued, and during the menstrual period she should remain in bed. Drainage through the uterus should be encouraged and kept up, and for this purpose the cervix should be dilated once or twice a week, and the uterine cavity touched over with some mild but efficient antiseptic, such as a twenty-five-per-cent solution of ichthyol in glycerine. After each treatment the vaginal vault may be painted with tincture of iodine, a tampon of cotton saturated with boro-glyceride placed against the cervix, and the vagina lightly packed with gauze.

If all therapeutic measures fail, after a sufficient delay recourse must be had to the radical operation of salpingo-oophorectomy. It is preferable to delay operation until the subsidence of an acute attack, but when the severity of the symptoms are such as to lead to the conviction that a purulent salpingitis is immediately endangering life, no delay should be made, but radical measures resorted to at once, for the removal of the adnexa and possibly of the uterus. Salpingo-oophorectomy is also indicated in interstitial salpingitis, if the patient suffers much pain, and has repeated attacks of pelvic peritonitis.

Salpingo-oophorectomy. The appendages may be removed through the abdominal walls or through the vagina.

1. *Abdominal salpingo-oophorectomy.* The abdominal incision is made in the median line sufficiently large to allow the entrance of two fingers. The first and middle fingers are introduced into the abdominal cavity, the omentum and intestines pushed up, and the fundus of the uterus sought for. Passing the fingers outward along the tube to the ovary, they are both lifted up between the

fingers through the abdominal wound. If there are ad-
hesions they are cautiously separated, relying on the
sense of touch alone. If the points of adhesions are diffi-
cult to overcome, they may be lifted into the wound and
separated there, or it may be necessary to enlarge the
incision, so as to make the whole pelvis accessible to the
eyes and hands. When the tube and ovary are lifted up,
a pedicle needle, threaded with a strong silk or catgut
ligature, is pushed from the front backward through the
broad ligament, a half to three quarters of an inch under
the ovary. After removal of the needle, the ligature is
brought up over the tube, close to the uterus, and tied
tightly, after which the ends are passed below the ovary,
and sufficiently far away from it to allow for a pedicle,
and again tied tightly. By this means the tube, ovary,
and the included broad ligament are tied off, and may
now be removed with a pair of scissors, taking care to
take away all of the ovary, and as much as possible of
the tube, while on the other hand sufficient pedicle should
be left to prevent the ligature from slipping. After care-
fully watching the stump to make certain that the vessels
are securely tied, the surface may be smeared with a little
iodoform, or aristol, the ligature cut short, and the pedi-
cle allowed to sink down into its normal position.

The operation, while it can be rapidly performed in
the absence of serious adhesions, is not an ideal one. It
includes in the stump a mass of tissue containing many
nerve filaments, sympathetic and otherwise, the ill effects
of which are demonstrable in various neuroses which at
times follow the operation. To avoid such a possibility
the operation may be performed so as to avoid the stump
formation. After the tube has been brought into view a
ligature is passed through the infundibulo-pelvic liga-
ment, sufficiently deep to include the ovarian artery. A
second ligature is passed through the broad ligament,
close to the uterine cornu, so as to include the utero-

ovarian anastomosis and tube. The tube and ovary may
then be cut from the broad ligament from within outward
or the reverse, after which the raw surfaces are united by
a continuous catgut suture.

As to the treatment of the appendages of the other
side, there is much difference of opinion; some authori-
ties recommend their removal even if they are healthy,
because they will very likely become affected later, while
others recommend that an effort should be made to save
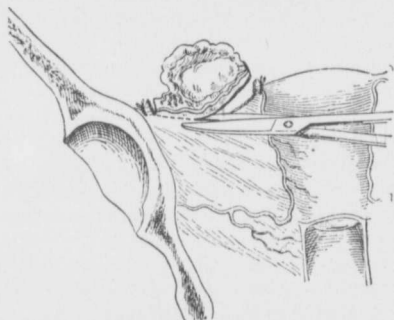
Fig. 99.—Salpingo-oophorectomy.   Severing tube and ovary from
broad ligament.   (Ashton).

them, even if found to be slightly diseased, particularly
where offspring is much desired. If both appendages
must be removed, it is almost as well to remove the
uterus too. This organ is often the source of the in-
fection, and besides, after the removal of the appendages
it is useless, and may be the cause or source of a new
infection.

Results. In a very large percentage the operation
brings on the menopause at once, or after a few months.
When menstruation continues, it may be due to the in-
complete removal of the appendages, to irritation of the
stump, to disease of the uterus, or to the law of "persis-

tence of habit." As a rule there is a discharge of blood for several days following operation, which is accounted for by the congestion caused by the ligatures. The sexual appetite may remain unchanged, increased, diminished, or may disappear altogether. In a considerable number of cases melancholia has developed. Even if the mental disturbance does not go so far as insanity, despondency and irritability are quite frequently observed.

Vaginal salpingo-oophorectomy presents the advantage that there is less shock, and less risk of causing a hernia, but it has the disadvantage that the field of operation is narrow and deep seated. When the diagnosis is uncertain, and when there are adhesions to intestine or omentum, it is much more difficult to cope with these difficulties through the vaginal route than by abdominal incision.

The vagina is opened by anterior or posterior colpotomy, or by both, and if more room is necessary, an incision in the median line may be carried from the posterior transverse incision as far down as the bottom of Douglas' pouch. The fingers are gradually worked up until they pass through the peritoneum. Adhesions may be now carefully broken up, after which the appendages can be brought down and ligated. The vaginal wound may be ligated in cases where there has been no local infection, otherwise it is best to lightly fill the wound with iodoform gauze, and subsequently the vagina.

PYOSALPINX.

Pyosalpinx is an accumulation of pus in a Fallopian tube as result of purulent salpingitis. The salpingitis may have been of rather recent origin, in which case the pathological changes in the tube are not well marked. In nearly every case, however, it is the outcome of chronic salpingitis with interstitial changes. The abdominal opening becomes obliterated by agglutination

and firm adhesions of the fimbriæ, and probably the uterine opening also, by inflammatory thickening, or by torsion of the tube. The closure of the openings permits of the retention of secretions and exudations within the tube, and, as a result, it undergoes enlargement and distension from the presence of its contents. The greater enlargements occur as the result of closure of both ends of the tube, the lesser are found in conjunction with a free uterine end, the contents of the tube having some opportunity for escape into the uterus. The escape is either a constant leakage, or an intermittent discharge, brought on by direct contraction of the tube, or by indirect pressure.

Clinical phenomena. Pyosalpinx is generally unilateral but may be bilateral. In the commonest form there is a general enlargement of the tube, club-shaped at the outer end, and tapering gradually towards the uterus, or more or less convoluted. The diameter of such tubes may reach an inch or more. When there is an absence of constrictions, it may assume the appearance of a pear-shaped cyst, and attain the size of a normal uterus; rarely it may reach the dimensions of a fœtal head.

The *pus* contained in the sac is often mixed with blood, serum, or mucus, which accounts for such a collection not presenting the active tendencies of collections of pure pus witnessed elsewhere. Collections of pus in a tube will often remain relatively quiescent for considerable periods of time, and may suffer partial absorption and inspissation, appearing ultimately as a pultaceous mass. The tendency, however, is for escape, the direction being most often along the canal to the uterus. Next in frequency, it tends to escape through the abdominal end of the tube, and least frequently by a combination of stretching and degeneration an opening may be made through the tube wall,

When the contents escape through the uterus, the tendency of the tube is to refill, and thus alternately emptying and refilling, the condition may exist for a long time, either ending in atrophy of the tube, or in permanent closure and the formation of a permanent pus sac. Leakage from the abdominal end is not uncommon, each escape being accompanied and followed, as has already been stated, by the phenomena of local peritonitis proportionate to the amount and specific virulence of the fluid. Leakage through the wall of the tube is less common, but should it occur at the upper and posterior surface, the favorite situation, there would be discharge of the tube contents into the general peritoneal cavity, accompanied by all the dangers which pertain to such an accident. The opening may occur on the under surface of the tube, between the layers of the broad ligament, through which the pus reaches the subperitoneal cellular tissue, where its further incapsulation is largely provided for. Fortunately most cases of pyosalpinx beget such an amount of local peritonitis about them as will ensure strong protecting peritoneal adhesions, and the occasional leakages only add to, and extend the adhesions, so that even though secondary foci of pus develop outside the tube, they are again held in check. It is in this way that pelvic abscesses are formed, and the further consideration of pus collections, originating in pyosalpinx, will be considered under that heading.

HYDROSALPINX.

Hydrosalpinx is a cystic enlargement of the tube, in which the general outlines and dimensions of the organ are, in the main, similar to those found in pyosalpinx, but contains, instead of pus, a clear serum or slightly tinged. It may result from catarrhal salpingitis or appear as an advanced stage of pyosalpinx, and representing a practical

destruction of the tube. The walls are attenuated and
may be so thin in places as to be translucent. It is found
as a bilateral rather than a unilateral disease, and is
rarely without the association of strong well organized
adhesions. It is free from the aggressive action which
characterizes pyosalpinx. It tends rather to quiescence,
sometimes to intermittent discharges through the canal
into the uterus, and ultimately to absorption and general
atrophy, more particularly of the outer parts of the tubes.

HÆMATOSALPINX.

Hæmatosalpinx is a tube distended with blood. Like
pyosalpinx, it has its seat in the ampulla, and has similar
dimensions and form.

Leaving aside that form already mentioned when
speaking of atresia of the genital tract, there are *two
chief varieties.*

The *first* and most frequent is apoplexy of the tube,
a condition which may occur in the course of a catarrhal
inflammation, or during an irregular menstruation
affected by fatigue, cold, or pelvic or uterine congestion.
The tube is about the size of the middle finger, the con-
tents fluid blood and retained in the tube by closure of
the abdominal opening which has occurred at some prior
inflammation. The lesion is usually only temporary,
the blood is reabsorbed, and the symptoms gradually
subside.

The *second* variety represents a graver condition.
Occurring in this form there will probably be extreme
dilatation of the tube, and a thickened and infiltrated wall.
On opening the tube it will be found filled with a syrupy,
chocolate colored blood, or more often with a clearer
liquid formed of a watery fluid and blood. Clots may
form in layers on the walls, or in little fibrous masses
lying free in the cavity.

Various explanations have been offered as to their production. *First*, that there is originally disease of the inner surfaces of the tube, and from this a true hemorrhage occurs at each menstrual epoch. This blood coagulates, filling the ampulla. A second hemorrhage occurs with coagulation of its blood around the original clot. This process is repeated time and again, until large masses are produced, which in time soften in the centre, and lead to the conversion of the entire mass into a collection of blood debris. The *second* explanation is that it follows a pyosalpinx or hydrosalpinx, as the result of
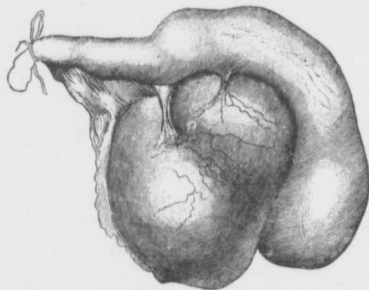
Fig. 100.—Pyosalpinx and ovarian abscess.

traumatism, or twisting of the pedicle or inner end of the tube. The *third* explanation presupposes a tubal pregnancy, arrested in its development by the death of the fœtus, from separation of the chorionic villi, and consequent hemorrhage at its tubal attachment.

Tubo-ovarian abscess. When the inflammatory process extends to the peritoneum in cases of chronic salpingitis, it is sure to involve the ovary. The first effect will be thickening of the capsule, which in turn prevents the rupture of the ripe ovarian follicle. The tension produced gives rise to considerable disturbance and pain,

and, as the enlarged follicles cannot discharge their con-
tents, it necessarily follows that an ovary which has long
been the seat of peri-oophoritis will be largely converted
into cystic spaces (cystic ovaritis), two or more of which
may become confluent, and form a cyst the size of a wal-
nut. As such a cyst enlarges, it not infrequently comes
in contact with a dilated pus-containing ampulla, and, by
mutual contact, adhesions form. Absorption takes place
between their walls, the cyst becomes infected and a tubo-
ovarian abscess is the result.

Atrophy of the tube may result from the destructive
action of pelvic suppuration. After a partial atrophy of
the walls by cystic degeneration, a rupture and discharge
of the contents may be followed by cicatricial contraction
and partial obliteration. Traces of mucous membrane
and muscular fibre may remain, but the chief part consists
of connective tissue so contracted as to resemble a fibrous
cord.

Symptoms. The clinical picture does not materially
differ from those drawn of non-cystic salpingitis. There
are the same pains, and the same menstrual disorders.
At times there may be a sudden flow of a certain puru-
lent, serous, or bloody fluid following an attack of colicy
pains, occurring at irregular intervals of a month or six
months. Unless there is leakage, or rupture into the
abdominal cavity, no marked constitutional symptoms
may be present, and it is possible for a woman to carry
about with her two sacs filled with pus, without any
serious phenomena, or even seeming to suffer from their
presence. Between the initial period of formation
and the final period of inflammation of surrounding
parts, and efforts at spontaneous evacuation, pyosal-
pinx passes through a torpid and latent phase, dur-
ing which the rational symptoms seem to be exactly
similar to those of chronic salpingitis, and the physical

signs in no wise different from those of hydrosalpinx and hæmatosalpinx.

Two groups of symptoms are really characteristic; the *pain* which directs attention to the uterine appendages, and the *local examination* which results in the finding of a tumor at one or both sides of the uterus. Physical examination should be undertaken with the utmost care, as serious and even fatal accidents have been caused by too rough handling of a pyosalpinx. By bimanual examination, a pear-shaped body can be made out, extending from the side of the uterus, and connected to it by a slender pedicle which can scarcely be reached. When the tumor is bilateral, it gives the sensation as if "a wallet had been thrown over the uterus, saddle-bag fashion." Fluctuation is rarely felt, but pain is always caused by the examination. Sometimes the tumor falls down into Douglas' pouch, giving in that region the sensation of the presence of an elastic or fluctuating globular mass, incorporated with the posterior surface of the uterus. It is usually purulent, and is at first free, but gradually becomes so adherent to the surrounding parts that it is transformed into a veritable pelvic abscess which cannot be enucleated.

Diagnosis. *Appendicitis* is distinguished by the high position of the exudate, by the seat of the pain being abdominal rather than pelvic, and radiating towards the umbilicus, rather than into the hips, or down the thighs. The attack is generally attended by disorders of the stomach or bowels, and with much greater tendency to nausea and vomiting, and there are usually absent those symptoms specially referable to the genital organs.

Pyosalpinx is to be suspected, if the dilatation of the oviduct follow gonorrhœal or puerperal infection, and if the tumor be closely adherent. Pyosalpinx is frequently, and hydrosalpinx usually double, while hæmatosalpinx is unilateral. While the tumor is still movable it may be

mistaken for a small *ovarian cyst*, and especially for an intra-ligamentous cyst. The latter however is soft, fills the ligament flush with the uterus, and is thus without a pedicle. A parovarian cyst is softer, and has no traceable connection with the uterus, and no adhesions. The differential diagnosis from *tubal pregnancy* is often difficult during the early months, but there will be the absence of those characteristic symptoms to be referred to later on. It may be mistaken for a *pedunculated intra-peritoneal fibroid*, but a fibroid is hard, insensitive, and can easily be traced to the uterine wall, while the adnexa may possibly be palpated on either side.

