

insoluble in water and soluble in ether, chloroform, and hot alcohol. It is used as an antirheumatic in dose of 0.3 to 1 gm. (gr. v.-xv.).
W. A. Bastedo.

METHYL-URETHANE, urethylane, $\text{CONH}_2\text{OCH}_3$, is prepared by acting on methyl alcohol with cyanogen chloride, and occurs in colorless crystals which are soluble in water and alcohol. It is used like urethane (ethyl urethane) as a hypnotic, which is not depressing to the heart. Dose 1 to 4 gm. (gr. xv.-3i.).
W. A. Bastedo.

METHYLENE BICHLORIDE.—*Methylene Chloride*, *Di-chloromethane*, CH_2Cl_2 . This body is closely related to chloroform chemically, and, accordingly, much resembles that body in physical characteristics and in physiological properties. Methylene bichloride is a heavy, colorless, ethereal fluid, of specific gravity 1.344, and boiling point 40°C . (104°F .), and of neutral reaction. Its odor resembles that of chloroform. It mixes freely with chloroform, ether, and alcohol. The medicinal importance of methylene bichloride lies in the anæsthetic powers of the vapor of the drug, which closely resemble those of chloroform both in kind and in degree. This anæsthetic is one of Dr. B. W. Richardson's numerous proposed substitutes for chloroform, and has been quite extensively used by many surgeons, notably by Mr. Spencer Wells. The only possible advantage of this substance over chloroform would lie in greater safety; but since several deaths have unquestionably been caused by methylene bichloride, the anæsthetic must rank among the dangerous group. Dose and method of administration are substantially the same as those of chloroform, the only difference between the two bodies—so far as the mode of administration is concerned—being a lower boiling point, and therefore a higher volatility, in the case of methylene bichloride.

The name "methylene chloride" has been given also to certain anæsthetic mixtures—to a mixture of the present body and ordinary ether, and to one of chloroform and methyl chloride, or chloroform and methyl alcohol.
Edward Curtis.

METHYLENE BLUE (Tetramethylthionine Chloride).—An aniline derivative, its formula being $\text{C}_{16}\text{H}_{18}\text{N}(\text{CH}_2)_4\text{S}_2\text{Cl}_2$. Chemically pure methylene blue occurs in small indigo-colored scaly crystals, with a bronze-like tinge and dark green in transverse fracture. It is slightly soluble in water, forming a deep blue solution, which is changed by sulphuric acid to a dark green, and from which a strong potash solution throws down a dark violet precipitate. The methylene blue of commerce (ethylene blue O) is a double chloride of zinc and tetramethylthionine.

This aniline product was introduced into medicine in 1890, by Drs. Ehrlich and Lippmann (*Deut. med. Woch.*, June, 1890), as an analgesic of some value. Professor Ehrlich had investigated the action of the drug on nervous tissue as a staining reagent, and had demonstrated that it had a peculiar selective action on the axis cylinders of motor and sensory nerves. Further experiments showed that when taken into the stomach, or introduced subcutaneously, it rapidly spread throughout the system and gave relief to all neurotic pains, and the pain in rheumatism of the muscles, joints, and tendons. A two-per-cent. solution was used, by means of which one grain was given hypodermically. It was also used in capsules, the powder being given in doses of gr. iss.-iv.; as much as gr. xv. were given in one day. No ill effects accompanied its administration, and there was no change in appetite, digestion, pulse, or any of the normal functions. The drug was absorbed very quickly, and a quarter of an hour after the smallest dose the urine became a bright green, after two hours a dark green, and after four hours a dark blue. In the saliva a bluish tinge was detected, but there was no discoloration of the mucous membranes or conjunctiva. Those observers found that the anodyne effect began in about two hours, and was gradually

produced; it had no effect on any fever or inflammatory condition. Other observers have reported it of value in nervous headaches, herpes zoster, alcoholic depression, migraine, and in the pleuritic pains of tuberculous patients. Further use has failed to confirm this analgesic property and the drug is now rarely employed for this purpose; other compounds have proved more effective, and the discoloration which it produces renders its use objectionable.

In the following year (1891) Ehrlich and Guttman announced that the drug was also a remedy for malarial troubles. They were led to experiment upon this disease from the fact that the plasmodia of malarial disease were readily stained by this body, not only in prepared specimens but also in fresh blood. They used the remedy in two cases of malarial fever—one quotidian, the other tertiary. They found that it had a decided curative power over the disease; the periodical attacks ceased within a few days, and at the end of eight days all plasmodia had disappeared from the blood. A dose of gr. iss. was given ten or twelve hours before the expected attack, and repeated every two hours until five doses had been taken. The treatment, they say, should be continued for seven or eight days after all malarial symptoms have subsided. Other European observers have reported the results of a trial of this remedy, with more or less beneficial results. Laveran experimented with it without obtaining any success. He injected it into the blood of pigeons affected with the hæmatozoon, and although the color was seen in the blood no effect was exercised upon the parasites.

