8. Cancer or sarcoma in the non-ulcerated state, and in the ulcerated state.
9. Wounds of the uterus, vagina, or vulva from accident, operations, leech-bites, abrasion or irritation as from ill-selected pessaries.
10. Voiding the blood of thrombi or of retro-uterine hæmatoceles.
11. Varicosity of the vessels of the labia, which may burst.
12. Imperfect involution of the uterus and obstruction of circulation kept up by impeded mobility from peri-uterine effusions.
13. Hyperæmia induced by the uterus being within the range of any abnormal vascular activity, as an extra-uterine gestation-cyst.

Hæmaturia, or disease of the meatus urinarius, may possibly be mistaken for hemorrhage of uterine origin. And, on the other hand, it is necessary to bear in mind that apparent hæmaturia may be due to uterine disease. Thus I have known urine which escaped by a fistula, the result of cancerous erosion, be retained for a time in the vagina, and being discharged mixed with blood, taken for hæmaturia, the result of bladder or kidney disease.

D. *Hemorrhages poured out internally—*

1. Retro-uterine hæmatocele, from blood from ovary, ovarian plexuses, or Fallopian tubes, under menstrual nisus.
2. Peri-uterine hæmatocele or thrombus, or effusion into the connections of the broad ligaments, or between the bladder and cervix uteri.

Similar events may happen from abnormal ovarian congestions; from rupture of ovarian tumors, or of vessels in their walls; from rupture of varices of the ovary or broad ligaments.

Under ovarian menstrual stimulus blood may be poured out into the abdominal cavity, because there is some obstruction in the course of the genital canal.

3. The Fallopian tubes may be occluded; there may be stenosis or atresia of the uterus, vagina, or vulva; there may be retroflexion of the uterus.

In these cases blood may accumulate above the seat of the obstruction, and regurgitate into the abdomen.

4. There may also be retrograde hemorrhage from abortion.
5. Abdominal hemorrhage may arise from rupture of the sac of an extra-uterine gestation. External hemorrhage commonly precedes or attends the rupture and the internal effusion.
6. The gravid uterus may rupture, with or without violence, after the fourth month. This is more likely to happen when the gestation is mural, or in one horn of a two-horned uterus. In these cases there will probably be some external hemorrhage also.

Lastly. Hemorrhage may take place in the abdominal cavity from various sources not connected with the genital organs or functions.

A methodical analysis of the various causes of uterine hemorrhage for diagnostic purposes would carry us through almost the entire field of ovarian and uterine pathology. The morbid conditions which are attended by hemorrhage will be described in their proper places. We can only now enumerate the conditions, physiological or pathological, which are associated with hemorrhage; and seek to lay down compendious principles of diagnosis and treatment.

In practice we are continually called upon to treat symptoms or consequences of disease. It is the merest folly or affectation of science in many cases, to pretend to remove a disease by at once attacking the presumed cause. The folly is often as great to postpone treatment until we have discovered the cause. In no case is this pretension more absurd or more dangerous than in that of hemorrhage from a mucous membrane. Whilst we are waiting to discover the cause, the patient may bleed to death. If we apply ourselves at once to stop the hemorrhage, we may save her, and so gain the opportunity of attacking the cause.

Treatment.—The first practical rule to observe when in presence of a profuse flooding is to take off the pressure of gravitation, by placing the patient in a horizontal posture with the pelvis somewhat elevated; to remove all articles of dress which, by their pressure upon the chest or waist, impede the circulation; to remove, as far as possible, all sources of excitement or emotion; above all, *to obtain absolute rest.* Wounds or injuries which would be of no consequence if the patient remained perfectly quiet and recumbent, may, so rich is the vascularity and so free the intercommunication of the vessels of the pelvis, lead to fatal hemorrhage, if she assume the erect posture, or undertake any bodily exertion.

The next practical rule is to endeavor to stop the bleeding as quickly as possible, without waiting to inquire into its cause. This can rarely be done effectually or certainly without the application of topical remedies. This necessarily implies a preliminary examination by the finger, hand, or speculum. We thus obtain incidentally useful, often adequate, diagnostic information. For example, we find a polypoid tumor or a wound. The hemorrhage may then be stopped by treatment *ad hoc.* We may find malignant disease; and then all we can do is to stop the bleeding by the application of powerful astringents or cauteries, as the perchloride of iron, chromic acid, nitric acid, or the actual cautery. We may find a fibroid of the uterus; and the hemorrhage may be controlled by the same remedies, postponing treatment adapted to prevent the recurrence of bleeding to a more favorable opportunity.

