Klob has described a twisting of the ovary on its axis, which is probably congenital, and has not yet been found to be of any pathological importance in an otherwise healthy ovary. In the cystic ovary a similar twisting has been observed to a more complete extent, and with disastrous results, as will afterward be described. The ovary is said sometimes to be completely detached from its normal position and relations, and forms new attachments elsewhere. This occurs with the healthy ovary, and, as Mr. Spencer Wells has shown, also probably after it has undergone degeneration. How and when it occurs have not yet been satisfactorily explained, but in all probability the curious axial rotation to which ovarian tumors are subject, as described in a subsequent chapter, has something to do with it.

In some rare instances we find the peritoneal layers so deficient that the ordinary mesenteries and ligamentous folds are completely absent. I have described several cases of congenital defects of the peritoneum (*Dublin Quarterly Journal of Medical Science* for February, 1869), but the most interesting I have met with is one I published in the *Obstetrical Journal* for October, 1876. There the peritoneal sac was wholly absent, the intestines being connected together by an abundance of extremely loose cellular tissue. In the pelvis it was absolutely impossible, on post-mortem examination, to identify any organ but the uterus, from the entire absence of any of the usual peritoneal limitations. Thus, the bladder was torn open in removing the uterus, under the impression that it was some of the loose areolar tissue, and its nature was recognized only by the escape of urine. Two masses close to the uterus, one on either side, when cleared of the abundant connective tissue and laid open, proved to be the ovaries, and in the left there was the clot of a recent Graafian follicle, the ovum of which, if it ever were extruded, must have been arrested in the surrounding tissue. Over the right ovary the Fallopian tube seemed to course in a normal direction, but it became lost in a mass of connective tissue, and I could find no appearance of the fimbriated expansion. On the left side there was an appearance of a rudimentary tube in a fold of tissue.

The menstrual history of the patient, as ascertained by my friend Dr. Hickinbotham, in consultation with whom I saw the patient during her life, was in no way abnormal, and she was twenty-five years of age. The cause of her death was the obstruction of scybalous masses in a bunch of coils of intestine, along which they could not pass, apparently because the intestines were unable to move about.

Another class of remarkable errors of development of the ovary consists of those to which I have given the name of hyperchesis. So far as I know, they are limited to the development of fetal structures in the ovum before it has left the follicle, this taking place probably during the fetal existence of the ovary, and constituting, in after-life, the variety of ovarian tumor known as " dermoid," under which head this remarkable change will be found fully discussed. They are also seen in the peculiar growths resulting, as I believe, from the extended life of ova which have been dropped out of the follicle into the peritoneal cavity, and there have continued their existence, becoming developed into huge cysts, instead of perishing, as they usually do. In the chapter upon ovarian tumors several instances of these will be described.

The errors of development of the Fallopian tube partake very much of the same character as those affecting the ovary. When the gland is insufficiently developed, its tube will be found correspondingly defective. I have, however, already narrated a case in which, coincident with defective development of the peritoneum, the growth of the tubes had been apparently arrested, while the ovaries had not suffered in this way. Sometimes, also, we find the tubes are displaced by congenital defect, being placed either too low, or being too short, or having their infundibula too small to enable them to acquire their periodic relations to the ovaries properly, and in these cases there is of necessity a resulting sterility. Conversely, we sometimes find that a badly developed ovary, or, it may be, an ovary which has suffered from inflammation, is displaced downward and outward, beyond the reach of the normal tube; and here again sterility is produced.

In some instances of arrested development of the tubes they are found to be occluded at both ends, and distended by the fluid into cysts. I have found, in several instances, that this occlusion at the outer extremity of the tube was formed by an adhesion of a permanent kind to the infundibulum of the ovary, perhaps of a congenital origin, but more probably the result of inflammation. In these cases extreme menstrual pain has resulted from periodic distention of the tubes, the patients have been sterile, and, when married, have been wholly unable to perform their marital functions. They have wandered about from one practitioner to another, and from hospital to hospital, vainly seeking relief, and the only means of giving it to them is to remove the ovaries and the tubes. Two or three characteristic examples of this condition I propose here to describe.