Dr. W. S. Thayer, in *Johns Hopkins Hospital Bulletin*, May, 1892, gives a detailed report of seven cases treated by this method. He concludes that: 1. Methylene blue has a definite action against malarial fever, accomplishing its end by destroying the specific organism; but it is materially less efficacious than quinine, failing to accomplish its purpose in many cases in which quinine acts satisfactorily. 2. Reaction appears to be rapid, the chills disappearing and the temperature, in remittent cases, falling to normal during the first four or five days; later, however, if a sufficient number of organisms have resisted the drug, they appear to develop again directly under its influence, causing a return of the symptoms. 3. Methylene blue seems to have no advantages over quinine which would warrant its further use. It is now recognized as a valuable remedy in the treatment of all forms of malaria, not replacing quinine, but of service in many cases in which this drug has failed, and the two together often succeeding when both have failed when given separately. The monograph of Dr. Cardamatis, of Greece, published in 1897 (*Deut. med. Woch.*, xxiv., 9) shows the remedy to be of decided value when given in doses of gr. x.-xij., commencing ten hours before the onset of the paroxysms.

A case of chyluria due to *Filaria sanguinis hominis* was reported by Austin Flint as cured by this treatment (*New York Medical Journal*, June 15th, 1895).

Methylene blue has also been given in tuberculous conditions. In pulmonary phthisis a dose of gr. iss. was given the first day, increased on the second day to gr. iij., on the third day to gr. ivss., and so on until gr. xxiv. were given in the twenty-four hours. The usual improvement of symptoms is said to follow its use. In tuberculous pharyngitis the powder may be applied to the affected part, and in serofulous glands of the neck, and for irrigating empyemic cavities, a ten-per-cent. solution has been used. A solution of the same strength has also been recommended in diphtheria. It is reported that the drug has been employed with advantage as an injection in severe forms of dysentery.

The latest use of methylene blue has been in the treatment of diseases of the genito-urinary organs, both by internal administration and locally as an injection. It has been shown that as much as sixty-eight per cent. of the amount given is excreted by the kidneys, and during its passage it is mildly diuretic and exerts an anodyne and germicidal action. Numerous cases of kidney disease

have been reported in which it has proved beneficial, but it has been of most practical value in cystitis and urethritis, particularly when gonorrhœal in character. The dose is gr. i. three times a day, and oil of santalwood, copaiba, etc., may be combined. The bladder and urethra may also be irrigated freely with a solution of the strength of from half a grain to the pint.
Beavmont Small.

METHYLENE DI-TANNIN. See *Tanneform*.

METHYLENE DI-COTOIN. See *Fortoin*.

METHYL VIOLET. See *Pyoktanin*.

METRITIS.—**DEFINITION**.—Metritis is defined as an inflammation of the uterus, or, in other words, of the uterine wall. This definition, so far as it goes, is satisfactory, and if all of the conditions which are grouped under this head were inflammatory in their nature and always involved the whole of the uterine wall, there would be but little difficulty in giving a systematic account of the disease. As it is, however, many observers describe as a distinct entity diseases of the endometrium. This division necessitates another name when the muscular and connective-tissue portion of the uterine wall, or the mesometrium of Schultz, is involved, and it is to inflammatory or other changes of this portion of the uterus that the name metritis is often applied to distinguish it from endometritis. From the close relationship, however, which exists between these tissues and from the fact that recent observations show an almost constant involvement of some of the mesometrial tissue following primary inflammation in the endometrium, it is no longer proper to describe endometritis as a distinct disease. Therefore it is best to use the term metritis as meaning an inflammation of the uterus as a whole, while if special stress is to be laid on changes in one or the other part of the wall we may speak of an endometritis, or of a parenchymatous metritis, or of a mesometritis.

Further, we find grouped under the one head of metritis several conditions which are not in their nature inflammatory, but are the results of congestive or degenerative changes; and though these should properly not be classed under a term meaning in its derivation inflammatory, for the present, at least, until our understanding of the exact etiological factors is clearer, they must be grouped here, especially as it is difficult sharply to differentiate between the inflammatory and the congestive changes, and it is even more difficult to differentiate between the results of these two conditions in the later stages.

VARIETIES.—As in the definition of the term, so also in grouping the varieties do we find much confusion, and it is only necessary to review briefly some of the proposed methods of grouping to realize how difficult a matter it is to obtain a satisfactory conception of the whole. Thus we may divide the varieties, as does Winckel, according to their etiology. This is cumbersome, however, and leads to much obscurity. We may divide them according to clinical symptoms, and speak of endometritis hæmorrhagica, endometritis dysmenorrhœica, and endometritis catarrhalis. Or we may follow Ruge's classification, describing endometritis glandularis, endometritis interstitialis, and endometritis diffusa, to which Ruge adds three special forms, endometritis decidua, endometritis post abortum, and endometritis exfoliativa. This last is the classification most frequently used in this country and the one, with some modifications, which is employed here.

Acute Forms Involving both Endometrium and Mesometrium.

1. Acute puerperal metritis.
2. Acute septic metritis (non-puerperal).
3. "Metritis desiccans" Garrigues, or "gangræna uteri partialis post partum," Grammatikati.

