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**Contributors**

Russell James, 1754-1836.  
Ballingall George, 1780-1855.  
Royal College of Physicians of Edinburgh

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CASE  
OF THE  
HIGH OPERATION OF LITHOTOMY,  
IN WHICH UNUSUAL DIFFICULTY WAS EXPERI-  
ENCED IN THE EXTRACTION OF THE STONE.

By GEORGE BALLINGALL, M. D., F. R. S. E., Surgeon  
Extraordinary to the King for Scotland, and Regius  
Professor of Military Surgery in the University of Edin-  
burgh.

(Read Wednesday 1st March 1826.)

(From the *Medico-Chirurgical Society's Transactions.*)

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*Royal Infirmary, Feb. 10. 1826.*

**D**AVID MEEK, æt. 6, a delicate looking boy, was brought into the Infirmary on the 30th ult., and the following account of his complaints obtained from his parents, who accompanied him. He was reported to have had difficulty in passing his urine, ever since he was at the breast, and to have been in the habit of passing it in bed. His father stated, that the excretion of the urine was generally preceded by a complaint of pain, and that he has been occasionally observed to grasp the genitals, and to suffer

excruciating pain after it. Was sounded, about twelve months ago, but no stone discovered.

The prepuce is contracted, and somewhat elongated; abdomen rather tumid; appetite pretty good; bowels regular; prolapsus ani occasionally occurs.

Since his admission into the House, he has been repeatedly observed to pass his urine in a full and continued stream, apparently without pain; and has also passed it, frequently unobserved, during the night. The greatest quantity voided, at any one time, is about six ounces; of a pale and rather cloudy appearance, but without any remarkable deposit. Was sounded the day after his admission; and again, on the 5th instant, in presence of all the surgeons of the House. Upon one occasion I felt the sound grate against a stone; but the information conveyed by this instrument is obscure and unsatisfactory; no one having ever heard it strike the stone. At both examinations the boy passed his fæces during the operation; and the rectum protruded to a considerable extent. Was sounded again on the 7th instant, and the existence of a stone distinctly established; chiefly by the finger of one hand in the rectum, and the other above the pubes. The stone was ascertained to be very large, and to lie unusually high up.

On examination from the rectum, while a sound or catheter is in the bladder, the parietes of this viscus appear thin and healthy. Has had occasional purgatives, and has been repeatedly in the warm-bath since his admission. For some days past, he has been

taking a few grains of the soda pill ; and in consequence of some flatulent swelling of the abdomen, he took, last night, a cupful of infusion of senna with aniseed. The rectum was this day washed out by an injection, about an hour before the visit ; and at noon the high operation was performed as follows.

“ A silver catheter was introduced into the bladder, and after drawing off the small quantity of urine which it contained, an attempt was made to distend the bladder by means of tepid water injected through the catheter ; this, however, was very imperfectly accomplished, in consequence of the boy's violent struggles, and the forcible resistance made by the action of the abdominal muscles.

An incision about two and a-half inches long was now made through the skin, and *linea alba*, terminating at the symphysis pubis ; the fibres of the pyramidal muscles were then separated in the mesial line, and partly detached from their origin in the pubes. The handle of the catheter being now depressed, its point was made to project about three-fourths of an inch above the symphysis, and a sharp-pointed bistoury was then pushed into the bladder, immediately below the point of the catheter, and carried down towards the pubes, by which sufficient space was made for the admission of the finger. On its first introduction, nothing could be felt except the extremity of the catheter ; but on turning the point of the finger upwards, the stone was felt impacted in the upper part, or fundus of the bladder, altogether

above the brim of the pelvis, and wholly above the wound. Attempts were now made to seize the stone with the forceps, which repeatedly slipped, bringing away with them considerable fragments of the stone. It being obvious, that nothing was to be gained by prolonging the incision downwards, it was now dilated upwards, on the point of the finger; and the attempts to bring away the stone by the forceps, scoop, and fingers in the rectum, were persevered in for some time without success. The stone, however, was brought nearer to the external orifice, and retained in that situation by the finger in ano. No farther prolongation of the wound upwards (however desirable) could be attempted, the peritoneum having been already laid bare, and the intestine threatening to protrude. Under these circumstances, an attempt was made to gain a little space, by cutting transversely; and a few fibres of the bladder were divided in this direction on the right side, when the stone was extracted, with a moderate degree of force. A quantity of tepid water was now thrown forcibly into the bladder, and the fragments washed out. The edges of the wound were besmeared with oil, with a view of preventing, as much as possible, the insinuation and lodgment of urine in the cellular membrane. Two stitches were passed through the upper end of the incision, supported by a strap of adhesive plaster: its lower extremity was left open, covered only by a slip of simple dressing, and a compress of soft lint. An elastic gum catheter was lodged in the bladder, and the patient conveyed to

