

The ovary, then, is simply a gland, developed as other glands, and formed of similar elements; its peculiarity is, that its cell-nuclei have special powers during a certain time of life; and this simplification of its physiology does much to simplify its pathology.

A few sentences from Balfour, concerning the phenomena observed in the maturation and impregnation of the ovum, may here be fittingly introduced. I take them verbatim, as it is a point upon which I have made no research.

“Every ovum, as it approaches maturity, is found to be composed of (1) a protoplasmic body or vitellus, usually containing yolk-spherules in suspension; (2) of a germinal vesicle or nucleus, containing (3) one or more germinal spots or nucleoli. The germinal vesicle, at its full development, has a more or less spherical shape, and is enveloped by a distinct membrane. Its contents are for the most part fluid, but may be more or less granular. Their most characteristic component is, however, a protoplasmic network, which stretches from the germinal spot to the investing membrane; but especially concentrated around the former germinal spot is a nearly homogeneous body, with frequently one or more vacuoles, occupying one of the eccentric positions within the germinal vesicle, and it is usually rendered very conspicuous by its high refrangibility, is sometimes capable of amœboid movements (Auerbach and Hertwig), and is more solid and more strongly tinged by coloring agents than the remaining constituents of the germinal vesicle.

“During the further maturation of the ovum the germinal vesicle moves toward the surface of the egg, its membrane becomes absorbed, and it is metamorphosed into a spindle-shaped body, this being done at the expense of the germinal spot. One end of this spindle enters a protoplasmic prominence at the surface of the egg, the spindle itself dividing then into two, one half remaining in the egg, the other in the prominence. This prominence, at the same time, becomes nearly constricted off from the egg as a polar cell, and a second polar cell is similarly formed. That part of the spindle remaining in the egg is converted into a nucleus—the female *pronucleus*—and this is moved toward the centre of the egg. On the entrance of one spermatozoon into the egg the head of the sperm is converted into another nucleus—the male *pronucleus*. Around this latter radial striæ immediately appear, and these travel toward the female pronucleus. The fusion of the two pronuclei, through the connecting striæ, form the first segmentation nucleus.”

## CHAPTER II.

### ERRORS OF DEVELOPMENT AND DISPLACEMENTS OF THE OVARIES AND OVIDUCTS: SALPINGITIS, HYDROSALPINX, PYOSALPINX, HÆMATO-SALPINX, AND FALLOPIAN PREGNANCY.

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THOUGH congenital defects of the ovaries and oviducts are of comparatively rare occurrence, yet, as might be expected, in the case of a gland which performs functions so important as those of the ovary, and whose functions are of universal existence, complete absence of the gland is extremely rare. So far as I have been able to find, there are only three preparations in this country indicating complete congenital absence of the ovaries. Of these, two exist in the cases of malformed fœtuses, in which there may be said to be an almost complete absence of the whole genital apparatus. The third occurred in the case of a girl who died at twenty, without ever having menstruated; and in that case also the whole genital apparatus was extremely defective.

Like every other organ in the body, the ovary is liable to arrests of development, but from what cause or causes these arrests arise, it is not very easy to say. This is a question which has not yet received sufficiently careful attention; but be the cause what it may, it is quite certain that whatever arrests the development of the ovaries equally affects the development of the whole of the genital organs. In the case of the *aves*, both ovaries and oviducts are equally developed in the embryo, but on one side an atrophy occurs early in life which leads to a total suppression of the organs on that side, and the sexual functions are carried on by the left side only. What the explanation of this, and what its cause, is wholly unknown. I am not aware that any similar condition is known to be of even occasional occurrence in woman. I have found only one reference to the existence of a unilateral arrangement of mature organs, quoted by Busch from Chaussier, in the case of a woman who had borne ten children, and who, on *post-mortem* examination, was found to have an entire absence of the tube and ovary of the left side, and apparently an absence of the corresponding side of the uterus. When the ovaries are defective it is almost invariably

the case that the other organs are equally ill-developed; but what is the order of the occurrence is not in any way clear.

I have already pointed out at some length, and I shall discuss in detail in a subsequent chapter, the effects which certain diseases of the zymotic type have upon the sexual organs—more particularly scarlet fever. As this disease is peculiarly incident to childhood, I have a very strong impression that a large number of the cases of incompletely developed sexual organs in women arise from the effects of this disease in childhood. In such cases we find that the occurrence of menstruation is unduly protracted, or it may not be apparent at all; that, at the time when the disturbance should occur, a number of vague symptoms make their appearance, sometimes trifling, at other times extremely serious. If, under these circumstances, the patient be examined, the uterus will be found to be infantile in size, anteflected; and if a *post-mortem* examination should be made, the ovaries will be found small, possibly somewhat puckered, the mesovarium but slightly indicated, the tubes extremely small; and should the patient have reached mature life without the occurrence of menstruation, the organs will be found to present all the appearances of those of a child between five and ten years of age.

