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PRACTICAL OBSERVATIONS  
ON THE  
LATERAL OPERATION OF LITHOTOMY,

BY  
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(From the Edin. Med. and Surg. Journal, No. 159.)

# STATISTICAL OBSERVATIONS.

In my paper on Hospital Statistics of Stone in the *Lancet*, as occurring in the *Lancet*, published in the January number of the "Edinburgh Medical and Surgical Journal" for this present year (No. 158, page 123), the tables show that between the age of 50 and 60, six were operated on, and all recovered; between 60 and 70, seven were operated on, and all recovered; and between 70 and 80 years of age, one was operated on, and all recovered. These figures, however, only one death in thirteen cases, where the ages ranged from 50 up to 75; a result so unusual that I feel it my duty to offer a sufficient apology for my coming before the profession with a detailed statement of a mode of practice that has been attended with such signal success. I refrain from commencing the above results with the recorded experience of others at the age, for it should seem invidious, and because it is little needed, as the record must be in the hands of every member of the profession who takes an interest in this branch of our art, and all may find full information on the subject in Dr. Willis's work on the treatment of Stone in the *Lancet*, published in 1843. I trust enough is said to awaken an interest in the mind of every practical surgeon as to the subject of communication, when he is reminded that the number of cases in England is one in seven and one-half; and that in France, the proportion admits that between a fifth and a sixth of all the cases the operation are lost; that in England, beyond the age of 60, the rate of mortality rises to one in four or five, while in France, on the authority of the same author, it reaches one in every two or three. I present these figures in accordance with the facts that have been reported by competent and experienced observers, and I feel that the surgeon will be found that I agree with the majority of the present English operating surgeons; in some points I





## PRACTICAL OBSERVATIONS, &c.

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IN my paper on Hospital Statistics of Stone in the Bladder, as occurring in the Aberdeen Infirmary, published in the January number of the "Edinburgh Medical and Surgical Journal" for this present year, (No. 158, page 123), the tables show that, between the age of 50 and 60, six were operated on, and all recovered; between the age of 60 and 70, seven were operated on, and all recovered; and that of six operated on between 70 and 80 years of age, five recovered; giving, therefore, only one death in nineteen cases, where the ages ranged from 50 up to 78; a result so unusual that I trust it may form a sufficient apology for my coming before the profession with a detailed statement of a mode of practice that has been crowned with such signal success. I refrain from contrasting the above results with the recorded experience of others at like ages, lest it should seem invidious, and because it is little needed, as such record must be in the hands of every member of the profession who takes an interest in this branch of our art, and all may find full information on the subject in Dr. Willis's work on the treatment of Stone in the Bladder, published in 1842. I trust enough is said to awaken an interest in the mind of every practical surgeon to the annexed communication, when he is reminded that the mean mortality in England is one in seven and one-fifth; and that in France, Dupuytren admits, that between a fifth and a sixth of all who undergo the operation are lost; that in England, beyond the age of fifty, the rate of mortality rises to one in four or five, while in France, on the authority of the most eminent French surgeons, it reaches one in every two or three.

I proceed, therefore, in accordance with the promise made in my last paper, to communicate and explain the principles that have guided me in practising the operation of lithotomy.

In many particulars it will be found that I agree with the majority of the present English operating surgeons; in some points I



differ ; the latter only will call for special remark in passing. No claim is put in to originality in being the first to propose the mode of operation which I have so successfully practised and do so strongly recommend. I have borrowed ideas from every quarter, adopting what my judgment taught me was right in the practice of a variety of operators, and discarding what I thought wrong, and after all, find that I make but a close approximation to one of the plans of operation as successfully practised by the father of English surgery, Cheselden, 100 years ago, as by any one of his fickle successors. Encouraged in my conclusions by noticing the favourable results in the practice of one class of lithotomists, and profitably warned by the disasters occurring in that of another, I am chiefly anxious to rivet attention on a few fixed principles, by acting out which, other operators may, with certainty, calculate on results as fortunate as those above stated.

My remarks will bring out what I wish to say more clearly by the aid of classification. I will therefore treat,

- I.—Of the preparation of a patient for lithotomy.
- II.—Of the instruments employed in the operation.
- III.—Of the line of first incision.
- IV.—Of the line of second incision
- V.—Of the mode of entry into the bladder.
- VI.—Of the mode of extracting the stone.
- VII.—Of possible accidents during the operation, and modes of dealing with them.
- VIII.—Of the general treatment after the operation.

I.—Of the preparation necessary before subjecting a patient to lithotomy. It will be seen, by referring to the tables already alluded to, that on the average every patient was  $60\frac{1}{2}$  days in the hospital,  $35\frac{1}{2}$  days of which being subsequent to the operation, gives  $25\frac{1}{3}$  days spent on each case in previous preparation. In young subjects I freely admit that very little preparation may suffice ; yet, my fixed opinion is, as no one seeks such a mode of relief until compelled by severe and protracted suffering, that every one would be the better for it. Their functions are less likely to be seriously disordered, and there are resources to draw upon in the vigour of their constitutions during the after treatment, but when the average age reaches  $56\frac{1}{2}$ , and a foreign body has been so long in the bladder as to acquire a weight exceeding eight drachms, it is not to be looked for that a patient should present in a fit state for operation. In some,



especially those far advanced in life, the body is wasted to a shadow, and the strength quite exhausted by incessant suffering and want of sleep. In most, the functions of the liver and whole digestive organs are deranged. In all, the bladder is in a highly irritable or in an actually inflamed state, as indicated by the amount of pain, the quality of the urine, and the copious ropy deposit from it. When any or all of these exist, I deem it a first duty to attempt their cure. The digestive organs are brought into a better condition by alteratives, (generally the mercurial pill), and light bitters. The strength is recruited by a generous diet, and the moment the inflammation in the mucous membrane of the bladder is quiet, wine is liberally allowed. The affection of the bladder is treated by enjoining absolute rest, moderate but repeated leeching over the pubis, followed by a succession of medium-sized blisters over the region of the bladder. The above, with the free use of diluents, such as thin gruel or lintseed tea, sums up the treatment in this one class of cases.

Another and very different class presents, aged usually from 50 to 55, fat and florid—in short, in the highest state of plethora, and in the worst possible state for lithotomy. These I have bled with advantage, but only as preliminary to a process of fining down by feeding them for two or three weeks on a light farinaceous diet. In those of this class which I have seen, the mucous membrane of the bladder was always inflamed, and leeches were freely applied, twelve and eighteen at a time, at times above the pubis, and occasionally, when the prostate was the seat of more pain than usual, they were applied to the verge of the anus, with excellent effects. Blistering was also practised in such, but with some precautions to hinder the absorption of cantharides—the chief was to remove the blister at the end of six hours, and complete the vesication by poulticing. In all cases of irritable or inflamed bladder, a flannel bag of hot poultice is the most common application to the hypogastric region, and very soothing it is to the feelings of the patient. It is thus seen how the time has been occupied between the day of admission and the day of operation. The annexed table will show how few or how many of a total of 23 had to go through such discipline, and also the exact time occupied in preparing each case

1 was operated on upon the 4th day after admission.

1	~	~	9th	~
3	~	~	14th	~
1	~	~	15th	~
1	~	~	16th	~



1 was operated on upon the 17th day after admission			
1	~	~	18th
1	~	~	20th
1	~	~	21st
2	~	~	24th
3	~	~	25th
1	~	~	26th
1	~	~	27th
1	~	~	37th
1	~	~	38th
1	~	~	44th
1	~	~	51st
1	~	~	74th, whose age was 74.
<hr/>			
23	Total.	25 $\frac{1}{3}$	as the average.

Some may think I am prolix on this head, but I wish it fairly to be seen, that, in my experience, few or none presented in which it would have been safe to have merely administered a dose of castor oil, and then have proceeded to operate. In a disease that has existed for months or for years, I can see no necessity for hurrying the patient to the operating table, especially as, during the period of preparation, the kind and attentive surgeon will have an opportunity of securing the well grounded confidence of the sufferer in his skill—a feeling desirable in every case where an operation is contemplated, but one almost essential to the success of lithotomy.

II—The instruments I use, and would recommend to others, are few and simple. With the exception of a forceps, the whole will be seen represented of exactly half their natural size, (superficial, not lineal measure,) in Plate IV. at the end of the present number of this Journal.

1. The staff is large, curved, and long in the curve, so as to enter well into the bladder, having a wide deep groove more on its lateral than on its convex aspect, but between them, the groove made to terminate abruptly, as a check, fully half an inch from the point of the instrument.

2. The knife is long in the handle, narrow and short in the blade, and, short as it is, its cutting edge is limited to an inch and quarter from the point; the back of the point is rounded off a little; the heel of the blade thick, so that a very short hold can be taken of it when necessary, and its heel can do no harm when opening the urethra in the very deepest perineum.

3. The probe-pointed bistoury is very narrow, thick in the blade, and squared until it reach within an inch and quarter of the point, which is the extent of cutting edge.



4. The blunted gorget has its left edge quite rounded, the other ground to an edge, and then blunted with a file. The point well rounded into a blunt button. It is a copy from "Cheselden's Conductor," as represented in one of the plates in Heister's Surgery, (see page 183.)

5. The slit probe will be found useful in pushing home the loop of the ligature, when it is thought advisable to tie the transverse perineal artery in weak and elderly patients.

6. With such a sharp hook, in a case where the artery of the bulb was cut in a fat subject, that artery and the transverse perineal forming apparently one common trunk, the perineum so deep as to prevent ligaturing, and sponge-plugs failing to restrain the hæmorrhage, the trunk was easily caught in the fold of the hook, and the bleeding effectually and permanently stopped by noosing the bend of the vessel over the point and heel of the instrument, and allowing the hook to remain in the wound until two days after, when ulceration liberated it. Were it necessary, the pudic artery might easily be hooked and secured in the same way—a screw joining half an inch above the hook, would allow the handle to be withdrawn, and leave the vessel safe in the close embrace of the ligature and the curved portion left behind.