We may find an ovum presenting at the os uteri, or some other form of hemorrhage connected with pregnancy. The treatment of these forms cannot be discussed in this work. I have described them carefully in my *Lectures on Obstetric Operations.*

Where we find no cause that admits of immediate removal, we may still arrest the hemorrhage. The method which is commonly the readiest, because it requires no special appliances, is plugging the vagina. Whilst waiting for these special appliances, it may be desirable to plug. This is done by pushing pieces of lint, linen, sponge, or silk handkerchiefs into the vagina. First of all, it is desirable to remove clots by the hand, and to wash out the vagina with cold water. Then holding the labia apart with the expanded fingers of one hand, the plugging materials lubricated in oil, or better with oil containing an eighth or tenth part of carbolic acid, or lard, are pushed in gradually by the fingers of the other hand, or by aid of the uterine sound, the handle of a tooth brush, or any other accessible instrument. The plugging must be firm, packing the vagina pretty tightly. It is, however, generally preferable to plug by the aid of a speculum. The pieces are thus accurately packed, and the

speculum is gradually withdrawn. In this way uterine and vaginal hemorrhage may frequently be checked for a while, and time be gained for choice of more scientific remedies. But plugging is not free from objections. In the first place, if the case be one of malignant disease, tight packing of the vagina is apt to break down the fragile malignant tissue, to increase the bleeding, and favor ulceration. In the next place, after a while the elastic and contractile vagina compresses the plug saturated with blood, which coagulating forms a compact ball which no longer fills the canal; blood then easily flows past; or being retained concealed, may give rise to a false security, and lead us to defer more effectual remedies. In the third place, plugs, by heating and distending the parts, are a source of irritation and distress; they often in this way seem even to keep up hemorrhage. In the fourth place, if retained a few hours, the plugs, or the retained blood, decompose and become exceedingly foul. Fifthly, the compression of the urethra, or the metastatic irritation, often causes retention of urine. And even if the plug have arrested the hemorrhage, this often breaks out again when the plug is removed.

In the majority of cases, therefore, it is wise to look upon plugging as a mere temporary expedient, to be adopted whilst preparing for more trustworthy means.

I could give no rule of more general application or more valuable than this: *In all cases of hemorrhage coming from the body of the uterus obtain and maintain free patency of the cervical canal.*

In cases of abortion, of the hemorrhages of gestation, of intra-uterine polypi, or fibroids, of hypertrophy of the mucous membrane, of malignant disease of the interior of the uterus, to obtain free external escape for the hemorrhage and free access to the source, in order to control the bleeding, is the first necessity. We might, it is true, in almost every case introduce a catheter or tube to carry a styptic injection into the uterus. But this proceeding, invaluable if properly carried out, may be useless or even dangerous if resorted to whilst the cervix uteri is contracted. Blood retained in the cavity of the uterus forms clots which, under the spasmodic contractions they excite, become compressed into firm masses of fibrin by the squeezing out of the serum. These coagula cannot make their way through the constricted cervical canal; they may even become closely adherent to the walls of the uterus, forming the "fibrinous polypi." Their presence in any form is a source of irritation and suffering: by causing alternate contraction and dilatation of the uterus they keep up hemorrhage; and, occupying the uterus, injections thrown into the cavity are lost upon the clots instead of constringing the bleeding surface. Moreover, as I shall show hereafter, wherever there has long existed a narrowing of the cervical canal, there will be produced a dilatation of the genital tract above the stenosis. Hence, there will be serious danger of injected fluids being driven along the dilated Fallopian tubes into the abdominal cavity. As a consequence of the same condition, there is also serious danger of the blood which gathers in the uterine cavity and tubes being driven in a retrograde course into the peritoneum. This is one way in which retro-uterine hæmatocele is produced. It is the way which may most successfully be guarded by securing a free outlet by the cervical canal and vagina.