Treatment. As soon as the diagnosis of a cyst of the tube is established, salpingectomy or salpingo-oophorectomy must be performed. As said before, operative interference should not be undertaken during an acute attack, but if it be of so serious a nature as to threaten general peritonitis, or if there be danger of rupture of the pyosalpinx, thoughts of delay must not be entertained, as operative interference is the only way to save the patient's life.

CHAPTER XXIII.

PELVIC INFLAMMATION.

Much confusion has existed for a long time in the classification and complete understanding of diffuse inflammations of the pelvis, and, as a result, a variety of names has appeared in the literature of pelvic inflammation, intended to represent the conditions which, under varying circumstances, seem predominant. The intimate relations existing between the Fallopian tubes, ovaries, peritoneum, cellular tissue, and lymphatics, compels an almost constant intermingling of the lesions of inflammation affecting them, and consequently under the heading "pelvic inflammation," recent authorities are disposed to include all those inflammatory diseases which involve these structures, treating them as if a single disease. As has already been pointed out, a pyosalpinx rarely exists except it is complicated by pelvic peritonitis, and in all probability by pelvic cellulitis, and the abscesses whch form are usually the result of more advanced stages of those conditions.

There are, however, two forms of inflammation occurring within the pelvis, which, from a clinical standpoint at least, deserve separate consideration, and the phrase "pelvic inflammation," as here used, is to be understood to include the two affections, *pelvic cellulitis* and *pelvic peritonitis*. Inflammation of the several viscera contained in the female pelvis are described under their several headings, and will only be referred to as far as they are concerned in the pathological processes that lead to the two diseases just named.

PELVIC CELLULITIS.

Pelvic cellulitis, also known by the synonyms *parametritis* and *peri-uterine phlegmon*, is an inflammation of

the pelvic connective tissue. Such inflammation may be *primary* or *secondary*, that is, it may originate in the connective tissue itself, or in one of the neighboring structures, and reach the connective tissue by extension.

The primary form, or that which will now be considered, is an acute infective disease, and differs in no respect from acute inflammation of the connective tissue in any other part of the body. Chronic pelvic cellulitis is always a secondary affection complicating inflammation of some other part.

Etiology. Primary pelvic cellulitis is always a result of septic infection. The infecting material may make its entrance through lacerations, contusions, or abrasions of the upper vaginal tract, or of the cervix, occurring during labor or an abortion. It may be the outcome of surgical operations, local examinations or treatments; or from the invasion of intestinal bacteria; or from bacteria latent in the vagina and aroused to activity by some form of local interference.

Pelvic cellulitis occurs with or without formation of pus. In the latter case there is an exudation of coagulable lymph with œdema into the tissue of the infected area, which at first produces increase of bulk without manifest alteration of consistence. Very soon the inflamed tissue becomes stiff and indurated, and, at a later stage, seems as hard as cartilage. This inflammatory exudation may gradually undergo absorption, and eventually disappear, or it may terminate in suppuration, with the formation of a pelvic abscess. Usually there is a single abscess cavity, but occasionally several are formed.

Symptoms. Pelvic cellulitis is often ushered in by a chill or rigor. In puerperal cases this usually occurs on the second or third day after delivery, but it may be later. In non-puerperal cases it seldom exceeds a day or two. The temperature rises, and the pulse becomes quickened. Severe pain is seldom present, unless the inflammation

extends to the neighboring peritoneum. When suppuration has occurred, the most marked symptom is progressive emaciation, associated with pallor, or a peculiar sallowness of the skin. There is complete anorexia and the bowels are usually constipated, though occasionally there is diarrhœa.

In the early stages, local examination does not give much information. After the lapse of several days, the exudation in the tissue of the affected area becomes densely hard. When the infection has occurred at the upper part of the vagina, or through the cervix, the latter loses its normal mobility, and the supra-vaginal tissues on the affected side are tender, and more or less hard and unyielding. It is seldom that both sides of the pelvis are uniformly affected. In the majority of cases the inflammation spreads laterally along the base of the broad ligament, and then passes forward to the tissues beneath the reflection of peritoneum on the anterior abdominal wall, and the induration produced there takes the form of a broad band lying along the upper border of the inner portion of Poupart's ligament. Sometimes the exudation spreads upward and outward from above Poupart's ligament into the iliac fossa, interfering with the action of the psoas and iliacus muscles, and causing the patient to keep the thighs flexed. In some instances the inflammation passes backward instead of forward, producing an exudation in the tissues of the utero-sacral ligament, in the tissues surrounding the rectum, and in those beneath the peritoneum lining the posterior pelvic wall. When the body of the uterus is the starting point of the cellulitis, and the broad ligament the seat of the exudation, bimanual examination will reveal a hard, smooth, flattened, slightly movable tumor by the side of the uterus, and inseparable from it.

Pelvic abscess. When a pelvic abscess forms, the situation of the abscess, and the position where it may be

expected to point, will depend upon the direction in
which the inflammatory exudation has extended. When
the inflammation is seated in the tissues at the base of
the broad ligament, and passes forward, forming an
area of induration above Poupart's ligament, the presence
of suppuration is manifested by œdema in the skin over
the indurated area which pits on pressure; by the signs
of deep seated fluctuation, and by the eventual pointing
of the abscess a little above Poupart's ligament. When
the inflammation extends backward, and suppuration
occurs, the abscess is formed beneath the peritoneum
covering the back of the pelvis, and, as free access is
difficult, burrowing is almost inevitable. Extension into
the iliac fossa and the loin is more particularly apt to
take place when the posterior pelvic wall is the seat of
an abscess, the abscess pointing either at the iliac crest
or above it. Sometimes the pus leaves the pelvis by the
sciatic notch, and follows the course of the gluteal ves-
sels. In other instances it may make its appearance in
Scarpa's triangle.   Pelvic abscesses may, though very
rarely, discharge themselves into the rectum, vagina, or
even the bladder. The usual time for an abscess to point
is from the seventh to the twelfth week.

Diagnosis. Pelvic cellulitis may be mistaken for
hæmatoma of the broad ligament, or a *fibroma* of the
uterus. The history of the case, and the absence of symp-
toms of severe illness will, as a rule, serve sufficiently to
distinguish a hæmatoma from an inflammatory condition.
Hæmatoma occurs suddenly, either from rupture of a
pregnant tube, or of a varicose vein in the broad ligament.
In either case the onset is usually marked by sudden pain
and faintness, and usually also by an attack of vomiting.
In the case of rupture of a pregnant tube, one or two
menstrual periods will have been missed, and attacks of
pain will have occurred in the lower part of the abdomen,
generally at one side, with slight irregular hemorrhages

from the uterus. It must not be forgotten, however, that a hæmatoma may become infected and undergo suppuration, when the symptoms will be similar to those of pelvic abscess due to cellulitis. In regard to *myoma*, no great difficulty should arise, unless developed laterally between the layers of the broad ligament, and complicated by an attack of localized peritonitis. The mobility of the cervix, and the absence of pain and tenderness, as well as the absence of the constitutional symptoms attending cellulitis, should readily diagnose it from the latter condition.

Prognosis. Except in those severe forms in which cellulitis forms only a part of a general septic process of the most acute and fatal type, the disease usually terminates in recovery. As soon as the fever subsides the exudation begins to undergo *absorption*, and will have entirely disappeared in a few weeks. Should the fever not subside in the course of five or six weeks, *suppuration* has probably occurred, and the duration and progress of the illness will then largely depend on the direction that the pus may take in its efforts to reach the surface. In the large majority of cases the abscess will point above Poupart's ligament, where it can be opened. These cases almost invariably do well. In the rarer cases, where suppuration occurs at the back of the pelvis, the pus is longer in reaching the surface, and is apt to burrow. Such cases often last a long time and are very trying upon the patient.

Treatment. Remembering that this disease which produces such wide spread destruction, and often dangerous and even fatal results, has its origin in septic infection, the necessity for strict asepsis, or surgical cleanliness, becomes fully apparent. If freedom from infection could be ensured to every parturient woman, and a similar freedom extended to every woman who is submitted to vaginal examination and manipulation, pelvic

cellulitis, as a primary affection, would entirely disappear.

It is doubtful whether, when once an attack of pelvic cellulitis has been initiated, it is possible to modify to any great extent the course of the disease, hence strict care should be taken not to do harm by meddlesome interference or frequent examinations.

The state of the bowels should receive the most careful attention, and a regular course of aperient medicine should be kept up. A mild febrifuge mixture, containing liquor ammoniæ acetatis, or citrate of potash, may be administered. The tendency to emaciation calls for generous dietary, and the patient's appetite should be tempted by every means available. When induration and pain are felt in the pelvis, hot fomentations kept in place by a bandage, or hot water bottles, should be applied to the lower abdomen. Vaginal douches of hot water should be administered frequently, after which a boro-glyceride tampon, or one saturated with a ten-per-cent solution of ichthyol in glycerine may be inserted in the vaginal fornix. When there are evidences of suppuration, quinine may be administered, and, if necessary, the system supported by stimulants. The abscess should be opened as soon as fluctuation is detected, or there is the faintest indication of pointing, and treated on general principles. The point for incision, whether intra-vaginal or external, must depend largely upon the direction which the abscess seems to be taking, and the degree of pointing in that direction.

Chronic pelvic cellulitis does not exist as an independent disease, or as a sequel to the acute form, but it occurs occasionally as a secondary result of purulent salpingitis. It only involves the parts immediately contiguous to the inflamed structures, and never gives rise to the broad band of induration in the lower part of the abdomen so common in the primary affection.

PELVIC PERITONITIS

Pelvic peritonitis, also known by the synonyms *peri-metritis,* and *peri-salpingitis,* is an inflammation of that portion of the peritoneum situated within the pelvis.

Etiology. In a large majority of cases, if not in all, it is an infective process, due either to the presence of micro-organism or to their chemical products. It probably never occurs otherwise than as a result or complication of some preexisting disease within the pelvis. Not infrequently, however, it is the first indication of the presence of such disease, for the symptoms of peritonitis are for the most part acute, and of a character to compel attention, whereas those of the original disease are often so slight as to be scarcely noticeable.

1. *Salpingitis and its complications.* In the vast majority of cases pelvic peritonitis is the result of inflammation of the Fallopian tubes. The methods of infection of the pelvic peritoneum by means of the tubes, and the effects produced, immediate and remote, have already been considered when speaking of salpingitis.

2. *New growths.* Peritonitis may result from twisting of the pedicle of an ovarian tumor, or by the presence of any new growth in the pelvis, and it is in this way, in ordinary cystic disease, adhesions are formed.

3. *Septicæmia.* When septic infection of a severe type follows abortion, parturition, or surgical manipulations, giving rise to diffuse septic infection of the pelvis, the pelvic peritoneum will also be involved.

4. *Pelvic cellulitis.* Pelvic peritonitis may result from the spread of the inflammatory process from the pelvic connective tissue, more particularly when it is attended by suppuration.

5. *Disease of the vermiform appendix* is not to be forgotten. Occasionally the appendix is found lying within the pelvis, and, when investigating a case of pelvic

peritonitis, it is well to remember that it may arise from disease of that organ.

Pathology. The earliest change produced in the peritoneum is hyperæmia, with cloudy swelling of the endothelium. The membrane loses its normal, smooth, shiny appearance, and becomes dull, dry, and slightly roughened. Plastic lymph is then poured out on the surface, which leads to rapid formation of adhesions between the adjacent surfaces. In addition to the lymph effused, there is also an effusion of serum which tends to accumulate, principally in Douglas' pouch, but it also tends to form collections of fluid in different parts of the pelvis, where spaces intervene between the adhesions. One of the earliest results of the adhesive process is to roof in the contents of the pelvis from that of the general peritoneum. The intra-peritoneal collections of serum are absorbed, but the adhesions formed continue for a long time, and many of them become permanent, with the result of producing more or less serious interference with the functions of the viscera involved. When the disease causing the peritonitis is purulent, the peritonitis is also apt to be purulent, and as a result, instead of accumulations of serum amongst the adhesions, collections of pus are formed (*intra-peritoneal abscess*).

Symptoms. An attack is characterized by pain in the lower part of the abdomen, sudden in the onset, and at first severe in character. There is rise of temperature, rapidity of pulse, and intestinal disturbance, indicated by vomiting and local or general distension. After the acute pain has subsided, movements of the body are painful, owing to the tenderness of the inflamed parts. There is usually constipation, and pain preceding defecation and during micturition. In subacute and chronic cases, pain in the back, and inability to undergo physical exertion, are the most common and may be the only symptoms, while trifling causes, such as slight over exertion or ex-

posure to cold readily provoke localized acute attacks. Such recurrent attacks are especially apt to occur when the chronic pelvic peritonitis is kept alive by the presence of pelvic suppuration, and serves as a better guide to the diagnosis of pus in the pelvis than does the temperature. In course of time, patients become ill and emaciated, and entirely incapacitated for work of any kind, and may even become invalided.

During an acute attack of pelvic peritonitis the patient lies on the back, usually with the knees drawn up. The lower part of the abdomen is extremely tender to the touch, and the walls over the area affected more or less rigid. On vaginal examination, the parts at this stage will be too sensitive to allow of a satisfactory investigation. If there be any depression in the vaginal vault, it will be central and not lateral, owing to the filling up of Douglas' pouch. There may be tenderness and a sense of resistance on pressing the fingers upwards into one or both lateral fornices, but it will not be possible to map out any definite swelling until the acute symptoms have subsided. After this has occurred, a careful bimanual examination will probably reveal an inflamed Fallopian tube as a fixed, irregular, tender, sausage-shaped swelling, and gradually increasing in size as it extends outwards from the uterine cornu. As the patient recovers from the immediate effects of the attack, the hardness of the peritoneum gradually disappears, and the outline of the adherent appendage more readily made out.

Diagnosis. *Pelvic cellulitis.* Pelvic cellulitis is a much rarer disease than pelvic peritonitis. Its origin is exclusively septic, never gonorrhœal or tubercular, and is essentially a disease of the puerperium, or one following surgical manipulation. Cellulitis, when uncomplicated, is unattended by pain, or at any rate by severe pain. In both diseases there is swelling in the lateral regions of the pelvis, but in cellulitis the swelling is usu-

ally unilateral, smooth, uniform, attended with fixation of the vaginal vault, and of stony hardness. In peritonitis it is more apt to be bilateral than unilateral, and instead of being smooth and of uniform consistence, is irregular in outline and unequal in consistence. In cellulitis the cervix is apt to be surrounded by a hard thick collar, in which it is immovably set, while in peritonitis it is not present, and the impairment of mobility of the cervix is never so complete. In cellulitis the rectum will often be felt surrounded wholly, or partially, by a belt of exudation of stony hardness, fixing the coats of the bowel at that part, and narrowing the cavity of the canal.   In peritonitis enlargement will be in Douglas' pouch, and will be less hard. When cellulitis has its seat in the broad ligament, bimanual examination will reveal a smooth, hard, flattened tumor by the side of, and continuous with, the margin of the uterus. This tumor can be moved backward and forward within certain limits. The swelling caused by the inflamed and adherent appendages in pelvic peritonitis is, on the contrary, of irregular contour, and is not continuous with the uterus, but on a plane behind it, and quite fixed.