As to forceps, Cheselden's has never been improved upon—strong in the handles that they may not yield and thereby lose grasping power—long for large stones—the blades of all hollowed—curved towards each other at the points, but not actually meeting—rough in the hollow, but not very sharp round the edges of the blades, lest the stone be thereby cut and chipped. The straight flat blades take an insufficient hold, and their points gape so as to dilate the wound during extraction much more than that above described.

III.—I now enter upon the consideration of the first incision in lithotomy,—and, strange as it may seem, I find I must join issue with several high authorities, living and dead, and challenge the line they recommend. Considering the narrow space and the fixed limits within which this incision must be made, one might naturally suppose there could be little room for difference of opinion about it. In truth one of our best surgeons, in a paper on this subject,—the candour pervading which does honour to his head and heart,—so recently as December 1842, in the London and Edinburgh Monthly Medical Journal, affirms, that "there is no difference of opinion as to the situation and extent of the external incision." I allude to



Mr. Syme. And if I may judge from a paper by Mr. Bransby Cooper in the last volume of the Guy's Hospital Reports, published in January of this year, he is very much of the same way of thinking. Yet notwithstanding the conclusions these eminent surgeons have deliberately come to on this point, I affirm that great and fatal difference of opinion exists on this very question; and because the space and limits are so confined, the inquiry is clothed with importance,—seeing that even a slight deviation from the right line may be followed by serious, nay, fatal consequences.

I quote from a living and from a dead authority, as representing a class of operators I think completely wrong. Dr. Willis, in his work on the Treatment of Stone, published in 1842, at page 127 says, “In this country all the methods” (of performing lithotomy) “may be said to be reduced to one,—the lateral operation as it is called;—that operation in which, a grooved staff having previously been passed into the bladder, an incision is made in the perinæum from the side of the raphé, *about an inch or more in front of the bulb of the urethra*, downwards and outwards by the side of the anus, midway between that outlet and the tuberosity of the ischium.”

Sir Charles Bell, whom I loved as a preceptor, and shall ever speak of with high respect as a scientific surgeon, is the next authority I call in question on this point, and I feel the more bound to do so, that his high rank in the profession, and his beautifully illustrated works on operative surgery, are calculated fearfully to mislead the young and inexperienced surgeon. In the second volume of his Institutes of Surgery, published in 1838, at page 58, he says, when treating of lithotomy, “The first incision is made by entering the knife *between the bulb of the urethra and the ramus of the os pubis*, on the left side of the perineum, and carrying it down past the anus. In doing this you do not cut with the face of the knife; for an incision thus made is sufficient to the eye, but the parts which ought to be divided are not cut. Therefore, strike the scalpel daggerways into the space *by the side of the bulb*; and as you carry it down you must bring it more superficial, or the rectum is in danger.”

He says that he subsequently reversed the mode of making the incision, “plunging the knife with the edge upwards, in a little behind, and by the left side of the anus,—he cut quite up to the face of the prostate,—moved it there so as to cut the essential parts,



in order to lay bare the membranous part of the urethra ; and withdrawing it, he cut across the transversalis, and, carrying the edge at once up by the side of the bulb, completed his incision ;" and that no doubt might exist as to the line of incision he both practised and taught others to adopt, he gives plates, (see Plates 18 and 19 of his *Illustrations of the Great Operations of Surgery*, published in 1821,) showing the line of first incision, and also the whole course of incision onwards to the bladder,—the same line of incision being distinctly marked by asterisks on Fig. 1. Plate X. page 70, of his *System of Dissections*, 2nd edition, 1799, in the view representing the first stage of dissection of the perineum. In Plate III. Figs. 1 and 2, at the end of the present Number of this Journal, will be seen correct delineations of the views he gives in his *Illustrations of the Great Operations*, so that by the time this paper is closed, every surgeon will be prepared to compare, and having compared, to conclude whether a difference exists between the lines of incision represented in Plates I. and II. (which portray what I have always practised,) and those referred to, and then which are to be preferred.

The evil consequences likely to result from entering the perineum, in the line recommended by Dr. Willis, and so long practised by Sir Charles Bell, are, *first*, the great risk, or rather certainty, of cutting the artery of the bulb ; *secondly*, injuring a part of the urethra not necessary to be touched ; *thirdly*, bringing you in upon the bladder so high up between the rami of the pubis that there is not space from bone to bone to allow of the extraction of an average-sized stone. In short, I will now quote Sir Charles Bell's own strictures upon others, and apply every remark he makes to his own line of incision. Strange it is, seeing the error so clearly in others, he should still have so constantly risked the cutting down upon the *symphysis pubis*. At page 59, Vol. ii. of his *Institutes of Surgery*, he says, "The most common error is in making the incision too high,—feeling for the staff. I have seen full one-half of the incisions above the level of the arch of bone, and consequently useless. The effect of this is, that when the operator has grasped the stone in the forceps, it is driven out of his hold by coming against the arch of the pubis, and he cannot, as he ought, draw downwards, because the incision is not low enough."

These express the sentiments I entertained from the first, of any line of incision in lithotomy commencing anterior to the bulb. I, time after time, satisfied myself in the dissecting-room of the incon-



venience and the danger of adopting such a line. I considered that, whether in male or female, there was only space behind for expansion when any bulky body came to pass by the lower outlet of the pelvis, and that, therefore, the farther I could get my outlet from the symphysis the better. And what is there to fear in going past the side of the rectum, in place of going past the side of the bulb, as recommended?—Nothing—taking care of the gut; there is literally nothing to cut but the *levator ani* and cellular tissue, till you reach the edge of the *gluteus maximus* muscle, or the external sacro-ischiatic ligament, were it ever possibly required to cut so deep. These views resulted in my adopting the line of incision, shown on Plate I. at the end of this Number. The *sphincter ani* being irritated to make it contract, and the perineum put on the stretch by the expanded fingers of the left hand, the knife is entered boldly behind the swell of the bulb close to the raphé, only one inch in front of the anus, in an adult; the knife is directed downwards and outwards, so as to run midway between the anus and tuberosity of the ischium, inclining more to the latter, becoming gradually shallower, the wound terminates at or near the edge of the gluteus muscle, about two inches behind the anus,—the line of incision being straight from the point of commencement.

By this incision I have, without difficulty, removed a stone measuring nearly three inches in diameter. In truth, it makes an approach to the outlet provided by an all-wise Creator in the other sex, enables you to act with your forceps in dilating the bladder and in extracting the stone in the proper line of axis, without fatally bruising the soft parts that intervene between the rami of the pubis and the forceps, when they are entered higher up and more forward; and, finally, it gives the most dependent opening that it is possible to conceive for the escape of the urine during the recovery; and that opening exactly in a line with the internal incision which you make into the bladder, making the whole wound one clean cut from the neck of the bladder to the edge of the hip. The majority of those who have recently written on the lateral operation of lithotomy seem disposed to recommend the first incision to be carried farther back than it formerly used to be; but, in general, they speak too indefinitely to afford any rule by which a beginner can be guided;—one orders the incision to commence an inch behind the scrotum,—but where is the line seen at which the scrotum terminates?—another begins the incision before the bulb, cuts only integument, and when past the bulb, enters the knife more deeply, and so on,—all advising



to pass the anus a little way; but all this is enjoined in Bell's standard work, and still the line laid down is fatally far forward, so that their united directions only encourage the young operator to practise the same. Sir Benjamin Brodie, in his *Lectures on the Diseases of the Urinary Organs*, published in 1842, is one exception. He is very clear and specific on this point. At page 130, he begins, "I say, then, let the opening in the urethra be made deep in the perineum, *behind the bulb*, and as near as can be to the prostate. Place the thumb of your left hand on the skin over the staff; and, in a man of ordinary size, about an inch and a quarter before the anus. Begin your incision immediately below this, on the left side of the raphé, and continue it backwards and towards the left side, into the space between the anus and the tuberosity of the left ischium. Here you may cut freely; you can injure nothing of consequence." He adds a little after, "All these incisions are, you will observe, made low down the perineum, that is, near to the rectum." And again, "There is also a great authority in favour of this mode of proceeding. Cheselden made his incisions in the way which I have mentioned, as is proved by the anxiety which he evinced to avoid injuring the rectum. Had he done otherwise, it would never have entered into his contemplation that the rectum was in danger." But for the want of precision on this question in some surgical writers, and the opposing statements of others, I might have introduced and dismissed the matter with the above quotation. As it is a question that admits of final settlement, and one that, from its importance, demands immediate settlement, I invite any one to note the success of those who have been known to practise the low line of incision from Cheselden downwards, and contrast that with the woful experience of such as, from inadvertence or wilfulness, have cut high in the perineum. In closing this section, I would guard myself from being understood as laying this down as *the* important point in lithotomy. I look on it as an important point, as influencing ease and safety in the after-stages of the operation; but my opinion is, that life and death, in the great majority of instances, hangs upon the right performance of the next step in the operation, which I now proceed to consider. That is,