In the case of retained ova, membranes or placenta, or clots, the first indication is usually to remove these. To do this it is often necessary to pass in one or two fingers to break them up and to bring them away. In the case of intra-uterine polypi, there must be room to introduce an instrument, as well as a guiding finger. In the case of an unhealthy condition of the uterine mucous membrane, free passage is wanted for the application of hæmostatics. These are, I believe, most useful if applied in a tolerably concentrated form. To do this, it is preferable to introduce them soaked in cotton-wool twisted on a roughened platinum probe. If a swab cannot be introduced, and it may be difficult to do it, unless the cervix be widely open, because the charged swab as it touches the cervix in its passage contracts the canal, it is then necessary to resort to injection, or the introduction of styptics in the solid form. The best way of applying styptics I have found to be by inserting small bits of sponge in a tube made on the model of my uterine ointment-positor, and saturating this with the styptic. The end of the tube is then carried into the cavity of the uterus, when by pressing upon the piston, the fluid is squeezed out in drops upon the lining membrane of the uterus. If this plan be inefficient, we must then inject a larger quantity through the tube by help of a syringe.

If any further reason were wanted to recommend the preliminary dilatation of the cervix uteri, it would be this: It is in many cases enough to arrest the bleeding. And, if not of itself successful, it at any rate opens the road by which we can pursue a treatment that will succeed.

What are the means of dilating the cervix? These are various, and the choice will depend upon the nature of the case. If it be one of abortion, of intra-uterine polypus or tumor, or of morbid condition of the mucous membrane, it will generally be easy to place one or more laminaria-tents or sponge-tents, which in the course of a few hours will effect the desired dilatation, and, whilst acting, will probably check the bleeding. If the case be metrorrhagia from fibroid tumor, or menstruation obstructed by stenosis of the os externum uteri, it may be necessary to dilate the part by incision. This operation will frequently not only prepare the way for relief from the immediate danger, but it is an essential condition of prevention in the future.

When we have stopped or moderated the bleeding, our next inquiry will be, how are we to prevent its recurrence? This will lead to the study of the causes immediate and remote of the hemorrhage, and of the means of alleviating or removing those causes. I cannot in this place further anticipate the history of the conditions associated with hemorrhage. They will be systematically discussed under their appropriate heads.

Active hemorrhage is characterized by increased vascular tension, by rapid determination of blood to the pelvic organs, by heat, throbbing, perhaps pruritus, pain, sense of fulness or weight, and bearing down of the uterus. If examination be made by touch, the vagina is felt hot; perhaps the vaginal pulse is perceived; there is increased softness of the vaginal portion; and tenderness of the uterus when pressure is made upon its walls through the vaginal roof. The general system evinces the perturbation caused by the local molimen. There is a state of febrility,

of vertigo, of swimming of the eyes, the eyes are suffused, and nervous symptoms of an hysterical kind are frequent.

Passive hemorrhage is not marked by the signs of fluxion or active determination. There is not the same local hyperæmia as in the active form; and it is not preceded by the same heat, vascular tension, or attended by the vaginal pulsation. Having once occurred, passive hemorrhage tends to establish itself by degrading the quality of the blood, and by altering the tissues, impairing their tonicity, and rendering them more easily permeable. The blood discharged often becomes more serous in character. It is in this form that arsenic, strychnine, and iron are especially serviceable.

The mode of dealing with hemorrhage is often too empirical. There are four principles that give a rational basis of treatment, and which may, in most cases, help to guide our proceedings.

1. Bearing in mind the great physiological factor that is almost always in play in the hemorrhages of women, namely, the general vascular tension, the increased action and irritability of the heart, associated with increased nervous tension, and the special determination of blood to the pelvic organs excited by ovulation, we must adjust measures to moderate this peculiar excitement. This is the principle that is most commonly neglected. The most useful agents in this connection are: digitalis, aconite, bromide of ammonium or potassium, sometimes opium, ipecacuanha, chloral, salines, as acetate of ammonia, nitrate of potash. Cold or a reduced temperature will often be useful.

In this association the avoidance of emotion is of great importance. The influence of emotion in turning the blood-tide to the uterus is most remarkable. And when with this unusual afflux the nerve-force is diverted, used-up in other ways, the vessels having lost their restraining power easily give way; the flood-gates are opened.

The reflex or diastaltic function, which is invoked with such pre-eminent effect in the floodings which attend parturition, must not be lost sight of in the hemorrhage of the non-pregnant. The local application of cold by means of ice or cold-water is often useful. Ice in the vagina, or cold-water injections, should generally be tried before we resort to local styptics. Cold may be applied to the spine. But the too common way of applying ice and cold-water to the abdomen or vulva is open to serious objections. It is rarely efficacious. It is apt to depress the system. It often lays the foundation of peritonitis or other inflammations. Emmet extols hot-water injections.