bed, having been in all upwards of half an hour on the table. The stone was of an irregular plum shape; weighing, exclusive of many large fragments, thirteen drachms, and one scruple: measuring in its longitudinal diameter upwards of two inches, and in its transverse diameter one inch and a-half." The fragments of the external layer, which were put into Dr Turner's hands for analysis, contain some uric acid, but consist principally of mixed phosphate of lime and ammoniaco-magnesian phosphate.

At 8 P. M., I visited this little patient, in company with Mr Allan. We found that he had slept some after the operation. Was lying upon his back, with his knees drawn up, to which position he always turned, although recommended to lie on his side. A considerable discharge of fluid from the wound, tinged with blood, and some urine flowing from the point of the catheter. Much tenderness over the whole abdomen, particularly in the immediate neighbourhood of the wound, where he could not bear the slightest pressure. Pulse about 120; tongue rather dry; respiration hurried. Eight leeches were ordered to be applied contiguous to the wound; To have a dose of castor-oil at day-break, and some stewed prunes for food.

11th.—On visiting him at 8 o'clock this morning, I found that he had slept a good deal at intervals during the night. The leeches had bled freely; castor-oil, which was given early this morning, had not operated; tenderness of the abdomen diminished; urine flowing both from the catheter and wound.



At 12 o'clock, matters appeared much worse : the boy's countenance was greatly altered, with a deadly paleness and lividity of the lips ; his pulse scarcely to be counted, and his respiration extremely hurried ; was still acutely sensible to pressure on the region of the abdomen ; but when not roused nor irritated, seemed disposed to sleep. A mustard cataplasm was directed to be applied for a few minutes over the abdomen, and wine and water freely administered. Notwithstanding this, he continued to sink rapidly ; became gradually insensible to surrounding objects, and to the presence of his mother, for whom he repeatedly called.

At 6 P. M., his pulse was imperceptible, his eyes turned upwards, and the pupils immoveable ; his breathing became stertorous, and he expired about 8 o'clock ; thirty-two hours after the operation.

*12th February.*

The body was opened in the theatre at the visiting hour ; and, previous to the commencement of the dissection, the following admeasurements were taken : from the umbilicus to the beginning of the external incision 3 inches ; length of the external wound, a little more than 2 inches ; distance between the tuberosities of the ischia,  $2\frac{1}{2}$  inches. A longitudinal incision was then made through the linea alba, from the ensiform cartilage to the umbilicus ; from which point, two oblique incisions were carried downwards, on the right and left, diverging towards the crests of the ilia, passing through the substance

of the abdominal muscles, and laying open the cavity of the abdomen. The peritoneum covering the triangular flap formed by these two last-mentioned incisions was dissected off from the inner surface of the muscles towards the wound: contiguous to this point, the peritoneum was found red, and suffused with blood, but perfectly entire in its texture. At one or two points on the left side, a little farther up, an increased vascularity was observed marking incipient peritonitis, and a little bloody serous fluid was effused into the abdominal cavity. The opening in the bladder was found to be nearly two inches long.

On removing the parts from the body, and prosecuting the examination farther, the upper part of the bladder embracing the stone, was found enveloped with strong and powerful muscular fibres, which converged towards a point a little below the superior extremity of the wound. At this point, also, the cellular membrane lying over the muscular coat, and in the interstices of its fibres, was thickened and indurated, particularly on the right side of the bladder, and on its posterior surface, where the peritoneum appeared slightly puckered or corrugated. The appearances at this point marked, I think, an incipient organic contraction; and below this, towards the cervix, the bladder was more flaccid and less fibrous, although altogether more muscular than a healthy bladder at this boy's period of life; its internal coat was highly vascular, and of a soft flocculent appearance.