IV.—The second incision. When the first incision has been made, as I have directed, no difficulty will be found in reaching the face of the prostate gland and membranous portion of the urethra, —the forefinger of the left hand directed upwards and backwards,



under and in behind the bulb, will answer all useful purposes for dissection,—the transverse perineal muscle at its point of union, and a sufficiency of the *levator ani* have been cut and cellular tissue only remains between the operator and the parts he has secondly to penetrate. It is worse than useless, therefore, to play with an edge tool in a deep wound where its presence is not required. The prostate reached, the staff, as it lies in the membranous portion of the urethra, has to be felt for; and here I must warn the beginner not to expect to feel the staff very distinctly:—the word membranous deceives such, and they are not at first prepared for what they will always find, viz. a thick firm substance surrounding the urethra, through which they have to cut before reaching the urethra or staff. The knife with which the operation was commenced is inserted in the manner shown in Plate II. at the end of this Paper, as close to the apex of the prostate as possible, a small slit is made sufficient to admit with ease the end of the probe-pointed bistoury,—the knife being laid aside, the narrow blade of the bistoury laid well into the groove of the staff, is slipped along into the bladder; the point is then fixed in the groove, and the handle moved outwards and downwards to a moderate extent, so as to insure the *sphincter vesicæ*, prostatic urethra, and a small portion of the prostate gland being cut. (A little urine usually flows at this stage.) The gut is in no danger, as the bistoury has no cutting edge, but close at the point, and that portion is at this moment wholly within the prostatic urethra and bladder. Keeping the gut, however, out of the way with two fingers of the left hand, I usually, in withdrawing the bistoury, bring it out of the prostate, and take a sweep along the lower angle of the wound out to the very skin, so that not a fibre can afterwards interrupt either the stone, or the urine in its escape subsequently—laying down the bistoury I take up the gorget, and having lodged its round probe beak in the groove of the staff, I pass it onwards into the bladder, neither with force nor in haste, but by a firm and steady movement, guarding against the possibility of a plunge—the tearing edge directed downwards and outwards, exactly in the line of the external incision, and, consequently, being a direct continuation of the incision begun in the prostate by the bistoury. (At this stage the bladder empties itself of urine by a gush along the hollow of the gorget.) In this way the incision can, if needs be, be carried to the very verge of the prostate, without any risk of the wound extending beyond that



gland, the structure of that organ, so different from the tissues composing the coats of the bladder, rendering it an easy matter to tear cleanly the former with an instrument, and a force that only dilates the latter. In this very way Cheselden entered the bladder, but his gorget or conductor, as he called it, was wholly blunt; and it was alleged that he often entered the bladder with it by simply but rapidly dilating the prostatic urethra, which of course occasioned difficulty and hindrance in getting out any but small-sized stones. This led Sir Cæsar Hawkins, at an after period, to put a cutting edge on Cheselden's conductor to insure a positive division of the prostate gland. We have authentic records to prove that, although Sir Cæsar Hawkins succeeded well with his cutting gorget, yet his success cannot compare with that of Cheselden; while in the hands of Hawkins' disciples the cutting gorget has proved so fatal a weapon as at length to have caused it to be almost banished from English surgery. I have looked in vain for any approach to the success of Cheselden since his time, until I find Mr. Martineau at the Norwich Hospital, again effecting his entry into the bladder with Cheselden's blunt gorget, and immediately recoveries multiply and deaths diminish, until an approximation to his average of mortality is made. The same success continues in the same institution, resulting from the same cause, in the hands of Martineau's successor, Mr. Dalrymple; and I do not remember a fault having been found to their practice, but that at times, as in the case of Cheselden, doubt existed whether the neck of the bladder was incised or not. Another eminent surgeon has laid the result of his experience before the profession, I mean Mr. Liston, whose success has been very great; and seeing that as yet he has not used the blunt gorget, his explicit avowal of the principles by which he has accomplished so many cures, tends powerfully to strengthen the conclusion which Cheselden's experience alone might long since have taught the whole world,—that a small incision into the bladder is sufficient in all ordinary cases for the removal of stone; and that in no case is it safe or advisable to let the second incision extend beyond the base of the prostate; and that the success of all the most fortunate lithotomists has depended upon the narrow limit to which they restricted themselves in dividing the neck of the bladder.

With these ideas in my head, it occurred to me to use a gorget neither blunt nor sharp,—an edge on it that behoved to cut through a substance so solid as the prostate gland, yet so blunt that such a



tough elastic membrane as the bladder would stretch upon its edge ; and this I found of easy accomplishment. I have several times finished the whole incisions with the first knife, using no gorget when the perineum was unusually shallow, contenting myself, of course, with a very moderate incision into the prostate, and all did well ; but in the great majority of the cases, the neck of the bladder and prostatic urethra were slit obliquely downwards and outwards to about half an inch, (see the black line of incision on the prostate in Plate II.,) and then finished the incisions, as shown by the continuous dotted line, by the aid of the blunted gorget. Thus I insure a positive entrance into the bladder, obviating the chance of merely dilating the *sphincter vesicæ*, as Cheselden and Martineau are alleged to have often only done,—and thus I escape the risk of cutting parts that never should be cut in this operation. I have seen both the gorget and the knife, in old experienced hands, make a fatal wound in the fundus of the bladder ; but that is next to impossible with the gorget I recommend. Take the worst kind of case that can well offer ; a deep perineum, an enlarged prostate, with the veins enlarged around it, and the calculus full sized,—how unsatisfactory does the operation prove in every such case, having only scalpel, broad-bladed knife, or cutting gorget to make a sufficient entrance into the bladder with, those can best testify who have encountered such cases—I also have—and the patients beyond 70 years of age ; yet by the limited slit in the prostate, effected with ease by means of the long narrow-bladed probe-pointed bistoury, and the gradual, but safe and effectual continuous tear in the same gland by a blunted gorget, with a rather broader blade than usual, the object was easily accomplished, without even the risk of harm having been incurred.

The number and variety of modes and instruments employed by different surgeons sufficiently proves the apprehensions felt at this stage of the operation, and no doubt the hazard is very great ; yet to me it seems that the danger to the patient mainly arises from the neglect of the principle I am seeking to inculcate, and that even by those lithotomists who *speak* of a small second incision. I need not dwell on the ingenious but destructive weapon the lithotome caché, either single or double, so patronized by the French, yet so deservedly repudiated by all English surgeons, as there is little fear of its adoption by any one here ; but not so with the broad-bladed knife of Sir Benjamin Brodie—his merited eminence is too likely to com-



mend any suggestion of his to immediate acceptance,—and, therefore, I venture to remonstrate against its use. A blade so broad when up at the urethra, where the probe point must enter, will almost touch the left ramus of the pubis as it closes in towards the symphysis, and there endanger the continuation of the pudic artery, or, at all events, the artery of the bulb;—it is not it may, for I have seen it happen in the hands of an old and experienced surgeon. Again, the wound in the prostate will be longer than was contemplated should the assistant move the staff even but a little to one side, by altering the angle of inclination of the knife, for of course the left hand of the surgeon will be too fully occupied in keeping the rectum out of harm's way to admit of much attention being given to the staff; and, *finally*, the broad sharp blade, bellying out without a blunt shoulder as the cutting gorget even had, is exceedingly likely to wound the bladder from within, as that organ falls rapidly in on the evacuation of the urine, and must embrace the blade all round; and in the act of withdrawing such a knife the rectum is a second time in danger. I trust I may be pardoned the freedom of these strictures. There is no man in the profession I so highly respect,—no man who has so fairly stated those views on the subject of lithotomy which I only aim at corroborating; yet my higher respect for the truth compels me to warn the unwary, where he would, unintentionally, lead them wrong. All the dangers alluded to are escaped from by the use of the blunted gorget, and as free and as clear an opening into the bladder obtained as by the broad knife commented on.

V.—But another advantage accrues from the use of the gorget,—it lies with safety in the bladder, and, the staff being withdrawn, becomes the actual conductor of Cheselden, guiding the forceps without violence safely into the bladder,—a business not easy to the most expert in a deep perineum,—or if so, then the ease has been purchased by a deep incision so free as will, in all probability, cost the patient his life. To all, therefore, the hollow of the gorget presents a fair channel along which to press the forceps till lodged in the bladder. To a beginner such a help is invaluable; only let me warn all beginners that their trust must not rest on mechanical appliances, but on a thorough knowledge of the anatomy of the parts concerned, a right apprehension of the principles that should control every step in the operation, and a calm collectedness of mind ready for any emergency. The staff is lodged in the urethra



and bladder, that the operator may find a sure director into the latter when his dissection has brought him to the face of the prostate ; let it, therefore, remain fixed in the mesial line, pressed against the *symphysis pubis* during the whole operation, and then he knows where to find it, just where by nature the urethra runs. The advice given by some writers, to make the assistant meet the knife by pressing the convexity of the staff against the left side of the perineum, is, to say the least of it, injudicious ; it occasions a risk of the point of the staff escaping from the bladder ; it alters the natural position of parts, and limits the space into which the operator has to cut, pushing his incision towards the ramus of the ischium, under the edge of which the pudic artery runs, the nearer to which that the lesser arteries are cut the more energetically will they bleed : and, *lastly*, the parts are thereby so pressed down upon the rectum as to endanger it at the very first cut.

Then, again, the blunt gorget is supplied, not as a substitute for anatomical knowledge, but as an instrument capable of opening the neck of the bladder just as far as safety admits, (that is, as far as the prostate gland extends,) and quite as far as sound principle requires, seeing that the elasticity of the coats of the bladder is sufficient to allow of the easy escape of any fair average sized stone, after that gland and the spincter of the bladder have been divided. Surely much need not be said to satisfy any surgeon that one is quite safe to draw upon the elasticity of the coats of the *living* bladder to allow of the escape of a large stone through a comparatively small opening ; the prostate might be injured and shattered by great dilatation ; no elastic quality resides in it ; but it is essential to the very function of the bladder that it shall dilate and contract—at one time reduced to the size of an egg, and in six hours expanded to the size of a human head—and again, in half a minute, by the power of the will, down to two and a-half inches in diameter. What difficulty can there be in obtaining for a minute or two the expansion of a small wound in such a membrane, freed of the girding effect of an uncut prostate, to allow of the escape of even a large foreign body, forcibly withdrawn in the grasp of a forceps, whose blades, smooth on the back, come out possessed of all the powers of the wedge ; and why, then, incur the fatal risk by extending the incision beyond the base of the prostate, of laying open the pelvis to the ingress of urine, by wounding the ileo-vesical fascia, when you not only have this elas-



ticity in the coats of the bladder to draw upon, but actually do draw upon in every case where the stone reaches an average size, one and three-quarters, by one, and by one and a quarter inches in diameter? Enclose such a stone in the blades of a forceps and then say if a lineal wound of even three inches long will admit of its exit without considerable expansion—and who among the advocates for free incision is prepared for such cutting, all to give transit to a foreign body occupying half a minute in its progress, and the opening then having to be healed up? I would only add before closing this section, that much fallacy has been introduced into this question by parties experimenting on the dead body, and then applying their conclusions to the living—forgetful all the time that the power of a living muscle, whether in resisting or sustaining, is to a dead muscle as 1000 to 1,—in truth they can form no fit subject of comparison.

