ON 114 CONSECUTIVE CASES
OF
OPERATION FOR CALCULUS IN THE
BLADDER,
PERFORMED AT THE HOSPITAL FOR SICK
CHILDREN,
AND A COMPARISON OF THE METHODS ADOPTED.

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THERE are recorded in the accompanying table 114 cases of calculus in children below the age of twelve. The methods and results of removal are as follows :

			Recovery in	Deaths.
By lateral lithotomy . . .	75	...	71	4
By vesico-vaginal lithotomy . .	9	...	9	0
Calculus in urethra . . .	4	...	4	0
By lithotrity . . .	11 (3 F.)	...	10	1
By supra-pubic incision . .	15	...	13	2
Total . . .	114	...	107	7

Dealing first with lateral lithotomy we have 75 cases with 71 recoveries, giving a percentage of 94·6. Comparing this with the tables collected by Sir H. Thompson,

we find that out of 850 boys operated on by the lateral method between the ages of one and twelve, that is to say the same as are included in the accompanying tables, there were 811 recoveries, or a percentage of 95·41. The statistics of Mr. Charles Williams of the Norfolk and Norwich Hospital give the results of 335 operations in boys between 1 and 10 years, and out of this number there recovered 314, giving a percentage of 93·73. It is more than probable that the former include the latter, but the tables are useful as showing the almost identical results of the operation under various circumstances.

Of the four *deaths* which occurred after the lateral operation one (No. 41) a child, æt. 8, had had stone in the bladder for about seven years, and died from old abscess in the kidney. A second boy, æt. 2, was very feeble (No. 48), and died of pleurisy and diarrhœa. The third case (No. 20), æt. 8, died on the twenty-second day after the operation from scarlatina, which appeared two days after the lithotomy. The fourth death (No. 54) was due to pyæmia.

Another boy, æt. 2, recovered from the operation but died three weeks later from croup, for which tracheotomy was performed. This case is not included among the deaths.

Hæmorrhage.—Of the *casualties* occurring after the operation hæmorrhage took place in six instances (Nos. 3, 6, 25, 28, 29, 92). In one (No. 3) arterial hæmorrhage from the deep part of the wound recurred up to ten days after the operation. Plugging round a tube was kept up for fourteen days, after which the wound rapidly closed. Plugging was required in a second case (No. 6). Two attacks occurred in another child (No. 25), and it took place on the second day (No. 28) in the fourth case, and (No. 29) one child had hæmorrhage followed by an abscess in perineo and testis. In the last case (No. 92) there was considerable hæmorrhage after operation, and a little more on the eighth day. All these patients recovered.

Abscess.—Abscess also occurred in the left side of the

scrotum in No. 1, and in No. 2 there was abscess in the left testis, pus in the urine and pain in micturition for some time, but ultimately a perfect recovery.

Erysipelas followed by scarlet fever and measles took place in one patient who also recovered (No. 26), and *scarlet fever* followed by albuminuria occurred in another instance which also recovered (No. 31). No. 33 got scarlet fever two days after coming into hospital. After operation a great deal of pus in urine, and albuminuria. No. 87 scarlet fever and ultimate recovery.

In one patient, æt. 5 (No. 78), much trouble followed the operation from atony of the bowel and accumulations of fæces, but the recovery was satisfactory, although three stones were removed at the time of operation. Most of these casualties occurred before the opening of the new hospital in the autumn of 1875, and some may therefore be fairly attributed to the faulty hygienic surroundings of the patients in the building which has now disappeared.

One boy had orchitis on the eighteenth day after removal of a very large stone (No. 61). One patient (No. 110), æt. 3 years 2 months, whose wound remained open for some weeks, caught nasal diphtheria and was in separate ward for five weeks, at the end of which the sinus had closed.

Of the size and nature of calculi.—Of the calculi removed by the lateral operation, some were remarkable for their size, shape or other peculiarities. In two cases (No. 23, Spec. G.G. 30; No. 78, Spec. G.G. 81)¹ three calculi were removed from the bladder of boys æt. 8 and 7. In four instances two stones were found (No. 49, 67, Specs. G.G. 45, 62; Nos. 71, 73, Specs. G.G., 67, 70) in boys of the ages of 2 years 6 months, 6 years 11 months, 2 years 3 months, and 2 years 4 months. The weights in the latter case were 42 gr. 44 gr. respectively. A calculus of peculiar shape and resembling two oval stones united by a narrow band, which weighed 63 gr., was

¹ The specimens are to be seen in the museum of the hospital, and are described in the catalogue prepared by Mr. Morgan, to which the numbers refer.