*Remarks.*—This little patient was sounded three times previous to the operation; and although, from the history of the case, and from the first examination, we were pretty well satisfied of the existence of a stone, yet no satisfactory information was procured as to its form, size or situation. The information given by the sound, was only conveyed through the medium of the fingers, the instrument not having been *heard* to strike against the stone. From the difficulty of bringing the sound in contact with it, my first impression was, that the stone was a very small-sized one, and, I believe, I mentioned this one day to the students at the patient's bed-side.

At the third examination, the situation and magnitude of the stone were first satisfactorily ascertained by my colleague Mr Allan, with the finger of one hand in the rectum, and the other hand above the pubes. In this way, the stone was distinctly felt by all present, lying above the brim of the pelvis; and in this position, I repeatedly felt it through the parietes of the abdomen, during the two days which intervened between this examination and the date of the operation.

The injection of the bladder, which was expected to facilitate the operation, was, as already stated, very imperfectly accomplished: indeed, I do not believe, that an ounce of fluid was thrown up; and this process, I apprehend, will always be found extremely difficult, when the patient is so young as not to be made sensible of the importance of his own stea-

diness during the different steps of the operation, or not possessed of sufficient firmness to withstand the pain which the distension of the bladder has always been found to give.

The catheter employed for injecting the bladder, was in this instance retained as a guide for making the opening into it above the pubes, from an aversion to employ more instruments than were absolutely necessary: but should I have occasion to perform this operation again, I would be disposed to employ the sonde à darde: the stilette of this instrument being once pushed through the anterior part of the bladder, would effectually obviate any tendency of the instrument to slip or roll, as it were, either to one side or the other. The groove in the concave part of this instrument, or in the staff employed by Mr Hutchison, must also be useful in protecting the posterior part of the bladder from injury, in making the opening into it with the sharp-pointed bistoury.

A stricture or contraction of the bladder below the stone was distinctly perceptible at the time of the operation; the scoop and blades of the forceps, which were pointed upwards, towards the umbilicus, evidently passed through a contracted opening into the more expanded cavity in which the stone lay.

On examining the parts carefully after death, it appeared that the incision might have been prolonged a little upwards before reaching the point of reflection of the peritonæum; but from the depth of the wound, and the protrusion of the peritonæum into it, this could not be ascertained, so as to enable me to avail myself of it during the operation. The exten-

sion of the incision transversely was very inconsiderable ; and although it might have been carried farther in that direction with safety, it is not clear to me that it would have facilitated the dislodgment of the stone. Unless made above the site of the stricture, it could not have increased the dimensions of the aperture through which the stone had to pass ; and the ultimate removal of the stone appeared to me to be expedited more by the exhaustion of the contractile power of the bladder, and the advantageous application of the scoop as a lever, than by any additional space gained by the transverse incision. Repeated attempts, I may observe, were made to break the stone by means of the forceps, after it was ascertained to be so disproportioned to the extent of the aperture ; but, although several large fragments were broken off from its lower or anterior extremity, its bulk was not materially diminished ; and when ultimately brought out, its size, compared to that of the little patient, excited a simultaneous expression of surprise from the spectators, amounting to not less than five hundred in number.

Although this is not the place to enter into any lengthened comparison of the merits of the high and lateral operations for the stone, I must be permitted to state my reasons for having, in this instance, preferred the former.

1. The magnitude of the stone.
2. The peculiar situation which it was invariably found to occupy.

3. The possibility of being foiled in bringing away the stone by the lateral operation, and being ultimately compelled to have recourse to the incision above the pubes; an occurrence which has more than once happened, and which, indeed, was the original motive for the performance of the high operation.

The existence of an extensive and troublesome proidentia ani, in this case, may also be mentioned, not as a bar to the lateral operation, but as an inconvenience in its performance.

