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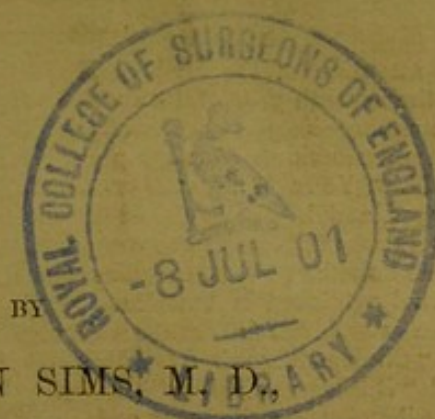
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of the Author
ON
5.

OVARIOTOMY.



BY

J. MARION SIMS, M. D.,

ONE OF THE SURGEONS TO THE NEW YORK STATE WOMAN'S HOSPITAL, ETC., ETC.

[REPRINTED FROM THE N. Y. MEDICAL JOURNAL, DECEMBER, 1872,
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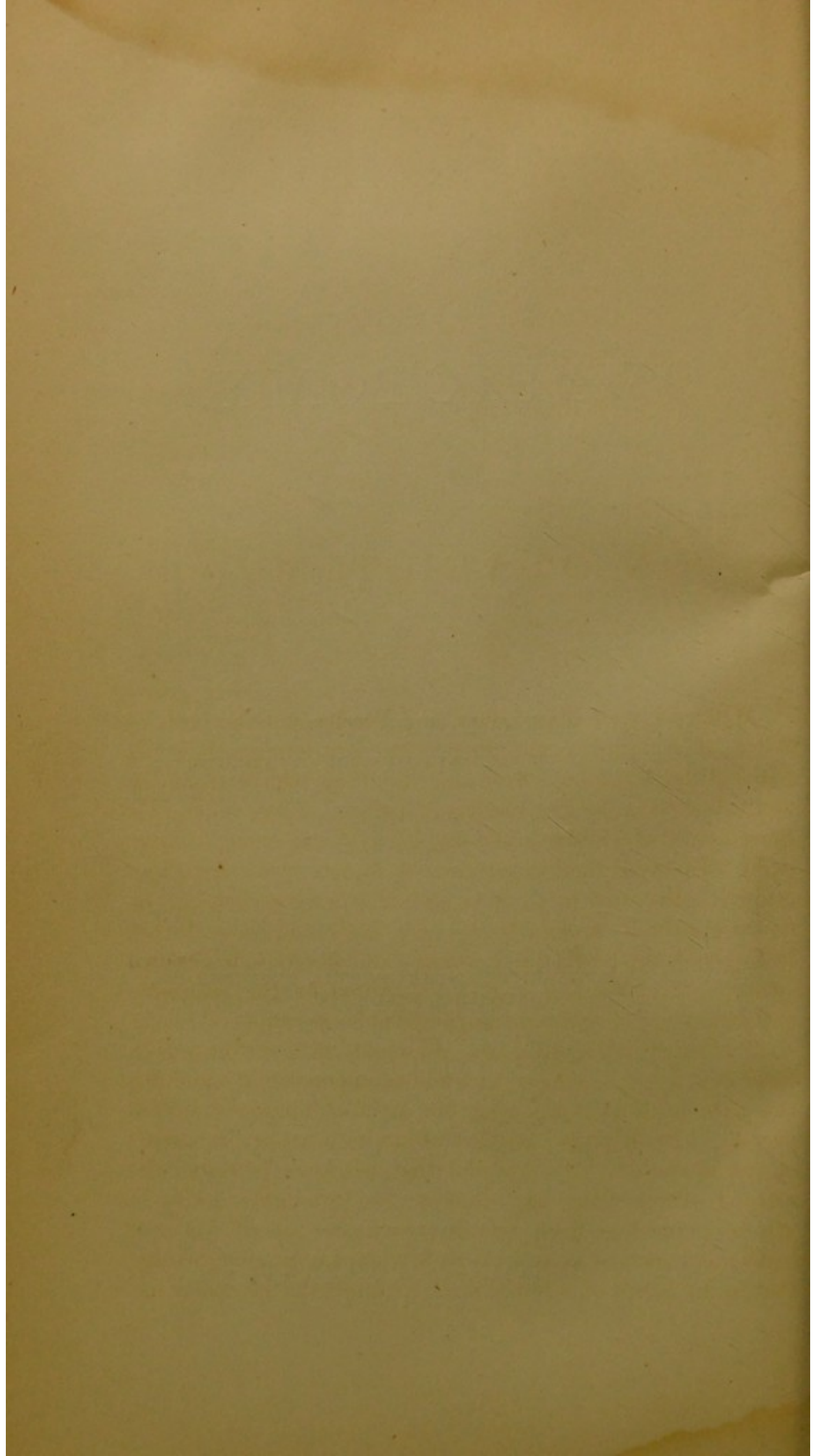
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ON OVARIOTOMY.

WHEN Clay, of Manchester, and Peaslee and the brothers Atlee, of America, began to perform ovariectomy, they met with nothing but rebuke from their brethren, who stood aghast, and called them by the hardest of names. I was among the great herd that could scarcely find terms strong enough to condemn what were then characterized as acts of butchery and murder. But, thanks to their unfaltering perseverance, seconded eventually so ably by Spencer Wells and Baker Brown in England, and by Kimball, Dunlap, and Bradford in our own country, ovariectomy is to-day recognized by the profession everywhere as a legitimate and justifiable operation.

Twenty years ago I knew personally no one who was in favor of it; and now I can find no one opposed to it; and this complete revolution has been the work of but eight or ten years. It has become our habit of late to boast of the success of the operation. We pretend that we have perfected the method of operating, and that we are gradually curing a greater percentage from year to year. For myself I do not believe our method is perfect; and, while I must acknowledge that in the hands of a few skilled operators the mortality has

been slightly reduced, I am frank to say that even with their results I am not at all satisfied. I do not believe that we are very far in advance of the earlier operators; for if the whole truth were known, if every case operated upon saw the light of day, I doubt if we have made any great progress since the time of McDowell, the father of Ovariectomy.

Dr. Thomas¹ gives us a table of operations performed by twenty-five surgeons, beginning with Spencer Wells's 400 cases. These twenty-five have performed 1,638 operations, and lost 504 cases, giving a mortality of about 1 in $3\frac{1}{4}$.

I must repeat that with this I am not satisfied, and that we have made little or no progress in the last ten years. One great principle has been pretty generally adopted, that of securing the pedicle externally. Duffin is, I believe, the author of it; Erichsen and Hutchinson were among the first to adopt it; but Spencer Wells and Baker Brown, and afterward Keith and Kœberlé and Atlee and Kimball, have made it almost the universal practice.

It renders the operation easier and quicker, but its advocates have no better success than Clay and Tyler Smith, and Peaslee and others, who follow a different method. The clamp may have its advantages; but it also has its disadvantages, which more than counterbalance the former. It is not of universal applicability, for in some cases the pedicle is too short and thick to allow of its use at all. In others, it is obliged to be removed prematurely, on account of traction and consequent suffering. In some it has slipped a little and allowed bleeding. In a few it has severed the pedicle too soon and allowed it to drop into the peritoneal cavity before adhesions were formed to fix it to the abdominal walls. In other instances, its traction and pressure have compelled its removal, and the short, stumpy pedicle has dropped in, with sloughy shreds attached, to poison the peritoneal membrane. Its traction produces often great suffering, necessitating the use of large and repeated doses of opium; and it doubtless aggravates, by reflex action, the tendency to nausea and vomiting; and who can tell what influence it may have exerted in such cases as

¹ "Diseases of Women," third edition, p. 719.

have died of tetanus? Besides all this, the pedicle attached to the abdominal wall, and other bands of connection between this and the omentum, have been the means of intestinal strangulation and of death.

A good result, that has not unfrequently followed its use, is that, in the act of vomiting, poisonous fluids have been accidentally forced out of the peritoneal cavity beside the pedicle, and thus lives have been unwittingly saved that otherwise would have swollen the already too great mortality.

The management of the pedicle is still a mooted point, which must ere long be settled. I think the clamp plan has seen its best days. When the question is positively determined, I have scarcely a doubt that it will be against the Duffin principle of drawing the pedicle externally. Clay adopts the principle, laid down by the great McDowell, of ligating the pedicle with a strong twine and leaving it dependent from the lower angle of the wound. Thus it forms a canal or outlet for drainage which has often saved life. Tyler Smith and Peaslee have been in the habit of tying the pedicle with a strong ligature, of cutting it off short, and dropping it into the peritoneal cavity, and of wholly closing up the external wound; and their success is quite equal to that of the eclampists—for they have lost 1 in $3\frac{7}{8}$, while the others taken collectively have lost 1 in $3\frac{7}{8}$, a difference showing that it makes no difference whether the pedicle is managed in one way or another. Of course, I know that such statistics are valueless, and that all statistics on a small scale are utterly so. For instance, I have known Mr. Spencer Wells to lose seven cases in succession, which is no argument against the eclamp; and again, I have known him to perform more than twenty operations without a fatal case, which, offset by the others, is no argument in favor of it.

For twenty years I have advocated the plan of tying the pedicle with silver wire, which I felt sure would become sacculated, and therefore produce no harm; and for the last ten years this plan has been followed by Dr. Emmet and myself. When the pedicle was narrow, I transfixed it with a double wire, and tightly twisted a wire around each half of the pedi-

cle. When the pedicle was broad, I introduced the requisite number of separate wires and secured it in segments. In one case, in Paris, I used six separate wires. But sometimes the wires, when tightened, have torn the segments asunder and produced a little bleeding, thus necessitating an additional wire, at considerable loss of time. Dr. Emmet, seeing this difficulty, then hit upon the happy idea of securing the pedicle by a figure-of-8 loop of wire and drawing the whole so firmly that, when the wires were fastened (by twisting) and the pedicle cut off, the ends of the constricted arteries could often be seen projecting beyond the level of the cut stump. The wire, thus applied, effectually strangulates the blood-vessels and prevents all danger of bleeding. It burrows into the tissue, and soon becomes perfectly sacculated, where it always remains without danger or discomfort. In 1864 I assisted Mr. Nélaton and Sir Joseph Olliffe in an ovariectomy in Paris. I told Mr. Nélaton how I managed the pedicle, and he kindly asked me to apply the wire ligature for him. The pedicle was long and slender, and I passed a double wire ligature and twisted each one tightly around its respective half of the pedicle. This was cut off nearly an inch beyond the point of constriction, and I then drew the serous membrane over the stump of the pedicle, just as we would the skin over the end of an arm or leg amputated by the circular method, and I whipped this membrane over with a continuous very fine wire suture. By this method no cut surface was left in contact with the peritoneal membrane.¹ It was simply serous tissue against serous tissue. Of course, this prolonged the operation at least ten or twelve minutes. The patient rallied, but died of septicæmia in about forty hours. On *post-mortem* examination we found, what I expected, the pelvis filled with about a quart or more of reddish serous fluid, which was the septicæmic source. But fortunately the patient lived long enough for Nature to make her own disposition of the wires in the pedicle. We found the pedicle floating loosely in the sero-sanguinolent fluid, and no sign of either of the wires could be seen. The strong, constricting wire had cut through the serous membrane, and this had healed over it, and it was thus completely

¹ A procedure now proved to be unnecessary.

sacculated, hidden from view. The little fine wire suture, with which the end of the stump had been closed up, was also lost to view, and it was necessary to incise the tissue to find either this or the constricting wire. Nothing could possibly have been more satisfactory.

So far, Dr. Emmet and myself have every reason to be satisfied with our method of dealing with the pedicle. But I have no prejudices whatever on the subject, and I think the time may possibly come when clamps and ligatures, whether of twine, cat-gut, or wire, may give way to torsion of the arteries, or to their obliteration by the enucleation of the pedicle from the coats of the cyst.

It must be admitted that torsion of the arteries of the pedicle is an important improvement in the operation of ovariectomy, and for this we are indebted to Dr. G. D. Bebee,¹ of Chicago. Dr. Bebee divides the pedicle not at one full sweep of the scissors, but, severing a portion at a time, the vessels are seized and twisted as soon as divided. He had used torsion successfully in six cases, up to the time of his report. And why should we not twist the arteries of the pedicle? In Guy's Hospital, torsion is the rule in all amputations and excisions. They have not tied an artery there in the last four or five years. At Sedan, I twisted, for MacCormac, arteries in all sorts of operations, and never with any unhappy result.

In his three amputations at the hip-joint, I twisted the arteries as fearlessly and as confidently as I did those of the wrist or the ankle, and with the same impunity. When I was at Guy's Hospital in August, 1870, and saw them torsionizing arteries, even in a hip-joint amputation, I said to one of the surgeons, "Have you twisted the arteries of the pedicle in ovariectomy?" He replied, "No," and in a manner that implied more; and yet for three years he and his colleagues had been daily using torsion, to the entire exclusion of the ligature. How hard is it for us to overcome the surgical dread of the peritoneal cavity handed down to us from the old masters!

Dr. Miner's² method of enucleating the tumor from the

¹ *American Journal of Medical Science*, April, 1871, p. 353.

² *Medical Record*, March 1, 1872, p. 14, and *American Journal of Medical Science*, October, 1872, p. 391.

expansion of the pedicle seems to find favor with the profession, and very justly too. It is as follows: "The finger should be gently introduced under the central portion of the pedicle, and followed out along the fasciculi of vessels as they extend over the sides of the cyst. Nothing could be more easy of execution, or more readily accomplished." I have tried Dr. Miner's method, and have but little doubt that it will come into general use. Indeed, I look upon it as a most valuable improvement. Even the advocates of the clamp must adopt it, as it will make the shortest pedicle quite long enough for their use. We shall then have no more complaints that the patient died because the pedicle was so short that it could not be drawn out and secured by the clamp.

Dr. John L. Atlee, many years ago, used Chassaignac's *écraseur* successfully for severing the pedicle; and recently Dr. Nott's rectilinear *écraseur* has been used for the same purpose, and with perfect success. Mr. Baker Brown used the actual cautery in 1864 and 1865. But the profession did not adopt it. However, I hear, through Dr. Dawson, just returned from London, that Dr. Meadows has been lately very successful with it at the Soho Square Hospital for Women. The transition from the hot iron to the platinum wire heated by electricity is natural enough, and the electro-cautery has been called into requisition by Dr. Noeggerath and others. But something more must yet be done before we can claim to have made any very decided improvement in the operation of ovariectomy, or to have diminished to any notable extent the degree of mortality now attending it.

It seems that the whole power of the medical mind, ever since the days of McDowell, has been concentrated upon the pedicle, and that its resources have at length been exhausted. As the pedicle was the source of nourishment to the diseased mass, it was looked upon as the great enemy to be conquered. And when it was eventually drawn out of its natural stronghold, and placed in chains and manacles, an "*Io! triumph!*" was suddenly shouted out by the whole profession, and men everywhere rushed forth madly to ovariectomize women, sometimes those who unfortunately had only fibroids or spleens, or kidneys, or even phantom tumors, to be extirpated! It was

not so much the success of Spencer Wells and Baker Brown, that fired the profession, as it was the thought that the supposed great enemy to success (the pedicle) had been led captive. The fact is, we have been so elated with what we have deemed a great achievement, that we have forgotten or overlooked all other sources of danger. We have in our imaginations created a hideous bugbear of the poor pedicle, and we have rushed upon it in a most frantically Quixotic manner.

Indeed, it really seems as if we had gone mad on the management of the pedicle; and still the question is an open one.

In all candor I think we have done enough and more than enough for the pedicle, and it is high time to leave it for a while, and to turn our attention to some other quarter, if we are ever to reduce the mortality of this operation from what it has been and even is to-day. And now to the question:

I have not seen many ovariectomy *post-mortem* examinations, but the few that I have seen presented uniformly the same general pathological appearances.

I have recently been studying Mr. Spencer Wells's¹ first volume, giving an account of his first hundred and fifteen operations. This volume is in itself a mine of wealth on this important subject. I have patiently examined the records of his thirty-nine fatal cases, with their *post-mortem* appearances, and I find that my limited observation is fully sustained by his immense experience. Our earlier operators seemed to think that hæmorrhage and peritonitis were the chief sources of danger. But nowadays how rarely does a patient die of hæmorrhage, and very few die of peritonitis, properly speaking. If none died but of peritonitis, I am satisfied that the mortality would not amount to one in ten. I fear that the causes of death are too often based upon preconceived opinions or guessed at without *post mortems*. In looking over some reports of cases in the medical journals taken at random, I find such items as these: "She progressed favorably till the third day, when symptoms of secondary hæmorrhage and peritonitis appeared, and death occurred on the day following. No *post-mortem* examination was made."

¹ "Diseases of the Ovaries." By T. Spencer Wells, F. R. C. S., etc., etc. London, 1865.

Again: "On the second day after the operation, symptoms of peritonitis manifested themselves, and the patient died on the fifth day. No *post mortem*." And again: "She gradually sank, and died in thirty-six hours, with symptoms of peritonitis. Impossible to obtain a *post-mortem* examination."

Now, I have given these veritable extracts to show that our statistics are as yet of no great value in giving us the real causes of death after ovariectomy.

Dr. John Clay,¹ in his analysis of the causes of death in 150 cases gives the following:

Shock or collapse.....	25	} =150.
Hæmorrhage.....	24	
Peritonitis.....	64	
Not stated.....	18	
Other causes.....	19	

Dr. Peaslee² gives the following table of 51 cases, collected by himself:

Peritonitis.....	12	Diarrhœa.....	1
Septicæmia.....	9	Erysipelas.....	1
Shock and collapse.....	7	Tetanus.....	1
Exhaustion.....	7	Ulcer through the bladder.....	1
Shock and septicæmia....	1	Unknown.....	9
Hæmorrhage.....	1		
Strangulation of intestine in wound.....	1		

In Mr. Spencer Wells's³ table of 500 cases of completed ovariectomy, we find recorded 128 deaths, classified as follows:

Peritonitis.....	44	Cancer.....	1
Exhaustion.....	22	Peritonitis and heart-clot.	1
Septicæmia.....	21	Chronic peritonitis from an accident.....	1
Collapse.....	7	Shock.....	1
Intestinal obstruction....	4	Pneumonic congestion and embolism.....	1
Heart-clot.....	3	Coma from heart-disease.	1
Septic peritonitis.....	3	Hyperpyrexia.....	1
Tetanus.....	2	Pneumonic congestion....	1
Diffuse peritonitis.....	2	Pleuritic effusion.....	1
Pyæmic fever.....	2	Hyperpyrexia and pericarditis.....	1
Pulmonary embolism....	2	Pneumonia.....	1
Cardiac embolism.....	2		
Pyæmic pleurisy.....	1		
Crural phlebitis and septicæmia.....	1		
Chronic peritonitis.....	1	Total.....	128

¹ Thomas, "Diseases of Women," third edition, p. 716.

² "Ovarian Tumors," p. 348.

³ "Diseases of the Ovaries, their Diagnosis and Treatment." By T. Spencer Wells, etc. London: J. & A. Churchill. New York: D. Appleton & Co., 1872.

Dr. Peaslee's and Mr. Wells's tables are of more recent date than Dr. Clay's, and we find them giving septicæmia as a cause of death, while it is not mentioned by Dr. Clay.

Septicæmia is, I think, the great outlet of life in ovariectomy. What the sources of this septicæmia, and what the treatment, prophylactic and curative, is the object of this paper.

I have seen seven *post-mortem* examinations, and in each one there was found in the peritoneal cavity a grayish, turbid serum or a sero-sanguinolent fluid, varying in quantity from four ounces to as many pints, and yet there was no general peritonitis.

Of course, this sero-sanguinolent fluid is more apt to be found where there are extensive adhesions; but it is often the mode or cause of death where there are no adhesions at all. It is known and generally acknowledged that adhesions between the tumor and the abdominal parietes, or between it and the viscera, always add to the risk of the operation; and yet we see patients sometimes recovering from serious operations where there were extensive adhesions, and that with very little constitutional disturbance.

If the adhesions are broken up, leaving a dry surface, the danger is less; but if the adhering surfaces are disposed to ooze a little blood—if there should be a sort of bloody sweating, as it were—then the danger is greater.

Now, to prove that my views of pathology here are correct, I propose to take up Mr. Spencer Wells's thirty-nine fatal cases, and to show that in the main and in detail they fully sustain me.

I have selected Mr. Wells, because there is no higher recognized authority among us, and because his cases are reported minutely and without any reference to any theoretical views whatever. Indeed, he calls many of his cases peritonitis which I shall try to prove by himself were not peritonitis at all.

