CHAPTER XIV

DISEASES OF THE FEMALE REPRODUCTIVE ORGANS

DERANGEMENTS and diseases of the genito-urinary organs have a widespread influence upon the physiological welfare of the individual as a whole. General diseases also have a marked influence upon the reproductive functions. The physician, therefore, must take into consideration the reproductive system when investigating the condition of the patient and especially in cases where there is evidence of endocrine imbalance. In a volume on Clinical Medicine it is essential to give some consideration to the methods of investigation and the general treatment of complications of the pelvic organs of women. The modern gynæcologist endeavours to restore reproductive function as much as possible rather than to destroy it by radical surgical treatment; therefore it is unnecessary to go into details of treatment of conditions in which surgical aid is essential.

§ **432**. Recent research on ovarian and pituitary hormones has thrown much light upon reproductive function and the causation of various gynæcological conditions. Before discussing the diseases affecting the pelvic organs, it is therefore advisable to give a brief account of the various hormones secreted by the ovary and the pituitary body and their influence upon reproduction.

Before the onset of *puberty*, the ovary contains primordial follicles whose secretion is associated to some extent with the early development of the genital organs. At puberty marked changes take place in the ovary; the Graäfian follicles develop, and secrete œstrogens from the follicle cells. This secretion causes proliferative changes in the uterine mucosa, with increased growth and activity of the reproductive organs and development of the secondary sex characteristics. As the follicle develops and ripens, extrusion of the oöcyte takes place, followed by the formation of the corpus luteum, which secretes a hormone known as progesterone. When there is defective secretion of œstrin, the development of the genital organs is arrested, the secondary sex characteristics fail to appear, menstruation does not occur and sterility results. If œstrin is injected, growth and activity in the genital organs occur to some extent.

Atrophic changes occur in the uterus and other genital organs when *oöphorectomy* is performed in adults. These changes can be partly arrested, or if they have already taken place, a certain degree of proliferation and vascularity of the uterine mucosa may be restored, by implanting ovarian grafts or by giving injections of œstrin. If œstrin is injected into castrated rats and mice, desquamative changes take place in the superficial cells of the vagina, similar to those which occur during œstrus in the normal animal. Œstrin also causes a certain degree of mammary activity. It arrests the reduction of the chromatophilic cells in the cervical ganglion which appear after castration, and also of the granular cells in the anterior lobe of the pituitary.

Menopausal changes occur as a result of diminishing œstrin secretion. Symptoms arising from these changes can be relieved by giving follicular hormone preparations such as stilbœstrol, alone, or in combination with other glandular extracts.

Menstruation.—At puberty menstruation begins. The menstrual cycle has two phases: (i.) the proliferative phase, when the action of œstrogen is marked; it prepares the mucosa for the reception of the fertilised ovum and lasts from the end of menstruation till the period of ovulation. (ii.) The secretory phase, where the action of

progesterone (the corpus luteum secretion) overcomes that of œstrogen but is dependent on its sensitising action. During the first 14 days of the intermenstrual cycle, there is increased secretion of œstrogen, causing proliferation and vascularisation of the uterine mucosa. These changes are in the nature of a preparation for the fertilised ovum and resemble the decidual formation which takes place between the 14th and 16th day of the intermenstrual cycle; the extrusion of the oöcyte is followed by the formation of the corpus luteum.

The follicular hormone is secreted throughout the whole of the menstrual cycle. The amount of it which is found in the urine during the proliferative phase gives some indication of the time at which ovulation takes place. Its action is inhibited by the secretion from the corpus luteum. If fertilisation does not take place, the superficial layers of the mucosa are cast off, hæmorrhage occurs, and a fresh menstrual cycle sets in; and in the absence of fertilisation, the corpus luteum degenerates and becomes scar tissue. If fertilisation does occur, the corpus luteum develops further and its secretion—progesterone—is concerned with the maintenance of the ovum in the uterus. It is the guardian of the ovum during the earlier stages of pregnancy at least, presiding over its destiny, together with the pituitary hormones. It inhibits uterine contractions and ovulation during pregnancy and prevents abortion. The administration of corpus luteum hormone prevents the occurrence of abortion in many cases. When examining specimens of the uterine mucosa after curettage it is necessary to remember the exact date of the menstrual cycle when the operation took place; otherwise physiological proliferative or degenerative changes may be looked upon as pathological.

Hormone Therapy has made rapid progress, and its value in gynæcological practice is recognised; its use will lessen to some extent the necessity for radical operations. There is still, however, so much confusion regarding its application that further research work must be carried out to stabilise medical opinion as to its merit in suitable cases. We are still ignorant of the various relationships between the endocrines; we have no exact knowledge of the stimulating and the controlling influences which one gland exercises upon another. Research upon the relationship between the anterior pituitary secretions and the gonads has produced a large number of extracts which are widely used, but further research and experience are required before we can have definite indications for the administration of hormone substances.

The standardisation of hormones has enabled the gynæcologist to prescribe exact doses of substances whose activity is maintained at a known level. The crystallisation of the hormones of the ovary is a recent and valuable advance.

The *follicular hormone* of the ovary can be administered orally, by injections, and also by means of ointments and vaginal suppositories. It is known as œstradiol by international workers: stilbœstrol, hexœstrol and dienœstrol, in tablet form by mouth, are replacing many of the previous injections. The *lutein substance* of the ovary, however, is usually given by injection, as it is more satisfactory than by mouth.

MENSTRUAL ABNORMALITIES.—*Defective œstrogen secretion* at puberty leads to imperfect development of the uterus, delayed onset, and scanty, irregular periods. Spasmodic dysmenorrhœa may be due to defective uterine development, or to defective follicular hormone secretion. Premature menopausal changes may take place when the œstrogen secretion is defective. Administration of œstrogen may remedy this.

Excessive œstrogen secretion leads to marked proliferation of the uterine mucosa and increased number of the follicles. Excessive menstrual loss alternating with periods of amenorrhœa may occur in young women; in these cases œstrogen is found in the urine. The *corpus luteum secretion* is defective in this type of young patient; in older women retention cysts are often present in the ovaries—the condition is known as *Metropathia Hæmorrhagica.* Treatment consists in the administration of progesterone alone or in combination with extracts of the anterior lobe of the pituitary; a daily intramuscular injection of progesterone is given for seven days before the onset of the expected period, the object being to counteract the over-action

of œstrogen. Œstrogen is a stimulant to uterine action ; progesterone has a sedative action. Should such treatment fail, it may be necessary to curette the thickened endometrium or apply radium 50 mgm. for 22 hours to the interior of the uterus. Radium reaction may cause hæmorrhage for some days or longer after its application, but the ultimate effect is satisfactory ; the small dose does not interfere with menstrual function or reproduction. In older women it may be necessary to excise the cystic portions of the ovaries before cure is effected. In some cases there may be granulosa cell formation in the ovaries. Hysterectomy should not be advised.

The *pituitary* is closely associated with ovarian function. The anterior and posterior lobes differ in physiological action. (1) The secretions of the *anterior lobe* are concerned with the reproductive function ; they control ovarian activity and are concerned with uterine changes and embedding of the ovum. They do not act directly on the genital organs but through the medium of the ovary. Two known hormones have been isolated—Prolan A stimulates the production of œstrogen, and Prolan B the formation of the corpus luteum and secretion of progesterone. In pregnancy Zondek and Aschheim found that pituitary hormones are present in the urine and if the urine is injected into an immature mouse, corpus luteum and hæmorrhagic changes take place. This constitutes the most reliable test for early pregnancy. Positive results are also obtained in cases of hydatidiform moles and teratomata. (2) The *posterior lobe* of the pituitary secretes a hormone which influences uterine contractions. This secretion has been divided into two forms : (*a*) one which influences uterine contractions only and (*b*) one which causes a rise in blood pressure. Pituitary secretion has no effect on a uterus after oöphorectomy ; its action is also inhibited by the corpus luteum. It is, therefore, more powerful in its action in the proliferative rather than the secretory phase of the menstrual cycle. Pituitary secretion influences abortion, but its action is more marked in late pregnancy, where it sensitises the uterus for the onset of labour.

The *Thyroid* and *Parathyroids* are related to reproductive function, inasmuch as some believe that they are concerned with calcium metabolism and partly counteract the influence of œstrogen, which stimulates the excretion of calcium. A combination of corpus luteum and of thyroid extract is useful in the prevention of abortion. Parathyroid extract gr. 1/10 is of benefit in some cases of dysmenorrhœa.

PART A. SYMPTOMATOLOGY

§ 433. Diseases of the pelvic organs have both Local and General symptoms. LOCAL SYMPTOMS are : Irritation or swelling around the vaginal orifice, vaginal discharge, including leucorrhœa, painful menstruation (dysmenorrhœa), excessive menstruation (menorrhagia), deficient menstruation (amenorrhœa), pain in the region of the organs, acute and chronic ; backache, various disorders of function (such as dysuria and dyspareunia), and tumours or swellings.

GENERAL SYMPTOMS consist of : (1) Malaise and general ill-health. The condition of chronic invalidism caused by pelvic maladies may be altogether out of proportion to the amount of local trouble. Most often such chronic ill-health dates from pregnancy or child-birth. (2) Disorders of the abdominal or pelvic viscera often cause symptoms of dyspepsia. (3) Anæmia, due to excessive hæmorrhage, lack of fresh air and exercise from confinement indoors, or from the toxæmia which occurs with degenerating tumours or as result of the complications of pregnancy. (4) Various neuralgiæ and a general hypersensitiveness of the nervous system follow derangements of the reproductive function.

Case-taking in diseases of women differs somewhat from that given in Chapter I. The following summary will form a guide to the principal questions to be answered as a matter of routine:

1. What is the leading symptom complained of by the patient?
2. History—name, age, married or single.

(*a*) If married, how long? How many children and ages of each? Character of confinements, easy or difficult? Any complications after childbirth? Any miscarriages?

(*b*) Menstruation—age at which it commenced? (1) Regular? How often does it occur? How many days does it last? (2) Is it profuse or does the flow contain clots? (3) Is pain present, before the onset or during the period? Has pain always been present? If not, when did it begin? Where is the pain? In back, legs, or in one or other side of lower abdomen? What relation has pain to the flow? Is it continuous?

(*c*) Is there any intermenstrual discharge—duration, quantity, white, yellow, clear, thin or thick? offensive? with blood?

(*d*) Micturition—painful, frequent during day or night? Condition of bowels, regular? Are purgatives taken as a rule? Is there pain on defæcation?

(*e*) Other physiological systems must be enquired into, and whether the general health has suffered.

PART B. PHYSICAL EXAMINATION

§ **434.** An abdominal examination should be a matter of routine in all gynæcological cases.

(*a*) *An External Examination* of the abdomen by inspection, palpation, percussion and auscultation (§ 240). For a thorough examination of the pelvic organs the patient should lie on her back with knees flexed and shoulders raised; this relaxes the abdominal muscles. The degree of rigidity or contraction of the abdominal muscles can be ascertained. Is rigidity due to the cold hands of the examiner or to clumsy methods of palpation? Or is it a guard to prevent the examining hand from touching a deep-seated lesion? Is the rigidity due to nervousness, and will it pass off when the patient is more at ease? Place the warmed hands, cup-shaped, on the abdominal wall, very lightly at first. If the patient is encouraged to talk, her attention will be diverted from tender areas which may be more or less due to a condition of hypersensitiveness. If the normal areas are palpated first, the painful regions may be found to be less resistant as the examination proceeds. If there is tenderness in a particular area, is it local or referred from a deep organ? If so, the pathological lesion may be in the intestine or the posterior parietal peritoneum may be involved.

(*b*) *Pelvic Examination.*—There need be no unnecessary exposure of the patient during the vulvo-vaginal examination. A light blanket or a sheet is thrown over the knees and lower abdomen. This examination should only be undertaken in the case of married women or women who have borne children. Virgins should only be examined in exceptional cases or under an anæsthetic; if, however, a pelvic examination is neces-

sary, the rectal route should be employed, the patient lying on her left side. In nervous women this examination is of little value owing to lack of relaxation. To perform a *vaginal examination* two fingers of one or other hand are covered with a rubber glove or finger stall, lubricated with liquid soap or glycerin jelly, and gently introduced into the vaginal opening, care being taken not to touch with the thumb the sensitive anterior portion which includes the clitoris. The skin should not be soiled with the lubricating fluid. If the vaginal entrance is small, the forefinger alone should be inserted. It is useful to be able to examine with either hand. The condition of the *vaginal walls* should be noted —dry or moist, a normal pink or fiery red, as a whole or in patches, atrophic or swollen; the position and condition of the *cervix*, patulous or soft as in pregnancy, conical, firm, granular, scarred or friable. Bleeding on examination should be noted.

(*c*) *The Bimanual Examination* is next made by placing the two fingers in the anterior fornix and palpating the uterus with the external hand pressed firmly above the symphysis pubis. The size, shape, position and mobility of the uterus can be felt between the two hands. The examination may also aid in defining whether a painful area is low down or high up in the pelvic cavity. As a rule the uterus itself is not painful on palpation; pain on examination indicates congestion, adhesions, inflammatory conditions of the peritoneum or ovarian lesions. Palpation of the ovary sometimes gives a sensation of sickness rather than of pain—a valuable aid in localising its position. Tumours, tubal or ovarian swellings can also be felt. The bladder and rectum must be empty.

Difficulties in examination may be overcome by giving an *anæsthetic*. This produces relaxation of the abdomen, so that palpation of the pelvic organs is easy on bimanual examination. As the patient goes under the anæsthetic the last area of rigidity may point to the seat of the lesion. The disadvantage of an anæsthetic is that areas of tenderness are not then ascertained, and deep palpation may thus cause damage, as in cases of ectopic pregnancy or pyosalpinx.

