

dites of Simpson are those to whom alone the term *true* can be applied."

In Simpson's third variety, to which he gives the name of "true double or vertical hermaphroditism," he describes the presence of a gland of each sex as present on both sides, or, as he says, "actual sexual duplicity." Without denying the possibility of such an occurrence, I must say that I think it very unlikely, and I have no hesitation in saying that none of the cases he quotes justifies the establishment of this variety. The most complete case is that recorded by Vrolik, and he distinctly states that neither in the structure which he supposed to be testicle nor in that considered to be ovary did he find a trace of histological evidence of the nature of the gland. Mere anatomical position goes for nothing in such a case, for the ovary descends sometimes in the same way as does the testicle, for it also has a gubernaculum. It must also be borne in mind that occasionally appendices both to testicle and ovary are met with, giving the appearance as if the individual had three or even four testicles or ovaries. If such a condition were met with in a hypospadiac male who had at the same time an enlarged prostatic utriculus, as many of the cases quoted by Simpson undoubtedly had, and if the testicular appendix had not descended with the true testicle, the appearances would be exactly as described in most of Simpson's cases, and yet there would be not the slightest reason for the statement that both kinds of glands were present. The only satisfactory test is that of microscopic examination; and so far the evidence goes to show that there is only one kind of true hermaphroditism—that in which there is an ovary on the one side and a testicle on the other.

The cases lately recorded by Leopold, of Leipsic, and C. E. Underhill, of Edinburgh, are clearly cases of descent of undeveloped ovaries into the inguinal canal—instances of hypererchesis.

## CHAPTER IV.

### OVARIAN TUMORS AND CONDITIONS WHICH SIMULATE THEM.

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OVARIAN pathology has always been a fertile field for research, and although the list of writers upon this subject which I have given above is a long one, it by no means fully represents the great number of contributions which have been given to it. The interest which diseases of these organs has always excited has been greatly increased during the last twenty years, owing to the remarkable triumphs which surgery has achieved in the establishment of ovariectomy as the most successful of the major operations.

The pathology of ovarian tumors—especially those of a cystic character—involves a number of questions which have been raised and discussed by observers of the greatest eminence; but I think it is only in very recent times that anything like a reasonable view of the origin of these growths has been advanced. In the first edition of this book I said that, up to the time of my writing it, I had found very little which either harmonized with my own observations, or seemed to me to give any satisfactory explanation of these growths. The conclusions which I put forward were at variance with those held by many previous and

probably much more competent observers; but these conclusions nevertheless seemed to me to be founded on fact, and to have the strong recommendation of affording explanations which were at least simple and intelligible. Since I wrote this a good deal more has appeared on the subject, much of which I have carefully studied, but without finding reason to depart from the views I published in 1873.

What seem to me by far the most important contributions recently made to ovarian pathology are the papers published by MM. De Sinéty and Melassez, in the *Archives de Physiologie* for 1878. I find in these papers a great deal which completely confirms my own previous conclusions; but, on the other hand, it is equally fair to say that much which has been advanced by these authors is quite out of harmony with what I have myself observed. Upon the latter point, however, I think the facts established by Balfour, in his researches upon the development of the ovary, which have been given at length in a preceding chapter, may be taken as conclusive, more particularly upon the alleged development of cystic disease of the ovary from the so-called tubes of Pflüger.

As to the prime causes which lead to any of these diseases, we may at once confess ourselves to be profoundly ignorant, and what little we do know is entirely confined to the processes by which these causes produce their peculiar results. It may be that some day we shall know here, as we desire so much to know in every other field of pathological inquiry, what may be the ultimate causes of any particular lesion; but up to the present we have no instance of any knowledge of this kind.

It is extremely difficult to arrange the discussion of this subject in such an order as will be satisfactory from a general view, and any division of ovarian tumors must be entirely arbitrary. We may take them from their physical characteristics, or from their surgical peculiarities, or from their microscopic appearances, or from their supposed methods of origin, but we cannot possibly take them in an order which will satisfy all these aspects. De Sinéty and Melassez adopt a perfectly arbitrary method of classification, which in itself would not be objectionable were it not that the names they make use of for the purposes of their division are such as—in England at least—involve certain meanings which the authors evidently do not imply by them. Thus, they divide their observations into those upon "cystic ovaries," thereby meaning instances where the cysts are very small, and where the ovary is still easily recognizable. "Cysts of the ovary" they use to designate tumors where the ovary is no longer distinct, but seems to have disappeared. And