I shall take his cases *seriatim*, from one to thirty-nine, designating each by its proper number in Roman letters as it stands in his book. I shall affix the date of operation in each case, the time of death after operation, the *post-obit* appearances as far as they bear upon the question at issue; and, when

any little item in the history or progress of the case may tend to throw light on the subject, I shall appropriate it—and always in the identical language of Mr. Wells's model book. I shall give his opinion upon the cause or causes of death, whenever he has expressed it, and I shall take the liberty of submitting my own opinion, based upon the symptoms and pathological appearances in each case. I shall take the further liberty of italicizing Mr. Wells's language wherever it suits the purpose of elucidating my own views. I have done this that the reader may, without loss of time, run his eye, in a few minutes, over the important points in the whole thirty-nine cases.

No. 1 (CASE IV.).—Operation, January, 1859. Death in thirty-two hours. *Post mortem* by Dr. Aitkin. "The lateral and posterior parts of the abdominal cavity were free from lymph exudation, and the peritonæum appeared natural. *A considerable amount of free liquid was present in the cavity generally* (as over the anterior margin of the liver, and surface of the stomach and transverse colon); it was pent up within cavities formed by recent exudation. *The fluid exudation was of an acrimonious nature*, if one may judge of its effects upon the hands. *The fluid had a pungent, irritant effect upon the thin skin beneath the edges of the nails and surrounding thin matrices.*

No. 2 (CASE VI.).—Operation, January, 1859. Death in forty hours. First day after operation. "*The bed was saturated with ascitic fluid, which continued to dribble beside the clamp.*" *Post mortem* three hours after death. "*There were from two to three pints of clear serum in the peritoneal cavity, no blood nor clots. There was evidence of peritonitis to a considerable extent in the parietal portion of the membrane. The peritonitis did not appear to have extended to the more deeply situated folds of the intestine. About a pint of serous fluid had gravitated into the pelvic cavity. In the right pleural cavity there were upward of six pints of clear serum.*"

No. 3 (CASE X.).—Operation, October, 1859. Death fourth day. On the third day "*a good deal of sanious discharge came away from the lower part of the wound.*" *Post mortem* by Dr. Aitkin and Mr. Huxtable. The folds of intestine

near the wound were united together by lymph effused at the spots where the folds came into contact with each other. There was no recent lymph, and *only about a pint of serum in the most dependent parts of the peritoneal cavity.*

No. 4 (CASE XII.).—This case died of tetanus on the tenth day after the operation.

No. 5 (CASE XIV.).—Operation, December, 1859. Died on twenty-three hours. "The abdomen was examined on the following day. *There were between one and two pints of bloody serum in the peritoneal cavity, but not a morsel of clot.* There were signs of peritonitis about the broad ligament on the left side, and on the parietes near the wound, and on two or three coils of intestine that lay near it; *but there were no marks of general peritonitis.* The ligatures did not appear to have set up peritonitis in their track."

No. 6 (CASE XVI.).—Operation, February, 1860. Death on thirty hours. No *post-mortem* examination was allowed. But Mr. Wells says: "I am disposed to attribute the death in this case partly to imperfect recovery from the shock of the operation, and the consequent exhaustion, and partly to the absorption of some morbid product of the decomposing cyst."

No. 7 (CASE XVII.).—Operation, February, 1860. Death on forty-six hours. *Post-mortem* examination, twenty hours after death, by Dr. Aitkin. Constriction of the lower portion of the jejunum (by pedicle), which was dilated and inflamed on either side of the constricted portion.

Extensive inflammatory action had glued the convolutions of intestine to each other immediately above the constricted portion, and "*a considerable portion of fluid effusion filled the cavity of the true pelvis.*"

No. 8 (CASE XXIV.).—Operation, April, 1861. Death in twenty-four hours. Examination, twenty-four hours after death. "*The peritoneal cavity contained from four to five pints of reddish serum, but no blood-clot, no lymph, nor adhesions.* The serum found in the peritoneal cavity must have been a very active animal poison, for I" (Mr. Spencer Wells) suffered severely two days after the examination from a very slight scratch with the point of a needle on the left forefinger. He sucked the spot instantly, but the next day a small vesicle

formed and I applied caustic freely. On the second day I had some rigors, lasting several hours, with intense headache; relieved by vomiting and a copious perspiration, which lasted about eighteen hours. For several days afterward I was very weak, but all the severe symptoms had passed off by the fifth day after the puncture." Mr. Wells further says: "To the report of this case published in the *Medical Times and Gazette*, in May, 1861, I made the following remarks, and subsequent experience has tended to support the views I then brought before the profession: 'This recalls a question I have raised before. *The peritonæum contained some pints of poisonous serum.* It was probably formed by part of the membrane, and might be absorbed by other parts. If so, a poison which affected me so severely in a small dose, might easily kill any one in a larger dose. I recovered after the absorption of a fraction of a drop; but the poor woman was overpowered by the quantity taken up by her own absorbents.' " This case seemed particularly to point Mr. Wells's mind in the right direction of inquiry, for he says, farther on: "This is not a mere question of theory or curiosity, for it leads to an important rule in practice, or rather to the suggestion that, in cases *where such poisonous serum may reasonably be supposed to be present*, a part of the wound should be opened to allow the free escape of the serum by the side of the peduncle. In two cases formerly published, I acted upon this rule with the greatest advantage, and both patients recovered. . . . I am disposed to think that, in many cases where there is such a condition as I have described after operation, a free opening should be made for the escape of the serum."

No. 9 (CASE XXV.).—Operation, June, 1861. Death on the fifth day. "The patient went on well for four days, then began to sink very suddenly and died. At the *post-mortem* examination some recent lymph on the anterior surface of the liver was the only sign of peritonitis; *but there was a good deal of turbid serum in the peritoneal cavity*, and the intestines were much inflated. There was no blood in the abdomen. It appeared that death had taken place from simple exhaustion."

No. 10 (CASE XXVI.).—Operation, July, 1861. Death in

forty-eight hours. "The *post mortem* showed nothing but turbid serum in the peritoneal cavity, and intestines distended with gas; no blood nor clot. It was clear that death took place from exhaustion, partly the result of the uncontrollable vomiting."

No. 11 (CASE XXIX.).—Operation, October, 1861. Death in forty-seven hours. "There was some oozing of bloody serum, and a little blood from the stump; so, in the afternoon of the day after the operation, I reapplied the clamp close to the ligature. She died, collapsed, in forty-seven hours. At the *post-mortem* examination we observed proofs of extensive peritonitis, both recent and of old date. There was not a drop of blood, nor any clot, in the abdominal cavity. The marks of peritonitis were not most intense around the operated parts, but in the neighborhood of the liver."

No. 12 (CASE XXXI.).—Operation, December, 1861. Death on the twelfth day. A good deal of oozing of blood before closing of wound, but no vessels ligated. Sutures and clamp removed on the fourth day. Constant nausea. On the seventh day, Dr. Lawford says: "The abdomen is enormously distended, and last evening, during an attack of sickness, the *upper portion of the wound burst open*. I replaced the sutures a few minutes afterward."

Eleventh Day.—Dr. Lawford wrote to Mr. Mills: "The ligature connected with the portion of omentum has not yet come away. I was pulling it this morning, but it would not separate, *but an ounce or more of pure pus escaped from the aperture*." On the twelfth day the patient died. "No *post-mortem* examination was permitted."

No. 13 (CASE XXXII.).—Operation, January, 1862. Death in twenty-nine hours. "On *post-mortem* examination, proofs of general diffuse peritonitis were observed, many coils of intestines being glued together by recent lymph, and the surface of the peritonæum being covered generally by a pasty layer of the albuminous portions of the ovarian fluid. *Some of this fluid had gravitated into the pelvis*, but there was no blood nor blood-clots in the cavity." Mr. Wells, farther on, in speaking of the error of leaving the least ovarian fluid in the peritoneal cavity, as was done in this case, says: "*It is prob-*

ably mixed with blood from separated adhesions, and is pretty sure to putrefy and to poison the patient if she live long enough."

No. 14 (CASE XXXIII.).—Operation, January, 1862. Death on the fourth day. *Post-mortem* examination. "*There was a little clear serum in the peritoneal cavity, but no blood, nor ovarian fluid, nor any trace of peritonitis. It appeared, therefore, that simple exhaustion was the sole cause of death.*"

No. 15 (CASE XXXIV.).—Operation, January, 1862. Death in sixty hours, of septicæmia. No *post mortem*, but Mr. Spencer Wells puts it down as death from septicæmia.

No. 16 (CASE XXXV.).—Operation, May, 1862. Death on the fourteenth day, of tetanus. *Post mortem*. "There was no sign of peritonitis."

No. 17 (CASE XLV.).—Operation, October, 1862. Death in forty hours. She rallied well, but vomited several times, and a good deal of reddish serum oozed out from around the pedicle. Five hours after the operation the clamp was removed, allowing the stump and ligature to sink within the abdomen. "*A good deal of reddish serum then began to ooze away and continued to do so. She became easier. The pulse was good—90 to 100—and there was no more vomiting.*" During the day after the operation a great deal of serum oozed from the abdomen; she became restless and depressed; the pulse rose to 110, 120, and 135; she continued to sink during the night, and died forty hours after the operation.

Post Mortem.—"A quantity of serum, tinged with blood, escaped as soon as the peritoneal cavity was opened. . . . There was neither blood nor clot in the abdomen. . . . The cause of death, therefore," says Mr. Wells, "was extensive diffuse peritonitis of a low form, and was probably due in a great measure to the unhealthy constitution of the patient."

No. 18 (CASE LIV.).—Operation, February, 1863. Death in forty-four hours. On the day after the operation the pulse rose to 140, was more feeble, and she became weaker. "*Early next morning she became faint, and a profuse discharge of serum, upward of a pint, escaped beside the pedicle;*" she continued to sink, and died forty-four hours after operation.

At the *post-mortem* examination "there was not a drop of

blood nor any clot in the peritoneal cavity, but there were evidences of a low form of diffuse *peritonitis*, shown rather by the effusion of serum, than of lymph. . . . There was a little bloody serum in the sub-peritoneal tissue of the uterus and left ovary."

No. 19 (CASE LIX.).—Operation, March, 1863. Death twenty-six days after operation. On second day after operation, "much flatulent distention of abdomen, pulse 130, clamp drawn backward, depressing the lower part of the wound, so that thirty hours after operation it was removed. The stump and ligature at once sunk inward, and *there was a slight discharge of bloody serum.*" She continued to grow worse, and on the fifth day "there was a very free, dark, serous discharge beside the pedicle, and a good deal of tympanitis; but the pulse had fallen to 104." On the morning of the sixth day she was better, had a good appetite, tongue cleaner, pulse 116, "*but the discharge was very free.*" In the afternoon, "*there was a free discharge of bloody serum through the dressing over the wound.*" On removing the dressing to-day, it was discovered that "the skin was not united, the edges gaped widely, and the fat and subjacent tissues bulged up between them; but the peritonæum seemed completely closed;" wound was reunited by sutures. On the ninth, tenth, and eleventh days, she was better; "*the discharge was more purulent, but still fetid.*" On the twelfth day she was very ill. On examination, a soft swelling was found behind the uterus. This was punctured through the vagina with a trocar, and "*a pint of serum, with blood and some pus, not at all fetid,*" was removed.

Thirteenth Day.—Free suppuration from wound.

Fifteenth Day.—Wound still disunited down to the peritoneal membrane; in the afternoon a copious discharge of fetid pus escaped by the vagina, and continued.

Sixteenth Day.—Purulent discharge very free by vagina, less so from wound. It is useless to give further daily reports of the case. "She gradually sank, and died on the afternoon of the twenty-sixth day."

Post mortem two days after death, by Mr. Wells and Mr. Cooper. "About three ounces of red serum in the pericardium. No sign of general peritonitis. At the bottom of Doug-

las's space there was a cavity containing three or four ounces of pus. The opening which I had made into this cavity from the vagina was quite closed. I regretted very much that I had not made it freer and kept it open. A free opening into the vagina should be made and maintained as soon as the existence of fluid is detected."

No. 20 (CASE LX.).—Operation, March, 1863. Death in fifty-four hours. She was "apparently exhausted by the vomiting and *the rapid formation of serum in the peritoneal cavity*. On *post-mortem* examination about forty ounces of dark-red serum, and two ounces of blood-clot, were found in the cavity."

No. 21 (CASE LXV.).—Operation, June, 1863. Death in fifty-four hours. On the second day "there was some prolapse of the pedicle, and *oozing of reddish serum around it*, so that I removed the clamp at 10 A. M. The pulse ran up to 150, and she died fifty-four hours after operation." *Post-mortem* examination twenty-three hours after death. "*Two or three pints of red serum in the peritoneal cavity*, but no clot. There was no pelvic peritonitis. A hard, cylindrical fibrinous clot was attached to the wall of the right ventricle, and passed along the pulmonary artery beyond its first division."

Mr. Wells is rather disposed to attribute the death to the heart-clot.

No. 22 (CASE LXVII.).—Operation, June, 1863. Death in eighty hours. No *post-mortem* examination. But Mr. Wells allows Dr. Courty, of Montpellier, to report the case in all its details, who says, "Her death can only be attributed to excessive weakness." But, from the number and extent of adhesions that were broken up, there is no doubt in my mind that she died of *septicæmia*.

No. 23 (CASE LXXI.).—Operation, July, 1863. Death in eighty hours. In thirty hours the clamp was removed. On the second day (or between forty and forty-eight hours), "the ligature (and pedicle) had sunk inward, and *there was a free, dark serous discharge from the abdomen*." On the third day, pulse 150. Mr. Wells "inserted an elastic catheter by the side of the ligatures, *through which about six ounces of clear, reddish serum, not fetid, were sucked up by a syringe*."

Patient died eighty hours after the operation. *Post mortem*, by Dr. Barratt, twenty hours after death. "Fibrinous clot in right ventricle. No blood in the peritoneal cavity, *only a little serum and some flaky lymph.*" Mr. Wells puts this case down as "death from fibrinous coagulum in the heart."

No. 24 (CASE LXXII.).—Operation, July, 1863. Death in forty-four hours. About thirty-six hours after the operation, Mr. Wells "removed the clamp, after tying a ligature behind it. There *was free oozing of bloody serum*, and a little discharge of pure blood. The pulse rose to 160, and the patient died forty-four hours after the operation."

"The *post-mortem* examination revealed no traces of peritonitis, and no internal hæmorrhage. Death seemed to have been due to want of power."

She evidently died of septicæmia, judging from the *oozing of bloody serum* beside the pedicle.

No. 25 (CASE LXXIV.).—Operation, August, 1863. Death eighty-two hours after operation. "A partial examination showed that *the abdomen contained much blackish serum*, and the peritonæum was covered with soft lymph. 'I suppose,' says Dr. Gordon, 'we may say her death was caused by a very low form of peritoneal inflammation.'"

No. 26 (CASE LXXV.).—Operation, September, 1863. Death forty hours after operation. "No examination of the body was permitted."

No. 27 (CASE LXXVIII.).—Operation, November, 1863. Death on eighth day. On fourth day it was necessary to remove the clamp "after cutting away all the slough above it. The slough sank between the lips of the wound, but seemed to be firmly attached there. At 5 she felt easier, but at 10 the pulse was up to 130; she had vomited again, and was thirsty. *The slough had sunk quite out of sight, and there was some dark serous discharge on the bandage.*

Fifth Day.—"Some red serum observed on each poultice, but none appeared at the opening. On passing in the end of the little finger, no slough could be felt, and there was no fetid odor on the finger."

Seventh Day.—"A most careful examination could detect no evidence of pus in the pelvis or cellular tissue."

Eighth Day.—"Patient died. No *post-mortem* examination, but Mr. Wells puts the case down as 'death from septicæmia.'"

No. 28 (CASE LXXXI.).—Operation, November, 1863. Death on eighth day. For the first twenty-four hours all went on well, but the pulse varied from 112 to 140. A good deal of abdominal pain and some vomiting. On the second day a dark, sanguineous discharge from the uterus. Third day, diarrhœa. On the fourth and fifth days diarrhœa continued, "and there was a dark, fetid discharge from the umbilicus. Died on the eighth day. *Post-mortem* examination was made by Dr. Ritchie in the presence of Drs. Routh and Rogers.

"The fundus uteri lay on a level between the symphysis pubis and the promontory of the sacrum. A layer of recent gelatinous lymph formed a sort of arched roof from the sacrum and rectum over the uterus to the bladder and pubes, enclosing about a pint of turbid serum in the pouch of peritonæum between the uterus and rectum, and to the right side of the uterus. The pouch was lined by a layer of lymph. There was a good deal of serum in the lower cellular tissue of the pelvis. The small slough" (of the stump) "enclosed in the ligatures had been surrounded by two coils of small intestine which were adherent to each other and to the end of the pedicle."

No. 29 (CASE LXXXII.).—Operation, December, 1863. Death, sixty-six hours after operation. No *post-mortem* examination was permitted. "On reflecting on this case," says Mr. Wells, "I think it would have been better to keep the ends of the ligature out, and thus have secured a drainage of fluid from the peritonæum."

Mr. Wells does not assign a cause of death in this case, but the above italicized quotation is suggestive, and in my own mind I have no doubt about it.

No. 30 (CASE LXXXIII.).—Operation, December, 1863. Death third day. Double ovariectomy. Both pedicles so short that the clamp could not be applied. Each pedicle was tied, and the ligatures were left hanging from the lower end

of the wound. On second night after operation "the pulse got quicker, and became intermittent, and stimulants were administered very freely. About 5 A. M., she begged to be turned on her side, when *a good deal of reddish serum escaped* from the wound. At 10 A. M., the pulse was 150, very feeble. At 3 P. M., *there was a little more discharge from the wound*, and she died at 9 P. M. No *post-mortem* examination was permitted."

Mr. Wells assigns no cause of death, but the reddish serum accounts for it.

No. 31 (CASE LXXXIX.).—Operation, April, 1864. Death in one hundred and fourteen hours. On the second day after the operation, "I cut away," says Mr. Wells, "a little slough which was above the clamp, and shortly afterward the pulse fell to 108 (from 120). When I made my evening visit I found that the patient had been sick twice, and that the straining had disturbed the clamp. Some of the stump had slipped through, and this had given rise to a *slight oozing of blood*. I put on a ligature under the clamp, and tightened the clamp again." A bad night, with epigastric tympanites, followed this, and "*there was a very slight serous discharge in the neighborhood of the clamp*," with pulse from 135 to 140, and free perspiration. Patient continued to grow worse, pulse 140 to 160, and on the fifth morning after the operation "I removed the clamp, and the pedicle sank inward, remaining, however, in sight." She "died one hundred and fourteen hours after operation. No *post-mortem* examination of the body was permitted. Dr. Fox's report of the state of the peritoneal coat of the cyst puts the tubercular character of the peritonitis almost beyond question." But, I think, the history of the case after operation puts the fact that she died of septicæmia quite beyond question.

No. 32 (CASE XCII.).—Operation, April, 1864. Death in sixty-four hours. "The patient went on very well for twenty-four hours, but early next morning there was vomiting, tympanites, scanty concentrated urine, and a pulse of 140, and she died at night, exhausted, sixty-four hours after operation."

Post-mortem examination by Dr. Barratt. "*About two pints of dark-red serum had been effused into the peritoneal*

cavity, which contained neither blood nor ovarian fluid. The recent lymph was confined entirely to the lower and back part of the abdomen and pelvis; the peritonitis radiating from the pedicle, not from the wound in the abdominal wall, nor from a surface where the cyst had been adherent." Mr. Wells says, in reference to the above case, that "the trials which I had made of returning the pedicle seemed to teach that in young or healthy subjects, where circumscribed peritonitis and effusion of plastic lymph might be expected, the practice was a good one; but in debilitated or cachectic patients, in whom diffuse peritonitis and effusion of serum, or of a plastic lymph, might be feared, it would be safer (where the clamp could not be used) *to leave the ends of the ligatures hanging out through the wound, and thus secure an opening for the escape of effused serum, and for the ligature itself with the tissues enclosed in it after their separation.*"

No. 33 (CASE XCVI.).—Operation, May, 1864. Death in forty-four hours. "On the morning of the second day after operation, the pulse was 150, and there was a little vomiting. Stimulants were freely given, but she died at 10 P. M., forty-four hours after the operation. No *post-mortem* examination was permitted." Mr. Wells assigns no cause of death.

No. 34 (CASE XCVIII.).—Operation, May, 1864. Death in sixty-seven hours. At 11 P. M., pulse 110. Vomiting at 6 P. M. next day, with pulse 120. Vomiting continued, and pulse rose to 130; second day 5 P. M., pulse 140. Vomiting at intervals, 10 P. M., pulse 150. Lowest stitch removed, and the finger introduced into the abdominal cavity, *when about an ounce of bloody serum came away.* At 11.45 bandage removed, and effort made to pump out the fluid in the peritoneal cavity. Only two drachms were obtained. Pulse 150. Died sixty-seven hours after operation.

Post-mortem examination made by Dr. Ritchie, thirty-two hours after death. "About a pint and a half of bloody serum without clot lay in the cavity of the pelvis." Mr. Wells says she died of septicæmia.

