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FIRST SERIES

OF

TWENTY-FIVE CASES

OF

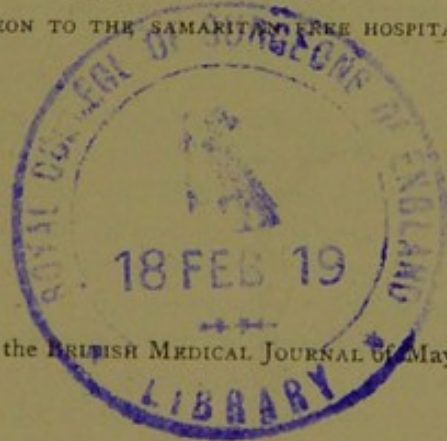
COMPLETED OVARIOTOMY.

BY

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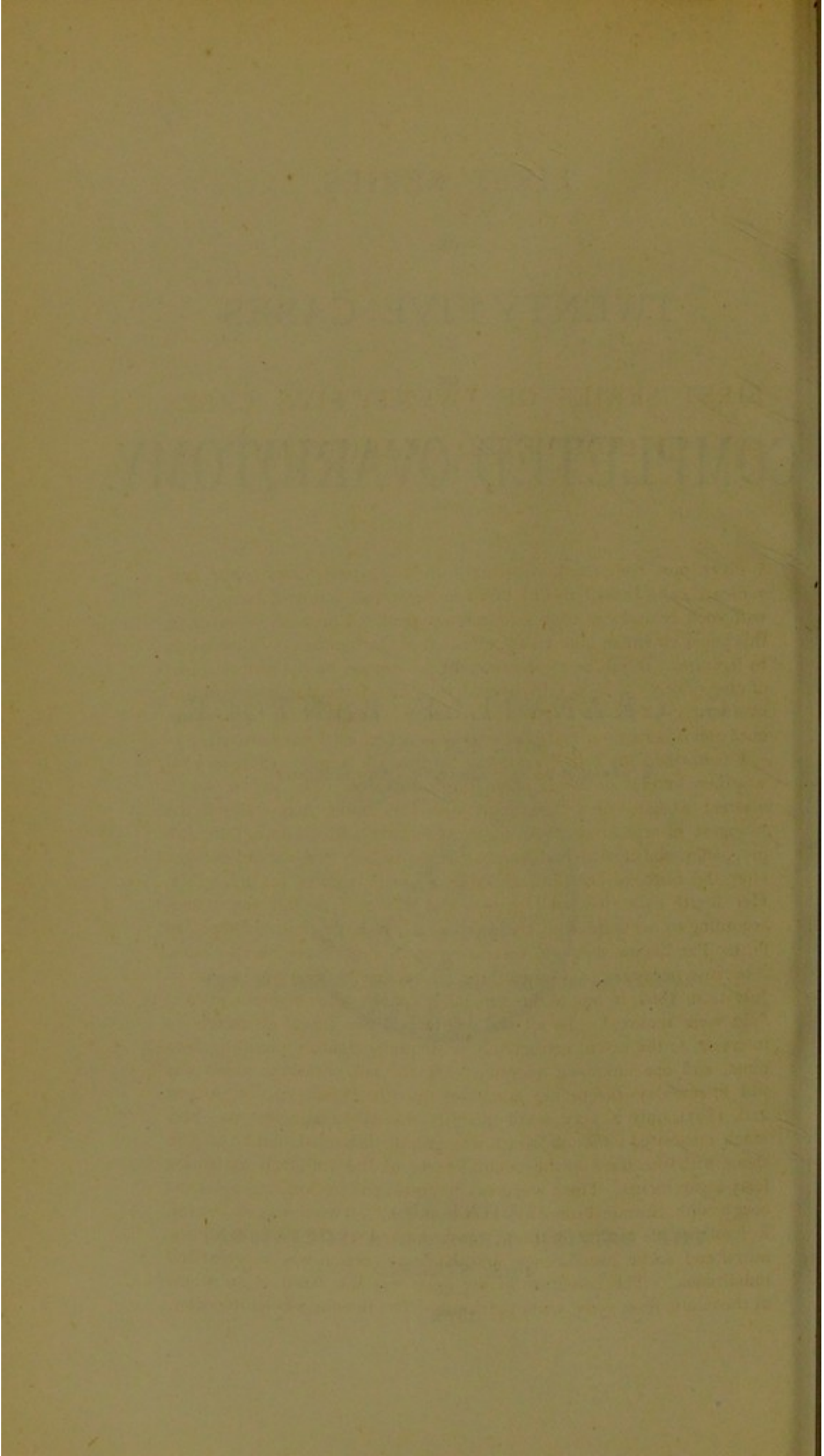
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1879.



FIRST SERIES OF TWENTY-FIVE CASES OF COMPLETED OVARIOTOMY.