VI.—Trusting, as I do, so much to the dilatibility of the coats of the bladder for affording a safe exit to the stone, it will at once be seen that some caution is required in its extraction, and I come, therefore, in the sixth place, to say a few words on that subject. It has often struck me on witnessing lithotomy, that there was little or no system or fixed principle ruling the surgeon in this stage of the operation. When searching for the stone, it seemed only a succession of ineffective glances with the forceps. When extracting—a succession of violent pulls, equally ineffectual for the attainment of the end desired. With the closed forceps let the stone be searched for—felt; let the closed blades on their flat side be pressed down on one side of the calculus to below its convexity, then fixing the lower blade in that position, with reference to the stone, let the handle of the upper blade drop, if need be, pressed down, until the blade is raised quite above the level of the stone, when it only requires a semi-rotation of the instrument, the lower blade still occupying the fixed point, and the stone is at once enclosed in its embrace. This for stones of average size and upwards; small stones may lodge, where the prostate gland is large, in the hollow behind it, or where the person is pot-bellied, it may be shelved above the *symphysis pubis*; in either case the stone may be easily found by a forceps slightly curved. Where too much water has been in the bladder at the time of operation, the circular fibres may contract, and enclose the stone in the very fundus of the bladder. This difficulty is to be detected and overcome by the



steady progress of a strait moderate-sized forceps, onwards till it reach the stone. I have seen the forceps go to a great depth in such a case, and nothing wrong but this longitudinal elongation I speak of.

The stone fitly seized in the smallest diameter, the dilatation of the wound begins in earnest. by a firm but steady downward extracting power, gently moving the handles from side to side, a little upwards and a good way downwards, from time to time allowing intervals of rest to the parts, and to the operator's own hand, but never for a moment relaxing the grasp of the stone itself. It is annoying to have to witness the necessity of going again and again to poke about the bladder, the stone having been once fairly and firmly caught. Having rested, the power must be again applied, coolly, calmly, firmly bearing down, exactly as an accoucheur does when delivering a foetal head with the forceps. Proceeding thus, a very few minutes suffice to complete the delivery; the stretched fibres speedily retract, and a comparatively small wound only remains to be healed, and that entirely surrounded and supported by the prostate gland, which must favour its closing up.

Lest doubt should still exist as to the competency of the incision effected by my blunted gorget, or as to the soundness of the views I lay down regarding the safety and sufficiency of the opening obtained by dilating the tunics of the bladder to give exit to any average sized stone, I will simply state the particulars of the very last case that went through my hands. On Saturday last, the 17th current, David Imray, from Midmar, aged 68, a poor broken-down subject, having been recruited by good living for nine weeks, was brought to the table. His limbs could only be separated a few inches in consequence of repeated attacks of rheumatic inflammation. His legs were, therefore, held over my head during the whole operation. I made the external incision, as usual, very low, and three and a half inches long,—opened the membranous portion of the urethra, close to the prostate, with the knife,—entered the bladder with the probe-pointed bistoury, (urine flowed by the wound,)—inserted the probe point of my broadest blunted gorget into the groove of the staff,—laid hold of the staff with my left hand, and by a steady onward movement passed the gorget into the bladder, the urine gushed out along its hollow. (The gorget used measures across exactly one inch and one-eighth at



its broadest point, the one I usually employ measuring at the same point seven-eighths of an inch.) The stone, though large, was readily seized, and with patience, but firmness, extracted. So much did it distend the perineum when it reached the external wound, that I had to touch the skin at the upper angle of the wound with a bistoury to give it easier exit. The whole time occupied was nine minutes, until he was removed from the table. The stone thus extracted in less than nine minutes (about five) weighs three ounces and three-fourths, and measures seven inches and one-eighth, by five inches and five-eighths in circumference, to which add the thickness of the blades of the forceps, and I think I make out a strong case in favour of my views, for the old man is already out of all danger, as far as the effect of the operation is concerned. I removed the tube from his bladder on Tuesday, 20th February, and to-day, February 22d, his urine is copious, his tongue is moist, and his pulse is natural. Let no one say the case is selected, for of all the unpromising subjects I have operated on, he certainly looked the worst.

VII.—The accidents at all likely to occur in the performance of this operation are, 1st, bruising of the soft parts; 2d, hæmorrhage; and 3d, wounding the rectum; a 4th, usually enumerated in this class, viz. infiltration of urine, may, I think in future, be excluded from the category.

1. When the stone is very large the risk of bruising during the extraction is very great, and the after-consequence, in aged subjects, is very commonly death, from extensive suppuration within the pelvis, should the patient not have sunk during the inflammatory stage; yet the case just detailed shows what can be accomplished by patience and a low outlet without free cutting. I was prepared, should any marked hindrance have offered, to use the blades of the forceps as a director while extracting, and with a probe-pointed bistoury have notched the right side of the prostate gland, and so have got a more free passage for the stone; but it was not needed. This plan I would, however, recommend in preference to breaking down the stone, which is a proceeding, fond as I am of lithotrity, which I cannot approve of. The positive injury inflicted in passing so often to and from the bladder with angular fragments, and the risk, almost amounting to certainty, of some fragments remaining in the loose folds of an empty bladder to form nuclei for future stones, ought, in my opinion, to discourage such a



proposition. If so large, that the dilating quality of the bladder, with both sides of the prostate cut, is not likely to admit of the passage of the stone, then the high operation would form an infinitely preferable mode of giving it an easy and a safe escape, and should be selected.

2. Hæmorrhage I always view with apprehension. A state of depression happens after this operation in almost every case, which I find much aggravated by even what is called a moderate, by some an advantageous hæmorrhage. It may be because I bring none to the table in a state to require depletion; but be that as it may, when the *transversalis perinei* artery bleeds with any vigour, I invariably lay down the knife, and with a tenaculum, or the spring forceps, take up and tie the bleeding vessel. I never operate against time; my sole object is to save my patient's life, and this proceeding has therefore every thing to recommend it. The vessel is at the moment easily seen and secured; not so in a little after, when the parts get infiltrated with blood. The after steps of the operation are carried through calmly, as no continuing hæmorrhage hurries you—the urine comes away afterwards clear at a more early period, much to the relief of the surgeon; and the patient's strength is husbanded. Should the artery of the bulb be cut, there presents only an additional reason for instantly adopting measures for effectually suppressing the flow of blood. I have elsewhere in this paper shown how it may be easily commanded. I have succeeded, by the pressure of sponge plugs dipped in tincture of benzoin, surrounding a tube, and pressed in between the rami of the pubis. The case recovered, but the hook is more to be depended on. Better far, however, to cut low and escape such a casualty.

3. I will not deny that the operation I advocate does endanger the rectum; but I must say, with ordinary care, injury to it is not likely to happen. The first incision only requires depth at its upper angle, for about one-third of its length; the remaining two-thirds ought to shallow rapidly, requiring little more than the integument to be cut, as the tissues beneath are elastic in a high degree, and yield readily during the extraction of the stone. I am quite convinced that the rami of the pubis have most commonly been the cause of the many desperate struggles we have heard of and seen in the extraction of calculi. There seems to be an unusual fear in the minds of some surgeons at the idea of wounding the



rectum, with which I cannot sympathize. How often do we all cut it up, one, two, or three inches for the cure of *fistula in ano*, and far from harm happening, it turns out one of the most successful and satisfactory of surgical operations. Once, in extracting a large angular fragment of a stone which had fractured in the grasp of the forceps, a small wound was made in the side of the gut, and twice a nitch was made with the knife. In the first instance, before closing the operation, I divided the *sphincter ani* as if for fistula, cutting through from the nearest point at the upper angle of the wound. By this proceeding, I left so little tissue to close in upon the urethra, that it gave me much after annoyance, and taught me what I earnestly recommend to others, to cut the sphincter through at the lowest point of the anus, and then push the lateral flap up into the gut to cover in the membranous portion of the urethra. The result will prove quite satisfactory. The above case strongly illustrated to me the ground of objection to the rectovesical operation—an operation which, I am certain, might be practised with great safety to life, could the suggestion I have offered with equal certainty ensure after comfort. But again, I would say, the question is needless if the low lateral incision is adopted.