In such extreme cases the development of the whole sexual apparatus is generally imperfect, the sexual appetite is in abeyance, and there may be comparatively little suffering after the first few months, during which an effort seems to be made by the system to establish the change. This is provided epilepsy does not supervene, which is, however, only too common an accompaniment of arrested sexual development in women. Women who are thus affected have frequently an absence of those external peculiarities of their sex evident in roundness of form, a *prononcé* bust, smooth and hairless skin, and highly pitched voice; and they often partake, in some slight degree, of the characters of the opposite sex, especially in the growth of straggling tufts of hair on the upper lip and on the chin in a line with the canine and premolar teeth.

A greater number of cases have the arrest at a later stage, and in them menstruation is established, after much difficulty and suffering, between sixteen and nineteen years of age, and, though it may last with fair regularity, but deficient quantity, for four or five years, it then ceases completely. In many of these cases, however, if marriage should occur during the time that menstruation is in action, and if the patient should be fortunate enough to become pregnant, a cure may result; that is, her periods will become more abundant, and her suffering less;

her health will be improved, and she may go on menstruating for many years, and may even have a number of children. Even without the occurrence of pregnancy, marriage often establishes the health of a woman afflicted with arrest of ovarian development.

The great bulk of cases of this kind are those which are afflicted to a less degree, but whose sufferings are nearly always sufficient to require medical assistance; and it is a singular fact that a very large percentage of the patients are found to be women of splendid physical development, who, to any but one well acquainted with such cases, look the most likely to possess capacity for procreation. In these women menstruation is established later than the normal time by a few months or a year or two. They have, at first, irregular times and much pain, but after a while the flow is established with normal quantity and regularity, and with but little suffering. In this way they go on for eight or ten years, and, if they marry in the interval, their menstrual career may run an ordinary course. If they remain single, however, they begin to suffer from ovarian dysmenorrhœa between twenty-five and thirty, and, after about ten years' suffering, they undergo a premature climacteric change. It is also noticeable in these women that their menstrual function is suspended on slight provocation. Any chronic disease—even of an unimportant nature—any occupation which necessitates an overstrain on their system, mental anxiety, or sudden fright, will check their menstruation for months or years, or perhaps forever. In fact, this slight excess of functional power which the ovary became possessed of at their puberty is readily and soon exhausted, and its extruded cells, on slight provocation, assume an immature form, and the systemic conditions become correlated. In fact, in such cases of amenorrhœa, and similarly to a less extent in those of dysmenorrhœa, there is a temporary resumption of the infantile condition of the ovarian functions; or it may be a complete and premature assumption of their senility. The amenorrhœa of pregnancy and lactation are also partial resumptions of the infantile condition. This view has been admirably expressed by Dr. Charles Ritchie: "In early infancy, extreme old age, and long-continued organic disease, the ova are minute, transparent, and structureless; and in advanced childhood, soon after the critical age, and during pregnancy and lactation, they are more or less organized, larger, and in the latter stage are often so well matured that about one-third of the renewed pregnancies of married women take place while they nurse."

In these slighter cases of this kind of dysmenorrhœa the uterus

is generally normally developed, and it is frequently so in some of the most severe cases. There is a converse condition where the uterus is infantile and the ovaries normal, much more rare and far more severe in its symptoms.

In all such cases the general symptoms are pretty constant and distinctive. Besides the menstrual irregularities and deficiency, there is almost always a persistent, sickening, and well-marked pain, occurring in the less severe cases only at the menstrual periods, but in others being seldom absent, and always greatly increased at the periods. It originates in the ovarian region, and shoots down the thigh, often also down the leg and around to the back. There is also often present, especially on the accession of atrophy, the peculiar submammary pain of ovarian disease, generally felt in the left side only. Headache, nausea, or even sickness and great general discomfort, are always present more or less.