removed from a boy æt. 6 (No. 17, Spec. G.G. 19). A uric acid calculus encrusted with phosphatic material and weighing 229 gr. was taken from a boy æt. 2 years 6 months (No. 45, Spec. G.G. 41), and a uric acid stone of 178 gr. from a boy 5 years 5 months (No. 60, Spec. G.G. 55), and a calculus with uric acid nucleus of 450 gr. from a boy æt. 11 (No. 57, Spec. G.G. 52). Other stones of uric acid and weighing respectively 64 gr., 151 gr., 108 gr., 140 gr., were found in boys aged 8, 6, 2, 2, 11, 9 (Nos. 61, 63, 64, 66, Specs. G.G. 56, 58, 59, 61). Calculi of oxalate of lime existed in two instances (Nos. 58, 65, Specs. G.G., 53, 60). They weighed 53 gr. from a boy æt. 9 years 6 months, and 36 gr. from a patient, æt. 4.

With regard to the recurrence of calculus; one child, a boy, æt. 11, was twice submitted to the lateral operation at an interval of five months (see Nos. 29 and 32). On the first occasion April 19th, 1871, there was hæmorrhage followed by abscess in perineo and testis, and the wound had not closed on September 23rd, when another small stone was removed. This was followed by great pain in both hips and some slight peritonitis, but the patient ultimately recovered.

In one instance (No. 37) a boy, æt. 8, had been sounded without result at St. Bartholomew's Hospital three months previous to his admission at Great Ormond Street, when he came under the care of the same surgeon, who removed a stone, and another boy had passed a calculus in the hospital the night before he was to have been operated on. He was, however, carefully sounded with no result. Ten months later he was re-admitted and a stone weighing 63 gr. was removed. And an instance of recurrence was found in a boy, æt. 11 (No. 52), who had undergone the lateral operation for a stone the size of a pea at another place thirteen months before admission, when a second stone of uric acid and weighing 88 gr. was removed by the same method.

One specimen of cystine calculus (Spec. G.G. 47) was taken from a boy, æt. 9 years.

It is noteworthy that there was no single death in all the cases of large or peculiar stones.

The four cases in which a calculus was found in the urethra call for no comment. All were removed, either by forceps introduced into the urethra or by a small incision, and were followed by no complication.

Females.—Of the total number of cases of calculus (114) twelve occurred in female children and of these eight were treated by vaginal lithotomy, one was removed *per urethram*, and three by the crushing operation. In all cases but two the opening in the vesico-vaginal wall closed and left no fistula, but in one case (No. 31) a uric acid calculus coated with large quantities of phosphates, which caused difficulty in its removal was successfully extracted, and the edges of the incision were closed with five sutures, but a fistula resulted, and there is no record of its having been finally closed (No. 36). Another patient had a fistula which was closed subsequently.

Lithotrity.—Of the three cases in females which were subjected to lithotrity one was submitted to two operations at a week's interval, but all were completely and rapidly cured. Eight male patients were treated by lithotrity, the youngest being two years and eight months and the oldest five, the eight giving an average age of three years and eleven months (Nos. 105, 111). In one boy the operation was performed on two occasions with a year's interval. All others were successfully treated at one sitting. The weight of the stone was $43\frac{1}{2}$ grs. in a boy (No. 96), $\text{\ae t.}$ 3 years 3 months, the whole being evacuated at the time of operation except one small fragment which passed naturally two days subsequent. Fifty-four grains of uric acid calculus were crushed and washed out from the bladder of a boy, $\text{\ae t.}$ 3 years 6 months (No. 100); a very little gravel was passed on the two subsequent days, but on the fifth the boy was up and about in the ward.

The one fatal case occurred directly from the operation. The patient was an unhealthy looking boy, $\text{\ae t.}$ 5, and a stone had been successfully crushed when the bladder

was injected with water from the evacuator. Suddenly this viscus which was distended with water was seen to collapse, and laparotomy was immediately performed, when a rent was found in the anterior wall at a part which did not involve the peritoneum. This was sewn up and a perineal cystotomy performed in order to prevent the escape of urine into the abdominal cavity, the patient, however, did not recover from the collapse and died in the course of a few hours.

Fifteen cases, all males, were treated by the suprapubic operation as modified in recent years, the bladder being washed out and afterwards distended by injection of boracic lotion, and an inflated bag of india-rubber inserted in the rectum. The first operation in this manner was performed on July 29th, 1885. Of these, thirteen recovered and two died. The death in one case, a patient, æt. 4 years and 2 months, was brought about by the boy having suffered from diarrhœa which was not reported by the nurses. The operation was performed in the usual manner, a moderate sized stone extracted and the incision in the bladder was united with catgut. The skin wound was also united and a drain inserted at the lower margin. Urine issued from the wound on the day of the operation, but the boy became collapsed and died on the third day following. Peritonitis was found at the examination, but the peritoneum had not been injured. In this case an attempt had been made on a previous day to pass a lithotrite, but was abandoned on account of the smallness of the urethra (No. 103).

