

**Emmenologia : an inaugural address to the Edinburgh Obstetrical Society /
by Alexander Russell Simpson.**

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EMMENOLOGIA:

AN INAUGURAL ADDRESS
TO THE EDINBURGH OBSTETRICAL SOCIETY.

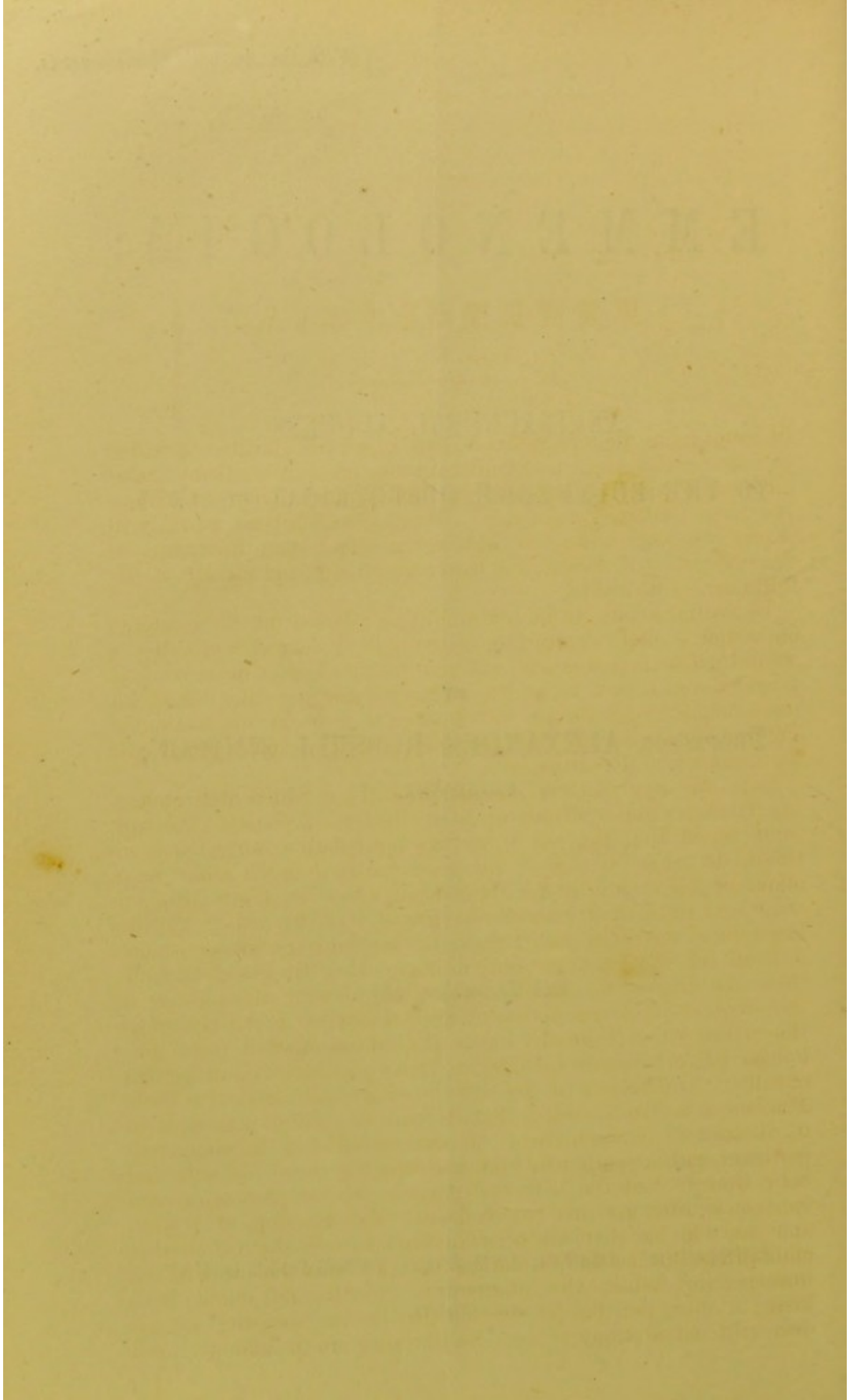
BY

PROFESSOR ALEXANDER RUSSELL SIMPSON,
PRESIDENT.

8th December, 1875.

EDINBURGH: OLIVER AND BOYD, TWEEDDALE COURT.

MDCCCLXXVI.



EMMENOLOGIA.