2. The undue current or tide setting in towards the pelvic organs may be further controlled by agents that effect a diversion or attraction to other parts. Of these perhaps the most effectual is one hardly likely to be often revived. It is the small bleeding from the arm. Cupping from the nucha or loins might answer the purpose. Ligatures round the limbs, the object of which is to retain a portion of the circulating fluid in the extremities, have been used. I should not be disposed to trust to this method for more than a momentary purpose. Position is important. We may call gravity to our aid instead of letting it work against us, by keeping the pelvis at a higher level than the rest of the body. Amongst the most useful revulsive measures is purgation. Saline purgatives especially, by diminishing the volume of the circulating mass, and by lowering the heart's action, operate with great advantage.

3. Certain agents taken internally appear to possess a special power, by modifying the constitution of the blood, or by constringing the coats of the vessels, or by promoting contraction of the uterine muscular fibre, in checking the escape of blood. Of these the most useful are turpentine, which may be swallowed in capsules; ergot, which may be given in the form of fluid extract or powder, or injected under the skin, or ergotine; tincture of hamamelys, in five or ten drop doses every three or four hours; cinchona or quinia, strychnia or nux vomica, sulphuric or phosphoric acid, tannic or gallic acid, acetate of lead, the Vinca major, Indian hemp, ipecacuanha.

Various combinations of these often answer better than any one in the simple form.

4. To secure the equilibrium of the circulatory apparatus, care should be taken to put the stomach, liver, and kidneys in the best working order. For this purpose alteratives, aperients, and salines are often essential; and where there is any gouty tendency, indicated by lithiasis, "rheumatic pains," or arthritic swellings, lithia and colchicum will be useful. And where there is no imperative contra-indication, exercise in the open air will be an effective adjuvant to, or substitute for, the Materia Medica.

But all these means may fail; or before they have time to act the patient's condition may be desperate. We must then rely upon local styptics. The bleeding area must be staunched by direct action. Of these the best are: perchloride or persulphate of iron, nitric acid, styptic colloid, iodine; the actual cautery, the most convenient mode of supplying which is by the galvanic battery, or by Paquelin's thermo-cautery.

After-treatment.—Hemorrhage, especially the active form, is followed by a stage of reaction, of erethism, which has been, not inaptly, called hemorrhagic fever. The pulse is quickened, the skin is warm and dry, there is intense beating headache, restlessness, hyperæsthesia manifested in general irritability, and morbid sensitiveness to light and sound. In this condition it is a serious clinical error to administer iron. It may be theoretically true that the vascular system wants iron; but the effect of giving it is to add fuel to the fever and excitement, to parch the tongue and mucous membranes generally, to check secretions, to increase headache and restlessness, to disturb digestion and nutrition. The system may want iron, but it wants saline solutions more; and it wants these first. Saline solutions serve better than anything else to replenish the exhausted circulating fluid. The vessels seem to crave in the first instance for a sufficient volume of fluid as a necessary condition for the efficient dynamic action of the circulating apparatus. It is a fact determined by the observations of Dr. Little and Mr. L. S. Little on cholera patients, that the injection of saline solutions of about the specific gravity of the blood will revive persons on the point of sinking. I can affirm, from large experience, that the exhibition of salines after hemorrhages is followed by the best effects. They exert a marked influence in subduing vascular excitement; they allay the fever, calm nervous irritability, improve the secretions, and prepare the way for iron and other tonics, which at a later stage find useful application. The best form of saline

is the acetate of ammonia, freshly prepared. To this may usefully be added a sedative, as Battley's solution, and sometimes digitalis or aconite. At a later stage, hamamelys, ergot, quinine, mineral acids, and bark, in decoction, or the liquor cinchonæ may be given; and later still iron. The best preparations are the citrate, acetate, or chloroxide of iron, given in an effervescent form, or dialyzed iron. The doses at first should be small, so as to feel the way. Strict rest must be maintained, so as to economize to the utmost the feeble powers of the system. To promote this, sedatives to procure sleep are often of signal service. If opium can be borne, as it often is, it may be given with the saline, or separately, in the solid form, as the compound opium pill, in 5-grain doses, or as Dover's powder, in 10-grain doses. If it is not borne, we have a precious resource in chloral, which may be given in scruple doses. Since active hemorrhage may induce a severe degree of anæmia, with consequent tendency to thrombosis in the iliac, femoral, or subclavian veins, great care is necessary to avoid exposure to cold or other disturbing causes.