X-ray examinations are useful in localising appendix complications, and reveal the presence of calculus, a calcified fibroid, or bony tumours; a salpingogram (after the injection of iodised oil, B.P.) reveals the condition of the Fallopian tubes. X-ray also shows the position and condition of the spine, the vertebræ and the joints, also any spinal or pelvic deformity: and pregnancy after the sixteenth week.

Instruments employed in the examination of the pelvic organs.

1. *Vaginal Specula.*—The Ferguson speculum is a tube; the bivalve or trivalve consists of two or three limbs jointed together; and the duckbill (Sims). The first is best for the examination of the os; the second for the examination of the walls of the vagina; and the third for operative measures. Note the condition of the mucous membrane, and the character of any discharge. In passing the speculum, do not forget that the vaginal canal is directed backwards and upwards; less pain is produced by quick movements in the right direction than by slow bungling. If it is necessary, apply treatment to the interior by means of a probe covered with cotton-wool; do this before withdrawing the speculum.

2. The *volsellum* is a form of hooked forceps used for drawing down one or other lip of the cervix. It is contra-indicated in those conditions in which the sound is contra-indicated, and in tubal pregnancy. Owing to its lacerating and painful effect upon the cervical tissue it should only be used when the patient is anæsthetised.

3. *The Sound* is rarely used now except when operating or examining under anæsthesia. Undoubtedly harm used to be done by passing it, without a protecting speculum, through a septic vagina into the uterus. Its use is contra-indicated in (1) pregnancy, (2) menstruation, (3) acute inflammation in the pelvis, (4) cancer, and (5) it should never be passed before making a bimanual examination. The uses of the sound are to discover: (1) the depth of the uterus, which is normally 2½ inches, and the thickness of its wall, prior to dilatation and curettage; (2) the position of the uterine cavity, when it is impossible to find it by bimanual examination; (3) the size and state of the os; (4) the presence of tumours in the uterus.

Examination of a vaginal discharge gives valuable information (see § 437). A glass tube, with a rubber nozzle attached, is used to remove a little discharge, from which a thin film is made. Fix in equal parts of 90 per cent. alcohol and ether, stain with hæmatoxylin, ether and water blue (Papanicolaou). Examine under the microscope. The epithelial cells of the vagina are large, flat and with irregular faint outlines; the nuclei stain deeply. When these cells are numerous there is healthy tissue in the vaginal walls, with information as to the secretion of œstrogen and also the stage of the menstrual cycle. If the epithelial cells are few in number and replaced by small round or oval cells with deeply staining nuclei, the inference is that there is denudation of the superficial or protective epithelium. (1) In the follicular phase the vaginal smear shows leukopenia and cornified squamous epithelial cells, with small pyknotic nuclei; (2) in the post-menopausal or ovari-ectomised case the smear shows many leucocytes, a predominance of non-cornified squamous cells with larger nuclei, or compact cells with large nuclei from the deeper layers of vaginal epithelium. To produce a change from the second to the first stage requires œstrogen daily, in dosage varying with the preparation used. Stilbœstrol in doses of 0·5–1·0 mgm. is commonly given; the effect does not last long.

Dilatation of the Cervix may be performed by the (1) *Slow Method* (seldom employed); tents inserted and left *in situ* for some hours, or by (2) the *Rapid Method*, with Hegar's or Fenton's dilators, vulcanite or metal instruments of graduated sizes. General anæsthesia is necessary. Having inserted the posterior vaginal speculum, fix the anterior lips of the cervix with the volsellum or ring forceps, draw well down, measure the length with a sound, and insert the dilators gradually one after the other until the cervix is dilated. The curette is then used. The nature of any growth present is discovered by a microscopic examination of the scraping; such examination should never be omitted. Dilatation of the cervix is contra-indicated in cases of possible pregnancy, or cancer of the cervix. It should be performed with great caution when the tissues are softened by recent pregnancy.

PART C. DISEASES OF WOMEN, THEIR DIAGNOSIS, PROGNOSIS, AND TREATMENT

§ 435. Routine Procedure and Classification.—Having ascertained the patient's principal or *Leading Symptom*, and the leading facts as to the *History*, according to the scheme given in Part B., proceed, unless the nature of the case is not already apparent, to the *Physical Examination* (subject to the reservations mentioned in Part B.).

The diseases are considered under the various cardinal symptoms to which they give rise—viz.:

(A) Morbid alterations of the vulva and external parts .. § 436
(B) Leucorrhœa and other causes of discharge .. .. .. § 437
(C) Pain connected with menstruation (dysmenorrhœa) .. § 438
(D) Hæmorrhage .. .. § 439

(E) Amenorrhœa .. .. § 447
(F) Pain in the lower abdomen, not necessarily connected with menstruation (pelvic pain) .. .. § 448
Acute pelvic pain .. .. §§ 449 to 451
Chronic pelvic pain .. .. §§ 452 *et seq.*
(G) Pelvic tumours .. .. § 453
(H) Disorders of micturition and defæcation, pain on sitting, dyspareunia .. .. § 456
(I) Backache, chronic .. .. § 457
(J) Sterility .. .. § 458

§ 436. (A) **Morbid Alterations of the Vulva.**—A few of the common alterations are enumerated here.

VULVITIS in children may be caused by the migration of thread worms, streptococcal and coli infection from the anus, uncleanliness, gonorrhœa, or bad habits. In adults it is generally accompanied by vaginitis (*q.v.*).

PRURITUS AND ECZEMA VULVÆ is sometimes very obstinate. Careful examination should always be made for pediculi or irritating discharges from the uterus, vagina, urethra or from the minute ducts near the vaginal entrance. Diabetes is a rare cause.

A CARUNCLE is a minute red irritable papilloma situated usually just within the urethral orifice, and is a frequent cause of painful micturition, painful sitting, and painful coitus. There is also a painless form. Slight prolapse of the urethra may give rise to a red swelling which may be mistaken for a caruncle, especially in the aged.

LABIAL THROMBOSIS is readily recognised. ABSCESS of the vulva sometimes follows the last named; often it follows inflammation of Bartholin's gland. HERPES is an eruption of a small group of vesicles. They readily rupture, leaving round superficial ulcers which may become infected secondarily.

NOMA, DIPHTHERIA, AGRANULOCYTIC ANGINA, CHANCRES, CONDYLOMATA, INFECTIVE WARTS, ULCERS (simple or malignant) also affect the part. LEUKOPLAKIA and KRAUROSIS are dealt with in § 651.

In the *Treatment* of *vulval* conditions cleanliness is essential, and on the whole the lack of this is one of the most frequent causes of vulvitis. *Caruncle* is treated by diathermy fulguration, cautery or by operation. *Labial thrombosis* requires surgical treatment. The treatment of *pruritus* and *eczema vulvæ* may tax every therapeutic resource. Severe cases should be kept in bed. All scratching is forbidden, and to ensure this, sleeping draughts, even morphia, may be needed during the acute stage. Sedative soothing lotions and pastes of calamin, zinc, bismuth and lead, should be used. Albucid gives relief in some cases, also anethaine ointment and nestosyl. Sitz baths with magnesium sulphate added, suit others. Dettol cream (5 per cent. in lanoline) often gives relief when smeared over the affected area. Fissured and lichenified surfaces may be painted once a week with 4 per cent. argent. nit.. The *cause* may be tracked down and removed, usually a vaginal, cervical or urethral discharge. Dietetic care and open-air exercise are essential. When local treatment fails, tests for allergic causes should be carried out. Electrical methods are most

valuable, especially X-ray and ultra-violet light, but require expert administration. Œstrogen in the form of ointment or vaginal suppositories is of value, especially in older women, provided the local cause is removed.

(*a*) *There is a white,* NON-PURULENT DISCHARGE *from the* VULVAL ORIFICE ; *the condition is* LEUCORRHŒA.

§ **437.** (B) **Leucorrhœa** is a discharge colloquially known as " the whites " ; there is no discharge in health. Leucorrhœa is usually a simple increase of the normal secretion of the genital tract, a non-infective type of discharge, not to be confused with the purulent discharge associated with inflammatory conditions of the vagina, cervix, uterus or tubes.

Diagnosis.—A local investigation is inadvisable in the case of young girls. Of recent years much has been discovered from examination of the discharge alone. The normal vaginal secretion is acid due to lactic acid formed by Döderlein's bacilli : the pH of about 4·4 deters the growth of other micro-organisms. When the discharge gives pH of 5·6 or over, this points to the presence of local infection. A smear shows whether epithelial or pus cells predominate, and the presence and type of micro-organisms may be determined by microscopical examination alone. A thin discharge is usually of vaginal, a tenacious glairy mucus of uterine or cervical origin. A foul smelling discharge, worse after the period, usually indicates *B. coli* and streptococcal, sometimes also staphylococcal infection of the cervix or uterus.

Etiology.—Leucorrhœa is common (1) at puberty, (2) before menstruation, (3) with sexual excitement ; and often accompanies (4) debility, anæmia and (5) local congestion due to undue exertion, constipation, gastro-intestinal disorders and other causes of pelvic venous stagnation. (6) Malnutrition due to deficiency of mineral and vitamin constituents in the food.

Treatment.—Remove any local cause ; improve the health with exercise, fresh air and other general tonic treatment. Douches are usually unnecessary ; the best is lactic acid ♏ 120 to ℥ii ; dettol pessaries (5 per cent. in glycerin jelly), freshly prepared lactic acid pessaries, or penicillin compound pessaries are of benefit. Stilbœstrol 1 mgm. daily by mouth may help.

(*b*) *There is a* PURULENT DISCHARGE *which comes from the* VAGINA ; *the condition is* **vaginitis, acute** or **chronic.**

In ACUTE VAGINITIS the discharge is profuse, yellow or greenish, sometimes blood-stained, attended by dysuria and local signs of inflammation. The chief *Causes* of acute vaginitis are : (1) Traumatism, due to pins, peas, and worms in children, or in the adult an irritant pessary, a foreign body (contraceptive appliances, etc.), too strong douches or excessive coitus ; (2) infection with *B. coli*, streptococci, staphylococci, micro-organisms and fungi of various kinds ; (3) gonorrhœa, which is hard to diagnose from other infections of the vagina except by the microscopic examination of the discharge ; (4) extension from adjacent parts, such as the urethra or Bartholin's glands ; (5) a diphtheritic form ; and

(6) agranulocytosis (§ 155). Acute vaginitis of gonorrhœal origin is dangerous because of the liability to extend to the uterus, tubes and peritoneum and to the bladder and kidney.

Treatment.—Rest, hot hip-baths and douches of potassium permanganate (10 grains to the pint), corrosive sublimate or various silver or aniline dye preparations, and after a few days some astringent lotion such as sulphocarbolate of zinc, Tr. iodine (♏60–Ōi), Jeyes' creolin (♏60–Ōi), protargol (4 per cent.) may be swabbed on the wall as the speculum is withdrawn. The oral administration of a sulphonamide is of value in these cases.

Acute Gonorrhœal vaginitis.—Local treatment : the entire surface, every crevice and fold of the vagina is swabbed daily and carefully with a mercurial salt, then dried and packed with gauze. The urethra, cervix and ducts are separately dealt with. *General treatment :* chemotherapy is now replacing local treatment, and usually cuts short the infection in a very few days. Sulphathiazole and sulphadiazine are the most effective sulphonamides and are used in doses of G. i t.i.d. for one week. Penicillin, by three-hourly injection, gives better results, but at least 300,000 units in all must be given ; this course may have to be repeated. Care must be taken that this does not mask a coincident syphilitic infection.

In Chronic Vaginitis there is a thick, continuous, opaque discharge, usually with local signs of inflammation. The *Causes* are (1) antecedent acute vaginitis ; (2) various constitutional conditions, such as general debility, errors of diet, such as excessive protein intake, diabetes, old age, alcoholism, anæmia, and convalescence from fevers ; (3) new growths in the vaginal walls, such as epithelioma ; (4) irritant foreign bodies and other causes mentioned under Acute Vaginitis.

Trichomonas Vaginitis due to a flagellated protozoon is a common cause. It causes intense pruritus, intertrigo, and acute pain on urination. The vagina is red and tender, the vault filled with a thin, yellow or greyish-yellow purulent fluid, frothy, offensive, often acid in reaction. The origin of the parasite is unknown ; many cases are complicated by other infections. Relapse after each period, with a uterine discharge, is common.