No. 35 (CASE CII.).—Operation, July, 1864. Death in ninety-two hours. The patient went on badly from the first, pulse varying from 140 to 168. On second day pulse 160 all

day, and "on the next day *there was a free oozing, partly of blood, and partly of reddish serum from the upper part of the wound.* After this she felt easier, the urine became more copious, and she took some nourishment, though vomiting was still troublesome. In the evening diarrhœa came on and some tympanites. On the third day, sixty-eight hours after the operation, I removed all the sutures, as the wound seemed to be firmly united, and I reapplied strapping. The pulse was then 168, and she complained of faintness and exhaustion. In the evening some bleeding came on from the lower part of the wound, and Dr. Parsons, finding it gaping, reapplied some of the sutures. She died ninety-two hours after operation. *Post-mortem* examination seven hours after death by Dr. Barratt."

"The sutures which were retained do not close the wound throughout, so that, at the central part, intestine can be seen clearly between edges—no union had taken place. . . . A diffused, dark, bloody discoloration of great omentum and surface of bowels; venous coagula and general infiltration around the right inguinal region; *seven ounces by weight of dark fluid blood were removed from the cavity of the pelvis,* and in some of the more dependent parts of the abdominal cavity there were small coagula. The right broad ligament of uterus had coagula adherent, and was reduced to a very short pedicle. The tumor must have been sessile almost. The pedicle has two transfixing ligatures which enclosed both the Fallopian tube and the round ligament; but a ligature which had been passed behind them at the time of the operation had evidently slipped off, and permitted oozing of blood from the spermatic veins. Some slight adhesion between neighboring folds of intestine were just commencing; but no general or partial peritonitis. . . . A tough fibrinous clot, free from blood-corpuscles, filled right ventricle with tenaciously-interlaced roots among the *carneæ columnæ.*"

Mr. Wells says, "I looked upon the case from the moment of operation as one of clot in the heart."

No. 36 (CASE CIII).—Operation, July, 1864. Death on twenty-ninth day. Forty-seven hours after operation she was doing apparently well, and Mr. Wells removed all the stitches,

as the wound seemed firmly united. At 9 P. M., on the third day, after an attack of vomiting, the lower part of the wound opened, and *a good deal of reddish serum escaped*. On fourth day, a full inch of the wound was open, but no intestine to be seen. Mr. Wells closed this by two hare-lip pins, leaving the *lower angle open to admit the escape of serum*. Fifth day, very low, pulse 140, tympanitic. Abdomen evidently containing fluid. Examination detected fluctuation high up behind the uterus. Vomiting with prostration continued, and on the sixth day (pulse 160) one hare-lip pin was withdrawn, and one finger passed into the peritoneal cavity, but *only about half an ounce of reddish grumous fluid came away*. At midnight the wound commenced discharging, and then the patient went on favorably.

On the seventh day, on inquiry into the history of this favorable change, it appeared that, in consequence of some lumps of fæces having been discovered in the rectum, an enema of soap-and-water had been ordered. A good deal of fecal matter had been evacuated, and (perhaps from the exertion of getting on the bed-pan) *the wound had discharged about three ounces of pinkish-white, thick, curdy fluid*; shortly after this the patient slept soundly for two hours, the pulse having fallen from 160 to 136.

On the eighth day *a free fetid discharge was coming from the wound*.

On the twelfth day passed a trocar into Douglas's *cul-de-sac*, and *three and a half pints of abominably fetid, black, tarry fluid were evacuated*.

On the sixteenth day the trocar was again introduced into the recto-vaginal pouch, and rather more than a pint of black, fetid fluid discharged. Next day canula replaced, and some more fluid discharged. The fluid drained all night, about a pint and a half having been passed since the reintroduction of the canula. On the twenty-first day the discharge was free, fetid, yellow, and purulent, pulse 140. On the twenty-fifth day the same state, the fetid fluid still trickling away from the tube. The canula was withdrawn, and the flow ceased on the next day. By probing the cavity, one ounce of fluid came away. Death took place on the twenty-ninth day after the operation.

Post-mortem examination twenty hours after death by Dr. Ritchie and Mr. McFarlane.

The place of the left ovary was occupied by a little capsule of lymph enclosing the ligatured stump. The recto-vaginal pouch was empty. The utero-vesical pouch was filled with creamy pus. The large, irregular cavity behind the uterus was capable of holding about a gallon of fluid; during life it must have been full of air. It was bounded superiorly by coils of small intestines, firmly adherent to each other and to the anterior abdominal wall. Pus was found incarcerated in spaces between the coils of intestine, thus forming a large number of circumscribed abscesses. Died of *pyæmia*.

No. 37 (CASE CVII.).—Operation, October, 1864. Death on the eleventh day. A large cyst had burst eight days before the operation, and the peritoneal cavity was filled with a clear, amber-colored, tenacious fluid, thick as calves-foot jelly. The pedicle was secured by a ligature and chain of *écraseur*. The pedicle seemed to be friable and there was some danger of its giving way. On the third day the chain and ligature separated from the pedicle, but there was no bleeding.

Two of the stitches were removed forty-eight hours after the operation. Tympanites was then getting troublesome. Three days after the operation *a gush of reddish serum escaped beside the pedicle*. On the fourth day there was vomiting, and Mr. Carden wrote to Mr. Wells that "the abdomen was enormously distended, the ligatures scarcely holding the wound together. A ragged, sloughy shred of pedicle lay at the bottom of the incision. Vomiting and hiccough. On the seventh day vomiting recurred in the afternoon, and, after a severe straining, *about a quart of pale, clear serum gushed from beside the remains of the pedicle*. She died on the eleventh day."

Mr. Wells says: "Unfortunately, no *post-mortem* examination was permitted; but it seems pretty certain that the peritonitis which had been set up before the operation was never subdued, and latterly the ordinary effects of peritonitis were complicated by septicæmia, some of the fetid fluid from the surface of the pedicle in all probability having been absorbed."

No. 38 (CASE CXIII.).—Operation, November, 1864.

Death in sixty-seven hours. On the day after the operation, "at 11 A. M., after some coughing and retching, the clamp came off, and *there was a little serous discharge beside the pedicle*. In the afternoon I found that the pedicle had sunk partly into the abdomen, and was almost out of sight, although some shreds adhered to the edges of the wound. There was no bleeding; she vomited all the afternoon. The pulse was 140, and she died at 10 A. M. on the third day, sixty-seven hours after the operation."

Mr. Wells assigns no cause of death.

No. 39 (CASE CXV.).—Operation, January, 1863. Death on the seventh day. Patient did well for forty-eight hours. Pulse 100. (After cutting away the tumor there was some oozing of blood around the clamp, but it was stopped by tying a ligature tightly around the pedicle beneath the clamp.) "I removed the clamp forty-four hours after the operation, as it seemed to be lying quite loose on the wound; the ligature which had been tied beneath it also came away with a shred of dead fibrous tissue. There was no bleeding. I also removed three of the sutures. On the third day after the operation, there was some flatulent distention of the abdomen and frequent eructation, but no vomiting. The rectum was cleared by an enema. At 9 P. M., during one of the 'fits of belching' as the nurse called them, *the lower part of the wound gave way, and a knuckle of intestine protruded; a good deal of fetid serum also escaped*. I returned the intestine, reapplied three sutures deeply, and the patient did not seem to be worse. On the next day there was free fetid discharge from the lower part of the wound, and vomiting became troublesome." Tympanites increased, she became weaker, and died on the seventh day, or one hundred and fifty-four hours after the operation.

Post-mortem examination: "There was a good deal of fetid serum in the peritoneal cavity, and some traces of recent peritonitis were also shown by flakes of lymph. There was no blood nor clots to be seen, and only one or two shreds of sloughy tissue at the spot where the tumor had been removed from the right side of the uterus. The pedicle of the tumor first removed connected the left side of the uterus closely with the abdominal wall."

Mr. Wells assigns no cause of death in this case.

Having now gone perhaps too minutely into the pathological appearances found in Mr. Wells's thirty-nine fatal cases, I have arranged them in the following table; the first column designating the causes of death according to Mr. Wells's views; the second according to my own interpretation of the symptoms or pathological appearances observed in each case. They are placed in the order in which they stand in Mr. Wells's book and in the preceding pages.

In many cases Mr. Wells has omitted to state positively the cause of death; in some of these I have inferred from his language what he supposed the probable cause to be, and I have so put it down; while in others, where I had nothing upon which to base my conclusions, I have placed them under the head of "not stated." Rigorously, this class should have been much larger than it is.

Causes of Death, according to

No.	CASE.	WELLS.	SIMS.
1....	IV.....	Not stated.....	Septicæmia.
2....	VI.....	Peritonitis.....	do.
3....	X.....	do.	do.
4....	XII.....	Tetanus.....	Tetanus.
5....	XIV.....	Peritonitis.....	Septicæmia.
6....	XVI.....	Septicæmia....	do.
7....	XVII.....	Intestinal obstruction.....	do.
8....	XXIV.....	Septicæmia.....	do.
9....	XXV.....	Exhaustion.....	do.
10....	XXVI.....	do.	do.
11....	XXIX.....	Peritonitis.....	do.
12....	XXXI.....	do.	Pyæmia.
13....	XXXII.....	do.	Septicæmia.
14....	XXXIII.....	Exhaustion.....	do.
15....	XXXIV.....	Septicæmia.....	do.
16....	XXXV.....	Tetanus.....	Tetanus.
17....	XLV.....	Peritonitis.....	Septicæmia.
18....	LIV.....	do.	do.
19....	LIX.....	Pyæmia.....	Pyæmia.
20....	LX.....	Exhaustion.....	Septicæmia.
21....	LXV.....	Heart-clot.....	do.
22....	LXVII.....	Exhaustion.....	do.
23....	LXXI.....	Heart-clot.....	do.
24....	LXXII.....	Exhaustion.....	do.

Causes of Death (continued) according to

No.	CASE.	WELLS.	SIMS.
25....	LXXIV.....	Peritonitis.....	Septicæmia.
26....	LXXV.....	do.	do.
27....	LXXVIII.....	Septicæmia.....	do.
28....	LXXXI.....	do.	do.
29....	LXXXII.....	Not stated.....	do.
30....	LXXXIII.....	do.	do.
31....	LXXXIX.....	Peritonitis.....	do.
32....	XCH.....	Exhaustion.....	do.
33....	XCVI.....	Not stated.....	do.
34....	XCVII.....	Septicæmia.....	do.
35....	CH.....	Heart-clot.....	do.
36....	CHH.....	Pyæmia.....	Pyæmia.
37....	CVII.....	Septicæmia.....	Septicæmia.
38....	CXIII.....	Not stated.....	do.
39....	CXV.....	Peritonitis.....	do.

Now, let us sum up these two columns and see how the causes of death in these thirty-nine cases have been interpreted by Mr. Wells and myself :

WELLS.	SIMS.
Intestinal obstruction..... 1	Tetanus 2
Tetanus 2	Pyæmia 3
Pyæmia 2	Septicæmia 34
Heart-clot 3	
Exhaustion 7	
Peritonitis 12	
Septicæmia 7	
Not stated 5	
—	—
39	39

Thus it will seen that, the two cases of tetanus excepted, I make all the deaths the result of blood-poisoning, three of pyæmia and thirty-four of septicæmia. Whenever in the progress of a case, after operation, there was a discharge of reddish serum beside the pedicle, I put it down as septicæmia, even when there was no *post-mortem* examination. I have assumed that others died of septicæmia, because the symptoms and manner of termination were such as to justify in my mind this conclusion. But let us see what interpretation may be put on these thirty-nine cases, by excluding all in which there were no *post-mortem* examinations. In eleven

out of the thirty-nine there were no *post mortems*. To these let us add the two tetanic cases, and that leaves us twenty-six to be dealt with in a strictly pathological sense. By running over these as epitomized in the preceding pages, I find that the peritoneal or pelvic cavity contained—

Acrimonious fluid in.....	1
Fetid serum	1
Clear serum	3
Turbid serum.....	3
Reddish serum.....	16
Pus	2
	26

Thus it will be seen that, according to the pathological appearances as noted by Mr. Wells, two had pyæmic poisoning, and twenty-four presented the infallible *post-obit* evidences of septicæmia. There cannot be the slightest doubt about any of these items except the clear serum. It then becomes a question of what is clear serum. One of these cases is noted as such after the characteristic *reddish serum* had been accidentally forced out beside the pedicle on the second day after the operation, and hence I have a right to suppose there was some error or rather omission of the term reddish or sanguinolent in the notes furnished Mr. Wells.

In another, Mr. Wells himself supposes that the fluid found was clear ovarian fluid, which had been left in the bottom of the Douglas *cul-de-sac*.

I think the absolute pathological appearances found in the twenty-six cases fully justify the conclusions that I have drawn from the symptomatology of the eleven non-*post-mortemized* cases.

In every one of my seven *post-mortem* examinations, and in every one of Mr. Spencer Wells's twenty-six, we find uniformly the same pathological appearances. In all of them we find a quantity of reddish serum, or grayish turbid serum, or fetid serum, or putrid serum, or acrimonious serum, in the peritoneal cavity; and in cases slowly dying of pyæmia we invariably find pyogenic reservoirs in the pelvic cavity. Is it not logical to infer that these pent-up fluids are the causes of the blood-poisoning that so uniformly, I should say universally, attends fatal cases of ovariectomy?

I do not pretend to deny that death may occur from shock, or from hæmorrhage, or from heart-clot, or from exhaustion, or even from peritonitis; but I feel sure that these, independently of blood-poisoning and its legitimate causes, are of comparatively rare occurrence. If, then, we have such an almost universal evil to deal with as septicæmia, and if that septicæmia is, in thirty-seven cases out of thirty-nine, clearly traceable to the poisonous fluids effused in the peritoneal cavity, is it not self-evident that the indication, both of prevention and cure, is to drain off these poisonous fluids in the speediest and most direct way possible? My facts and premises granted, the conclusion is inevitable—and we must all say, yes. But many will reply that this is nothing new, that it has been often done before, and many lives have already been saved by it.

All this is true. The great McDowell had a drain from the peritoneal cavity, when he left the ligature of the pedicle hanging from the external wound. Clay does the same thing in the same way to-day, and for the same purpose. Peaslee does it when he rolls a tent the size of the index-finger, and leaves it in the lower angle of the abdominal incision, to allow the peritoneal cavity to be washed out if necessary. Spencer Wells has had the abdominal wound to accidentally burst open, and allow the escape of pent-up reddish serum. Kœberlé has intentionally opened the cavity at top and bottom for the evacuation of fluids. Keith and Kimball and others have done the same thing.

Few men have seen much of ovariectomy, who have not seen cases where a favorable result was obtained by drainage, and ablution of the peritoneal cavity. And yet no one has formulated the principle into a law. The cases in which it has been done were either accidental or exceptional.

As said before, Mr. Spencer Wells has had several cases of recovery from septicæmia, by opening the peritoneal cavity in the line of abdominal incision, and allowing the reddish sero-sanguinolent fluid to run out; and he has had some cases of pyæmia cured by puncturing pouches of putrid fluid through the *cul-de-sac* of the vagina. In the first, the peritoneal collections have been generally accidentally forced out beside the pedicle, by the tympanites and forcible vomiting.

In the second, he detected swellings in the *cul-de-sac* of the vagina, and punctured with a trocar.

In May, 1862, Mr. Wells removed a multilocular cyst (Case XXXVI., page 107), in the presence of Mr. Nélaton, Dr. Ramsbotham, Dr. Protheroe Smith, and others. The patient went on "fairly well," the pulse varying from 110 to 120 for ten days, when she began to look yellow, to lose appetite, and to feel very weak, and there was a discharge of gelatinous mucus from the rectum. On examination, Mr. Wells found a depression of the recto-vaginal septum, which led him to suspect the presence of some serous or purulent fluid in the pelvic cavity. On the twelfth day she was much worse, and Mr. Wells, finding the recto-vaginal pouch more prominent, passed a trocar into it just behind the womb, and evacuated "eight ounces of very fetid bloody serum; which was followed by a discharge of grumous pus, and by immediate relief, with improvement in her general condition. Two days afterward a very free discharge of fetid pus escaped by the side of the remains of the pedicle; and this continued in varying quantities for several days; but she gradually improved," and left the hospital a month afterward in good health and spirits.

Curiously enough, on the day that the above case was discharged from the Samaritan Hospital, Mr. Wells operated on another patient (Case XXXIX.), whose case presented the same peculiarities and had the same fortunate termination as the one just narrated. For some days after the operation the pulse was rapid; the face dusky-jaundiced; the urine ammoniacal, and a pelvic abscess was suspected. About ten days after the operation he discovered a fulness between the uterus and rectum, but he did not feel warranted in puncturing it till, in three or four days more, there were such unmistakable signs of a pelvic collection that he passed a trocar into the swelling behind the uterus and evacuated "eight ounces of dark-colored fetid fluid. She said she felt immediate relief, and she continued to improve from that time."

In Mr. Wells's Case LIX., a synopsis of which may be found on page 575, he tapped the pelvic gathering through the Douglas *cul-de-sac*, but the patient eventually died from pyæmia, twenty-six days after the operation. The true nature

of the complication had not manifested itself early enough to call for the only means that held out the slightest hope of saving life.

In November, 1863, Mr. Wells lost a patient (Case LXXXI.), on the seventh day after operation, with fully-marked symptoms of septicæmia, and on *post-mortem* examination he found "*about a pint of turbid serum* in the pouch of the peritonæum between the uterus and rectum." Mr. Wells remarked to the gentlemen at the *post-mortem* examination: "If I had made a puncture by the vagina and let off the fluid, as I had done in three other cases, I think the patient would have had a much greater chance of recovery; but nothing had led me to suspect the presence of the fluid, or to make the examination by which it would have been detected. The case shows the importance of making vaginal examinations when bad symptoms come on after ovariectomy."

Mr. Wells's fourth case of puncturing through the Douglas *cul-de-sac*, for the evacuation of pent-up fluids, is on page 261 of his book (Case CI.). This patient did well till the ninth day, when she was found in a typhoid state, with dry tongue, dilated pupils, flushed face, and drowsiness. As she continued to grow worse, Mr. Wells made a vaginal examination in the afternoon, and, detecting fluid, "made a puncture by a trocar and let out five ounces of dark, bloody serum, which had a putrid, ammoniacal odor. This was followed by some relief. The pulse sank from 112 to 95 and 92, but mucous diarrhœa came on, and the typhoid condition was aggravated next day. As the discharge from the trocar puncture had ceased, an examination detected fluid still in the recto-vaginal space." Mr. Wells made another opening into this space, evacuated ten ounces of fluid still more putrid than that of the day before, and containing pus. He then carried on the trocar through the opening made the day before, and drew a drainage-tube through the canula, before withdrawing the latter. The tube was then tied and left fixed. He took great care that it should pass through the lowest point where the peritonæum is reflected from the rectum to the vagina. Very free discharge came through the tube for several days, and the general condition rapidly improved. The tube was removed at

the end of about nine days, and she left in a fortnight, and regained her health perfectly.

Mr. Wells, in remarking upon this case, said that "the danger of puncture had been very greatly exaggerated; that the benefit of the evacuation of fluid is often very marked; and that any danger arises from too early closing the opening, not from the opening having been made. Where, in cases of blood-poisoning, it is very important to maintain a free passage for putrid fluids, the drainage-tubes of Chassaignac render most valuable service."

The last case, illustrating this subject, that I shall quote from Mr. Wells, was operated upon in July, 1864 (Case CIII., page 271), and is here epitomized on page 582. She was very ill after the operation, and on the third day the wound in the abdomen gave way, and "a good deal of reddish serum" escaped from its lower angle. The case progressed badly, and, about a fortnight after the operation, Mr. Wells found fluctuation in the Douglas *cul-de-sac*, and with a trocar "three and a half pints of abominably fetid, black, tarry fluid were evacuated." There was more or less discharge for about twelve days longer, the patient, after a hard struggle for life, at last dying of pyæmia.

It will be perceived that, in all the cases quoted from Mr. Wells, the punctures were made not into the peritoneal cavity, properly speaking, but into distinct sacs containing the poisonous fluids. In all these cases there is every probability that the punctures were made into pouches isolated or shut off from the peritoneal cavity. In those that died, the *post-mortem* examinations proved this to be true. In Case LXXXI. (page 203), where death from septicæmia occurred on the seventh day, the *post-mortem* examination revealed the fact that "the fundus uteri lay on a level between the symphysis pubis and promontory of the sacrum. A layer of recent gelatinous lymph formed a sort of arched roof from the sacrum and rectum over the uterus to the bladder and pubes, enclosing about a pint of turbid serum in the pouch of peritonæum between the uterus and rectum, and to the right side of the uterus. The pouch was lined with a layer of lymph."