IN entering on the occupation of the honourable position to which you have called me, I do not attempt to express in words my grateful sense of your kindness, and my high appreciation of the honour you have conferred upon me. Words would fail me worthily to thank you; and instead of hearing me dilate upon the dignity of the office, it will please you better to see me bend myself to the fulfilment of its duties.

In casting about, in the too brief time allowed me, for a subject on which I might venture to address you, it seemed to me that it would not be inappropriate, and might be somewhat interesting, if I asked you to look for a little at the phenomena which bring the members of the female sex within the sphere of our observation as Fellows of this Society, and see what insight we have gained into the meaning of Menstruation.

It is the occurrence of menstruation, I say, which first renders the female an object of interest to an Obstetrical Society. Perhaps some would add, that were there no menstruation, our occupation would be gone. If one of the sexes rather than the other has a claim on the interest of the obstetrician when he meets them on their exit from their intrauterine home, it is the male. For his larger head makes his transit through the parturient passages more difficult and dangerous, not only to his mother, but also to himself, than the birth of his smaller sister; and though the number of boys born be in excess of that of girls, the extra mortality among the males, which is greatly due to the effects of their more prolonged delivery, serves ere long to bring the sexes to a numerical equality. Differences in the sex do not specially attract us then. The one is so like the other, that it requires careful investigation to distinguish between them. I once travelled in the same compartment with a gentleman who was bringing home his wife and baby from a visit the lady had gone to pay her parents on convalescence after her first confinement. She was fond of a joke; and she told me that when her husband arrived, she had another child dressed in her baby's clothes and put into the arms of the unsuspecting father, who admired its growth, and might have kissed it often, but that he was told that he was caressing, not his own girl, but a stranger boy. So like they are in infancy. And

much alike they remain in their external appearance, in their mental characteristics, and in their relative proclivity to disease and death, not only during the first septennary and first dentition, but during the second also, when nutrition and growth of the entire system are in active progress, until, with the arrival of the third septennary, the new set of evolutionary changes set in which mark the age of puberty, and which, when completed, leave the boy transformed through the youth into the man, and the girl through the maiden into the woman. Without dwelling on the diversity of features that now appears in the physical frame and in the psychical manifestations of the two sexes, we may note the remarkable difference they exhibit in their capability of resisting morbid influences. Till now the mortality between the sexes has been nearly equal, boys dying almost cent. per cent. with girls. Between the ages of 14 and 18, however, statistics show that for every 100 youths as many as 128 maidens die. And this higher mortality continues through all this third septennary, though not so markedly in the later as in the earlier section of it. From 18 to 21 or 22, the relative mortality is 105 women to the 100 men.

It is at some time during these years, so fatal to her sex, that the girl becomes the subject of the change, of which to her the most striking feature is the escape of a bloody discharge from the genital orifice.

THE DATE OF ITS FIRST APPEARANCE

varies considerably in different individuals. Statistics have been collected with great assiduity by many emmenologists, and collated with the view of determining the mean date of the first discharge of the menstrual fluid. When we look at the tabulated result, we notice that the year opposite to which stands the heaviest figure in the total column is the age of 15. Closely following it, and of nearly equal value, are the figures opposite the ages 16 and 14. Considerably behind these are the figures opposite the years 17 and 13. Still lower are those at 18 or 12. The figures become very low opposite 19 and 11; still lower at 20. There is still an appreciable proportion at 21; but the figures opposite the years beyond this are so small, that the non-appearance of menstruation in any individual who has passed this age may well give rise to grave apprehension regarding her general health or the condition of her sexual organs; and although now and again cases are met with of its outburst at the age of 10, or earlier, we regard the occurrence as quite exceptional, and we may sometimes find the genital hæmorrhages of childhood to be something quite other than a menstrual discharge. The causes of the great range of date in the first appearance of the flow are not easily determined, any more than the diversity in the dates of the evolutions of the teeth in infancy and childhood. The causes may sometimes be due to individual peculiarities of constitution or hereditary influence. But there are some conditions that have been distinctly shown to have a modifying influence.