Pelvic hæmatocele. The diagnosis will largely depend upon the clinical history. As pelvic hæmatocele, in a majority of cases, is a complication of tubal pregnancy, there will usually be a history of early pregnancy and of a sudden attack of pain accompanied by great faintness. The patient will have a blanched appearance, or that of shock. The effusion is at first fluid, but soon acquires a doughy consistence, and later becomes diminished in bulk and harder.

Prognosis. The prognosis in pelvic peritonitis is much less favorable than in pelvic cellulitis. The mortality is higher, and the after effects in those who recover are apt to be much more troublesome. The damage done to the uterus, ovaries, and tubes during an attack fre-

quently produces sterility. Displacements of the uterus are apt to follow, together with the symptoms induced by such conditions, and the normal action of the bowels are apt to be disturbed.

Treatment. *Preventative.* Inasmuch as the large majority of non-purulent cases of pelvic peritonitis is due to gonorrhœal salpingitis, care should be taken to destroy gonorrhœal infection as soon as discovered, and before it has gone beyond the reach of local applications. Strict attention to surgical cleanliness in every form of manipulation will often prevent the occurrence of salpingitis, the forerunner of pelvic peritonitis. In those who have once been the subject of pelvic peritonitis, it is important to avoid such causes as are likely to provoke a relapse, such as exposure to cold during the menstrual period, over exertion, prolonged standing, and inattention to the bowels.

The *medical treatment* consists in very much the same measures as those recommended for the relief of pelvic cellulitis. Pain being a most distressing symptom must be relieved by small doses of morphia, and the tendency to the formation of scybala prevented by the careful use of enemata. Should the state of the pulse indicate it, stimulants in the form of brandy or wh.skey should be given in defined and measured doses, and the effects carefully watched. Tendency to collapse should be met by the application of hot water bottles, and by hypodermatic injection of strychnia.

Surgical measures, when necessary, are best deferred until the acute symptoms have subsided, and until an opportunity has been afforded of making a thorough bimanual examination and arriving at a correct diagnosis. If it is a first attack, and the symptoms such as to lead to the diagnosis of non-purulent inflammation of the appendages, operative interference should not for a moment be recommended. If, on the other hand, the patient has had

several attacks previously, and the swelling has attained such dimensions as to make it fairly certain that pus is present, nothing but the operative measures advised when speaking of salpingitis will be of any avail.

CHAPTER XXIV.

DISEASES OF THE OVARIES.

Malformations. One or both ovaries may be congenitally absent, but such a condition is very rare. When it does exist, it is generally only a part of a complete want of genital development manifested by the parts making up the vulva, vagina, and uterus. More common than absence is rudimentary development, in which the ovaries may or may not contain Graafian follicles. The gland itself may be of nearly normal size and in a normal situation, but the gland contents, the Graafian follicles and ovules, may be absent. Such conditions may be found in connection with a normal uterus, but most commonly they are found associated with arrest of development of that organ. A diagnosis in such cases is extremely difficult, but the condition may be presumed when the ovaries cannot be palpated bimanually, combined with want of development in the other genital organs, with absence of the usual signs of the menstrual crisis, and with lack of general constitutional vigor and development.

The ovaries of new-born children may be twice their normal size, a condition which may be due to uniform enlargement of its constituent parts, or to fœtal inflammation resulting in a preponderance of connective tissue, and a partial or total disappearance of the Graafian follicles. Accessory ovaries immediately joining the normal ovary, and included usually within the same peritoneal investment, have been found. The ovary may likewise be constricted so that it consists of two practically independent parts. A true supernumerary ovary, far removed in station from its fellow, is extremely rare.

DISPLACEMENTS.

Congenital displacements of the ovaries are very rare. In the early embryo they are situated, like the testicles, in close relation with the kidneys, but soon after birth they are found to occupy a position in the true pelvis. Only in extremely rare instances have ovaries been found retained in their original relations with the kidneys.

Congenital inguinal hernia of the ovary is also rare, but when it occurs, it is generally due to deficient development of the round ligament, by which the ovary, tube, and sometimes one horn of the uterus, are pulled through the canal of Nuck. There are usually no symptoms until menstruation sets in, when there may be much disturbance of that function. The only treatment consists in extirpation.

Acquired displacements of the ovaries are not uncommon. Any influence which increases their weight, or draws upon them directly, or acts upon them by traction, may cause them to leave their position, and sometimes to such an extent as to pass out of the pelvis in the form of a hernia.

Causes. Displacement of the ovaries may be brought about by any causes which will increase their weight; such as inflammation, hypertrophy, or cystic degeneration. They may be acted upon by contraction of effused lymph resulting from pelvic peritonitis, or by contraction of the ovarian ligaments drawing them out of place. It may be brought about by displacements of the uterus, more particularly retroversion and retroflexion, or by insufficient support from below, especially when it is the outcome of a weakened or ruptured perineum.

Displacements may be subdivided into *intra-pelvic* and *extra-pelvic*, according to whether the ovary is found within, or outside the pelvis.

Intra-pelvic displacement, or prolapse of the ovary, is a common disease, and one of considerable practical importance. When the ovary becomes displaced it sinks backward, downward, and inward, first upon the retro-ovarian shelves, and next into Douglas' pouch, describing in its descent an arc of a circle.

Symptoms. The symptoms will vary according to the causes which have induced the displacement, and to the possibility of its return to its normal position. Ovaries prolapsed behind the uterus manifest themselves by more or less severe, or constant pain in the lower part of the back, usually referred to the sacral or rectal region, and intensified by the passage of hardened feces or by the act of coition. There is a further sensation of dragging or bearing down, and when the ovary is adherent these symptoms are usually aggravated.

The *diagnosis* is usually made by vaginal examination. The prolapsed ovary can readily be touched in its abnormal position, giving a peculiar sensation of faintness and nausea when pressed upon. It might be mistaken for a swollen tube, but the latter is more sausage-shaped. A small pedunculated fibroid is harder and not sensitive, while scybala may be indented or crushed without much pain, and may be removed by enemata or cathartics.

Treatment. The treatment consists in replacing the ovary, if it is movable, by digital manipulation, or by posture in the genu-pectoral position, and, after replacement, its return to the pelvic cavity prevented by some suitable support, such as a Thomas' retroflexion pessary, or astringent balls or tampons of cotton packed behind the cervix. If a retro-displacement of the uterus exists, the reposition of that organ, together with the ovaries, and its retention by a suitable pessary will usually suffice. If the ovary is adherent it will be necessary first to endeavor to stretch and break up adhesions. This may be

done by pelvic massage, and by packing the posterior
fornix of the vagina, while in the genu-pectoral position,
with cotton balls, the first few inserted being impregnated
with boro-glyceride, or a ten-per-cent solution of ichthyol
in glycerine. If these measures fail recourse may be had
to radical methods. If there are no adhesions and the
uterus is freely movable, Alexander's operation may be
performed; if otherwise cœliotomy must be undertaken
in order that the adhesions may be broken up, after which
the uterus should be retained in place by ventral fixation.

Extra-pelvic displacement, or hernia of the ovary.
The ovary may pass through the same openings as other
herniæ, but all but two forms are exceedingly rare.

Inguinal. The passage of the ovary into or through
the inguinal canal can only occur when the tube and
infundibulo-pelvic ligament are unusually relaxed and
elongated. When such a condition exists hernia may be
produced by a fall or similar violence, and the ovary, in
its abnormal place, may become inflamed, or undergo
cystic or cancerous degeneration.

The *diagnosis* may be made by the presence of a tumor
in the inguinal region corresponding in shape to that of
the ovary, and producing a peculiar sickening sensation
when pressed upon. Bimanual examination reveals
absence of the ovary from the pelvis and tilting of the
corresponding uterine cornu to that side, while backward
and forward movement of the uterus causes the tumor to
move.

The hernia may be reduced by taxis, and held back by
the application of a suitable truss. Herniotomy may be
necessary to relieve the imprisoned ovary, and when per-
formed may be followed up by a radical operation to
secure permanent results, or by extirpation of the ovary
if it is found to be diseased.

Crural. The ovary may make its way through the
crural ring into the crural canal. The same symptoms

and treatment are applicable in this variety as in the former.

<center>HYPERÆMIA AND HÆMATOMA.</center>

Hyperæmia of the ovaries occurs to a considerable extent during each menstrual period, and often just previous to, and during coition, but should hyperæmia be kept up for any length of time, or is frequently repeated, it will result in persistent dilatation of the vessels, and some serous effusion into the stroma; and in more severe cases hemorrhage into the Graafian follicles may take place. The hemorrhage may be confined to one follicle, or it may occur in many. When there are many follicles affected, rupture of their septa may take place, producing hæmatoma, of a size varying from a pea to a walnut, or even larger. Hemorrhage may take place into the stroma assuming the form of numerous minute extravasations.

The blood may be completely absorbed, or remain as a coagulum, or as a mass of tarry fluid. The fluid part may be absorbed altogether, leaving a granular pigment, or the solid parts may be absorbed, so that only a cyst filled with serous fluid remains, or suppuration may set in. An extensive hemorrhage may cause rupture of the ovary, and the blood pouring into the peritoneal cavity or penetrating between the two layers of the broad ligament, will form a hæmatocele.

Etiology. It may be due to anything which will produce venous stasis, such as masturbation, venereal excesses, uterine displacements, and sedentery habits, or it may arise from causes which produce a disordered condition of the blood, such as severe burns, phosphorus poisoning, scurvy, typhoid fever, or septicæmia.

Symptoms. A patient affected with hyperæmia of the ovary is likely to suffer from menorrhagia, and accompanying it there will be pain in the region of the ovaries

and extending down the thighs, and sometimes neuralgia of the breasts. Hemorrhage into the ovary may take place without giving rise to any symptoms. If the collection is large, it causes severe pain, and even nausea and vomiting, and on examination the ovary will be found enlarged. Hyperæmia and hæmatoma may be diagnosed, if, in a healthy person, one or both ovaries suddenly become enlarged and tender without fever. In those who have been affected with blood dissolution, hæmatoma may be inferred if the patient is seized with ovarian pain, and a movable tumor can be felt in the pelvis.

Treatment. In hyperæmia, rest in bed is demanded; but to be complete, physiological rest must be secured as well. The general health should be improved, suitable tonics administered, and the bowels properly regulated. Some form of local treatment for the purpose of reducing general hyperæmia should be instituted, such as occasional counter-irritation over the lower abdomen by means of tincture of iodine or blisters, by hot vaginal douches, and by the use of ichthyol or boro-glyceride tampons. Later the patient may be allowed to return to out door exercise, still keeping up the local and general treatment, but rest in bed must be insisted upon during each menstrual period. Should an acute attack occur at any time, the patient should at once be put to bed, an ice bag placed over the hypogastric region, and a dose of morphia administered to relieve the pain. If the ovaries have suffered in structure, the result of prolonged hyperæmia, or from repeated attacks, they should be removed.

OOPHORITIS.

Oophoritis, or inflammation of the ovary may be either *acute* or *chronic*.

Acute oophoritis. The inflammation may begin on the surface, *peri-oophoritis;* in the interior, *interstitial*

oophoritis; in the follicles, *follicular oophoritis;* or in the stroma, *inter-follicular oophoritis.*   As a rule both organs are involved.

Etiology.   Acute oophoritis is infrequently found outside the puerperal state. It may, however, be caused by *hyperæmia* and *hæmatoma,* of the ovary, or by any of the causes mentioned as liable to produce that condition; or by a sudden *suppression* of the menstrual flow. The infection may be the outcome of gonorrhœa, pneumonia, mumps or the acute exanthemata. It may follow minor operations, such as the use of the sound, incision of the cervix, or trachelorrhaphy. From proximity of the ovary to the abdominal end of the tube, inflammation of the latter necessitates an almost constant implication of the ovary, peri-oophoritis being here the first form presented. Oophoritis may however occur quite independently of salpingitis. The lymphatics leading from the ovary connect in the meshes of the broad ligament with those coming from the upper part of the uterus, and it is thus easy for pathogenic germs to reach the ovary through those channels and infect them, without the presence of salpingitis. Interstitial oophoritis is the form here presented.

Whether the initial lesion begins within or without the organ, the results will generally be the same, for by transmission through the lymphatics outside implication will extend to the interior, and inside implication to the exterior. When the disease begins as a peri-oophoritis the surface will be found covered with a serous, plastic, or purulent exudation, in accordance with the grade of inflammatory action present. The ovary will be enlarged, and in the plastic and serous types, the cortex will be more or less infiltrated with small round cells, similar to inflammatory processes in other organs. If the type of inflammation be purulent, pus cells will predominate. Beginning as an interstitial process, the same elements

pervade the organ, the predominance of the simpler inflammatory elements, or those indicative of suppuration, being governed by the presence or absence of septic elements. The Graafian follicles in all cases suffer changes kindred to those going on around them. There is turbidity of the liquor folliculi, with softening and disintegration of the membrana granulosa, and the ovum.

Course. In the absence of purulent infiltration, it may terminate in resolution, or in connective tissue sclerosis, leading to atrophy, or the follicles may be converted into cysts, the ova and the membrana granulosa undergoing fatty degeneration. Purulent infiltration leads to the development of abscesses, coalescence of which may convert the ovary into a complete pus sac, nothing remaining but the tunica albuginea. These pus sacs may become encysted, but the rule is, a continuance of suppuration until the pus makes its way through the tunic, when the course will be similar to escape of pus from the tube.

Symptoms. Often the symptoms are masked by those of the disease which produced it. The ovarian region will be the seat of a burning pain radiating down to the knee, and to the bladder and rectum, and occasionally there will be reflex pain in the breast, and not infrequently nausea and vomiting. By bimanual examination it is possible to feel the ovary enlarged and exceedingly tender to the touch. When an ovarian abscess has formed, it will give rise to symptoms similar to the formation of pus elsewhere, and when felt, a sensation of fluctuation may possibly be made out. It is seldom possible to make a certain diagnosis. An inflamed tube or a pyosalpinx is sausage-shaped when palpated, an inflamed ovary or ovarian abscess is round. Pelvic abscess is situated lower down and is absolutely immovable.

Treatment. The patient must be kept quiet in bed, with an ice bag over the affected side, and the bowels

kept relaxed by means of saline aperients. Pain is to be combated by means of morphia in some form. If the symptoms point to the presence of pus, it is to be removed either by abdominal or vaginal oophorectomy.

Chronic oophoritis represents certain changes brought about in the ovary the result of repeated attacks of congestion or of acute inflammation, or it may be a chronic process from the beginning. The common changes which occur are *atrophy* and *cystic degeneration*. *Atrophy* is most marked in conjunction with adhesions, which, by
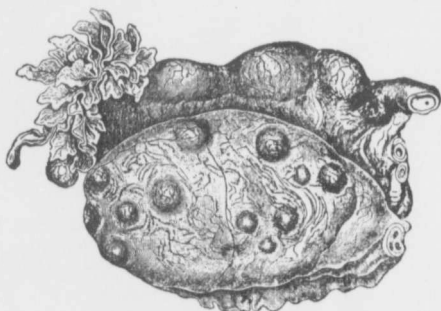
FIG. 101.—Ovary with many dropsical follicles (Leopold).

compressing the ovary, increase the sclerotic changes induced by the acute interstitial form. The whole organ may be converted into a small mass of connective tissue, with almost entire disappearance of distinct formation. In the *cystic form* the albuginea is thickened, and the organ filled with cysts intermixed with comparatively normal follicles. The cysts are transformed follicles with thickened walls surrounded by indurated tissue, the ova and membrana granulosa having undergone fatty degeneration and absorption, leaving merely limpid fluid. In other cases the cysts may contain a gelatinous or colloid

material. Some of these cysts may be so large as to involve the whole ovary.