These cases of Mr. Wells were plainly examples of pelvic

abscess, with consequent pyæmic poisoning; and there could not have been the slightest doubt about the propriety of the course of treatment to be pursued. But what I am more particularly interested in is septicæmia from poisonous fluids, whether sanguinolent serum or turbid serum in the true cavity of the peritonæum.

Dr. Thomas¹ says: "The most valuable suggestion with reference to this matter has emanated from Dr. Peaslee, who has unquestionably placed at the disposal of the ovariologist a method which robs the operation of much of its danger. It consists in washing out the peritonæum with disinfectants." Now, let us see what Dr. Peaslee has done, and what he has to say on this point.

Dr. Peaslee² says he first used intra-peritoneal injections in February, 1855, and considers them "more valuable and effectual than all other methods" in treatment of septicæmia after ovariectomy. He cites the following cases:

CASE I.—Septicæmia from decomposed ascitic fluid; cured by intra-peritoneal injections; an ovary tumor complicated with ascites removed, February, 1855, one hundred and six pounds of ascitic fluid had been withdrawn by a previous tapping. It was feared that the immensely distended peritonæum would continue to secrete the ascitic fluid after the operation, and a gum-elastic catheter was passed by the vagina, behind the uterus, through a puncture into the Douglas *cul-de-sac* and there left. On the sixth day symptoms of septicæmia appeared suddenly, and on removing the cork which had been placed in the catheter a small amount of very fetid fluid escaped. A quart of pure water (98° Fahr.) was at once injected through the tube into the peritoneal cavity and then allowed to flow out again. This was repeated the second time, when the patient said: "I feel refreshed, as if I had taken a bath." She then became bright and natural, but the septicæmic symptoms would return in from eight to twelve hours, and the injections were repeated. Afterward a solution of salt, 3j (to 3ij) to Oij water was used, and later a solution of liq. sodæ chlorinatæ 3j to 3ij to Oj water was

¹ "Diseases of Women," third edition, p. 751.

² "Ovarian Tumors," Peaslee, p. 509.

alternated with the salt-and-water. These injections were used two or three times daily for seven days, when the odor of decomposition was gone, the tube withdrawn, and the patient had a favorable recovery.

CASE II.—Same class as preceding; cured by injections. At first a warm, aqueous solution of salt and albumen was used in order to imitate the natural secretion of the peritonæum. But the albumen was decomposed by commixture with the fluid in the cavity, and the solutions described above were resumed. The injections were used twice daily for a time, and then once a day for fifty-nine days in all. The fetor then ceased, and the patient recovered. In this case the symptoms of septicæmia did not occur until the eighteenth day.

CASE III.—Septicæmia produced by blood oozing from vessels of the omentum, and subsequently continued by pus forming on a granulating surface; both fluids were decomposed in the peritoneal cavity—cured by injections. The symptoms from the decomposed blood appeared on the fourth day, but were not decided until the seventh, when the injections were commenced. Sometimes 3j of the liq. sodæ chlorinatæ to $\frac{3}{4}$ iv of water was used; after all the blood was removed the formation of pus necessitated three daily injections for twenty days in order to keep the patient from sinking; then two a day for twenty-one days; then one daily for thirty-three days; making, *in toto*, one hundred and thirty-five injections in seventy-eight days! In the preceding case the injections were used four weeks, and in this case three weeks, before the least improvement in the character of the fluid could be perceived.

CASE IV.—Septicæmia from blood-clot. Injections commenced on the twelfth day; death on the seventeenth day. The blood-clot (probably about four ounces at first) was from some small omental vessels which did not bleed during the operation, or for twenty minutes after it, as the incision was kept open for that time to give an opportunity for oozing blood. The septicæmia was declared the twelfth day, and the injections were commenced. They always returned from the cavity the color of dark beef-broth, with oil on the surface,

though used three times daily. The patient died on the seventeenth day, and the autopsy showed a decomposed clot, about three times the size of a hen's-egg, between the posterior surface of the omentum and the small intestines. The injections had operated on this mass too slowly to save life. Had the symptoms warranting them occurred several days sooner, the result might probably have been different. Dr. Peaslee says that, of these four patients, "three had unquestionably been rescued from death" by the injections, a result which he believes could have been obtained in no other manner.

He also notes with interest how quickly the blood threw off the septicæmic agent it contained, by the use of the injection, although it was again rapidly poisoned by reaccumulation of the fluid. Feeling that in these cases he had only *removed* septicæmia, he now resolved to attempt its *prevention*, and that in every case where he had any reason to fear that blood, ascitic fluid, pus or fluid from the ovarian tumor, could remain or collect in the peritoneal cavity after the operation, he would leave a tent in the lower end of the incision, which should remain undisturbed until the fourth day, unless symptoms demanded its removal sooner. When removed, the cavity should be examined for fluid, and the opening closed or the injections used as the examination should decide. He never used the glass tube as employed by Kœberlé, as he considers that the use of any tube invites septicæmia.

CASE V.—Septicæmia feared; no fluid found in peritoneal cavity; recovered. A large fibro-cystic tumor of the uterus, with very extensive adhesions, was removed, and the peritoneal cavity well sponged out. Hæmorrhage was feared from the lacerated surfaces, and a tent of moistened and firmly-twisted linen was left between the two lowest of the silver sutures which closed the incision. This tent was three-eighths of an inch in diameter, and projected half an inch into the peritoneal cavity. After ninety-six hours no symptom of blood in the peritoneal cavity appeared, and the tent was removed, and a silver prostatic catheter was passed through the opening to the bottom of the pelvis, where alone the fluid would be found if it existed in very small quantity. The instrument was introduced with the index-finger applied air-tight to its

distal extremity; when the beak reached the floor of the pelvis the finger was removed, to allow any fluid there to enter it, and replaced before the instrument was withdrawn, in order to retain the fluid, though only a drop or two. The instrument being withdrawn, the beak was placed on clean white paper and the finger removed, when the color and properties of the fluid could be perfectly perceived. This proved a very satisfactory test of the amount and quality of the fluid in the peritoneal cavity. But two or three drops of serum, faintly tinged with blood, of natural odor, were obtained. The tent was not replaced, the incision was finally closed, and the patient recovered.

CASE VI.—Threatened septicæmia from internal hæmorrhage prevented by the injections; recovery. In a case where, like the former, hæmorrhage was feared from the detachment of very vascular adhesions, a tent was left in the lower part of the incision; forty-eight hours after the operation, the tent was saturated with blood; on its removal, about three gills of serum, deeply tinged with blood, and some gas, not fetid, issued from the peritoneal cavity. Dr. Terriberry, of Paterson, New Jersey, had the after-care of this case, and he at once commenced the injections of salt-water with carbolic acid (gr. j to Oj), and used them twice daily for twenty-nine days, and once a day for fourteen days more. The freshness of the blood discharged showed that the hæmorrhage continued thirteen days after the tent was removed, and fifteen days after the operation. On the ninth day, there was evidence of a clot in the pelvis, and, remembering Case IV., Dr. Peaslee advised Dr. Terriberry to break it up by the gum-elastic catheter used for the injections. This being done, fresh blood and clots were discharged for six days; then clots for seven more; then two or three large, black coagula came away, and the fluid became purulent and less in quantity, until it ceased on the forty-third day. A peculiar fact in this case was the tendency of the opening to close. After the third week it was often necessary to insert a sponge-tent. There were no symptoms of septicæmia at any time, and never more than a slight odor of decomposition. The patient was reduced by the continued hæmorrhage, but had a good recovery.

CASE VII.—Septicæmia threatened from colloid contents of ovarian cyst retained in the peritoneal cavity, but prevented by the intra-peritoneal injections. In spite of thorough sponging, some portions of the viscid, colloid contents of a polycystic ovarian tumor, which had been removed, adhered to the peritonæum. A tent was used as before. After ninety-six hours, no bad symptoms arising, the tent was removed, when a quart of very offensive, light-brown fluid issued from the peritoneal cavity. Three quarts of warm salt-water (3j salt to Oj water), with three grains of carbolic acid, were injected, and repeated twice more, until the fluid returned with no odor of decomposition. This injection was repeated each afternoon for three weeks, four grains of carbolic acid to a quart of water being used at last. After the commencement of the third week the fluid was also pressed out of the peritoneal cavity daily, at six o'clock, A. M. The third day the injections were used, about 3 viij of pure pus were obtained; this diminished gradually, and, at the end of the third week, amounted to 3j in twenty-four hours; the fourth week but two injections were used, and the pus was less than 3j daily. At the end of six weeks the pus amounted to a mere trace, and the injections were abandoned. The patient recovered, but died, five months after the operation, of embolism of the left middle cerebral artery. It is worthy of note that, at the end of four months and a half, the opening had not closed, and a few drops of pus issued daily. A small gum-elastic catheter was then passed into the track taken by the pus, and a small quantity of salt water injected; the second day after, the ligatures of the pedicle were thrown off.

In a review of these cases by Dr. Peaslee we find that, of four cases of developed septicæmia, three were cured by intra-peritoneal injections, and one died. The internal remedies doubtless sustained the first three, and to some extent counteracted the septic influence, but, had the decomposed fluid not been removed, death must have resulted in every case. In the cases where septicæmia was feared, it was *undoubtedly prevented* by the injections. Dr. Peaslee adds that, of these seven cases, all, except number five, were in a condition much below the average as candidates for ovariectomy. He therefore concludes that—

1. Intra-peritoneal injections of water at 98°, with the addition of liquor sodæ chlorinatæ, or carbolic acid, as before explained, are entirely safe after ovariectomy, in the conditions requiring them.

2. They should be used with a *curative* intention in all cases of septicæmia already developed, and in all cases for *prevention*, where it is feared from the presence of any fluid in the peritoneal cavity, whose decomposition will produce it.

3. Thus used, they may reduce the percentage of deaths from septicæmia after ovariectomy, from one-sixth of all who die after it, to one thirty-sixth, and increase the average success of ovariectomy four or five per cent.

4. Intra-peritoneal injections are never to be thought of except for the purpose of removing a fluid already in the peritoneal cavity, which either already has, or assuredly will have, produced septicæmia.

5. A tent may be inserted for two to four days at the lower end of the incision, with entire safety, in any case of ovariectomy where the accumulation of such fluid is apprehended.

6. Finally, septicæmia would more rarely occur after ovariectomy if all fluid were removed from the peritoneal cavity by the most careful sponging before closing the incision.

In these liberal quotations from Dr. Peaslee I have tried to do him justice, and to give him full credit for the originality and success of his practice. To him we owe the principle of intra-peritoneal medication. I claim only to be his coadjutor. But, the rule that he would establish for exceptional cases, I wish to make applicable to all alike; and, instead of washing out the peritoneal cavity at the top, I propose to open it at the bottom, as he did in 1855, and let the fluids run out spontaneously and continuously. The natural outlet of the peritoneal cavity is through the Douglas *cul-de-sac*.

If the drainage through this *cul-de-sac* be made promptly and thoroughly, there is every reason to believe that pyæmic collections, such as happened to Mr. Spencer Wells, could never take place; and that septicæmic poisoning would in a great measure be prevented.

What I propose, then, is simply this: to puncture the *cul-*

de-sac of the vagina behind the cervix uteri, and to pass a tube of some sort into the peritoneal cavity to drain off any effusion that may take place in said cavity. I propose to do it in every instance, whether there are adhesions or not. Patients may and do die of septicæmia after ovariectomy, where there are no adhesions. Hence it is safe to make this puncture in every case, whether simple or complicated. If in three or four days we see that there is no necessity for this precautionary step in the operation, we have nothing to do but to remove the tube, and in twenty-four hours the little puncture closes up spontaneously. Where is the harm, then, of making the puncture? It adds nothing, not the prick of a pin, to the danger of ovariectomy. It cannot, possibly, do the least harm, and it may be the means of saving life. It may be said that it is time enough to make the puncture when bad symptoms arise. But we know that many cases go on very well for two or three days, when, all at once, there is an explosion as it were; the pulse suddenly jumps from 100 to 120, and then to 140, with vomiting, tympanites, hot skin, and oppressed breathing; the pulse gets quicker and more feeble, and the patient sinks exhausted in sixty or seventy hours after operation. We are in doubt what else to do but to give stimulants; and it is too late to be operating in the dark on a dying patient's vaginal *cul-de-sac*. During the ovariectomy it would have been nothing to puncture it, but now it becomes a difficult thing to do, and we naturally shrink from tormenting one in such extreme agony and prostration, unless we should feel sure of finding the cause of the evil, and of warding off the dangers of the moment. But in my own mind I am sure of what generates these alarming and too often dangerous symptoms, and I beg to urge upon my brethren, with all the earnestness of a deep-settled conviction, the propriety, the necessity, the safety, and the efficiency, of resorting to this drainage by the vagina in every case of ovariectomy, both as a preventive and curative agent against septicæmia, which, I am sure, is the great danger in this formidable operation. For many years I have been convinced that a puncture of the *cul-de-sac* of the vagina would be a sure means of obviating some of the dangers of this operation, and in the spring of 1864, when I assisted Mr.

Nélaton and Sir Joseph Oliffe in an ovariectomy, and when, twenty-four hours afterward, I saw that the patient must die, I said to Mr. Nélaton that she was dying from an effusion of a reddish serous fluid in the peritoneal cavity, and I suggested to him then to puncture the *cul-de-sac* of the vagina, and let it run out. It was not done. The patient died, and I assisted Mr. Nélaton and Sir Joseph Oliffe at the *post-mortem* examination, when we found precisely what I had predicted; viz., a large effusion of a sero-sanguinolent fluid (a quart or more) completely filling the pelvic and abdominal cavities. Mr. Nélaton called it peritonitis with aplastic effusion. Until a recent date, I was under the impression that it would do to wait for dangerous symptoms to arise before making the puncture, but on this point I have changed my mind, and I believe the puncture should be made at once, and in every instance.

In May (1872) I operated, at the Woman's Hospital, on an English lady, aged forty-six, the mother of a grown-up family of children. Her health had always been good. The tumor was of about three years' standing. It was enormous. She measured, around the largest part of the abdomen, fifty-nine inches, and, added to this, she had a very large umbilical hernia, certainly as large as the two fists. Dr. Emmet had seen the case a year before, but, as her health was then good, and she did not suffer particularly, he wisely put her off till urgent symptoms should demand surgical interference. On examination, I pronounced it a case of unilocular ovarian cyst. Dr. Thomas, Dr. Peaslee, and Dr. Emmet, all thought the operation called for; but Dr. Emmet, who had seen the case in its earlier stages, had some misgivings about the relations of the tumor and the uterus. The operation was performed with the assistance of Drs. Emmet and Thomas, and the staff of the hospital. There was nothing peculiar in the operation till we came to its conclusion. The unilocular cyst was without adhesions anteriorly, or to the viscera of the abdominal cavity, but it adhered so intimately to the posterior surface of the body of the uterus, and to the left broad ligament, that we were obliged to follow Dr. Miner's plan of enucleation. We accordingly enucleated the sac entirely out of its peritoneal capsule, and, instead of having a solid pedicle

to deal with, we had this hollow sac, which we gathered into folds, and drew out through the lower end of the external incision, and fixed it with a clamp, just as if it were an ordinary pedicle. The bleeding from the cavity of this sac, from which the tumor had been rolled or skinned out, was very profuse, and it was necessary to use the liq. fer. subsulph. freely, and even to apply it on a tent of cloth, which was subsequently removed. Besides this tumor there was another, about the size of a foetal head, occupying the place of the right ovary, with the same sort of sessile attachments to the right broad ligament. This being, like the other, without a pedicle, was likewise enucleated, and its membranous sheath was gathered into folds and pulled out through the external incision, and clamped as the other was. We had nearly as great difficulty in controlling the hæmorrhage in this as in the first one. Not expecting to find any attachments or any abnormal condition of things, I was not prepared for the emergency. I felt convinced at the time that I ought to have made a double puncture through the vagina, one in the bottom of each of these sacculated peduncles for drainage-tubes, but, having no facilities at hand for this purpose, I thought it would be enough to leave the abdominal incision open at its lower end; and I determined to pass a trocar down through each sac to the bottom of the pelvis, and out into the vagina, through the Douglas *cul-de-sac* for drainage, whenever the symptoms should become urgent. There was considerable reaction after the operation, and my patient seemed to be strong, and I hoped she would be able to throw off the disease. I went to the hospital every day, prepared to puncture and pass drainage-tubes, but I did not think her in so dangerous a condition as she really was, and she died on the third day, when I was by no means expecting such an early termination of the case. A *post-mortem* examination showed each one of the sacs, from which the tumors had been enucleated, filled with a dirty-grayish turbid serum; not more than four ounces in the larger, and two in the smaller one; no peritonitis, but there was a large effusion of venous blood in the cellular tissue behind the peritonæum, reaching from the lower part of the pelvis up toward the right kidney. This coagulum had, of course,

nothing to do with the fatal result; she died of septicæmia—a termination that might have been averted if I had done what I ought to have done, and what I must implore all others to do, under like circumstances; viz., to establish a free and thorough drainage through the vagina at the moment of the operation.

This case was a sad lesson to me; for I felt that a valuable life had been sacrificed; and I then made up my mind to institute, in every instance thereafter, the drainage system at once, whether the case was simple or complex, adhesions or no adhesions.

Since then (May, 1872), I have performed four ovariotomies with the drainage plan.

Its utility may be inferred upon theoretical grounds, but can only be established by direct experiment. Although I have treated but four cases by drainage, my experience has been such that I feel justified in bringing the subject thus prominently before the profession, that others may be induced to adopt the same method.

For the notes of the following case I am indebted to Dr. O'Byrne, lately house-surgeon to the Woman's Hospital:

A maiden lady, aged sixty-two, was admitted to the Woman's Hospital, on the 26th June, 1872. Change of life occurred at forty, and she had enjoyed a good degree of health till about a year ago; when she took a long walk, became very much fatigued, and felt a severe pain in the left side, and for the first time detected a swelling there. She consulted her physician, who diagnosed ovarian disease. A week after this there was a flow from the uterus, resembling the menses, which lasted six weeks. About the same time her bladder became irritable, and she was obliged to pass water frequently. The tumor began to grow rapidly, and is now very large.

The following were the measurements on admission:

Circumference at umbilicus.....	40	inches.
From ensiform cartilage to umbilicus.....	11	"
From umbilicus to symphysis.....	10	"
" " to right ant. sup. spinal process.....	10 $\frac{1}{4}$	"
" " to left superior spinal process.....	10 $\frac{1}{2}$	"

The tumor has never been tapped, and has given her comparatively little inconvenience. She has no pain, but a constant sense of soreness over the abdomen, with tenderness on pressure. No vomiting, no constipation, eats pretty well, but is losing flesh very rapidly.

Diagnosis.—Multilocular ovarian tumor. It was a question whether the operation should be performed now or in the month of September, when the hospital would be reopened for the reception of patients.

Drs. Emmet, Thomas, and Peaslee, were called to see the case with Dr. Sims, and it was agreed that the patient stood a better chance of recovery if the operation should be done at once than if it were procrastinated. The patient was anxious to have it done immediately; and it was accordingly performed the next day (June 27), Dr. Sims being assisted by Drs. Emmet, Thomas, and Peaslee. An incision was made from the umbilicus nearly to the pubes. At the lower end of the incision, a large, tortuous vein, lying in or on the peritonæum, was cut, which bled furiously, and was secured with great difficulty, and only then by passing a loop of silver wire through the abdominal walls, just below the lower end of the incision, through the peritonæum, behind the wounded vein, and then out again through the parietes, where the two ends of the wire were tightly twisted, thus forcibly compressing the vein against the abdominal walls, and instantly stopping the bleeding. When the peritoneal cavity was opened, a large quantity of clear, albuminous-looking fluid escaped, supposed to be from a ruptured cyst of some portion of the tumor. As soon as this free fluid passed off, the shining sac of the tumor appeared at the incision, and the doctor passed his hand between the tumor and the walls of the abdomen, freely breaking up adhesions that were formed everywhere anteriorly. No little difficulty was experienced in performing this part of the operation, for the adhesions were numerous and firm. Spencer Wells's trocar was passed into the largest sac, and a dark, grumous, albuminous fluid was evacuated, and the more solid portion of the tumor was then drawn through the opening, when it was found closely adherent to the omentum and to the right broad ligament. These adhesions were sep-

arated, and the pedicle was transfixed by a silver wire, made to enclose it in a figure-of-8 loop, which was tightly twisted, cut off close, and the pedicle, being severed about three-fourths of an inch beyond the constricting wire, was dropped back into the pelvis. A large surface of the omentum which had been separated from the tumor continued to ooze blood pretty freely. After waiting some time for the bleeding to cease, it was determined to remove all that portion of omentum that was the source of trouble. It was about five inches by three. Its base was tied, in sections of an inch, by five silver wires passed and twisted separately; and Dr. Emmet then cut off the mass with scissors, just beyond the row of wire ligatures, and the stump of omentum was then dropped in, and the peritoneal cavity was carefully sponged out. A trocar was then plunged through the Douglas *cul-de-sac*, from above downward, the end passing out at the vulva. A long double silver wire was then passed along the canula of the trocar, and the two were withdrawn. To the end of the wire was attached a bit of India-rubber tubing about ten inches long, and an eighth of an inch in diameter, with oval fenestræ cut alternately along its whole length, at distances of a half-inch or more, according to Chassaignac's plan for drainage-tubes. The wire was drawn to the lower angle of the external wound, holding the upper end of the tube on a level with the brim of the pelvis, while its distal end projected from the vagina for two or three inches. The object of this tube was to secure drainage from the peritoneal cavity. This done, the abdominal incision was brought together by the continuous silver-wire suture; a large roll of cotton wadding was laid on the abdomen, covered with a napkin, and then secured by four or five strips of adhesive plaster. Dr. O'Byrne administered nitrous-oxide gas; the operation lasted fifty-six minutes. The patient recovered consciousness in two minutes after she ceased to breathe the gas.