In the milder cases treatment is generally successful in mitigating the sufferings, and often the ovary may be made, even in some very well marked cases of arrested development, to fulfil its functions completely. First of all therapeutic remedies there stands iron, which will be found in such cases to be of great use, even though there should be no general indications for its employment. There can be no doubt that many forms of this remedy have a specific power over the sexual organs, male and female; for, in a case of chronic metritis or subinvolution, smart hemorrhage may be induced by large doses of iron. In ovarian and tubal dysmenorrhœa it is best given during the intermenstrual periods in small doses, one to five drops of the liquor ferri perchloridi, well diluted, and increased suddenly to fifteen or twenty for a day or two previous to and during the menstrual flow; or, quite as good, is the substitution of an iron and aloes pill for this large dose, there being few better combinations in the pharmacopœia than that old-fashioned remedy. Hot hip-baths and leeches to the perineum at the period are often useful additions, with an occasional blister on the sacrum. To such as this, the treatment of delayed or difficult menstruation at puberty, due to inefficient ovarian development, must be confined; for the other means are only allowable in very obstinate cases, after the patient has been married, or when there are indications of premature ovarian atrophy. Marriage is, perhaps, the most efficient remedy, and one we may, under certain circumstances, recommend; for, even if the patients should not have children, they will have better health, and they may even become pregnant if they marry early enough and are not mismanaged.

The last and most powerful aid is mechanical irritation of the

uterus; but, as it is not free from risk, and therefore requires careful use, it is not always to be recommended. It is, besides, in the class of cases where the uterus is most at fault that it is least risky and most serviceable. The method of irritation I generally employ, as the most convenient and least troublesome, is the insertion of Simpson's galvanic pessary. This instrument has by some writers been very much decried, but I think by those only who seem to have used it indiscriminately, and without reference to a proper selection of cases.

The irritation set up by the presence of a galvanic stem in the uterus is communicated indirectly to the ovaries in a manner that is not as yet explicable, but that it has an influence is beyond doubt, and, if it remain within bounds, it is in a large number of cases beneficial. A large experience has shown me that it is only in occasional instances that the stem cannot be borne, and that, if carefully watched during the first few weeks of its use, these cases are easily eliminated. In a case where I have been led to regard the use of the stem as advisable, I always begin with a small size, and after this has been worn for two or three months I change it for a larger one. For the first week after its introduction it is not unusual for the galvanic stem to give rise to considerable discomfort and even positive pain; but this usually passes off if the patient keeps her bed for a few days, and there is no further trouble save from the leucorrhœal discharge, which is a part of the process. The action of the stem is not purely mechanical, as has been stated; for, very soon after its insertion, the zinc becomes coated with an albuminous deposit, from which the copper is free, and the zinc becomes corroded. It is certain, therefore, that there is a galvanic action set up, and the stimulating effects are due partly to this, and partly to the interior of the uterus being constantly bathed in a weak solution of chloride of zinc. However produced, it is certain that the uterus rapidly enlarges under the action, and there is every reason to believe that the ovaries take part in the increased activity. If once the uterus becomes accustomed to the presence of the galvanic stem, it may be worn for many months, and the longer it is retained the more permanent will be the benefit; but if, after a trial of a few months—say four or five, there is no apparent alteration for the better, the attempt should be given up, and the case considered as hopeless.

In a very large number of cases of incompletely developed ovaries another remnant of infantile life is met with in an exaggeration of the normal curve of the uterus, amounting sometimes to complete ante flexion, and in this class of cases the galvanic stem is especially serviceable.

The results of my attempts to arrest premature atrophy of the ovary from any cause, when once begun, have been far from satisfactory; and this has been more especially the case when that atrophy has been due to a constitutional disease, such as tubercle. Sir James Simpson had a belief that the pretubercular amenorrhœa, so often seen in young women, was a cause of the subsequent disease; and he therefore directed his attention to the restoration of the utero-ovarian function as a means of treatment or prevention of the consumption. From the views previously expressed, it will easily be seen that I consider his theory to be based on error, though in some cases his treatment would seem to have been successful; but how much of his success was due to local and how much to general treatment cannot now be determined. It is not, however, a practice likely to meet with many followers.

It will be seen, therefore, that not only is the ovary extremely liable to be arrested in its growth from childhood to adolescence, but it is also liable to have induced upon it a condition of premature senility. It is unlike most of the glands of the body in that it has its functions limited to a particular period of life, or at least the period during which these functions are complete is so limited—and therefore it seems possible, and to be of not unfrequent occurrence, that the period of complete functional activity is very materially shortened. This I think we shall afterward see to be by no means unusual after first confinements, more particularly after miscarriages which occur early in sexual life; for the number of women who come under my care is large in whom the history is uniformly given of an attack of pelvic inflammation after the first pregnancy, and who have suffered from distress from that date, and have never again become pregnant. The explanation of this will be found in the adhesions formed by the tubes, to be afterward described.