Etiology. Chronic oophoritis is much more common than the acute form, and is often the result of, or follows acute inflammation. A displaced ovary strongly predisposes to it. It is most frequently due to puerperal or gonorrhœal infection, while venereal excesses, masturbation, the abuse of alcohol, and syphilis are strong factors in its production.

Symptoms. The symptoms are often masked by surrounding inflammation. The patient complains of pain in one iliac fossa, or, if both ovaries are affected, as is often the case, in both fossæ, the pain often extending to the rectum, bladder, hips, and down to the knees. The pain is increased at the approach of the menstrual period and during coitus, especially if the ovary is prolapsed. Standing or walking for even a short time gives great fatigue. Menstruation is often irregular and profuse, but in the atrophic form there may be amenorrhœa. Leucorrhœa is a common accompaniment. Often the digestive and nervous system suffer to a greater or less extent. On examination it is extremely difficult to say whether a mass felt through the roof of the vagina is an ovary or tube. Sometimes the enlarged and prolapsed ovary can be made out by its globular form and extreme tenderness.

Treatment. The management of chronic oophoritis coincides in most respects with that described for chronic salpingitis, and when the case has been seen early, treatment may be of great benefit, but when degenerative changes have taken place to any marked extent, it will be readily understood that no immediate benefit can be derived. A displaced ovary, or retroverted uterus should be restored to its normal position and retained there. Hot vaginal douches and medicated tampons often give much relief from pain, and absorption of inflammatory material may be promoted by painting the vaginal vault with tinc-

ture of iodine. Notwithstanding local and general treatment, carried out methodically and persistently, in many cases nothing short of an operation for the removal of the diseased structures will be of benefit, and should be recommended before the patient's health commences to break down from the continued strain on the nervous system.

CHAPTER XXV.

DISEASES OF THE OVARIES CONTINUED.

NEOPLASMS.

From a histogenitic point of view tumors of the ovaries have been divided into neoplasms of connective tissue origin, and epithelial neoplasms. The first group, *desmoid* tumors, includes *fibromata, sarcomata,* and *myxomata,* all of rare occurrence. The second group, *epithelial* tumors, includes *cystomata, carcinomata* or *alveolar epitheliomata,* and *adenomata* or *mucoid epitheliomata.*

For convenience of study, and from a clinical standpoint, they are most conveniently divided into *cystic* and *solid growths.* The cystic tumors include *simple, proliferating, dermoid,* and *broad ligament cysts.* The solid tumors are *fibromata, sarcomata,* and *carcinomata,* all comparatively rare.

CYSTS OF THE OVARY.

Cysts may originate in any part of the tubo-ovarian structure; in the cortical, medullary, or parenchymatous structure of the ovary; in its inferior border or hilum; in the structures between the tube and ovary in which are found the remains of the Wolffian body, known as the organ of Rosenmuller, or the parovarian structure; or in the hydatid of Morgani, the obliterated remains of the canal of Gartner. Cysts may also develop in the folds cf the broad ligament, and then are known as *broad ligament cysts.* The cysts may be *unilocular* with limpid contents, or *multilocular* with varying contents, some clear and limpid, others thick and viscid, or discolored with admixture of blood.

From an anatomical standpoint it is important to distinguish cystic growths according to the size which they attain. Some of moderate dimensions may be well tolerated or give rise to troubles, which, though painful, do not threaten existence. Others, on the contrary, increase in size with the greatest rapidity from the moment their development has been started.

Small cysts may be subdivided into:—1. *Small residual cysts* coming from Morgani's hydatid, or the horizontal canal of the parovarium. *2. Follicular. 3. Cysts of the corpus luteum. 4. Tubo-ovarian cysts.*

Large cysts may be subdivided into:—1. *Glandular proliferating. 2. Papillary proliferating. 3. Dermoid. 4. Parovarian.*

1. **Small residual cysts.** In uterine fibromata and ovarian tumors at the start, there are found either on the broad ligament or on the tubes, small transparent vesicles, but are of no surgical interest. They are of three kinds:—

i. *Cyst of the hydatid of Morgani.* Attached to the fimbriated end of the Fallopian tube there is generally found a cyst varying from the size of a pea to that of a cherry, transparent, and covered with a single layer of endothelium. This hydatid is the remains of the extremity of the canal of Muller.

ii. *Supra-tubal cyst* is no larger than the preceding and has the same appearance and structure. It is probably a micro-cyst of the broad ligament which has slipped under the serous membrane, and worked its way up to this unusual position.

iii. *Micro-cysts of the broad ligament.* Some of these are suspended from Rosenmuller's organ, and some are free and of undertermined origin. Only those which originate from the vertical tubes of the parovarium have ciliated epithelium, and are likely to subsequently develop into papillary growths.

2. **Follicular cysts.** Hydrops of the Graafian follicles was long considered the only or chief cause of large ovarian cysts. From failure to rupture owing to some morbid cause, particularly inflammation of the appendages, the follicles may form cysts from the size of a hemp seed to that of a walnut (cystic ovaritis). There may be exceptionally an agglomeration of several of these sacs, causing the ovary to become as large as the fist or a fœtal head (*Rokitansky's tumor*).
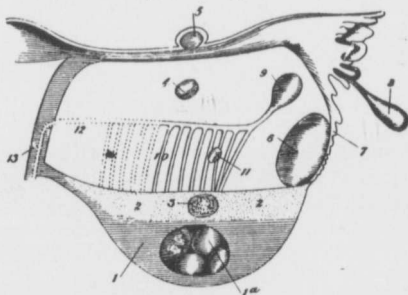
FIG. 102.—Diagram of the structures in and adjacent to the broad ligament. (Doran.)   1. Framework of the parenchyma of the ovary, seat of a simple or glandular multilocular cyst, 1 *a*.   2. Tissue of hilum, with, 3, papillomatous cyst.   4. Broad ligament cyst.   5. A similar cyst above tube, but not connected wth it.   6. A similar cyst developed close to 7, ovarian fimbriæ of tube.   8. The hydatid of Morgagni.   9. Cyst developed from the horizontal tube of parovarium; cysts 4, 5, 6 and 8 are always lined internally with a single layer of epithelium.   10. The parovarium.   11. A small cyst developed from a vertical tube.   12. The duct of Gartner, often persists in the adult as a fibrous cord.   13. Tract of that duct in the uterine wall.

3. **Cysts of the corpus luteum.** This cyst, when first described, was believed to be a corpus luteum of pregnancy transformed into a cyst, but microscopical examination of the walls will show the bud-like papillæ characteristic of the corpus luteum. The recognition of this prevents their being confused with follicular cysts, or with suppurative ovaritis. They are generally no larger than a walnut, but cases have been described in which they have attained the size of an orange.

4. **Tubo-ovarian cysts.** The presence of an ovarian cyst not infrequently results in the formation of a tubo-ovarian cyst through its proximity to a distended tube. A dilated follicle or small cyst may rupture into a distended tube with which it is in contact and adherent, and form one sac. They do not usually attain to a large size. The uterine opening of the Fallopian tube may remain pervious and as the fluid increases it passes into the uterus.

· **Large cysts.** Proliferating cysts are also called myxoid cystomata in opposition to dermoid cystomata, be-
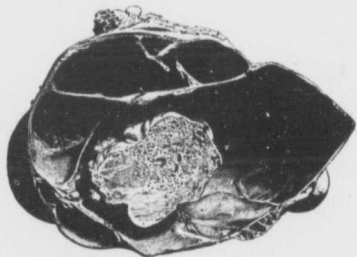
FIG. 103.—Small multilocular cyst. (Museum of the College of Physicians and Surgeons.)

cause their inner surface resembles a mucous membrane. The term "proliferating" has been given them because they produce new cysts or papillary growths from their inner surface. There are two varieties, *glandular* and *papillary*.

1. **Proliferating glandular cystoma** has a wall composed of the same structures as found in follicular cysts and similar external epithelium, but the internal epithelium undergoes a remarkable proliferation which results in the development of gland-like growths. This epithelium is polymorphous, but the long columnar is the predominant variety. It is stratified and forms pouches,

which are at first placed regularly side by side, and are about the same size, but in consequence of the continued proliferation they become closed, thus forming a secondary cyst in the wall of the primary cyst. When the secondary cyst is formed, the same process of proliferation is repeated, so that continually one generation of
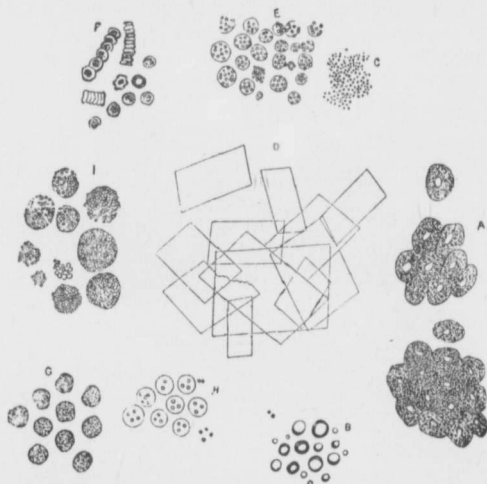
FIG. 104.—Microscopic examination of fluid from ovarian tumors. A. Epithelial cells. B. Oil globules. C. Fine granular matter. D. Crystals of cholesterin. E. Granular cell. F. Blood corpuscles. G. H. Pus cells. 1. Inflammatory globules of Gluge.

cysts is formed in the wall of another. With the production of new cavities, a reduction in their number takes place by the absorption of the partition which separates them. By this continued proliferation of epithelial cells, formation of new cysts, and absorption of their walls, very large tumors are formed, in which, as a rule, one cyst predominates, with a greater or smaller number of

secondary cysts in its wall. These cysts are therefore always multilocular from a pathological standpoint, although they may be considered unilocular from a surgical one. This variety of tumor is by far the most common, and may reach an enormous size. The outer layer of the wall corresponds to the albuginea, is smooth and dense in texture, and pearly-grey or white in color. The inner layer furnishes the connective tissue, and together with the epithelium enters into the composition of the secondary cysts. It is of a reddish color, slightly uneven, and velvety like the inside of the stomach. From
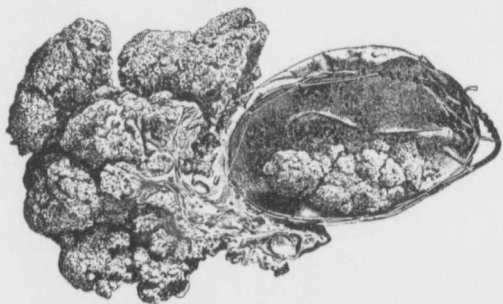
FIG. 195.—Papillomatous ovarian cyst. (Museum of the College of Physicians and Surgeons.)

the outer layer may grow small excrescences covered with short columnar epithelium. As a rule they have a pedicle.

Contents. In very small new-formed cysts, the tumor may be one solid mass of cells, but as a rule the contents become more fluid as the cysts grow. The fluid in common ovarian cysts is of a grey, yellow, or brown color. It may be limpid as pure water, or filled with solid bodies as not even to be translucent. Usually it is more or less viscid. Its specific gravity will therefore vary much, but

its reaction is always alkaline. Generally ovarian fluid does not coagulate spontaneously, but by being boiled the contents are more or less completely turned into a solid mass. It possesses a remarkable degree of resistance to decomposition, formed elements being sometimes preserved in it for weeks. As a rule, ovarian fluid is full of a variety of formed elements, red blood corpuscles, epithelial cells, nuclei, pigment granules, finely granular globular bodies like lymph corpuscles or colorless blood corpuscles, pus corpuscles, spindle-shaped cells, and crystals of cholesterin and of indican.

2. **Proliferating papillary cystoma** is not nearly so common as the glandular, being found in only one out of ten ovariotomies, nor does it acquire such large dimensions. They contain a comparatively small number of secondary cysts. From their inside spring dendritic or cauliflower-shaped growths, called papillomata, which may entirely fill the secondary cyst in which they grow and break through its walls into a neighboring cyst; or they may perforate the wall of the primary cyst and cover the outside of the ovary and neighboring parts. They may even penetrate the uterus, bladder, rectum, or other viscera, so as to form one mass with them. The papillæ range in size from that of a pea to that of a small orange. They are sessile or pedunculated, and may be white, dark red, or black. The interior of a papillary cyst is usually lined with ciliated epithelium, and the contained fluid not viscid or colloid, but of more watery consistency. This kind of tumor is often bilateral, and its development is much slower than that of the glandular variety. It is often accompanied by ascites.

Mixed proliferating cysts. In one and the same cyst some cavities may be of the glandular type, others of the papillary, indicating that there is no radical difference between the two varieties, the glandular variety being built up of the epithelial walls which enter into the form-

ation of the ovaries, the papillary from its connective tissue mainly.

Origin of proliferating cysts. There is still a considerable diversity of opinion in regard to the origin of these cysts. Microscopical examination has shown that

both the glandular and the papillary variety may develop from a Graafian follicle.   Another source may be the germinal epithelium, which in some ovaries, even of adults, forms pouches extending into the stroma of the ovary.   Some claim that the papillary cystomata are developed from remnants of the Wolffian body growing into the ovary from the hilum.   The source of the glandular variety is by some thought to be a degeneration of the tunica intima of

FIG. 106.—Dermoid cyst, showing plates of bones and large quantities of long tawny hair.

the arteries in the ovary.

3. **Dermoid cysts.** These cysts vary greatly from any already described.   The internal surface is covered with a membrane which looks like skin and has a similar structure.   Upon the surface of the derma are papillæ,

and hairs are inserted into hair follicles occasionally provided with a sebaceous gland. The hairs, whether free or implanted, are long, and tawny in color, agglutinated together by sebaceous matter and sometimes rolled into little balls. Sebum resembling the vernix caseosa, partly fills the cavity, and often forms small isolated masses. It is sometimes oily in consistency, and contains many epithelial cells, cholesterin crystals, and fatty acids. Teeth and bones have been found in these cysts. The bones are inserted in the wall, and are more or less covered by the dermic layer. They are irregular in shape, usually flat, and formed of compact tissue. Cartilage is sometimes present in small patches. The teeth project into the cavity, and are often loosely inserted into aveoli formed of bony debris. As many as one hundred teeth have been found in one cyst. Unstriped muscle fibres have been found in the dermic layer. Cases are quoted where striated muscle fibre, and nerves distributed to the teeth, have been found. A most remarkable case is reported where the cyst, besides skin, hair, and teeth, contained a body which resembled an eye, with a species of convex cornea, and epithelium like that of the retina. There was also a mucous membrane similar to that of the intestines and stomach, and encephaloid nerve substance.

Origin. The question of the origin of dermoid cysts is one of the most obscure points in general pathology. Various theories have been put forth. It has been ascribed to extra-uterine pregnancy, to diptogenesis by fœtal inclusion, and to parthenogenesis due to a proliferation of germinating epithelial cells. The theory of impaction, according to Pozzi, is, on the whole, the most satisfactory. According to this view, during intra-uterine existence certain portions of the blastoderm become impacted by pressure within the tissues, and develop there later, giving rise to an irregular formation of the normal

tissues. The outer surface of a dermoid cyst is, as a rule, of a dull gray, or greenish color, with orange or ochre colored patches. They are small, or of medium size, rarely exceeding in size an adult head. Commonly but one ovary is affected, but two or three cysts may develop in the same ovary. A dermoid cyst may form adhesions and rupture into another organ, or on the surface of the body. If it opens into the bladder, hairs may be eliminated with the urine. A dermoid cyst in one ovary may be combined with a proliferating myxoid cystoma in the other.