Chronic Forms Involving Chiefly the Endometrium.

4. Endometritis glandularis.
5. Endometritis interstitialis.
6. Endometritis diffusa.
7. Endometritis exfoliativa.
8. Endometritis decidua.
9. Endometritis senilis.

Chronic Forms Involving Chiefly the Mesometrium.

10. Parenchymatous or interstitial metritis.

Conditions classed as metritides, in which there is no distinct pathological change.

11. "Metritis hysterica," Vedeler.

ETIOLOGY.—As etiological factors two main causes are found—bacterial infection and circulatory disturbances; although besides these two there are other influences which must be borne in mind, as, for instance, in cases of glandular metritis the clinical picture is of a hyperplastic change in the epithelium, and in this form we must search for some form of irritation. Again, for instance in the hysterical metritis, we must consider the cause as a local hyperæsthesia of the nerve terminals, and in fact in a number of cases of metritis we are forced to concede the fact that as yet but little is known of the etiology.

In studying more in detail the bacterial infections we find in the acute forms that the condition is a result of the attack of the pyogenic cocci. Thus, the most frequent variety of bacteria in cases of acute puerperal metritis is the streptococcus pyogenes, either alone or as one member of a mixed infection. This organism gains entrance to the uterine cavity through the widely opened cervix, and generally as a result of its introduction from outside through the medium of an unclean finger, speculum, forceps, or other instrument.

Acute septic metritis, not puerperal in origin, is less frequently recognized and is a rarer condition. As in the puerperal form, however, it is the result of the presence of one of the pyogenic cocci, probably most frequently the gonococcus, though various other forms have been isolated from the uterine cavity in these cases. The method of invasion varies. Most frequently, perhaps, the acute inflammation follows the introduction of a dirty sound or other instrument. The introduction of dirty instruments, or of an infected finger, into the vagina is also a means of infection, the micro-organisms reaching the cervix and gaining entrance to the uterine cavity through the cervical canal. In the same way a dirty pessary may be the means of spreading the infection. An acute gonorrhœal infection of the uterine wall usually begins some time during the menstrual period when the cervical canal is more widely open than usual, and when the organisms which have already attacked the cervix may be more easily carried into the uterine cavity by a back flow of the fluid blood.

Metritis desiccans is but one of the later stages in puerperal metritis, and is characterized by the destruction and sloughing off of large portions of the uterine wall.

As regards the more chronic forms, we must conceive in many cases a different course of events. A certain number of cases of chronic endometritis, especially the interstitial form, follow as a later result after the acute inflammation has subsided, there being in these cases a round-cell infiltration and a proliferation of the connective tissue with a possible change in the character of the epithelial cells which in places are found flattened or cuboidal and lying several layers in depth in place of the one layer of cylindrical cells. In many of the chronic cases the condition does not follow a bacterial infection at all, but is due to circulatory changes or to interference with uterine involution after delivery, and we may find the chief trouble either in the glandular tissue, in which case there are proliferative or degenerative changes in the glands, or it may be in the interstitial tissues in which it gives rise in the same way to active proliferation or degeneration; or, finally, we may find the chief effects of the circulatory disturbance in the mesometrial tissues,

the most marked change being a great increase in the connective tissue.

Theilhaber has carefully described an abnormal condition in the mesometrium which he thinks is the cause of many cases of endometritis. This change is chiefly in the muscle fibres, which are weakened, and for this reason there are not the usual rhythmical contraction and dilatation of the uterus which he considers to be always present normally, and as a result of this the venous circulation is not so rapid as it should be, and there result, naturally, congestion and dilatation of the venous trunks in the uterine wall. He considers this change in the muscle fibres due to too rapid growth, to degenerative changes such as are found in chlorosis, or to fibroid changes such as occur at the menopause. This theory at least accounts in a plausible manner for many changes in the uterus which we cannot otherwise explain.

To recapitulate briefly, we find, in the acute cases, that the etiological factor is always bacterial in its nature. In the chronic cases the condition may be due to bacterial infection, but it is probably more frequently the result of circulatory disturbances, or of subinvolution, or of some abnormality, or of degenerative changes in the uterine muscle.

PATHOLOGY.—In the acute puerperal metritis there is a varying pathological picture depending upon the grade of the infection. In the more common form, in which the infection has not extended through into the muscular walls, we find the superficial portion of the decidua more or less completely broken down, forming a disintegrated mass in which are seen clumps of bacteria and an occasional cell. Beyond these are still recognizable cells between which lie leucocytes and bacteria, and still deeper in the tissues is a wall of leucocytes beyond which the bacteria have not penetrated. In the more severe grades there is a more decided degree of necrosis of tissue, and masses of leucocytes are seen, instead of a distinct wall, while scattered through the tissue are bacteria lying in the lymphatics or small vessels, these being the foci for the abscesses found in the uterine wall in the later stages.