4 P. M.—Ten minutes after the operation the pulse was 144, and she complained of great pain. Gave $\frac{1}{4}$ grain sulph. morph. hypodermically.

5 P. M.—Pulse 120; no pain.

6.40 P. M. “ 116.

8 P. M. “ 112.

There was a complete drainage by the tube of a reddish serum in sufficient quantities to necessitate the constant use of napkins. She had a good night, sleeping under the influence of the morphine.

28th.—Pulse from 112 to 114; temperature, 99. Morphine was given subcutaneously twice a day. She took beef-tea freely, and ate large quantities of ice.

29th, at 7 P. M.—The pulse was 120, but she was cheerful and her expression was good. She complained of some pain, but morphine never failed to relieve it; at midnight her pulse had fallen to 100. Ever since the operation there has been a constant drainage of a dirty, brownish, inodorous serum from the peritoneal cavity.

A further daily report of the case is unnecessary. She took beef-tea for the first three days, became tired of it, and took a milk diet for a day or two, and then she began to eat beef-steak and chicken. She suffered a little from flatulent indigestion, which baffled the ordinary remedies, but yielded at last to a plentiful use of champagne. Her bowels were moved spontaneously on the fourth day and every three days thereafter. She took morphine (hypodermically) twice a day for more than a fortnight, then once a day for a week or more. Her pulse never rose above 120, and then only two or three times, and for but a few hours. It ranged from 110 to 116 for the first five days, and then it fell below 100. She was cheerful and hopeful during the whole time. Her temperature on one occasion rose to 101, but its usual range was from $98\frac{1}{2}$ to $99\frac{1}{2}$. The wire sutures were removed on the tenth day. They ought to have been removed three or four days earlier, for they produced a small anthrax at the upper angle of the wound. At the end of a fortnight she had a bed-sore, which gave a good deal of trouble, and was slow in healing. About this time her bowels became irritable, seemingly the result of imprudence in eating and of the heated term that we had passed through. In the course of the following ten days she had three or four attacks of diarrhœa, which were promptly controlled by morphine and proper diet.

But the most interesting feature of the case was the working of the drainage-tube. Soon after the operation, the sero-

sanguinolent fluid began to pass off by the tube, and the napkins were saturated with it, and necessarily changed frequently.

On the second night a large sheet folded and laid under the hips was wet through and through. The tube was moved up and down a little every day by pulling alternately on the wire as it protruded from the lower angle of the external wound, and then on the end of the tube as it projected from the vagina. Now and then a little warm water was thrown into the peritoneal cavity by the vaginal portion of the tube. On the fourth day the discharge became thicker and of a darker color, but was still inodorous.

On the fifth day I found her person soiled with what appeared to be semi-fluid fæces, which I supposed must have passed involuntarily from the bowels, and I scolded the nurse for allowing her to lie there in such a filthy state. The nurse declared that the discharge came from the tube.

On examination, I found it in the tube and in the vagina. But it looked so much like fecal matter that I introduced my finger into the bowel to ascertain if I had unwittingly passed the drainage-tube through a segment of the rectum where the vagina is reflected from it. It was intact, and I was satisfied that the discharge, which had the appearance of dissolved fæces, really came from the peritoneal cavity. This peculiar, dirty, chocolate-colored, pasty stuff continued to come away for three or four days. It had no disagreeable odor whatever. It gradually disappeared, and after a few days there was a small purulent discharge, with a very unpleasant smell. When the chocolate-looking discharge ceased, I removed the Chassaignac tube and introduced a silver catheter three or four times a day, and injected an ounce of carbolic water through it. Soon after the removal of the tube, water could not be injected in larger quantities than an ounce. It seemed to enter a closed sac, and, if we attempted to inject more than an ounce, it produced so much pain that we were obliged to desist. The discharge, small in quantity, became purulent about the tenth day, and the little cavity that gave rise to it was syringed out three times a day for a fortnight longer. When the operation was performed the adhesions were found to be so extensive, and the patient was so aged in appearance

as well as in reality, that no one present thought she could possibly recover; and, but for the drainage-tube, I am convinced that she would have died of septicæmia in thirty or forty hours after the operation. She left the hospital on the 1st of August, and is now enjoying good health.

My next drainage-case is altogether unique:

Mrs. D., aged thirty, married four years, no children, at fourteen years of age was accidentally kicked by her brother in the left iliac region, while they were in a romping play. She lost a great deal of blood at the time from the vagina, and was laid up for many months. As she has never been entirely free from pain in the region of the kick, she attributes to this accident all her subsequent troubles. In 1862, '63, and '64, she had what her physician termed congestion and inflammation of the left ovary. In 1865 she had an attack of enteritis. In 1866 she accidentally ran against the corner of a marble table, which struck her in her weak (left iliac) side. This laid her up for many weeks, and her physician thought her very dangerously ill. She never fully recovered from this attack; always complained of pain; and, soon after her marriage in 1868, she discovered some enlargement of the abdomen. I saw her in January, 1869. She was very pale and quite anæmic. Menstruation irregular, rather scanty, and exceedingly painful. Os tincæ small, cervix small, nipple-shaped, and indurated. Uterus small, but of normal depth. In the Douglas *cul-de-sac* there was an oblong cystic tumor, perhaps five or six inches in its largest or vertical diameter, which elevated the uterus and pushed it toward the symphysis pubis. Its attachments were seemingly to the left of the uterus, but my mind was not clear as to their nature and extent.

I prescribed tonics and generous living, and advised her against any immediate surgical interference. However, I assumed the supervision of the case, and when I saw Mrs. D., ten months afterward, I found that the tumor had grown to be about the size of the uterus at the sixth month of gestation.

In 1870 it did not increase much, but her general health broke down completely, and she rarely left her house. During the last winter (1871-'72), she was so much reduced as to be confined mostly to her bed.

In the spring (May, 1872) she appeared to be failing so fast, that she implored me not to procrastinate the long-promised relief. The hot weather of June prostrated her exceedingly, and she feared to wait till the fall for the operation. I was about to leave New York for Newport for the summer, and Mrs. D. insisted on going to Newport for the operation, provided she should there recover strength enough to undergo it. I consented, and in three weeks she improved so much that she drove to the beach, and was able to sit up two or three hours at a time. With her improvement she became impatient for the operation, and it was done at the Perry House, Newport, on August 3, 1872.

My diagnosis was a single cyst of the left ovary. I was assisted by Dr. Perry, of the Woman's Hospital; Dr. Sands, Dr. Engs, and Dr. Birkhead, of Newport; and Dr. Argyle Watson, of New York. Harry Sims gave her nitrous-oxide gas.

The usual incision was made down to the peritoneal cavity. The tumor presented, but it did not have the pearly appearance of an ovarian tumor. It looked more like the uterus than any thing else, and its serous covering seemed loosely attached by cellular tissue to its deeper and denser structure. Blood-vessels were large and plentiful all over the surface. There were no adhesions anteriorly. The trocar was pushed into the sac, and about thirty pounds of very light amber-colored serum was discharged. To the eye it had the appearance of ascitic fluid. The abdominal incision was enlarged to about five inches, to allow the hand to pass into the peritoneal cavity, at the same time that the sac was drawn out. To my dismay, I found the tumor really a cystic tumor of the posterior wall of the womb, and intimately connected with the broad ligament on the left side.

I was for a moment in doubt what to do. If I had stopped with making the trocar-puncture in the sac, I could have stitched it up with silver wire, and left the case as an unfinished exploratory operation. But I had cut a large, irregular hole in the cyst for the purpose of passing my hand inside, to explore its nature and connections. Dr. Perry suggested to me to remove the uterus with the tumor. The operation was

practicable, but I thought my patient entirely too feeble and exhausted to bear the shock, and I felt pretty sure that in her condition she could not recover from it. My dilemma was overcome by hitting upon the plan of pulling the sac out as far as we could through the abdominal wound, and of securing it in the lower angle of the incision just as we do the pedicle.

In making forcible traction on the sac, its peritoneal and fibrous covering was lacerated longitudinally along its posterior surface for about four inches. This was whipped over with half a dozen points of silver wire, which was cut off close, and left to be sacculated. I then made a puncture with a trocar through the left side of the posterior *cul-de-sac* of the vagina into the pelvic cavity, and inserted a self-retaining tube made of hard rubber, about the size and shape of a cock's spur, for the purpose of draining the peritoneal cavity.

Expecting to find a single ovarian cyst, I was not prepared with another tube. I then made a puncture through the bottom of the cyst behind the uterus and through the *cul-de-sac* of the vagina, but, having no tube to leave in the track of the puncture, I introduced a bit of gum-elastic bougie No. 8, about five inches long, with little perforations on opposite sides for drainage. Thus it will be seen that I had two drainage-tubes, such as they were, passing through the roof of the vagina, the first lying in the peritoneal cavity, the second passing through the bottom of the cyst and resting in its cavity. These imperfect drainage-tubes being arranged, it was then time to secure the sac between the edges of the abdominal wound. The cyst, when forcibly drawn out and put on the stretch, was fully as large as the wrist. It was crowded down to the lower angle of the wound, while the incision above was closed for two and a half or three inches with silver wire. All that portion of the cyst that was now held external to the abdominal incision, was cut open with scissors in a vertical direction, one-half being pulled over toward the crest of the left ilium, the other half toward the right. Each side was then secured by three silver sutures to the side of the abdominal wound, with which it was in immediate contact. The flaps of the cyst were then cut off, about an inch above the level of their union with the

parietes of the abdomen. A large darning-needle was passed transversely through the projecting portion of the cyst, to aid in holding it in a state of tension, and in preventing it from prematurely sinking down into the abdominal cavity. The cut surface of the projecting cyst was covered with pledgets of cotton wet with liquor ferri subsulphatis. A large roll of cotton-batting laid over the abdomen, covered with a napkin, and held down with sticking-plaster, completed the dressing, and she was put to bed, having been under the influence of the nitrous-oxide gas sixty-three minutes. She recovered perfect consciousness in five minutes; she was four minutes getting under the influence of the gas: the operation lasted, then, fifty-four minutes. On her recovery she complained of excessive pain, and, as she objected to the hypodermic use of morphine, I ordered fifty drops of McMunn's elixir of opium. Waiting nearly an hour, and finding her in no way relieved, I gave a half-grain of morphine by the skin, and in a very brief period she was easy; pulse 114.

At 7 P. M. vomiting came on and produced pain in the womb, and bleeding from the cut surfaces of the cyst, which was checked with difficulty. I was obliged to split each flap with scissors into two or three divisions, and tie each of these separately with strong ligatures, and then smear the raw surfaces over with undiluted liquor ferri subsulphatis. I have no idea how much blood she lost—perhaps five or six ounces; certainly too much for one so debilitated as she was. Up to midnight her pulse was from 112 to 119.

August 4th.—Water drawn three times since operation, scanty and high-colored.

3.30 A. M.—Nausea and vomiting; very restless; sweating about the face; pulse 140. All these symptoms supposed to show the need of a dose of morphine; gave $\frac{1}{4}$ grain hypodermically. In ten minutes afterward she was relieved, and the pulse came down to 118, and in thirty minutes it stood at 112. At 3 A. M. the vomiting, which was severe, had so much displaced the drainage-tube on the left, entering the peritoneal cavity, that it was removed; and a few hours afterward, when my patient was tranquil, I attempted to replace it, but it was

impossible for me even to designate by the touch the point that had been perforated.

9 A. M.—Some nausea and vomiting; pulse 117.

12 M.—Pulse 120; great retching, but little vomiting, for her stomach is empty, as she has taken nothing since the operation but lumps of ice and a little lime-water. Gave $\frac{1}{6}$ grain morphine by the skin.

2.30 P. M.—Pulse 112. She is easy, quite tranquil, and asks for ice-cream.

4 P. M.—Complains of a sense of fulness in the head, left cheek flushed; she attributes this to the morphine, having great prejudice against taking it. Pulse 104.

7 P. M.—Vomited the ice-cream taken a few hours ago.

9.30 P. M.—Vomiting.

11 P. M.—Severe retching and vomiting; pulse 120. Gave $\frac{1}{6}$ grain morphine by the skin; thirty minutes afterward pulse 111, and she was sleeping quietly.

It would be too tiresome to make a further daily report of this case. Her recovery is undoubtedly due to close watching, good nursing, and the drainage-tube. On the third day I removed the bit of gum-elastic catheter that had been passed from the vagina through the Douglas *cul-de-sac* into the peritoneal cavity, and on into the bottom of the sac. It had collapsed, and did not answer the purpose of drainage. But at this time there was nothing in the sac itself to drain. On its removal I attempted to introduce a tube of hard rubber, about three inches long, but I could only pass it into the peritoneal cavity. It was impossible to find the opening in the bottom of the sac. However, it answered a good purpose here, for it served to drain a little reddish serum from the peritoneal cavity for five or six days, and I supposed my patient was about to recover without any serious drawback. I threw a little warm water, night and morning, through the tube into the peritoneal cavity, not more than an ounce or two at a time, and repeated these injections until the water would return clear. At the end of a week the reddish serum ceased to make its appearance, and was supplanted by a purulent secretion. At the end of ten days my patient was alarmingly ill. Her pulse rose above 120, temperature to

104½; she vomited constantly when not under the influence of morphine; complained of dizziness and exhaustion, and talked incoherently. She had all the appearances of pyæmic poisoning. With this idea fixed, it was easy to find its source. The cavity of the sac was secreting a sero-purulent matter, which could not escape, as the opening in the bottom of the sac had closed when the gum-elastic catheter was removed. For the purpose of exploration, I passed a small gum-elastic catheter down to the bottom of the sac, through the large opening in the abdominal incision, and, by throwing a stream of warm water through it, two or three teaspoonfuls of turbid sero-purulent matter were washed out, to the great relief of all the symptoms. This was done every three or four hours, and it was surprising to see how the dizziness and other distressing symptoms would be almost instantly removed. Dr. Peaslee reports cases in which all distressing pyæmic symptoms were instantly relieved by washing out the peritoneal cavity. One must see the thing done, to realize the rapidity with which it is followed by relief.

With my best efforts to wash out this long, narrow pouch (five inches deep), I saw that my patient must die unless there was a continuous drain through the bottom of the sac, and through the *cul-de-sac* of the vagina. She was so exhausted that I feared to give her an anæsthetic, even the nitrous-oxide gas, so I resolved to risk the shock of a puncture without the gas. I passed a long, curved trocar, about No. 10, through the external opening of the sac down to its lowest point behind the cervix uteri; then, with a finger in the vagina to feel the trocar, I passed it suddenly through the sac and through the *cul-de-sac* of the vagina and out at the vulva, and by this means a drainage-tube about twelve inches long was drawn up through the sac, one end hanging out over the abdomen, the other projecting from the vagina. This being perforated along the portion that lay in the cavity of the sac and in the vagina, served as a spontaneous and continuous drain. Every three or four hours warm water, often a pint, was injected with a Davidson or Mattison syringe, until it passed through quite clear. It was necessary to move the tube up and down a little at least twice a day, to liberate its little fenestræ from the pressure of the soft parts in contact with it.

This tube was worn for about six weeks, till the canal in which it lay was contracted so closely around it that it was painful to pull it up or down. I then replaced it with one only one-sixteenth of an inch in diameter, which she wore for a month, when it was removed, leaving a silver wire in its stead. The wire was retained only three or four days, and soon after its removal the little fistulous track, so long occupied by the drainage-tube, closed spontaneously. This poor patient has had a hard struggle for life, and deserved to get well. When I thought her entirely out of all danger, she was taken with symptoms of pelvic cellulitis on the left side of the uterus, from which she is just now recovering.

Let it be remembered that this was not a case of ovariectomy. The cyst was uterine.

My third drainage case was an utter failure, resulting in the loss of a most valuable life. But it is not less interesting or less profitable on this account. Mrs. G., aged thirty-six, the mother of five children, had enjoyed good health till about three years ago, when she discovered some enlargement of the abdomen, and complained of a sense of bearing down.

On consulting her family physician, Dr. Owens, of Lynchburg, Virginia, he detected a tumor which he thought was ovarian. The abdomen continued to enlarge till Dr. Owens was obliged to tap her last April, drawing off about thirty pounds of ascitic fluid, leaving hard tumors, now more easily to be felt in connection with the uterus. In May Mrs. G. went to Baltimore and consulted the eminent Prof. Nathan R. Smith, who advised her against any surgical interference. Soon after this she came to New York to see me, and I found the abdomen rapidly filling again with ascitic fluid. There was also a hard tumor about the size of a quart measure in the right iliac region; one end of it appeared to be attached in the neighborhood of the right side of the uterus, while the other floated in the ascitic fluid and reached up toward the right hypochondrium. The uterus, of normal depth, was pushed forward and above the symphysis pubis by a hard, rounded tumor in the Douglas *cul-de-sac*, which appeared to be continuous with another equally hard tumor in the left iliac fossa. These tumors felt as hard and inelastic as fibroid tu-

mors ever do. I thought they were fibroids, and saw no hope of doing any thing for her relief. Dr. Emmet and Dr. Thomas were called in consultation, and agreed with me that the tumors were probably fibroid, and advised me against any operative procedure. The abdomen continued to grow larger and larger, and soon it became necessary to tap her again, and, in about eight weeks after the tapping by Dr. Owens, I drew off another thirty pounds of ascitic fluid. The removal of this fluid allowed a little closer investigation into the nature of the supposed fibroids; and I discovered a soft or rather elastic point, hardly larger than the end of the thumb, in that portion of the tumor resting in the left iliac fossa, and just above the iliac border of Poupart's ligament. Every other portion of the tumor was hard and inelastic. Although I found but a single point of fluctuation, I determined to puncture the tumor, and ascertain the nature of its contents. Accordingly, I passed a No. 2 trocar of Dieulafoy's *aspirateur* through the abdominal walls into the tumor, to the depth of about four inches, and drew off sixteen ounces of an amber-colored fluid, which I submitted to Dr. Waterman, telling him that it was probably from a fibro-cystic tumor of the uterus. He said the spectroscope would determine the nature of the fluid—that if it were ovarian, the spectroscope would demonstrate the presence of lutein; but, if it were fibro-cystic, the lutein would not be found. On the following day Dr. Waterman informed me that the fluid was undoubtedly from an ovarian cyst, as the lutein line was clearly demonstrated by the spectroscope. Considering that the nature of the principal tumor was now settled, I proposed to make an exploratory operation, which was willingly acceded to by Mrs. G.

It was understood and agreed that the peritoneal cavity should be opened, that the operation should end with this if the tumors proved to be fibroid, but, if they were ovarian and removable without more than the ordinary risk, the operation should be completed. Having full faith in Dr. Waterman's spectroscopic diagnosis, I expected to find the tumor behind and on the left side of the uterus ovarian; but the long, narrow indurated one on the right side of the uterus I thought was a fibroid. The operation was performed at Newport, on

August 6, 1872. I was assisted by Dr. Emmet, Dr. Cleveland, and Dr. Nicoll, of the Woman's Hospital, and by Drs. Watson, Engs, Birkhead, and Harry Sims. Dr. Nicoll gave nitrous-oxide gas. The usual incision was made, and, when the peritonæum was opened, we drew off about twenty pounds of clear ascitic fluid. The oblong tumor on the right side of the uterus was to my surprise a cyst, but so hard that to the touch it was as tense as a well-stretched drum-head. Its contents were evacuated, the cyst was enucleated from its sessile attachments, the pedicle thus formed was secured by silver wire, and the two were cut off close. The tumors on the left side and behind the uterus were all cystic, with very firm attachments, and they were all (four) enucleated. I have seldom seen stronger adhesions or a more difficult operation. The posterior surface of the uterus, the left broad ligament, the sigmoid flexure, and even a portion of the rectum, were more or less denuded. The bleeding was very profuse, and several vessels required torsion or ligatures, and the gentle, almost imperceptible oozing of blood from the lacerated surfaces necessitated the free use of the liquor ferri subsulphatis.