The second death occurred in a boy æt. 9, in whom also an attempt to use the lithotrite was made but had to be abandoned on account of the size of the stone. The usual operation was performed and a large stone extracted (No. 109). There was a good deal of phosphatic deposit which required to be washed out of the bladder. The incision was not stitched. In the evening hæmorrhage occurred and two vessels required to be ligatured. The boy died in the evening of the following day, and as no

satisfactory cause could be ascertained it was presumably due to septicæmia.

Of the casualties that followed this operation one patient after recovering from the operation had some nasal discharge and was afterwards affected with diphtheritic paralysis which placed his life in jeopardy for some time.

In No. 89 there was slight extravasation of urine after vomiting and much urine passed through the wound, which, however, healed on the thirteenth day. In a case (No. 91) where the muscular coat of the bladder was united by catgut sutures, and the incision in the abdominal wall by silk, a catheter was left in the bladder to drain it *per urethram*, but this causing urethritis was withdrawn, and the bladder became distended with urine so that the stitches were torn out and some hæmorrhage took place into the viscus, but on the clots being washed out the boy eventually made an excellent recovery (*vide* 'Lancet,' May 7th, 1887).

In a boy (No. 95) æt. 1 year and 4 months, weakly and rachitic, symptoms of calculus had existed for three months and a stone was found on sounding which did not readily move in the bladder, and when the suprapubic opening was made a stone was felt lying in a sacculus in the region of the trigone, below and between the orifices of the ureters and overlapped by the mucous membrane of the bladder to such an extent that it became necessary to raise the calculus from below by the assistance of the forefinger in the rectum. The stone was of uric acid weighing fifty-three grains and was of the shape of a blunted cone, the apex of which was buried in the walls of the bladder. No sutures were used and the wound healed on the sixth day (*vide* 'Lancet,' October 22nd, 1887).

In another case a calculus was found to be fixed in the mouth of the ureter (No. 97).

Of two cases in which the bladder wound was sutured with carbolised catgut, in the first (No. 101) urine escaped through the wound on the fourth day but ceased to do so

at the end of fourteen days, and union of the wound was complete at the end of a month. In the second (No. 102) the incision of the bladder united at once, but suppuration occurred in the superficial parts which delayed union till the end of three weeks, and in a third (No. 104) instance which was similarly treated urine leaked through the wound on the third day but ceased on the seventh, and union was sound on the seventeenth day.

In reviewing the results of lateral lithotomy it is impossible not to be struck with the very great success which has attended its performance. Of the deaths which occurred in patients who were subjected to this form of operation only one out of a total of seventy-five cases can be attributed as directly due to the operation, namely the case (No. 54) of a boy, *æt.* 2 years, who died of pyæmia. It is true that this occurred in the wards of the new building, but it was in the year 1877 when precautions against sepsis were not universally carried out with that punctilious observance which is now-a-days almost invariable, and it is possible that even this death might have been prevented with more rigid precautions. Of the other deaths two were no doubt due to the changes in the kidneys resulting from the continued presence of stone, and the other was the result of epidemic diseases which must prevail at intervals in all institutions where a large number of children are congregated. Hæmorrhage was the most frequent and the most serious of the casualties following the operation, but death did not occur in a single instance in which hæmorrhage took place, nor was there a fatal result in any of those cases where abscess, orchitis, erysipelas, &c., which are among the recognised sequelæ of this operation occurred, and the number of instances in which any of these sequelæ happened is remarkably small out of so large a number, seeing that the patients were from among the very poor and ill-fed children, and were suffering from a disease which is largely engendered by ill-advised feeding from a very early age, as well perhaps as from a faulty constitutional

state. Due credit must also be given to this operation for the success which has attended the removal of even the largest stones, the size of which has in many instances been mentioned, whilst from the specimens before the Society it may be judged that there are many instances, not mentioned above, where the calculus must have presented difficulty in extraction either on account of its shape, or size, or other peculiarities.

Although, in one instance, the urethra was torn and the stone was not extracted at the time of the operation, it came away through the wound on the following day and the patient ultimately did well. It should be noted that there is no single instance amongst these seventy-five cases in which the rectum was wounded, notwithstanding the large size of some of the calculi removed, and due credit will be given for this by those who have had occasion to treat patients in whom this untoward accident has taken place.

It is, of course, impossible to say whether any ulterior consequences have supervened in any of these cases, such, for instance, as have been pointed out as liable to result from this operation by reason of injury to the vesiculæ seminales. There are obvious reasons why such results can never be ascertained as following an operation performed on children many years before the advent of puberty. But the immediate casualties resulting from the operation are sufficiently numerous, notwithstanding their immunity from fatal consequences, to make it desirable to avoid a cutting operation, even under the improved methods now in vogue, the origin of which is subsequent to the period in which a large proportion of these cases were treated.