Such inflammatory affections as spread into the uterus are apt to pass along the tubes and produce ovarian or peritoneal

mischief. In this way the inflammation of the tubes is of immense importance, and it may be suspected after the appearance of indications of the more serious extension of the disease. It may also have an important result, in addition to the extension of the inflammation, in the form of destructive desquamation of the ciliated epithelium which lines the tubes. The function of this ciliated epithelium, as well as that of the peristaltic movements of the tubes, is evidently chiefly for the passage downward of the ovum; but it also seems to me likely that it is to hinder the contact of the spermatozoa with the ovum until the latter has reached the cavity suited for its maturation. The statement that impregnation takes place before the ovum has reached the true uterus seems to me an assumption based on insufficient evidence—indeed, on no evidence at all. *A priori*, we may safely say that, if it is the rule, Fallopian pregnancies and the disasters which follow them ought to be much more common than they are, and I believe it to be more than likely that the real cause of this accident is the coincidence of a set of circumstances, the most important of which is the destruction or insufficiency of the ciliary movement. Inflammatory desquamation may then be a cause, and probably is not an infrequent one, of tubal pregnancy. Destruction of the tubal epithelium may also, and undoubtedly often does, cause atrophy or occlusion of the tubes, and occlusion of the apertures of the tubes may be the cause of another disease of the tubes, of which I have seen a considerable number of cases—dropsical distention. The fact which is mentioned by many authors, that both tubes are usually affected, is suggestive that tubal dropsy is generally the result of inflammatory action. The distended tubes seldom reach a large size, and the majority of the cases, where they are described as having reached such a size as to rival and demand the treatment of ovarian tumors, are open to the suspicion of inaccurate description. There is, however, one case given by Dr. Peaslee in his book on ovarian tumors, about which there can be no doubt. It contained eighteen pounds of fluid, and would have been removed if the patient had recovered from the tapping.

In some six or seven cases where I have found the Fallopian tubes distended with fluid, and where I could not remove them, I have drained them by the process I have described elsewhere as applicable to cysts of the liver and kidney and to pelvic abscesses. I first of all expose the cyst, then empty it by the aspirator, and then enlarge the opening into and stitch its edges to the edges of the parietal wound by a continuous suture, so as completely to close the peritoneal cavity. The cavity of the cyst is carefully drained in front, or by a tube passing both upward and downward, as well as into the vagina. I have in this way cured cases of hydro-, pyo-, and hæmatosalpinx, but the results and the rate of progress are not nearly so satisfactory as when the uterine appendages are completely removed.

This occlusion of the Fallopian tubes, which is certainly of very frequent occurrence, is facilitated by the relations of the infundibulum to the ovary, this being far more intimate than is generally imagined. Fig. 1 (p. 4) gives a perfectly exact representation of the organs, but in order to display them their relations have been destroyed, for the fimbriæ are always in close relation to the ovary, and the tubes, as I have said, curl over and around the ovary, so that the infundibulum is in contact with the lower and posterior surface of the ovary, the axis of which is often nearly vertical generally, but not always. Adhesion, as I have said, occurs at the menstrual periods independently of ovulation, and I think it more than probable that not more than one in ten of the ova shed by the glands really enter the tubes. The rest drop into the peritoneum and die there.

The largest collection of fluid which I have seen in an occluded Fallopian tube occurred in the following case, the more remarkable in that the disease was unilateral.

