No treatment whatever relieves these cases, save removal of the uterine appendages.

Most of my cases had been in the hands of some of our most eminent specialists before they came to me, and an infinite variety of treatments, both by drug and operation, had been used fruitlessly. They had all been treated by pessaries, and many of them had had their cervical canals dilated and cut.

Tapping the dilated tubes is of no use and is extremely difficult.

At the operation the organs are nearly always found matted to the pelvic wall and to intestines, and their removal is often extremely difficult—far more difficult than removal of an ovarian cystoma. I always remove the ovaries along with the tubes, as without the ducts the glands are, of course, useless.

All my patients—twenty-two in number—have recovered, and of those in which a sufficient time has elapsed since the operation I can say confidently that they are all completely cured.

All the cases had been, of course, rendered sterile by the disease, and in most of them the marital function was also destroyed. I have not found that the operation has had any other effect than that of restoration of sexual activity where it has been lost.

Menstruation has, in most cases, been arrested immediately, but in a few it has lingered for a month or two.

The pathological condition of most importance is practically the same in all these cases, and arises, I think, from an attack of acute or subacute oöphoritis or peri-oöphoritis. During this process the trumpet-shaped extremity of the tube approaches the ovary for its normal temporary attachment; and this, by the inflammatory process, becomes permanent. Certain it is that, in nearly all the cases, permanent attachment of the tube to the ovary is to be seen. Probably, after the attachment has occurred, the inflammatory process extends to the tubes, there is a desquamation of the ciliated epithelium, and occlusion of the tube at its uterine extremity occurs.

The nature of the contents of the tube is determined by causes which I do not understand. The most common of the varieties of this disease is hydrosalpinx, and the rarest is hæmatosalpinx.

In connection with these cases I may refer to a curious series of phenomena which has repeatedly fallen under my notice, and which, I gather from the writings of other observers, has also been noticed by them. Thus, in several cases where I have opened the abdomen for the purpose of removal of the ovaries on account of severe and intractable pelvic pain, I found the organs matted together with all the appearances of old pelvic

peritonitis—so much so that I have been unable to complete the operation. I have also, as I have already stated, found in very many instances the Fallopian tubes occluded and distended with fluid which, in several cases, was purulent. Looking back upon the histories given by some of the patients in whom I was unable to complete the operation, I have found distinct statements made of recurrent attacks of severe pelvic inflammation. I have also noted, in some of them who had been under my care for prolonged periods, that at some of my examinations I found distinct tumors on one or both sides of the uterus, while at other examinations no trace of these tumors could be seen. Speaking of an absolutely similar experience, Dr. Mathews Duncan says: "After a time the tumor disappears. Frequently its disappearance is accompanied by adhesive perimetritis. Now, what has happened in these cases? Of course it may be said that it is a case of mere ignorance, or that the cysts were parovarian; but, to this latter explanation there is, for me, the great objection that the cases occur more frequently by far than to admit of their being justly so explained. We must suppose, therefore, the bursting of the not infrequent small follicular dropsies. I would further add that the bursting of simple parovarian cysts does not appear to me to be followed by perimetritis, or accompanied by it, so generally in the case of the disease of which I have been speaking."

In only one of my cases have I seen reason to accept Dr. Duncan's explanation, that is to say, in only one of them have I found the small cyst of the ovary (which was probably on the point of bursting), and elsewhere in the ovaries, distinct evidence that similar ruptures had occurred before. I feel perfectly certain that in some of the cases there can be no doubt that Dr. Duncan's explanation is the correct one; but I have so much more frequently found the Fallopian tubes at fault, that I am inclined to believe that in the great majority of these cases of recurrent pelvic peritonitis, due to rupture of a cyst, it is in the tubes that we shall find the origin of the mischief.

Looking at some of my preparations of hydro- and pyosalpinx, I find it difficult to resist the conclusion that periodic rupture of the distended infundibulum is a somewhat frequent occurrence in them. It is, of course, very likely that in many cases a cure is effected in this way; but in others the disease is only aggravated, and probably in many the rupture is fatal. In a discussion which took place at a meeting of the American Gynecological Society in 1880, I find a corroboration of my views in some of the remarks of my friend, Dr. James R. Chadwick, of Boston. He speaks as follows: "Now I have had several cases