On the other hand, a glance at the collection of stones here exhibited makes it evident that in a large number of instances the surgeon would have preferred to avoid an operation involving risk either immediate or secondary, if the removal of the calculus could with equal efficiency be brought about by other means, and if the bladder could be thoroughly relieved of all its foreign contents without

danger of any remaining to form the nucleus of a fresh concretion. The list of cases which have been treated by lithotrixy is but a small proportion of the whole number, but the results have been most satisfactory, with the one exception of death occurring as an immediate accident of the operation. In all the other cases the stone was crushed and completely evacuated at one sitting, except in the case of a girl (No. 81) who was submitted to two operations within a week. Of the eight boys in whom this operation was performed, except for the passage of small pieces of *débris* on the days following the operation, there has not been one who might not have left the hospital in the course of three or four days, but in those five upon whom I operated their discharge was delayed in order that I might feel certain that no fragments were left behind, and for this purpose the bladder was aspirated again at the end of a week, but in no single case were any more fragments washed out.

It will be noticed in the table that accompanies this paper that in three cases which were operated on, one by the lateral (No. 110), and two by the supra-pubic method (Nos. 103 and 109) the lithotrite could not be used. In two of these cases there was difficulty as to its introduction, and in one the stone was too large to be grasped by the lithotrite. But since the date of these operations Messrs. Weiss, from whom these instruments were obtained, have succeeded in producing efficient lithotrites of a smaller calibre. These are now to be obtained of the following dimensions :—

No. 5	...	5 in. stem	...	6 in. angle	...	opening $\frac{1}{2}$ in.
6	...	6 "	...	7 "	...	" $\frac{1}{2}$
7	...	7 "	...	8 "	...	" $\frac{3}{4}$
8	...	8 "	...	10 "	...	" 1

All these instruments are fenestrated.

The objections which have been raised against this form of operation in the case of boys have been so recently combated by Surgeon Major Keegan that it is unnecessary to repeat his arguments, and it will be generally admitted

that instruments of the size above-mentioned can be introduced through the urethra into the bladder of most boys over two years of age when the meatus has been incised, a proceeding which is hardly attended even by temporary inconvenience. Occasionally it happens as in two of the instances above mentioned, that, owing probably to a puckering of the mucous membrane of the urethra, in front of the projection of the end of the male blade, an impediment may occur to the introduction of the instrument, but this is the only circumstance which is likely to prevent its introduction to the bladder. As regards the capacity of that viscus, my own observation, drawn from a very large number of soundings of children who have been the subjects of stone, or have presented all the subjective symptoms of that affection, points to the fact that, owing probably to frequent distension, the bladder in these patients is exceedingly ample, and affords considerable space for the movements of a sound, or, if necessary, of a lithotrite, without danger of injuring the mucous membrane if ordinary care is observed. This being the case, I confess myself unable to see any objection to this form of operation in the case of stones of a small size, such as form a very large majority of those before the Society. Where the calculus is of such material, *e. g.* oxalate of lime, that its fracture cannot be accomplished by instruments as slender as those must be which have the above stated dimensions, the introduction of a lithotrite cannot prejudice subsequent proceeding, and the same may be said of the case of stones of such a size that they cannot satisfactorily be seized within the blades of the instrument.

Females.—As the records include only three cases in which lithotrity has been practised upon female children, the opportunity for comparing it with other methods is hardly sufficient, but again referring to the experience of those who have met with cases in which a vesico-vaginal fistula has resulted from the operation of lithotomy, it may fairly be urged that the former operation is to be pre-

ferred to one which runs the risk of causing this exceedingly intractable malady. It needs no arguments to urge the preference which should be given to the former operation in cases where the stone is of moderate size, or of a material which can easily be crushed. Not only is the above casualty avoided, but even the amount of dilatation of the urethra need be so slight as to cause no fear of its regaining its normal contractile powers. Very large stones, and others which do not lend themselves to the crushing operation, require to be dealt with by other means.

The subject of recurrence of calculus as a result of a fragment being left behind, I cannot but consider to be exaggerated as to its frequency, and as to its importance. Four out of five patients upon whom I personally operated, I have seen at intervals of two or three years, and in none has there been any evidence of symptoms of recurrence. On the other hand, a boy, who was treated by lithotritry by one of my colleagues in 1888, was re-admitted exactly a year later and submitted to the same operation (Nos. 105 and 111). Whether this stone in the second instance, which was judged to be of the size of a small nut, was a fresh one which had passed down from the kidney, or an accumulation around a fragment which remained in the bladder after the first operation, it is impossible to say, but I have seen the boy at a year's interval after the last operation and he has had no further symptoms of stone.