Fig. 107.—Unilocular cyst. (Museum of the College of Physicians and Surgeons).

4. **Broad ligament cysts.** Broad ligament, or, as they are sometimes called, parovarian cysts, are not in reality cysts of the ovary, being anatomically separate from it, but are best described in connection with the latter, being surgically and clinically closely connected to them. Broad ligament cysts are much rarer than ovarian cysts, and, as a rule, are monocystic. Commonly they do not exceed the size of a pregnant uterus at six months gestation, but exceptionally they may become enormous. As a rule, the wall is so thin as to be translucent, but in exceptional cases, the cyst may look like a uterine growth, on account of the thick layer of involuntary muscle fibres derived from its broad ligament covering. The wall is composed of peritoneum, a layer of connective tissue containing muscle fibres, and but few blood vessels, the absence of which gives it its white

color. Its internal surface is smooth, or wrinkled, but has no glandular formation, and is covered with a single layer of epithelium. The fluid is normally watery, nearly colorless, and alkaline or neutral. It does not coagulate spontaneously, nor to any extent by heat before adding an acid. Papillary and dermoid cysts may also develop in the broad ligament. As a rule cysts of the broad ligament are sessile, but sometimes the ligament forms a pedicle. They are found during the period of sexual maturity; they grow very slowly, do not impair the health, and give rise to no symptoms except such as are produced by their bulk.

The pedicle. Whatever the origin of ovarian cysts, there is one important point in their surgical history, the presence or absence of a pedicle. Ovarian cysts as a rule rise up into the abdomen, and are connected with the uterus by means of a pedicle. In some cases the development takes place downward, so that the cyst is situated between the layers of the broad ligament, more or less close up to the uterus, and accordingly has no pedicle. The pedicle may be long or short, thick or thin, broad or narrow. It always contains the ligament of the ovary, and part of the broad ligament, and, as the tumor grows, the Fallopian tube is drawn in so as to form part of it, and is as a rule both elongated and thickened. The arteries may become as large as the radial and the veins the size of the finger. Besides these structures, lymphatics, nerves, involuntary muscle fibres and connective tissue, all forming a bundle covered by a peritoneal sheath, enter into its formation.

Accidents and complications. 1. *Torsion of the pedicle.* When the pedicle is long and thin, the tumor from some cause may rotate on its axis. Sudden torsion may lead to gangrene and fatal peritonitis. If it develops slowly, it will cause œdema and hyperæmia of the wall, hemorrhage into the wall and cavity, or suppuration. If the

torsion continues the whole pedicle may be severed. Torsion of the pedicle may involve the intestine and cause its occlusion; on the other hand it may effect a cure, by causing atrophy from diminished blood supply.

2. *Adhesions.* So long as the wall is covered with its epithelium it slides freely over the surfaces with which it comes in contact, but when the epithelium is rubbed off, or covered by inflammatory exudation, adhesions to the surrounding structures or organs are easily formed.

3. *Ascites.* An accumulation of ascitic fluid sometimes accompanies an ovarian cyst, especially the proliferating papillary variety.

4. *Hemorrhage.* Blood, arising from erosion of the vessels, ulceration of the walls, or torsion of the pedicle, may be poured into the cystic cavity, imparting to the fluid a dark red or brown color. Rapid increase in the size of a tumor is strongly suggestive of hemorrhage.

5. *Suppuration.* The wall of a cyst may become inflamed and the contents changed to pus. The suppuration may be due to torsion of the pedicle, to puncture of the cyst, or to puerperal infection.

6. *Rupture.* The cyst may rupture and pour its contents into the abdominal cavity, when the fluid, if unirritating, may become absorbed. Bloody, ichorous, or purulent fluid, and the contents of dermoid cysts cause more or less violent peritonitis, and very likely death. Rupture may also occur into the intestine, stomach, vagina, bladder, or Fallopian tube, or through the abdominal wall, especially at the umbilicus.

7. *Calcification and ossification* may take place to such proportions that the whole tumor may be changed into a hard shell.

8. *Cancerous degeneration.* Proliferating glandular cystomata and dermoid cysts may become malignant and implicate neighboring organs, and with the formation of metastatic deposits elsewhere.

Symptoms. The onset is characterized by vague disturbances which do not differ from those described under other circumstances. They are at first reflex troubles due to congestion and stretching of the appendages, later come symptoms due to pressure on the rectum and bladder, but the latter are often absent. Following these occurs the period of tumefaction, when the abdomen becomes more or less distended, and the general health affected.

Two stages in the development of cystic tumors can be recognized. In the first stage the tumor is small, is hidden in the pelvis, and recognized only by bimanual palpation. In the second stage the tumor has become abdominal and may be felt through the walls.

Pelvic stage. As soon as the tumor has attained three or four times the size of a normal ovary, it falls into Douglas' cul-de-sac. Bimanual examination will determine its presence, and its situation and connections, as well as its ovarian nature. It is usually hard, because of the small size and great tension of the capsule. When it has a well defined pedicle it is very movable. When included in the broad ligament it seems to be one with the uterus, but careful examination will reveal a slight groove between them. Tumors limited to the size of the fist or fœtal head will probably remain permanently in the pelvis, if larger they will ascend into the abdominal cavity.

Abdominal stage. By *palpation* a well defined spherical tumor is felt above, in one or other iliac region. Irregular shape or protuberances generally indicate a polycystic tumor. *Fluctuation* may be felt, the degree depending upon the size of the tumor and the elasticity and thickness of its walls. *Percussion* over the tumor gives dulness. *Bimanual* palpation reveals the uterus anteverted, lying close behind the pubes, and pushed slightly to the opposite side from the cyst. The cervix is drawn

upward and not easily within reach. In some cases the uterus may be pushed downward and backward, the tumor resting upon it. In cysts of the broad ligament it may be pushed completely to one side. The sound sometimes will show decided elongation of the uterine cavity.

When the cysts have grown to a large size the abdominal walls will be thinned out, fluctuation will be more readily made out, while towards the sides solid masses are .often found. Percussion elicits flatness over an irregular spherical area, convex above, and separated from the region of hepatic dulness by a zone of resonance. Pressure on the aorta and crural arteries may cause vascular souffles.

Menstrual disorders are rather rare. Menorrhagia is often very extensive in follicular cysts of the ovary. Sterility is an unavoidable result when both ovaries are affected, but a unilateral ovarian cyst sometimes complicates pregnancy. Pressure upon the bladder often produces incontinence of urine, and upon the rectum constipation. When the tumor reaches very high in the abdomen, the movements of the diaphragm may be seriously embarrassed, causing dyspnœa and cyanosis.

Sooner or later the general health becomes rapidly impaired, caused by compression of the various portions of the digestive apparatus, joined with a reflex dyspepsia observed in the course of all utero-ovarian diseases. Compression of the ureters, though it may not for a long time cause albumenuria, does cause serious uropoietic disturbances, and adds to the malnutrition of the system. Pressure upon other organs, causing pain and sleeplessness, act in the same way by adding to the general enfeeblement. When combined these conditions produce an appearance of ill health and distress to which Spencer Wells has given the name "fascies ovariana."

Prognosis. "When ovarian tumors," writes Spencer Wells, "attain such a size that the general health is

affected, the length of life granted to the patient will probably not exceed two years, and these two years usually consist of serious trouble, even of torture and despair." However, in some rare cases, the course of the disease may be very slow. Unilocular broad ligament cysts may rupture into the peritoneum several times in succession, with quite a long respite after each rupture. On the other hand, proliferous cysts, after remaining quiescent for a long time, may suddenly take a rapid course. An absolute or relative spontaneous cure is not an impossibility. Intra-peritoneal rupture often brings about the cure of broad ligament cysts. Gradual torsion of the pedicle may, exceptionally, cause atrophy. Death is the ordinary result of cystic development, unless there be surgical interference. Marasmus, peritonitis, and embolus are the three causes of death. Ascites, although not necessarily fatal, is an unfavorable occurrence.

Papillary cysts tend towards malignancy, and when so diagnosed, should always make the prognosis very guarded. Glandular cysts may also undergo cancerous degeneration. Certain clinical symptoms, indicated by sudden development of a tumor which has already existed for some time, rapid emaciation and cachexia, multiple adhesions, especially in the pelvis, œdema of the lower limbs and abdominal walls out of all proportion to the size of the tumor and the amount of ascites present, leave no doubt in such cases.

Diagnosis. 1. *In the pelvic stage.* In the early stages of ovarian cysts, it is difficult to distinguish them from other tumors situated by the side of the uterus. A sessile cyst of the broad ligament might be simulated by a *cellulitis* or *salpingitis*, but a remembrance of the previous symptoms, and the course of the disease, will prevent error. A small pelvic hæmatocele shows fluctuation at first, but does not give the sensation of an encapsuled tumor, while the manner of its appearance is entirely different.

Extra-uterine pregnancy in the beginning has few distinctive symptoms, except those of amenorrhœa and congestion of the genital mucous membrane. Later it is characterized by special signs which will be referred to in a subsequent chapter.

Retroflexion of the gravid uterus will be suspected when the signs of early pregnancy are present.

2. *In the abdominal stage. Pregnancy.* Error in such a case is a very serious one, and is most likely to be committed when there is hydramnios, for then it is difficult
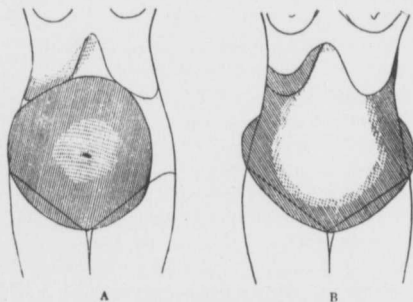
FIG. 108.—The shaded portion shows the area of dulness.
A. Ovarian tumor. B. Ascites.

to palpate the fœtus or hear the fœtal heart sounds. It must not be forgotten that amenorrhœa, swelling of the breasts, and imaginative sensations of fœtal movements, produced by borborygmus, may exist in a case of ovarian tumor. The diagnosis will be settled only by the perception of fœtal movement, the hearing of the heart sounds, the identification of fœtal parts, contraction of the gravid uterus, ballottement, and toward the end of pregnancy engagement of the fœtal parts.

Ascites. Ascites may simulate a large cyst. In effusion of fluid within the pelvic cavity, the abdomen is

more spread out, less acuminated, and on percussion
flatness is found in the dependent portions, and tympan-
ites on the uppermost surface of the dome. In a position
of lateral decubitus, the fluid gravitates to the side and
iliac fossa, while the tympanitic note appears on the op-
posite side where it did not previously exist. This dis-
placement of the fluid is very characteristic. In cases
where ascites has rapidly developed in connection with
an ovarian tumor, much difficulty may be experienced in
making a diagnosis, but the rapid increase in the size of
the abdomen, œdema of the lower limbs, decline of the
general health, and the absence of a previously existent
tumor, will assist in making a correct diagnosis. An-
other sign to be looked for is mobility of the uterus,
which is present in ascites and absent in large cysts.
Finally the condition of the heart and liver should not
be overlooked, disease of either of which often gives rise
to ascites.

Tubercular and cancerous peritonitis. In the first
named there will be signs of intestinal or pulmonary
tuberculosis, and irregularities in the shape of the abdo-
men due to meteorism interfered with by adhesions. In
the case of *cancer* there will be the presence of irregular
masses in the mesentery and neighboring parts, together
with rapid cachexia. Puncture may be of service in
establishing a diagnosis, but at the present day it is
usually omitted. Even when done with the greatest pre-
caution it is by no means a harmless operation. It may
be followed by effusion of fluid into the abdominal cavity
and fatal peritonitis; or by suppuration of the cyst; or by
grave hemorrhage from wounding a blood vessel in the
abdominal wall; or an overlying portion of intestine may
be punctured. If the tumor be of the papillary form, there
may be escape of vegetations into the abdominal cavity,
and consequent infection of the peritoneum. If none of
these accidents happen, the puncture is apt to set up in-

flammatory adhesions, which, if extensive, or of long standing, may complicate the removal of the tumor subsequently.

Uterine fibroids. Uterine fibroids, particularly fibrocystic ones, may simulate ovarian cystomata, but a careful examination under an anæsthetic, taken in consideration with the history and symptoms of fibroids, will generally make the diagnosis easy.

Hæmatometra may be recognized by its situation and special etiology.

Vesical distension has been the source of numberless errors, but may be avoided by the employment of a catheter before proceeding to examine.

Renal tumors, hydronephrosis, and *hydatidiform cysts* have also given rise to mistakes. In such cases the diagnosis may be made by ascertaining whether the tumor is fixed in the hypochondrium, and free inferiorly, permitting the hand to be passed beneath it quite far above the pubes; and also by ascertaining whether the intestines, especially the colon, are interposed between the tumor and the abdominal wall. Tumors of the liver, spleen, mesentery, omentum, and echinococcus, may also give rise to error, which sometimes can only to be cleared up by cœliotomy. Tumors of the abdominal wall, phantom tumors, tympanites associated with partial contraction of the abdominal muscles, or superabundance of fat in any particular spot, may give rise to difficulty in making a diagnosis, particularly in hysterical patients, but the difficulty may be overcome by examination under an anæsthetic.

Treatment. It is scarcely necessary at the present day to reiterate the statement made by all writers, that there is only one form of treatment for ovarian cysts, and that is extirpation.

Medicinal treatment. Electrolytic puncture, injections of iodine and other astringents into the cyst are now

regarded as malpractice. It is only a few years since it was the frequent practice to tap the cyst several times before its removal, a proceeding which has been abandoned by all who recognize its dangers. There may be circumstances under which it may be impossible to perform ovariotomy on account of the objections of the patient or of the friends; or where the presence of cancer, extreme weakness, or grave visceral complications would render an operation inevitably fatal. In such cases tapping may be resorted to, to relieve immediate symptoms.

OVARIOTOMY.

Ephraim McDowell, of Kentucky, was the first to do an ovariotomy for ovarian cyst, in 1809. The pedicle was left in the abdomen, and a cure followed. Subsequent to this there were isolated cases of bold operations which found no imitators. In America, in 1844, W. L. Altlee commenced a remarkable series of operations which, in 1871, reached the number of two hundred and forty six. Ovariotomy can be said to have been thoroughly established in America after the year 1865. In England, between 1852 and 1856, Baker Brown operated nine times. In the year 1858 commenced the remarkable career of Spencer Wells, and which was kept up almost to the time of his death, when he had well passed the thousand. The next prominent figure in ovariotomy is that of Thomas Keith, of Edinburgh, who performed his first operation in 1862. On the Continent, the names of Koeberle, Schroeder, Billroth, Martin, and others, are honorably associated with the operation. The introduction of antisepsis into the field of surgery introduced a new phase of existence for the operation. Ovariotomy has now passed from the hands of a few eminent specialists into those of surgeons all over the civilized world. In every capital, city, or town, there are surgeons who, with honor to their art and credit to themselves, successfully perform the operation which, half a century ago,

was condemned by the leaders of surgery as being little removed from murder.