I HAVE now completed ovariectomy in seventy-six cases. For convenience sake I shall record them in successive series of twenty-five, with such remarks as each series may suggest. I propose, however, in this paper chiefly to take up the question of the treatment of the pedicle by ligature. It will be unnecessary for me to enter on the historical part of the subject, as it is fully treated in some of the standard works on ovariectomy. I desire to place on record the results of my own experience and observation, and the conclusions at which I have arrived.

I performed my first ovariectomy on the 13th August, 1867, in what was then known as the London Surgical Home. The patient was a married woman, aged thirty-four, who had borne four children, the youngest of which was then nineteen months old. During the last pregnancy, she carried her ovarian tumour, which was first noticed just after the birth of her third child, as a small lump in the left groin. Her fourth child was well grown and delivered at full time; and, according to her statement, she was "nearly as large after as before" its birth. The tumour went on increasing until, about seven months later, it became necessary to do something for her relief. She was tapped on July 14th, 1866, in one of the general hospitals, when eighteen pints of fluid were removed. In all she was tapped five times, at decreasing intervals, to the extent respectively of six pints, eighteen pints, eighteen pints, and one unknown quantity. On the last occasion, which was just fifteen days before her admission into the Home (viz., on August 2nd, 1867), only a very small quantity was obtained. She was very much emaciated; the abdomen was greatly distended, until the skin shone with the tension, the circumference at the umbilicus measuring forty-seven inches. There was great dyspnoea, and she had a troublesome cough with chronic bronchitic expectoration. There was, moreover, a loud double cardiac murmur, most marked at the base, indicating mitral and aortic insufficiency, and the heart's action was irregular and tumultuous. This condition of the heart was the result of an attack of rheumatic fever some years previously. The tumour was multilocular,

with one cyst of considerable size. After consultation with the late Dr. Tanner, I determined to remove as much of the fluid contents as possible, in order to relieve the distressing dyspnoea. On the 7th, I succeeded in getting away ten pints, in spite of repeated blocking of the cannula, but had to leave a considerable quantity. The reduction in circumference effected was only seven inches, but the relief was marked. The state of the case was afterwards plainly put before her, and she was told that while, on the one hand, death was not far distant without operation, on the other, the probabilities of a successful result were very small. However, she elected to take the benefit of the doubt. I operated on her on the 13th, encountering firm and extensive parietal, omental, and pelvic adhesions, and I secured the pedicle (left side) by a single hempen ligature, of which the ends were cut off short. The operation was rather a long one from the extent and nature of the adhesions, many bleeding points requiring ligature; but she bore it well and made an excellent recovery, leaving the Home on September 27th.

Of course, recovery under such desperate circumstances was very gratifying, and afforded great encouragement to a young operator.

Here I should have dismissed the case but for a special feature which is worthy of notice, viz., the proof which it affords us of the safety of chloroform in some forms of cardiac disease. In these later days, when it is too much the fashion to decry this anæsthetic, and when a gentleman of high reputation has had the courage to affirm that, in presence of the superior safety of ether, it would be *criminal* to employ this agent, it will not be amiss to bring the facts clearly into view. In this case, the anæsthesia was entrusted to the care of Dr. Sansom, and, I hardly need add, it was conducted with his well-known skill and intelligence. It will be remembered that the cardiac action was irregular and tumultuous, and it may surprise some to know that under the influence of the chloroform it was as steady and equable as that of a normal organ, and the breathing was all that could be desired. I was not unprepared for this; for I had witnessed the same result while acting as Resident Surgeon in the Royal Maternity Charity of Edinburgh. At that time it was the rule to give chloroform in every case of labour, and very careful notes were taken of the action of the chloroform on the labour, on the dilatation of the cervix, and other matters. Of course, the pulse was an important point. In one case, it was not till next day that I discovered that the patient was the subject of cardiac valvular disease producing irregular action. The chloroform had removed this during the labour.

If there be one thing which has taken possession of the public mind—the English public especially—more than another, with reference to the administration of chloroform, it is the association of death following its use with heart-disease. And the first question asked by anyone contemplating the inhalation of chloroform is: May I take chloroform?

meaning thereby, Is my heart sound? And it is a well-known fact that it is sufficient to satisfy a coroner's jury, and lead them to return an exculpatory verdict, to be told that the heart was diseased. Hence the practice of examining this organ before the administration of chloroform, a practice which has not obviated a single death. In my time, as a student at Edinburgh, such a proceeding was unknown, at least to me. It is not within the scope of this paper to offer an explanation of the too frequent deaths from chloroform, but it is a noteworthy fact that, in a large majority of the cases in which a *post mortem* examination has been recorded, the left heart has been found firmly contracted. This is at least inconsistent with the theory of death from syncope or paralysis of the heart.