From some recent accounts of the successful performance of the high operation by Sir Everard Home, and by my friend Mr Copland Hutchison, I have been led to form rather a favourable opinion of that operation in general; and the peculiar distribution of the arteries, which occurred in Mr Shaw's case in the Middlesex Hospital, and from which a fatal hæmorrhage occurred after the lateral operation, may also be considered as an argument in favour of the incision above the pubes. But it is not my object to depreciate the lateral operation, and I find I am wandering into generalities, into which it is not my present purpose to enter. I adopted the high operation, in the foregoing case, as the shortest and most direct route to my object; and I may now observe, that, whatever were my difficulties in its performance, they would, I apprehend, have been greatly increased had I proceeded by the lateral method. In that case, I should have had to traverse the whole extent of the pelvis with the forceps, scoop, and

every instrument employed for the breaking or removal of the stone: above all, I should have lost the advantageous application of the scoop as a lever, by which the stone was eventually dislodged, and brought to the orifice of the external wound. Indeed, it is the opinion of a distinguished anatomist, who was present at the operation, after measuring the distance between the tuberosities of the ischia and the dimensions of the stone, that its extraction by the perinæum, in its entire state, would have been altogether impossible.

As to the manner in which a stone originally forms a lodgement in the fundus or very uppermost part of the bladder, as in this instance, I feel much at a loss to satisfy myself, or to offer to the Society any thing like a satisfactory explanation. Whether the peculiarity of the situation of the bladder in the foetal and infant state, the limited capacity of the pelvis in the young subject, and the great proportion of the patient's life spent in the horizontal position during his early years, may have facilitated the lodgement of the stone in the peculiar situation it occupied, I do not presume to determine. But even if these circumstances were admitted to have operated in this case, they would not afford an explanation of the remarkable case, annexed to this paper, communicated to me from the unbounded experience of my colleague Mr Russel, in which a stone was found, singularly situated, in a patient who died at an advanced period of life, and which, although not a parallel case to the one

I have detailed, is well deserving the attention of the Society.

It now only remains for me to offer my acknowledgments to my colleagues in the Infirmary, and particularly to Mr Allan, who assisted me during the operation. To Dr Monro and to Mr George Bell I am much indebted, for the use of several ingenious kinds of forceps, with which I was glad to be provided in a case where difficulties were anticipated. To Mr Benjamin Bell I am under peculiar obligations, for the neat and accurate sketches by which this paper is illustrated, the more so when I consider the promptitude with which they were so kindly undertaken, and the alacrity with which they were executed.

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30 *Abercromby Place,*

MY DEAR SIR, *Monday, 13th February.*

Accompanying this note you will receive a sketch of a preparation, which was taken from the body of a patient who had long been afflicted with symptoms of stone in the bladder of urine. In this case the shape and situation of the stone was singularly remarkable. The stone (about the size of a pigeon's egg, and of an ellipsoid form) was lodged in the superior fundus of the bladder, which grasped the whole of the surface completely, excepting a small portion about one-half inch in diameter, opposite to a transverse axis. The bladder was most contracted at this part; beyond which it became more expanded, and



formed the principal receptacle for the urine. The stone passed through the narrow neck of the bladder to the length of about three-fourths of an inch. Corresponding to the extremities of its long axis, there were two projections, about one-fourth of an inch in diameter, which protruded into the ureters on each side, to the distance of more than an inch. The stone was of a very friable texture, the general mass being composed of small particles, about the size of the grains of sea-sand, which adhered very loosely together. The surface was in general protected by a continuous covering, consisting of the same component parts, about the thickness and strength of the shell of a hen's egg. The surface of the portion which projected into the cavity of the bladder had no continuous covering, the slightly cohering particles being immediately exposed to the action of the urine, which was absorbed into the substance of the stone, and kept it moist. The bladder was thickened and contracted, and near the centre of the upper fundus there was an aperture nearly half an inch in diameter. But the stone was so firmly grasped by the bladder at this part, as to prevent the urine from escaping into the cavity of the abdomen.

In considering the history of this case, it appears probable, that the stone had at one period of its formation been grasped by the upper fundus of the bladder, and having been retained there, gradually underwent changes, which at last produced the appearances which were found upon dissection.

The probability of this explanation was confirmed

by circumstances which occurred in a patient, on whom I had occasion to perform the operation of lithotomy. In sounding this patient, it was necessary to introduce the sound a great length before the stone could be felt, which it was at last, by the extremity of the staff, when it had reached the fundus of the bladder. On performing the operation, the forceps had to be pushed upwards to the superior fundus of the bladder, where the stone was lodged. The bladder, which seemed to be contracted about the stone, was distended, by dilating the blades of the forceps. By this means the stone was seized and extracted.

In cases like the above, the stone is lodged in a cyst, which is more or less permanent, according to the duration of the case. At first, and during the early period, the contraction seems to be merely spasmodic and transitory. But, if it continue long unremoved, organic changes take place, which make the cyst permanent, so that any future resolution of the contraction becomes impracticable.