In acute septic and gonorrhœal metritis we sometimes find much the same changes as appear in the puerperal cases, there being a superficial necrosis of the mucous membrane with further invasion of the tissues by bacteria. Masses of leucocytes offer a barrier to this invasion, although this is not necessarily always the case, for sometimes small abscesses are found deep in the uterine wall, or the bacteria may extend through the lymphatics to the pelvic connective tissue or to the peritoneal surfaces. In less severe grades of acute metritis we do not notice such necrosis of the tissues, but find evidences of the acute disease in the filling of the lumina of the glands by masses of bacteria and leucocytes, and by the infiltration of the subepithelial connective tissue by leucocytes and newly formed round cells. In these cases there may be some infiltration of the deeper layers of muscle.

In the chronic forms of metritis there is a much more varied picture, depending upon the type of the disease. The interstitial form shows chiefly changes in the connective tissue between the glands, this tissue giving the impression of being denser and firmer than normal, due to an increase of connective tissue with necessarily a concomitant narrowing of the glands. On careful examination this increase is found to be due to the presence of spindle-shaped cells, which differentiate themselves sharply from the rather lightly staining cells of the normal subepithelial tissue. In the glandular forms we find, on the other hand, an increase in the number of the epithelial cells. There is a lengthening of the glands and they become extremely tortuous, with a lumen much wider than is normally the case, while the interstitial tissues show no change. Finally, we may have a combination of the two forms described above, in which there are changes both in the interstitial tissue and in the glands, giving rise to another type—endometritis diffusa.

Endometritis exfoliativa is characterized by the loosening and extrusion, at the menstrual period, of a complete or incomplete cast of the uterine cavity, this cast being

composed of the mucous membrane and the underlying portions of the connective tissue.

Endometritis senilis is a result of the changed uterine conditions which follow the menopause, and is really a slow atrophy of the mucosa and submucosa. A section through the uterine wall of a well-marked case of this type shows either an absence or at least a flattening of the epithelial cells which are cuboidal in shape. There is an almost complete disappearance of the glands, and where they persist there is often an occlusion of the outer end, and a cystic enlargement from retention of the secretion. The submucosa is greatly thinned and the mesometrium is made up chiefly of dense connective tissue which has slowly taken the place of a portion of the muscle.

In parenchymatous metritis the most marked change takes place in the mesometrium, though the endometrium is always involved to some extent. The uterus feels firmer and harder than normal, and on section connective-tissue bands are seen in the wall. On microscopic examination the connective tissue is found to have extended between the muscle bundles, and in places appears to usurp entirely the place of the muscle. The vessels are large, especially the veins, and their walls are thickened and show signs of arterio-sclerotic change.

SYMPTOMATOLOGY.—The symptoms of metritis vary greatly, according to the variety of the disease which may be present. Acute puerperal metritis appears usually within the first three days after delivery. As a rule it is ushered in by a chill accompanied by a sharp rise of temperature and an accompanying increase in the rapidity of the pulse. The patient feels bad, and headache, with perhaps nausea and vomiting, is complained of. The lochial discharge may not change in any way, though in many of the cases it is lessened, and it may become more serous in its nature. The presence or absence of odor depends upon the type of the micro-organism present or upon the amount of tissue destruction. Pain in cases of puerperal metritis is not a marked symptom, but when it is severe it should always cause a suspicion of peritoneal involvement. The course of such a case varies in accordance, apparently, with the virulence of the organism present. In many instances there is a direct extension of the infection to other tissues of the body, with death in the course of a few days. On the other hand, instead of a general infection we may find a severe local infection of the surrounding tissues with, for instance, local peritonitis, pelvic cellulitis, or pelvic phlebitis. In still other cases the leucocytes are able to cope with the infection and we find a distinctly local point of disease in the uterine wall, this being surrounded by a wall of leucocytes which prevents further invasion of the tissues. There may also be an extension of the disease into the tubes.

The symptoms of acute septic metritis are apt to be hidden by the frequent occurrence of tubal inflammation, which often accompanies it. In a case of pure metritis, however, a rise of temperature may be looked for soon after the use of a dirty sound, or, if the inflammation is of gonorrhœal origin, at the end of the menstrual period. At the same time there is apt to be a profuse discharge, rather thin and purulent in character, which possibly causes some local irritation. Besides this there is a feeling of general malaise, the patient complains of an aching in the lower abdomen, and there is a sensation of dragging on the pelvic viscera. On examining such a patient the abdomen will be found tense in the lower zone, tenderness on pressure is complained of, and on vaginal examination the uterus is found somewhat enlarged, soft, and very tender on palpation, the least movement of the uterus between the hands being accompanied by severe pain. If the speculum is introduced, a thin purulent discharge will be noticed welling out from the cervix, and if a sound is passed its withdrawal is followed by a little bloody discharge.

Metritis desiccans is characterized in the beginning by the same group of symptoms which occur in puerperal metritis. As the disease progresses, however, the dis-

charge becomes extremely foul in odor, is of a dirty yellowish or brownish color, and mixed with it are shreds and irregular pieces of the uterine wall which are soft and mushy in consistency.