The *cul-de-sac* of the vagina was then punctured with a trocar, and the cock-spur hard-rubber tube was passed from the vagina into the peritoneal cavity for the drainage of what I knew was inevitable after such an operation. The bleeding appeared to be checked, and we rapidly closed up the external incision with the continuous silver-wire suture, leaving an opening the size of the index-finger at the lower angle also for drainage. Just as I was placing a bit of India-rubber tubing doubled on itself in the lower angle of the incision to keep it open, a violent fit of vomiting forced a quantity of blood out by the tubing. We quickly pulled out the sutures, opened the abdomen, and found six or eight ounces of blood in the pelvic cavity, which was sponged out, and Dr. Emmet found a bleeding vessel on the right side of the pelvis in the cellular tissue, near the iliac fossa, which he tied with catgut. Waiting a while, and feeling sure that there was no more danger of bleeding, the external incision was closed as before, leaving an opening at the lower angle, which was occupied by

the bit of tubing. She was under the influence of the gas one hour and thirty-four minutes. The following notes of the case were furnished me by Dr. H. D. Nicoll :

When placed in bed at 2 P. M., the pulse was scarcely perceptible, and the extremities were very cold. Brandy by the mouth. Hot bottles to surface and feet. She soon began to vomit, and the breakfast, taken four hours before the operation, was thrown up.

2.45 P. M.—One-sixth grain morphine by the skin ; brandy and beef-tea by the rectum ; pulse very feeble.

5 P. M.—Vomiting less ; patient very restless ; one-fourth grain morphine by the skin.

9.30 P. M.—Very decided reaction ; skin warm, moist ; pulse 135. Has slept for two hours and a half ; vomits occasionally. Has taken nothing but some bits of ice ; no pain over abdomen ; has passed a little urine twice.

August 7th, 3 A. M.—Has dozed occasionally, very restless ; pulse 150 and very weak ; one-fourth grain morphine under the skin. Vomits about once an hour, throwing off each time an ounce of greenish, transparent liquid ; surface beginning to grow cold again.

4 A. M.—Surface colder. Pulse very feeble and frequent. Brandy and beef-tea by rectum.

5.30 A. M.—Pulse 160, scarcely to be felt. Great restlessness. Extremities cold. Vomits every twenty minutes.

6.15 A. M.—One-quarter grain morphia hypodermically.

7 A. M.—Pulse 150. Extremities getting warmer.

7.30 A. M.—Beef-tea and brandy by rectum.

7.45 A. M.—Effect of enema perceptible in pulse, skin, and countenance. General condition seemingly better. Pulse still 150, but stronger.

8.30 A. M.—Some warm water thrown into peritoneal cavity through the drainage-tube, which returned with a reddish tinge.

9 A. M.—Beef-tea and brandy by the rectum. Patient dozes and vomits occasionally.

10 A. M.—Pulse 140, respiration 24. Repeat beef-tea and brandy. One-fourth grain morphia by the skin.

12.30 P. M.—A little bloody serum has passed from the vagina. Threw six or eight ounces of warm water through the tube into the peritoneal cavity, which returned highly

sanguinolent. Pulse scarcely perceptible; voice strong; expression good. Temperature 107.

1 P. M.—Beef-tea and brandy by rectum.

2 P. M.—Twenty-four hours since operation. Cold, clammy sweat.

3 P. M.—Washed out peritoneal cavity by vaginal tube; water returned highly colored with bloody serum. Temperature 103½.

4.30 P. M.—Peritoneal cavity again washed out; water highly colored; some blackish granules of iron and blood.

5 P. M.—The tube has not answered the purpose of spontaneous drainage at all. Removed it, and introduced a gum-elastic catheter No. 6, and threw a half-pint of water into the peritoneal cavity, which returned highly colored. Tube replaced to keep puncture in *cul-de-sac* open.

6.15 P. M.—Brandy and beef-tea by enema. Temperature 104, pulse imperceptible.

8 P. M.—Arms cold and clammy to elbows. Removed tube. Peritoneal cavity washed out through a catheter; water returned reddish. Tube replaced.

9.45 P. M.—Temperature 104. Brandy and beef-tea by rectum.

10.30 P. M.—Has been sleeping; waked up complaining of pain in the bowels. No pulse; seems to be unconscious.

Midnight.—For the last four hours there has been no discharge from the vagina, nor has there been any since the operation except when water was thrown into the peritoneal cavity by the tube. The tube was now removed, and there was a sudden gush of reddish serum from the peritoneal cavity, and it continued to flow away in quantities sufficient to wet napkins and to soil the bed-linen. Impossible to say how much reddish serum was discharged in an hour. It might have been a pint, or it may have been only half that quantity. However, it gave no relief whatever to the general symptoms of suffering and prostration, and she continued to sink, and died at 10 A. M., forty-six hours after the operation.

Post mortem at 4 P. M., August 8th, six hours after death, made by Dr. Nichols, of Boston, and Dr. Walker, of the Woman's Hospital, assisted by Dr. White, of New York, and Harry Sims.

Abdomen opened by cutting the parietes from the crest of one ilium up along the margin of the short ribs, then across the epigastrium and down on the opposite side to the other iliac crest. The flap thus made was turned down over the thighs so as to expose the peritoneal surface of the abdominal incision. This was six and a quarter inches long, closed by seventeen sutures of silver wire, and was perfectly united through its whole extent down to the lower angle, which had been intentionally left open for drainage. Peritoneal cavity filled by a reddish, sero-sanguinolent fluid measuring twenty-one and three-quarters ounces; about one-third of this was in the sulcus between the lower margin of the liver and the transverse colon, the balance generally diffused over the peritoneal cavity. The pelvic viscera were blackened by the large quantity of iron used to arrest the oozing of blood; and there was a sort of amalgam of granulated blood and iron in the Douglas *cul-de-sac*, which effectually prevented the sero-sanguinolent fluid above from passing out through the drainage-tube.

The cock-spur drainage-tube was the worst contrivance that I could possibly have devised for the purpose. It had no opening in the upper end, only fenestræ on each side, and these were doubtless closed by the exudation of lymph and by the pressure of the soft parts; for it will be remembered that there was no spontaneous drainage at any time by this tube. On three or four occasions water was injected through it into the peritoneal cavity, and always returned of a reddish color. At midnight, ten hours before death, the tube was removed entirely, and a large quantity of reddish serum came away, probably all that had gravitated into the pelvic cavity.

When the operation was finished, the case was looked upon as almost hopeless by Dr. Emmet and myself. With my ineffectual drainage apparatus it proved to be absolutely so. With the Chassaignac tube running from the external incision down through the *cul-de-sac* of the vagina, there would have been some chance of recovery; but, with the stupid arrangement I had, there was none. Indeed, she died precisely as she would if there had been no puncture in the *cul-de-sac*, and no effort at drainage at all.

My fourth case by drainage was remarkable on account of the number of physicians she had consulted—in all, fourteen or fifteen.

Miss —, aged thirty-nine, had always enjoyed good health till about a year ago, when she noticed some enlargement of the abdomen, which she thought was the result of her climacteric period. The abdomen continuing to enlarge, she consulted Dr. Hurlbut and Dr. Hoyt, of Stamford, in March last, who discovered that she had an ovarian tumor. In April she saw Dr. Willard Parker and then Dr. Thomas, and then Dr. W. T. Walker, afterward Dr. Chapman, of Brooklyn, and Dr. Kimball, of Lowell, all of whom recognized the true nature of her disease. Up to this time her health had been perfect; but on the 25th of April she had an attack of peritonitis, was exceedingly ill for about six weeks, and did not leave her room till July. I saw her at Newport early in August, and a few days afterward she was suddenly seized with an attack of peritonitis in the left side of the abdomen, which lasted a week.

She measured thirty-seven inches around the abdomen, and was losing flesh rapidly. She was exceedingly anxious for the operation, and it was done at Newport on the 25th of August. Prof. Mussey, of Cincinnati, Prof. Johnston, of Baltimore, Dr. Bailey, of Albany, Dr. Neftel, of New York, Dr. Sands, of Newport, Dr. Nichols, of Boston, Dr. Cahoon, of Vermont, and Drs. Walker and Cleveland, of the Woman's Hospital, were present. Harry Sims gave nitrous-oxide gas. The adhesions between the peritonæum and the tumor were very intimate, and the sac was so unusually thin that I opened it accidentally and prematurely. Having done this I proceeded to empty its contents—about thirty pounds of chocolate-colored fluid—before breaking up the adhesions. These, not easily separated, were found everywhere anteriorly and laterally. There were also adhesions to the sigmoid flexure and the left broad ligament.

The parietal peritonæum was deeply congested and showed signs of the recent severe attacks of peritonitis and oozed out bloody serum in abundance from the abraded surfaces. The sac was enucleated from the pedicle, which was very short

and broad. This was tied in two segments by two figure-of-8 silver-wire ligatures, cut off and then dropped in the pelvic cavity. Some small vessels were tied with cat-gut, and the cavity was carefully cleared of coagula and bloody serum. The Douglas *cul-de-sac* was then punctured with a curved trocar from the pelvic cavity through into the vagina, and a drainage-tube of India-rubber was passed from the vagina up through this puncture into the pelvic cavity, and brought out at the lower angle of the abdominal wound. All that portion of the tube that lay in the peritoneal cavity and in the vagina had perforations or fenestræ on opposite sides, about a half-inch apart, for the purpose of spontaneous drainage through the vagina. The portion that passed out at the lower angle of the abdominal wound was intact and long enough to fall over the pubes and drop between the thighs. The body was thus traversed by this tube, one extremity projecting from the vagina, the other above the pubes. The operation lasted forty-eight minutes. Perfect anæsthesia was kept up for fifty-one minutes. On coming from under the influence of the gas, she complained of such agony in the region of the wound that I gave her one-sixth of a grain of morphia by the skin, in fifteen minutes one-quarter of a grain, and in another fifteen minutes another quarter of a grain, before she became tranquillized. I have seldom seen any one so excited on the eve of an operation. Her pulse was 120 before the operation, and the same immediately after it, but with the third dose of morphine it fell to 108.

The operation was completed at 12 o'clock, and at 1.40 P. M. a napkin was saturated with bloody serum drained from the peritoneal cavity by the vaginal end of the tube. She was quiet, and comparatively free from pain, but had some nausea; reaction complete.

4.40 P. M.—Some nausea and vomiting. Takes pounded ice. Gave one-quarter of a grain morphine by the skin.

6.10 P. M.—Pulse 106; nausea and occasional vomiting; skin warm. Just removed the third napkin saturated with bloody serum since she was put to bed six hours ago.

9 P. M.—Perfectly free from all pain. Slight discharge from the drainage-tube. Drew off one and a half ounce urine. She says morphine always arrests its secretion.

11 P. M.—Pulse 104.

August 26th, 8 A. M.—She had a quiet and rather comfortable night. Six ounces urine drawn off at 4. Pulse 112. Complaining now of pain. Gave one-quarter of a grain morphine hypodermically. Hardly any drainage by the tube during the night. Injected four or five ounces of warm water through the tube, which was at first reddish, but soon passed clear.

8.30 A. M.—Six ounces urine drawn.

11.20 A. M.—Complains of increasing pain in lower part of the abdomen. One-quarter grain of morphia by skin.

12.30.—Found napkins much soiled with a dirty, brownish, inodorous, watery discharge. Pulse 112; temperature $101\frac{2}{10}^{\circ}$. No nausea and no vomiting in the last twelve hours. Six napkins in all have been soiled by the drainage in the twenty-four hours since the operation. The first three with reddish serum, the others are of a dirty, yellowish-brown color, all of them thoroughly moistened, and perfectly inodorous.

2.40 P. M.—The napkin applied at 12.30 now thoroughly saturated with reddish serum. Pulse 116; very little nausea; some pain and considerable restlessness.

5 P. M.—Some pain. One-quarter grain of morphia.

8.40 P. M.—Pulse 112; temperature $101\frac{1}{2}^{\circ}$. Hardly any drainage in the last four hours. Injected a little warm water through the tube.

August 27th, 4 A. M.—Much nausea, pain, and restlessness. Till now has rested and slept well during the night; removed napkin well saturated from drainage-tube. Pulse 124; one-quarter of a grain of morphia hypodermically. A little fluid issues from the upper end of tube, from lower end it is quite profuse.

4.40 A. M.—Removed another napkin thoroughly saturated. Pulse 116.

9.45 A. M.—Pulse 120; nausea and restlessness; one-quarter of a grain of morphia by skin.

10.30 A. M.—Pulse 120; temperature $101\frac{6}{10}^{\circ}$. The discharge from both ends of the tube very great; three or four good-sized napkins saturated in the last two hours. The discharge may be said to be inodorous, and yet it has a faint,

sweetish odor, *sui generis*, and is a little sticky to the touch. It is of a brownish, muddy color, perhaps it would be more appropriately termed chocolate-colored. No vomiting since about twelve hours after the operation; but occasional nausea, which soon passes off; slight pain in the right iliac region.

1 P. M.—Pulse 128; temperature $101\frac{4}{10}^{\circ}$. The pulse is the only indication of danger. The temperature, condition of the skin, and expression, are all good. Has had a dozen napkins soiled with the drainage in the last twenty-four hours.

2.45 P. M.—Washed out peritoneal cavity with warm water injected through the tube. Pulse 128 before the injection, 120 immediately after it.

4.40 P. M.—Pulse 132; temperature $101\frac{8}{10}^{\circ}$. Drainage still going on. Injected eight ounces of warm water through the tube, as much more into the peritoneal cavity by a catheter passed in by the side of the drainage-tube. It passed through quickly and of an amber color, with a few flakes of lymph in it.

7.30 P. M.—One-quarter of a grain of morphia by skin.

9.30 P. M.—Pulse 120; temperature $101\frac{6}{10}^{\circ}$. Washed out peritoneal cavity; injected six ounces of water through the tube, and ten by the side of it by means of a gum-elastic catheter, which was passed down five or six inches into the peritoneal cavity. Most of it passed out by the abdominal end of the tube, but little by vaginal.

11.40 P. M.—Pulse 116; sleeping.

August 28th, 2.30 A. M.—One-quarter of a grain of morphia.

9.30 A. M.—Rested and slept well during the night; now complaining of pain; gave one-quarter of a grain of morphia. Has had a copious discharge from both ends of the tube during the night. Fifteen good-sized napkins have been thoroughly saturated since mid-day, yesterday. Pulse 112; temperature 101° .

2.40 P. M.—Free discharge of chocolate-colored serum by upper end of tube, with sediment of same color. Injected a pint of warm water through the tube and by the side of it. A large quantity of sedimentary, chocolate-looking fluid flowed out through the upper end of tube; one-quarter grain of morphia by skin. Pulse 112; temperature 101.

4.10 P. M.—One-eighth of a grain of morphia by skin.
7.20 P. M.—Rather restless; pain in lower part of abdomen; washed out the peritoneal cavity, and she felt better after it. Gave one-quarter of a grain of morphia.

11.20 P. M.—At last visit removed the old drainage-tube and introduced a new one, which seems to be doing better; free discharge below as well as above; some soreness in epigastric region.

August 29th, 3.30 A. M.—Free discharge from both ends of the tube. Two napkins saturated since last note.

8.20 A. M.—Free discharge by both ends of tube, and from the vaginal end it is thicker and darker-colored than at any time before.

10 A. M.—She is suffering a good deal of pain. Has taken no nourishment to-day; feels weak and exhausted; a sense of faintings and distress in epigastric region. Whines and cries like a starved baby. No discharge since last visit; washed out peritoneal cavity. Not much coloring matter in the water as it passes out. One-quarter of a grain of morphia, and ordered nourishment and brandy. Pulse 112; temperature $101\frac{2}{10}^{\circ}$.

12 M.—Increased restlessness. Pulse 110; one-quarter of a grain of morphia. Within the last two hours has taken cream, beef-juice, and champagne, freely.

1.30 P. M.—Discharge by tube pretty free, and is thicker than at any time before. It looks like chocolate-paste, or the muco-fecal stools of an infant; inodorous. Washed out peritoneal cavity. Pulse 110; temperature 101° .

4.40 P. M.—Very severe pain in lower part of abdomen; one-quarter of a grain of morphia.

6 P. M.—She began to complain of severe pains in the lower part of the abdomen, of an intermittent, spasmodic character, very much like labor-pains. The discharge by the tube was thick and pasty; and to this fact, and to the partial obstruction of the tube, these bearing-down pains seemed to be due. At times she screamed out so loudly with the pains as to alarm the inmates of the house. Dr. Cahoon gave her one-quarter of a grain of morphia, and sent for me, and when I arrived at 7 P. M. I repeated the dose. The pains were like those of labor. Thinking the tube was possibly compressed

at its passage through the vaginal *cul-de-sac*, I concluded to remove it for the purpose of enlarging this opening. I attached a long silver wire, doubled, to its lower end, and drew the tube out at the abdominal opening, leaving the wire in its stead, to serve the purpose of drawing another tube through when necessary. When the tube was removed I found its fenestræ obstructed with gelatiniform secretions. The opening in the abdomen, and the one in the *cul-de-sac* of the vagina, seemed to compress the tube, and, in a measure, to impede the flow through it; so I concluded to enlarge these two openings.

9 P. M.—Harry Sims gave her nitrous-oxide gas, and I removed the lower suture and broke open the abdominal wound, so as to admit the end of the index-finger. I then tried to enlarge the opening in the *cul-de-sac* of the vagina, but it was not so easy as might be supposed. Indeed, it was very difficult. The opening was so small that it was not easy to find it. After incising it bilaterally, and making it large enough to admit the end of the index-finger, I expected to pass the finger freely into the peritoneal cavity, and to sweep it round behind the uterus. But this was not the case; instead of entering freely into the peritoneal cavity, I was greatly surprised to find that the finger entered only a narrow canal, along which I forced it with the greatest difficulty for an inch and a half or more. This canal seemed to be formed of fibrinous bands that had completely capsulated the drainage-tube. After this opening was enlarged, I passed a gum-elastic catheter through it into the peritoneal cavity, and about four and half ounces of clear reddish serum were drained off. I was surprised at not getting a larger quantity after enlarging the two outlets. Hence the operation was useless, and I regretted afterward having subjected my already-exhausted patient to such a severe ordeal. The gas, which she inhaled resistingly, the operations, and the fright she got into, seemed to be a dreadful shock to her, for her pulse went from 116 at 9, up to 130 at 11 o'clock P. M.

August 30th, 8.15 A. M.—Under the influence of morphia she had a quiet night's rest. The tube has discharged freely, and she is completely exhausted. She is taking brandy and

beef-tea freely, and this morning she chewed a little beef-steak.

Dr. Cahoon gave one-quarter of a grain of morphia at 8—the only dose since 10 o'clock last night. Pulse 132. Washed out peritoneal cavity. Got a large quantity of flocculent, brownish sediment out of it. Attached a Davidson syringe to upper end of tube and sucked up from the cavity an ounce or more of thick, chocolate-colored sediment. When the vaginal end of the tube projected from the vagina, air passed freely through the tube, and the peculiar chocolate-looking paste was easily drawn up by the syringe. But when the lower end of the tube was crowded into the vagina, and the vulva closed, so that no air was admitted, I could draw nothing whatever with the syringe from the peritoneal cavity by the upper end of the tube; and why? Because the suction-power only drew the soft parts in contact with the tube into the fenestræ, and hermetically closed these little openings.

This also proved that there was no large amount of free fluid in the peritoneal cavity, at least along the track of the tube.

11.20 A. M.—Washed out peritoneal cavity again. Pulse 128; temperature 102° .

1.30 P. M.—The dirty, chocolate-colored discharge very free since last visit, especially by lower end of tube. Patient imagines it has more odor than before, but I do not discover it. One-quarter of a grain of morphia.

4.45 P. M.—Discharge by lower end of tube freer than it has ever been. Has had no colicky pains since last night's work. Washed out cavity. Large quantities of brownish flocculi in the water. Pulse 128; temperature 102° .

7 P. M.—One-quarter of a grain of morphia.

8.40 P. M.—Discharge very copious in the last four hours; contains less of the chocolate-colored sediment. Pulse 130; temperature $102\frac{2}{10}^{\circ}$.

12 N.—Continued discharges from lower end of tube, with decidedly less coloring-matter than at any time before. One-quarter of a grain of morphia.

August 31st, 8.30 A. M.—Slept very well last night. Discharge very profuse, and almost wholly by vaginal end of

tube. No longer any brownish, chocolate-colored masses, but simply a dirty serum. Washed out peritoneal cavity. Pulse 120; temperature $101\frac{1}{2}^{\circ}$.