E. E. T——, aged twenty-eight, was placed under my care by Mr. Watkin Williams, of this town. She had been married, but had been obliged to divorce her husband for misconduct. It is more than probable that gonorrhœa had been communicated to her about five years before I saw her. From that date she had suffered from intense pain during the menstrual period, and had become very much emaciated. She had been under a great many doctors without obtaining relief. I discovered a small cystic tumor behind and to the right of the uterus, freely movable, but very painful when moved. I advised its removal, and this I undertook on May 23, 1879. I found it to consist of the right Fallopian tube, distended by about a pint of clear serum. The infundibulum was glued on to the right ovary, and the uterine part of the tube was distended like a tortuous sausage, the greater part of the cyst being made from the outer half of the tube. I removed the tube and left the ovary. She made an easy recovery, is now in robust and perfect health, and has married again.

Dr. Saundby examined the fluid removed, and gave me the following report upon it: specific gravity, 1014; reaction alkaline, pale greenish color, clear, with scanty grayish deposit; contains about three-fifths of its volume of an albuminous body, having

all the characters of serum-albumen. After removing the albumen, the filtrate precipitates with mercuric nitrate (urea ?) and with argentic nitrate (chloride of sodium ?). The microscopical examination showed only a few indifferent cells.

E. C——, aged thirty-two, was married at seventeen years of age, and had her first child when she was eighteen, and her second in the following year. She was quite well until 1876, when she had a smart attack of inflammation of the pelvis, and ever after that she had extreme pain at her periods, when she had to remain in bed for several days; and she described her sufferings as amounting to agony, and resembling labor-pains more than anything that she knew of. She was seldom free from pain in the back, and for the last three years she has been utterly unable to endure married life. I found the uterus slightly retroverted, and on each side of it there was a distinct mass in the position of the ovary, large, fixed, and extremely tender. She had been under a great variety of treatments, without the slightest benefit. On October 5, 1880, I made an exploratory incision, and found both ovaries adherent in the cul-de-sac, the infundibula of both tubes occluded, and the tubes themselves distended into cysts. The whole of the organs were matted together, and the operation for their complete removal was extremely difficult. The amount of fluid in each tube was about two ounces. She made an uninterrupted recovery from the operation until the monthly period after, at which time she had a small hæmatocele on the right side, coincident with a slight menstrual appearance. From this, however, she speedily recovered, and on February 17th last I found the uterus perfectly free and normal in direction. I last saw her on March 26th, and found her in perfect health, absolutely free from pain, and she told me that she had seen no appearance of menstruation since November, and that marital functions had been resumed without the slightest pain.

H. S——, aged thirty-seven, had been married seventeen years, and had only one child, fifteen years ago. She did not recover well from that confinement, and ever since had menstruated too often and too profusely, being rarely a fortnight clear. I found the fundus large and tender, somewhat anteverted, and what I regarded as the ovaries formed two large masses low down, and somewhat behind the uterus. For a long time past sexual intercourse had been quite impossible on account of the suffering it caused her. Dr. C. H. Phillips, of Hanley, who placed her under my care, had exercised a large amount

of ingenuity in her treatment, without any benefit, and from February till August, 1880, we conducted further treatment equally in vain. On August 3d I opened the abdomen, and found the ovaries large, completely adherent in the cul-de-sac, covered with lymph, and having the infundibula of the tubes occluded. The tubes were distended into large cysts, each containing from four to five ounces of clear serum. The organs had to be very carefully detached, as the adhesions were extremely firm, and the hemorrhage during the operation was tolerably profuse. Her recovery from the operation was rapid and easy, and the only distresses she encountered were the climacteric flushings. In May last Dr. Phillips sent me a most satisfactory account of her condition.