1. The effect of climate appears in a comparison of the statistics gathered from countries under different degrees of temperature. The tables I looked at in citing the figures above, are drawn from information gathered at different points within the temperate zone, between 33° and 54° of N. latitude. If we look at tables showing the mean date of commencement of menstruation in warm climates—between 33° and the equator—we see the heaviest figures in the total column opposite the years, not 14 to 18, but from 11 to 15. The heaviest are opposite 12 and 13, at which ages a nearly equal number begin to menstruate. Then follow, at a marked distance, those opposite 14 and 11. At 15 and 16 a considerable proportion begin to menstruate; but the retardation beyond the age of 17 is extremely rare; whilst many begin as early as 10, some as early as 9, and a few even at 8 years of age. On the other hand, a reference to the tables of the first eruption of the menses in colder climates—between 54° N. and the pole—informs us that the mean date is somewhat later. The heavy figures here run from 15 to 20. The heaviest is at 16, though 15 is almost equal, and 17 not far behind. Opposite 18 and 19 the figures are still large, and even opposite 20. At 21 they become distinctly less; but there remains a notable proportion in whom menstruation is delayed till the 22d or 23d year of life. The figures opposite the years of 14 and 13 are nearly the same as at 21. At 12, however, there is a decided diminution, and the appearance at an earlier age in these colder climates is almost unknown. But, however well marked the influence of climate may be in the acceleration of menstruation in warm, and its retardation in cold countries, there is good warrant for believing that—

2. Race exerts a distinct influence in determining the date of its first appearance. We know, for example, that Anglo-Indians retain in this respect the habit of their race, and instead of beginning to menstruate, like the Hindu women, at 12 or 13, first menstruate like their relatives at home between 15 and 16. Among different races in Hungary, one observer has noted these diversities in the mean age of the first onset of menstruation. Among Steyerians it began chiefly between the ages of 13 and 14; among Jewesses, between the ages of 14 and 15; among Magyars, between the ages of 15 and 16; and among Slavacs, between the ages of 16 and 17.

3. A third element that exerts a notable influence on the date of the first menstrual discharge, is the social condition of the female. Thus, where the mean period of commencement was 15 years and 4 months in all classes of the community, the mean date among the richer classes was 14 years and 8 months, and among the poorer, 16 years, so that, *ceteris paribus*, we may expect the menstrual discharge to begin earlier in a maiden well nourished and in easy circumstances, than in one who leads a life of privation, toil, and care. Other conditions have been looked to as modifiers of the date of commencing menstruation; but these are the chief; and passing from this, it is time to inquire, What is this discharge that is taking place? Is it a simple hæmorrhage?

NATURE OF THE DISCHARGE.

Some physiologists note three stages in the flow. *1st*, a stage of Invasion; *2d*, a stage of Persistence; and *3d*, a stage of Decline. In the first brief stage of Invasion, the discharged fluid is pale and scanty, not unlike the discharge that escapes from the genitals of some of the lower animals at the period of rut, and usually having a peculiar odour, more marked in some individuals than in others. It is like a leucorrhœal mucous discharge faintly tinged with blood, and contains many epithelial cells derived from the different mucous membranes lining the genital canals and their follicles, quantities of mucous corpuscles or wandering cells, and a few red blood-globules. This preliminary pale discharge has not lasted long when it is followed by the bright red discharge which continues through the several days' stage of Persistence. The fluid that now escapes presents all the peculiarities of blood drawn from a wounded surface, except that it has little tendency to coagulate. But it is known that the admixture of a small proportion of pus or mucus to fresh-drawn blood prevents coagulation. And when we examine the menstrual discharge chemically and microscopically, it is found to consist mainly of blood mixed with cells and fragments of epithelium from the walls of the vagina and vaginal portion of the cervix, cylindrical epithelium from the canal of the cervix and from the cavity of the uterus and the uterine follicles, many rounded nucleated cells like pus and mucous globules, and compound granular corpuscles. In the third stage of Decline or Cessation, the fluid gets less in quantity, becomes first darker, less arterial in colour, then pale and turbid, and then more clear, till it returns to the condition in which it was before the Invasion. During the day or two of the Decline, the fluid is found to contain chiefly mucus and pus, with many cells in various stages of fatty disintegration.

QUANTITY.

The amount of blood that thus escapes, it is difficult to estimate. The statement that we may count an ounce for each cloth that the patient wears during a period, must be received with considerable qualification. The sense of comfort and propriety in different women differs too widely to render such a standard available, and to estimate the loss of blood at an ounce per diaper would certainly give an exaggeration in the ordinary run of cases. The difficulty of determining this point has led writers to give quite different statements as to what we are to consider as the normal loss—some giving it at 2 or 3 oz.; others at double that amount, or more. There is certainly such considerable diversity in different women as to make it impossible to say that every woman who loses 7 or 8 oz. of menstrual blood is menstruating too freely, or that one who loses less than 2 oz. is amenorrhœic; and in dealing with individual cases, the important point to be

ascertained is the patient's own habitual loss. For though at the first appearance of menstruation the amount may vary from much to little for a few months, it soon steadies to a quantity which the woman will regard as her natural standard—whether it be free, as 53·5 per cent. express it, or moderate, as in 16·5 per cent., or small, as in 30 per cent. is said to be the case. The habitual loss once established, should persist throughout the reproductive period; and its modification in any marked degree, either in the direction of plus or minus, we properly regard with suspicion as an indication of disease.