From this digression I return to the subject in hand. Nearly three years elapsed ere I had another opportunity of performing ovariectomy. In this case I had to remove both ovaries: one, the right, weighed ten pounds, and the other two pounds. The pedicle of the former I secured by clamp, that of the latter by ligature of hemp. The patient recovered well from the operation, nursed a child through a bad attack of typhoid fever about six weeks afterwards, but died at the end of twelve months from cancer of the stomach and other parts. The left side afforded me a specimen which I exhibited before the Obstetrical Society of London, on January 3rd, 1872.* In my remarks, on that occasion, I referred to the experiments of Spiegelberg and Waldeyer, which shewed that within the peritoneal cavity "the ligature of considerable portions of living tissue is not followed by sloughing of the distal portion, except under the destructive influence of peritonitis; but that, by the effusion of plastic lymph and its subsequent organisation, or, as they term it, by the rapid growth of cells, its vitality is maintained to a certain degree". I went on to state that the course of events would appear to be as follows. "When the ligature is applied, it forms a deep constriction, which, by the bulging of the tissues on each side, causes the living to come into contact with the strangulated tissues; plastic lymph is thrown out, glueing together the opposing surfaces; and its organisation establishes a vital connection between the two, so that sloughing is prevented. This result—the prevention of sloughing—is also favoured by the fact that by displacement (separation) of the tissues immediately embraced by the loop of the ligature, in course of time the loop ceases to exert any constricting force; and it is possible that the capillaries ultimately become pervious" to some extent. "No sooner has the organisation of the lymph taken place, and the capillaries have become pervious, than the absorbents begin their work, and remove not only such portions of the tissue as are unable to maintain their integrity, but the ligature itself yields to the forces at work. The experiments of Spiegelberg and Waldeyer show that this disintegrating action begins within a few weeks in the case of the ligature, and the specimen confirms this; while it further shows that the strangulated portion also

* See *Obstetrical Transactions*, vol. xiv, p. 2.

suffers at an early period. Their experiments do not appear to have been continued to ultimate results, but the specimen furnishes a complete account. It shows how the interruption of a through-current interfered with the nutrition of the proximal portion of the pedicle, and subsequently led to atrophy of the included portion of the Fallopian tube." Thus all trace of the pedicle had disappeared.

I have little to add to the above statement, except to say that further experience has confirmed the views therein expressed. This was the first specimen of the kind ever exhibited; but the lessons taught appear to have been overlooked until a recent period. The nearest approach to this case is that of Dr. Heywood Smith, recorded in the *Lancet* for March 9th, 1872, and quoted by Peaslee, in which death ensued three months and eight days after the operation. "The ligature could not be found, being *completely embedded* in the pedicle." I should have said *completely absorbed*.

More recently, Mr. Alban Doran, working partly on specimens with which I had furnished him, has still further elucidated this subject, confirming my statements, in an excellent paper in the *St. Bartholomew's Hospital Reports*.* To this and another paper of great merit in the same publication,† in continuation of the subject, I would refer such of my readers as are interested in it. I shall return to this subject anon.

Two and a half years elapsed between my second and third cases.

Then I met with a case of parovarian cyst (with the ovary closely attached), presenting a long and slender pedicle. This I treated with the actual cautery with excellent result; but it was of that kind to which any method would have been equally applicable. I was as yet undecided. I had been with the late Mr. Baker Brown on most of the occasions in which he had employed the cautery, but it did not impress me so favourably as it has since done Dr. Keith, for I had seen bleeding several times occur when the pedicle was set free.

Again I had to wait over two years for my fourth case. Then I used the clamp; and the patient did well.

My next case (November 13th, 1875), which was the first to prove fatal, was also treated with the clamp. The patient was a very fat woman, fifty-five years old; the tumour had grown very rapidly, and such was her distress, that she could not lie down, and I was obliged to tap her to obtain temporary relief, removing twenty-three pints of fluid. Unfortunately, symptoms of inflammatory action in the cyst set in, and five days afterwards her temperature reached 103 deg. at 3 P.M. In consultation with Mr. Spencer Wells, it was decided to give her the chance of an operation. Next morning, the temperature, just before operation, was 101.8 deg. The tumour, where in contact with the parietes, was adherent (by recent lymph). A small portion of omentum was also attached, and when separated its bleeding points were secured by silk ligature. A clamp was applied to the pedicle.

* *St. Bartholomew's Hospital Reports*, vol. xiii, p. 195, *et seq.*

† *Ibid.*, vol. xiv, p. 113, *et seq.*

The progress of the case was unsatisfactory from the beginning. On the third and fourth days bloody serum escaped between the stitches in the middle of the wound, but this discharge gave no relief, and the patient died with the usual symptoms of septicaemia ninety-six hours after operation. Looking back on this case, with the light of subsequent experience, I now see that I ought to have used the drainage-tube. Now, I should confidently anticipate a different result in such a case with the help of this most valuable instrument.

From the time that I had obtained the specimen above referred to, I had been thinking much and often over the ligature, and I had determined to put my views into practice as soon as a favourable opportunity should present itself. Soon after this the late Dr. Peaslee's book came out, and in it he strongly advocated the use of the ligature. Anyone who is interested in this subject should read his masterly marshalling of facts and arguments for and against the clamp and ligature. His facts and arguments strengthened my resolve, his conclusions confirming, as they did, my views. Still, the example and teaching of Mr. Spencer Wells, as it were, compelled, or perhaps I should say impelled, me to employ the clamp. But the sixth case was destined to be the last of my clamp cases. The pedicle was long and slender, and, in spite of all my care, a considerable portion became prolapsed. It gave much trouble, and I had at last to remove the prolapsed portion by means of the elastic ligature. This case confirmed me in the determination to give the ligature a fair trial: in fact, to use it in every case until I had satisfied myself of its relative value.