A. S——, aged thirty-eight, had been twice married, and had had five children by her first husband, the youngest being twelve years of age. She has had no children by the second husband, to whom she has been married six years. After her second

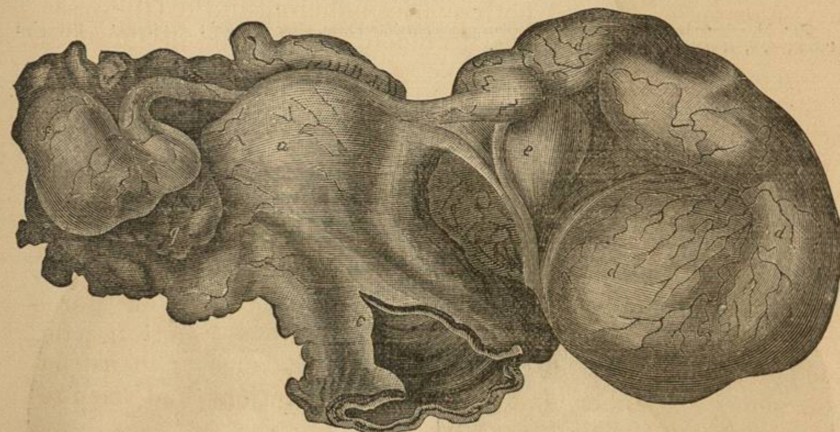

FIG. 19.—Bilateral hydrosalpinx (after Hooper, from Arthur Farre, Encyc. Anat. and Physiol.): *a*, uterus; *b*, vagina; *c*, os uteri; *d* and *f*, Fallopian tubes; *e*, ovary.

marriage she seems to have had an attack of pelvic inflammation, and ever since she has had intense pain at her periods. She referred this pain distinctly to the region of the ovaries. For somewhere about three years she had been wholly unable to submit to intercourse, and her domestic life was thereby rendered extremely uncomfortable. I found the uterus to be normal in position, and on each side of it I found a mass situated quite low down, and having characteristics exactly like those in the two cases given above, so that I had no hesitation in making up

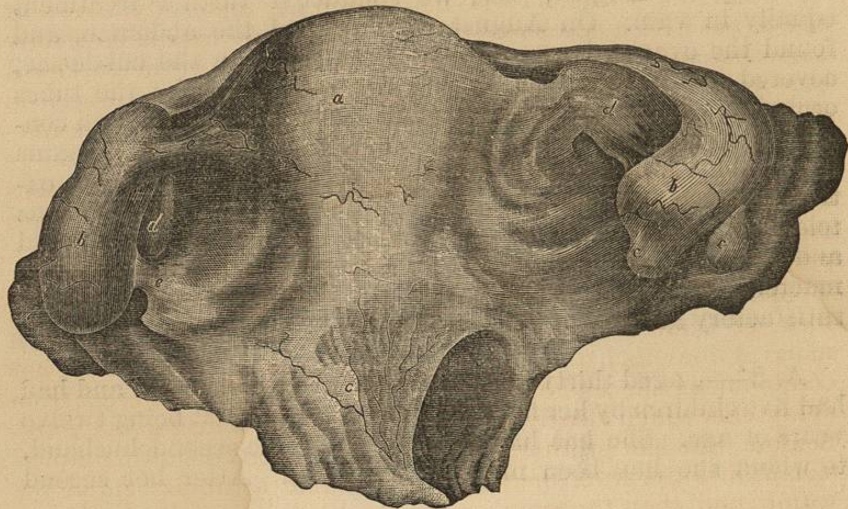

FIG. 20.—Occluded and adherent Fallopian tubes (Arthur Farre, after Hooper): *a*, uterus; *b*, Fallopian tubes; *d*, *d*, ovaries; *e*, *e*, bands of adhesion.