DURATION OF THE DISCHARGE.

Closely connected with the question as to the amount of the discharge, is that as to the duration of the flow. In this matter, also, there is great variation. But most women tell us that the discharge lasts with them month after month for the same length of time. With only some hours of more or less, the flow lasts for the same number of days. Some 92 or 93 per cent. thus report the duration of the discharge to be steady. In the remaining 7 or 8 per cent., it lasts a variable length of time, sometimes for 3 days, sometimes for 6 or 8, so that they cannot tell how long the courses will run. Of those with steady duration of flow, some—and these number fully 26 per cent.—menstruate for 8 days each time; some (21 per cent.) 3 days; some (17 per cent.) 4 days; fewer (12 per cent.) 5 days; still fewer (10 per cent.) 6 days; and a very few (4 per cent.) 7 or 2 days. Duration of less than 2, or more than 8, may be regarded as abnormal, or should at least call for special inquiry as to the general or local condition of the individual case. It has been observed that there subsists this relation between the quantity of menstrual fluid that escapes, and the duration of its flow; that when the blood is paler and scantier, the duration is shorter, and the longer the duration of the discharge, the more profuse is the amount of blood discharged, and the greater tendency does it show to be mixed with clots.

FREQUENCY OF THE FLOW.

But we have still to note another feature, and that to us as obstetricians the most important, in connexion with this hæmorrhage, and that is the frequency of its appearance, and the regularity of its return. It is this periodicity of the hæmorrhage which has given to it its common designations—"catamenia," "menses," "monthlies," "periods," "les regles," "les époques," etc.; for once it has become established, it regularly recurs at somewhat definite periods. In something like 87 per cent. of women, at least, the type of menstruation is reported to be regular. In the remainder, the menstrual cycle is of indeterminate length: the interval between the commencement of one period and the recurrence of the next is so uncertain, that the woman does not know when to expect it. Among other women, in whom the cycle is con-

stantly, or nearly constantly, of the same duration, we find it presenting different types. Thus some, and these by far the largest number (— 71 per cent.), have menstruation of the 28-day type, 28 days intervening between the commencement of two successive menstruations. The next most common is (— 14 per cent.) the 30-day type. More rare are (— 2 per cent.) the 21-day or (+ 1 per cent.) the 27-day types. Figures such as these, gathered as they are by inquiries made of patients, are not to be received as altogether exact; and there is good ground for doubting whether in almost any woman we should regard the type as absolutely constant, and the menstrual cycle unvarying; but they are sufficiently correct to guide us in our deductions from their physiological or pathological interruptions. What we have to remember is that the menstrual month, while it may correspond with the solar of $30\frac{1}{2}$ days, or the lunar of $29\frac{1}{2}$ days, or with the calendar month of from 28 to 31 days, may be distinct from all, but in general retains in each individual woman its own individual type.

ANCIENT THEORIES.

It is time we were inquiring, What is the meaning of this menstrual discharge? You know the theories with which the fathers of medicine were fain to satisfy themselves regarding it. It was held by some to depend on the elimination of some noxious material from the female economy; and this chemical theory met such wide acceptance, that among many communities menstruating females were doomed to segregation during their periods, as though there was issuing from them some exhalation that could defile their neighbours, damage fruit-trees, poison bees, turn the milk, etc.; and this theory we trace in the Hippocratic designation "*Katharsis*," our "*Cleansings*," and the German "*Reinigung*." Again, by many it was held to be due to plethora. In the developed female, it was supposed, a surplus quantity of blood was formed, ready to furnish material for the growth of an embryo, but no conception occurring, the system got relieved by the periodical loss. Some were even so precise as to allege that the weight of an infant corresponded to the weight of the blood that would have escaped during its gestation had it not been present to appropriate it. Yet again it was argued that it was an unnatural occurrence—superinduced by the irregularities of civilization, said one—resulting from the non-satisfaction of the reproductive instinct, said another—due, said a third, to the erect posture of the human female as compared with the lower animals, one of the drawbacks of the "*vultus erectus ad sidera*" of the human race.

SOURCE OF THE DISCHARGE.