What was the line of reasoning which led to this resolution in the first instance?

The results of the practice of leaving in free communication with the external air the long ends of a ligature, whether of an ovarian pedicle or bleeding vessel, as a drain for the sloughing tissues, had confirmed the belief that, when a ligature was applied to any portion of tissue, death of that on the distal side must necessarily ensue. I saw that the fact was overlooked that the sloughing was the result of the practice. The saddle was put on the wrong horse.

Throughout this period of indecision, I could not but look back upon my first case treated by ligature, of which all I knew was that the ligature had somehow produced no bad symptoms; nor did a perusal of numerous cases similarly treated help me over the difficulty. The idea then prevalent was that it became encysted;* and in this I complacently took refuge. Even some of our systematic treatises at the present day serve to keep alive this now almost exploded doctrine. Thus, Erichsen† says of the ligature: "This practice was revived.....and has been adopted.....with the happiest results, the ligature either *becoming encapsuled*, or *being discharged after a time through a suppurating track*." Still more recently, Dr. Kidd of Dublin is represented

* This theory was probably confirmed by, if not derived from, the behaviour of metallic substances imbedded in the tissues.

† *Science and Art of Surgery*, 7th ed.

TABLE of Twenty-five Cases

The Capital letters, R., L., and D., in Treatment of Pedicle column,

No.	Age.	State.	Children.	Previous Medical Attendant.	Operation.		Adhesions.
					Date.	Place.	
1	34	M.	4	—	August 1867	London Surgical Home.	Parietal, omental, pelvic
2	41	M.	5 3*	Dr. Granville Bantock	June 1870	Private	Pelvic
3	47	S.	0	Ditto	January 1873	"	None
4	28	M.	1	Dr. Dunlop, Alderton, Suffolk	May 1875	Hospitl.	None
5	55	M.	0	— Ux-bridge	Novem. 1875	"	Parietal, omental
6	28	M.	2	Dr. Blake, Reigate	"	"	Parietal, oment., uterine, vesicula
7	18	S.	0	Dr. Woodward, King's Lynn	April 1876	"	Omental
8	60	S.	0	Dr. Osborne, Islington	June 1876	"	Parietal and pelvic; very firm and extensive
9	25	M.	0	Dr. Weber, German Hospital	July 1876	"	Omental, pelvic, and to Fallopian tube (opp.)
10	31	M.	3	Dr. Reed, Southsea	August 1876	"	Parietal, oment.; very extensive
11	48	M.	4	St. Bartholomew's Hospital	October 1876	"	Parietal, oment., pelvic, uterine; very extensive and firm
12	27	M.	4	Dr. Dunlop, Alderton	Novem. 1876	"	Universal parietal, omental, pelvic
13	28	M.	4	Mr. Randle, Southsea	Decem. 1876	"	Parietal, oment., pelvic, epiploic
14	28	S.	0	Mr. Paulin Martin, Abingdon	January 1877	"	None
15	27	S.	0	Dr. B. Forman, Stoke Newington	"	"	Universal
16	15	S.	0	Dr. Churchill, Aldershot Camp	"	"	Universal
17	49	S.	0	Dr. J. H. Browne, Gordon Square	Feb. 1877	"	Omental
18	19	S.	0	Dr. Mead, Whitby	March 1877	"	None
19	25	S.	0	Dr. Granville Bantock	"	"	None
20	31	S.	0	Mr. Collins, Chew-Magna	April 1877	"	Extensive parietal
21	37	M.	4	Mr. Kesteven, Holloway	May 1877	"	Parietal, oment., intestinal, and append. cæci
22	37	M.	1	Dr. Wynn Williams	June 1877	"	Omental & pelvic
23	43	M.	12	—	July 1877	"	Parietal (up to diaphragm), omental
24	61	M.	7	Dr. Smith, Holloway Road	October 1877	"	Parietal, omental, & epiploic
25	35	M.	3	King's College Hospital	"	"	None

* Denotes number of abortions.

† See paper by Mr. Doran (*St. Bartholomew's Hospital Reports*), case from which specimen figured on p. 202 was obtained.

of Completed Ovariectomy.

mean respectively Right, Left, and Double Ovariectomy.