then again, when they speak of a case in which the solid parts of a tumor become the predominant elements, they use the term "cystic tumor." It is perfectly useless to take up space in discussing the want of precision of such a division as this; all that can be said in its favor is that it is no more illogical than others which have been propounded. The authors themselves say: "It is very certain that between cystic ovaries, ovarian cysts, and cystic tumors of the ovary, there exists quite a series of intermediate tumors, and that it would be very difficult, even impossible, to establish between them well-defined lines of demarcation. In fact, the difficulty is just the same as has been found, within the last two or three years, to hang round the use of the word ovariectomy; for every one whose experience has extended beyond the removal of large ovarian cystomata, has found it quite impossible to use any such word as oöphorectomy, in contradistinction to ovariectomy, without some arbitrary definition and division of his cases. Therefore I have already indicated my intention hereafter to make use of the word *ovariotomy* to include the removal of an ovary for any purpose or disease whatsoever. In like manner I intend the word *cystoma* to refer to any disease of the ovary in which the existence of cysts is a leading characteristic. Whether I may be more successful than my predecessors in establishing subdivisions of this disease, or whether I may succeed in giving a rational view of their methods of production, must be left to the judgment of my readers.

In the first chapter of this book I have drawn attention to the somewhat numerous observations which establish the fact that at the time of birth the follicles of the ovary are very frequently found to be so much distended by limpid fluid as almost to present the appearances of disease; and from the fact, equally well established, that these cysts do rupture and go through the stages of cicatrization, we may assume as proved, that in the dropsical distention of the Graafian follicle we have at least a very common origin of ovarian cystoma. If we go through the literature of this subject, we shall find numerous instances in which these follicles have become so distended as to have an absolutely morbid appearance. Thus, in the *American Journal of Obstetrics* for January, 1880, Dr. T. G. Thomas describes an ovarian cyst, removed post-mortem from a new-born child, which was sent him by a physician in New Jersey. The peculiarity in the case was that the child was delivered at full term, and nothing abnormal was discovered. About one month after birth a tumor was discovered in one iliac fossa, about the size of a hen's egg. The child was well developed at the birth, but soon began to show signs of impaired nutrition, grew very slowly, became

emaciated, and languished until it was three years and five months old, and then died. The autopsy revealed the existence of an ordinary ovarian (or parovarian?) cyst filling the abdomen. The remains of the Fallopian tube and ovary were upon one side of the tumor.

At a meeting of the Pathological Society of London, on May 21, 1878, Dr. Leared showed specimens of ovarian cysts from twin infants, who had been under the care of Dr. Macmahon, of Norwood. They were born at full term, and one, jaundiced from birth, died at the age of eight weeks. There was found complete obliteration of the common bile-duct. Each ovary was the seat of a cyst the size of a filbert. The other child died from pneumonia, and it also presented a small ovarian cyst the size of a pea.

The observations of De Sinéty and Melassez, and also those of Hausmann, therefore, lead us to the conclusion—which has been quite established by fact—that ovarian cystoma may be the result of these processes in the young child, and that we may expect, every now and then, to see one of these follicular dropsies reach such a size as to require surgical interference. Thus, Dr. Basil, of Bonn, has performed ovariectomy on a child two years of age, on account of a large cystoma. Mr. Folker, of Hanley, has operated at three years of age. A case is recorded by some American surgeon of an operation at seven, and Mr. Wells has operated on a child of eight years. The probability is that in these cases, and in many others, the cystoma has been due to the extension of the follicular dropsy, which occurs normally during the first three months of life, and which has become pathological by reason of the follicles not rupturing, as in the ordinary course of events.

Waldeyer, in the *Arch. f. Gynækologie*, tome I., p. 289, also observes that: "In the ovaries of old women are often found small cysts from the size of a pea. . . . They are covered with a cylindrical epithelium, which, under the form of glandular tubes, often penetrates into the ovarian stroma. . . . These little cystomata never contain ovules or remains of ovules. . . . In some cases may be seen a continuation of the epithelium which covers these cystic cavities with the epithelium of the ovarian surface."