The most common displacement of the ovary is dislocation downward into the retro-uterine pouch, to which the name of prolapse of the ovary has been given, as I think, somewhat improperly. I have very little doubt that a large number of women go about with marked dislocation of their ovaries downward, without any kind of suffering; and there is equally no room for doubt that this dislocation is in many cases a source of suffering so great as absolutely to prevent the woman from fulfilling her duties in life, and to render her life a prolonged misery.

The origin of this peculiar dislocation is very various. I have no doubt that, in some of the cases I have seen, the position of the ovaries in the cul-de-sac was congenital; in others the dislo-

cation has probably arisen from some accidental strain; but in by far the largest number of cases it has been due to some accident during the process of involution of the uterus after a confinement or a miscarriage. In a large number of cases it is associated with retroversion or retroflexion of the uterus, but in others the uterus is nearly normal in direction, and then we can only assume that there has been some relaxation of the peritoneal investments of the ovaries, by which they have been allowed to drop downward and give rise to the trouble.

There can be no doubt that by far the larger number of these cases arise in a condition which is practically that of subinvolution, and in two anatomical facts we have a complete explanation of this result. Turning to Henning's table (p. 4), it will be found that the ovary of the puerperal woman is extremely large—indeed, nearly twice as large as it is at any other time. It is also extremely remarkable that the left ovary increases in the puerperal woman to a much larger extent than does the right, a circumstance which I have no doubt is fully explained by the want of a valve in the left spermatic vein (v. p. 8). As the ovaries rise in the abdomen with the pregnant uterus, their ligaments, their tubes, and everything connected with them rise in proportional degree. It is not, therefore, to be wondered at that any incident which interferes with the subinvolution of the uterus after parturition should also affect the ovary. One of the most common results of subinvolution of the uterus is retroflexion, and therefore it is that we have a large number of these cases of dislocation of the ovary downward associated with this uterine displacement; and my experience is entirely in accord with that of Professor Goodell, when he says that if we find a dislocated, or, as he calls it, a "prolapsed" ovary, it is almost sure to be the left. It is therefore practically a subinvolution of the ovary with which we have to deal; and as in the uterus we have hyperæmia of the organ gradually passing into chronic metritis, so we have a similar process occurring in the ovary, and in several remarkable cases, in which I have been obliged to remove the ovaries on account of extreme suffering, I have found the organs in a condition of chronic inflammation and greatly enlarged, associated with chronic fundal metritis and enlargement of the whole body of the uterus. In these cases intractable menorrhagia has been a leading symptom, and the monthly engorgement involved by the process of menstruation leads, of necessity, to an increase of the symptoms and an exaggeration of the pathological condition.

The history of such a case as this will generally be that of some disturbance after confinement, followed by a prolonged

convalescence from childbed, a speedy resumption of menstruation, great difficulty and pain in locomotion, almost always pain on defecation, and pain during sexual intercourse. Besides these local symptoms, there will be very often a number of more or less distinct reflex symptoms, such as headache, pain in the breasts, pain in the back, and pains travelling down the thighs. The loss at the monthly periods will increase until it may amount to absolute flooding. The patient becomes anæmic, dyspeptic, and suffers from symptoms of extreme mental depression, and in course of time she will become an absolute invalid.

On examination, the uterus will be found to be markedly retroverted or retroflected, or both, the fundus usually being much enlarged. It may happen, however, that the uterus will retain its normal direction, though it will be rarely found that it is of normal size. Great care must be taken in the examination to ascertain the position of the fundus, because it is quite possible to mistake an enlarged and dislocated ovary for a retroflected fundus, and *vice versa*. But the fundus may easily be recognized with a little care, by finding that the tumor felt is continuous with the cervix. The temptation may be great to replace this by means of the sound, but I would strongly urge, especially on the beginner in gynecology, not to yield to this temptation. The sound is a most dangerous implement, and in the record of more than one of my cases it will be found that an immense increase of suffering has resulted from this practice. The experienced gynecologist should generally be able to replace the depressed fundus by the point of his finger, and if he is unable to do this in any particular instance, he may suspect that there is some adhesion which will make it much safer not to use the sound. The leverage of the sound in such a case will exercise an amount of force of which the operator may have no exact knowledge, and which is likely to do more harm than good. If I may here venture to sum up my experience of this instrument, extending over more than twenty years, I would say that it has done an infinite amount of mischief, and that probably we should have lost nothing if it had never been invented, and that the more experience grows in practice the less will this instrument be used.