<i>o</i> <i>N</i>	Treatment of Pedicle.	Weight of Tumour	Drain- age.	Result.	Cause of Death.	Remarks.
1	R. Lig. (hemp)	33lb	—	Reco- very	—	Cardiac valvular disease
2	D. Clamp ligature	12lb&2lb	—	"	—	Died of cancer of stomach, etc., one year afterwards
3	R. Actual cautery	9¼lb	—	"	—	Parovarian cyst; ovary closely attached
4	R. Clamp	20lb	—	"	—	
5	R. Clamp	10¼lb	—	Death	Septic- æmia	Inflammation of cyst after tapping of twenty- three pints; recent adhesions
6	R. Clamp	23¼lb	—	Recov.	—	Prolapse of pedicle. A baby, April 1879
7	L. Lig. (hemp)	30lb	—	"	—	Malignant disease of peritoneum afterwards, and of parovarian cyst on opposite side†
8	D. Ligs. (3 & 2)	16¼lb & 1½ oz.	—	"	—	Peritoneum severely injured in trying to find cyst-wall
9	R. Liga- ture	16lb	Glass tube	"	—	Rupture of cyst, with colloid contents, a few hours before operation‡
10	D. Liga- tures	4½lb 150 gr.	—	Death	Ob- structn.	Obstruction of colon at commencement of sigmoid flexure; no peritonitis
11	D. Liga- tures	10lb	Glass tube	Recov.	—	Operation lasted two hours; several liga- tures on uterus, continuous and interrupted‡
12	R. Liga- tures (2)	47lb	Glass tube.	"	—	"A fine boy" on Nov. 1st, 1877. Adhesions extended from pubes to diaphragm, and from flank to flank
13	R. Liga- tures (2)	14½lb	—	"	—	Filamentous adhesions of retroverted uterus
14	R. Liga- tures (2)	5½lb	—	"	—	
15	R. Liga- ture	11lb	Glass tube	"	—	Rupture of (colloid) cyst 3 weeks before oper- ation; a true forlorn hope;‡ married 1878
16	L. Liga- ture	5¼lb	Do.	"	—	Inflamed dermoid cyst‡
17	R. Liga- tures (4)	6½lb	—	Death	Septic, 9 days	Patient in very delicate health; a small quan- tity of effused blood had decomposed slowly
18	L. Liga- tures (2)	7¼lb	—	Recov.	—	
19	L. Liga- tures (3)	10¾lb	—	Death	Septic- æmia	Secondary hæmorrhage from retraction of outer edge of stump
20	R. Liga- tures (5)	25¼lb	—	Recov.	—	Died of cancer three months afterwards
21	R. Liga- tures (3)	9¼lb	—	"	—	Twins, boy and girl, April 2nd. Very good labour
22	R. Liga- tures (4)	17lb	—	Death	Periton- itis	Wound burst open by cough after removal of sutures
23	R. Liga- tures (2)	11lb	Glass tube	"	Abscess behind liver	Suppurating cyst; liver became adherent to raw parietes, shutting in a small quantity of bloody serum; drainage of pelvis perfect
24	L. Liga- ture (3)§	8½lb	—	"	Ob- structn.	Kinking of colon at junction of transverse and descending portions. No peritonitis
25	R. Liga- tures (3)	13½lb	—	Recov.	—	A thick fleshy pedicle nearly four inches broad and barely half an inch long

† Case recorded in my paper "On Drainage in Ovariectomy".

§ This was the first case in which I employed the fine ligature to outer edge.

as adhering to this view, for at a meeting of the Surgical Society of Dublin, viz., on January 17th last, he used these words: "Probably it (the ligature) *becomes completely encysted*."* My observations on this subject had as yet fallen on barren ground. Truth spreads but slowly, and even now I am often asked the question, What becomes of the ligature? And if there be many of them, the greater is the expression of wonderment on the face of the questioner.

Few of the lessons taught by ovariectomy had as yet been learned. Strange it now seems that the frequency with which ligatures were applied to bleeding points within the peritoneum, without causing the death of the patient, had not been properly interpreted. The experiments of Spiegelberg and Waldeyer first cleared away part of the mist by showing that sloughing did not take place; but they had not got farther than this, for we find them recording the results of their experiments as follows.† They found the ligatures either "(1) closely *encapsuled* by newly formed cellular tissue; or (2) free in the peritoneal cavity, having slipped off from the tied parts; or (3) free as if swimming in a small cystic cavity of the stump". Their observations were not carried over a sufficient length of time. It was not till my specimen was obtained that the riddle of the disappearance of ligatures was completely solved. The correctness of this solution has been recently confirmed by Mr. Doran, after independent examination of a specimen taken from a patient who died five months after operation. He could find in it no trace of the ligature which was of hemp.

Though I deliberately and of set purpose put the ligature on the second pedicle of my second case, with a faint hope that in some points it might prove a test case, yet I little suspected that it would yield such an abundant harvest of facts. I was at once able to contrast the different immediate results of the two methods in the most complete manner; to note the pain caused by the clamp, its entire absence on the side of the ligature, the trouble of dressing the sloughing stump of the one, and the absence of it on the other. And in the end I could not avoid asking myself the question, If one case can be so successful, why not all, other things being equal? and I could not escape from the conclusion that this was not a mere accident, but that the disappearance of the ligature was the normal issue.