Here, then, we have a starting-point, from which we may arrive at an explanation of ovarian cystoma—the only one, in my belief, that can be reasonably advanced. It seems to me it will explain all the specimens which I myself have examined. Indeed, I am quite strengthened by my later researches, as well as by those before referred to, in the views I advanced eight years ago, to the effect that ovarian cystoma is the result of fol-

licular dropsy only. The fact which is now almost universally admitted, that ovarian cystomata are never unilocular, also points to this conclusion. Thus, De Sinéty and Melassez say: "Amongst all the cysts we have examined, we have not found one which was truly unilocular. All those sent to us as such presented, truly, a large principal cyst, but, on examining them with care, we have always found other cystic cavities, sometimes small enough, it is true, to pass unperceived on a first examination."

This conclusion I can entirely substantiate from the examination of a very large number of tumors. There is one possible exception, however, and that is of a small cyst—now in the museum of the College of Surgeons—which I removed as an ovary, in a case of severe hemorrhage due to a uterine myoma. The patient recovered, and the operation had for some months a perfectly successful result; but about seven months after it she died, as I believe, from cancer of the uterus. No post-mortem examination was made, and I have been quite unable to obtain any information concerning her case from the practitioner under whose care she was at the time of her death. It is, therefore quite possible that what I removed on that side was not the ovary; or, it may be that I did not remove the whole of the ovary, but merely an outstanding cyst. At any rate, I do not feel disposed, on account of this isolated and incomplete observation, to depart from the conclusion I have come to from an otherwise uniform experience, which is that such a thing as a unilocular ovarian cystoma does not occur. On *à priori* grounds such a condition would be extremely unlikely, for it is difficult to imagine—whatever be the cause of the distention of Graafian follicles into pathological cysts—that it could or would affect one follicle only, and allow the rest of the gland to remain free from its influence. Conversely, granting the likelihood that follicular dropsy develops ovarian cystoma, then we have at once an explanation of what is the fact—that these tumors are always multilocular.

I think that the term *adenoid* may be retained with advantage in the nomenclature of ovarian tumors, because it conveniently classes them with reference to the tissue from which they originate, and by the hyperplasia of which they are formed, without giving any theoretical explanation of their formation. All non-cancerous tumors of the ovary are, therefore, adenoid; even the dermoid tumors are so to a certain extent, for they are the result of increased growth of one or other normal constituent of the gland, without alteration save in quantity. Cancerous growths, on the other hand, introduce tissue which is either not

found in the gland normally, or they produce it in a form which is immature.

There are two methods of origin for pathological cysts which are universally accepted, and both of which are instanced in the ovary. The first is by occlusion of normal ducts or tubes, as best seen, perhaps, in the kidney and salivary glands, and in connection with the ovary in the form of cystic dilatation of the Fallopian tube or of its trumpet-shaped extremity, after adhesion to the ovary—tubal and tubo-ovarian cysts. The other form of cyst-growth consists in the dilatation of a physiological cyst-cavity by its own secretion poured out to an abnormal extent; and this secretion may either retain its original character and constitution, or be altered by the addition of blood or of some of its usual or exceptional albuminous products. This is the common form of cyst-formation in the ovary, and in the multiple adenoid tumor and in the dermoid we see instances of it. The former illustrates the formation of cysts by the retention of its products in the cavity of the normal sac of the gland, these products being the fluid cell-substance and its nucleus, the ovum. This is accomplished, as far as I could discover from two specimens I have to describe, by hypertrophy of the fibrous covering of the gland—a sclerosis of the ovary; and the nucleus, the ovum, seems to have retained its normal appearance until destroyed by some process not yet understood. It is, however, possible that some defect of action in the nucleus may have to do with the non-rupture of the sac; for, under healthy conditions, it is undoubtedly the maturation of this nucleus that governs the rupture of the wall of the ovisac, and enables the perfect ovum to escape. Upon this point it seems to me that the observations of De Sinéty and Melassez have very great value, for they show that, coincident with the absence of the ovum in the follicle, changes are effected in the epithelium of a very marked kind. Whether they result from or are themselves the cause of absence of the ovum, we cannot say.

The dermoid cysts are due, on the other hand, to an altered and increased activity of the cell-nucleus in early life, the results remaining latent for years, until re-excited by the great systemic change. We may look, then, to some other altered condition of the cell-elements for explanation of the remaining variety of cystic tumor of the ovary which has been termed by Mr. Wells and others "proliferous."