Alcohol in the form of wine, or spirits, will at times act as an efficient sedative, as well as a stimulant. But stimulation, or "keeping the patient up," is often overdone. Stimulants must be given watchfully, and with discretion. Taken largely, they disturb the balance of the stomach, provoke vomiting, excite the circulation unduly, and may even maintain or cause a return of the hemorrhage.

Light, easily assimilable nourishment should be given in small quantities, at short intervals.

THE SIGNIFICANCE OF NERVOUS PHENOMENA, INCLUDING THE VARIETIES OF PAIN.

It may be stated, as a general law, that pain referred to a particular part or organ is presumptive evidence of disorder, structural or functional, of that part or organ. Of course, in some cases, the disorder is only secondary or consequential upon disorder in some other part. Thus, one form of headache is the consequence of disordered stomach, and is cured by correcting the condition of the digestive organs. Pain in one part may be the reflex response to distress in another part. Of this we see repeated examples in the history of ovarian and uterine disease. Pain in the dorsal, lumbar, and sacral parts of the spine is a frequent phenomenon in connection with uterine disease. It is often the predominant symptom. The spinal pain may be so severe and enduring that it attracts the chief attention; and, unless the rule of interrogating all the functions be carefully followed, it is easy to fall into the snare of regarding the case as one of spinal irritation, vertebral disease, or simply hysteria. If this error be committed the patient will probably be doomed to a long course of mechanical or medicinal treatment, under which the general health may break down, the original disease pursuing its course all the while.

Attempts well deserving consideration have been made by observing the seat of the pains complained of, and interpreting by the knowledge of the sources and distribution of the nerves supplying the pelvic organs,

to diagnose with something like precision the nature and seat of the pelvic disease.

There are certain facts which are so frequent in their recurrence and association as to lend weight to this method of analysis. But, like all other methods of clinical research conducted upon one line, it is exceedingly apt to lead astray. It is useful as a means, but not as the only means. We want help from every quarter.

Pain, in association with ovarian and uterine disease, is referred, first, to the region of the ovary or uterus itself; secondly, chiefly to the sacral, or lumbar, or lumbo-sacral region; thirdly, to the hips, thighs, and down the legs. In many cases pains may be said to radiate from the pelvis as a centre in various directions, as to the back, abdomen, and thighs.

Pain in an organ, arising during or aggravated by the performance of its functions, is especially presumptive evidence of structural disorder of that organ. This is true of pain during menstruation, and of pain in the performance of the sexual act. This part of the subject will be discussed more particularly under the heads "Dysmenorrhœa" and "Dyspareunia."

Pain described as in one or other inguinal region or rather deeper, is often referred to the ovary, and is taken as evidence of ovaritis, or of ovarian irritation. But in the great majority of instances this presumed ovarian pain is the signal of sub-acute or chronic inflammation of the neck of the uterus. This has been insisted upon by Dr. Henry Bennet. I find this pain so frequent in connection with disease of the neck of the uterus, there being no perceptible concurrent disease of the ovary, that I hesitate in every case to regard it as due to ovarian disease until I have examined by touch the ovaries themselves, as well as the uterus. If under touch we make out that the ovaries are swollen, and exhibit increased tenderness, we get the required confirmation as to the implication of these organs. I have several times obtained experimental proof of pain in the ovary being due to uterine disease. Touching the os uteri has caused pain referred to the region of the ovary.

By those who do not examine at all either uterus or vagina, except by external palpation, this ovarian pain is often called "ovarian irritation," or "ovaritis;" and to subdue it leeches, blisters, or irritating ointments are resorted to. This so-called "ovarian irritation," however, does not deserve to be ranked as a morbid entity demanding special treatment. There may indeed be irritation of the ovary; but then there must be something to irritate it. It is this something we should search for. And this something, in the majority of cases, has its seat not in the ovary itself, but in the uterus. The pain is more frequent in the left ovary than in the right. Pain referred to the uterus itself, intensified under touch, is often attributed to "irritable uterus," and this vague expression is sometimes accepted as a satisfactory diagnosis. Now, as in the case of "ovarian irritation," logic and clinical observation compel to the conclusion that since the uterus shows signs of being irritated, there is an irritating cause, which it is our business to find out.

Another expression which is often adopted as a conventional substitute for precise diagnosis is "neuralgia of the uterus," or "hysteralgia." These terms really mean nothing more than "pain in the uterus."