presenting a similar succession of symptoms, in which I have been able to detect a cyst on one side or the other of the uterus, which I have diagnosticated as a cyst of the Fallopian tube, but have never verified my opinion by operation or autopsy. My explanation of the symptom is this: that fluid collects in the tubes, of which the fimbriated end is occluded until it is greatly distended; as the monthly period approaches, peristaltic action repeatedly occurs in the tube, attended with great pain, which tends to expel the fluid through the uterine end temporarily occluded. This action continues at intervals with increasing violence, until, during the catamenial relaxation of the uterus, the fluid contents of the tube are forced through the opening into the uterine cavity, with immediate relief. If this view be correct, the removal of the ovaries was of no consequence, though the operation was quite as urgently called for, as the best and perhaps the only means of relieving the cystic condition of the tubes, and securing to the patient immunity from her suffering."

A patient who had been under my care for some months died suddenly a few weeks ago, and the pelvic organs were obtained at the post-mortem examination. She came under my care in January last, as an out-patient at the Women's Hospital, with symptoms of chronic metritis, including severe menorrhagia. On April 28th I recognized the presence of a small cyst on the right side, as large as an orange. At the end of May she had an attack of pelvic peritonitis. On June 13th the tumor had disappeared. On August 15th it had returned, and it again disappeared in September, its disappearance being accompanied by inflammatory symptoms. On October 10th it was again to be felt, and about the 30th she died, and Mr. J. Garman, of Wednesbury, obtained the preparation for me when I told him that she had a bursting pelvic cyst. Mr. Alban Doran has examined the preparation, and confirms my opinion that the cyst is the right Fallopian tube. Doubtless many a mysterious case of peritonitis arises from some such cause as this.

Thus it will be seen that recent advances in pelvic surgery, by which we are enabled to deal with a great number of cases which formerly were left to unrelieved suffering, and often to inevitable death, have made it clear that there are very many cases in which the tubes, having become occluded by acute or chronic inflammation, are occupied by purulent fluid—a condition which can be remedied by surgical operation alone.

In its acute stage inflammation of the tubes is a most formidable disease, and so rapidly ends in general peritonitis that we can hardly recognize the necessity for interfering before it is too late to do anything. I have seen several fatal cases of peritonitis which undoubtedly had their origin from inflammation of the Fallopian tubes, and which ought to have been treated by abdominal section. Indeed, I do not think I shall again willingly allow a case of peritonitis to die without an effort to save her by an operation. I am fully persuaded that we might save many such cases by boldly opening the abdomen and cleansing its cavity. In three cases of chronic peritonitis I have done this, and cured the patients completely.

Pyo-salpinx is, however, a more chronic condition, some of the cases upon which I have operated having lasted over several years. Probably they all arise in some acute inflammation which occludes both openings of the tubes, and converts one or both—generally both—into chronic abscesses; yet in the last case I have narrated there was in the history no incident of an acute kind. Dr. S. Wilks has met with two cases where pyo-salpinx caused general pyæmia, one case proving fatal from an abscess in the liver, the other from an abscess in the brain.

Besides pus, we occasionally find that an occluded Fallopian tube may contain bloody fluid (*hæmato-salpinx*) of menstrual origin. It has been completely established, especially by the observations of Bernutz and Goupil, that the tubes generally share in the secretion of the menstrual fluid, and when the clamp used to be employed in ovariotomy, we constantly saw menstrual weeping from the stump. It is not, therefore, surprising that occasionally we should meet with a case of hæmato-salpinx. Dr. Alfred Medows records the post-mortem examination of one in the eighth volume of the "Transactions of the London Obstetrical Society," in which "it was found that both Fallopian tubes were enlarged, not regularly and uniformly, but so as to form a kind of cyst. On the right side there were two such enlargements; on the other, one. There was no evidence of any communication between these dilatations and the fimbriated opening. On the left side there was not even an opening into the uterus, the ostium uterinum being completely occluded. They were all filled with a dark, thick, grumous fluid, of a prune-juice color. It is evident that, in this case, we have an example of what Bernutz and Goupil contend for—menstrual retention within the Fallopian tube. The one fact which is clearly revealed is, that the Fallopian tubes do, as well as the uterus, take part in the menstrual secretion; and hence, when any obstruction occurs to the passage of that secretion into the uterine cavity, and so externally, we get the resulting symptoms of menstrual retention."