Then there could be no doubt that the period of convalescence would be considerably shortened by the adoption of the ligature, though this was a matter of secondary importance.

Another argument was, that by the adoption of the ligature the necessary *armamentarium* was diminished. I thought it at least desirable that we should find a method applicable to every case of ovariectomy. In this, both the clamp and the cautery were admittedly deficient.

This latter fact furnished a still more important and weighty argument

* *Medical Press and Circular*, February 12th, 1879, p. 124.

† As quoted by Mr. Spencer Wells, *Diseases of the Ovaries*, p. 363.

in favour of the ligature, for it is true that hitherto, *i.e.*, since the introduction of these two methods, the ligature had been resorted to, of necessity, when the pedicle was too short for the application of the clamp, and even under these untoward circumstances had yielded excellent results. What more could be desired by the advocates of the ligature? Yet it was confidently pointed out, by the other side, that the clamp showed better results than the ligature. Could anything else have been expected? The data were not at hand for instituting such a comparison, nor are they likely to be. This is a misapplication of statistics; for it is evident that the cases in which the clamp can be most easily applied (and in this I include the cautery, for a clamp is a necessity of the method) are those best adapted for the ligature. There was no escape from the fact that, if the ligature was good enough for a short pedicle, to which a clamp could not be applied, it was also good enough for a long one.

A sufficient amount of experience has now confirmed all these arguments; but others remain.

It has been urged as an objection to the clamp, that menstrual fluid often escapes, at each recurring period, from the cicatrix at the site of the stump. Mr. Wells admits that this occurs in as many as "nearly a third" of the cases thus treated. I have recently seen a case in which it has now gone on for many years. "But", argues the same author, "the fact that it does escape sometimes is, to my mind, an argument in favour of the clamp; for, if menstrual fluid can escape through the partially closed Fallopian tube fixed in the cicatrised wound, so it may escape if the tube be left within the peritoneal cavity, and the result may be a fatal hæmatocele. I have known this to occur in cases where the ligature was used and cut off short." It does not come out clearly whether a fatal result has been observed from this cause, or whether it was only conjectured that a hæmatocele had occurred. I have now used the ligature in fifty operations, of which the subjects are alive as I write, and in not one of these has anything of the kind happened. Nor, according to my views, is it difficult to understand this. A little explanation will make it clear. When the ligature is used, there is no sloughing off of the distal portion. This portion is deprived of all blood-supply through its large vessels, and is merely kept alive through its capillary circulation, for the most part through the vessels formed in the effused plastic lymph, as already described. Consequently, this distal portion acts as a plug, which forms an effectual barrier. But more important still is the change which takes place in the proximal portion. Examination of specimens shows that, as I have already stated, the remainder of the pedicle, deprived of its through-current by the blocking of the large vessels as far back as the nearest collateral circulation, gradually decreases in substance until it forms a mere cord or band of fibrous tissue of small degree of vascularity. It is, therefore, impossible that it can undergo the physiological congestion characteristic of the menstrual state, and which has to be seen to be appreciated.

On the other hand, when the clamp is used, the distal portion sloughs off very rapidly, the proximal portion becomes adherent to the parietal peritoneum in its whole circumference, whence it rapidly draws a large supply of blood, the through-current is established so rapidly that time is not given for the large vessels to become permanently occluded, and the nutrition of this portion undergoes very little diminution. Hence it is as liable to the physiological congestion as before. Finally, the surface of the stump becomes blended with the tissues of the parietes, and thus its nutrition is in all points secured. Now, if the pedicle be long, there will of course be no drag, and the end of the stump will be, *pro tanto*, the nearer the surface. There will then be the less obstacle to the escape of blood, by the rupture of the minute vessels of the membrane, which is usually present and covering it in. If, on the other hand, the pedicle be short, the circulation in the first instance will be diminished by the stretching of the tissues, and consequent narrowing and compression of the vessels, the strain on the pedicle will draw down the end of the stump until, by the closure of the tissues over it, a firm cicatricial mass is presented, which acts as an efficient plug, as does the distal portion of the ligatured stump.

The facts which have come under my notice lead me to adopt this explanation of the frequent occurrence of this inconvenience in cases treated by the clamp.

One of my cases bore a child within twelve months, and another has been recently delivered of twins—boy and girl (within eighteen months). Nor have any symptoms arisen, in the course of convalescence or afterwards, referable to the pedicle, except in one case, which is shortly as follows. A small fibroid of the right ovary, sessile, was treated with six ligatures; the chain was not complete, through breaking of one of two of the ligatures in the process of tying. The tumour opened up the broad ligament, and lifted the peritoneum until it partly occupied the iliac fossa, so that, when the incision was completed, there was not more than an inch or inch and a half between the cut edge of the peritoneum and the base of the tumour. In applying the ligatures next the bottom of the wound, the cut edge of the peritoneum was drawn in, so that, when I came to close the wound, I could not secure it. I accordingly caught up the end of the stump with the two bottom sutures, using silkworm gut, so as to cut off the raw surface from the peritoneal cavity. There was consequently a heavy drag on these two stitches. They were left in for over a fortnight, by which time there was a little irritation in the track of each; and when the patient left the hospital, these tracks had not closed. Some months afterwards, a ligature was seen and drawn out, and the opening forthwith closed up. I saw this patient a short time ago, when all was sound and well.