Ever very truly yours, &c.

JAMES RUSSELL.

To Dr BALLINGALL,  
*Queen Street.*

*Explanation of the Plates.*

Plate I. represents the wound in the anterior part of the bladder; the parts being suspended by the peritonæum, the recti and pyramidal muscles, with part of the ossa pubis, dissected off the forepart of the bladder, and turned downwards.

AAA, The point at which the peritonæum is reflected over the fundus of the bladder.

B, The opening into the bladder, measuring nearly two inches, and above which the stone was lodged.

C, A probe passed through between the cervix vesicæ and rectum.

D, The ossa pubis turned downwards.

E, A probe passed through the incision in the linea alba, between the recti and pyramidal muscles.

Plate II. Fig. 1. a lateral view of the parts, the bladder and rectum nearly *in situ*, after the peritonæum had been dissected off.

A, The upper part or fundus of the bladder in which the stone was lodged, covered with strong and powerful muscular fibres.

B, The point mentioned in the report of the dissection, where an incipient organic contraction appeared to exist.

C, Part of the body and neck of the bladder; the limits of the wound being marked by two probes.

D, The ureter.

E, The rectum.

F, The ossa pubis.

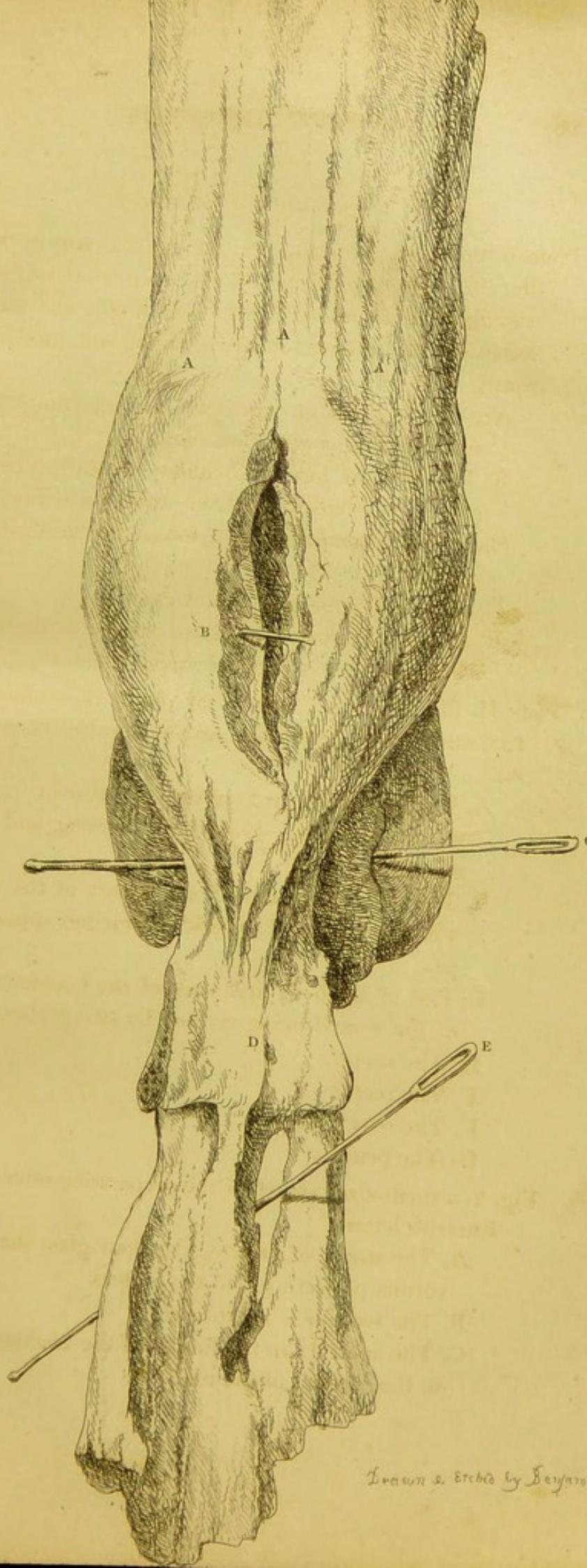
G, The penis.