The writings of Surgeon Major Keegan have brought the subject of litholapaxy in the case of boys so forcibly before the profession that it is unnecessary to repeat the arguments which he urges in favour of its adoption by English surgeons. The brilliant series of results which he and several of his fellow labourers have obtained in India serve to encourage us in this country to follow their example. The main objections which have been urged against it are :—1st, The smallness of the urethra in boys and its extreme sensitiveness. 2ndly, The liability to recurrence which there may be if fragments are not

thoroughly evacuated. The first objection is shown by Surgeon Major Keegan to be exaggerated. With instruments such as are now manufactured, the urethra can be easily traversed, except in occasional cases where, as already narrated, the mucous membrane puckers in front of the male blade and causes difficulty to its introduction. But with improved instruments even this difficulty is not likely to occur, and as regards the sensibility of the urethra there is no reason why this should be greater in English children than it is in those born in India, and with the aid of an anæsthetic there can be no reason to avoid the operation on this ground. With regard to recurrence, it is, as has already been said, almost impossible to speak from facts, but while an instance has been given in which lithotrity has had to be repeated within a twelvemonth, another instance is mentioned where lithotomy was twice performed on the same patient within five months, and a second in which it was repeated after thirteen months, and in another boy a stone was removed ten months after another had been passed per urethram, and the probability seems that in one case as in the other fresh calculi passed down from the kidney, and as lithotrity is the operation from which recovery is most rapid and which leads to less complications, it seems indicated as the most desirable in cases where the stone is suited for the operation. It may be permitted me to say that in thus recommending the operation, I may endorse what is said by Mr. Keegan, viz. that lithotrity in the case of children is even a more delicate operation than in adults, and should not be attempted by any but those who have mastered all the manipulative details.

A safeguard against recurrence has already been mentioned, which is at the same time free from risk, and possibly even under all circumstances advisable, namely the washing out of the bladder by means of an evacuator, on a second occasion, at an interval of a few days. By this means not only is any remaining detritus removed but any fragment of such magnitude as to be unable to pass through

the urethra can be detected even more certainly than by the sound, and if discovered, can be treated with the lithotrite.

The author in omitting to refer to the excellent work which has been done in the direction of ascertaining the best means to be adopted in the removal of calculi from the bladders of the young of either sex has no idea of ignoring the admirable advice and conclusions which have been furnished in recent papers, more particularly by Mr. Jacobson and Mr. Walsham and others, but as the statistics herewith given form a history in themselves, the author has abstained from broadening the scope of the paper into a general treatise.

In conclusion I venture to submit that the facts disclosed in the accompanying table warrant the following propositions :

1. That in the cases of boys and girls small stones should be dealt with by litholapaxy.
2. That stones composed of oxalate of lime or of such size as not to be readily grasped between the blades of a lithotrite should be removed by the lateral operation in the case of boys.
3. That the supra-pubic operation should be reserved for stones of very large size or inconvenient shape in boys or girls, or cases of calculus embedded in a saccule of the bladder or impacted in the mouth of a ureter.

(For report of the discussion on this paper, see 'Proceedings of the Royal Medical and Chirurgical Society,' Third Series, vol. iii, p. 18.)

Appendix to Mr. J. H. Morgan's Paper on Calculus.

No.	Date.	Sex.	Age.	Nature of operation.	Operator.	Result.	Remarks.
1	1864. March	M.	6	Lateral	Mr. Holmes	Good recovery	Abscess formed in left side of scrotum, but was insignificant. Very rickety child. Abscess left testicle. Pus in urine, and pain on micturition for some time after. Ultimately quite recovered. Hæmorrhage, arterial, recurring up to 10 days after operation from deep part of wound. Plugging round a tube for 14 days. Rapid closure of wound.
2	"	M.	4	"	Mr. Smith	"	
3	June	M.	4	"	"	Recovery	
4	July	M.	4.6	"	Mr. Holmes	Rapid recovery	
5	1865. April 27th	F.	5	Dilatation and incision of urethra and vagina	Mr. Smith	Recovery May 7th	—
6	May 8th	M.	3	Lateral	"	"	Hæmorrhage after operation, requiring plugging of wound. Died after tracheotomy, July 26th, for croup.
7	June 14th	M.	2	"	Mr. Holmes	"	
8	" 28th	M.	3	"	"	"	
9	Oct. 21st	F.	7	Lateral (?) lithotomy not stated	Mr. Smith	" Nov. 6th	
10	1866. March 14th	M.	5	Lateral	Mr. Holmes	" April 11th	—
11	April 18th	M.	10	"	"	" May 20th	—