It has been stated that the ligature is an unscientific proceeding; but I fail to see the grounds of such an objection, for, if practice affirm that the ligature be suitable for bleeding vessels, or for encircling an artery for the cure of an aneurism, science must be at fault, and facts must take the place of it until the two can be reconciled.

Until the introduction by Professor Lister of the antiseptic method I had always used a fine hempen ligature, of which I had obtained a beautiful sample, many years ago, from Coxeter. I was induced to adhere to this from a consideration of the fact that a hempen cord shortens on becoming wet, and that thus the tightness of the loop might be ensured. Now that the ligatures are previously steeped in carbolic water, this argument ceases to hold. I had always been under the impression that whipcord was too stout, and that by its use a willing horse was being overburdened. May not this be held as, in part, an explanation of the untoward results sometimes witnessed in former days?

In thinking over the ligature, I had worked out mentally a mode of application, viz., the chain link, when a single loop was insufficient, owing to the thickness of the pedicle. In this I found myself at one with the late Dr. Peaslee, to whose work I refer for an illustration.*

In my eighth case, I encountered a very broad and short pedicle, which I had to divide into three portions. The process was in this manner. I first passed a needle armed with two threads through the pedicle, at the point between its outer (broad ligament) and middle thirds. Then I re-threaded the needle with one of these, and a third ligature which I carried through the pedicle at such a distance as to divide the whole into three nearly portions. Each thread was now tied in turn, and care was taken to complete the chain. The object of this linking of the loops was to prevent the pulling open of the holes made by the needle; for it will at once be seen that, if the needle should happen to pierce a vessel in passing through the pedicle (a very difficult thing to avoid when the pedicle is very thick), immediate and troublesome bleeding, or slow oozing, more serious in its after-effects, might ensue. This patient, aged 61, made a most excellent recovery, and is in admirable health to this day. Although the parietal adhesions were very extensive, and so intimate that a considerable extent of peritoneum was separated from its subperitoneal tissue, and otherwise injured on both sides, in the endeavour to find the cyst-wall proper, and there were extensive adhesions at the brim of the pelvis on one side, and the other ovary had to be removed, the patient's temperature never exceeded 100.4 deg., and she was quite convalescent by the fifth day.

There is one modification in the application of the ligature which I have not seen anywhere mentioned, and which I was, I believe, the first to introduce. It is that of first securing the outer or broad ligament edge of the pedicle by a fine ligature (No. 1 or 2 Chinese silk) separately. Painful experience in my nineteenth case, in which hæmorrhage occurred from retraction of this portion of the pedicle, taught me that it was necessary, in the case of very short pedicles, to use some special means for preventing this accident; I accordingly hit upon the plan of first of all passing a very fine ligature through the pedicle, about a quarter or three-eighths of an inch from its outer edge, where the strain was greatest. This I tied independently. The stronger ligature occu-

* *Ovarian Tumours*, p. 466.

pied the groove thus formed. The argument is this : the broad ligament at the point in question is composed of two layers of peritoneum, with intermediate vessels, cellular tissue, etc. When the pedicle is put on the stretch it is difficult to tie the loop sufficiently tight, owing to the resiliency of the structures, from the abundance of muscular and elastic tissue. If a considerable amount of this tissue be included in the loop, a great strain is put upon the part by the puckering of the pedicle when the process of ligation is completed, and the edge has a tendency to retract like a piece of India-rubber. With a long pedicle, it is unnecessary. Since adopting this modification, I have not met with this accident.

The plan has been tried of doubling back the free and raw surface of the stump by means of a suture, but it is troublesome to accomplish, is not unattended with risk, and is rarely effectual. I prefer the method of catching up the pedicle with the lowest abdominal suture. The object is to keep the stump out of the way of becoming adherent to a coil of intestine, and so, perhaps, producing obstruction. When the pedicle is short, it remains upright and is out of harm's way. With silkworm-gut this proceeding is perfectly safe, as the stitches may be left in for a week, or even a fortnight. With silk I should have less confidence in the result. The silkworm-gut presents a perfectly smooth surface on which fluids have no effect, while the silk offers a ready lodgment in the grooves and interstices for the collection of serum, etc., which from certain changes which are inevitable, sooner or later produce irritation and suppuration.

While on this subject it may be permitted again to call attention to the superiority of the silkworm-gut suture over any hitherto employed. It presents a smooth surface like the metallic suture, and in the absence of strain produces no irritation ; it is more pliable, and therefore easier to take out. On a recent occasion, I cut both ends of the loop at the knot, leaving the loop in its place. Nothing more has been heard of it, for the openings forthwith closed up. Had I used the silkworm-gut sutures in Case 22, I need not have been in such a hurry to remove them, and I should probably have obviated the accident which subsequently proved fatal. They could have been left in until the wound was able to bear the strain to which it was subjected by the cough.