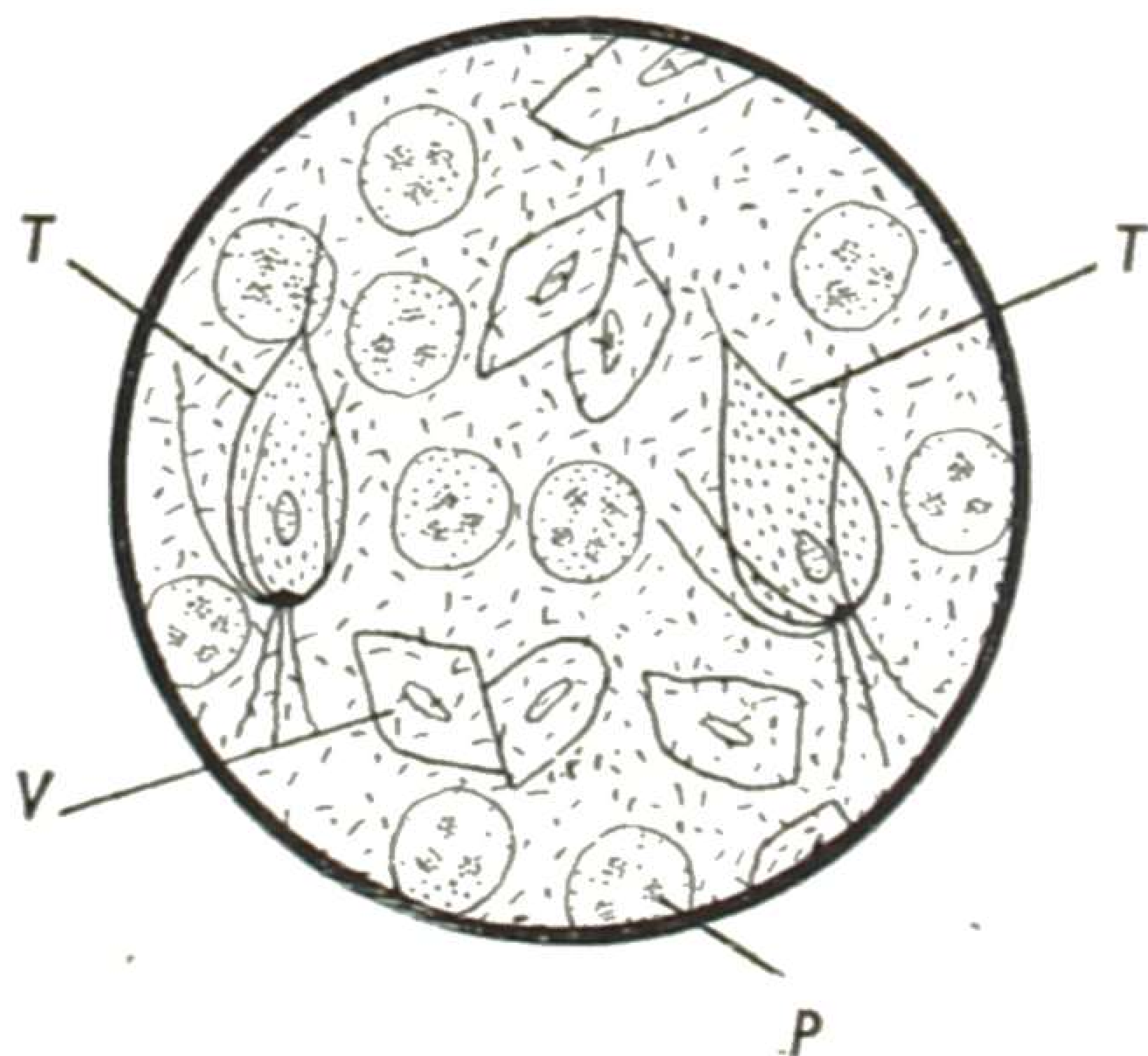

Fig. 109.—A Diagram drawn from a Microscopic Specimen of Vaginal Secretion. It shows Trichomonas Vaginalis Organisms (T) with Flagellæ : also Pus Cells (P) and Vaginal Epithelial Cells (V).

Treatment.—(1) Treat any constitutional disease and remove foreign bodies and new growths. (2) Deal with any primary cause originating in the cervix or body of the uterus. (3) For *trichomonas vaginitis*, insert high into the vagina each night two stovarsol vaginal tablets : after a week they should be used on alternate nights for a further 2–3 weeks. Lest this drug irritates the vulva, apply a wool tampon : and if relapse occurs,

repeat the treatment. (4) For other vaginal discharges, or to prevent infection after vaginal laceration, compound pessaries of penicillin with 0·1 per cent. flavizole give the best results. When considered desirable, local applications through a Ferguson's speculum of liq. iodi mitis or a solution of silver nitrate (5·0 per cent.) may be used. An insufflation of silver picrate powder (1·0 per cent.) each 5-7 days has been most helpful, but must not be used in the later months of pregnancy. Hot sitz baths produce a beneficial effect. Gonorrhœal cases demand special treatment (see Acute Vaginitis). When *vaginitis continually relapses,* seek and treat any source of re-infection in the cervix, urethra or Bartholin's glands.

SENILE VAGINITIS may occur in elderly women and with the menopause. The vaginal lining shows atrophy and red patches; the discharge may be blood-stained, and adhesive bands near the cervix are often found. The glycogen content of the vaginal epithelium is diminished. The cervix and urethra may be involved. Senile vaginitis responds to vaginal pessaries, diathermy or ionisation, and in some cases to œstrogen medication alone.

VULVO-VAGINITIS IN CHILDREN used to require very lengthy treatment. Œstrogen preparations stimulate the formation of glycogen in the vaginal lining and of lactic acid in its secretion; both of which aid nature's defence mechanism and are often curative. For gonorrhœa the sulphonamide group of drugs and penicillin have shortened the course of the infective discharge to a matter of a few days. According to the age of the patient, sulphadiazine ¼ G. is given four to six times a day for five days, then three times daily for another five days.

DISCHARGE OF **Uterine Origin** may be due to endocervicitis, endometritis, cancer (see Hæmorrhage), salpingitis, inflammation around the uterus (see Pelvic Pain)—and constitutional causes.

I. In ENDOCERVICITIS, or inflammation of the cervix, the discharge is more or less constant, and usually consists of *glairy material* like white of egg, but it may be muco-purulent. Other symptoms are: (1) The cervix is swollen, and may present retention cysts, but usually on examination with the speculum one sees an "erosion" or catarrhal patch, which may bleed slightly on pressure. (2) When the tissues around the cervix are congested, there is tenderness on palpating the cervix, often menorrhagia, dysmenorrhœa, and backache; (3) general malaise and other signs, as with other septic foci. Cervicitis may have to be *diagnosed* from cancer of the cervix. Here the age is not much guide, as cancer of the cervix may appear in a young patient. Cancer is hard to the touch and is friable, readily breaking down and bleeding when touched, and there is usually a blood-stained discharge. Microscopic examination of scrapings will determine the diagnosis. When fixity of the uterus and cachexia have appeared, the diagnosis is simple. For *Causes* and *Treatment* see below.

II. In ENDOMETRITIS, or hyperplasia of the lining membrane of the body of the uterus, the discharge comes in gushes when the patient rises or walks about. Endometritis is usually accompanied by both menorrhagia and dysmenorrhœa, and general pelvic discomfort and pain. The general health may be poor. Bimanually, the uterus is found to be enlarged; the cervix is often hypertrophied and inflamed. Sometimes there is a history of recurring abortions or of sterility. Endometritis must be

diagnosed from cancer, especially if there is blood in the discharge. Owing to the risk of delay, in doubtful cases curettage should be performed and the scrapings examined.

The *Causes* of endocervicitis and endometritis are classified thus: (1) Bacterial invasion—gonorrhœal, streptococcal, staphylococcal, diphtheroid, coliform and other infections, spreading upwards; from laceration at childbirth, retained products after labour or abortion, or dirty instruments; (2) congestion of the uterus, as in displacements, tumours, injury, subinvolution, tumours of the adnexa, excessive coitus and constipation. Endocervicitis of non-inflammatory or infective origin is sometimes due to œstrin deficiency. Microscopic examination of vaginal smears gives important information about the ovarian follicular influence on the pelvic tissues and also about the effects of œstrogen administration (§ 434).

Treatment.—Chronic discharge from the uterus requires general treatment, together with penicillin compound vaginal suppositories, especially if there is menorrhagia. Attention to the diet, with avoidance of much meat, regularity of the bowels and open-air exercise all help.

Endocervicitis, with or without erosion. Pass a Ferguson speculum and swab away the tenacious mucus with wool soaked in liq. potassæ; then apply picric acid, or a mercurial or silver salt several times a week. In this class of case copper or zinc ionisation 2 per cent., 10 to 15 m.a. for ten minutes twice a week for three weeks, is effective. If there is co-existing tenderness and swelling of the cervix, this should be preceded by pelvic diathermy, twice a week. If the body of the uterus is affected also, the probe often passes readily beyond the cervix, in which case intra-uterine ionisation by an expert gives excellent results.

For *endometritis,* antiseptics applied to the interior of the uterus at regular intervals has been the method of treatment in vogue for years. It may succeed in mild cases, but without free drainage it is of little value. The best results are obtained by free drainage. Dilatation should be carried out, under anæsthesia, by Hegar's dilators. A self-retaining rubber catheter is introduced into the cavity of the uterus and kept in position by a catgut suture to the tissue at the external os. Glycerine is injected slowly into the tube by means of a serum syringe until it is seen to flow into the vagina. The vagina is loosely packed with gauze and the tube brought out through an opening in a pad of gamgee, which is kept in place by a T-bandage. Glycerine is injected several times a day into the uterus for four or five days, until the catgut is absorbed and the tube falls out. This is a modification of Remington Hobbs' method.

§ 438. (C) **Dysmenorrhœa** is pain during the menstrual period. Various classifications have been made: three main types correspond to three sets of clinical symptoms: (1) SPASMODIC, due to disorderly and spasmodic muscular contractions of the uterus; (2) INFLAMMATORY, due to some mechanical abnormality or inflammation of the pelvic organs; (3) MEMBRANOUS, due to the passage of membranes or casts from the uterine cavity.

(1) Spasmodic Dysmenorrhœa accounts for the majority of cases in young women. The pain occurs during the first few hours or days of the menstrual flow: it may resemble colic or spasm, or it may be a continuous ache; and it may be accompanied by sickness, headache and general malaise. The pain may be referred to the pelvic joints and to the legs. It is most frequent in young single women or in married women associated with sterility. It does not as a rule begin at the onset of puberty but about the age of 18 years or older. It is frequently associated with a sedentary occupation, such as office work, and with deficient exercise and open air; it also occurs when there is overstrain or lack of occupation or interests. Dysmenorrhœa in young women often depends on the general health, as it may disappear when active life is taken up in the country. It can rarely be traced to over-exertion or to physical work. Local causes may be stenosis of the cervix and imperfect development of the uterine muscle; childbirth often cures such cases. The uterus may be in a position of pathological anteflexion and disturbed polarity may occur. The passage of abnormally large clots, thickening of the endometrium and congenital or acquired retro-displacements of the uterus are other causes.

Treatment.—In the case of single women a vaginal examination should not be made unless some pathological lesion is suspected or medical treatment has been ineffective. Examination per rectum is of little value in such cases. The vaginal examination should be made under anæsthesia; if local treatment such as dilatation or curettage is indicated, it can be carried out at the same time. Displacements in girls should be treated by daily exercises, such as those of the knee-chest position; pessaries should not be inserted. *General* treatment such as vitamin full diet, avoidance of constipation, and open-air games or exercises, especially deep abdominal breathing, should be advised: dancing is a substitute for those who are unable to get much open air. Warm baths often relieve the pain if taken before the onset of the period and are usually also beneficial during the period. Considerable success is achieved in dealing with girls of the leisured classes when interesting occupation is found and less attention given to the attractions of rest and warmth at the time. In some cases, however, owing to the severity of the pain, the girl is incapacitated, and special treatment is then imperative.

Remedial treatment at the time of the period consists in hot bottles, hot drinks with sal volatile or essence of peppermint. Antipyrin, phenacetin and caffeine citrate succeed in some cases. Aspirin, liquor sedans, bromides have varying success. Alcohol should never be prescribed: in resistant cases pethidine is useful—(5–10 mgms. orally t.d.s. given the day before the onset of a period and longer if necessary). As dysmenorrhœa in girls is due in some cases to underdevelopment of the uterus, the administration of œstrogen either orally or by injection has proved valuable. Intramuscular injections of œstrogen may be difficult to arrange; hence the synthetic form, stilbœstrol, taken by mouth in doses

of 1–2 mgm. daily for 14 days, commencing on the first day of a period, has advantages. It is doubtful if luteal extracts are of value, as recent work shows that the luteal phase occurs if stimulation of the follicular phase is obtained. Testosterone by mouth or by injection are said to relieve pelvic congestion and pain. Spasmodic dysmenorrhœa is sometimes aided by luteal extract by mouth or injection. Hormone treatment is useless when the genital organs are much underdeveloped. Iron is given when there is anæmia, also the vitamin B complex is helpful. The teeth should be attended to; treat all digestive disturbances, especially constipation. Dilatation of the cervix has cured cases in which this measure is indicated. In cases with other signs of disorder of the sympathetic nervous system, sympathectomy has succeeded.

(2) Inflammatory or Congestive Dysmenorrhœa.—The pain usually begins a few days before menstruation and may be relieved or aggravated at its onset. The pain is continuous, and varies according to the position of the inflamed area which is its cause—*e.g.*, peritonitic adhesions, metritis, subinvolution, fibroid, ovarian cysts, salpingitis or displacement. Stenosis may occur after operation on, or too strong diathermy coagulation of the cervix. Exercise and movement aggravate, whilst rest improves this type of dysmenorrhœa.

Treatment consists in rest and warmth. Heat can be applied in the form of hot sitz baths and prolonged hot vaginal douching, given by a nurse. Sedatives, such as those above mentioned for spasmodic cases, give relief during menstruation. Adhesions are aided by pelvic diathermy. Surgical treatment may be required for the causal lesions.

(3) Membranous Dysmenorrhœa is uncommon. One type occurs in virgins, another is caused by changes in the endometrium due to infection after childbirth. The pain is associated with the passage of portions of or a complete cast of the uterus at frequent intervals. The pain is similar to that of labour pains and is due to the contraction of the uterus in its efforts to evacuate the membrane or cast. There is slight hæmorrhage; at first the pain is not severe but increases and reaches its height as the membrane is being passed. The cast may be solid or may be hollow and triangular in shape like the cavity of the uterus. In some cases the openings for the Fallopian tubes and the internal os may be seen. Under the microscope fibrin is seen with leucocytes and red blood-corpuscles and remnants of uterine glands and vessels. The cast is distinguished from extrusions from the uterus in cases of tubal gestation or uterine abortion by the absence of decidual cells or chorionic villi. There is the history of recurrent attacks unassociated with the early symptoms of pregnancy.