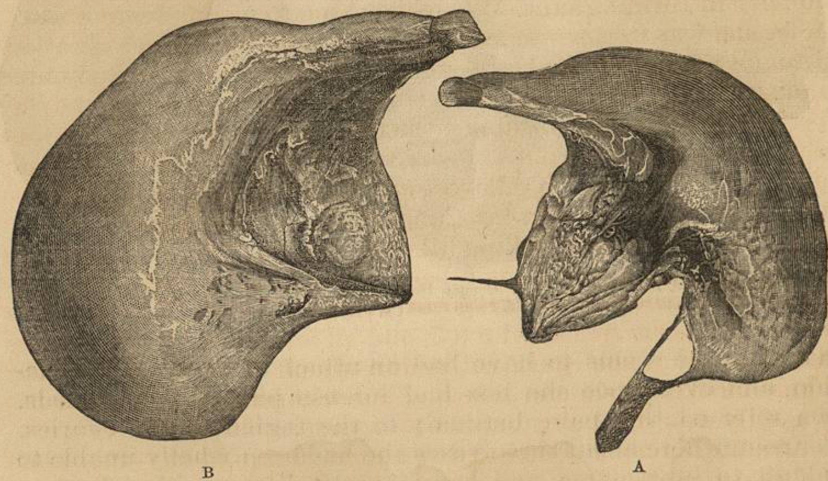

FIG. 21.—Right (A) and left (B) Fallopian Tubes and Ovaries, removed by abdominal section from a patient aged thirty, who had suffered early in her married life from gonorrhœa. The large bulbous masses are the Fallopian tubes occluded and distended with serum (hydrosalpinx), the shrivelled ovaries being shown in the convexity of the tubes. (From a photograph slightly reduced. Preparation now in Museum of Royal College of Surgeons.)

my mind that she had occlusion and distention of the tubes. Dr. Cameron, of Bilston, who had placed her under my care, sent her to me with a statement to the effect that he was perfectly sure that nothing but an operation would relieve her. This I performed upon May 21st, and found matters exactly as described in the last case. Her recovery was rapid, and the relief immediate and complete.

In some cases we find that the contents of these closed tubes consist of pus or menstrual fluid, both of which I can instance from my experience in the following cases.

Mrs. L——, aged thirty-four, was sent to me by Dr. McLinctock, of Church Stretton, in September, 1878. She had been married four and a half years, and had one child. Since her confinement she had never been well, and had suffered from symptoms which clearly were those of subinvolution and retroflexion. She had profuse menstruation, and on consulting a physician, in July, 1872, she was told she had a tumor behind the womb, and that the womb must be dilated and the tumor removed. For this purpose a sponge-tent was introduced, and inadvertently left in, according to her reiterated statement, for nine days. She had suffered from an attack of "acute inflammation of the bowels, and was in her bed for seven weeks." This incident occurred, I am pleased to say, neither in Church Stretton nor in Birmingham. When she came to me on September 24, 1878, she was in a wretched state of exhaustion and emaciation. I found a mass on the right side of the uterus, which fluctuated indistinctly. The uterus was retroflexed and fixed completely by perimetric effusion. I tapped the mass, and removed about four ounces of pus from what I now know was an abscess of the right ovary. She was much relieved, and returned to Church Stretton under Dr. McLinctock's care, and slowly gained some strength. She did not make anything like a recovery, however, and her medical attendant sent her back several times to me, and together we carried on a variety of treatment, without much benefit. The uterus remained fixed, and all efforts to replace it were so painful that she could not endure them. She could not bear intercourse, and she never was a day without pain, and her life was fitly described as a burden to herself and her relatives.

Dr. McLinctock sent her down to me again at the end of last February, and in his letter he told me he was sure something more must be done if our patient's life was to be saved. I found that the mass on the right of the uterus was just as I had left it, that the uterus was still fixed and retroflexed, that there was now a more clearly defined mass to the left of the uterus, and