I do not like this term as applied to the compound cysts of any kind, for it assumes, what I am quite certain is not true, that the large cysts are directly the parent of the small ones. Thus, Mr. Wells, at page 25 of his book on "Diseases of the Ovaries," de-

finer: "Proliferous cysts—parent-cysts with secondary cysts growing from the interior of the cyst-wall." These minor cysts are secondary, as far as date of growth is concerned; but they are the younger brothers and sisters, not the children, of the larger sacs. In fact, the very caution which Paget gave his hearers in using the term *proliferous* is disregarded in such an application of it, as may be seen from the following quotation:

"In an ovary, it is not unfrequent to find many small cysts, formed apparently by the coincident enlargement of separate Graafian vesicles. These lie close and mutually compressed, and, as they all enlarge together, and sometimes, by the wasting of their partition-walls, come into communication, they may at length look like a single many-chambered cyst, having its one proper wall formed by the extended fibrous covering of the ovary. Many multilocular cysts, as they are named, are only groups of close-packed single cysts; though, when examined in late periods of their growth, and especially when one of the groups of cysts enlarges much more than the rest, it may be difficult to distinguish them from some of the proliferous cysts." (Paget's "Surgical Pathology," p. 415.)

The formation of a compound cystic tumor in the ovary, whether it be of the multiple variety or of the less complete kind of which I am about to speak, may be very well illustrated by blowing soap-bubbles in a basin. If the fluid be not viscid enough to enable the bells to retain their form, then the normal condition of the ovary is represented, its cells bursting and disappearing. Let us suppose that the cell-growth is constantly going on, and that some alteration occurs in the state of matters which prevents the cell-walls bursting; the fluid in the basin is so viscid that the bells do not break, and bubble after bubble is formed, some larger, some smaller, until a large multicystic tumor is the result. The actual appearances of the cystic ovary may be very well imitated in the basin of soap-lees. A large cyst can be made with little ones crowding into it, looking like its offspring, and the walls between two or three may be broken down, making one larger multilocular—the remains of the intervening walls not being left in the instance of the soap-bubbles. If they had been left, the appearances would be identical with what is represented diagrammatically for ovarian tumors in Mr. Wells's book on page 39. In the ovary we have the continual production of cells, representing the continuous blowing of the bubbles; and we have only to discover what it is that is analogous in the ovary to the increased viscosity in the solution of soap; what it is that keeps the cysts in their entirety, perverting a physiological into a pathological process.

With the exception of two examples of "Rokitansky's tumor" (to which I give the name of multiple cystoma), and which I shall afterward describe at length, I have failed to find anything like ova in any cysts of the tumors I have examined; and I have not seen any reason to believe that the little secondary cysts met with in the walls of some of the larger sacs are what Dr. Ritchie has interpreted them to be—dropsy of the blastodermic vesicles—chiefly because I have failed to see round them anything like remains of the membrana granulosa, and I have seen three or four of them on more than one occasion on the wall of the same sac. In searching for ova in the cysts of the two tumors where I found them, I had seldom occasion to look for them in the walls of the cysts, as they seemed to have been floating about loose, or to have been set free by the opening of the sacs. In other cases, not finding them in the liquor folliculi, I adopted the further plan of first isolating the cyst to be examined, and, having opened it, I searched carefully in every sediment of its contents for the ovum. Not finding it, I turned the sac inside out over a ball of cotton-wool soaked in glycerine, smeared its everted surface with the same substance, and, covering it piecemeal with a thin glass, I carefully examined it over its whole extent by reflected light. I never found anything I thought was an ovum. In one tumor which I removed lately, I found a mass of secondary growth in the position of the ovary at the base of a single large cyst. I made sections of this mass by the freezing process, and found it composed of follicles all lined with their proper epithelium and undergoing cystic enlargement, but in none was there any trace of an ovum.

I cannot reconcile this discrepancy between my observations and those of Dr. Ritchie otherwise than by supposing that, having been one of the discoverers of ova in a certain kind of ovarian tumor, he was too anxious to apply his principle of explanation to all; or he must have had a plan of examination more successful than mine.

My original observations, made in 1872, have been amply confirmed by De Sinéty and Melassez, who say: "no author has met with ovules in cysts larger than a walnut. All the large cysts we have studied, and which we shall describe farther on, possessed an epithelial investment completely different from that of the follicles, a fact equally attested by all recent observers." Rindfleisch has found, only once, one ovule in an ovarian cyst of which the cavity was no larger than a cherry.