The symptoms of the chronic forms may be taken up in a more general way, though in most of them one symptom predominates.

Pain.—This is a symptom which is present in most forms of metritis, although it varies greatly in character. In endometritis exfoliativa acute pain is always present during the menstrual period while the extrusion of the uterine cast is going on. Acute pain is also one of the chief symptoms in many cases of interstitial metritis, especially at the menstrual period. On the other hand, the pain, instead of being sharp in character, is more of a dull ache located deep in the pelvis or referred to the lower back or to the legs, and occurring most frequently at the menstrual time, though it may appear and be most severe in the intermenstrual epoch. Finally, some patients do not experience any real pain but complain of a feeling of weight or dragging in the pelvis; the sensation, as they describe it, is as if the pelvic organs were about to fall out.

Menstruation.—This is almost always changed in some way. Most frequently it is increased in amount, both the time during which the flow is present being prolonged and the amount of flow increased. There is frequently, also, some irregularity in the occurrence of the flow, the intervals between being usually shortened. This is true especially in the glandular forms of the disease or when the uterus is displaced backward. In the later stages, on the other hand, there is often a lessening of the menstrual flow with an increase in the length of the intermenstrual period.

Discharge.—Some discharge is almost invariably present in chronic metritis, though it is often masked by the discharge of a coincident cervical disease. The characteristic uterine discharge is thin, sero-purulent, or possibly blood-stained, and when the cervix is normal it may be noticed oozing out of the uterine canal. This discharge varies greatly in amount, sometimes being so free as to cause the patient much discomfort, while at other times it is so slight in amount as to be hardly noticeable; in fact, in some cases its existence can be ascertained only by careful examination.

GENERAL SYMPTOMS.—Besides these local symptoms of metritis there are numberless others of which the patients complain. Some have violent occipital or vertical headaches, while others have vertigo or other nervous manifestations such as local anaesthesia or hyperaesthesia. The digestive tract is often involved, there being loss of appetite, slow digestion, intestinal flatulency, or troublesome constipation. Anæmia is a common symptom and with it are frequently noticed cardiac palpitation, swelling of the ankles, or possibly dyspnoea on exertion, etc.

DIAGNOSIS.—In a great majority of the cases the diagnosis is comparatively a simple matter, being based on the subjective symptoms and the result of the examination. The dull, aching sensation in the pelvis and back, with perhaps acute attacks of pain during the menstrual period, the uterine discharge differentiated from that coming from the cervix by its thin, watery character, the menstrual disturbances, and the general symptoms such as headache, etc., while not pathognomonic are, at least, when found together, very suggestive. If in addition to these it is found, as a result of bimanual examination, that there is enlargement or some change in the shape of the uterus, with uterine tenderness on palpation, and possibly slight bleeding, or acute pain if the uterine sound be passed, we have a symptom complex which in most cases admits of but little question. The difficult cases to diagnose are those in which one symptom alone is present or in which one symptom is so marked as to mask all the others. Among these stand, for instance, the cases of glandular endometritis in which the only symptom is profuse bleeding, and which must be differentiated from adeno-carcinoma of the uterine body, or from an intra-uterine polyp or small myoma.

This can be done only by removing, for microscopic examination, some of the uterine mucosa. Another illustration is the "endometritis hysterica" of Vedeler, in which the only symptom is acute pain in the pelvis, which might be taken, on hasty examination, for inflammatory disease of the tubes or pelvic peritoneum, and which can be diagnosed only by a careful examination of the uterine cavity with a sound, demonstrating the existence of local tender points in the uterine wall. Finally, the possible presence of tuberculosis of the endometrium must always be borne in mind in making a diagnosis of metritis, as the symptoms of tuberculous disease here are always those found in other forms of metritis, and it is by the curette alone that we are able in many cases to decide whether or not tuberculosis is present.

TREATMENT.—Prophylaxis.—As has been seen, in considering the etiology, many cases of metritis are due to faulty involution of the uterus after delivery at term, or after a miscarriage, to displacement of the uterus or to disease of the cervix, to too frequent pregnancies, or to a markedly lowered condition of the general health; and if these factors were more carefully borne in mind by the general practitioner fewer cases of metritis would need later treatment. It is certainly easy to advise our patients to remain in bed after delivery or after a miscarriage longer than is usually done, and it is our duty to insist on this when the uterus is slow in returning to its normal size or when a bloody discharge lasts longer than is usual. Many displacements may be corrected by properly fitted pessaries, congestions or erosions of the cervix relieved by hot douches or other local measures, and advice given against the too frequent pregnancies which are so often seen.

General Treatment.—As the general health in most patients suffering from metritis is below par, much may be done by general treatment to relieve them. Many are anæmic, either as a result of profuse bleeding or because of the lowered general tone, and great benefit often follows the use of some easily assimilable form of iron, as, for instance, one or more of the Bland's pills two or three times a day after meals, or, if this be not well borne, one of the albuminate of iron preparations is often satisfactory. The digestive troubles can be relieved by a carefully selected dietary, one of the simple bitter tonics being administered before the principal meals. The bowels are to be regulated by a proper selection of foods, or by one of the milder cathartics taken regularly for a time—as, for instance, small doses of the fluid extract of cascara sagrada, or one of the pills containing aloin, strychnine, and belladonna, with perhaps cascara or ipecac added. In addition to this, regular exercise is advisable, spending part of the day in the open air, with regular habits as regards rest, the time of meals, and the time of the bowel movements.