The following case has occurred in my practice, and I have

fortunately been able to operate on it successfully. The patient remains now (1881) in perfect health :

Miss M——, aged thirty-eight, was sent to me in the beginning of 1877, by my friend Mr. Alfred Freer, of Stourbridge. In November, 1876, she had an ill-defined illness, during which she had obscure pelvic pains, accompanied by fever. Previously to this illness she had been in good health, and had menstruated regularly. After it, she had severe pain during the whole period of menstruation, and she gradually increased in size until Mr. Freer discovered a pelvic tumor in February last. I found the tumor to be pear-shaped, quite movable, attached to the uterus at the left cornu, evidently unilocular, and about the size of an infant's head. I diagnosed it as a cyst of the parovarium, and advised that it should be tapped after it had increased in size sufficiently to warrant interference. She returned to me in May, with the tumor increased so as to be felt above the umbilicus. I advised her to come again in a month. She came, however, before the expiration of that period, on account of a sudden accession of serious symptoms; and when I saw her, on June 20th, there could be no doubt she was suffering from peritonitis. Her pulse was 130; the temperature was 38.4° C. (101.12° Fahr.), and rose to 39.6° C. (103.28° Fahr.) in the evening; and there was excessive pain all over the abdomen, with considerable flatulent distention. I administered opium freely, and applied counter-irritation over the epigastrium.

On the morning of the 21st she was easier, but the temperature and pulse had not fallen. I therefore had her placed under the influence of ether by Dr. A. H. Carter, and proceeded to open the abdomen, assisted by Mr. Priestley Smith. The tissues of the abdominal walls were extremely vascular, and it was necessary to use a large number of ligatures to arrest the bleeding. The peritoneum was found to be intimately adherent to the tumor, and, as soon as the latter had been laid bare for a short distance, it became evident that it was not an ovarian tumor, but presented the red, muscular appearance of the uterus. Passing the forefinger of my left hand down as deeply as I could in front of the tumor, with that of my right hand in the vagina, I made out distinctly enough that my original conception of the relations of the tumor to the uterus were perfectly correct. Under the suspicion that it might be a tubal pregnancy, I did not separate the tumor further, as I had not opened the peritoneal cavity, but cautiously opened the cyst in the middle line by means of a knife. As soon as I had reached its inner coat, I passed my small trocar in, and evacuated about six quarts of thick, dark brown fluid,

having the peculiar smell of menstrual fluid. After the cyst was emptied, I passed my finger through the hole made by the trocar, and, to my amazement, I found that the cyst had contracted; moreover, as I kept my finger in the cavity, I distinctly felt it contracting round and grasping my finger. Passing the forefinger of my other hand into the vagina, I made out that what I had opened was, beyond doubt, the left Fallopian tube, and that I must have opened it close to its fimbriated extremity. I could find no canal leading into the uterus, and did not deem it advisable to make one. I washed out the cavity freely with weak carbolic lotion, by reversing the syphon action of my trocar. The wound was closed by four deep sutures, one of which was so arranged as to fasten in a loop of wire drainage-tube; but before this was done I acted on a hint from Mr. Priestley Smith, and snipped off a piece of the cyst-wall for microscopic examination. This fragment proved to be composed of an abundance of unstriped muscular fibre, conclusively supporting the view that this singular tumor was a distended Fallopian tube. After the operation I treated her exactly as a case of ovariotomy. Her temperature fell slowly. The wound suppurated freely, and shreds of what was undoubtedly mucous membrane came away with the discharge in large quantity. The drainage-tube was removed on the twenty-first day, and its track continued to discharge until the beginning of August. It then healed, and she is now (October 18, 1881) in perfect health. She has never menstruated since the operation.

From the fortunate issue of this case much is left to speculation, but of the nature of the tumor there is no doubt. As to its origin, it seems to me that it may be accounted for by the supposition that the illness from which all her symptoms dated was a localized salpingitis, which resulted in the closure of the two ends of the tube. The peritonitis, which she undoubtedly had when I operated on her, I suggest was due to a threatening rupture of the tube, and possibly a slight escape of its contents. If this be so, it is evident that it was only the accident of my determination to act promptly which saved the patient's life.

Arthur Farre quotes a case of this kind, in which the distention by the menstrual fluid advanced to rupture, followed, of course, by death. I think my case was on the verge of a similar fate.