The *treatment* is difficult. Dilatation and curettage have variable success. Relief may be obtained after curettage has been performed twice. In other cases œstrogen therapy has helped.

Endometrioma.—Dysmenorrhœa may be caused by the presence of endometriomata. This growth is similar in character to the endometrium and is said to be carried as a *rest* or graft from the uterus. It takes on menstrual changes during the period, with congestion, swelling and hæmorrhage. The pain may be localised to one side or may be generalised. It occurs before the onset and at the beginning of the flow and is relieved thereby. It is more frequent in women about the early thirties. Removal of the tumour is the only cure.

Mittel Schmertz.—This pain occurs midway between the periods and comes on as a rule after twenty years of age. It is said to be caused by ovulation. This is difficult to prove and all inflammatory lesions must be first excluded. Sedative drugs are used, as in dysmenorrhœa. If pathological lesions are found, the appropriate treatment should be carried out.

§ **439.** (D) **Hæmorrhage.**—*Menorrhagia* indicates an excessive flow at the monthly period; *Metrorrhagia* indicates irregular hæmorrhage from the uterus, irrespective of the period. It is difficult to separate these, as their causes are more or less identical, and they often occur together. Hæmorrhage from the *vulva or vagina* is usually slight in quantity, and its cause readily discovered by inspection. Hæmorrhage from the *cervix* is usually due to polypi, cervical erosion or malignant disease; rarely, it is due to ulceration, syphilitic or tuberculous, or to injury by a pessary. All of these are made out on inspection. Hæmorrhage after coitus is suggestive, especially in older women, of malignant disease or a polypus hanging from the cervix. Slight bleeding from a cervical erosion may be due to œstrogen deficiency.

Local causes of hæmorrhage from the *uterus* are: Endometritis, fibrosis or metritis, fibroids, polypi of the uterus, inflammation of the adnexa and in the pelvis, subinvolution of the uterus, congestion consequent on cardiac or lung disease, malignant disease, retroverted uterus incarcerated in Douglas' pouch, ovarian tumours (occasionally), inversion of the uterus, and extra-uterine fœtation. Flexions and versions of the uterus rarely cause symptoms unless attended by pelvic inflammation or adhesions. *Constitutional* causes are considered in § 440.

In women *over thirty-five* any of the above causes may give rise to hæmorrhage, but malignant disease must be excluded. The sudden supervention of *hæmorrhage* with *acute pain* suggests a miscarriage or an extra-uterine fœtation (§ 446). In women *past the menopause* some lesion of the uterus, especially cancer or uterine fibroid, is nearly always present.

Many of the above mentioned causes of uterine hæmorrhage are dealt with elsewhere. The following are considered here: (I.) Certain Constitutional conditions; (II.) Uterine Fibroid or Polypus; (III.) Chronic Subinvolution (in persons under forty); (IV.) Metritis; (V.) the Menopause; and (VI.) Malignant Disease (in persons over thirty). These conditions will therefore be differentiated here.

§ **440.** I. Hæmorrhage may depend upon certain CONSTITUTIONAL CONDITIONS. (1) Certain women of plethoric build, usually with florid countenances, may have too profuse periods all their lives, and excessive flow on any trivial exciting cause. (2) When associated with hypertension it may be the natural method of relieving this. (3) Prolonged lactation, too many and too frequent pregnancies; (4) residence in tropical climates; (5) acute specific fevers, septic foci, purpura and other blood conditions; (6) mental overstrain, especially with a sedentary life. Strong emotion may cause a single heavy hæmorrhage, possibly through its action on the pituitary. (7) Congestion, as with heart or liver disease;

also after sudden change of temperature or over-exertion. (8) Endocrine imbalance, as at the onset of puberty, when it is said to be due to variations in the œstrogen secretion. The flow may occur every two or three weeks, though the amount may not be increased, and it may be readily excited, as by a hot bath or a day of unusual exercise. Other endocrine causes are deficiency of thyroid and unbalanced production of pituitary and ovarian hormones. There results hypertrophy of the endometrium, a condition seen especially in **metropathia hæmorrhagica,** where also occur follicular cysts of the ovary. It is believed to be due to excessive œstrogen stimulation and absence of luteal influence. There is loss of the menstrual rhythm, profuse and lengthy bleeding with, in some cases, periods of amenorrhœa, also. See § 432.

§ **441.** II. Hæmorrhage due to a UTERINE FIBROID. The symptoms vary with the position of the tumour. These tumours may be submucous, interstitial, or subserous. When the fibroid is *submucous* or *interstitial*, the symptoms of uterine fibroid are (1) menorrhagia and metrorrhagia; (2) discharge and sometimes dysmenorrhœa. (3) On examination with the sound the uterine cavity is found to be enlarged; and (4) on bimanual examination enlargement of the uterus, which is usually hard and bossed from the presence of more than one fibroid, can be detected. The submucous variety tends to become polypoid, remaining attached to the uterus by a pedicle. The *subserous* fibroid may present no symptoms for many years and may even then be discovered by accident. Amenorrhœa may accompany such cases quite as often as menorrhagia, and the latter is never profuse. In short, pressure symptoms may be the earliest indication of a subserous fibroid. In uterine fibroids of all kinds the rate of growth, though it varies somewhat, is nearly always slow; but as the tumour increases there are symptoms of pressure upon the surrounding organs, such as frequent micturition, varicose veins, backache, neuralgia in the legs, indigestion, or hydronephrosis. Fibroids, especially when very large, tend to undergo degenerative changes which give rise to symptoms of toxæmia.

UTERINE POLYPUS. The most common forms are fibroid polypi and mucous polypi. Placental and fibrinous polypi occur, the first after labour or abortion, arising from retained portions of the placenta, the second from the stump of a growth previously removed. When very small, polypi can be made out with certainty only by dilating the os and exploring the interior. When the polypus is larger, or springs from a lower site, examination with the speculum may reveal it hanging from the os into the vagina. After a time it may slough, and cause an offensive discharge.

§ **442.** III. SUBINVOLUTION, or the non-return of the uterus to its normal size, is a very frequent cause of menorrhagia after labour or abortion. After a confinement the uterus begins to diminish in size, and at the end of about two months resumes its normal length of 3 inches. In cases of subinvolution we find (1) on vaginal examination that the uterus is enlarged; (2) it tends in most cases to be retroverted and lower than normal; (3) the patient generally complains of backache, bearing-down pain and discharge; and (4) lassitude, weakness, general malaise and anæmia.

Etiology. (1) Toxæmia occurring during pregnancy or the puerperium; (2) retained membranes or portions of placenta; (3) pelvic inflammation; (4) delayed labour or over-distension of the uterus; and (5) the practice of not suckling the infant. Therefore it occurs chiefly after numerous and rapid pregnancies.

§ **443.** IV. Metritis or Fibrosis is a condition in which the uterine tissue is thickened, tense, and hard or flabby. Profuse menorrhagia is the chief symptom; there is usually a feeling of weight and dysmenorrhœa, and the uterus is felt to be enlarged and firm. It is caused by infection, rarely syphilitic, usually of gradual onset, and may occur at any age. It may be due to endocrine deficiency.

§ **444.** V. The Menopause, or climacteric, is the epoch at which the sexual activity of the female undergoes involution, and the menses, which are the sign of that activity, cease. This may take place in three ways: (*a*) They may cease gradually, without any disturbance of the general health; (*b*) quite suddenly; (*c*) there may be a series of hæmorrhages.

The existence of this cause of menorrhagia or metrorrhagia can only be recognised by the attendant phenomena. (1) The age varies considerably, between thirty-five and fifty-five, the average being about forty-five. (2) "Flush storms," which consist of a hot stage, a cold stage, with or without shivering, and sometimes a stage of perspiration. With many healthy women these flushes appear only when there is a septic focus or intestinal cause co-existing. (3) Nervous phenomena at this time are extremely varied—irritability, restlessness, and depression. (4) While fibroids and other gross lesions sometimes undergo involution at this epoch, the case should be carefully watched lest carcinoma develop. When menstruation ceases at the normal age of menopause, the patient should be assured that the occurrence is physiological: constitutional symptoms can be alleviated by intramuscular injections of œstrogen, or by stilbœstrol by mouth (1 mgm. daily for several weeks, then 0·5 mgm. daily). At and after menopause, atrophic changes in the genital organs cause the vaginal folds to become smooth, often with some vaginal discharge; the influence of ovarian secretion is estimated by microscopical examination of epithelial smears. When the ovaries have been surgically removed, menopause is much more sudden and disturbing.

§ **445.** VI. Malignant Disease of the uterus is clinically met with in four forms: (*a*) Cancer of the cervix, chiefly met with in multiparæ, between the ages of twenty-five and seventy; (*b*) cancer of the body, which is chiefly met with in nulliparæ, between the ages of fifty and sixty; (*c*) sarcoma of the uterus, which is rare, unless we include under that term certain fibroids which appear to take on the malignant features of spindle-celled or large round-celled sarcoma; and (*d*) chorion epithelioma, a very rare form following parturition.

The symptoms differ in the first three varieties. (*a*) Cancer of the Cervix usually runs a somewhat more rapid course in younger women. (1) On digital examination the os feels hard, friable, granular; it is so characteristic that this feature and the blood-stained discharge upon the finger are alone, in experienced hands, sufficient to diagnose the disease. (2) In a later stage examination reveals a mushroom-like growth ("cauli-

flower excrescence ") or crater-like depression, readily breaking down and readily bleeding. It tends to spread to the vaginal wall, to the utero-sacral ligaments, broad ligaments, and body of the uterus, leading to fixation of the uterus and a hardness which is easily made out on palpation. (3) Metrorrhagia and menorrhagia are present. (4) In the intervals between the marked hæmorrhages there is a continuous watery discharge, usually pinkish-brown, often with a very offensive odour. (5) Local pain is usually a late symptom, but, like the wasting and the cachexia, is sure to supervene sooner or later. Pain points to invasion of the cellular tissue by the growth.

(*b*) Cancer of the Body of the uterus is chiefly met with in nulliparæ over fifty years of age. Bleeding occurs at a later stage than in cancer of the cervix. The symptoms are: (1) A watery discharge, usually coming in gushes; (2) metrorrhagia, and in the intervals pinkish brain-like discharge; (3) on bimanual examination the uterus is found to be enlarged. (4) If the passage of a sound is attempted, considerable hæmorrhage may take place. It should not be used in cases with much bleeding and offensive discharge. (5) Later on, as the disease extends to the broad ligaments, the uterus becomes fixed; this fixity to the educated finger is very characteristic of the disease. (6) The cachexia, pain and other general symptoms resemble those of cancer elsewhere. The diagnosis from senile endometritis or a degenerating fibroid can be made only by microscopic examination of the discharge or a scraping taken for the purpose.

(*c*) Sarcoma of the Uterus is a relatively rare condition. Its symptoms do not differ materially from those of uterine fibroid, except in the rapidity with which the case progresses, and the liability to deposits elsewhere.

(*d*) Chorion Epithelioma is characterised by bleeding in the late puerperium or after the removal of a vesicular mole. The Aschheim-Zondek test is positive, and a curettage of the uterus with subsequent biopsy confirms the diagnosis. The ovaries show cystic degeneration. *Treatment* consists in early removal of the uterus. In some cases, the metastases clear up when the primary focus is removed.

§ **446. Extra-uterine Pregnancy** (or Ectopic Gestation) may become manifest by menorrhagia, metrorrhagia, or amenorrhœa. The term is applied to the condition where pregnancy takes place outside the uterus, as a rule in the Fallopian tube, but sometimes in the ovary. The tube usually ruptures at the second or third month after fertilisation, either into the broad ligament (extra-peritoneally) or into the peritoneal cavity. The ovum in some instances is extruded through the abdominal opening of the tube into the peritoneal cavity, forming the so-called Ectopic Abortion.

Symptoms.—(1) In many cases paroxysmal pains are experienced in one iliac fossa; (2) in about 70 per cent. of the cases there is a history of amenorrhœa for some weeks or a month over time, followed in most cases by a history of irregular hæmorrhages from the uterus. A membrane or cast may be discharged from the interior of the uterus at the same time. (3) Other symptoms of early pregnancy, such as morning sickness, are but rarely present. (4) On bimanual examination a swelling is found in the fornix, and the cervix is soft as in early pregnancy. In most cases, however, none of the above symptoms may be noticed by the patient, and advice may not be sought until the time of rupture of the tube, when the patient consults us for *severe pain* and *hæmorrhage.* Extra-peritoneal rupture is attended and followed by the symptoms of pelvic hæmatocele; intra-peritoneal rupture by the symptoms of perforative peritonitis (§ 243). If the rupture takes place about the fourth week the

shock is not so severe, and the hæmatocele often remains extra-peritoneal. The prognosis and treatment are discussed under Hæmatocele (§ 451).