But as you also know, modern research has traced the discharge to its proper seat, and has shown it to be associated with changes that certainly exert a modifying influence on the general system, but that have their immediate source and spring

in the sexual organs themselves. When we come to search for the exact seat of the hæmorrhage, it is easy to exclude the vaginal walls and vaginal portion of the cervix uteri. There is no good evidence to show that it ever comes from the canal of the cervix below, or from the Fallopian tubes above; but there is the clearest evidence that it takes place in the cavity of the uterus itself. There was a time when the word matrix was used to designate all the hollow organs opening at the genital orifice. By and by, the vagina was differentiated from the body which we designate the uterus. But we cannot rest here; for the uterus proper, marked off by the os internum within and the isthmus on the surface, must be held to be a distinct organ from its cervix anatomically, physiologically, and pathologically—very intimately connected with it, indeed, in all these respects, but yet perfectly distinct, as comes out very clearly when we examine more carefully the

LOCAL CHANGES ASSOCIATED WITH MENSTRUATION.

There is at the period increased vascularity and hypersecretion taking place in the canal of the cervix, with intumescence through all its walls, as in a less degree there is in the vaginal tube. But in the uterus proper there are these and more. If we look at the uterine mucosa some ten days before a menstrual epoch, we notice that the almost smooth surface is beginning to be interrupted by the elevation of patches with furrows between, marking them out into irregular fields; the orifices of the uterine follicles, before hardly discernible, become now easily visible; and the pale reddish gray tint gives place to a darker red as the deeply injected capillaries are seen running in lozenge-shaped loops around the follicular openings. This tumefaction of the mucosa affects all its elements. There is a proliferation of the epithelial cells lying on its free expanding surface, and lining its many follicles; the interglandular connective tissue shows also increase in number and size of its corpuscles, with infiltration of its intercellular substance, and even the capillary tubes seem to sprout and multiply. This hyperplasy of the mucosa, which causes it to wrinkle up within its limited cavity, reaches its height when the return of the catamenia is due; but for the preceding week it has already been so great that, in the lower part of the cavity at least, the anterior and posterior walls of the uterus get crushed together, and the transmission of any fluid along it then must be regarded as exceedingly improbable. When the day has come, the mucosa is in a condition of what has been fitly described as acute catarrh; the cellular elements on the surface and nearest to it become the seat of cloudy swelling; it is but a step further, and that passes over into fatty degeneration; the disintegrated elements break down as the period of Invasion sets in; the capillary tubes get broken open, and the extravasated blood with its admixture of mucus begins to trickle away, and then to flow more freely through the stage of Persistence, until it is succeeded by the

mucous or muco-purulent discharge of the stage of Decline. At this time, it is found that a distinct layer of the uterine mucosa has moulted or been shed off, for instead of the smooth surface covered with ciliated epithelium, continuous with that of the cervix, there may be seen from the sharply-defined line of the os internum upward a somewhat fretted surface, in which it requires close examination to detect the follicles with a fine gelatinous layer of connective tissue around them, through which may be sometimes seen the fibrous bundles of what has been shrewdly described as the *muscularis mucosæ*, *i.e.*, the innermost layer of the muscular walls of the uterus, in which the blind extremities of the follicles are deeply and firmly embedded. On the layer of mucous membrane that is left there begins at once a process of repair, and in a few days its restoration is complete.

But we have yet to find the impulse to this cycle of changes in the uterus and its mucosa in particular. To discover it we must look elsewhere. Ere we leave the uterus, however, let us note, that the changes in it we have looked at point it out as an organ marvellously adapted for the function of serving as the nest in which a fertile egg might be incubated. Its soft and succulent mucosa will furnish an easy soil in which a body capable of self-development may root itself; its capacity for growth will enable it to expand with the increase of its growing contents; and when the embryo has reached maturity, its muscular fibres will be ready to effect its delivery. Hence the preparation in the mucosa for the reception of such an egg has been called its nidation, and the partial exfoliation that takes place at the period of the flow has been called the denidation of the uterus.

OVULATION.