that the whole roof of the pelvis was exquisitely tender to the touch. Her temperature went up at night, and she had night-sweats; and although I could feel no fluctuation, I had no doubt there was pus somewhere. I therefore advised and performed an exploratory incision on March 6th. I found the pelvis roofed over by adherent coils of intestine, which I lifted with much trouble. Below this the whole of the organs were matted together, and their identification was a matter of the greatest difficulty. Finally, I succeeded in recognizing the right Fallopian tube, distended into a cyst with greatly thickened walls, and full of pus. Below it, and intimately adherent to it, lay the ovary, as large as an orange, and containing some old cheesy matter, the remains, probably, of the abscess which I tapped two and a half years before. The uterus was bound down in the cul-de-sac by old adhesions, and from these I relieved it. I found the left ovary adherent below the fundus, and from it the left Fallopian tube ran a circuitous course, like a sausage in appearance, and adherent to the brim of the pelvis, the uterus, and a piece of small intestine. It contained about two ounces of pus. I removed both ovaries and both tubes, cutting the latter off close to their uterine attachments. The hemorrhage during the operation was very troublesome, but was controlled by sponge-pressure. Mr. J. Raffles Harmar assisted me, and Mr. Wright Wilson gave ether.

The patient has recovered without a bad symptom, and is perfectly free from pain for the first time since the incident of the sponge-tent. The uterus is now perfectly free, and any movement of it gives her no pain. My only regret about this case is that I did not operate two years before.

J. H——, aged thirty-one, came under my care in April last, after having been under the treatment of many well-known practitioners. There was no history of any acute illness, but for many months she had been ailing, unable to walk, and constantly in pain, and her sufferings during the menstrual week were very great. She was desirous of getting married, but, as she was quite unable to get about, this was out of the question. She had been told by all her doctors that she suffered from a displaced womb. On either side of the uterus was a large, fixed mass, the slightest pressure on which produced pain of a sickening kind. No fluctuation could be determined. She used iodine blisters and took bromide of potash for two months, without any benefit. At the end of June I proposed an abdominal section, but only with the result that she consulted another practitioner, greatly my senior, and under whose care she had previously

been, who told her that she ought never to submit to any such proposal.

She came back to me, however, in August, and I took advantage of the presence of Dr. Battey in my house as a guest to get his advice. He agreed with me that it was a case urgently demanding interference. This induced her friends to take her to an eminent specialist at a distance, who characterized my proposal as absurd; but yet the poor girl got no better, and she returned to me on October 18th, determined to have the operation performed.

One matter of importance was the question of her affianced husband's knowledge and consent, and this I desired should be secured. For that purpose I had an interview with him, and fully explained the case and my proposed treatment. He raised not the slightest objection, and expressed himself as desirous only of obtaining relief for his *fiancée*. The operation was performed on October 21st, and I found the pelvic organs completely matted together. After I had separated them—a matter of great difficulty, taking a long time in its performance—I found the left Fallopian tube distended and as big as an orange. Unfortunately it burst, and the curdy pus with which it was filled was scattered into the peritoneum; and a similar misfortune occurred in the removal of the right tube, which was also distended with pus. I need not say that I took every care to cleanse the pelvis well out, and I used a drainage-tube. The removal of the tubes and ovaries in this case constituted the most protracted and difficult operation I have ever performed. The patient recovered speedily and completely, has not menstruated, and is completely free from pain.

At the meeting of the Société Anatomique, held on January 16, 1880, a case of pyosalpinx was narrated from Dr. Bernutz's service at La Charité. The patient was aged twenty-nine, and was admitted with very severe symptoms, pointing to pelvic inflammation, and subsequently, peritonitis. She died four days after admission, and, on a post-mortem examination, suppurative peritonitis was found to have spread up from the pelvis, having arisen from the rupture of a tubal abscess. The following is a description of the parts:

"The tubes extended one on either side, and were the seat of the principal alterations. The internal half of each tube was healthy, and its direction normal, but the outer half presented three or four dilatations, varying in size, the largest being situated at the outer extremity, being formed by the occlusion of the pavilion, so that there was no opening into the tube, which was distended with pus. These dilatations communicated one with

another, and the internal mucous surface was smooth and softened, but otherwise normal. There was no communication between the uterus and the tubes. The ovaries did not occupy their usual situation, being both displaced downward and embraced by the concavity of the tube, making with this a largish mass. On the left side there was a peculiar arrangement; a cyst occupied the pavilion of the tube, of the size of a hen's egg, which seemed to be directly continuous with the cavity of the ovary, and the two cysts were entirely empty. The internal surface of the tube was smooth, while that of the ovary was very rough and much reddened, the difference being distinctly marked by a line of division of the two structures. The ovary was not greatly enlarged, and upon its posterior surface, toward the middle, was found a small rupture through which the contents had been extravasated into the peritoneum."