The *Prognosis of Hæmorrhage* depends upon the cause. Uterine bleeding of itself is not fatal to life, but some forms are very intractable, and lead to considerable anæmia, debility, discomfort, and inability to fulfil the duties of life. (1) The undue bleeding at the MENOPAUSE and of SUBINVOLUTION tends to spontaneous recovery, and that which is due to CONSTITUTIONAL conditions is usually amenable to treatment; so also, in many cases, is that due to PELVIC INFLAMMATION, or such cases may develop CHRONIC METRITIS. With endocrine imbalance, as in METROPATHIA HÆMORRHAGICA, the outlook is not favourable (see § 432). (2) METRITIS is one of the most intractable causes, though it responds to local treatment. (3) The prognosis in a case of FIBROID tumour depends upon its position. The submucous varieties and mucous polypi (§ 441) are readily treated, but if neglected these may slough, and produce death by exhaustion and septic intoxication. The subserous form may cause little trouble for many years, and then chiefly by pressure symptoms. The interstitial form is the most serious, and if there be much loss of blood and consequent prostration the patient is seriously incapacitated. Fibroids, even if occurring near the menopause, should be treated surgically, because they rarely disappear spontaneously. Curettage is not permissible. Intensive doses of X-rays have succeeded when operation was refused. (4) CANCER is the most serious of all the causes of hæmorrhage. Cancer of the body of the uterus is not so grave as cancer of the cervix. The chance of recovery depends upon the diagnosis of the disease and its treatment *at an early stage.* If cancer of the cervix is discovered before it has spread to the parts around, or if cancer of the body is taken in hand while the uterus is still freely movable, radium or operation offer a fair prospect of recovery. The results of treatment by radium and deep X-ray therapy are giving much satisfaction and many gynæcological surgeons are employing this method of treatment instead of, or after operation. The prognosis of extra-uterine pregnancy is discussed in § 451.

Treatment of Hæmorrhage.—(*a*) Symptomatic, in all forms. To relieve the hæmorrhage calcium lactate or gluconate in full doses is helpful. Ergot, especially in the form of ergotamine tartrate, by mouth or injection, adrenalin, tinctura hamamelidis, tonics, quinine, are all useful. In some cases injections of progestin are valuable. 1 c.c. of a standardised solution of pituitary extract may be injected intramuscularly or adrenalin applied locally in severe cases. The results of administration of testosterone are still inconclusive. Injections of antuitrin S. are also useful, and the injection of glycerin into the uterus is of value. X-rays in expert hands may cure interstitial fibroids and metritis. Copper ionisation is most useful when there is an infective discharge from the cervix or uterus. Small doses of radium are especially useful in the treatment of uterine hæmorrhage. Menorrhagia of puberty is sometimes difficult to treat; injections or oral

doses of œstrogen may succeed by improving the development of the uterus. In others luteal therapy may benefit by antagonising the effect of the follicular secretion. If these treatments fail a small intra-uterine dose of radium gives excellent results—50 mgm. for 22 hours, administered by an experienced radiologist. Hysterectomy should never be carried out in these cases. (*b*) Remedial treatment is directed to the cause. (*c*) In all cases general measures are required—the food must be nourishing, exercise must be avoided near the period, and the patient must rest in bed while the flow is profuse. Strong purgatives must not be used, but it is extremely important to avoid constipation. Septic foci and constitutional causes must be sought for and remedied. For the menorrhagia of the menopause, bromides, calcium salts and liver preparations are recommended. Anterior pituitary extract given by injection, for several successive days, aids cases of hæmorrhage without a mechanical cause. Thyroid is beneficial in some cases, both in old and young, even when hypothyroidic symptoms are few or absent. Blood transfusion in small amounts is of value.

§ **447.** (E) **Amenorrhœa** is that condition in which the catamenia are either deficient or absent. The term *primary* amenorrhœa is applied to the condition in which menstruation has never occurred, as in rare cases where there is a congenital absence of the organs concerned, and also in cases of infantile uterus and undeveloped ovaries. The condition is fully discussed in § 432. *Apparent* amenorrhœa is that form in which there is a feeling of fulness in the breasts and abdomen every month, but the menstrual flow is retained behind an imperforate hymen, an occluded os or vagina. *Physiological* amenorrhœa is the cessation of the menses which occurs in pregnancy, during lactation and at the menopause. In *secondary* amenorrhœa, the flow, after having been once established, ceases or becomes deficient for a time.

In Pregnancy, the physiological cause of amenorrhœa, the *General Symptoms* are as follows: (1) Morning sickness is usually one of the earliest, coming on about the first or second, and ceasing at the fourth month; frequent micturition is also a sign. (2) The mammæ present a dark areola around the nipple, they become enlarged and after the third month contain colostrum. The *Local Signs* are: (1) On digital examination there is *a softness* of the os which is unmistakable to the educated finger; (2) a gradual increase in the bulk of the uterus is early apparent. These are the earlier symptoms. From the third and fourth month we have a series of unmistakable signs—viz., (3) about the eighteenth week fœtal movements can be felt by the physician, and (4) the fœtal heart-sounds (at the rate of 120 a minute) can be heard on auscultation, usually midway between the umbilicus and one or other anterior superior spine; and (5) ballottement can be made out about the fifth or sixth month. (6) X-ray examination will assist.

The *diagnosis* of early pregnancy is often difficult. Since the introduction of the Aschheim-Zondek and other tests the accuracy of diagnosis has

been made almost certain. It depends upon the presence of anterior pituitary hormone in the urine (§ 926).

The *Causes* of SECONDARY AMENORRHŒA may be divided into constitutional and local causes. (*a*) *Constitutional* causes are the most frequent. Endocrine imbalance as a cause of amenorrhœa is considered in the introductory paragraph to this chapter (§ 432); to this may be ascribed the amenorrhœa following a sudden change of abode or mode of life, anxiety, stress or mental shock. It also occurs with tuberculosis and anæmia and after severe illness, during prolonged lactation, chronic poisoning with cocaine and opium, and sometimes with pyrexia. (*b*) The most important *local* cause is an ovarian tumour, with which menstruation is often absent or irregular. Other causes are a chill during menstruation, inflammatory conditions in the pelvis, superinvolution of the uterus, and extra-uterine fœtation.

Treatment of constitutional causes includes plenty of fresh air, exercise, and healthy living. Warm hip and foot baths at the expected time are useful. Keep the bowels regular; iron, calcium and vitamin D preparations are beneficial. Adopt general tonic treatment in young unmarried girls; only after these have failed should local causes be investigated. When the uterus is normal in size, the ovaries can be stimulated by anterior pituitary injections, together with small doses of thyroid. When the uterus is undeveloped œstrogen by injection or by mouth, as stilbœstrol, may be of use, but fails if marked mal-development is present. Pelvic galvanism and diathermy succeed in some cases of secondary amenorrhœa.

SUDDEN SUPPRESSION of the catamenia is a form of amenorrhœa which requires special treatment. The flow has probably come on normally, and then suddenly ceases on the second or third day, and the patient suffers a good deal of general discomfort. In such cases the patient should put her feet in hot water or a mustard bath, or sit in a warm hip-bath, and then should get into a thoroughly warm bed with hot bottles and take hot drinks. Subsequently saline purgatives in small doses, and general attention to the health are indicated. When the time of the expected period again comes round, repeat the same procedure.

§ 448. (F) **Pelvic Pain.**—Pain in and about the pelvis is one of the commonest symptoms of disorder of the female reproductive organs. " Bearing down " is often spoken of; and " backache " or pain over the sacrum is so constant a feature of uterine disorders that it has come to have that association in the minds of the laity. The position and character of pelvic pain vary with the different maladies, but its degree is largely influenced by the temperament of the patient. Reference has already been made to painful menstrual periods (dysmenorrhœa), but the causes of a continuous pain (without reference to the menstrual period) are usually due to acute or chronic inflammatory lesions of the reproductive organs which have a toxic or bacteriological origin. Referred pain is frequently present in acute gynæcological lesions because the parietal peritoneum is involved through the somatic nerves.

Clinical Investigation of **Acute Pelvic Pain.**—To ascertain the significance of pain in a given case attention must be paid to the general mental and nervous condition of the patient. The method of procedure in the investigation of abdominal pain in § 242 should be studied here.

(1) The history of the onset, and the area of pain give valuable indications as to the nature of the lesion. If the pain begins at the umbilicus and later extends to the right iliac fossa suspect appendicitis. If the pain starts in the lower abdomen and later settles into one or both iliac fossæ, suspect tubal disease, which is often associated with pelvic peritonitis (§ 449).

(2) Tenderness is present either in the skin (hyperæsthesia) or in the deep structures (deep tenderness), in association with congestion or inflammation of underlying organs. In appendicitis there is usually deep tenderness over MacBurney's point, but if the appendix is in the pelvis the tenderness may be much more marked on vaginal or rectal examination. Morley states that if the maximum tenderness is close to the anterior superior spine, the appendix is to the outer side of the normally situated cæcum; but if the maximum tenderness is on the lower part of the right rectus, close to the middle line, the appendix is hanging over the brim of the pelvis. Any other inflamed organ in the pelvis may cause much more tenderness by vaginal or rectal examination than by abdominal palpation. And see § 247.

(3) Rigidity is generally associated with deep-seated tenderness and usually indicates an acute inflammatory condition. (4) Inquire as to menstrual irregularity, which gives important indication as to pregnancy or abortion. (5) Vaginal discharge, if acute or severe, may point to extension upwards of gonorrhœal or other sepsis. (6) Rectal or vaginal examination must never be omitted, as it detects tenderness, swelling, discharge or displacement.

Uterine Pain is rare apart from pregnancy. (1) It is associated with alteration in menstruation and (2) is usually spasmodic in character, due to irregular uterine contractions.

Spasmodic Pain associated with uterine hæmorrhage may indicate abortion, a ruptured tube, or tubal gestation (§ 446). The condition of the patient in the latter is usually much more serious, as shock and internal hæmorrhage may be present. Shoulder pain is sometimes an indication of tubal gestation. Examination of the pelvis will clear up the diagnosis.

Severe Pain and Collapse follow torsion of the pedicle of an ovarian cyst. The tumour will be felt on palpation.

Pain in the left iliac fossa associated with signs of peritonitis may be due to diverticulitis (§ 321).

If there is difficulty in diagnosis between a tubal lesion and an appendix, the insertion of a glycerine drain in the uterus will cause cessation of spasmodic pain in salpingitis, whereas if the appendix is involved, uterine drainage has no effect.

Examination under an anæsthetic may clear up the diagnosis. In the case of the appendix, prompt surgical treatment may be indicated, but tubal conditions react to expectant treatment, for the time at least.

General Treatment of Pelvic Pain.—It is unnecessary to lay stress upon the fact that successful treatment of pain lies in the proper recognition of its cause. When the accurate diagnosis has been made the appropriate treatment will suggest itself. If there are displacements of the pelvic organs, tumours, etc., surgical treatment may be the only form which will give relief. If, however, the cause is unknown, or if there is an inflammatory lesion, medical treatment should be carried out until there is a definite indication for surgical interference. Pain is relieved by the administration of sedatives, as indicated in Chapter IX. The phenacetin group give relief, also aspirin and tab. codein co. (veganin). Morphia is used only

in severe conditions, owing to its tendency to mask symptoms, and thus delay proper surgical treatment. Chloral hydrate and bromides aid cases with hypersensitive nerves; and are useful because they help to reduce the blood pressure. Local treatment, especially for inflammatory or septic lesions, is called for. The most efficient form of treatment is the application of heat in the form of electric light or sitz baths. Prolonged hot vaginal douching should be carried out by a nurse, not by the patient herself. When the acute stage has passed, pelvic diathermy is of value.

The **pelvic pain** *came on* **acutely** *and recently; it is accompanied by more or less* CONSTITUTIONAL DISTURBANCE—PELVIC PERITONITIS, INFLAMMATION of the UTERINE APPENDAGES, PELVIC HÆMATOCELE, ACUTE CYSTITIS, or some other INFLAMMATORY CONDITION within the pelvis, may be suspected; the reader should first turn to § 448.

If the PAIN *has come on* VERY SUDDENLY *with* FAINTNESS *and* NAUSEA, turn first to PELVIC HÆMATOCELE, § 451; *if it be accompanied by* METRORRHAGIA, it suggests MISCARRIAGE, or EXTRA-UTERINE FŒTATION (§ 446).

§ **449. Pelvic Peritonitis** is a frequent cause of pelvic or lower abdominal pain. It is due to septic infection causing an inflammatory condition of the peritoneum covering the pelvic organs. Exudation may be present and in chronic cases adhesions may lead to a matting together of the uterus and appendages. The terms peritonitis and cellulitis have been used to indicate different lesions; but these conditions are almost identical. The involvement of the cellular tissue may be an extension from the pelvis especially in puerperal cases. In the case of septic lacerations of the cervix the cellular tissue may become involved first and the peritoneum later. The symptoms of pelvic sepsis may be acute or chronic.

Symptoms of ACUTE PELVIC PERITONITIS: (1) Severe pain across the lower abdomen; (2) on examination, distension and tenderness of the abdomen and (3) a tender swelling may be felt. (4) The legs are flexed; the patient lies on her back. (5) The quick pulse and high temperature indicate the severity of the condition. Vomiting may occur. (6) On bimanual examination there is great tenderness, but little may be made out. Later, when exudation and adhesions have taken place, (7) a swelling may be felt behind the uterus, pushing it forwards, and the uterus cannot be moved, owing to adhesions. (8) There is usually hæmorrhage or mucopurulent discharge from the cervix.

Symptoms of CHRONIC PELVIC PERITONITIS: (1) pain in the lower abdomen in one or both iliac regions. (2) Backache is usual; the pain is constant, bearing down in character and is much worse at the menstrual period. (3) Chronic ill-health is usually marked. (4) On bimanual examination the uterus may be found to be retroverted and fixed by adhesions, posteriorly or to one or other side, and (5) there is tenderness due to adhesions, especially when in the ovarian region.