12 M.—Feels quite exhausted, and says she thinks the profuse discharge from the peritoneal cavity is the cause of the exhaustion, but on inquiry I find that the nurse has not comprehended instructions about giving nourishment and stimulants. She has been giving them by the teaspoon, when tablespoonfuls was the order. A more generous diet was immediately ordered. Pulse 128; gave one-quarter of a grain of morphia, and washed out the peritoneal cavity. The discharge is a dirty, muddy-looking serum, without the chocolate-colored sediment. For the sake of experiment, I concluded to remove the tube for a while; so a silver wire was hitched on to its vaginal end, and the tube was drawn out above, leaving the wire in its place. In addition to nourishment by the stomach, ordered beef-tea and brandy by rectum.

4.40 P. M.—Not much discharge by vagina, considerable by abdominal opening. Pulse 136, with greater evidences of exhaustion, although she has been taking more nourishment than at any time since the operation. Convinced that it would not be safe to leave the tube out any longer, it was hitched on to the wire and easily replaced.

5 P. M.—Pulse 136; temperature $101\frac{1}{2}^{\circ}$. One-quarter of a grain of morphia.

9.20 P. M.—Discharge by lower end of tube very profuse, very little by the upper end. Pulse 128; temperature $101\frac{1}{2}^{\circ}$.

September 1st, 8 A. M.—Rather a bad night. Discharge from lower end of tube very free, comparatively nothing above. Pulse 128; temperature $101\frac{4}{10}^{\circ}$.

September 2d, 1 P. M.—One-quarter of a grain of morphia.

September 3d, 8 A. M.—Has had a bad night. Refused to take morphia since 1 o'clock yesterday. Had diarrhoea and griping pain in bowels all morning. Has a splitting headache, talks wildly, and imagines all sorts of things. I explained to her that she had an attack of delirium tremens from the too sudden suspension of the use of the morphia, and I begged her to allow me to give her an hypodermic dose; gave nearly one-half of a grain. Pulse 120; temperature $100\frac{6}{10}^{\circ}$.

10 A. M.—Found her quiet and rational. Washed out peritoneal cavity. Water brought away only a few darkish, mucous-like flocculi, as it has done for the last two or three days.

Nothing can be more irksome than daily reports such as I have given above. But I have chosen to do so that others may draw their own conclusions from the history and facts of the case. It is unnecessary to continue them further. For the successful management of the case I am indebted to Dr. Nichols, of Boston, who left his home and remained by the bedside of my patient, in Newport, for more than three weeks. We came near losing her. As Mr. Spencer Wells would say, she barely "pulled through." When the operation was performed I said to the gentlemen present: "Cases like this where there are such extensive adhesions, and such an amount of bloody oozing, almost always die. But in this instance the bloody serum will be drained off as fast as it is exuded, and our patient will recover." Her recovery was slow and tedious, but she is now in good health. The drainage-tube was worn for about a month. I must acknowledge that there is some doubt in my mind as to the proper time for its removal. I am sure it ought to have been removed at least a week earlier in this instance.

For the fifth drainage case I am indebted to the courtesy of Dr. W. T. Walker, Assistant-Surgeon to the Woman's Hospital.

Mrs. Burley L., aged thirty-seven, married; had one full term labor and five abortions before she was twenty-four years old. A year after the last miscarriage, say twelve years ago, she discovered some enlargement of the left iliac region, which gradually extended over the whole abdomen, and eventually it was necessary to tap it, when a large quantity of fluid was evacuated. It gradually refilled, and two years afterward it was tapped a second time, and in one year after this a third time. In ten months more she was tapped a fourth time. Eight months after this it refilled again, but soon disappeared spontaneously, without any interference whatever. She was then free from all appearances of a tumor till about three years ago, when the right side of the abdomen began to enlarge, and has continued to do so till now the tumor occupies

the whole abdominal region. During all this time the menses have been regular and normal in quantity.

She was admitted to the Woman's Hospital on the 4th of November, 1872. She measured forty inches in circumference, and the tumor was diagnosed unilocular ovarian cyst; and, as the general health of the patient was fair, it was pronounced favorable for operation. She had arrived at the period when it was necessary either to tap the tumor or to remove it. On due consideration, she selected the latter, and Dr. Walker performed the operation on the 8th of November. He made the usual incision, about three inches long, and, when he arrived at the peritoneal membrane, he found it everywhere adherent to the cyst anteriorly and laterally, and it was necessary to enlarge the incision. The adhesions were very firm and difficult to break up. After they were all separated, the cyst was punctured, and twenty-seven pounds of chocolate-colored, viscid, albuminoid fluid were evacuated. The pedicle (right) was enucleated from the cyst, and bled very freely. Two small vessels were ligated with cat-gut, and, as there was a good deal of bloody oozing from the enucleated surface of the pedicle, this surface was folded together longitudinally and stitched up with half a dozen turns of fine silver wire; the end of the pedicle was then transfixed with a strong silver wire and tied with the figure-of-8 loop. On searching for the left ovary, he found its place occupied by a flat, irregular-shaped body, some three or four inches long by about two wide, and a half-inch thick, having somewhat the color and appearance of a small pancreas flattened out. This was removed, and its pedicle ligated as usual with the figure-of-8 loop of strong silver wire. There were four small pedunculated fibroids on the fundus and posterior wall of the uterus, two about the size of filberts, and two not larger than English peas. Mr. Spencer Wells cautions against the temptation to interfere with such outgrowths. Nevertheless, these were removed; the peduncles of three were tied with very fine silver wire. A small one on the top of the uterus was twisted off, but the torsion did not prevent bleeding, and, after some delay, it was arrested by the actual cautery.

The peritoneal cavity was then cleared of coagula, and a

puncture made in the *cul-de-sac* of the vagina for a drainage-tube. This part of the operation Dr. Walker kindly asked me to take charge of, and I alone am responsible for its bad performance.

When a puncture is to be made in the *cul-de-sac* for drainage purposes, it is reasonable that it should be made in the very lowest point of the pouch where the vagina and rectum are reflected from each other.

When my second case was operated on at Newport (page 46), the two punctures were made at the lowest point. It will be remembered that the tube on the left side was displaced and then removed, and, when I attempted to replace it a few hours afterward, I found it impossible to do so, because the little puncture was made diagonally through the vaginal septum, and I could not find it. I thought at the moment, if it had only been made in the central part of the pouch up nearer the cervix uteri, that it would have been more easily detected.

Again, when I operated on my fourth case (page 58), the puncture was made at the lowest point just where the vagina is reflected from the rectum, and in this instance, when it became, as I thought, necessary to enlarge this puncture, I found that the anterior or vaginal portion of the *cul-de-sac* was firmly united to the posterior or rectal portion by a solid exudation of fibrin which formed a perfect tube or canal around the drainage-tube. Now, to avoid these accidental complications, I determined, in Dr. Walker's case, to make the puncture in the *cul-de-sac* high up in close proximity to the cervix, thinking that the uterus by its own gravity would sink to the lowest part of the pelvis, and naturally hold the vaginal wall and rectal wall of the Douglas *cul-de-sac* in close apposition; and thus, while the puncture would be at least two inches above the lowest point of the *cul-de-sac*, I supposed it would be virtually on the same level with it. In making the puncture I passed the trocar from above downward, instead of from below upward. The special reason for this was, that I intended to use a short silver tube, to be drawn into the *cul-de-sac* from the vagina. The trocar, like hospital instruments generally, was very dull, and, when I attempted to push it through

the *cul-de-sac* from above against my left index-finger in the vagina, it unfortunately slipped a little, and passed through, not centrally, as I intended, but just to the right of the cervix and on a level with it.

I knew what had happened, but thought it would make no difference as to the consequences. The opening made by the trocar was too small to allow the passage of the silver instrument, so it was laid aside and a long caoutchouc drainage-tube was substituted for it. One end of the tube projected from the vagina, the other passed out at the lower angle of the abdominal wound, and hung down over the pubes. The peritoneal cavity being again thoroughly cleaned out, the abdominal incision was closed with the continuous silver-wire suture; the abdomen covered with cotton secured by adhesive plaster, and the patient put to bed. Dr. Baker gave ether. The operation lasted one hour and twenty minutes.

Before the operation, the pulse was 84; after it 96. She complained of pain, and Dr. Cleveland gave McMunn's elixir of opium by the rectum.

When the *cul-de-sac* of the vagina was punctured, and the drainage-tube introduced, some arterial blood flowed out by the vaginal end, but this soon ceased, and in two hours following the operation about eight ounces of blood and bloody serum (mostly blood) flowed out through the long abdominal end of the rubber tube into a vessel placed between the thighs. I am very sure that this was from the artery wounded by the trocar.

10 P. M.—A small quantity of bloody serum has passed by the upper end of the tube, none by the lower. Pulse 100; temperature $100\frac{3}{8}^{\circ}$. Urine normal in quantity and appearance. Some pain and soreness in lower part of abdomen. No nausea; no vomiting. Skin warm. One-quarter of a grain of morphia by skin.

November 9th, 7.30 A. M.—Passed a comfortable night. Pulse 104; temperature $99\frac{3}{8}^{\circ}$. Pulled the drainage-tube down so as to inspect the portion of it that lay in the Douglas *cul-de-sac*, and found it filled with coagula, which accounts for the blood and bloody serum passing out by the upper end of the tube last evening, instead of taking the shortest and most direct route out of the pelvic cavity.

2 P. M.—Washed out the peritoneal cavity by injecting water through the upper end of drainage-tube. It did not pass out by the vaginal end till the tube was moved up and down, and then it passed through, at first of a reddish tinge, and afterward quite clear. She complained of pain, and we gave one-quarter of a grain of morphia by skin.

7.40 P. M.—She is lying quietly and comfortably on the left side. Pulse 104. About an ounce of bloody serum has drained off by the upper end of the tube in the cup placed to catch it. No drainage whatever by the vaginal end, which is probably compressed where it passes through the puncture in the *cul-de-sac*. Pulse 100; temperature by vagina $102\frac{2}{5}^{\circ}$, by axilla $101\frac{2}{5}^{\circ}$; one-quarter of a grain of morphia.

November 10th, 7.40 A. M.—Pulse 94, full and strong; skin warm and soft; urine drawn last night and this morning normal. She asked for raw beef-steak, which was ordered for her. No discharge by either end of the drainage-tube.

11.30 A. M.—Pulse 96; temperature $100\frac{4}{5}^{\circ}$. The nurse left the room for a moment, and the patient got up out of bed and walked to the easy-chair, where she was found sitting quietly when the nurse returned and put her to bed again. This mad effort did not seem to hurt her in the least. It produced no particular pain, and her pulse was only 100 afterward.

8 P. M.—About a teaspoonful of dark, bloody serum has passed by the upper end of the tube into the cup, and a small quantity of reddish serum has passed by vaginal end. Washed out the tube by injecting warm water, which passed out below of a deep-reddish tinge.

November 11th, 5 A. M.—Has been sleeping; now complains of pain; gave one-third of a grain of morphia. Pulse 100; countenance anxious, breathing spasmodic; some nausea, with eructation of colored fluid.

8 A. M.—Pulse 104; temperature 102° ; respiration 20; voice feeble; skin warm; lying on right side. No signs of drainage from tube during the night. Washed out the vagina; it was full of reddish serum. Washed out the peritoneal cavity by a small gum-elastic catheter, which was passed in by the side of the drainage-tube to the depth of four or five inches. At first the water was of a deep-reddish tinge, but soon it passed through clear.

10 A. M.—Pulse 110; temperature 102° .

1 P. M.—Pulse 116.

2 P. M.—Pulse 124; temperature $102\frac{3}{8}^{\circ}$.

7 P. M.—Warm water injected by tube; passed at first slightly reddish, and then clear.

7 P. M.—Fifteen minims of Magendie's solution by skin. In the last three hours there has been a good deal of nausea and vomiting.

9.40 P. M.—Pulse 120, small; skin rather cool; respiration labored. She seems to have had too much morphine, but is not narcotized. Washed out vagina, which contained reddish serum; washed out peritoneal cavity, not only by drainage-tube, but also by gum-elastic catheter passed deeply into pelvic cavity by the side of the tube. Water passed out below quite clear. Epigastrium tympanitic. No tympanites in lower part of abdomen.

November 12th, 7.40 A. M.—Slept none last night. Had occasional vomiting. Had beef-tea and brandy by rectum. Pulse 128; not so much opiatized as she was yesterday morning; took only twenty-five drops McMunn's elixir of opium by enema during the night. No outward drainage by tube, but the vagina contained a quantity of reddish serum, which was washed out. Water thrown into the peritoneal cavity came through below quite clear. The inference was, that the reddish serum drained from the Douglas *cul-de-sac* into the vagina as fast as it was formed or reached that point.

12 M.—Pulse 136.

2 P. M.—Vagina contained a small quantity of reddish serum, which was washed out. The tube seems to drain the peritoneal cavity, for I always find a teaspoonful or two of reddish serum in the vagina, while water injected by the upper end of the tube passes out below quite clear. Notwithstanding this evidence of complete drainage, her appearance is bad. Pulse 132; temperature 101° .

5 P. M.—Pulse 140; no vomiting to-day; temperature $102\frac{2}{8}^{\circ}$.

9 P. M.—Pulse 112; washed out vagina; water reddish. Washed out peritoneal cavity. First syringe-ful reddish, the remainder clear.

November 13th, 7.40 A. M.—Rested well all night; found her fast asleep, lying on right side. Pulse 108; temperature $101\frac{3}{8}^{\circ}$. Small quantity of reddish serum in vagina, giving a decided tinge to water injected into the vagina. Water injected into peritoneal cavity went through slightly tinged with red.

3 P. M.—Has had several loose passages in the last six hours. Has also vomited several times. Pulse 110. Ordered one-quarter of a grain of morphia, also brandy and beef-tea by enema.

5.20 P. M.—Still suffering a good deal of pain. Epigastrium tympanitic. Pulse 112.

8.30 P. M.—Pulse 116.

10 P. M.—Pulse 126, and very weak; breathing labored. Temperature $101\frac{1}{2}^{\circ}$. Diarrhœa and occasional vomiting during the night, and she continued to sink, and died at 9.35 A. M., on the 14th, five days and nineteen hours after operation. Just twenty-four hours before death she had every appearance of recovery. Her pulse was 108; temperature $101\frac{3}{8}^{\circ}$. She had passed a good night. Had a cheerful aspect, warm skin, normal secretion of urine, and some appetite. But all at once diarrhœa and vomiting set in, and in three or four hours she was prostrated to the point from which there was no chance of recovery. If there had been no *post mortem*, the hospital record would in all probability have terminated with the following entry: "Died of exhaustion." But a *post-mortem* examination was made by Dr. H. D. Nicoll, Pathologist to the Woman's Hospital, and he has furnished me with the following notes:

"*Post mortem* of Mrs. Burley L., made November 14, 1872, six hours after death.

"*Rigor mortis* well marked. Body and extremities considerably emaciated. Abdomen largely distended and tympanitic. The incision in the median line extending from just below the umbilicus to within two inches of the symphysis pubis had been closed by eight silver sutures. Union had taken place throughout the entire extent of the wound, except at the lower angle, where the drainage-tube had passed. Some folds of the small intestine and a portion of the omentum were attached to each other and to the walls of the abdomen by

a very slight lymphic exudation which was easily broken up. The stomach and intestines, particularly the transverse colon, were greatly distended with fluid and gaseous products. The ovaries were absent, but their places were marked by the presence of pedicles ligated with silver wire. Uterus was slightly hypertrophied; the cavity measured three inches. An intramural fibroid the size of a small almond was found in its anterior wall, a little to the right of the middle line. The seat of three fibroids on the fundus and posterior wall of the uterus was marked by small loops of silver wire passed around their respective pedicular attachments. The seat of the fourth on the fundus was shown by discoloration of tissue made by the cautery. The puncture in the *cul-de-sac* of the vagina for the exit of the drainage-tube was made on a line with the os uteri and a little to the right of it.

"The pouch between the bladder and uterus contained nearly an ounce of reddish serum. The pouch of the Douglas *cul-de-sac* contained nearly five ounces of deep-colored reddish serum. The Douglas *cul-de-sac* extended down between the rectum and vagina to an unusual degree. It ran down to within two inches of the perinæum, and was full of reddish serum. There was no other fluid exudation in any other portion of the peritoneal cavity."

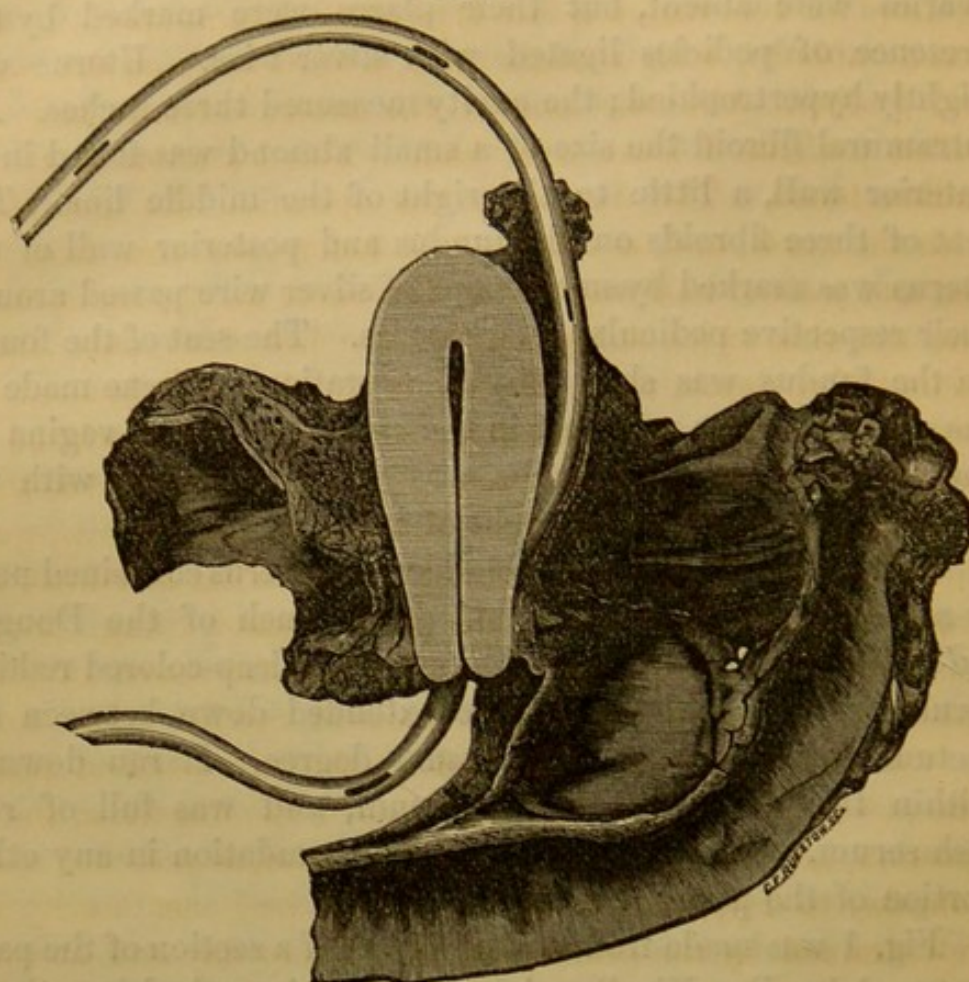
Fig. 1 was made from a photograph of a section of the parts removed by Dr. Nicoll. After the specimen had been in alcohol for five or six weeks, it was taken out, and the rectum, vagina, and bladder, were stuffed with cotton-wool, and allowed to harden in the cold. (If the weather had been warm, we would have placed it in a freezing mixture.) The cotton was then removed and the section was made. It is valuable only as showing the exact relations of the drainage-tube with the uterus and *cul-de-sac* of the vagina.

I sent the reddish serum, obtained at the *post mortem*, to Dr. Waterman for analysis, and he reported as follows:

"The red serum shows the absorption bands of blood between D and E of the spectrum when diluted with water. Left in the tube (used for the procedure) for several hours, these two lines disappear, and give room to the broad band of reduced hæmato-crystallin.

"Submitted to the microscope, the fluid contains a very large number of blood-corpuscles, more than is usually found

FIG. 1.



in normal serum. These corpuscles have an unusually pale appearance. They are swelled up and look globular, with loss of discoid form. Besides these blood-corpuscles, we find floating a fibro-globous plastema in lumps, and also in delicately twisted, fibrillated, wavy curls. There are a number of nucleated cells having a dark appearance, which are most probably pus-cells. Vibriones and a very offensive smell point to putrefactive condition.