Dr. Mathews Duncan has for a long time insisted that occasionally the Fallopian tube might be patent so far as to admit the passage of the sound through it. I am bound to say that I have never seen any evidence, from my own experience, that

such a condition has occurred, though I have admitted its possibility. The cases in which it is stated to have occurred I have always regarded as instances of the passage of the sound through the fundus, an incident to which Simpson drew attention, very many years ago, as of not infrequent occurrence. In the *Lancet* of 1872, I have reported authenticated instances of this curious fact. In the *British Medical Journal* of March 12, 1881, Dr. Duncan has published a paper in which he gives some very curious information on the subject of "Open Fallopian Tube," and though I am still somewhat sceptical, I give the following extract from his paper, in order to draw attention to the subject. That it is not impossible is certain from the fact that in cases of parovarian cysts, where the tube is often wound around the base of the tumor, and greatly increased in length and thickness, it is sometimes possible, with care, to pass a No. 4 or 5 male catheter through the tube.

"Investigating the pelvic conditions of a case destined by a colleague for ovariotomy, I found the uterine probe pass to the right side of the pelvis, and far beyond the limits of the uterine body, which was easily and certainly felt. When the woman was on the operating-table, I failed to pass the probe again through the tube, probably from the unfavorable circumstances under which the attempt was made. A few days subsequently, in the post-mortem examination, the right tube was observed lying in the route which the probe had taken, and its uterine extremity was patent—not to the extent of being wide enough to transmit a uterine sound, with its large, bulbous point, but to transmit a common small surgical probe.

"Interesting evidence of the patency of the tubes is found in the intra-uterine clots discharged in some cases of metrorrhagia. These, coming away as models of the uterine cavity, bear, at their upper angles, long clots drawn out of the tubes, and found hanging from the main intra-uterine clot. Appendages of the same appearance and origin may be found attached to the decidua in cases of abortion (see the author's 'Researches in Obstetrics,' p. 296); but these are decidual in structure, and have some strength, and are not extracted from the tube, but are part of the tube. They do not indicate patency; but the extraction of a long clot, so delicate and perishable as it is, attached only by the feeble cohesion of coagulation to the main intra-uterine clot, indicates a decided patency of the canal from which it passed. In Pirie's case (*Obstetrical Journal*, January, 1880, p. 5), 'the upper part of the clot was firm, even somewhat tough, and the tubal cords were nearly four inches long.' In the case of C. Rokitansky (*ibid.*, March, 1880, p. 133), the body of the uterus

contained 'a three-cornered coagulum, ending above, on both sides, in a short, thin thread running to the tubes.' Whitehead (*ibid.*, March, 1880, p. 137) says that, in his case, 'small fibrous prolongations from the clot corresponded to the Fallopian tubes.'

"Of the possible evil results of persistent patency of a Fallopian tube, the following is an example, related to me by Mr. Hewer, as having occurred in the practice of his partner, Mr. Calthrop. A widow, aged forty-eight, had a polypus of the cervix snipped off by scissors. On the fifth day after the operation her sister gave her, gently, a vaginal injection of warm water with Condy's fluid. While receiving the injection the patient cried out, 'You have killed me,' and was seized with sudden pain in the right side of the abdomen. She lived for three days, in great pain till within a few hours of death. On post-mortem examination there was found general peritonitis, with flaky lymph on the intestines. The right Fallopian tube was seen to be much larger than the left—twice as broad; it was freely patulous. The section of the pedicle of the polypus was healthy. There were two other polypi in the cervix. Here, as Mr. Hewer says, it was plain that the injected fluid passed into the peritoneal cavity through a canalized tube, and caused peritonitis and death. Of this accident many cases are now on record, the injections being either vaginal, as in Hewer's case, or intra-uterine.

"By the same route I have long held that blood frequently passes from the uterine cavity into the peritoneal cavity, and gives rise to hæmatocele. Indeed, I incline to the opinion that this diversion of blood, whether menstrual, menorrhagic, or metrorrhagic, is the most frequent cause of this not uncommon disease. Of course it is necessary to suppose, what has been well accounted for, that the morbid course of the blood is mechanically easier than the natural or ordinary one through the cervix uteri into the vagina; and there can further be no doubt that, ordinarily, even when a tube is patent, the mechanically easier progress of the blood is through the cervix into the vagina. Were it not so, hæmatocele would be much more frequent than it is. I have often known a woman lose blood from her uterus *per vaginam* while a tube was freely patent.

"Besides the passage of blood, there is the almost certain, but very rare, passage of a lumbricus through a patent tube (Winckel: 'Die Pathologie der weiblichen Sexual-Organe,' S. 321). This kind of passage is effected by the movements of the animal.