I am often asked the question : What is silkworm-gut ? It is the contents of the silk-glands of the silkworm. "The mode of producing this material is to place the worms, when full grown and just ready to spin, into a vessel containing vinegar, which has the effect of making their bodies soft, and of converting the fluid in the silk-glands into a pulpy mass. After remaining in this bath for a couple of hours, the worms are taken out, the skins removed, and the silk-glands extracted. By rolling these glands between the finger and thumb, and stretching them to the necessary length and tenuity, and fixing them till dry, the 'gut' is completed." (*The Colonies*, 1878).

Some points are worth re-stating.

1. The pedicle should, if possible, be free from all strain while the knot is being formed.

2. The ligature should not be too stout. Usually No. 3 Chinese silk is sufficiently strong, but occasionally No. 4 is required. *Whipcord should never be used.*

3. The number of divisions should correspond with the breadth and thickness of the pedicle.

4. The distal portion of the pedicle should not be less than half an inch long; three-quarters is a better length.

I may add that special care should be taken that the knot is a true sailor's knot, and not a "dummy", and that the ends are not left too long, say one-eighth of an inch.

When the pedicle is very œdematous, as I recently observed in one of my cases, final inspection of the stump will probably show that, by loss of fluid, the ligatures are not safe. It will then be necessary to apply them afresh; or, if more convenient, to encircle the whole by a separate ligature. It has been suggested that care should be taken to avoid tying the ligature too tight. I think there is more danger of not tying it sufficiently tight. All *post mortem* examinations with which I am acquainted support this view.

A golden rule is the following: always examine the pedicle before closing the wound.

With these precautions, I hold that the ligature is a perfectly safe and efficient agent, and second to none in all respects.

A few words with reference to the table.

1. As to the causes of death. In 5 and 17, I believe the drainage-tube might have obviated the fatal result. In 10 and 24, death arose from what might be called an accident that could not be provided against, and that had nothing to do with the mode of performing the operation, but that might have been rectified by opening up the abdomen when signs of obstruction had set in. In 23, the drainage had done its work most efficiently in the pelvis; but, as stated in the table, a small quantity, less than an ounce, of bloody serum had got shut in behind the liver, where it underwent septic change after the patient's temperature had come to the normal standard. A small portion of the inflamed cyst had been left adhering to the parietes opposed to the liver, and had been overlooked. This was no doubt the origin of the mischief.

2. As to the frequency of adhesions, the table shows a much too large proportion. In only six were there no adhesions. In Mr. Spencer Wells's 800 cases, the proportion is 313 with adhesions to 487 without. It is undoubtedly a fact that in hospital practice we meet with this complication much too frequently. Mr. Wells's 800 show only a slight excess in mixed practice. My table shows a proportion of nearly four to one. The same proportion still holds good. This is partly due to the unwillingness of patients, in a few cases, to submit to such a serious operation until death almost stares them in the face, but chiefly to a rule that has been laid down for the guidance of practitioners, that we should delay operation until the patient is able to accomplish only about a mile

of continuous walking. This is at least unfortunate, and I am convinced that early operation would be a safer rule. The existence of adhesions greatly diminishes the chance of a favourable result. Mr. Wells, summing up the results of 500 cases, with the view of determining this point, says: "That the mortality of cases where there are considerable adhesions is about 13 per cent. greater than in cases where there are no, or only trifling, adhesions." But the existence of adhesions has never deterred me but once from operating, and in that case the result of an operation subsequently performed fully justified my refusal. On the other hand, I have repeatedly operated on cases that have been elsewhere rejected.

Of twenty cases without adhesions, I have lost only three, or 15 per cent. Of 313 cases, Mr. Spencer Wells lost sixty-one, or about 20 per cent. One of my cases, No. 19, died from retraction of the outer edge of the pedicle; another had, at the time of the operation, consolidation of part of one of her lungs from an attack of pneumonia some weeks previously, and died of acute bronchitis; and the third was a case of sessile dermoid. There were nine ligatures on the pedicle. Two ligatures broke on tying and had to be re-applied, and a large vessel was wounded by the transfixing needle. From one of the punctures about an ounce of blood had escaped into the peritoneal cavity, and a small hæmatocele formed behind the line of ligatures between the layers of the broad ligament, in which suppuration took place.

Of my last thirty-three operations I have lost only three. Of these thirty-three cases, in three the tumour was not removable, and they were drained, and two amounted only to an exploratory incision. The rest were complete-ovariotomies. Of the three who died, one had rupture of intestine from gastro-enteric catarrh, a portion of intestine having been adherent to the tumour; one was a hopeless case of soft sarcoma, and the patient died within twenty-four hours after the operation; and the third was poisoned by the carbolic acid. This last is a subject for separate consideration.

12, Granville Place, Portman Square, W.

May 17th, 1879.