No.	Date.	Sex.	Age.	Nature of operation.	Operator.	Result.	Remarks.
12	May 23rd	M.	3	Lateral	Mr. Holmes	Recovery July 5th	—
13	Nov. 12th	M.	2.6				
14	1867. May 11th	M.	4.6	Calculus in urethra Lateral (?) lithotomy (?)	Mr. Holmes	"	Removal.
15	Oct. 19th	M.	8				
16	" 26th	M.	3				
17	1868. May 4th	M.	6	" Lateral	"	"	—
18	June 6th	M.	3.6				
19	July 15th	M.	8	" "	"	"	Weight 63 grs. Shape of stone curious. Resembled two stones united by a narrow band. <i>Vide</i> text.
20	Nov. 4th	M.	5				
21	1869. May 26th	F.	10	Vesico-vaginal Lateral (?) lithotomy	"	Recovery	Stone very large; weight 7 drms. 38 grs. Scariatina 2 days after operation. Stone small; weight 80½ grs.
22	June 16th	M.	8				
23	Oct. 20th	M.	9				
24	Dec. 1st	M.	5				
25	1870. July 16th	M.	6.6	" "	Mr. Marsh	Good	Had two attacks of hæmorrhage and had vari- cells.
26	Aug. 13th	M.	2.6				
27	Dec. 8th	F.	3	Vesico-vaginal	Mr. Howard	"	
28	1871. Feb. 8th	M.	4.6	Lateral	Mr. Marsh	Relieved	Had erysipelas, scarlet fever, and measles. Fistula remained, and she caught smallpox. Fistula was afterwards successfully closed.
29	April 19th	M.	11	" (?)			

30	June 21st	M.	2.6	"	(?)	Mr. Smith	"	—
31	Sept. 16th	M.	4	"	(?)	"	"	Caught scarlet fever; albuminuria.
32	" 23rd	M.	11	"	(?)	Mr. Haward	"	Second operation (first April 19th, 1871). Small oval stone removed. Wound from first operation had not closed. Had great pain in both hips and some slight peritonitis.
33	1872. April 20th	M.	7	"	(?)	Mr. Smith	"	Got scarlet fever 2 days after coming into hospital. After operation a great deal of pus in urine and albuminuria as a consequence.
34	May 4th	M.	5	"	(?)	Mr. Marsh	Good	—
35	Aug. 10th	M.	3	"	(?)	Mr. Smith	Cured	—
36	Sept. 9th	F.	—	"	Lithotomy (?)		Successful lithotomy	Uric acid calculus coated with large quantity of phosphorus. There was difficulty in removing stone because of this soft crusting.
37	Nov. 23rd	M.	8	Lateral (?)		"	Successful	The incision was made in anterior wall of vagina, which was afterwards adjusted with five sutures.
38	1873. Feb. 2nd	M.	4.6	"	(?)	"	"	Was under Mr. Smith in St. Bartholomew's Hospital 3 months ago. No stone could be detected at that time.
39	June 18th	M.	6	"		Mr. Marsh	"	Symptoms had lasted only 3 weeks. On the Sunday, day of operation, they were so urgent as to require immediate operation. Small stone.
40	Oct. 17th	M.	3	"	Incision of urethra		"	—
41	1874. March 5th	M.	8	Lateral (?)		Mr. Smith	Death	Calculus could easily be felt in its position. Mr. Marsh seized it with his fingers and cut down into urethra, whence it was easily got out.
42	" 25th	M.	4.6	"	(?)			Had had the stone in the bladder about 7 years.
43	May 2nd	M.	3.9	"	(?)	Mr. Marsh	Recovery	Death from old abscesses in the kidney.
44	July 15th	M.	5	"	(?)	"	Successful	—
45	Oct. 31st	M.	2.6	"	(?)	"	"	—
46	Dec. 2nd	F.	4.4	"	Vesico-vaginal	Mr. Smith	Recovery	—
							Successful	Stone very large; weighed 3 oz. 2 scr. 4 grs.