It is when we search for the development of the egg, and the conditions under which it is laid, that we find the key to the explanation of the changes which take place in its well-adapted nest. These we find, of course, in the egg-bearers—the ovaries. In the deep layer of their parenchymatous zone, we find a fertilizable ovulum. According to some physiologists, it takes nine months from the period when the ovulum begins to ripen until its ovisac reaches the surface of the ovary. However this may be, a time arrives when the nutritional impulse inherent in it starts it on a new stage of more active growth. As the ovisac expands, it produces irritation of the ovarian nerves, which is transmitted to the central ganglia, and is reflected thence in such a manner to the whole of the sexual apparatus, that hyperæmia results, perhaps at first but as a faint and transient blush, but increasing with each new wave until the well-known changes take place which lead to the dehiscence of the ovisac. The ovum thus expelled has great potentialities within it, but these are all dependent on the access to it—and probably at this point—and the amalgamation with it, of spermatozoa. Let the spermatozoa fail the ovum here or in

the oviduct into which it is received, and it will move along whithersoever it may be carried, exerting no further influence on its surroundings than any epithelial cell by which it may be accompanied. So it will drift through the Fallopian tube and on into the cavity of the uterus, where already, it may be, the surface has begun to melt down, and with the menstrual discharge it will be washed away.

Not perhaps with such perfect adaptation, but with some such close relationship in time and function, will the ovary discharge its ovisac, and the uterus shed its surface, period after period, as each new follicle takes on more active growth and rises to maturity, on the disappearance of its predecessor. And when we are looking thus closely at the central point in the phenomena of menstruation, we can easily comprehend how, apart from climatic, and racial, and other general conditions, the rate of rapidity with which each Graafian follicle ripens and bursts, will depend on individual and special conditions in the ovaries themselves. The regular evolution of successive ova, once fairly started, might go on for long. It might be too long to render the young lady in whom we have traced the establishment of the function an object of interest to us. So, as we have come within sight of a leap year, let us wish her a happy new year, and a husband before it runs out. Then let us hope that one of us will be called in to interpret for her the non-appearance of the usual menstrual discharge.

CONCEPTION.

We will take it for granted that an ovum has been fertilized. But it may be questioned, At what epoch did the ovum escape from its capsule? Was it the ovum from the period when last a catamenial discharge took place? or was it an ovum that was shed when the next discharge was due? Up till a recent date, the almost universal answer would have been, that it was the ovum separated at the time when a uterine discharge occurred, that became impregnated; and hence it was supposed the sooner, subsequently to a menstrual epoch, that connexion was accomplished, the more chance there was of the ovum being fertilized. It was even averred that there was an agenetic period, dating from twelve or fourteen days after one catamenia till the next was due, during which semen might be discharged into the vagina without interrupting the menstrual cycle, because the ovum of the last epoch had by that time perished, and spermatozoa could not have access to another ovum till after the following epoch, and the rupture of a fresh ovisac. Such a period of agenesis, however, cannot in the face of well-known facts be admitted; and if a single coitus practised within a week of the commencement of a menstrual epoch be less likely to prove fruitful than a single coitus of an earlier week, the circumstance is susceptible of another explanation. For during the pre-menstrual week, as we have seen, the uterine

mucosa has swelled to such a degree as to block up the uterine cavity, and prevent the upward migration of the spermatozoa; whereas, during the two post-menstrual weeks, the whole canal is more easily permeable for them. It may even be that there is special facility for their transit during the first post-menstrual days, ere the uterine mucosa has become regenerated, and its epithelial cilia begin to cause a downward current, as they are believed to do from fundus towards os. If we be correct in speaking of each ordinary menstrual discharge as the accompaniment of the birth of an unfecundated ovum, as many observations seem to indicate, then we are forced to the conclusion, and I am quite disposed to believe it is correct, that the fecundated ovum of a normal pregnancy is a product of the period that had become due, *and that has duly come*, though it be not distinguished by the occurrence of a uterine hæmorrhage.

The interruption to menstruation we trace to the presence of spermatozoa in the genital canals, and we have to inquire at what plane they come into contact with the ovum. We have seen how easily they have access to the higher planes during the early part of the inter-menstrual interval, and there is no reason to doubt that when the generative mucosæ of the female are in a healthy condition, the spermatozoa will retain their vitality in their mucus for a considerable period. That they meet the ovum in the cavity of the uterus itself, we can hardly conceive; we may conjecture that they meet in the Fallopian tubes; but we know that they do sometimes meet on the surface of the ovary. In this situation, in fact, we sometimes find the ovum undergo its further development. For though the uterus be its usual and most appropriate nest, it may get lodged and incubated in some other cavity. In most of these extra-uterine gestations, the nest fails to meet all the requirements of the growing ovum. Either there is not a soil in which the chorionic villi can take root, or the walls of the nest give way under the bursting pressure of the expanding ovum, or the fully-developed product is imprisoned, till it dies. But whatever the ultimate history of these ill-lodged ova, their occurrence teaches us that the spermatozoa traverse all the mucous canals sometimes, and warrant us in believing that when a menstrual era has arrived, they may have found, in ordinary cases, their way to the surface of the ovary, so as to fertilize the ovum at the moment of its escaping from its ovisac. The ovum thus fertilized is no uninfluential, passive, perishing cell like its unfertilized predecessor of the foregoing epoch. It has within itself a new life power, a power of self-development. Evolutionary changes are set up in it, and in virtue of these it will at once begin to exercise a potent influence upon the structures with which it comes into relationship. By the time it has passed into the cavity of the uterus its chorionic villi are ready to lay hold of the soft and swollen surface of its lining membrane; that mucous membrane, which was in a state of growth verging on decay,