4. As I have before said, fatal infiltration of urine arises in every instance from the deep incision extending beyond the base of the prostate gland, and penetrating the fascia that passes from the sides of the pelvis on to the bladder at the boundary line of the gland. Once past this defence, and the urine comes in contact with the peritoneum—the necessary consequence of which is death—less from pure peritoneal inflammation, judging from all the cases I have seen, than from the poisonous absorption of urine. I can conceive infiltration of the cellular tissue along the wound, of a very troublesome, but far less disastrous character, from the *lips* of the wound having been allowed to close before lymph had sealed up the divided cells, to guard against which I invariably keep a flexible tube in the bladder until from thirty to fifty hours after the operation, according to the age of the patient; but the occurrence I refer to as the most fruitful source of mortality in this operation cannot be mistaken. The patient goes on well until twenty-four hours after the operation, and the pulse natural, when the urine becomes less copious—the tongue becomes dry—the belly rather full and uneasy, and the bowels flatulent. Four hours more and the patient's countenance has assumed a pinched anxious look; his



pulse up to 100 ; his manner is hurried ; he wanders in his ideas ; at thirty hours his pulse is 120 ; his belly tumid and tense ; urine scanty ; almost suppressed ; skin covered with a clammy sweat ; tongue dry as a board ; even *local* depletion will close the scene at the end of thirty-six hours. If cordials are administered, the feeble and delirious struggle may be protracted till fifty-two hours shall have elapsed from the time of the operation ; but a cure, after this train of symptoms is kindled, I have never seen, and no one can see in them any affinity to what offers in peritonitis. It is clear to me that a poisonous fluid has got where it never ought to be, and to guard against the risk incurred by the use of cutting instruments at such depth, and in the immediate proximity of such, though unseen, dangerous boundaries, I entreat surgeons to lay aside knives, cutting gorgets, and lithotomes, and fall back on the safe, sufficient, and successful mode and instruments suggested and used by Cheselden, as now laid down in this paper.

Rude violence and unnecessary haste in extracting a large stone might, no doubt, tear the bladder far enough to allow of the infiltration I have just been describing, but such an abuse of power would only prove the operator to be wholly ignorant of the very first principle upon which the suggested plan of operation is based, and could in no way weaken the force of the evidence I adduce to prove, that surely there is a fixedness and a soundness of principle in the practice that has led to such an unusual exemption from mortality, at the very age at which the ratio of mortality is the highest, by all the other modes of operation at present in use.

VIII.—On the treatment after the operation.—Much of the personal comfort of the patient during the after-treatment will depend upon the unceasing attention of two experienced nurses, but his safety and progress rest, under God, on the surgeon's skill and care. For six hours after the operation the surgeon should never be above an hour at one time absent from the bedside,—noticing the tube to keep it pervious, the quantity and the colour of the urine—and resting satisfied on the head of hæmorrhage only when the urine flows clearly as well as copiously. These two points gained, his visits may then be dispensed with for intervals of four hours, until the thirtieth hour has passed. That hour come and gone without constitutional sympathy, and all danger from infiltration of urine is past, the tube may be safely withdrawn, although in old subjects some hours later may be preferable, to give time for lymph to be



poured out and consolidated ; and now the visits need only be repeated every six hours. This, I think, should be continued for a week ; it enables the surgeon to keep every thing right, which is easier and safer than having to set them right ; it affords opportunity for cheering the patient on, also, a matter of no light moment—the tendency to despond after this operation being very great. This, it might be easy to account for ; so great has the mortality been after this operation, that the great majority of persons labouring under stone will never entertain the question of operation until death itself begins, from protracted sufferings, to stare them in the face. They then begin to reason, that die they must, and if so, better choose the easiest because the shortest path. Their settlements are very generally the last document they sign before coming to the operating table ; and is it any wonder that it is sometimes even difficult to convince them that they will recover, after danger has entirely passed ? For this reason all condoling friends should be shut out for days after an operation. I have seen them occasion infinite harm, and bring on nervous symptoms very annoying, if not alarming. Let the surgeon himself minister to the mind as well as prescribe for the body ; and while he rests on the blessing of God for success in the case, let him watch and strive as if the cure depended on his unaided efforts. Unless surgeons are in a sense determined not to lose a case, they will find it an easy matter to let one slip through their fingers during the after treatment. It is the known prevalence of this feeling of despondency that has hitherto discouraged the practice of operating on more than one case at or about the same time, lest, should one die from the operation, the other should sink from apprehension afterwards. I would not treat lightly the fear of harm happening, but only suggest that, in hospital practice, there are good and cogent reasons why the fear should be disregarded. The surgeon, when nerved for such an operation, feels more ease at a second, and still more freedom at a third following in rapid succession. The parts are bright in his mind's eye, and his hand is in the way of it, and all this the patient gets the benefit of. Then two nurses can as easily attend to three in the same ward, or in adjoining closets, as to one ; and, again, the surgeon's frequent calls are well requited by the feeling that so much good is being accomplished. I have repeatedly had two, and lately had three in one day, and found no inconvenience result ; but, mercifully, no casualty occurred in either of the instances. I



can testify that the last operation is always best done, if degrees of comparison can be said to exist where all recovered well, which is what I hold as the only evidence of a well-performed operation.

From the total silence on the subject in most practical works, a beginner must often conclude that, the operation safely accomplished, there is little more to do ; but this is a great mistake. In old or feeble subjects the struggle for life only then begins. No doubt, in the young and vigorous, mild diet, a frequent change of the drawing sheet, to keep the bed dry, and an occasional laxative, is all that is required, and in from fourteen to twenty-one days they are going about sound and well. But in those more advanced in life, a diligent watch must be kept on the state of the secretions, the tongue kept clean—often a difficult matter—soups must be allowed from the hour of operation, wine and animal food allowed from the third day, and the former with such liberality as the patient can bear. In George Gray's case, see Table of particulars in the last Number of the *Edinburgh Medical and Surgical Journal*, his recovery took thirty-four days, during which time the average allowance of port wine he had was eight ounces daily. His age is 73, and it is not a week since I heard of him driving his horse and cart, and sharing in all his farm-work. I am not here advocating the use of wine in every case,—the feeble only require it ; but I do advocate the adoption of more generous treatment as to diet, after this and most other major operations, and the utterly discarding of that bugbear fear of inflammation, which has occasioned so many to be starved out of existence. If it arise, treat it, and withhold the supplies then ; but, while there exists a call upon the constitution to heal up a great wound, let no idle, and so generally groundless, fear induce the surgeon to keep the balance of life trembling, from sheer want of food. Much discomfort will be escaped from, if careful nursing, the use of spirit lotion, and plenty of prepared lard, can keep the nates from excoriating. I have kept a note of how many folded sheets required to be drawn every twenty-four hours, in a number of cases, and for ordinary and reasonable comfort to the patient. During each of the first eight days after operation, eight large sheets are daily requisite.

It is during the convalescence that I see most clearly the advantage of previous preparation. The patient is in good health, has a fair appetite, and is nourished by what he takes. I ascribe the recovery of several of my old men entirely to the care bestowed



on their previous treatment. No art could have carried them through applied in any other way.

I think I have now freely communicated my views on my practice, and the principles that guide me in the performance of lithotomy.—To sum up—

The patient should be previously brought into the best possible state of health. Tongue clean, and urine as nearly natural as may be. The nates clean shaved—a dose of castor oil administered on the evening prior to the day of operation—an enema on the morning of that day—and only the accumulation of thirty minutes' secretion of urine in the bladder—prepare the patient for the operating table.

A large curved staff, with a deep groove on its right lateral aspect, is then to be introduced into the bladder and the stone felt. The feet and hands to be then firmly secured to each other. The nates brought just over the edge of a table, thirty inches high. The knees steadied by two assistants, but not tied by a tape passing over the nape of the neck. The staff held by the third and chief assistant, from the commencement to the close, firmly in the centre line of the perineum, fixedly against the *symphysis pubis*, and fairly into the bladder, care being taken that no movement of the patient, and no dropping of the assistant's hand, shall occasion its withdrawal from that viscus until an entry has been effected. The external incision to commence at the raphé one inch anterior to the anus, to pass outwards and backwards midway between the anus and *tuber ischii* to the extent of three inches or more from the point of commencement, according to the probable size of the calculus, previously ascertained. The wound deep at its upper angle, only to be carried on with the finger, almost unaided by the knife, fairly below, and then in behind the bulb of the urethra, until the face of the prostate gland and membranous portion of the urethra, are felt; the knife is made to enter the groove of the staff in the latter, and just notch the apex of the gland; this opening is enlarged, continued onwards to the bladder, the *sphincter vesicæ* and prostatic urethra cut in a direction outwards and downwards, by means of the narrow-bladed probe-pointed bistoury. The blunted gorget carries this incision to the very base of the prostate, if that should be required. The forceps, easily and safely introduced along the hollow of the gorget, is then made to embrace the stone, as formerly directed, and becomes a safe and efficient dilator of the coats of the bladder during the extraction of the stone. There are few operations to which the



adage, *Festina lente* does not apply. To lithotomy it is especially suitable, and to this stage of it peculiarly applicable. At it "make haste slowly" should be ringing constantly in the surgeon's ear.

One other principle that has exercised great influence over my success I must announce before closing. Believing, as I firmly do that the issues of life are wholly in God's hands, I never fail urgently to implore his presence and blessing on every operation. From my bended knees I approach the operating table, the immediate effects of which is to impart to me a calmness that nothing can ruffle, a self-possession that has never been disconcerted—and occurrences have happened that might have embarrassed any one—a steadiness of hand, and fertility of resource, that I thankfully acknowledge as gifts from God, while the final results have come out only such as could issue when the blessing of the Almighty descends.

257, UNION STREET, ABERDEEN,

23d February, 1844.







## EXPLANATION OF THE PLATES.

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PLATE I. shows my ordinary line of first incision in Lithotomy, and the manner in which the staff ought to be held.

PLATE II. represents a section of the pelvis, showing the anatomy of the parts concerned in Lithotomy, copied in great part from Watt's views of the pelvis. Into this sketch I throw the lines of incision I practise. The black line at the apex of the prostate shows all that is cut both by knife and bistoury; the dotted continuation indicates what is accomplished by the blunted gorget. Altogether it correctly conveys my ideas of what the lateral operation should be, in the position, direction, and extent of both the external and internal incisions.