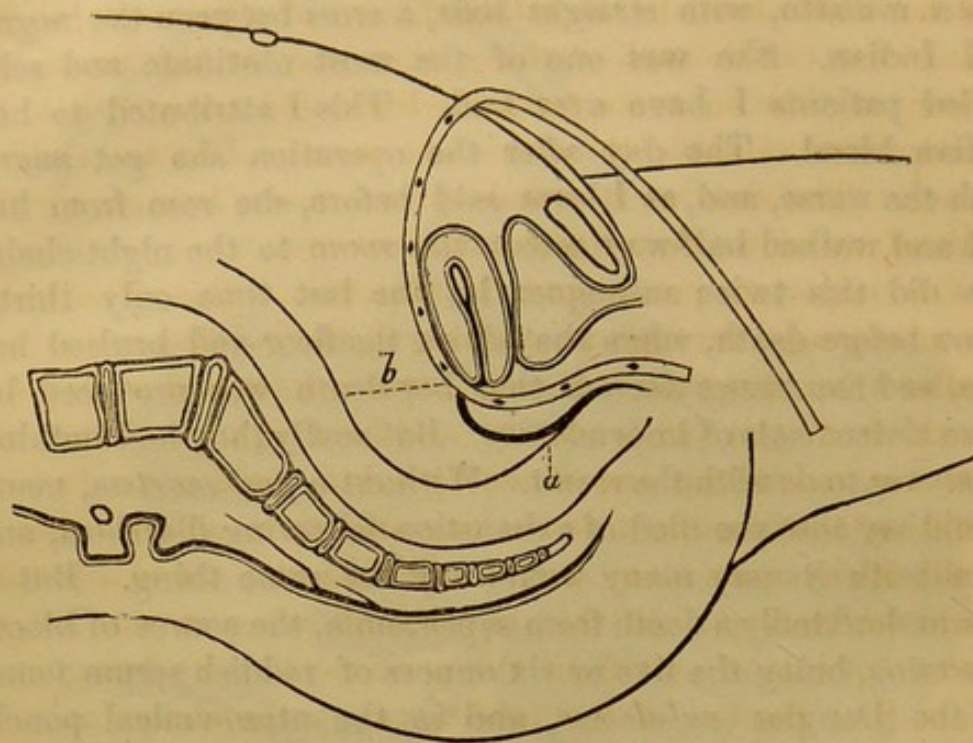
"That a fluid thus constituted, advanced to putrefactive activity, is able to form or to create septicæmic conditions, is of course conceded."

It is too often our habit to try to explain away the cause of death by some accidental complication, some neglect of the attendants, or some wilful disobedience of the patient. It

would be very difficult to convince any of the nurses at the Woman's Hospital that this poor woman did not sacrifice her life by her own imprudence. She was a remarkable personage, and for this region a rare type of the human species. She was a mulatto, with straight hair, a cross between the negro and Indian. She was one of the most obstinate and self-willed patients I have ever had. This I attributed to her Indian blood. The day after the operation she got angry with the nurse, and, as I have said before, she rose from her bed and walked half-way across the room to the night-chair. She did this twice subsequently, the last time only thirty hours before death, when she fell on the floor and bruised her face, and the nurses declare that her death was produced by these violent acts of imprudence. But really they had nothing whatever to do with the result. Without a *post mortem*, many would say that she died of exhaustion following diarrhœa, and even with it very many would say the same thing. But it was undoubtedly a death from septicæmia, the source of blood-poisoning being the five or six ounces of reddish serum found in the Douglas *cul-de-sac*, and in the utero-vesical pouch. The absorption of this poison produced the diarrhœa, the exhaustion, and death. The notes of the case, as recorded above from day to day, went to show that the peritoneal cavity was well drained by the drainage-tube. Every day and at every visit we found a small quantity of reddish serum that had leaked through the drainage-tube into the vagina, there remaining till it was washed out by injecting warm water into the vagina; and then, when water was injected through the upper end of the tube, it passed out below, at first faintly tinged red, and soon it became clear; and again, when water was thrown into the peritoneal cavity by a gum-elastic catheter passed through the abdominal opening by the side of the drainage-tube, it passed out in the same way, at first slightly tinged, and then clear. The *post mortem* proves that all this was fallacious; that there was a part of the pelvic cavity in the Douglas *cul-de-sac* that lay below the level of the outlet by the drainage-tube, and could not, therefore, be drained at all or influenced in the least by any amount of fluid injected into the peritoneal cavity.

This may be better explained by the diagram, Fig. 2. Here the drainage-tube is represented as passing through the *cul-de-sac* of the vagina in contact with the cervix uteri instead

FIG. 2.



of through the lowest point of the pouch, where the vagina and rectum are separated at *a*. If any fluid found its way into the pouch between the lowest point (*a*) and the imaginary line (*b*), it would remain there, because it was below the level of the outlet from the pelvic cavity by the tube. And this is exactly what we found in this instance. If the puncture had been made where it ought to have been made, at the lowest point (*a*), there is every certainty that the fluid found in this pouch would have been drained off, and, as a consequence, there is every probability that our patient's life would have been saved.

Instead of saying that she died in consequence of her imprudence in getting up and walking about the room, as the nurses believe, or that she died of exhaustion following diarrhœa, as the non-post-mortemist would say, let us place the blame where it belongs. She died of blood-poisoning from the absorption of a decomposed bloody serum retained in the utero-rectal pouch, because the puncture in the *cul-de-sac* for

its drainage was improperly made. It is hard that life must be so often sacrificed to establish correct principles of treatment! While I lament and regret the death of our patient, I have great comfort in feeling that she has not died in vain; that her death leads to the establishment of a principle, so far as one case can do such a thing, that may be the means of saving, in time to come, valuable lives, and many, it is to be hoped, more valuable than this one sacrificed on the altar of science. The case as it stands proves more, I think, for the truth of my views than if she had recovered.

One important point, not to be forgotten, is this: The drainage-tube passed through an opening in the *cul-de-sac* that was smaller than the tube. Hence it was compressed at its point of exit from the pelvic cavity, and held tightly. When the tube was moved up and down by taking hold of its two extremities, and pulling first on one and then on the other, it would always pass along with a sudden jerk; the elastic tube would be thus put on the stretch, and, when it was let go, the two points of exit from the peritoneal cavity being fixed points, that portion of the tube between the abdominal and the vaginal openings would necessarily contract to its normal state, and thus, becoming shorter than when it was on the stretch, it would elevate the uterus and the vaginal portion of the *cul-de-sac* up in a line toward the abdominal opening, and thus enlarge the pouch between *b* and *a* where the reddish serum was found. The elasticity of the tube was thus mischievous in a marked degree.

The great lesson from this case is to make the puncture at the lowest part of the Douglas *cul-de-sac* at *a*. Another important lesson is in reference to septic fluids in the utero-vesical pouch. We found nearly an ounce of reddish serum in this pouch, and there was no possibility of its escape by drainage. In washing out the peritoneal cavity hereafter it would be well to pass, not a flexible gum-elastic catheter, but a silver tube through the abdominal incision down between the uterus and bladder, and forcibly wash out this pouch and overflow its contents (if any) into the Douglas *cul-de-sac*. This would be easily done by first introducing the index-finger

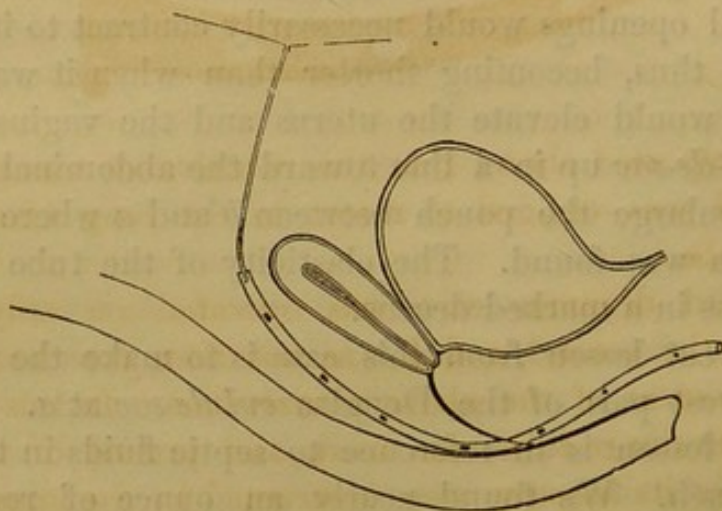
into the vagina, and then passing the end of the syringe down into the utero-vesical pouch from above. The anterior *cul-de-sac* could be thrust upward by the point of the finger, and the fundus uteri thrown backward, thus making drainage from the utero-vesical pouch into the Douglas *cul-de-sac* very prompt and thorough.

This manœuvre becomes important, when we call to mind the fact that Mr. Spencer Wells reports a case dying of pyæmic poisoning, where the utero-vesical pouch was full of pus, while he had completely drained the Douglas pouch by a puncture through the vagina behind the cervix uteri.

Let us look back at these five cases, and, comparing the method of drainage in each, see how the question stands at this moment.

In the first case the puncture was made at the lowest point of the Douglas *cul-de-sac* just where the rectum and vagina separate, and a Chassaignac drainage-tube, about eight inches long, was introduced and held in place by a double silver wire,

FIG. 3.



which was brought out at the lower angle of the abdominal incision. The tube was held in position by bending the ends of the wires over each side of the abdomen. The part of the tube just within the vaginal *cul-de-sac* doubtless became surrounded by a coating of fibrinous exudation, for, on its removal, water could not be injected into the peritoneal cavity

in a larger quantity than an ounce without producing some pain, and it would be thrown out in a jet, thus indicating that it was injected into a closed pouch, and not into the free cavity of the peritonæum.

This I did not understand at the time, but it was made clear in the fourth case. In my second case (the uterine cyst) there were two punctures made into the peritoneal cavity through the vaginal *cul-de-sac*, one passing also into the bottom of the uterine cyst behind the uterus. They were both made at the lowest point of the Douglas *cul-de-sac*. One tube slipped out, and I was not able to replace it. I did not use the caoutchouc elastic tube. I thought it would be enough to introduce a short tube of some hard substance that would be self-retaining. Accordingly, I had some tubes made of hard rubber about the shape of the cock's spur, and about two and a half inches long. The diagram represents the tube nearly of actual size and shape. It had three openings on each side.

FIG. 4.



The case reported shows that this contrivance was a failure, and that I was obliged to resort to the long Chassaignac drainage-tube.

My third drainage case was operated on only a few days after the second, and I was not then convinced of the utter uselessness of the above contrivance. In this case the cock-spur drainage-tube was used, and proved of no value whatever, for its fenestræ were obstructed by the lateral pressure of the parts in contact with it. When it was removed, about twelve hours before the death of the patient, a pint of reddish serum, more or less, passed out by the puncture which it had occupied, but there was more than twenty ounces of the poisonous fluid still left in the peritoneal cavity, and death was the result. In the fourth case the puncture was made in the lowest part of the Douglas *cul-de-sac*, and a drainage-tube introduced entirely through the pelvis, one end

hanging out of the vagina and the other passing out of the abdomen at the lower angle of the abdominal incision, and then falling over the pubes.

On the fifth day I concluded that the tube was obstructed by a contraction of the punctured opening through which it passed into the vagina, and so determined to enlarge the opening. I was greatly surprised to find, when the opening was enlarged by incision bilaterally, that the finger could not pass into the peritoneal cavity, but entered into a dense, inelastic tube of well-organized fibrinous structure which had surrounded the drainage-tube for at least two inches. How much more it was impossible to determine. This fact, and the experience of the first case, determined me to make the puncture thereafter, not in the lowest part of the *cul-de-sac*, but as near the cervix uteri as it could be made, and with what result has already been detailed in the history of Dr. Walker's case, in which he so kindly allowed me to make the puncture. This case proves, beyond question, that the proper place to make the puncture is at the lowest point of the Douglas *cul-de-sac*, just where the rectum and vagina diverge from each other. While I am satisfied on this point, and while I am convinced more than ever that drainage should be made through the *cul-de-sac*, I am not satisfied with the *tube à drainage* of Chassaignac for the purpose. In Dr. Walker's case I attempted to introduce a self-retaining silver tube through the puncture in the *cul-de-sac*, but failed on account of the unfitness of the mechanical contrivances at hand at the time. If I had succeeded, I think our patient might have stood some chance of recovery, because the little tube would not in the least have disturbed the easy and natural relations of the boundaries of the *cul-de-sac*; whereas, with the Chassaignac tube, as already explained, the uterus was elevated and lifted up toward the abdominal incision, thus allowing four and a half or five ounces of reddish serum to settle down into the pouch below the level of outlet by the drainage-tube. With the silver tube unattached by any contrivance above, the uterus would naturally have gravitated to the level of the lowest point of the *cul-de-sac*, and then the drainage might have been complete.

From the above it will be seen that I have had five desperate cases in succession. The first, second, and fourth, were evidently saved by the drainage system. No one who witnessed the operations thought it possible for either of them to recover. Nor do I believe their recovery would have been possible under other circumstances. The third case would, in all probability, have died even if the drainage had been good. But the cockspur tube arrested the discharge from the peritoneal cavity as effectually as if the puncture in the *cul-de-sac* had been filled with a cork or any other solid substance. It is perfectly plain that the fifth case died in consequence of the imperfection of the drainage.

Again, let me repeat, I am convinced that the principle of drainage by the *cul-de-sac* of the vagina is correct; and that the outlet or puncture should be made at the lowest point of the Douglas *cul-de-sac*. But I am not satisfied with any method as yet adopted for drainage. Fearing that the ordinary caoutchouc tube of commerce contains some element that may be noxious in itself, I had some tubes made of pure black soft rubber. But they were too soft and too easily compressed to be depended upon.

I cannot give up the principle of a self-retaining tube, to be left in the puncture in the *cul-de-sac*. Fig. 5 represents a silver tube, about the size and shape of the instru-

FIG. 5.



ment I have had made. The little rings on the vaginal end are for the purpose of preventing the instrument from turning on the side. It is large enough for a No. 4 or 5 catheter to be passed through it into the peritoneal cavity, and at the same time to allow a free return of water or other fluids from the cavity.

Figs. 6 and 7 represent one and the same instrument; Fig. 6 the canula closed and ready for introduction; Fig. 7, its appearance after it is lodged in the Douglas *cul-de-sac*. To introduce it, a loop of wire twelve or fifteen inches long is passed

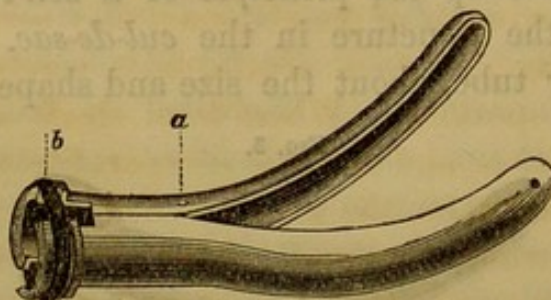
through little holes in the end of the two blades; they are then closed and the wire is twisted tightly to hold them so; the *cul-de-sac* of the vagina is to be punctured with the trocar from above downward; the trocar is to be withdrawn, and then the wire attached to the end of the tube is to be passed

FIG. 6.



along the canula till the point of the drainage-tube rests in the open end of the canula; pull the canula out, and at the same time draw the tube up through the opening in the vaginal

FIG. 7.



cul-de-sac; then cut the wire loose from the tube, and the little rubber band at *b* will contract, and, as there is a pivot-joint at *a*, the blades will open, as shown in Fig. 7. Thus, it becomes a fixed, self-retaining instrument. To remove it, clip the rubber band *a* with a pair of scissors, and with a pair of common dressing-forceps it will be easily drawn out.

As yet I have had no opportunity of using either of these instruments, but I would prefer the one represented by Fig. 5, because it is simple and easily managed.

I do not pretend that the short drainage-tube would be of

universal applicability. In cases like that described on page 39, the Chassaignac drainage-tube would be indispensable.

I do not expect the profession to accept my views all at once. It is very difficult, for those who have always believed that ovariectomy kills by shock and peritonitis, to turn suddenly to the belief that simple blood-poisoning is the cause and manner of death. It is the general belief that, when septicæmia causes death, it does so by a slow process, taking not hours, but days and weeks. It is impossible for such as hold these views to believe that it may kill in a few hours. Truth travels slowly, but surely. The medical scientists of England, France, and Germany, indeed of all Europe, are now working out the great problem of blood-poisoning, and I feel sure that they will establish the fact that septicæmia, under some circumstances, will kill just as easily in five or six hours as, under others, in five or six days.

There is no more reason why the system should not be suddenly overwhelmed by the rapid absorption of concentrated septic fluids, than by the rapid absorption of a powerful dose of morphine. Opium in sufficient quantities will kill in from eight to twelve hours. Septicæmia will do the same thing often in less time.

Death from wounds of the abdomen may occur from shock, from hæmorrhage, or from septicæmia; rarely from peritonitis, properly speaking. When from shock or hæmorrhage, there is no reaction, and death is comparatively sudden. Reaction once established, the shock is over, and the direct danger from hæmorrhage is passed. I have long held and promulgated these views, and, when I went with the Anglo-American ambulance to Sedan, I had the opportunity of testing their truth. We had seven cases of wounds of the abdomen, and they all died, most of them within twenty-four hours. I made *post-mortem* examinations in several of these, and in all I found an effusion of reddish serum in the pelvic peritoneal cavity, and in all death was evidently the result of septicæmia. I saw several cases of recovery where balls passed through the pelvis, wounding the bladder or bowel, or both; but no recovery where the wound was above the brim of the pelvis.

MacCormac¹ gives an account of three cases of pelvic gunshot-wounds that recovered under treatment in the Anglo-American ambulance at Sedan. In one case, "the ball entered on the left side of the coccyx, traversed the rectum and bladder, and emerged just above the symphysis pubis. For a considerable time all the fæces passed by the posterior opening, while the urine flowed entirely by the anterior wound. He recovered without one single unfavorable symptom. Both wounds had closed by the 18th September, and remained so till his discharge from hospital on September 28th, when he appeared as well as if nothing had happened to him." MacCormac saw three other cases of gunshot-wound of the bladder recover without an accident, two in a Belgian ambulance, and the third under Dr. Junker, at the *Château de Bazeilles*. Four days after the battle of Sedan, I went to Mézières, for supplies for our wounded soldiers. Travelling under the banner of the red cross, we were hailed at almost every hamlet, and asked to visit the sick and wounded. Among the great number demanding our care, Harry Sims called my attention to a young German who was shot through the pelvis. The ball entered about two inches above Poupart's ligament, and midway between the linea alba and the crest of the ilium on the left side, and passed directly through the pelvis, wounding the sigmoid flexure. Fæces passed by both openings, but, of course, more freely by the one behind. His pulse was but 78, and there was no pain in any part of the abdomen. Indeed, he had every appearance of a rapid recovery. He was among French wounded, could speak only his own language, and his greatest suffering was from nostalgia. When my son spoke to him in German, and gave him every assurance of a speedy cure, and of an early removal to a German ambulance, it seemed to raise his drooping spirits, and, from my experience of similar cases before alluded to, I have scarcely a doubt that he eventually got well. Now, here was a poor fellow shot through the pelvic peritoneal cavity, and yet there was not the least constitutional disturbance, nor the first symptom of peritonitis; and why was this, when all those

¹ "Notes and Recollections of an Ambulance Surgeon," etc., by Wm. MacCormac (pp. 73, 74).

with wounds of the peritonæum above the pelvis invariably died within twenty or thirty hours? There was no exception to this rule. The answer is simple and self-evident. In the pelvic wounds there was a direct outlet or drainage for reddish or septic serum, which is always found in peritoneal wounds, and is always the cause of death when retained. Wounds of the abdomen, properly speaking, were universally fatal, because the septic fluids could not escape, but gravitated to the lowest part of the cavity, were there retained, then absorbed, and thus produced death. I have alluded to my Sedan experience, because I believe it establishes very clearly that the principle of drainage at the most dependent part of the peritoneal membrane is the correct method of treating wounds of the peritonæum. Pleuritis was formerly occasionally fatal, but no one now-a-days dies of it. It terminates sometimes in an abundant effusion, that may kill by suffocation, and again in the exudation of a pyæmic fluid that kills by blood-poisoning. But in this enlightened day death never occurs in this way, because the effusions, whether benign or pyæmic, are promptly evacuated and life is saved, and so it shall be in diseases and wounds of the peritonæum. The time will assuredly arrive when peritonitis, so called, will not kill, because we will learn that the effusions in the peritoneal may be as safely evacuated as those of the pleural cavity; that the danger will consist, not in opening the peritoneal cavity, but in keeping it closed with its retained fluids to poison the blood and take the life of the poor sufferer. The time will also come when gunshot and other wounds of the abdomen, and perforations of the intestine, will be treated by opening the peritoneal cavity, and washing out or draining off the septic fluids that would otherwise poison the blood; for death in all these cases is produced by the same causes and in precisely the same way, and they will require the same plan of treatment.

The incidental allusion above to my Sedan experience opens up an interesting field of inquiry, to which I hope to return at some early day.

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