receives a new impulse which leads to active proliferation of its elements, so that it grows up around the body that has got ingrafted on its surface, till it surrounds it with a distinct capsule—the decidua reflexa. At the spot where the ovum became rooted in it (decidua serotina) a mutual intergrowth takes place between the villi on the chorionic surface and the structures in the mucosa, until the vascularized villi are hanging free into blood-pools channelled in its tissues. Throughout the rest of the cavity the mucosa (decidua vera) goes on developing until, as the ovum expands within its new capsule, the outer surface of the latter becomes amalgamated with the free surface with which it is in opposition. In this way the disintegration of the uterine mucosa is for that period arrested, and there occurs no menstrual discharge from what has now begun to be a gravid uterus.

UTERO-GESTATION.

But probably our patient will be less curious to know the cause of the non-appearance of the menses, than anxious to be told the probable term of their return, or rather, as the question will present itself to her, what is the probable date of her confinement. Shall we attempt to fix a given date as woman's standard term of utero-gestation? You know how piously Harvey has fixed it at the 275 days, which, as he states it, run "from the festival of the Annunciation in the month of March, to the day of the blessed Nativity, which we celebrate in December." But when we seek authority for the dates we do not find them in the only book which could have told us, for it was given to tell us of other things. The dates are derived only from the teachers of the Roman Catholic Church, and when their true meaning is investigated, it is found that the 25th of March was held as Lady-day in pagan Rome in honour of Cybele, the mother of the Babylonian Messiah, long before the era of our Lord; while the 25th of December was kept among many Gentile peoples as the birthday of the son of that "Queen of Heaven." They would thus carry back to remote ages the observation that this length of time was looked on as the usual period of human gestation. Statistics meritoriously compiled have shown that what was true then is near the truth still. But the patient who has asked for our opinion as to her probable term, is not likely to be able to give us a definite day to count from; and if she did, and we were to refer her to the standard measure, we should be as likely to set her wrong as right. If we are to make the closest possible approach to the calculation of the probable date of her confinement, we must above all have regard to her own individual menstrual type, and ascertain what is with her the usual length of a menstrual cycle. The ovum which took nine months of so many days to ripen within its ovisac, will, after it has become impregnated, take the same number of months to undergo its development within the uterus. We have therefore to find out the number of days between

the commencements of the two menstruations that preceded conception, and multiply the figure by ten ; and within a range of five days earlier or later, the birth of the impregnated ovum will probably take place. In the round and rough, we are safe in following the usual calculation of counting nine calendar months from the date of the commencement of last catamenia, and adding a week, because the greater proportion of women have the 28-day type of menstruation, which closely answers to this calculation. But where we are specially anxious to avoid error and to attain the nearest approach to accuracy, we must, I repeat, ascertain the individual menstrual cycle and expect the delivery on some day in the decade, the central day of which corresponds to the date when the tenth menstruation should be due. For, by the return of this tenth menstrual epoch, the foetus has become fully developed ; the once greatly hypertrophied mucous membrane of the uterus has become stretched and thinned, and its superficial portion has undergone in great part of its extent a marked degree of fatty degeneration, while, according to some recent observations, the necks of its follicles have become dilated till there are mere threads of intervening connective tissue left between. As a result of the changes going on in the lining membrane of the uterus, leading to partial desquamation of its surface, the sensory nerves are irritated. The irritation conveyed to the centres is reflected to the sexual organs, where it is manifested first in an increased mucous secretion corresponding, though in an exaggerated form, to what we see in the Invasion stage of an ordinary menstruation ; and, secondly, in contractions set up in the muscular walls of the uterus, at first so slight as to be hardly appreciable, but increasing in intensity and continuing until the ovum has been expelled *non sine labore*. The expulsion is also attended, as was the non-laborious birth of its predecessor, with a hæmorrhage (the red lochia) such as goes on during the Persistence stage of ordinary menstruation, and afterwards a paler mucous discharge (the white lochia) as in the stage of Decline. The internal surface of the uterus when examined at such a time presents appearances similar to those which we found immediately after the cessation of the catamenia, only on a greater scale, as the whole organ has undergone an enormous degree of hypertrophy during its gestation of the ovum. In a short time, however, the disintegrated surface of the mucosa is regenerated, and the worn-out muscular fibres have melted down and have been replaced by younger cells and corpuscles, and the uterus is ready to resume once more its nine months' interrupted series of changes.