The fact that I never found ova in any of the sacs of these multicystic tumors, even the smallest, or in those with the most limpid contents, led me to entertain the opinion that in this we have

an explanation of their formation. The function of the ovary is one of cyst-formation from its earliest existence to its latest, and in its pathology we need not go far away from its physiology. It seems to me, therefore, *à priori*, very unnecessary to resort to the ingenious explanations of cyst-formation advanced by Dr. Wilson Fox, though they may be fitted to exceptional cases. Experience in the examination of the growths themselves has strengthened this view; for my wonder is greater, the more I see of them, that they do not occur more commonly and with more complexity than they do, considering the apparently reckless amount of ovarian cyst-production that goes on throughout life.

The aim and object of this cyst-formation is the production, maturation, and discharge of the ovum. But, if the ovum be not formed, or if it be produced only to a rudimental extent, may it not happen that the cyst will not be ruptured, but go on aimlessly expanding? Whatever be the source of the change, we know that it does not affect one ovisac alone, but may influence them in great numbers, whether it be in a tumor where the ova have been matured and subsequently prevented from escaping by sclerosis of the coat of the ovisac, or in a growth where the ova are not to be found. There is a great clinical difference between these two kinds of tumor; for in the one the growth is very limited and slow, and in the other it may be, and often is, extremely rapid, and is practically unlimited in extent. In fact, the growth of these cysts without ova partakes somewhat of the character of malignancy assigned to them originally by Bright for clinical reasons. Malignancy, apart from any association with cancerous structure, is always indicated histologically by a tendency to the production of a form of tissue which is young and immature, and this is certainly the condition of these ovaless ovisacs.

As a matter of fact, ovarian cystomata are a great deal oftener malignant than has yet been admitted. The recovery from an ovariectomy is generally so rapid and easy that at the end of a month we say "cured," and discharge the patient. But a number of these "cures" die speedily of cancer of the peritoneum or of other organs, and the more our primary mortality from the operation has diminished, the more numerous have become these secondary deaths from cancer, occurring between three and thirty months after the operation.

A few months ago I removed an ovarian tumor from a child aged twelve, and did not see, either in the tumor or in the abdomen, a single trace of malignant disease. She recovered from the operation, but died within the month with cancer in all the large organs. This singular sequence requires explanation, and

I believe that has now been arrived at, the last link being supplied by the work of De Sinéty and Melassez; and if the observations be correct, then a bright light is shed by them on the whole question of cancer. Elsewhere ("Diseases of Women," 1877) I have said: "Histologically, the characters of cancer are essentially those of immature and reckless cell-proliferation, the presence of numerous nuclei, both in the cells and free, suggesting the idea that they have had no time to become full-grown; and I have never failed to find evidence that the primary changes take place in the epithelium." The bearing of this will be seen more fully later on, when I speak of cancer of the ovary, but at present it leads up to the remarkable discovery of De Sinéty and Melassez, to which I have alluded.

"If, then," say these authors, "we cannot absolutely deny the possibility of the formation of a large cyst of the ovary at the expense of a follicle, it may be seen that this formation does not appear to result from a simple dilatation of these follicles, as many have said, and that we must admit a destruction of the ovules and a transformation of the epithelium when the follicles exceed a certain volume." It will afterwards be seen that there is probably an error in the last clause of this quotation, in that the cause is put for the effect; but it is in the establishment of the fact of the change in the epithelium, or rather in the interpretation of it, that the merit lies. I had long been quite familiar with the fact that between the epithelium of a healthy Graafian follicle and that of a large ovarian cyst there was a great difference. I had also ascertained the fact that, in an ovarian cystoma where ovules were to be found (Rokitansky's tumor, or the multiple cystoma), the epithelium remains as it is in the Graafian follicle. I had concluded, therefore, that the cyst in the latter case was merely the result of follicular dropsy, and that therefore probably all ovarian cysts were the same; but I had not seen, in the alteration of the epithelium, the explanation of the marvellous difference in the two kinds of tumors, nor that here we might find an explanation of the growth of ovarian cystomata. Such, however, I now believe to be the case.

Among other facts which lead me to the conclusions which I propose now to discuss were the absolute resemblance between the arrangements of the blood-vessels of a Graafian follicle and those of an ovarian cystoma which has not been altered by rupture, tapping, inflammation, or malignant degeneration. If such a cyst be carefully injected, cut into sections, and compared, in the matter of its vascular arrangements, with a Graafian follicle either before or after its rupture, no difference can be seen. The description of these will be seen in the first chapter. Roki-