Local Treatment.—As a rule the first thing used is the time-honored tampon, and fortunately its use is often followed by relief if it be applied in properly selected cases, and especially if it be used in conjunction with hot douches. The cases in which the tampon is of the most service are those of interstitial endometritis and parenchymatous metritis. In these cases we have a large, heavy uterus, often somewhat displaced or tender on pressure, with possibly in addition a cervical erosion, or a large hypertrophied cervix. The tampon is made either of cotton or of lamb's wool, and is soaked in boroglyceride, or, as is sometimes advised, in a ten-per-cent. glycerin-ichthol mixture. It is then carefully packed up against the cervix and into the vaginal fornices through a bivalve speculum. The tampon has a cord attached to it by which it may be withdrawn by the patient, and directions are given that it be removed at the end of twenty-four hours and a hot douche taken. These tampons are generally introduced two or three times a week, and in the interval the patient is advised to use a hot douche twice or three times during the twenty-four hours. Explicit directions must be given as to how the douches are to be used, as otherwise many patients will content themselves with sitting over a vessel and forcing the water into the

vagina, allowing it to run out immediately rather than to take the trouble of using it while in a recumbent posture. Applications of various caustic or antiseptic substances to the uterine cavity were formerly much used, and the chloride of zinc and other like substances were applied in solution by means of cotton wrapped on an applicator, or by injecting it into the uterine cavity with a long-spouted syringe. This treatment is still sometimes advised, but it is unsatisfactory and may be dangerous, and, as a general rule, it has fallen into disrepute of late years.

Dilatation of the cervical canal and curetting of the uterine cavity probably constitute the most satisfactory method of treating metritis, the object being to remove the diseased mucous membrane and bring about a regeneration of this tissue, while at the same time the patient gets the good effect of an enforced rest in bed and the best chance is given for uterine involution to take place. Curetting should always be carried out with all proper antiseptic precautions, and the operation is much more easily and satisfactorily performed with the patient under general anæsthesia. As a rule, packing of the uterine cavity after curetting is advised against, and it should be an inflexible rule that such patients remain in bed for at least a week after the operation. Curetting may be performed at any time during the month, but, if it be practicable, the best time is about a week after the end of the menstrual period.

Another recent addition to our means of treating this disease is the local use of superheated steam, the method being known as *atmokautis*. This is carried out by introducing into the uterine cavity a suitably insulated tube connected with the proper form of kettle in which water is boiling. The steam is allowed to come into contact with the tissues for a varying length of time, depending upon the effect to be produced. It is, however, a dangerous method and, unless it is used under skilled directions, much harm may follow.

Finally, in some extreme cases of glandular endometritis in which curetting has given only temporary relief, and in which the patients are almost exsanguinated by the constantly occurring hemorrhages, removal of the uterus is the only means at our command for definitely controlling the symptoms. This should, however, be done only as a last resort when all other forms of treatment have been exhausted without relief to the patient.

Otto G. Ramsay.

METORRHAGIA.—The ordinary or customary discharge of blood from the womb at the menstrual period is the point of departure, so to speak, from which this term originates. Just where to draw the line is difficult because the term is a relative one. What is ordinary and not excessive for one woman may be extraordinary and excessive for another. Any hemorrhage from the womb, be the quantity large or small, which depletes the woman's vital force may be regarded as metrorrhagia. The term metrorrhagia is often used when this excessive loss occurs in connection with the monthly flow.

Metrorrhagia may therefore be regarded as a hemorrhage from the womb, excessive in quantity, occurring at no definite time, of no definite duration, and due to a variety of causes.

Conditions which favor or cause such a hemorrhage are relaxation of the uterine structures, hypertrophy of the uterine mucosa, malignant degeneration of the uterus, repeated congestion of the pelvic circulation, especially if the blood tension is high or the vascular walls are weak or friable.

1. *Relaxation of the Uterine Structures.*—Such a condition may signify merely a relaxed state of the uterine muscle, or relaxation of the mucosa as well. After a prolonged and severe parturition—especially if there has been uterine inertia during parturition, or if the patient has been kept under the influence of an anæsthetic for an unusually long time—the uterus frequently remains relaxed, the great uterine sinuses remain unclosed, and the blood may pour forth in a mighty current. This is com-

monly termed post-partum hemorrhage. It is a true metrorrhagia. The relaxed and flabby condition is often present in weak or anæmic women or in those who are suffering with serious disease, such as Bright's disease of the kidneys or tuberculosis. In such cases the hemorrhages are frequently profuse and of long duration. They may occur with the monthly period or during the interval and should be regarded with great seriousness, for such women cannot well sustain such losses of the vital fluid.