Fig. 2. a small-sized sketch of the preparation referred to in Mr Russell's letter.

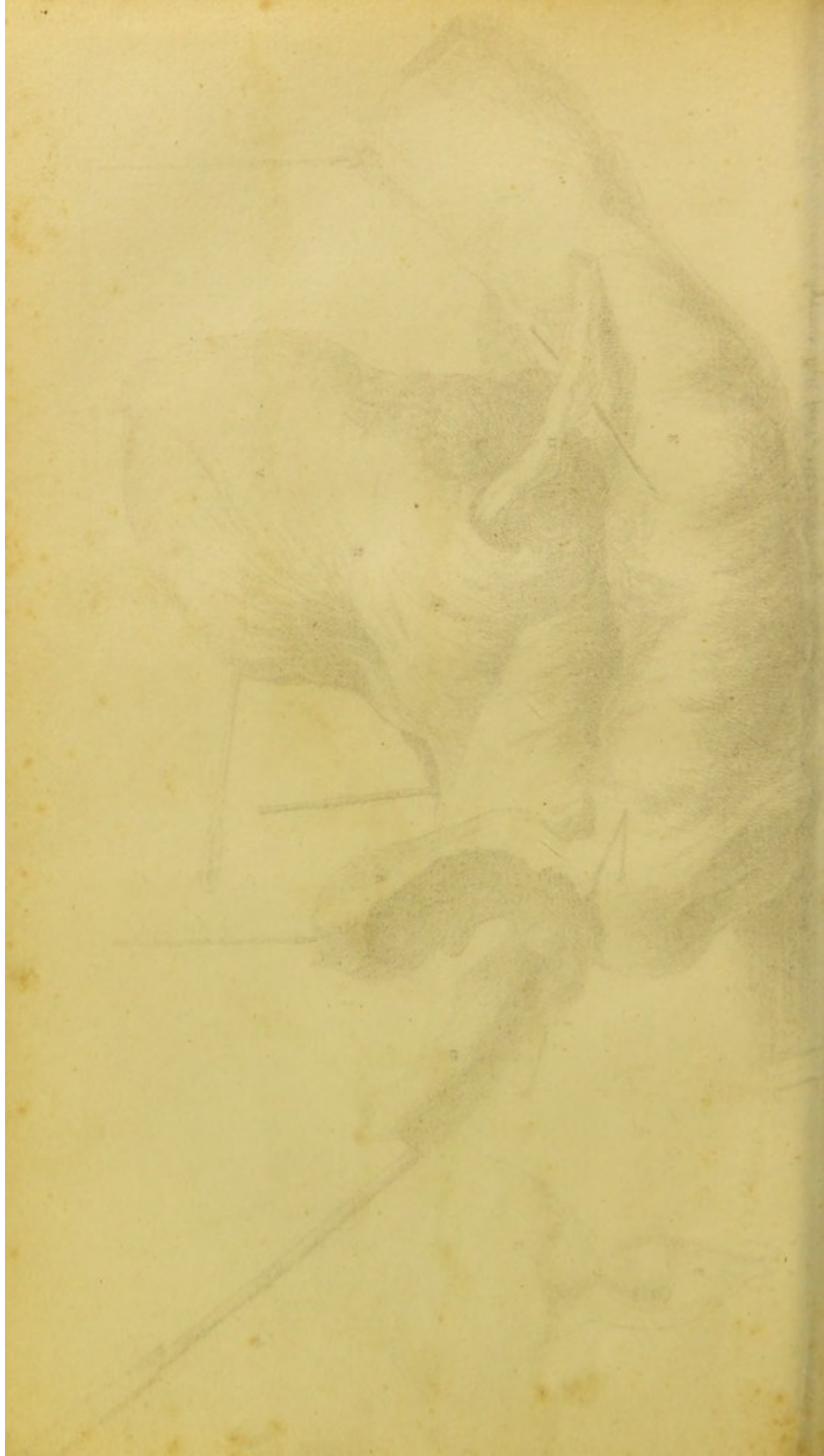
A, The stone, of an irregular hour-glass shape, with its cornua projecting into the ureters.

B, The receptacle for the urine.

C, The aperture in the fundus of the bladder, mentioned in the account of the case.



*Drawn & Etched by Benjamin Bell*



*Benjamin Beekley*