LACTATION.

The date of the resumption of these changes will depend, however, on the condition of the ovaries, for, as we have seen, they take place in concert with the dehiscence of an ovisac. Now there is no evidence to show that ovulation goes on, for example, during utero-gestation. Rather we must believe that whilst

the nutritional energy of the female is demanded for the evolution and growth of one fertile ovum, there are no fresh ovisacs ripening and bursting; and hence we look upon menstruation during pregnancy as an altogether abnormal occurrence. But the woman is not done with the claims of the ovum whose history we have traced down to its expulsion from her womb. Further changes of growth and development in the child are to take place which demand constant nutritive supplies, and for these it will be dependent on the mother's milk; and this demand on her nutritional energy will again run on for an average duration of nine more months. It is certain that during the period of lactation, in a large proportion of women, the ovaries have already begun to resume their functional activity. Still we are to regard the non-appearance of the menses during lactation as the rule, and it is only after the infant is weaned and the nutritional energy—whatever that may involve, not only of blood-supply, but of nervous influence—is free to be directed once more to the ripening of ova within their ovisacs that we are to expect the normal re-establishment of menstruation.

THE MENOPAUSE.

I will not weary you by dwelling on the pathological conditions under which menstruation may be modified, so that the discharge becomes too profuse, or painful, or perverted, or suppressed. I fear I have already drawn too long upon your kind attention; and after all, some one may rightly charge me with having treated all too cursorily the great subjects of emmenology. Let the suddenness with which the intimation came upon me, that an address was expected from the new President to-night, be some apology; and let me hasten to add, in conclusion, that in following out the history of our interesting patient, whom at several safe confinements we shall suppose ourselves, during a series of years, to have assisted, there comes a time when the menstrual discharge will cease to flow. Her married life may be running on its happy course, till, sometimes slowly, the discharge lessening month by month—sometimes suddenly, without any premonitory change in its character—sometimes, again, after a sudden increase in the quantity, or some change in the quality, or brief repeated interruptions of its regularity, there comes a time when it finally disappears. A very variable time the date of its cessation is, having a far wider range than the date of its first appearance. In some cases the menopause has already arrived at an age when the menses often first appear in other women, at the age of 21; and at the other extreme we find it running on till the age of 65 or 70. The usual range which we may regard as normal, however, runs between 35 and 55, the larger proportion falling within the central decade. In nearly a half, menstruation ceases between the ages of 45 and 50; in fully a quarter, between 40 and 45; in rather more than one-eighth, between 50 and 55; and in the remainder between 35 and 40. It has been noted that women whose menstruation is late in

making its first appearance have a tendency to early menopause—the duration of the reproductive life in them being thus shortened at either end. On the other hand, the early menstruation is not so likely to be associated with delayed cessation. At least, in hot countries, where the early menstruation is the rule, the menopause comes on at a much earlier period than in temperate climates, and the duration of the reproductive life of the female becomes so curtailed as to have led to the remark, that the three or four wives of an Abyssinian only equal in fertility the single wife of a European. If now we examine the condition of the sexual organs, to discover the cause of this cessation of the hæmorrhage which for thirty years or more has been continuing with such regular periodicity, we find that in the ovaries the relatively few ovisacs that remain unruptured show little tendency to further evolution; and if there were the attempt at development in one, it would find its expansion impeded by the density which has settled down on the surrounding stroma, and its dehiscence prevented by the interposition of firm fibrous layers between it and the surface. It is quite possible that this state of matters obtains for some time in the ovaries, before the discharge finally disappears from the uterus. But more or less consentaneously, and in some cases apparently at an even earlier date, changes set in in the uterus also which destroy the power in its mucous membrane of periodic proliferation, desquamation, and repair. Then many of the peculiar attributes of mind and body of the female become modified, so that again she comes to bear external likeness to her male companion—a likeness in some instances so striking that a stranger meeting her and her husband casually will say, “How like these two people are; they must be sister and brother.” In any case, her name now disappears from the list of our midwifery engagements, and the happiest meeting we are likely henceforth to have with her is in circumstances where none can render such efficient help as she—at the confinements of her daughters, or other women of a younger generation.