The operation. The patient having been prepared according to the general directions given in an early chapter, is placed upon the back upon the operating table. The incision is made in the middle line, between the pubes and the umbilicus, after the manner already described. On reaching the peritoneum it will be found to vary in thickness. It may be thinned by distension, or thickened by constant irritation or inflammation. When there has been much inflammation, the peritoneum may be a thick highly vascular tissue, which bleeds freely on division. The incision is made in that structure long enough to admit of the extraction of the collapsed and empty cyst without using force. If the tumor is unusually large, or the adhesions abundant or very dense, it may be subsequently enlarged to suit the conditions present.

Emptying and delivery of the cyst. Whatever be the condition present, it is always best to begin by emptying the cyst, and the best mode in the large majority of cases is by tapping. For a cyst of small size Wells' small cyst trocar, and for a large one Tait's instrument with blunt conical point, may be used. To prevent the escape of fluid at the side of the trocar, a flat sponge wrapped around the point of introduction will suffice. After the trocar has entered the cyst cavity and the walls become flaccid, large forceps are made to grasp the cyst wall and pull it steadily but gently out of the wound, keeping the parietes of the tumor in easy contact with the abdominal parietes. A flat sponge placed between the cyst and the parietes may be useful in preventing the escape of fluid into the abdominal cavity. Secondary cysts may be emptied without removing the cannula from the main cyst, but while this is being done, the fingers inside the abdomen should make certain that the trocar is not pushed through the main cyst wall. As the cyst is withdrawn the trocar opening is pulled over the edge of the

wound, and as soon as it is clear of the abdominal open-
ing, a fold of the cyst wall above and below is caught in
strong forceps. The trocar is now removed, and if the
sac has not been emptied sufficiently for its total with-
drawal, it may be incised between forceps, permitting
the cyst contents to run down into the ovariotomy pad.

Adhesions. If, after emptying the cyst as completely
as possible, adhesions prevent it being delivered, the im-
portant step of separating them is to be begun.   For
separating very soft, fine, and recent adhesions, a sponge
may be used, the adherent structure being, so to speak,
sponged away from the tumor. Adhesions of firmer con-
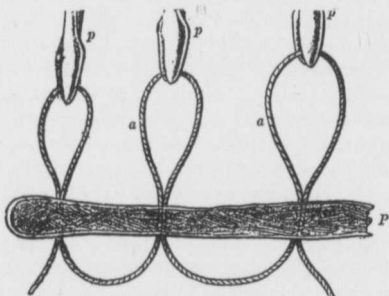
FIG. 109.—Ligation of pedicle in three sections.

sistency may be dealt with in various ways. If compara-
tively recent they may be peeled off with the fingers. If
the adhesions are old, fibrous, and thick, they may be sur-
rounded by ligatures and divided. During the separation
of adhesions the walls of any of the hollow viscera may
be torn. Such laceration must of course be immediately
closed by suitable sutures. If at any point the connection
to the bowel or bladder is so intimate that complete separa-
tion seems dangerous to the integrity of the organ, then
a thin layer of the adherent portion of the cyst wall must
be cut off and left behind.

Treatment of the pedicle. The pedicle has been sub-
jected to almost every conceivable surgical treatment.
"It has been tied entire, tied in sections, been twisted off,
burnt off, crushed off, cut square off, cut off in flaps, left
inside, left outside, and has been made to slough off."—
(Bland Sutton).

The extra-peritoneal treatment by the clamp is now
permanently abolished, and needs no description. The
silk ligature is now almost universally used for securing
the pedicle, although strong coarse catgut is used by some
surgeons. After fully exposing the pedicle, and estimat-
ing its size and the position of the blood vessels, a pedicle
needle, threaded with stout silk, is passed through the
centre, taking care to avoid all vessels. After dividing
the silk into two equal parts, the needle is unthreaded
and withdrawn. Each division of the ligature, after inter-
locking it with the other, is tied over its own half of the
pedicle, and then returned and tied over the opposite half.
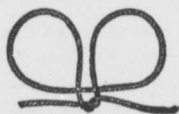
FIG. 110.—Staffordshire knot.

When the pedicle is very broad
it may require ligation in sections.
This may be done by passing the
pedicle needle, armed with an extra
long silk ligature, through the pedi-
cle one third distant from the mar-
gin. The loop thus formed is caught
on one finger and the needle still threaded with-
drawn, and re-entered midway between the last point
of entrance and the opposite margin. The pedicle
needle is again withdrawn and the loops arranged
so that they will be of equal length. The liga-
ture is divided at the loops, and after inter-
locking one with the other, each ligature is separate-
ly tied so as to include its own section. The ends of the
outer ligatures may be reversed and tied around the op-
posite sides of the pedicle. A favorite method for secur-
ing the pedicle is that known as the "Staffordshire knot."

The pedicle needle, armed with a silk ligature, is passed through the pedicle and then withdrawn, so as to leave a loop on the distal side. This loop is then drawn over the tumor, and one of the free ends drawn through it, so that one end is above while the other is under the re-tracted loop. Both ends being seized in the hand, they are drawn through the pedicle until complete constriction is made.

The pedicle secured, it may now be divided at a dis-tance from the ligature sufficient to prevent it slipping, and the stump, after its peritoneal coat has been sutured to close in the raw surface, allowed to drop back into the pelvic cavity. The peritoneal cavity, if necessary, is to be carefully cleansed, taking care not to overdo it. A sponge on a holder is left in contact with the stump of the pedicle until the parietal sutures are introduced, after which it may be withdrawn, and if it indicates that no hemorrhage is going on, the abdominal wound can be closed.

Accidents during operation. Mishaps, such as the escape of fluid into the cavity, hemorrhage, or injury to the viscera, may occur during the most simple ovario-tomies, and they are especially frequent in difficult cases. It is necessary therefore for every surgeon, to be success-ful, to be able, promptly and efficiently, to deal with such accidents, and without such knowledge no surgeon should undertake an ovariotomy.

Broad ligament cysts, as a rule, grow away from the ligament, pushing aside the ovary and tube, and occasion-ally they exhibit a well marked pedicle. Sometimes, how-ever, they may grow downward, widely separating the layers of the broad ligament, and stretching out the tube and ovary over their walls. Adhesions are rare, but spon-taneous rupture is not infrequent. These cysts were once removed by tapping or aspiration, and their innocuous

nature and slowness to refill are great inducements to use that kind of treatment, but since it has been discovered that some of them are papillary growths, and the radical operation in most cases easy and safe, extirpation is preferred. Their removal, when there is a pedicle, is to be accomplished the same as in ovarian tumors.

In some rare cases, when the cyst grows between the layers of the broad ligament, removal may be attended with considerable difficulty. Here there is no pedicle, and the base of the cyst lies deep in the pelvis. The growth in these cases must be dissected out between the layers of the ligament. Beginning on the side next the uterus the peritoneal investment is opened, and the wall of the cyst exposed. The finger pushed into the cellular tissue separates the cyst from the ligament, bleeding vessels being caught up by forceps. Step by step the process is continued until the cyst is completely enucleated from its bed. The two flaps representing the layers of the broad ligament may, according as seems best at the time, be left untouched, or united by suturing; or after ligation in section, its upper portion may be cut away and the peritoneal structures turned in and sutured.

Incomplete operations. The presence of firm general adhesions of an intra-ligamentous cyst which will not permit of its being enucleated without extreme shock and loss of blood, or the sudden collapse of the patient in the middle of the operation, may determine the surgeon to conclude it without total removal, or as rapidly as possible. In such cases the cyst may be emptied, and after being drawn up into the wound, as much of the sac as possible may be excised, and the remaining portion sutured in the lower angle of the wound and drained by gauze packing. The method of draining by an opening through the vagina presents many advantages, especially in the case of suppurating cysts firmly adherent to the floor of the pelvis.

SOLID TUMORS OF THE OVARY.

Under this heading is included *fibroma, sarcoma,* and *epithelioma* or *carcinoma.*

Fibroma. Fibroids of the ovary are rare. They do not form circumscribed new growths like fibroids of the uterus, but seem rather to be a kind of fibroid degeneration of the organ, and so uniformly hypertrophied that its shape and relations are not altered. As a usual thing they are small, not larger than a hen's egg or an orange, but they may reach larger proportions. They are hard in consistency and have a mammillated surface. They usually have a pedicle, and are free from adhesions because of the ascites which they produce. They may become cystic, due to dilatation of the lymph spaces in the connective tissue—the so called *geodes*—and filled with a coagulable serous fluid.

Symptoms. The symptom which usually first attracts notice is ascites, caused by the excessive mobility of the tumor. When this symptom is absent, the tumor may escape notice, or may accidentally be discovered by attention being drawn to the patient, owing to menstrual disturbances. It is almost impossible to diagnose it from a pedunculated fibroid of the uterus. The treatment consists in its removal by vaginal or abdominal hysterectomy.

Fig. 111.—Spindle-celled sarcoma of the ovary.

Sarcoma. This neoplasm is of rare occurrence. It may be primary, or it may develop secondarily in an ovarian cystoma, and is often bilateral. It forms a pink tumor, ranging in size from that of a small orange to that of an adult head. It is globular or oval, has a smooth surface, and of varying consistency according to structure. Spindle-celled sarcoma is the most common variety, but round celled and mixed celled

sarcomata are also found. From a clinical point of view these tumors are of great malignancy, and the symptoms are those of a rapidly developing malignant tumor. Ascites is always present and cachexia rapidly appears, features which distinguish it from fibroma.

Epithelioma or carcinoma. If secondary cancerous degeneration of cysts is excluded, primary cancer of the ovary is very rare. It may effect the young as well as the old, and is apt to be bilateral. Two principal anatomical forms are described; one, a diffuse infiltration of the ovary, originating in the epithelium of the follicles of Pfluger's ducts; the other a superficial development from germ epithelium. In the former, the ovary retains its shape for a long time, with the exception that its surface becomes nodular. It may attain the size of an adult head, and as it increases in size the pedicle and broad ligament become infiltrated. In the latter variety a dendritic growth appears on the surface of the ovary, which, in the later stage cannot be distinguished from papilloma of the ovary.

Ascitic fluid, possibly tinged with blood, is characteristic of this disease, and the other symptoms will be similar to those of sarcoma. The diagnosis is based upon the blood tinged ascites, infiltration of the broad ligament, upon the existence of nodules about the recto-uterine cul-de-sac, and upon the rapidly appearing cachexia. When seen early, the treatment consists of performing oophorectomy; later the treatment can only be palliative.

CHAPTER XXVI.

ECTOPIC GESTATION.

By this term is generally understood development of the impregnated ovum outside the normal uterine cavity. No entirely satisfactory conclusions have yet been reached regarding the cause of this form of pregnancy. The chief difficulty lies in the fact that it has not yet been determined at what point of the female genital tract normal impregnation of the ovum takes place, and until this question is settled, the primary question, whether extra-uterine fœtation is an abnormal ectopic impregnation, or is simply a detained impregnated ovum, must remain unanswered.

Etiology. It is claimed by many that the seat of coalescence of the male and female elements is normally in the Fallopian tubes, and if such be admitted, it can readily be seen how a variety of causes may operate to detain the ovum in the tube. The most frequent conditions named as tending to bring about ectopic gestation, are :—Adhesions of the ovaries and tubes, the result of peri-salpingitis; loss of ciliated epithelium; flexion of the tubes; dilatations and diverticula; constrictions from inflammatory changes; and polypi of the tube, closing its lumen like a ball valve. As a result of one, or a combination, of these conditions the fructified ovum is arrested at once by the unsurmountable barrier, or is retarded until, by growth, its size is such that it can no longer make progress towards the uterine cavity.

In not a few cases operative interference and subsequent examination have shown the absence of any form of tubal disease. Here the explanation is offered that an unusual and excessive hyperæmia of the tubal mucous membrane retards the progress of the fecundated ovum,

during which it has time to assume such proportions as to arrest its further progress and thus becomes impacted in some part of the tube.

Classification. Ectopic gestation may be divided into *primary* and *secondary* forms. The primary form may be thus classified:—

1. Tubal. { a. Tubo-uterine or interstitial.
{ b. Isthmial.
{ c. Ampullar.

2. Ovarian.

In *tubal pregnancy* when the fertilized ovum develops out near the fimbriated extremity it is called *ampullar;* when at the inner portion of the tube it is called *isthmial;* and when in that part of the tube which traverses the uterine walls, it is designated *interstitial* or *tubo-uterine.*

The occurrence of *primary ovarian pregnancy* by fecundation of the ovum and its subsequent growth upon the ovary has been denied, but quite recently several well authenticated cases have been reported.

To these two varieties has been added a third— *tubo-ovarian*—in which the fecundated ovum has been arrested on its way from the ovary to the tube.

The *secondary form of ectopic gestation,* often called secondary abdominal pregnancy, is always a sequela of the primary form, the result of rupture of the enclosing sac and secondary implantation and growth of the ovum upon an adjacent organ within the abdominal cavity or between the folds of the broad ligament.

Tubal pregnancy. As nearly every ectopic gestation is primarily tubal it will be sufficient for our purpose to study its progress, growth and various terminations under this one heading. In the first week after fecundation the tube begins to thicken, due mostly to excessive vascularization, and not, as in the case of the pregnant

uterus, to any great increase in its tissue elements. As pregnancy progresses, the wall of the tube becomes thinned and stretched, until in some cases it appears as a thin transparent membrane, composed only of an attenuated stratum of muscle covered with peritoneum. The development of the fœtal membranes is the same as in intra-uterine pregnancy, except that the placenta is largely fœtal in its origin. During the first four to six weeks, the abdominal ostium of the tube becomes hermetically sealed. Until the fœtal membranes are well formed, the chorionic villi have but a feeble hold upon their points of attachment, and may be easily separated, giving rise to intra-tubal hemorrhage and the formation of a "tubal mole." This subsequently, along with the ovum, may be entirely absorbed, or terminate in the formation of a *hematosalpinx*.

Should the ovum continue to grow a time must arrive when the tube can no longer keep pace, and then one of two things must occur, (1) rupture of the tube, and escape of the gestation sac, or (2) extrusion of it at one or other end of the tube.

When the pregnancy is ampullar, and the attachments light, it may be extruded into the pelvic cavity (*tubal abortion*). This extrusion is usually associated with a considerable amount of hemorrhage from the site of its attachment and the blood collecting in Douglas' cul-de-sac forms a *pelvic hematocele*.

When the pregnancy is tubo-uterine extrusion of the ovum may take place into the uterine cavity to be at once expelled, or reimplanted on the uterine decidua. This form of termination is exceedingly rare.

When rupture of the tube occurs escape will take place either into the abdominal cavity, or downwards between the layers of the broad ligament. Just what will occur will depend upon the location at which the ovum has been arrested within the tube and may be thus classified:

(1) Ampullar.
- *a.* Tubal abortion.
- *b.* Rupture and escape into the abdominal cavity.
- *c.* Rupture and escape between layers of broad ligament.

(2) Isthmial.
- *a.* Rupture and escape into abdominal cavity.
- *b.* Rupture and escape between layers of broad ligament.

(3) Tubo-uterine.
- *a.* Extrusion into the uterus.
- *b.* Rupture and escape into the abdominal cavity.
- *c.* Rupture and escape between the layers of broad ligament.

(4) Ovarian. Rupture and escape into abdominal cavity.