When the CELLULAR TISSUE is involved in chronic conditions the pain (1) may be referred to one leg (which may be drawn up to relieve the pain) and on examination the swelling in the pelvis may be limited to one side.

(2) Backache is marked. (3) The pain is dragging in character when there are posterior peritonitic adhesions. (4) Pus may be found in acute or subacute septic conditions of the cellular tissue. Abscesses may point towards the vagina or rectum, or upwards in the direction of Poupart's ligament. Pus may also be found in the Fallopian tubes and ovary as the result of septic infection of the uterus.

Etiology.—(1) Infective processes from lacerations during labour or sepsis during the puerperium. (2) Septic abortion, which in most cases has been induced, is a frequent cause of streptococcal infection. (3) Direct infection downwards from the appendix by the colon bacillus, or (4) upwards from the cervix by the gonococcus or other organisms.

Course and Prognosis.—(*a*) In *acute pelvic peritonitis* the acute symptoms should subside in a week; if widespread adhesions are present, part of the exudation will be absorbed, and part will remain, giving rise to the symptoms of chronic pelvic peritonitis. The prognosis will depend (i.) upon the extent of the inflammation, and (ii.) its cause. If it is the sequel to an acute attack with widespread adhesions, the patient, if untreated, will probably have chronic pelvic pain, menorrhagia, a discharge and dysmenorrhœa all her life, with resulting chronic invalidism and nervous symptoms. Sterility is usual. If due to extension from a diseased organ, the patient will be subject to relapses with acute pain after any imprudence in the way of chills or over-exertion. If the fever continues for four or five weeks pus has formed, and the patient will be invalided until the pus finds an exit (which may not be for months). The swelling felt in one lateral fornix becomes larger, pushing the uterus to one side, and later on a firm lump, which may extend to the iliac fossa, is felt along Poupart's ligament. The pus may point in the iliac fossa or follow the line of the vessels into Scarpa's triangle; or it may burst into the vagina, bladder, rectum, or peritoneal cavity. When the cellular tissue is involved adhesions and fibrous tissue are formed rather than pus. They do not interfere with pregnancy, and may be absorbed in time, but anteflexion or version of the uterus is a common result of the contraction of the utero-sacral ligaments.

Treatment.—Acute pelvic infections must be treated by (1) absolute rest in bed; (2) hot fomentations or turpentine stupes to the abdomen: or the electric light cradle should be used at intervals; (3) in every case a sulphonamide and/or penicillin should be given; (4) saline purges; (5) morphia, if necessary, to relieve pain. (6) Drainage of the uterus by glycerin gives satisfactory results (§ 436). Watch for the formation of pus and deal with it surgically. If pus cannot be detected by palpation, the leucocyte count will settle the diagnosis: drain if possible by the vaginal route. *Preventive* treatment consists especially of: (1) cleanliness of the hands and surroundings in cases of labour or abortion; (2) prevention of extension of sepsis from the cervix or perineum; (3) free drainage of the uterus. Treatment of *chronic* pelvic infection is by hot sitz baths, hot douches given by a nurse, tampons or pessaries of ichthyol and glycerine. Pelvic diathermy in mild doses allays pain and disperses adhesions. Cold

or damp and undue exertion in walking or standing must be avoided; and a certain daily interval of rest in the recumbent position should be ordered. In toxic or septic conditions, where there are intestinal symptoms, colonic lavage is beneficial. Belladonna and trasentin allay intestinal spasm. Drastic purgation is not advisable for gynæcological conditions; give, rather, confection of senna, liquid paraffin, elixir of cascara, magnesium sulphate in small doses or mycolactin. If symptoms persist, surgical advice should be sought. When suppuration has occurred, the pus must be evacuated by free incision, preferably per vaginam. For further treatment a volume of gynæcology should be consulted.

§ 450. **Infective Conditions of the uterine appendages** may also be a cause of pelvic pain. It is not always possible to separate the inflammatory affections of this region.

Oophoritis is inflammation of the ovary, and should be distinguished from ovarian neuralgia. The *Symptoms* of oophoritis are so frequently accompanied by those of pelvic peritonitis that it is difficult to differentiate them. Indeed, *acute oophoritis* is found solely with acute pelvic peritonitis or cellulitis (*q.v.*). *Chronic oophoritis* may be recognised by (1) severe pain at the pelvic brim, extending down the thigh of the affected side; (2) pain increased by any pressure on the pelvic viscera (*e.g.*, by much standing, constipation, or flatus in the abdomen, and in severe cases by sitting); (3) menorrhagia and dysmenorrhœa, because endometritis so often accompanies oophoritis; and (4) dyspareunia. (5) The ovary is usually prolapsed, and therefore, per vaginam, a walnut-sized swelling is found at the site of the ovary, to one side of or behind the uterus, acutely tender to touch, which causes a "sickening" pain. *General* symptoms, referable for the most part to the nervous system, often supervene. The *Causes* of (1) acute oophoritis are sepsis after labour, abortion, or surgical operation; (2) chronic oophoritis may be due to the same causes as peritonitis, to certain fevers (*e.g.*, mumps), or to infection after a chill, with suppression of menstruation.

Salpingitis (inflammation of the Fallopian tubes) occurs in three forms, hydro-, pyo-, and hæmato-salpinx. (i.) When the fimbriated end of the tube is closed by adhesions, the exudation within, unable to escape, tends to accumulate in the tube instead of escaping by the uterine opening (hydrosalpinx); (ii.) when the tubes are filled with pus (tuberculous, gonorrhœal, or septic) the condition is named pyosalpinx; (iii.) when the tubes are filled with blood, hæmatosalpinx.

The *Symptoms of salpingitis* are (1) pain across the lower part of the abdomen, usually greater on one side, often shooting down one leg; (2) on examination a sausage-shaped swelling is found, usually double, running from the lateral fornices to Douglas' pouch; (3) as peritonitis usually accompanies it, the uterus is less mobile than normal; (4) dysmenorrhœa, discharge and menorrhagia. (5) General symptoms—in hydrosalpinx there may be none, but pyosalpinx is accompanied by fever. In a pyosalpinx of sudden onset (often gonorrhœal), the fever may be very high and the symptoms those of acute peritonitis. *Causes.*—(1) Acute salpingitis is usually due to streptococcal or gonorrhœal infection extending upwards. Sometimes *B. coli* and streptococcus fæcalis appear to travel by direct extension from an inflamed appendix. (2) The commonest form of salpingitis in young single women is tuberculous. It is generally bilateral, and apparently enters by the blood or by extension from tuberculous peritonitis. It is generally chronic. (3) A chronic or subacute vaginitis or endometritis extending upwards may result in salpingitis, especially after abortion. See pelvic peritonitis (§ 449) for other causes. (4) Hæmatosalpinx is due usually to a ruptured extra-uterine pregnancy.

Prognosis.—In *oophoritis* this depends on the extent of the inflammation. If there is much matting the case is really one of peritonitis. If the inflammation is confined to the ovary the prognosis is favourable, provided the cause be removable and the

patient is not neurotic. With *salpingitis* sterility may result; when the infection has died out, Rubin's inflation test, and X-ray after iodised oil B.P. (lipiodol) injection give information as to the patency of the tubes. Pyosalpinx is dangerous to life, as it may at any time burst into the peritoneum. Tuberculous salpingitis is very chronic, and less painful than the other forms. In all forms there is a tendency to relapse, and to peritonitis by extension rather than to spontaneous cure.

Treatment.—Acute and chronic *oophoritis* are treated like peritonitis (*q.v.*), together with hot applications to the hypogastrium when the pain is severe. Constitutional treatment is important. In *acute salpingitis,* with pus and the condition certainly diagnosed, some recommend laparotomy and removal of the tube; others consider that rest in bed in the Fowler position with a sulphonamide followed by penicillin injections are best. Glycerin drainage of the uterus should be tried in every case before abdominal section is contemplated. There is a great element of risk in operating in the acute stage, owing to dissemination of infection. In *chronic salpingitis,* rest, penicillin suppositories, or ichthyol and glycerin tampons may be tried for several weeks. If this treatment and pelvic diathermy fail, it may be necessary to remove the tubes.

§ 451. **Pelvic Hæmatocele** is an effusion of blood either into the peritoneal cavity (intraperitoneal) or into the connective tissue of the broad ligament (extraperitoneal), usually due to a ruptured tubal pregnancy (§ 446). Here there is a *sudden onset* of (1) severe pain, starting in one iliac fossa and soon spreading over all the lower part of the abdomen, accompanied by (2) faintness, perhaps collapse with (3) nausea, and in some cases vomiting. (4) There may be some uterine hæmorrhage, with discharge of a cast of the interior of the uterus. (5) On examination, the uterus, in the intraperitoneal variety of pelvic hæmatocele, is found pushed forwards behind the pubis, while in the extraperitoneal variety the swelling is smaller, and causes a lateral displacement of the uterus as in pelvic cellulitis. The intraperitoneal variety, if large, forms a lump which can be felt, on bimanual examination, both in Douglas' pouch and above the pubes, and the abdomen is tender and distended. After forty-eight hours, adhesions form and the uterus is fixed, and other signs of pelvic peritonitis may then ensue. The temperature begins to rise in twenty-four hours after the onset of pain—that is to say, when the pelvic peritonitis commences.

Diagnosis.—If the bleeding is (*a*) intraperitoneal, the hæmorrhage is rapid and excessive; (*b*) if extraperitoneal, it is usually slow and limited in amount and tends to become encysted. (*a*) In the former, in addition to the symptoms of abdominal pain with collapse, there are the symptoms caused by hæmorrhage, viz., pallor, restlessness and air-hunger. The diagnosis from a *ruptured viscus* (§ 243) is very difficult at first. (*b*) When there is a smaller amount of bleeding, there may be acute pain and collapse, as above, but the symptoms may subside after a few hours, and attacks of pain may recur at intervals for days. The local signs resemble *pelvic cellulitis,* from which it may be diagnosed by a history pointing to extra-uterine pregnancy, and by the fact that pyrexia is absent at the onset, and there is pallor and a low tension pulse.

Prognosis.—If hæmorrhage be large, death has been known to occur in about an hour. In smaller hæmorrhages adhesions due to pelvic peritonitis or cellulitis follow, and the exudation may be (i.) entirely absorbed, or (ii.) may go on to suppuration with a danger of general peritonitis. When due to extra-uterine pregnancy, an extra-peritoneal is not so immediately serious as an intraperitoneal hæmorrhage. Secondary rupture may occur into the peritoneum. In rare cases the fœtus may live till full time, when the patient goes through a spurious labour, after which the placenta becomes absorbed and the fœtus mummified, causing no symptoms.

Treatment is operative, except in the encysted variety, when operation is not so urgent.

The **pain** *is of a* **chronic** *character, is of considerable duration, and is* UNATTENDED *by* PYREXIA. Almost any of the different diseases mentioned in this chapter may be suspected. Examination may reveal METRITIS,

ENDOCERVICITIS, CHRONIC PELVIC PERITONITIS (§ 449), or a UTERINE DISPLACEMENT; or careful bimanual examination may reveal a PROLAPSED OVARY or an INFLAMED TUBE. UTERINE DISPLACEMENTS and PELVIC TUMOURS alone remain to be considered. PROLAPSE OF THE UTERUS is a cause of dragging pain, especially in its early stages.

§ 452. Uterine Displacements.—The normal position of the uterus is one of anteversion, with slight anterior flexion. The uterus undergoes physiological displacements according to the fulness of the bladder and rectum. In itself a displacement leads to no symptom; the symptoms so often associated with displacement are due in the majority of cases to the inflammatory processes in or near the uterus which have caused the displacement. Tumours and inflammatory exudation in the pelvis may cause LATERAL or UPWARD DISPLACEMENTS of the uterus.

FORWARD DISPLACEMENTS (ANTEFLEXION).—On bimanual examination the os is found to be high up, and the fundus is felt unduly far forward. In single women a stenosis of the os or an elongated cervix with spasmodic dysmenorrhœa may accompany a forward displacement of congenital origin. As above stated, *Symptoms* may be entirely absent, and attention is first drawn to the condition when other mischief, such as pelvic inflammation, endometritis, parametritis, or a history of dysmenorrhœa, sterility, or constantly recurring abortions, is present.

Etiology.—(1) A congenitally ill-developed uterus is often displaced forwards. A forward displacement is diagnosed as pathological as distinct from physiological, when there is lessened mobility of the uterus, and pain on attempting to move it. Forward displacements are found in association with (2) pelvic peritonitic adhesions, and (3) cellulitis affecting chiefly the utero-sacral ligaments.

Prognosis.—Anteflexion is a frequent concomitant of sterility. Its treatment is extremely troublesome, but if consistently and carefully carried out a radical cure is certainly to be expected unless the condition is due to a considerable degree of pelvic peritonitis or cellulitis, when the prognosis depends upon the removability of these conditions.

Treatment.—Treatment must be directed to any pelvic peritonitis or cellulitis present (*q.v.*). Ichthyol tampons and hot sitz baths with purgative treatment work wonders in the slighter forms. Bimanual massage is sometimes practised where the anteflexion is due to contraction of the utero-sacral ligaments. Dilatation of the cervix has aided some cases.

BACKWARD UTERINE DISPLACEMENTS consist of *retroversion* and *retroflexion*. In a backward displacement there is also a certain degree of descent of the uterus. Retro-displacements in themselves cause no symptoms; sometimes they are congenital. On examination the finger detects the forward displacement of the cervix, which is usually somewhat lower than normal. The uterus is not palpable in the anterior fornix, whereas a lump is felt in the posterior fornix, which is found to be the uterus because it is movable with the cervix, and can be felt to be continuous with the cervix.