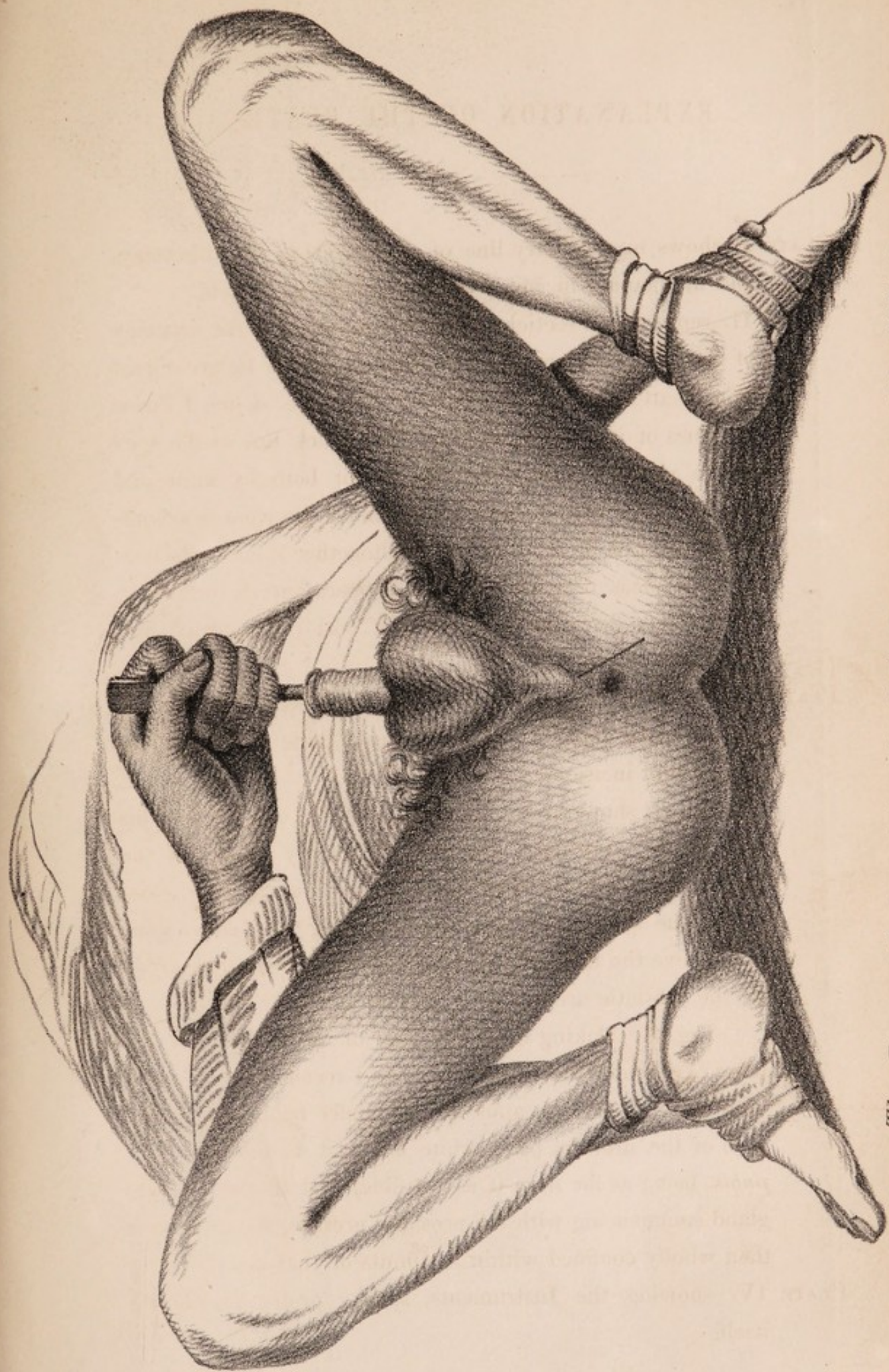
PLATE III. shows, Fig. 1, a correct copy from Bell's Illustrations of the Great Operations in Surgery, Plate 18, giving his line of first incision.

Fig. 2 shows, from the same work, his own view of his own lateral operation. The incision mainly in front of the anus, traversing the bulb of the urethra, passing close under the *symphysis pubis*, and reaching the bladder some way above the level of the natural entrance into that organ by the prostatic urethra.

Fig. 3. Taking the same view of the anatomy of the parts, I portray the lines of incision I recommend, showing their bearings to the anus, being chiefly behind it, to the bulb of the urethra, being quite below it, to the *symphysis pubis*, being as far from it as possible, and to the prostate gland commencing with the prostatic urethra, the incision is then wholly confined within the limits of that gland.

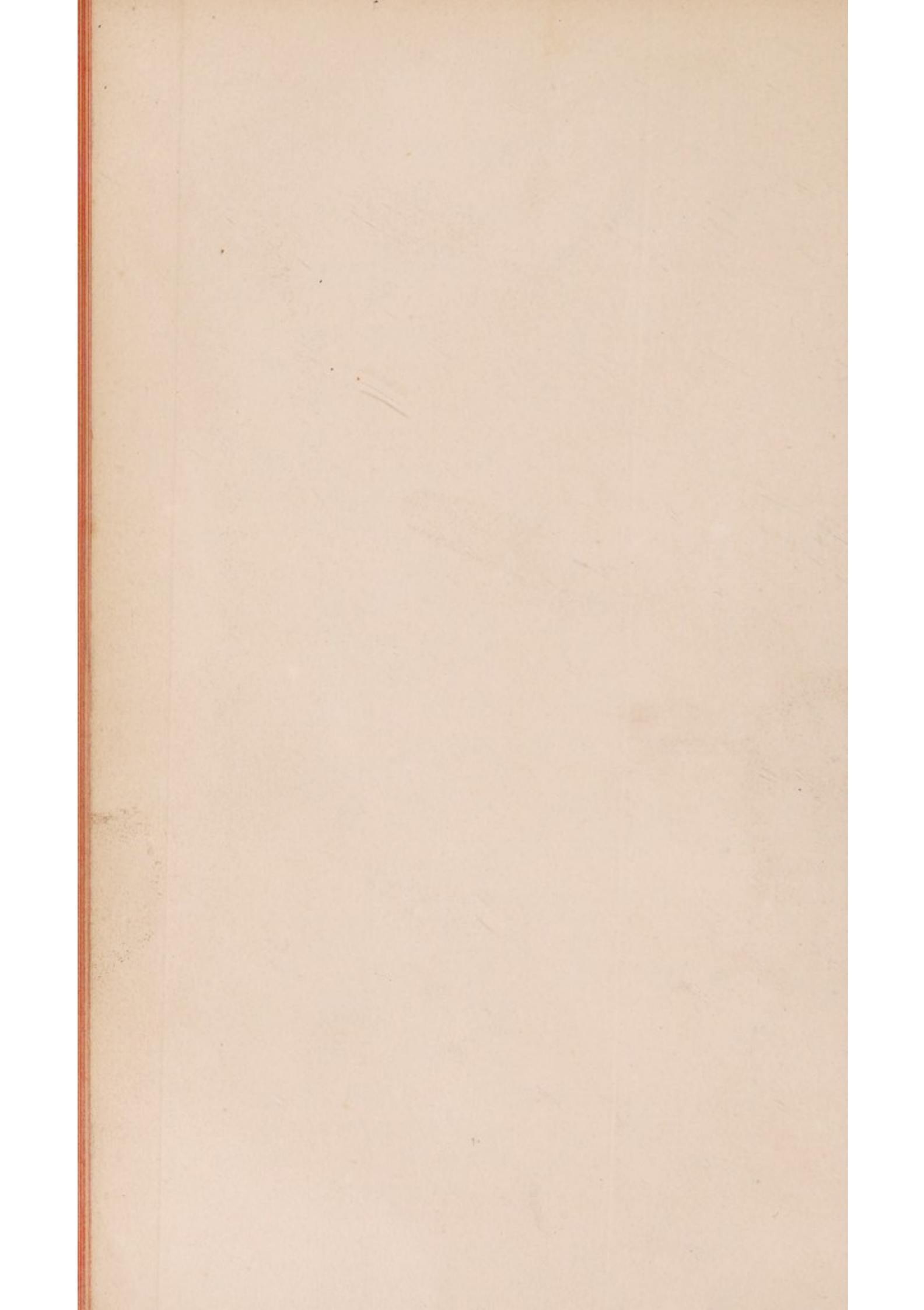
PLATE IV. showing the Instruments, speaks pretty plainly for itself.