The time at which rupture may occur, and the direction which it may take, depend largely upon the location of the placenta and the extent of attachment. In tubal pregnancy primary rupture occurs usually between the second and fourteenth weeks. When the placental attachment is on the upper or lateral walls of the tube rupture will most likely be intra-abdominal. When on the floor of the tube the walls of the broad ligament will first be separated and then rupture will occur downwards between them.

The fate of the mother will depend largely upon the direction of the rupture. If *intra-abdominal* fatal hemorrhage may take place in the course of a few hours, or the hemorrhage may spontaneously cease after a small or copious hemorrhage and the patient may make an ultimate recovery with absorption of the clot.

Should rupture take place *into the broad ligament* she will have the best chance for life as the hemorrhage will

cease as soon as an equilibrium has been established between the tension of the layers of the broad ligament and the blood pressure, and as the space is limited the amount of hemorrhage cannot be very great. This form of rupture and its accompanying hemorrhage gives rise to a *broad ligament hematoma.*

The fate of the fœtus will be influenced in a similar way. If the rupture is *intra-abdominal,* and the mother lives, its further life depends upon whether by maintaining its attachment to the tube or becoming implanted upon some adjacent organs it will derive from these sources sufficient vitality to maintain life for a period of time.

If rupture takes place *into the broad ligament* the fœtus will have a better chance for life for it finds in the hematoma which surrounds it material sufficiently fertile for continued growth.

The reimplantation and growth of the fœtus under one or other of the conditions described constitutes what is known as *secondary ectopic gestation.* When intra-abdominal it is called *secondary abdominal pregnancy,* and when within the broad ligament, *secondary broad ligament pregnancy.*

Should the fœtus continue to maintain its vitality in its new locality it may (1) die at a subsequent period from various causes or (2) live on to full term, and when delivered by section may, in rare cases, be well formed, but in the vast majority of cases will be deformed, puny, and die after a day or so.

It is not to be forgotten when considering the dangers to the mother that at any period during secondary ectopic gestation separation of the membranes from their attachment may occur and the mother will again be exposed to all the dangers of another hemorrhage.

Should the fœtus die at primary rupture, or at any period subsequently, it will undergo changes dependant

upon its age. Up to the second month it may be completely absorbed, later it may undergo *mummification,* *calcification* or what is commonly called *lithopedian.* It may be converted into *adipocere,* remain for a long time in the abdominal cavity, with later conversion into a putrid mass which may be discharged into the rectum, vagina or bladder.

Symptoms. All the symptoms of normal pregnancy may, though not always, be present. In some cases, instead of amenorrhœa there will be profuse metrorrhagia with expulsion of some bits of decidua. This symptom is not to be confounded with membranous dysmenorrhœa, already referred to when speaking of that disorder. Pain is variable, in some cases it is almost constant, and in others absent. When present before rupture it may be sharp and lancinating, or a dull heavy aching. Changes occur in the external genitals similar to those in normal pregnancy, together with softening of the cervix, and the formation of a tumor in one or other vaginal fornix. Should pregnancy have advanced to the third or fourth month, a tumor with a well defined area of dullness on the anterior abdominal wall may be made out by percussion. By vaginal examination the tumor will be found lateral, and at one side of the uterus with a sulcus between them.

The symptoms of *rupture* are very pronounced. A patient in previously good health, complaining only of some mild form of disturbance, and possibly with some of the earlier symptoms of pregnancy, is suddenly seized with severe lancinating, cutting, or agonizing abdominal pain. If the hemorrhage is extensive, she may fall almost as unconscious as if struck a blow. Soon there are the usual symptoms of severe internal hemorrhage, indicated by a rapid or almost imperceptible pulse, quickened jerking respiration, air hunger, vertigo, nausea and vomiting, and dimness of vision. These symptoms soon

merge into those of profound shock, the extremities becoming cold and clammy, the skin pale, the conjunctivæ pearly, and the face drawn. Death may follow at once, or it may be delayed for a day, or even longer. In some cases the hemorrhage ceases for some time, to begin some days later and then prove rapidly fatal.

When rupture occurs into the broad ligament the initial attack is similar, but the subsequent symptoms are not so urgent, and the hemorrhage will soon cease from its own pressure. Should the embryo die there may be no further trouble, but often the fœtus continues to develop, and sooner or later a secondary rupture occurs.

In those rare cases which go on to full term, labor like pains, closely resembling normal labor, come on, and may continue for hours, or even days, and then cease. During this time escape of blood, and of portions of the decidua occur in a majority of cases.

When the patient survives rupture the sharp labor like pains subside, the breasts diminish, the tumor decreases rapidly in size, and she may regain her health in time, absorption, or one of the other changes that render the fœtal body innocuous, taking place.

Diagnosis. A careful review of the clinical history will often lead to a suspicion of the condition. A multipara, who, perhaps, has not borne any children for some years, and probably has had in the meantime an attack of salpingitis and pelvic peritonitis, develops the early symptoms of pregnancy. There will be more or less dull ovarian pain, which continues until it terminates in the paroxysms of rupture, and which, if not fatal, is followed by marked anæmia. A bimanual examination taken in conjunction with this clinical history, will point certainly to the nature of the pregnancy.

A retroverted gravid uterus may give rise to misleading symptoms, but a careful vaginal and rectal palpation will make out the enlarged fundus.

Ovarian tumors and *enlargement of the Fallopian tubes* associated with intra-uterine pregnancy, may lead to error, but the fever which accompanies pyosalpinx in the majority of cases will mark the difference. If it be impossible to arrive at a definite conclusion, it is justifiable to recommend exploratory cœliotomy. The *rupture of a pyosalpinx* may be mistaʹen for a ruptured tube, but when such occurs, the clinical history is entirely different, the pulse is not so rapid, the temperature rises rapidly and steadily, the patient does not present such marked symptoms of loss of blood, but shows early signs of sepsis. It can scarcely be expected to differentiate between the tubal, ovarian, and the secondary abdominal form, when anatomists fail to agree concerning them when the abdomen is opened.

Treatment. Undoubtedly when a diagnosis has been made *previous to rupture*, the proper course to pursue is the removal of the affected tube. Cases with a history suggestive of ectopic gestation, and a mass lateral to the uterus detected by vaginal examination, should be operated upon without hesitation. A proportion of such cases may prove to be pyosalpinx or hydrosalpinx, but the error is not a serious one, as in either instance operation is indicated.

If the patient is seen at the time of, or immediately after rupture the general rule is to operate without delay. It may be unwise to wait for reaction from the shock and hemorrhage, for hemorrhage is the very indication for interference, and in a very large proportion of cases only ceases with death. Two exceptions may be made to this:—(1) cases in which examination makes certain that rupture has occurred into the broad ligament; (2) cases which, when first seen, exhibit such a degree of collapse that it is felt certain the shock of operation will only take away the chances which the consequent low arterial pressure offers as a means of hemostasis.

Operation. Operation before rupture is not more difficult than ordinary salpingo--oophorectomy. After rupture the abdominal clots should be turned out as rapidly as possible, the bleeding points caught between the fingers, or blades of a pair of forceps, and held until the tube has been ligated.

The free infusion of normal salt solution, preferably under the breasts, is strongly indicated. When a more rapid method is demanded the intra-venous method, or the introduction of the solution into the abdomen before closure of the wound must be resorted to.

In cases inoperable for the reason mentioned it is best not to stimulate the patient in any form, or to use any means for raising the blood pressure, prefering by posture, bandaging the limbs and arms, compression of the aorta and other methods for the management of profound hemorrhage, to tide the patient over.

If rupture has occurred and the patient has recovered from the immediate effects of it, and gestation has ceased with the death of the fœtus, there may be a spontaneous cure. Under these favorable circumstances, especially if there be a continuous improvement in the symptoms, one may adopt the plan of watchful expectancy. Intraligamentous rupture is rather liable to be followed by recovery and absorption. In either case one must be prepared to operate promptly on the least evidence of secondary trouble.

Previous to the fourth month the entire gestation sac and its contents may be removed, usually without great danger of fatal hemorrhage. The hemorrhage, if troublesome, can usually be controlled by ligature.

If gestation has advanced beyond the fourth month, and the child living, attempts at the removal of the fœtus, together with the placenta and gestation sac, may result in uncontrollable and fatal hemorrhage which even ligature of the ovarian and uterine arteries and compres-

sion of the aorta may not control. The more usual and safer plan is to incise the sac, remove the fœtus, stitch the sac to the abdominal wound and leave the placenta to disintegrate and drain away by means of gauze or tubular drainage, or for removal at a later period. When the fœtus has been dead for some time, and placental cirlation ceased, the products of conception may be removed in their entirety with a minimum amount of danger.

Evacuation of the gestation sac through the vagina. After carefully examining the mass and deciding upon the most accessible point for evacuation, usually in the fornix, a pair of blunt-pointed forceps are thrust into the sac, and with the blades opened are partially withdrawn while the sac is being steadied from above. The embryonic debris is evacuated with the finger inserted through the opening, after which the sac may be washed out with a weak solution of bichloride, and afterwards packed with gauze.

CHAPTER XXVII.

PELVIC HÆMATOCELE AND PELVIC HÆMATOMA.

The mere effusion of blood (intra-pelvic hemorrhage) into the pelvic cavity should not be confounded with hæmatocele, the term pelvic hæmatocele being reserved for encysted collections of blood. When the blood effused and so encapsuled lies within the peritoneal cavity, it is termed *intra-peritoneal hæmatocele,* or simply *pelvic hæmatocele.* When the blood is spread out below the serous membrane, within the broad ligaments, it is called *extra-peritoneal hæmatocele.* or simply *pelvic hæmatoma.*

PELVIC HÆMATOCLE.

Etiology. The effusion of blood into the pelvic cavity may arise from the tubes at the regular menstrual period, the hemorrhage taking place from its distal end, and generally presupposes the existence of salpingitis. In such a case the amount effused may be comparatively small, and may undergo absorption, or may become encapsuled from inflammatory adhesions. Subsequent tubal hemorrhages may increase the size until the hæmatocele may attain considerable proportions. The *most common origin* is recognized by all to be the early rupture of an extra-uterine pregnancy, and by some it is stated to be the only one. *Other causes* are assigned, such as rupture of varicosities of the utero-ovarian plexus, disorders of ovulation, abortions in connection with peritoneal adhesions, hæmatosalpinx or ovarian hæmatoma, atresia of the cervix or vagina, and the rapid evacuation of the uterus for hæmatometra.

The tumor is usually *situated* in Douglas' cul-de-sac. At the outset the blood is liquid and forms a sort of lake, but the cyst, however, is rapidly formed, and is then en-

tirely separated from the mass of intestines. In this way it is often difficult to distinguish the arch formed by the new membranes from an uplifted peritoneum. The uterus is pushed towards the symphysis and the sac is adherent in front to its posterior wall, and to the agglutinated intestines which lie upon it. The sac contains a mass of coagulated, or syrupy semi-liquid blood, according to the length of time the lesion has existed. Even in

cases where there is reason to suspect tubal pregnancy as the cause, it is not usual to find any piece of the fœtus, as it usually disintegrates and is absorbed.

Symptoms. The appearance of hæmatocele is usually associated with symptoms characteristic of its production, such as those connected with the uterine appendages, or ectopic gesta-
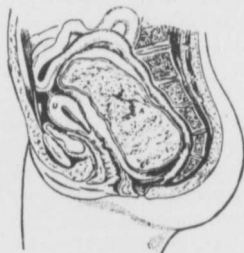
FIG. 112.—Retro-uterine hæmatocele. U., Uterus. R. Rectum. A. Blood-clot.

tion. It is seldom that the effusion of blood is not ushered in by some decided disturbance. In the most severe cases, there may be those which have been mentioned as characterizing ruptured tubal pregnancy. In less severe cases there may only be local pain, and a sensation of weakness, accompanied by an increase in the size of the abdomen; or the oozing of blood may be so insidious that the symptoms may be imperceptible. On making a vaginal examination, a fluctuating tumor will be felt in Dogulas' cul-de-sac which pushes the uterus upward so that the cervix is reached with difficulty, and when felt is found flattened against the pubes. By bimanual examination, the uterus can be outlined and seems to be incased in the mass which fills, or more than fills the pelvis.

The course of the disease is essentially chronic, but successive attacks at times occur. In the most favorable cases, the patient will look ill, perhaps be unable to walk, during which the tumor may become reduced in size and finally disappear by degrees. Instead of this the tumor may remain for an indefinite period, with but little change in the syrupy chocolate colored contents. Suppurative inflammation may set in, and the mass may be converted into an abscess cavity, which increases its size and softness. Perforation into the abdominal cavity is rare, but perforation may take place into the rectum, by which the whole mass may become evacuated and complete recovery follow.

Diagnosis. The sudden appearance of a retro-uterine tumor coinciding with the phenomena of internal hemorrhage is almost pathognomonic. It might be mistaken for a ruptured pyosalpinx or a retroverted gravid uterus, but the diagnosis of these conditions has already been referred to in the chapter on ectopic gestation. Ovarian cysts and uterine fibromata have nothing in common with hæmatocele their manner of appearance and course are entirely different.

Treatment. Active interference is justified only by the appearance of accidents which may endanger the life of the patient. If seen at once, absolute rest in bed is demanded, and ice may be applied over the lower abdominal region. Antisepsis of the vagina is to be attended to, to avoid all danger of infection through that channel. It is best to leave the disease to itself, so long as it follows a regular and progressive course towards absorption. Should such not occur within a moderate limit, or the patient's life is threatened by compression or inflammatory phenomena, rapid evacuation of the cyst becomes obligatory.

Incision is preferable to puncture, and the site of the incision is to be determined by the protrusion of the

tumor. If it projects plainly into the posterior cul-de-sac, it should be opened through the vagina. By the use of retractors the field of operation is enlarged as much as possible, and an incision is made following the axis of the tumor, care being taken not to injure the ureter by going too far forward in the lateral fornix. The finger in the rectum will serve as a guide in avoiding the intestine. After reaching the interior of the cyst, the opening may be enlarged and the contents carefully evacuated with the fingers, or by antiseptic injections. After clearing out the cavity, it may be loosely filled with strips of iodoform gauze, which will prevent further hemorrhage and complete the process of disinfection. The strips may be allowed to remain for forty eight hours. When removed the irrigation may be renewed, and drainage kept up by strips of gauze inserted into the opening in the cyst cavity, and by a few pieces inserted loosely into the vagina.

Abdominal section. The vaginal operation gives the best and most rapid results but there may be special reasons for selecting the abdominal route. When the hæmatocele has been exposed, and the general abdominal cavity walled off, the hæmatocele may be opened and the contents sponged out. An incision is next made through Douglas' cul-de-sac into the posterior vaginal fornix and the cavity drained in that way by gauze or tubular drainage. After a careful abdominal toilet the abdominal incision is closed completely.

PELVIC HÆMATOMA.

By pelvic hæmatoma is understood the effusion and accumulation of blood between the walls of the broad ligament so as to form a tumor of variable size.

Etiology. It may be the result of intraligamentous rupture of an ectopic gestation, hemorrhage the result of rupture of the pampiniform plexus which runs along the

lateral margin of the uterus, between the layers of the broad ligament. It not infrequently follows operation for the removal of the tube and ovary.