Symptoms arise when pelvic adhesions are present, or when the displaced organ interferes with other organs in the vicinity. In such conditions, a retroverted uterus gives rise to (1) pain in the back and the lower abdomen of a bearing-down, dull, aching character; (2) dysmenorrhœa and menorrhagia; (3) constipation and painful defæcation. (4) If pregnancy occurs, the sickness of the early months is excessive, and after the fourth month there may be retention with dribbling of urine.

Diagnosis.—The diagnosis of a backward displacement is not difficult, but the diagnosis of the cause may be obscure. It is important first of all to determine whether the uterus is freely movable or not, as the prognosis and treatment differ.

Etiology.—(i.) Congenital; (ii.) the dragging of adhesions consequent on pelvic peritonitis; (iii.) changes in the uterine tissues, such as subinvolution, or tumours in the walls; (iv.) relaxation of the ligaments, as after pregnancy; (v.) sudden fall or strain; and in a few cases (vi.) a habitually over-distended bladder. Several of these causes may act in combination; thus, subinvolution together with relaxation of the ligaments causes a retroversion with a certain amount of downward displacement of the uterus, as pointed out in Prolapse (§ 455).

Prognosis.—(1) So long as the uterus is freely movable and not enlarged, there may be no symptoms until pregnancy occurs. Most often, perhaps, constantly recurring abortions take place. (2) In time retrodisplacements are apt to lead to congestion and enlargement of the uterine body, with endometritis, cervical erosion, and prolapse of the ovaries. Adhesions may follow the chronic inflammation of the tubes and ovaries. (3) Where the uterus is bound by adhesions, there is a condition which, according to Playfair, is "not fatal, but tends to life-long discomfort."

Treatment.—(1) If the displacement is giving rise to no symptoms, treatment is not required. If a backward displacement gives rise to pain, knee-elbow exercises should be advised three times daily and later a Smith-Hodge pessary inserted. If there are adhesions which prevent replacement, a course of sitz baths with glycerine and ichthyol tampons, or of pelvic diathermy frequently facilitates replacement. If the symptoms continue, examination under anæsthesia should be carried out, followed by operation where necessary. If there is retroversion of a gravid uterus, rest in bed with the pelvis raised and frequent posturing in the knee-elbow position is usually successful. Retention of urine must be dealt with. Rarely is it necessary to perform an operation in these cases and induction of abortion should not be advised. In unmarried women, where the health of the patient is seriously affected by the displacement, the best treatment is operative, when necessary. Gilliam's suspension of the uterus by the round ligaments is satisfactory. In unmarried women no local treatment should be carried out; pessaries are an objectionable method.

§ 453. (G) The following are some of the more important **Pelvic Tumours and Vaginal Swellings:** (*a*) *Internal tumours*—(1) uterine fibroid; (2) cervical or uterine polypus; (3) cervical or uterine cancer; (4) retroverted uterus; (5) pelvic cellulitis;

(6) ovarian tumour; (7) pyosalpinx; (8) appendix abscess; (9) pelvic hæmatocele; (10) hydatid of the pelvis. (*b*) *External swellings* or swellings about the vulva may be due to (1) prolapse of the uterus; (2) inversion of the uterus; (3) prolapse of the vaginal walls (cystocele and rectocele); (4) cysts or tumours of the vaginal wall—*e.g.*, of Bartholin's gland; (5) uterine polypus with a long pedicle; (6) local conditions of the *vulva*, such as abscess, hæmatoma, or labial thrombosis (§ 436); (7) cysts of the vaginal wall, usually found on the anterior wall, about the size of an egg and painless; (8) hernia.

Most of these various conditions have already been fully referred to, but three conditions which may appear as external swellings remain to be described--PROLAPSE OF THE VAGINAL WALLS, PROLAPSE OF THE UTERUS, and INVERSION OF THE UTERUS.

§ 454. **Prolapse of the Vaginal Walls** is very common in multiparæ, and especially affects the anterior wall. It is then named cystocele, because of its close connection with the bladder; indeed, the anterior vaginal wall may draw down the posterior wall of the bladder along with it. Prolapse of the posterior wall may occur, and when the rectum is prolapsed also, it is named rectocele. But, as the rectum is not so intimately attached to the posterior vaginal wall, a prolapse of that wall is not usually a rectocele. The only symptom in addition to the swelling may be difficulty in passing water until the prolapsed part is pushed up. The diagnosis from a cyst of the vaginal wall is made by passing a sound per urethram and with one finger in the vagina, feeling the point of the instrument in the bladder. The chief predisposing cause of prolapse of the vaginal wall is a ruptured perineum.

For the *Treatment* of the two conditions, see below.

§455. **Prolapse of the Uterus** is its displacement downwards. Three degrees of displacement are described: (i.) The organ may occupy a position somewhat lower than normal; (ii.) it may have partly or entirely passed through the vaginal orifice (procidentia); and (iii.) in extreme procidentia it lies entirely outside the vulva, the body lying in the inverted vaginal wall.

In slighter cases the vaginal wall is seen coming down on asking the patient to strain. In severer degrees the cervix can be seen and the body of the uterus and the ovaries can be felt. The other symptoms of prolapse of the uterus are: (i.) The uterus is enlarged, the cervix is frequently hypertrophied, there may be accompanying endometritis or endocervicitis; (ii.) in early cases there may be incontinence or frequent micturition; later, there is difficulty in passing water till the prolapsed organ is pushed up; (iii.) sometimes there is a weight or a bearing-down feeling in the pelvis, but more often no pain is complained of, only the discomfort of the lump during walking and sitting. In the early stages, on the other hand, backache may be a prominent feature. (iv.) The uterus is usually retroflexed. (v.) Leucorrhœa is usually troublesome. Ulceration of the external parts is apt to supervene on procidentia.

Etiology.—(1) As in prolapse of the vagina, (i.) a ruptured perineum; (ii.) a relaxed condition of the parts after labour, usually associated with sepsis; and (iii.) a laborious occupation which demands much muscular strain, such as that of a washerwoman. The exciting causes are (i.) increased intra-abdominal pressure, such as occurs with undue muscular strain, sagging of dilated intestine, or undue deposit of abdominal fat. (ii.) The increased weight of the uterus in cases of chronic subinvolution or tumours of the walls.

Treatment.—Preventive treatment is most important. All lacerations occurring during delivery should be stitched up at the time. For chronic cases, rest, tampons, massage and electrical treatment are of value. A well-fitting two-way elastic stretch corselet with strong shoulder-straps and suspenders is very beneficial in supporting the intestine and preventing downward pressure upon the pelvic organs. Belts can be worn when fitted to the patient's requirements: some belts owing to want of proper support of the sagging intestine, are of more harm than use. Pessaries may be tried in some cases, but operative measures give the best permanent results.

Inversion of the Uterus.—Sudden inversion of the uterus may occur in the third stage of labour, when the fundus is relaxed, but here we are concerned only with the

chronic form of inversion, a very rare condition. It may be the sequel to acute inversion if the patient survives the shock, or to the dragging of a tumour. The fundus alone may be inverted through the os, or the whole uterus may be inverted. (1) The swelling is red, bleeds readily, and is tender. (2) The sound cannot be passed the normal distance, if at all. (3) Bimanually the fundus is found absent; and if a sound is placed in the bladder in the middle line and the finger in the rectum these can be made to meet without any uterus being felt. (4) There may be symptoms of bearing-down, menorrhagia, and leucorrhœa. (5) The orifices of the Fallopian tubes can sometimes be distinguished. A *Diagnosis* may have to be made from fibroid polypi, in which the fundus is not absent from its usual position.

Prognosis.—There is no tendency to spontaneous cure. The *Treatment* is operative; the reader should consult a text-book on Gynæcology and Obstetrics.

§ 456. (H) It is proposed to discuss briefly the causes of the following symptoms for which the physician may be consulted: (*a*) DISORDERED MICTURITION (Retention. Unduly Frequent, Painful, or Difficult Micturition and Incontinence); (*b*) PAINFUL DEFÆCATION; (*c*) PAIN ON SITTING; and (*d*) DYSPAREUNIA.

(*a*) **Disordered Micturition** is dealt with more fully in kidney diseases (§§ 420 to 422); here only a few of those special to the female will be mentioned.

I. RETENTION OF THE URINE.—The *Causes* peculiar to women are impacted fibroids, malignant disease of the cervix involving the vagina, tumours of the vagina, a retroverted uterus (especially about the fourth month of pregnancy), and other conditions causing obstruction of the urinary passage consequent on pressure over the mouth of the bladder. The condition is also found in reflex retention after operations on the perineum and in hysteria.

II. FREQUENT MICTURITION may be caused in women by (i.) pressure on the bladder by early pregnancy, an enlarged anteflexed uterus or a tumour; (ii.) a vascular caruncle of the urethra; (iii.) acute cystitis; (iv.) cystocele; (v.) pelvic inflammation, especially during the early stages; (vi.) calculi and crystals; and (vii.) various nervous conditions.

III. PAINFUL MICTURITION is found especially in connection with urethral caruncle, cystitis, and in the early stages of pelvic inflammation or oophoritis.

IV. INCONTINENCE OF THE URINE is found (i.) in vesico-vaginal or vesico-uterine fistula; or (ii.) after dilatation of the urethra has been performed—*e.g.*, as a preliminary to lithotrity.

V. DIFFICULT MICTURITION is found (i.) after labour, when the parts are swollen and bruised; (ii.) with prolapse of the uterus, in which case the symptom is relieved on pressing upwards the prolapsed parts; (iii.) all causes of incomplete obstruction.

(*b*) **Painful Defæcation** may be due to (i.) retroverted and retroflexed uterus, especially when bound down by adhesions; (ii.) an incarcerated retroverted pregnant uterus; (iii.) pelvic inflammation when acute; (iv.) oophoritis; (v.) prolapsed ovary; (vi.) coccydynia; (vii.) a fibroid or other uterine tumour pressing upon the rectum and (viii.) rectal disease, *e.g.*, hæmorrhoids, proctitis or fissures.

(*c*) **Pain on Sitting and Coccydynia** are often associated with painful defæcation. (1) The commoner *external* causes of painful sitting are (i.) a vascular caruncle of the urethra; (ii.) vulvitis and all other acute conditions of the vulva; (iii.) hæmorrhoids or fissures of the anus. (2) The *internal* causes of painful sitting may depend upon (i.) an increased pressure within the pelvis—*e.g.*, pelvic inflammation, or any tumour within the pelvis; (ii.) injury or inflammation affecting the sacro-sciatic and the sacro-coccygeal ligaments; (iii.) a movable condition of the sacro-iliac joints after parturition; or (iv.) a rheumatic condition of the same joints. (v.) Dislocation or malunited fracture, inflammation, or "neuralgia" of the coccyx is also a recognised cause of the condition.

Diagnosis.—The diagnosis of pelvic inflammation is discussed elsewhere. *Neuralgia* of the coccyx is known by the fact that the coccyx is sensitive to the touch. It may be connected with constipation or disorder of the rectum. Injury of the sacro-sciatic or sacro-coccygeal ligaments is known by: (i.) the history of pain often dates

from childbirth, or from the injury which produced it; (ii.) pain is produced by pressure on the ligaments, which tightens them; and (iii.) there is an absence of swelling or dislocation of the bone. *Dislocation of the coccyx* has no pain or tenderness, and is known by the fact that the bone, in most conditions, is displaced backwards. When the dislocation is found to be forward, it is much more painful, so that the patient usually sits on one ischial tuberosity—*i.e.*, sits sideways. In a *movable condition* of the joints there is a history of accident or of forceps delivery at confinement. In slight cases it may be very difficult to diagnose except by means of X-rays. *Rheumatism* is known by the absence of other local signs and by the shifting character of the pain, and perhaps the fact that the patient has other manifestations of rheumatism.

Prognosis and Treatment.—Vulvitis and pelvic inflammation are discussed elsewhere. Inflammation and neuralgia of the coccyx are usually cured by laxatives, hot baths, sedative and electrical applications. Injury which has affected the ligaments may also be cured by laxatives and hot baths, but the improvement is slower. Some advise in extreme conditions the division of the ligaments. Dislocation of the coccyx, if backward, may be a cause of no great inconvenience, but if recent may be reduced at the time; if of old standing it should be left alone. A forward dislocation, on the other hand, is much more troublesome, and may require the removal of the coccyx. A movable condition of the joints tends to recover spontaneously. It may be necessary to make the patient rest for a time, and afterwards to walk with a tight bandage across the pelvis.

(*d*) **Dyspareunia** (painful coitus) arises from a variety of causes. (1) The most frequent is a functional spasm of the sphincter vaginæ (vaginismus), often associated with a general neurotic state. In these circumstances the attempt to pass a speculum will sometimes elicit the same spasm, but may also be a means of cure. (2) Other local conditions should be carefully looked for, such as a vascular caruncle of the urethra, vulvitis, or vaginitis (see above). Fissures or small ulcers of the vulva or the anus may be causes of discomfort, which remain undiscovered for months and perhaps years. (3) Oophoritis or a prolapsed ovary may produce considerable pain on deep penetration. (4) Pelvic cellulitis or peritonitis (especially when associated with endocervicitis), and retention of foreign bodies. (5) Masturbation. (6) There may be, though this is relatively rare, a disproportion between the individuals concerned.