No.	Date.	Sex.	Age.	Nature of operation.	Operator.	Result.	Remarks.
47	1875.	M.	5	Lateral (?)	Mr. Smith	Recovered	—
48	April 14th	M.	2	" (?)	Mr. Marsh	Death	Child very feeble. Pleurisy; diarrhoea.
49	July 3rd	M.	2.6	" (?)	"	Recovery	Two calculi.
50	1876.	M.	3	" (?)	"	Successful	—
51	Jan. 8th	F.	5	Per urethram	Mr. Smith	"	No incontinence after operation. Had been cut
52	Feb. 23rd	M.	3	Lateral (?)	"	Recovery	(laterally) for stone 13 months previously.
53	1877.	M.	9	" (?)	Mr. Marsh	"	—
54	Feb. 28th	M.	2	" (?)	"	Died	Pyæmia.
55	March 10th	M.	2.6	" (?)	Mr. Smith	Recovered	—
56	July 7th	F.	2.9	Vaginal lithotomy	"	Successful	Stone removed through roof of vagina. No in-
57	Oct. 17th	M.	11	Lateral (?)	Mr. Marsh	"	continence of urine.
58	1878.	M.	9.6	" (?)	Mr. Smith	Recovery	Oxalate of lime calculus.
59	April 17th	M.	4	" (?)	"	Successful	—
60	June 19th	M.	5.5	"	"	"	Stone, uric acid; weight 2 oz. 2 scr. 18 grs.
61	Oct. 6th	M.	8	" (?)	"	"	—
62	1879.	M.	8	" (?)	"	"	Uric acid calculus; weight 1 oz. 4 grs. Orchitis
63	Feb. 8th	M.	5.6	Vesico-vaginal	"	"	18th day. Stitches removed April 30th. Dis-
64	April 2nd	F.	6	Lateral	"	"	charged May 1st.
65	" 16th	M.	2.3	"	"	"	Not a trace of fistula. No incontinence of urine.
66	June 25th	M.	4	"	"	"	Uric acid calculus; weight 151 grs. Orchitis
67	Sept. 10th	M.	4	"	"	"	16th day; lateral lithotomy. Mr. Smith held
68		M.	4	"	"	"	staff himself.
69		M.	4	"	"	"	Weight 108 grs.
70		M.	4	"	"	"	Oxalate of lime, 36 grs.

66	Oct. 4th	M. 11.9	"	(?)	"	"	Uric acid calculus, 140 grs. Two oval lithic acid stones.
67	" 29th	M. 2.3	"	"	"	Successful	—
68	1890. Sept. 1st	M. 3.8	"	"	"	"	—
69	1881. Feb. 16th	M. 11	"	"	"	"	—
70	" 16th	M. 6.2	"	"	"	"	—
71	March 19th	M. 6.11	"	Per urethram Lateral	Mr. Owen Mr. Marsh	"	Two stones were found at the operation weighing together 45 grs.
72	May 14th	M. 9.7	"	"	Mr. Smith	"	One large stone and one small.
73	" 18th	M. 2.3	"	"	Mr. Marsh	"	—
74	July 18th	M. 3.3	"	"	Mr. Smith	"	—
75	Sept. 3rd	M. 1.8	"	"	Mr. Owen	"	Straight staff used.
76	Oct. 29th	M. 2.9	"	"	Mr. Marsh	"	—
77	1883. Sept. 8th	M. ?	"	"	Mr. Owen	"	—
78	1884. June 11th	M. 7	"	"	"	"	Three stones removed. Much trouble after operation from atony of bowel and accumulation of faeces.
79	1885. Jan. 24th	M. 9.5	"	"	Mr. Morgan	"	Ten months previously had passed a small stone per urethram.
80	March 11th	M. 5	"	"	Mr. Owen	"	—
81	June 20th	F. 2.3	"	Lithotrity	Mr. Pitts	Successful, partially	None of the nucleus seems to have been crushed; only the outer laminae of phosphates came away.
81A	" 27th	F. 2.3	"	"	"	Successful	Second operation. The nucleus of stone was crushed; appeared to be lithic acid.
82	July 29th	M. 11	"	Supra-pubic	Mr. Morgan	"	Sept. 28th, went to Ascot. Small fistula still remains, which discharges slightly. Nov. 19th, sinus now healed.
83	Sept. 9th	M. 3.6	"	Lateral	Mr. Pitts	Recovery	Stone, about size of almond, removed.

No.	Date.	Sex.	Age.	Nature of operation.	Operator.	Result.	Remarks.
84	Sept. 19th	M.	3.10	Calculus in urethra	Mr. Owen	Recovery	The calculus could be felt in perineum. Mr. Owen cut down upon it in the middle line, and extracted a small stone about the size of a pea.
85	" 30th	M.	3.6	Lateral (?)	"	"	Stone, about size of small eating chestnut, removed. Uric acid.
86	Nov. 21st	M.	2.6	Supra-pubic	Mr. Morgan	"	Size of stone 243 grs. Uric acid. Boy had diphtheritic paralysis in December. His condition for a time was very critical.
87	1886. March	M.	8.2	Lateral lithotomy (?)	Mr. Marsh	Successful	Small stone, about size of small almond. Mar. 24th, N.B. with scarlet fever.
88	April 17th	F.	5.5	Lithotrity	Mr. Owen	"	Mr. Owen dilated the urethra, and crushed the stone with a lithotrite. The stone was supposed to be about the size of a Spanish olive.
89	Sept. 18th	M.	8	Supra-pubic	Mr. Marsh	Cure	Slight extravasation of urine after vomiting; much urine passed through wound. Wound healed and patient up in 13 days.
90	Oct. 21st	M.	10	Lateral	Mr. Owen	Successful	—
91	" 23rd	M.	6.5	Supra-pubic	Mr. Morgan	"	'Lancet,' May 7th, 1887.
92	1887. Jan. 19th	M.	5	Lateral	Mr. Owen	"	Considerable hæmorrhage after operation, and a little more on 8th day.
93	Feb. 12th	M.	4.3	Supra-pubic	Mr. Marsh	"	—
94	" 16th	F.	5.9	Lithotrity	Mr. Owen	"	Bladder was not stitched. Wound healed on 6th day.
95	June 11th	M.	1.4	Supra-pubic	Mr. Morgan	"	42½ grs. came away at the time of the operation; 1 gr. was passed 2 days afterwards.
96	July 12th	M.	3.3	Lithotrity	"	"	One calculus was found in mouth of ureter. Stone about size of small hazel-nut.
97	Sept. 7th	M.	9	Supra-pubic	Mr. Pitts	Recovery	Nov. 5th, walking about ward. No pain or any other trouble in micturition since operation.
98	Oct. 26th	—	—	Lateral (?)	Mr. Owen	Successful	
99	Nov. 3rd	M.	2.8	Lithotrity	Mr. Morgan	"	