"Further, openness of a tube is a necessary condition for the accomplishment of the wandering of the ovum in certain cases of extra-uterine pregnancy.

"In conclusion, it is necessary to remember that, besides natural and morbid conditions of patency, there may be unnatural absence of temporary patency, or of occasional dilatation of the tubes; for it is probable that they dilate during sexual excitement, and permit the passage of the semen. Indeed, it is scarcely conceivable that semen can permeate the tubes while they are in their usual closed state. This absence of dilatability of the tubes, or their rigidity, may thus be a cause of barrenness.

"The proposition of Tyler Smith to catheterize the tubes, and thus cure sterility, was brought forward under the influence of different theoretical views from those expressed in this paper. It has, as yet, led to no more practical result than the proposal of Froriep to close them by cauterization, in order to produce sterility."

Of course I need hardly say that I regard such views as Dr. Duncan here expresses concerning the passage of semen up the tube as wholly contrary to fact, and quite irreconcilable with what I have already said concerning the physiology of the tubes.

Simpson relates a case of simple hypertrophy of the muscular coat of the walls of the tubes. Various authors also mention tumors as having been found in their substance, but the majority of these cases are not described with sufficient minuteness of anatomical detail to enable us to accept them implicitly. Myomata of small size, as we might expect from the structure of the tubes, have been repeatedly found, and about their occurrence there can be no doubt. Cancer and tubercle extend into the tubes from the uterus; but we may dismiss all these conditions by saying that their diagnosis is impossible, and that it would be of little importance if it could be made.

Occasionally calcareous concretions have been found in the tubes, possibly the result of old, chronic abscesses. The clinical history of such cases is never given. The organ of Rosenmüller, a small cyst which remains from the ducts of the Wolffian body, is a curious feature of the outer part of the tube. I believe that sometimes it undergoes cystic enlargement, and should be treated as an ovarian tumor. In one of my recent ovariotomies I found it to be about four or five times its usual size, and I removed it.

One of the most important abnormalities of the Fallopian tube is that in which the ovum comes in contact with spermatozoa during its passage through the canal, becomes adherent to its walls, and develops into a Fallopian pregnancy. This accident occurs probably when the ciliary action of the mucous lining is destroyed by some desquamation or other accident, for I

have already stated that I do not believe that impregnation takes place in the tubes save under exceptional circumstances, and when it does occur the probabilities are great that the fertilized ovum will there contract the adhesions which it ought to have in the uterus. When this misfortune does occur, the tube expands to a certain limit, that limit being reached between the second and third months of pregnancy, at which time rupture usually takes place. In the vast majority of cases that rupture is fatal, and I am sure that there is no experienced gynecologist who has not seen at least several instances of it. I have known at least twenty post-mortem examinations of women who have died from ruptured tubes. In not a single instance which I have seen, nor in any of which I have found record, has the pregnancy been anywhere but in the tube. The cause of death in these cases of tubal rupture is invariably hemorrhage, and the source of hemorrhage is the enlarged maternal vessels at the site of the placenta. Unfortunately, it is just here that the rupture nearly always occurs, because the tissues are thinner, more vascular, and more easily torn than elsewhere. These facts I was able abundantly to prove in a case which I attended with my friend Mr. Hall-Wright, in which I removed the parts *en masse*, and succeeded in injecting them perfectly. Occasionally this rupture takes place without hemorrhage, or at least without fatal hemorrhage, and the patients survive the accident. In what percentage this fortunate issue occurs we do not yet know, but it is probably not large. By the rupture the ovum is extruded into the peritoneal cavity or between the layers of the broad ligament, the latter being an exceptional and a very favorable occurrence, because the patient is not likely to die of the hemorrhage.

It was after the dissection of a case of this kind, described by Dezeimeris as "subperitoneo-pelvic" (his second variety "sous-peritoneo-pelvienne"), that I was led to reconsider the whole question of the pathology of this important subject. Up to that time we had accepted the involved classification of the author I have just quoted, who made out ten different varieties. Growing experience and the consideration of a large number of recorded cases have, however, induced me fully to adopt the view of the origin of all cases of extra-uterine pregnancy which I first laid before the Obstetrical Society of London in 1873. Of this view the late Dr. John S. Parry, in his exhaustive treatise on the question, says: "In opposition to this minute anatomico-pathological classification of Dezeimeris, we have the simple one of Mr. Lawson Tait, who asserts that there are only two forms of misplaced conception. In one the oviduct bursts, the peritoneum