Prognosis and Treatment.—The condition of dyspareunia is apt to lead to considerable discomfort, not only to the individual, but to home life in general, and may have far-reaching consequences. When the physician is consulted he must make a very careful and minute examination of the vulva in a good light. Spasmodic contraction on touching the parts may give the diagnosis of some nervous or physical cause. If there is vaginismus, manual dilatation under anæsthesia, with the subsequent wearing of vaginal dilators in graduated sizes, cures most cases. Psychotherapeutic treatment and adjustment of marital relationships may be required in cases of neurosis. Cocaine ointment and suppositories and small doses of bromide are helpful. Childbirth frequently cures vaginismus.

§ 457. (I) **Backache.**—Pain in the back may accompany various chest diseases; for these see § 103. We are here concerned with the pain in the lumbar region which is so frequently complained of, especially by women. Chronic backache in women used to be attributed as a rule to some abnormal condition of the reproductive organs and the patients came under the care of the gynæcologist: a common condition, cervicitis, may have pain referred to the back. Since backache has been studied by the orthopædic surgeon, it has been found to be due most frequently to strain of the sacro-iliac, lumbo-sacral and other joints. The condition frequently started with undue stretching during labour. Badly balanced conditions of the spine contribute to the symptoms, which may be

confused with gynæcological lesions. These cases improve if treated orthopædically.

Physical Examination.—When the patient complains of backache, the physician should make a thorough examination of the region over which the pain is felt. For the adequate performance of this examination it is essential that the patient should be stripped. If the clothes are removed only so far as the waist, important physical phenomena may be overlooked. Note first whether there is any curvature of the spine, displacement, tumour, or redness. By palpation endeavour to make out the presence and position of any tenderness or swelling. Examine next the precise position of the pain; whether it is unilateral or bilateral; whether it is accompanied by tenderness or not; whether it is aggravated by the movements of certain muscles or joints or is accompanied by muscle spasm; whether it radiates along the course of any nerve. Examine the sacro-iliac joints and the costo-vertebral joints, and whether pressure over those joints elicits pain. An examination should be made next of the viscera; dilatation of the cæcum or a "dropped" colon may be present; vaginal and rectal examinations may reveal disorders in these regions. The urine may reveal kidney disease. In the absence of such causes, X-ray examination should be made. The history of the onset of pain, and of the concomitant symptoms at the time of the onset, may give important clues in the diagnosis.

Causes of Backache.—Sometimes the case belongs to the province of the gynæcologist, as in *Pressure pain* and *Bearing-down pain.*

(1) *Pressure pain* may occur as the result of *displacement of the uterus*, although this is infrequent unless some other complication is present. *Pelvic tumours* may also give rise to pain.

(2) *Bearing-down pain* may indicate uterine enlargement and displacement (§ 452), *e.g.*, retroflexion, retroversion and prolapse, or tumours pressing on the rectum. It is also frequent with inflammatory lesions in or near the uterus. Constipation is not an infrequent cause. Pain is present in advanced malignant conditions of the uterus.

(3) Backache occurs in many *acute diseases*, in most of the acute specific fevers, notably small-pox and influenza, and its cause is then recognised by pyrexia and other general symptoms.

(4) *Functional Causes.*—In nervous individuals, whose general health is below par, fatigue is usually evidenced by backache. It is frequently met with after childbirth, after infectious diseases, after operations, and often associated with constipation. The condition is mainly nutritional and is treated by attention to the diet, with cod liver oil or other vitamin preparations; gentle exercise, fresh air, regulation of the bowels, and calcium are beneficial. Suitable corsets may be necessary.

(5) Lumbago is known by: (i.) a history of a sudden onset, usually when stooping; (ii.) the pain is increased by movement of the lumbar muscles, and is relieved by local warmth; (iii.) tender nodules are palpable near the origin and insertion of the muscles affected.

(6) CURVATURE OF THE SPINE, whether it be due to Pott's disease or to simple lateral curvature, is a cause of backache. The later stages of Pott's disease (tuberculosis of the vertebræ) show an angular curvature and come under the notice chiefly of the orthopædic surgeon. The early stages are frequently overlooked, as no symptom may be present except pain. X-ray reveals the cause. Prolonged rest and general treatment as in other forms of tuberculosis are required. The slighter forms of lateral curvature are a frequent cause of backache, especially on standing. This cause of pain, especially in the early stages, is often missed, because of the neglect of the physician to examine the spine with the patient stripped.

(7) SECONDARY DEPOSITS, especially from carcinoma of the breast, and a SPINAL TUMOUR give intractable backache. X-ray examination is essential.

(8) **Sacro-iliac strain** or **subluxation** may be caused by a jerk when stepping off a kerb, or when stooping to lift a heavy object. Pain is felt on and off for a time, then is continuous and spreads over the buttock and leg. Symptoms: (i.) pain and tenderness over the joint is made out on palpation, or when the ilium is pressed inwards by the physician; (ii.) pain is elicited by flexing the thigh on the abdomen while the knee is fully flexed; (iii.) the patient sometimes stands on one leg, and may complain of pain passing down one sciatic nerve; (iv.) there is usually a history of strain. When a strain is present, rest the back and strap it for support; otherwise heat, massage, exercises and often manipulation are necessary.

(9) Pain low in the back may be due to **sacralisation**—*i.e.*, adhesions or ankylosis between the fifth lumbar vertebra transverse process and the sacrum. Rheumatic or other fibrositis compresses the nerve and sets up referred sciatica. Even neuritis, with muscular wasting, may be caused.

(10) **Osteo-arthritis** is known by: (i.) signs of the disease elsewhere; (ii.) the pain is made worse by coughing or sneezing; (iii.) it often radiates down the sciatic nerve.

(11) A DISPLACED INTERVERTEBRAL DISC (§ 825) is now a well-recognised cause.

(12) Backache may be due to disease connected with the KIDNEYS, such as perinephric abscess, pyelitis and pyelonephrosis, movable kidney, tumour and stone. An examination of the urine may first lead the physician to suspect the kidneys.

(13) Other ABDOMINAL TUMOURS, such as retroperitoneal sarcoma, aneurysm, and tumour of the spine, cancer of the stomach and rectum.

(14) GALL-STONES and a DUODENAL ULCER may rarely give rise to pain in the back before the pain works round to its usual position in front.

(15) **Spondylitis** or inflammation of the vertebral joints may be mentioned as a cause of backache: rarely it follows typhoid fever or syphilis. The "*typhoid spine*" appears a variable time after typhoid fever. There is pain and tenderness, sometimes starting pains along the nerves, occasionally paresis and wasting. The diagnosis from *polyneuritis* and *tuberculous disease of the vertebræ* is made by a positive Widal reaction, and albumin in the cerebro-spinal fluid. X-rays show osteo-periostitis. Kyphosis may result if the condition is not treated by rest.

(16) RECTAL disease and hæmorrhoids, in some cases.

Treatment.—Appropriate treatment can be carried out when the cause is known. When no obvious lesion is found, and especially with women who have borne children, a well-fitting belt or elastic corset is beneficial, especially when worn continuously, night and day: it should be kept in position by suspenders and shoulder straps and not end at the waist line. If no gynæcological cause can be found, orthopædic advice should be sought.

§ **458.** (J) **Sterility** is that condition of a woman who under ordinary circumstances of reproduction, does not bring forth a living child. Natural sterility may be either

absolute or *relative.* In absolute sterility conception cannot take place without treatment; in relative, sometimes called "one-child sterility," a fœtus is cast off before viable or one child only is born. Whether a woman will be sterile or not is practically decided within three years of marriage; only 7 per cent. bear children after that time.

Etiology.—(1) In 25 per cent. of cases a single absolute cause will be found. Any condition causing dyspareunia or vaginismus, any deformity, mal-development, inflammatory condition, new growth, displacement or obstruction to coitus may result in failure to conceive. (2) 75 per cent. of infertile marriages are due to a totality of multiple infertility factors, which, in themselves, may be of little importance. If a fertile couple be investigated, one or two of these infertility factors will be found, but in an infertile couple the number varies between two and eight factors; investigation and treatment is thus directed to removing as many as possible of these, so that the fertility level of the sterile couple may be raised well above the threshold of conception. In an ordinary case with four or five infertility factors, the removal of two or three may result in conception occurring. Thus it follows that any one of several therapeutic measures may be successful.

Female Infertility Factors.—*Local* genital factors are the more common, such as (1) minor degrees of genital hypoplasia indicated by a relatively long cervix and a small firm uterine body; (2) hostile viscosity of the endo-cervical mucus; (3) tubal blockage; (4) absence of or mechanical impediments to ovulation such as small cystic ovaries; (5) uterine displacements. Retro-displacements reduce fertility, anteflexions generally form part of an endocrine factor. (6) Important *general* causes are endocrine deficiencies of the thyroid, anterior pituitary and ovary; (7) chronic intoxications, particularly focal, such as appendicitis and chronic cholecystitis; (8) dietetic errors such as insufficient protein and absence of fresh foods; (9) general debility and anæmia.

Investigation.—The female. This is best carried out in the mid-menstrual period (1) First enquire into the medical history:—(i.) General questions concerning age, duration of marriage, any history of past abdominal inflammation such as appendicitis, salpingitis or septic abortion. (ii.) Any discharge requires careful investigation. (iii.) Whether menstruation is normal, whether it started late, whether it is infrequent, excessive or small in amount. (iv.) Frequency of coitus. If more than twice a week, the spermatozoa may not have time to mature and fertilisation is less likely. (2) Next examine the wife: (i.) look for any evidence of endocrine disturbance suggesting thyroid deficiency, or virilism, and note the general development; (ii.) test the acidity of the vagina with nitrazene paper. About the mid-menstrual phase the pH of the vagina should be 4·5—higher acidity will need correction. (iii.) Examine the vaginal mucosa: if it is thick, rugose and pink, ovulation is probably occurring. When it has more the appearance of a vaginal mucosa at the menopause, then fertility is reduced as ovulation is less likely. (iv.) Examine the vaginal discharge: if it shows a semi-solid ground-rice appearance, it is indicative of hyper-acidity. Frank pus may be present the result of inflammation, most probably due to the trichomonas. There may be excessive mucus from the cervix. At the mid-menstrual phase this should be clear and watery; turbid mucus at this time indicates impaired fertility. At other times it is more gelatinous and turbid. The cervix may show an erosion. (3) Bi-manual examination may reveal gross abnormalities of the uterus but more likely a disturbance of the utero-cervical index only. If the examination is being carried out in the week preceding the period, a diagnostic scrape may be taken from the uterine cavity which will indicate the presence or absence of ovulation in that particular month. An isolated negative finding indicates the absence of ovulation that month only and is not proof of permanent absence of ovulation. Any tubal swelling would suggest tubal occlusion. (4) If nothing abnormal is detected the husband should be tested.

Male Infertility Factors are most often constitutional states producing relative deficiencies in the semen, such as general infective and toxic states, dietetic errors, obesity, endocrine disturbances and drug abuse. Local causes are less common.

Male infertility is present in at least one-third of all cases and in one-third of these again, aspermia will be present.

Investigation.—Two tests are necessary. (1) After four days' abstention a fresh specimen of semen is examined and should shew in the region of one hundred million motile sperms per c.c., with less than 20 per cent. of abnormal heads. Less than sixty million or more than 20 per cent. abnormal heads indicates male infertility, but cases of pregnancy have occurred with much lower counts. (2) The post-coital test of Huhner. If live and active spermatozoa are found penetrating the cervical mucus two hours after coitus, the husband can be excluded.

Treatment.—I. If both parties, as a result of these investigations, appear to be normal and are under thirty, and if a reasonable time for conception to occur has not elapsed, give them some general advice and ask them to report in six months. (i.) Advise against too frequent coitus. (ii.) Likely days for ovulation to occur should be given, such as the fourteenth day prior to the onset of the period. (ii.) If there is a history of profluvium seminis, or the vaginal fornices are shallow, advise elevation of the buttocks after coitus.

II. Assuming the husband to be normal, the wife may have to be treated for (i.) Defective production of a normal ovum: (ii.) Obstruction to its entry to the tubes: (iii.) Failure of penetration of the spermatozoa and (iv.) Failure of the ovum to imbed. Any organic cause must be removed. In the VAGINA, vaginitis due to Trichomonas infestation is a frequent cause. A high acidity vagina with the typical ground-rice discharge and a low pH due to high œstrin activity should be treated with a sodium bicarbonate douche two hours before coitus. CERVICAL infection with erosions and cervicitis are very frequent causes of sterility. Dilatation and linear cauterisation are indicated. If thin watery mucus is not present in the cervical canal at the supposed time of ovulation it suggests deficient circulating œstrin. The treatment should consist of giving increasing doses of stilbœstrol from the end of the period until the thirteenth day of the cycle. If failure of ovulation is proved, synapoidin injections given from the tenth to the thirteenth day of the cycle inclusive, may induce ovulation.

UTERUS.—(*a*) If hypoplastic, stilbœstrol given following the period to the twelfth day with progestin later in the cycle, may be helpful. For failure of the ovum to imbed, curettage is indicated. (*b*) Tubal occlusion. Try repeated insufflations. Lipiodol injections will indicate the site of occlusion (this should not be carried out during the week following the period). (*c*) Endocrine disturbances, as indicated by obesity and amenorrhœa. Thyroid deficiency, indicated by a low basal metabolic rate must be dealt with. Thyroid given to the limit of tolerance if successful in reducing the weight and producing normal menstruation, is often followed by conception.

Artificial Insemination is indicated where coitus is impossible due to male deformity or where the cervical discharge is proved to be persistently lethal to the sperms. Careful attention to the health and hygiene of adolescents, with a view to preventing genital hypoplasia, the correct teaching of sex hygiene to avoid pelvic congestion, the eradication of venereal disease and the avoidance of useless local treatment such as curettage for discharge, will help to reduce considerably the number of infertile marriages.