The treatment which I have found most effective for the first class of cases is the tamponade of the uterus in the presence of the hemorrhage. Other measures need not be discussed, for with me, at least, they have proved distinctly inferior to the tampon. My plan is to draw the uterus down to the vulva with a volsella firmly fixed in the anterior lip of the cervix, and then to carry successive portions of a long strip of aseptic gauze, two inches wide, quite to the fundus, with long narrow dressing forceps, until the cavity is fairly well filled, at the same time compressing the uterus with the left hand through the abdominal wall. In my hands this has several times proved efficient after other measures had failed. The same treatment is equally suitable for the profuse hemorrhage which often follows abortion. For the second class of cases one must first improve the general condition with iron, strychnine, and an abundance of food. In the intervals between the bleedings one may apply Churchill's tincture of iodine, or the nitrate of silver, four drachms to the ounce of water, to the endometrium every other day, and should such treatment be ineffective after a few weeks of trial, one may dilate the uterus and curette the endometrium. It may not be possible or desirable to scrape away much of the uterine mucosa, but the effect of the operation will be to stimulate the organ to contraction. The operation should be repeated if a single scraping proves insufficient. Some of the cases of profuse hemorrhage during the menopause are successfully treated by this method. The uterus is then tamponed, but not too firmly, the tampon being retained for two days.

2. *Hypertrophy of the Uterine Mucosa.*—The metrorrhagia which results from this cause may consist either of a continual dripping which requires the constant use of a napkin, or of a more or less profuse flowing which ceases only when the patient is exhausted or when the uterus is filled with a clot. The hypertrophied tissue is usually of rapid growth, contains an abundance of vessels, and breaks down readily. After it has broken down it is quickly renewed only to break down again and be accompanied by another hemorrhage. Such a condition frequently follows parturition at term, or abortion, especially if the entire product of conception were not expelled or removed. It also results from gonorrhœa which may have invaded the endometrium, from the presence of fibromyomata within the uterine muscle, especially when their development is toward the endometrium rather than toward the peritoneum, and it not infrequently is one of the phenomena which accompany the menopause. The treatment in all these conditions is the same, for the pathological significance is the same in all. To attempt to relieve the hemorrhage by the internal use of drugs is futile and an unreasonable waste of time. Even the use of astringent or caustic applications to the endometrium is of doubtful value, and in most cases will only prove disappointing and unsuccessful. The only excuse for such treatment would be the unwillingness of the patient to submit at once to the operative method. This consists in the careful and sufficient dilatation of the uterine canal and the removal, with a sharp curette, of the entire hypertrophied mucous membrane. The uterine cavity is then tamponed with aseptic gauze which may usually be retained for two days. In almost all cases the result of this operation will be the immediate cessation of the hemorrhage, and very frequently the cure will be a permanent one. If, however, the cause of the bleeding is a fibromyoma the bleeding will probably recur, and it may be necessary to remove the tumor to produce a permanent

result. A repetition of the operation is also frequently required in connection with the menopause.

3. *Malignant Degeneration of the Uterus.*—Any form of malignant degeneration of the uterus is likely to be accompanied by metrorrhagia. In the case of sarcoma the bleeding is not so frequent and may not be so profuse as in that of carcinoma. Whether carcinoma be limited to the cervix or to the corpus, or involve both parts of the organ, hemorrhage will invariably occur. It may occur as a result of great emotion or excitement; it often occurs after coitus. The slightest disturbance of the friable tissue of the cancerous uterus causes bleeding which may be very difficult to arrest. If the diseased tissue is not disturbed in any way there will be a periodical disintegration and breaking down of such tissue, accompanied by profuse hemorrhage. The hemorrhage usually comes with a gush and continues until the patient is exhausted, until a sufficiently large clot is formed, or until it is arrested by mechanical means. The treatment of such hemorrhages is of course only palliative, in so far as the disease which causes them is concerned. For the immediate arrest of the bleeding, pledgets of cotton wool saturated with a solution of alum or of persulphate of iron should be carefully introduced, one after the other, into the vagina, until that cavity is firmly packed. This packing may be left undisturbed for twenty-four hours, and then, if the bleeding recurs when it is removed, the same procedure should be repeated. As soon as possible it is desirable that the diseased tissue should all be scraped away with the sharp curette and a tampon introduced like that which has been described. Such an operation is usually followed by relief from hemorrhage, perhaps for weeks or even months.