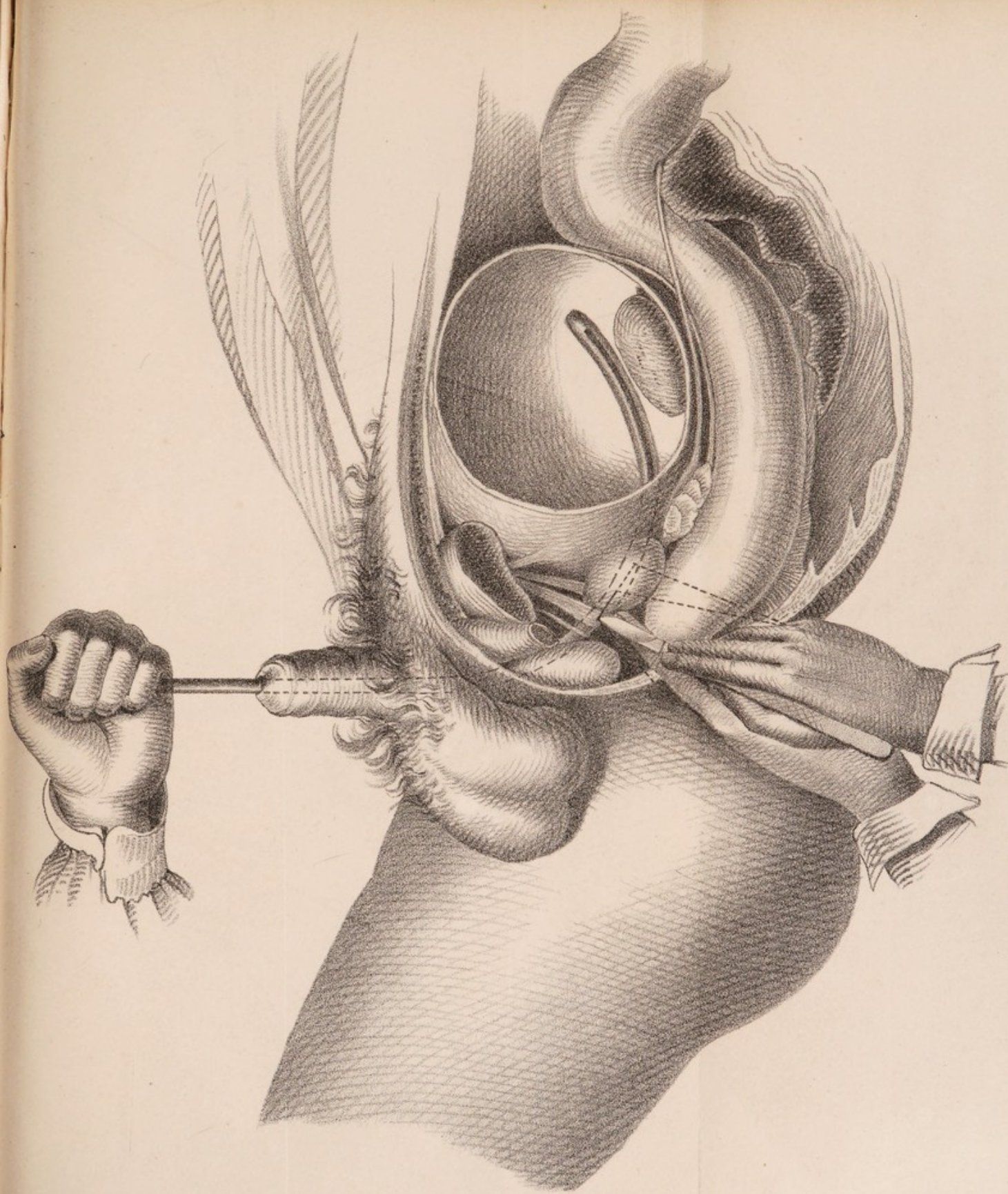


*The Line of first incision in Lithotomy as practised by D<sup>r</sup> Keith*



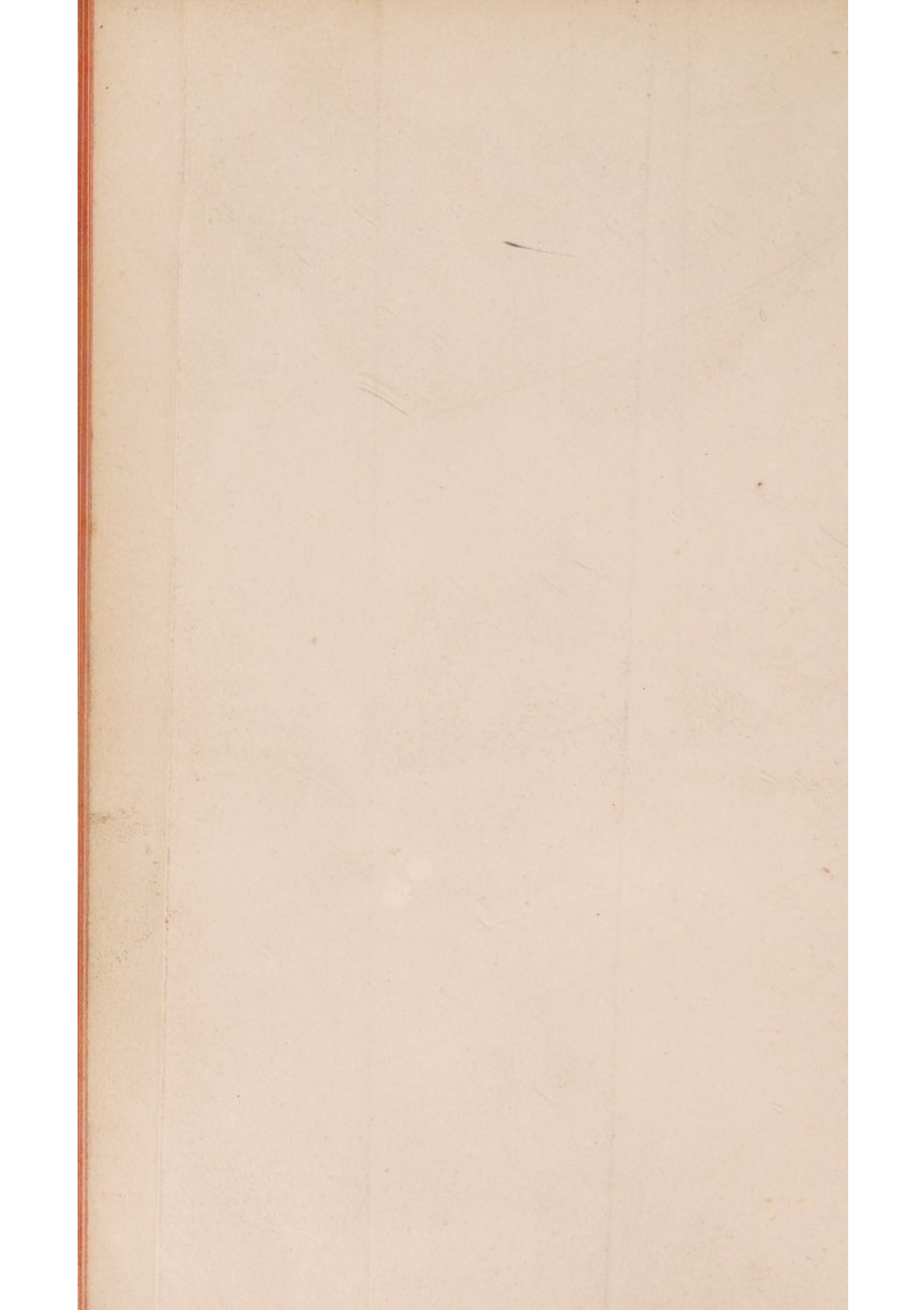




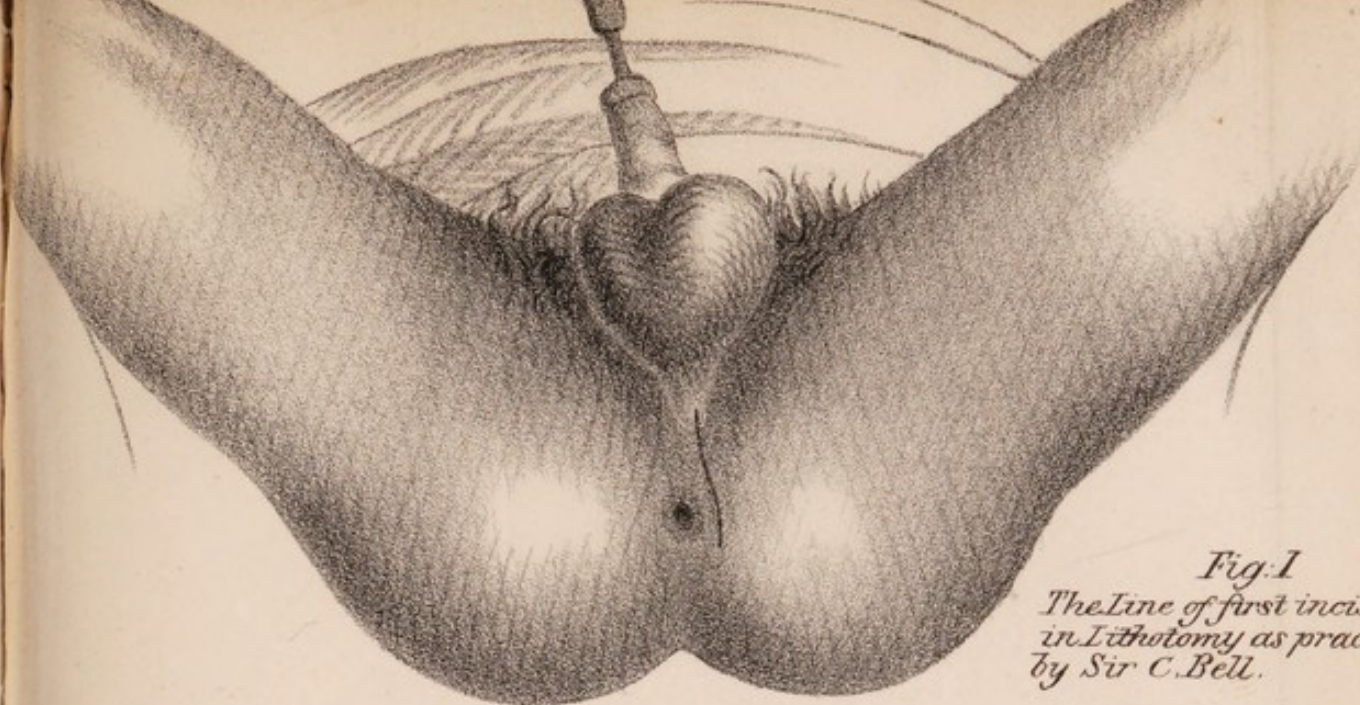


*The Lateral operation of Lithotomy as practised by D. Keith*

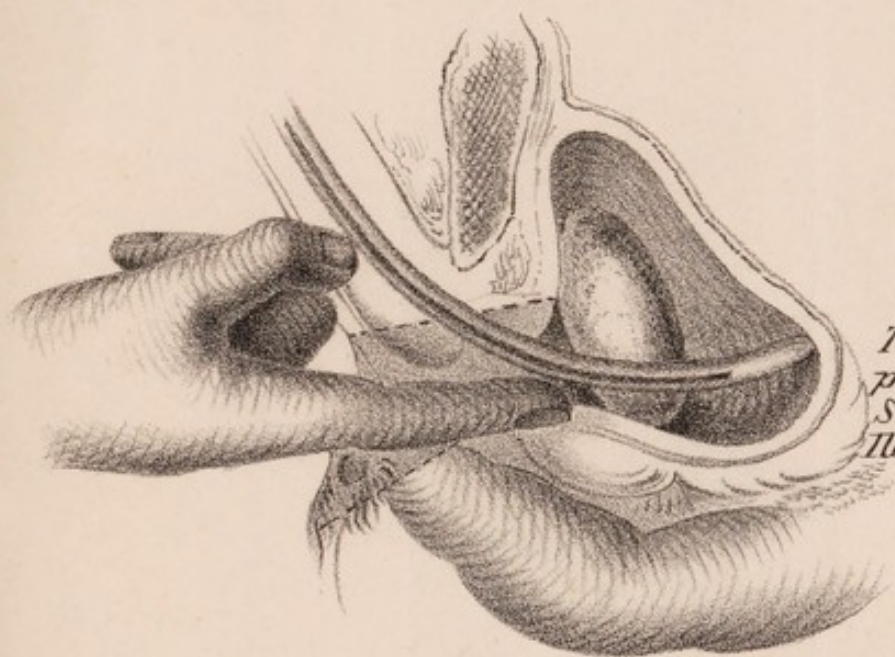




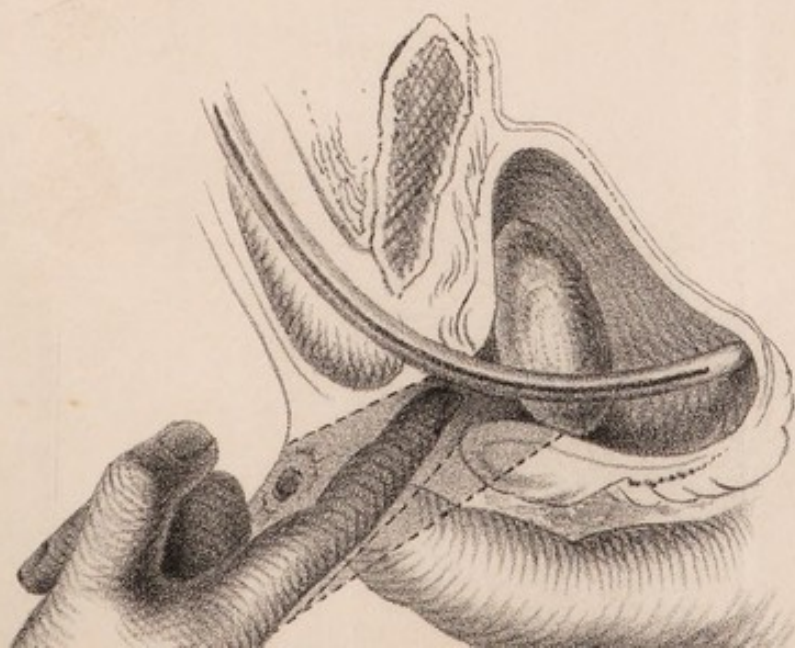




*Fig. 1*  
*The Line of first incision*  
*in Lithotomy as practised*  
*by Sir C. Bell.*