M. Bernutz remarks that in all probability the suppuration of the tubes and left ovary was of ancient date, and that the fatal peritonitis was undoubtedly due to the perforation of the abscess into the peritoneum. He does not give any explanation or history of the pyosalpinx. The case, however, is to me an extremely interesting one, for it illustrates exactly the same conditions as those seen in the case narrated above, and I think there is little reason to doubt that, if the patient had been seen earlier in her history, the symptoms would have been found sufficiently severe to warrant an abdominal section; and, if that had been done before the rupture, not only would the patient's life have been saved, but her disease would have been cured. Even after the rupture of the cyst and the onset of peritonitis, had the case been under my care, I would have opened the abdomen without the slightest hesitation, have cleaned out the cavity, and removed the cause of the disease. I have had numerous cases in my recent practice where such a proceeding—which would have been regarded as madness three years ago—has had the most brilliantly successful results.

As another instance of pyo-salpinx, I may give the following:

M. F——, aged twenty-six, had been, ever since the age of seventeen, living an immoral life. About three years ago she suffered from gonorrhœa, which was followed by severe pelvic inflammation, and ever since that time she had suffered from severe menstrual pain. About six weeks previous to my seeing her she had been exposed for a whole night to extreme cold, and after that suffered from great pelvic pain. She was placed under my care in March last, by Mr. John Green, of this town. I found her suffering from all the symptoms of pelvic suppuration, and

there was a fluctuating pelvic tumor on the left side of the uterus. This I diagnosed to be the left Fallopian tube distended with pus. I opened the abdomen on March 28th, and found my diagnosis correct. It was, however, quite impossible to remove the tube, and I therefore had to content myself with emptying it, dragging it up to the wound, securing the two openings together by a continuous suture, and fastening in a drainage-tube. This was kept in for some weeks, and she made a satisfactory recovery. Her menstrual suffering, however, is quite unrelieved, and therefore the cure is only partial. It could only have been made complete by the removal of both tubes and ovaries, but this was made quite impossible by the dense adhesions formed by the previous inflammation. In such a case, of course, there is not the slightest hope of her ever becoming a mother, though, as she has left her irregular life and has been married for about a year, this would be desirable. As it is, she will certainly remain a sufferer until she reaches the climacteric.

A few days ago I operated on a patient sent to me by Dr. Standish, of Cradley, on account of persistent pelvic pain, greatly aggravated at each period, and which no treatment relieved. I could find nothing on examination, and I had very great misgivings about operating in a case where the conditions were purely subjective. I opened the abdomen, however, and found both ovaries and tubes adherent. The tubes were occluded, and the outer extremity of each was occupied by a small chronic abscess, which amply accounted for all the symptoms. The preparations are now in the museum of the College of Surgeons. The patient has made an excellent recovery.

The features common to these cases are (1) a history of severe pelvic inflammation, though sometimes this cannot be ascertained with precision. Its origin is variously ascribed as from gonorrhœa, a chill, or sudden stoppage of menstruation, and (most frequently) inflammation after labor or a miscarriage. There is always (2) pain, which comes on after exertion, and especially after intercourse, and generally becomes intensified when menstruation appears. At this time the pain is often described as excruciating, and it lasts throughout the period. In the majority of instances there is (3) irregular and profuse menstruation, often amounting to hemorrhage.

The physical signs are (1) swellings at the seat of the ovaries, which are always tender and generally quite fixed. Distinct fluctuation can often be felt, and their peculiar sausage-like shape has frequently enabled me to diagnose correctly the condition previous to the operation.