If the tumor in the cul-de-sac be found not to be the fundus, then the probability is that it is an ovary; and if it be an ovary, and not adherent, it may easily be pushed upward in the direction of its proper place, and this will generally be found to be toward the left side. If it be an ovary, the peculiar, dull, sickening pain evinced by pressure will at once declare its nature, and if it cannot be easily replaced by the finger, it may be assumed that it is

adherent. The conditions may be fully established by the bimanual method of examination, and in all probability this will not be done with perfect satisfaction without the assistance of an anæsthetic, and ether is by far the best agent to use. By this method of examination it should, first of all, be ascertained whether or not the ovaries are in their proper place on each side of the uterus. If they cannot be found, it is most probable that the retro-uterine tumor is an ovary, and more particularly if it be adherent I would recommend the greatest caution in dealing with it, for I have more than once seen a smart attack of pelvic peritonitis set up by too rough handling. If the tumor be a fundus, it will probably easily be dealt with; but if it be an ovary, very great difficulty indeed may be met with in treating the case satisfactorily. If the gland is not adherent, it may be replaced by a pessary, adapted so as to keep it in place, or at least far enough up to be out of harm's way; but, if it be adherent, it may be taken as certain that no pessary can be borne. The best pessary for this purpose is one which I introduced many years ago, under the name of the "wedge pessary," and which is here figured. I have frequently had cases brought to



FIG. 18.—Wedge Pessary.

me in which the sufferings of the patient had been greatly increased by well-intended efforts to replace by pessary an adherent ovary.

The general treatment should consist of absolute physiological rest; that is to say, that during the menstrual period the patient should be confined absolutely to bed, and that there should be a cessation of intercourse. Any kind of treatment which will tend to improve the patient's general health should be employed, and by far the most effectual remedy will be a judicious administration of ergot and the salts of potash. What has proved in my experience to be the best method of giving these drugs is to put the patient on a prolonged course of the bromide and chlorate for alternate months, in doses of from five to twenty grains twice daily, and taken continuously; and to this is to be added a pill containing from half a grain to two grains of ergotin, to be taken for a few days before the appearance of menstruation, and during the whole of the period. I am bound to say that no other treatment by drugs has seemed to me to be of the slightest use. Professor Goodell speaks in high praise of

a combination of the ammoniac and mercuric chlorides, but I have not found them of much use. He gives them in the following formula:

R. Hydrargyri chloridi corrosivi..... gr. j.  
Ammonii chloridi..... ʒ ij.  
Mist. glycyrrhizæ co..... f. ʒ vj.  
M.

S.—One dessertspoonful after each meal, in a wineglassful of water.

In addition to this, Professor Goodell recommends treatment by the genu-pectoral position, as introduced by Dr. Campbell; and in some cases of dislocated ovaries which were not adherent, accompanied by retroflexion and subinvolution of the uterus, I have found this plan to be distinctly effectual. It is, however, very harassing to the patient, for it requires prolonged use, and I have not found many women sufficiently persevering to give it an extended trial; the misfortune in these cases being, like very many others in this line of practice, that almost any treatment requires to be continued for so long a time that most sufferers are apt to lose patience, and seek other treatment at the hands of some fresh practitioner. I take the following description of this postural treatment from Professor Goodell's writings:

"A very excellent way of keeping up the ovaries—one which, in every case, I adopt, and one which I shall now teach this patient—is the knee-breast posture, devised by Dr. C. F. Campbell, of Georgia. Two or three times a day, or more frequently if needful, this woman will unhook her dress, loosen her underclothing, and kneel on her bed as she now kneels on this table. Her body is then bent forward until the breast is brought down to the surface of the bed, while her head is turned to one side and supported in the palm of her left hand. Her knees should be about ten inches apart, and the thighs perpendicular to the bed. If she now refrains from straining, and breathe naturally, a reversal of gravity will be established. With the fingers of her free hand she will next open her vulva. Air will rush in, and the abdomen and its contents will at once sag down. This will, of course, draw up the womb and the displaced ovaries out of the pelvic canal. As it is rather awkward for a woman, while in this posture, to free one hand and reach the vulva, Dr. Campbell advises that, previously to taking this attitude, she should insert into the vagina a small glass tube, open at both ends, and long enough to project externally. This will leave an air-way, and dispense with the use of the fingers. With such tubes as I