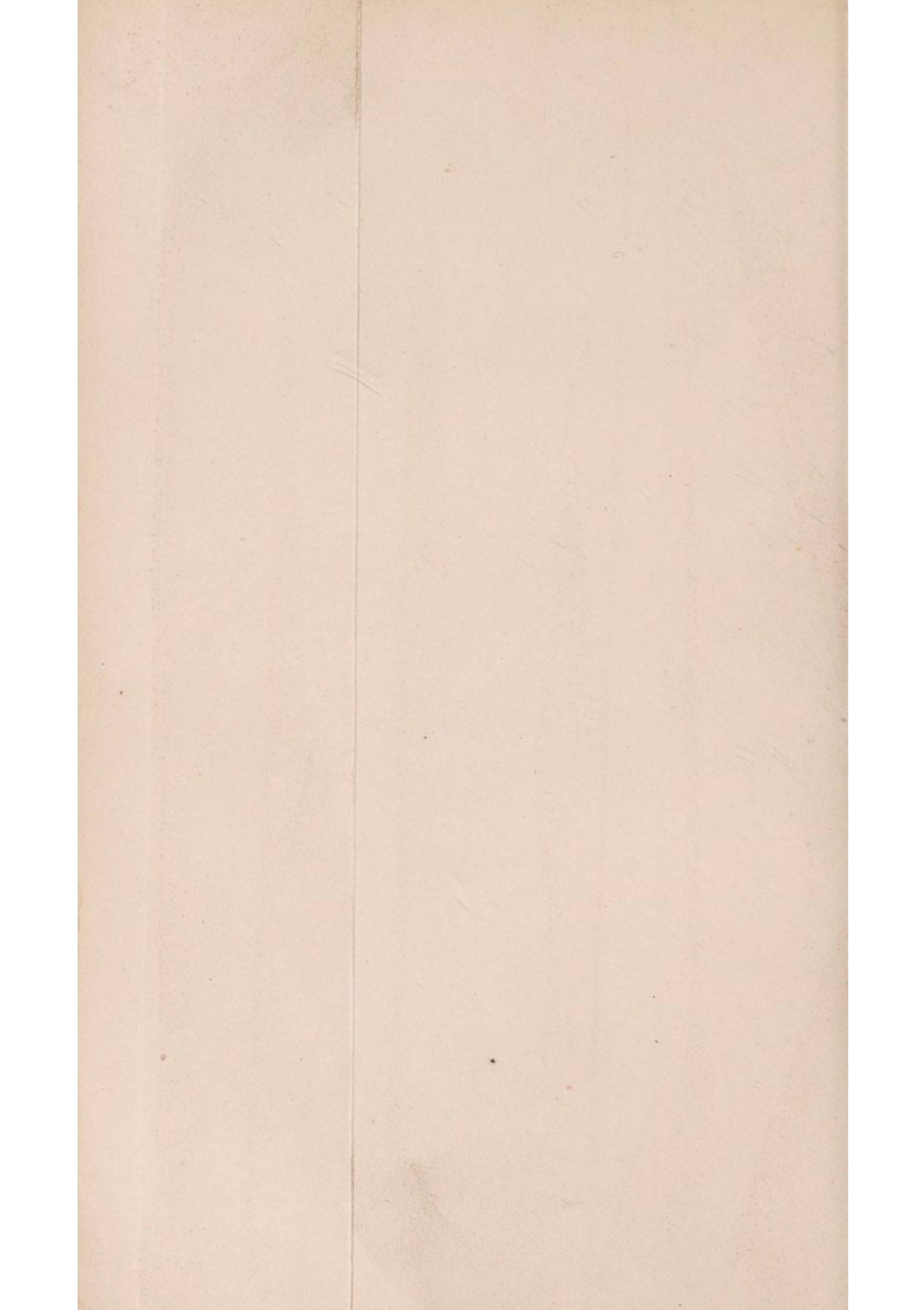


*Fig. 2.*  
*The Lateral operation as*  
*practised by Sir C. Bell.*  
*See Plates 18 & 19 of Bell's*  
*Ill. of G<sup>t</sup> Operations. 1821.*

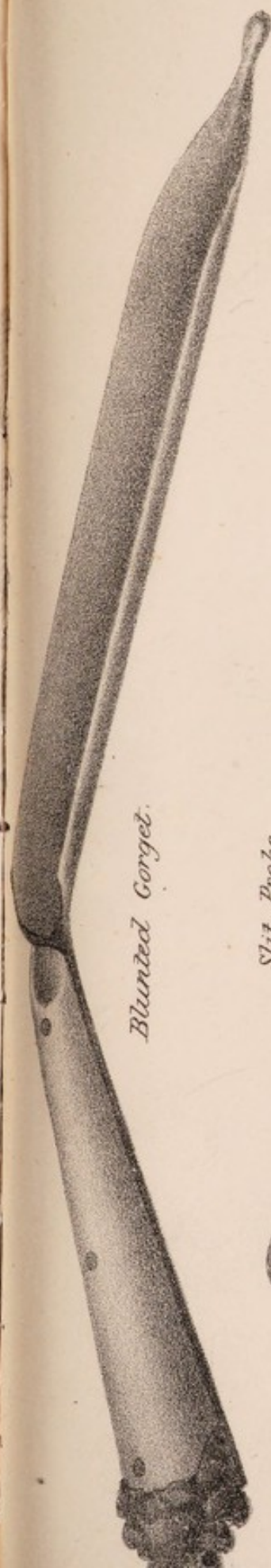


*Fig. 3*  
*The same, with Dr. Keith's*  
*lines of incision shown.*









*Blunted Corset.*



*Slit Probe.*



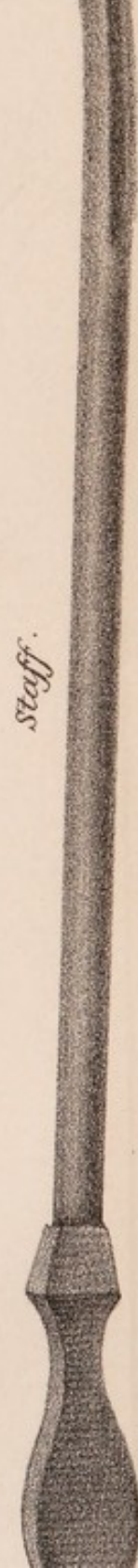
*Sharp Hook.*



*Knife.*



*Probe-pointed Bistoury.*



*Staff.*