Symptoms. The objective symptoms are, in a manner, similar to those of a pelvic hæmatocele, but not so well marked. It usually occurs in women who are apparently in good health. The immediate attack is at times traceable to some unusual strain or over exercise during menstruation. Sharp pain in the abdomen marks the onset, attended by a tendency to syncope. Symptoms of decided anæmia, and troubles due to compression of the bladder, are manifested, with swelling and tenderness over the abdomen.

Bimanual examination will elicit the presence of a turtle-back-shaped tumor in one or other broad ligament, and is soft and pasty in consistence. The tumor is usually of medium size, varying from the size of an orange to that of a small fœtal head. The locality is decidedly lateral. The uterus, instead of being pushed to the front, as when the tumor is in Douglas' cul-de-sac, lies on the opposite side of the pelvis, and when the tumor is not large can be distinctly outlined on every side. The changes which may occur in this form of pelvic hæmorrhage are similar to those occurring in pelvic hæmatocele.

Treatment. Expectant treatment is the rule. If the gravity of the symptoms calls for interference the vaginal route has its dangers, owing to the possibility of wounding the uterine artery, the ureter or even the intestine. If the tumor bulges well down into the parametrium, and distends the vaginal fornix on that side, incision and drainage, after the manner recommended by pelvic hæmatocele, will prove the best.

In cases not so favorable it may be evacuated by the combined operation of cœliotomy and drainage through the vagina. After opening the abdominal cavity and

protecting it after the manner already described, the sac is carefully incised and the contents removed. Guided by the fingers of one hand in the vagina, an opening is made through into that canal. The sac is then loosely packed with strips of iodoform gauze, the ends being brought out through the vaginal opening, and drainage established by that route. The edges in the upper opening in the sac are then inverted and drawn together by a continuous catgut suture, and after a thorough cleansing of the abdominal cavity, the abdominal wound is closed.

CHAPTER XXVIII.

GENITAL TUBERCULOSIS.

Tuberculosis of the female genitals, although long known, has only recently attracted special attention. It was previously known only as a concomitant of advanced phthisis, and it was not until cœliotomy demonstrated its frequent occurrence, either alone or in combination with tubercular peritonitis, that its clinical importance began to be appreciated. It may involve any or all of the various parts of the genital tract, though some portions are more frequently affected than others, the order of frequency being the tubes, uterus, ovaries, vagina, cervix, and vulva.

Etiology. Tuberculosis of the genital tract may be either *primary* or *secondary*. Primary inoculation may occur when the patient has been much in the company of one suffering from tuberculosis. The clothes, a sound, or the fingers of a physician may carry the germ. Cohabitation with a person who has either genital or pulmonary tuberculosis is a well authenticated cause in many instances. The puerperal state has a large share in primary infection, but whether infection can come through the semen, the saliva, or the blood of a scratch, is a disputed point.

Secondary genital tuberculosis is that which is developed in the course of tubercular degeneration of other organs, especially the lungs. In the great majority of cases, genital tuberculosis is secondary and metastatic, the infection taking place by way of the peritoneal cavity and the lymph channels, from the abdominal viscera, or through the general circulation from distant organs, or by auto-inoculation from the secretions.

Vulva. Vulvar tuberculosis is the least common, and is often unassociated with tuberculosis of other portions

of the genital tract, being due either to blood infection or
to direct infection. The tuberculous ulcers may attain a
considerable size and are usually shallow. Their margins
are irregular, sharply cut, slightly raised above the gen-
eral surface, and of a more or less granular appearance.

Vagina. Vaginal tuberculosis is much more frequent,
and while it may be primary, it is usually secondary to
tuberculosis affecting the higher portions of the genital
tract. It occurs in the form of miliary tubercles, never
larger than millet seeds, and which in time undergo
caseation and break down, producing tuberculous ulcera-
tion. The ulcers thus formed are irregular in outline,
their margins sharply cut and perpendicular, the base
shallow, studded by granulations of varying size, and
color, and covered by a layer of caseous material. These
ulcers by extension may perforate the walls upon which
they are situated and lead to the formation of fistulæ. It
is generally limited to the posterior wall of the vagina,
and does not ordinarily extend below the upper third,
circumstances which are explained by the fact that infec-
tion generally takes place by secretions from the tuber-
culous uterus or tubes.

Uterus. Tuberculosis of the uterus is not a rare affec-
tion. It is generally associated with tuberculosis of the
tubes from which it has usually originated, and is fre-
quently secondary to phthisis, or occurs as a part of a
general infection. It is nearly always limited to the
corpus uteri. When tuberculosis of the cervix occurs, it
is usually without any involvement of the body, and
appears either in the form of miliary tubercles, or of
tuberculous ulceration, or as a combination of both forms.
It is at first limited to the endometrium, but later the
muscular coat becomes involved. The formation of the
miliary tubercles occurs just beneath the epithelium of
the endometrium, and may or may not be combined with
inflammatory changes. The appearance of the tubercles,

an·l of the ulcerations resulting from them, does not differ essentially from that observed in tuberculosis of other mucous membranes.

In chronic diffuse tuberculosis, the interior of the body of the uterus is filled with caseous material which forms a layer over its inner surface. On scraping it off the subjacent tissue is seen jagged and irregular, and studded with tubercles in all stages of development, from the typical grayish semi-transparent nodule, to the irregularly shaped ulcer. As the disease progresses, tubercles are gradually formed in the muscular coat, which accordingly undergoes hypertrophy, and leads to
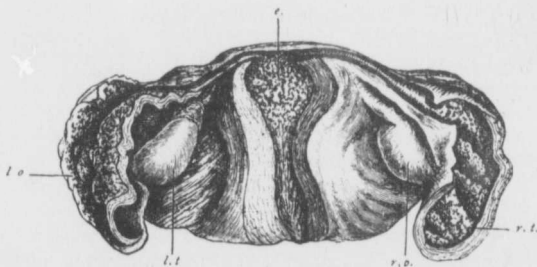
FIG. 113.—Primary tuberculosis of the tubes and ovaries, posterior view. (*Kotschau.*) *r.o.* Right ovary, enclosing caseous masses evacuated by the tearing apart of adhesions. *r.t.* Right tube, dilated and adherent to ilium, having formed part of the wall of a tuberculous abscess. The left ovary, tube, *l.o.* and *l.t.*, and endometrium, *e*, are also tuberculous.

a considerable enlargement of the uterus. By obliteration or clogging up of the cervical canal, it may lead to the formation of a pyometra.

Tubes. The Fallopian tubes are far more frequently affected by tuberculosis than any other portion of the genital tract, and in the great majority of cases either the uterus, or the ovaries, or both, are likewise affected. In most cases it is secondary to tuberculosis elsewhere,

although in a considerable number of cases they are the seat of the primary form.

Tuberculosis of the tubes may occur in two forms. *Miliary tuberculosis*, in which the tubes present the general characteristics of miliary tuberculosis of other mucous membranes, and *chronic diffuse tuberculosis*, which corresponds to the like named process in the uterus, and is the form familiar to all under the name *caseous pus tubes*.

In advanced cases the tube is greatly enlarged, and if the peritoneum is involved, its external surface is studded with tubercles in various stages of development. It is densely adherent to the surrounding structures, and in some cases presents an almost stony hardness. In most instances the fimbriated extremity is occluded, but when patulous caseous material will be found protruding from it. On section the lumen is found more or less dilated and filled with typical yellowish caseous material, which varies greatly in consistency, sometimes being fluid, sometimes it forms a soft mass, and occasionally is dry and solid or even calcified. The normal appearance of the mucosa has disappeared, and presents a ragged, ulcerated surface over which are strewn tubercles in all stages of development.

A third form of tuberculosis of the tube has been described, *chronic fibroid tuberculosis.*. It differs from the others in the excessive formation of fibrous tissue in and between the tubercles.

Ovary. Tuberculosis of the ovary is comparatively rare, and when seen is usually found in combination with other forms. The process may be limited to the surface of the ovary, or it may invade the entire organ. Macroscopically it appears in the form of miliary tubercles, caseous masses, or tubercular abscesses.

Symptoms. No period of life is exempt from genital tuberculosis, but the period in which its occurrence is

most frequent is that of the greatest sexual activity. The early symptoms are often not very clear, or so masked by those of the primary affection that the involvement of the genitals is not suspected. When it occurs in the vulva and vagina, it gives rise to symptoms common to all ulcerative processes, and in these instances simple inspection is frequently all that will be required, but a positive diagnosis can be made only by the microscope.

Tuberculous ulceration of the cervix may show itself by profuse hemorrhage, and in that way may be mistaken for carcinoma. In cases in which the uterus is affected there is usually a very profuse leucorrhœa, which in some instances consists of a mixture of the caseous material and the ordinary secretions. The uterus will be found enlarged, and there will be associated with it menstrual disturbances.

The symptoms produced in tuberculous disease of the ovaries and tubes are in most instances overlooked in the general condition, and even no symptoms at all may be present. When the process is limited to the tubes and ovaries, the symptoms will vary from those of a simple salpingitis to those of the most severe form of pelvic abscess, and in spite of careful examination nothing will be found to indicate the tuberculous nature of the affection. Amenorrhœa is not necessarily an accompaniment, but if it occurs it is usually due to the coexisting phthisis.

Diagnosis. From the clinical history afforded, it becomes evident that prior to the discovery of the tubercle bacillus a positive diagnosis of genital tuberculosis could not be made.

Tuberculosis of the vulva and vagina may be confounded with *granular vaginitis*. When the frequency of the latter is compared with the rarity of the former, it is in itself almost sufficient for a diagnosis; but when one considers that when tuberculosis of the vagina occurs it is in phthisical women, and that granular vaginitis is

frequently associated with pregnancy or gonorrhœa, a mistake should not occur. Tuberculosis should also be diagnosed from the *papular* and *ulcerative syphilides*, which may be done by the history, by the entire absence of pain, and by the total disappearance of the latter under antisyphilitic treatment.

Herpetic eruptions about the vulva occur as small cysts filled with clear fluid, and usually appear about the menstrual period, and disappear soon after. *Hard* and *soft chancres* may be diagnosed by the history, by the appearance of the patient, and by their well known characteristics.

Tuberculous ulceration of the cervix may be diagnosed from *carcinoma* by the aid of the microscope. In tuberculosis of the uterus, and in all cases where there is the slightest suspicion of genital tuberculosis, the vaginal and uterine secretions should be inspected with the greatest care for tubercle bacilli. The diagnosis of tuberculous disease of the tubes and ovaries is more difficult than that of tuberculous disease of the uterus, for the reason that their secretion is not so readily obtained for examination, and it is doubtful if, when the disease is limited to these organs, a positive diagnosis can be made.

Prognosis. Primary tuberculosis of the genitals is always to be regarded as a serious affection, as it always presents the possibility, as do other foci of tuberculosis, of a general infection, with its uniformly fatal termination. Tuberculosis of the tubes and ovaries tends to the production of tubercular peritonitis, or it may go on to the formation of an abscess in them. The results of operative treatment have been quite satisfactory. If the tuberculosis is limited to the tubes and ovaries, the prognosis after removal will hardly be more grave than if they were removed for the usual inflammatory affections.

Treatment. Remembering the sources of primary infection, the necessity for prophylaxis becomes apparent.

Possible infection by physician or attendant should be carefully guarded against. Persons afflicted with genital tuberculosis, whether male or female, should be impressed with the dangers of infection by coitus. The treatment will vary according as different portions of the genital tract are affected, and whether the affection is primary or secondary.

Ulcers of the vagina and vulva may be made to disappear by the application to them of tincture of iodine, iodoform, or lactic acid. If a tuberculous ulcer of the cervix is recognized, and fails to respond to conservative treatment, it should at once be amputated. If the process is limited to the uterus, it should be curetted and iodoform suppositories inserted. If there is the slightest recurrence of the infection, the uterus should be removed by vaginal hysterectomy, and in such cases it is best to remove the tubes and ovaries as well.

The question as to the removal of the tubes and ovaries when they are the seat of tuberculosis, is a difficult one. As primary tuberculosis is rarely diagnosed, the propriety of their removal is seldom faced, but when discovered in cases of cœliotomy undertaken for other causes, there should be no hesitation as to the propriety of their removal. In advanced or decided cases of pulmonary phthisis, there should be no thought of operating. In cases associated with tuberculous peritonitis, there need be no hesitation to perform cœliotomy and remove the tubes and ovaries, and uterus as well, unless the general condition of the patient is altogether unfavorable.

CHAPTER XXIX.

TUBERCULOSIS OF THE PERITONEUM.

In connection with miliary and chronic pulmonary tuberculosis, it is not uncommon to find the peritoneum studded with small gray granulations.   They are constantly present too on the serous surfaces of tuberculous ulcers of the intestines. Apart from these conditions the membrane is often the seat of extensive tuberculous disease, which occurs in the following forms:—

Acute miliary tuberculosis, with sero-fibrinous or bloody exudation.

Chronic tuberculosis, characterized by larger growths, which tend to caseate and ulcerate, leading to perforation.   The exudate is purulent or sero-purulent, and is often sacculated.

Chronic fibroid tuberculosis, which may be subacute from the onset, or which may represent the final stage of the acute form.   The tubercles are hard and pigmented, there is little or no exudation, and the serous surfaces are matted together by adhesions.

Tubercular peritonitis occurs at all ages, and is common in children associated with intestinal and mesenteric disease.   The incidence is most frequent between the ages of twenty and forty.

A striking pecularity is the frequency with which the condition simulates, or is associated with tumor, and is to be remembered when making a diagnosis of abdominal and pelvic tumors.

Omental tumors may form from the puckering and rolling up of this membrane until it forms an elongated firm mass, attached to the tranverse colon and lying across the upper part of the abdomen.

Sacculated exudation may occur, in which the effusion is limited and confined by adhesions between the coils of

intestines, the parietal peritoneum, the mesentery, and
the abdominal or pelvic organs. This encysted exudate
is most common in the middle zone, and has frequently
been mistaken for an ovarian tumor. It may occupy the
entire anterior portion of the peritoneum, or there may be
a more limited saccular exudate on one side or the other.
It may be completely within the pelvis proper, associated
with tuberculous disease of the Fallopian tubes.   In
rarer cases the tumor may be due to the great retraction
or thickening of the intestinal coils. Not only the small
intestine, but the entire bowel, from the duodenum to the
rectum, has been found forming such a hard nodular
tumor.

Mesenteric glands occasionally form very large tumor
like masses, but they are more commonly found in chil-
dren than in adults.

Encysted tuberculous peritonitis may, as has been said,
be mistaken for an *ovarian tumor.* In addition to the
local signs of ovarian tumor already mentioned, the
presence of salpingitis, the induration of the sacro-uterine
folds as felt by the finger introduced into the rectum, the
slow development and other signs and symptoms of tub-
erculosis, will serve to distinguish it. An ovarian tumor
with pelvic adhesions presents severe increasing pelvic
symptoms, with proportionately less general depression,
loss of health and emaciation than tuberculosis.

Diagnosis. The previous history, the gradual onset
and progressive development will suggest the nature of
the disease in most cases. Many cases set in acutely
with symptoms resembling typhoid fever or peritonitis.
Abdominal tenderness, tympanites and fever are usually
accompanying symptoms. In the more chronic cases
subnormal temperatures are not uncommon. Associated
with these there is usually, in either case, imperfect di-
gestion, loss of flesh, emaciation, sometimes diarrhœa,
and occasionally pigmentation of the skin.

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