4. *Repeated Congestion of the Pelvic Circulation.* Hemorrhage from this cause is of frequent occurrence, and there may or may not be any apparent hypertrophy of the uterine mucosa. It may be the result of excessive sexual indulgence, of great emotion or excitement, of sudden removal to a great altitude where the atmospheric pressure is decidedly lower than the pressure within the blood-vessels, or of unusual blood tension from a variety of causes at the time of the monthly flow. I have frequently seen this variety of metrorrhagia in prostitutes, and I believe that it is very common with them, especially if they are also suffering with disease of the tubes and ovaries, to which they are very susceptible. Hysterical women or women who experience great calamities or catastrophes are sometimes sufferers from this form of hemorrhage. Women who remove their residence from the sea level to an altitude of six thousand feet or more are frequently troubled with metrorrhagia until they become accustomed to their new surroundings, even though they may be in ordinary health in all other respects. Those who suffer from this cause at the time of the monthly flow may not present any lesion which is discoverable as a cause. Metrorrhagia sometimes occurs upon the approach of the menopause. The condition will usually yield quite readily to treatment. It is hardly necessary to say that if the cause is excessive coitus such excess should cease. Those who reside in high altitudes should change their residence if the bleeding does not cease after a few months. The hysterical and emotional must learn self-control, and if the blood tension is excessive a course of treatment with the bromides must be entered upon. In some cases it may be desirable to make applications of iodine or carbolic acid or persulphate of iron to the endometrium, and if this does not avail it will be necessary to dilate the uterine canal and curette the endometrium. For the immediate treatment of the hemorrhage the tamponade of the vagina after the manner which has been described will usually prove effective.

Andrew F. Currier.

MEXICO.—This great southern portion of North America, extending over seventeen degrees of latitude and thirty of longitude, is comprehended between the United States and Central America on the north and south, and the Pacific Ocean and the Gulf of Mexico on

the east and west. It is 1,950 miles long and 750 wide in the widest part, and 140 in the narrowest. It has an area of 767,005 square miles, and almost equals Great Britain and Ireland, France, Germany, and Austria-Hungary together. Mexico is a republic (largely modelled on that of the United States) containing twenty-seven states and one federal district. Its population is 13,545,462. It consists principally of an immense tableland or plateau, averaging 8,000 feet in height at the southern portion in the states of Mexico and Puebla, and thence northward it falls in height to 3,600 feet at El Paso Del Norte. The boundaries of this plateau are formed by the Sierra Madre—an almost unbroken chain—on the west; and on the east, parallel to the Gulf Coast and from ten to one hundred miles from it, by the Sierras of the east, forming more a series of groups than a connected range. There are also short cross ridges which break up the surface, the principal one being the Cordillera de Anahuac. Outside of these mountain boundaries the land slopes to the Gulf and to the Pacific, quite gradually on the east, while on the Pacific side the Cordillera runs on the whole very near the coast, leaving a very narrow strip of land between the same and the sea. "All climates," as Hann remarks, "are represented in Mexico—the hot, damp climate of the tropics, as well as the hot dry desert climate of the lowlands. The temperate climate of the medium elevations, and the climate of the region of eternal snows on the highest mountain peaks." This relief of the land—its varying elevation—rather than the latitude, determines the diversity of the climate.

Three different climatic zones are distinguished. *First*, the warm—*Tierra Caliente*—up to about 3,000 feet. This is considered a hot, damp, unwholesome region as a whole, especially the low marshy Gulf coast, where various diseases are prevalent—malaria, yellow fever, dysentery, and others. The temperature varies from 77° to 82° F.; it seldom falls below 60° and often rises to 100° or more. In the coast valleys, however, at an altitude of from 500 to 3,000 feet, the climatic conditions are improved, and malaria is much less prevalent. These valleys "blossom" throughout the year and are well sheltered by the mountains, so that neither extreme heat nor uncomfortable cold prevails. At Vera Cruz, one of the principal ports on the Gulf, yellow fever is exceedingly prevalent, and Wells refers to the great mortality of American consuls there ("Mexico," David A. Wells). *Second*, the temperate zone—*Tierra Templada*—embracing territory from 3,000 to 5,000 or 6,000 feet in altitude. The climate in this region is that of continual spring, the mean annual temperature being 62° to 70° F., varying but a few degrees during the season. This zone embraces all the higher terraces and portions of the central plateau. "The zone of temperate lands, oceanic slopes," says Romero ("Geographical and Statistical Notes on Mexico," M. Romero, 1898), "enjoys an everlasting spring, being exposed neither to severe winter nor to intolerable summer heats; in every glen flows a rippling stream; every human abode is embowered in leafy vegetation, and here the native plants are intermingled with those of Europe and Africa. Each traveller in his turn describes the valley in which he has tarried longest as the loveliest in the world; nowhere else do the snowy crests or smoking volcanic cones rise in more imposing grandeur above the surrounding sea of verdure all carpeted with the brightest flowers." Chihuahua, elevation about 4,500 feet, may be taken as a type of the climate of the central plateau lying in this zone. The coldest months are from November to February, and the hottest from May to August. The summer climate is very agreeable and the air cool and bracing. According to Hinsdale ("A System of Physiological Therapeutics, Climatology, Health Resorts," vol. iv., book ii., p. 219), yellow fever, dysentery, and diarrhœa are frequent causes of death in this zone, while, on the contrary, it is stated in the article on Mexico in the Encyclopedia Britannica, that endemic fevers cease altogether at an elevation of 2,700 and 2,800 feet. *Third*, the cold zone—*Tierra Fria*—embracing territory of an elevation of from 5,000 or 6,000 to 8,000 and 9,000 feet.