100	1888. Jan. 11th	M.	3.6	"	"	Cured	Calculus, uric acid, 54 gr. Some pain in micturition for 3 days after operation. A very little gravel passed during first 2 days. Got up on 5th day.
101	Feb. 11th	M.	5.5	Supra-pubic	Mr. Pitts	"	Bladder sewn completely up. Skin wound left open at lower part, with drainage tube inserted. Urine leaked through wound on 4th day; skin sutures removed, and wound opened in whole extent; boracic fomentations applied. Urine ceased to come through wound on Feb. 26th, and wound had healed by March 7th.
102	April 2nd	M.	5.6	"	Mr. Marsh	"	Bladder wound sutured with chloric carbolised gut; skin wound left open $\frac{1}{2}$ in. at lower part for drainage tube; incision opened left rectus sheath; bladder united thoroughly. Some suppuration of superficial wound, probably from rectus sheath. Wound healed April 23rd.
103	" 11th	M.	4.2	"	Mr. Morgan	Death April 14th, 1888	Boy suffering from diarrhoea at time of operation, which had not been reported by nurses. Bladder sewn up with gut; skin wound sewn up, with drain at lower end. Urine through wound on day of operation. Boy collapsed, but temperature rising. P.M.—Peritonitis. Lithotripsy previously tried March 28th, but urethra too small for lithotrite.
104	May 12th	M.	3.7	"	Mr. Marsh	Cured	Second stone not diagnosed before operation. Bladder opened in usual way and stones easily removed; bladder wound united with seven catgut sutures; skin wound united above with catgut. Left open below for drainage tube, which was removed after 24 hours. Urine leaked through wound on May 15th; ceased to come through wound on May 19th. Healed May 29th.
105	July 25th	M.	4	Lithotripsy	Mr. Owen	"	Bladder wound left open. Urine first came
106	" 30th	M.	8.10	Supra-pubic	Mr. Morgan	"	through penis on 12th day.

No.	Date.	Sex.	Age.	Nature of operation.	Operator.	Result.	Remarks.
107	Sept. 10th	M.	4.5	Supra-pubic	Mr. Marsh	Cured	Small uric acid calculus. Some oozing of blood from wound during first 24 hours. Healed soundly by first intention. No escape of urine through wound.
108	Oct. 20th	M.	5.2	"	Mr. Morgan	"	Stone very large, broke in extraction. Wound in skin and bladder left open.
109	Nov. 7th	M.	9	"	"	Death Nov. 8th, 1888	Lithotripsy begun, but stone too large for lithotrite. Removed by supra-pubic incision, which was left open, and fragments washed out. Bled during day, so that chloroform had to be given again in evening and two vessels tied. Vomited constantly next day. Died 8.45 p.m. P.M.—No very evident cause of death; septicæmia.
110	" 28th	M.	3.2	Lateral	Mr. Owen	Cured	Lithotrite could not be introduced; urethra small. A stone was removed, but wound remained unclosed for some weeks. Patient had nasal diphtheria, and was in separate ward for 5 weeks. Sinus from bladder completely healed over.
111	1889. July 31st	M.	5	Lithotripsy	"	"	A small stone, the size of a small nut, was crushed and evacuated.
112	Aug. 3rd	M.	3.6	"	Mr. Morgan	"	The stone was about the size of a pea, and was crushed and evacuated.
113	Oct. 18th	M.	3.8	"	"	"	A small stone, about the size of a pea, was crushed by the usual operation.
114	1890. Jan. 22nd	M.	5	"	Mr. Owen	Death	Bladder ruptured. Laparotomy and perineal cystotomy.

Note.—These statistics are copied verbatim from the operation-book of the hospital. A (?) is placed in those instances where the nature of the operation is not specified.