ureter, (2) at the brim of the pelvis, and (3) at the vesical end of the ureter.

When we speak of renal calculus, we include not only one embedded in the substance of the kidney, but also one lying in the pelvis or calices of that organ. And, this being so, I know of no symptoms by which we can, with anything approaching certainty, distinguish between a kidney stone lying in the pelvis and one impacted in the ureter at any position above an inch or two from its vesical orifice. The symptoms of a stone lodged along the greater part of the course of the ureter are to all intents and purposes the same as those of a stone lying in the renal pelvis and obstructing the ureteral orifice.

It is true that a ureteral calculus blocking the passage will give rise to hydronephrosis on the affected side; but so may a pelvic stone; and if both ureters be blocked in this way calculus anuria will result. It is also possible that a stone impacted in the ureter may give rise to pain or tenderness on pressure at the seat of impaction when deep pressure is made along its course, and this, combined with other symptoms, may lead you to strongly suspect the nature of the disease. But the probabilities are so strongly against a definite diagnosis that the recognised rule of surgery in all such cases now is to explore the kidney for stone in the first instance by the lumbar method, and, if it be not found there, to examine the ureter by a bougie or probe passed down through the pelvis, and, if a stone be then found, to extend the lumbar incision parallel with Poupart's ligament sufficiently far to enable you to reach the stone and extract it. By this procedure I discovered and successfully removed the calculus which I show you, which was firmly impacted 4 inches from the pelvis of the kidney. The details of the case are published in the *Transactions of the Medical Society of London* for 1899, and in the *Lancet* of July 22nd, 1899. When, however, the stone is impacted in the lower end of the ureter, at or near its vesical orifice, it generally admits of recognition.

I need scarcely tell you that when, after repeated attacks of renal colic, all the kidney symptoms are replaced by those of stone in the bladder you will at once come to the conclusion that the stone has made its way down the ureter, and is lying in the bladder. I could detail to you numerous cases with a history of this kind from my own practice, in which I detected the stone in the bladder and removed it by litholapaxy.

But when the renal symptoms cease, and are followed by vesical symptoms, and no stone can be detected by the sound, you should suspect its impaction in the vesical end of the ureter; for a stone in this position may give rise to all the symptoms of vesical calculus.

How are we to diagnose a stone in this position? Introduce, in the first instance, the forefinger into the rectum, the patient lying on his back, and make deep pressure above the pubes with the other hand, when you may feel the stone as a hard nodule lying in the ureter beyond the trigone. In the female it may be similarly detected by introducing the finger into the vagina. Then, again, if the stone project from the ureteral orifice into the bladder, it may be felt by the sound; or in the female the urethra may be dilated, a finger introduced into the bladder, and the calculus detected in this manner.

But the most important means of diagnosing a calculus lying in the lower end of the ureter or projecting from its orifice is Leiter's electric cystoscope. By this instrument I have in recent years detected several calculi lying in this position which were not recognisable in any other manner.

These two large calculi which I show you were contained in a cystic tumour of the ureter projecting into the bladder, which I diagnosed by the cystoscope, and successfully removed suprapubically. The case is recorded in full in the *Medico-Chirurgical Transactions*, 1898, vol. i.

In the *Lancet*, July 22nd, 1899, details are given of a case in which the cystoscope revealed a long narrow stone projecting into the bladder from the left ureteral orifice, and which I successfully removed by introducing a lithotrite, catching the end of the stone, pulling it out of the ureter, and then crushing it.

In May last a patient came under my care in whom the symptoms of kidney stone on ceasing were followed by those

of vesical calculus. He had been sounded by several surgeons with a negative result, and I myself could find no stone by the sound. By the cystoscope I detected the lower end of the right ureter prolapsed into the bladder, in shape and size like the nipple of a woman's breast. At the bottom of the dimple, in the centre, I saw a dark grey speck, and came to the conclusion that this was a stone lying in the ureter. I performed suprapubic cystotomy, found matters exactly as seen by the cystoscope, and show you this stone which I successfully removed.

A fortnight after this I saw a case—an officer just home from the Boer war—in consultation with Dr. Robert Maguire, with a history similar to that just recorded, but no stone could be found on sounding. Cystoscopic examination revealed practically the same appearances as in the last case, on the left side. We arrived at a similar diagnosis. As the patient's symptoms were of recent standing we thought it advisable to send him to Contrexéville for a course of the waters, in the hope that the stone might be washed out. Three months later the patient was sent back from Contrexéville with an intimation from Dr. Debut d'Estrée that the stone had passed into the bladder, and on September 19th I removed it by litholapaxy, Dr. Maguire being present.

As this method of diagnosis of ureteral calculi is comparatively new, I have thought it right to give you brief details of some specific instances of its success from my own practice.

NOTES ON 206 OPERATIONS FOR STONE.

By W. F. ADAMS, M.R.C.S.ENG., L.R.C.P.,

Mission Hospital, Dera Ghazi Khan, Punjab.

DURING the two years and four months I have been stationed at Dera Ghazi Khan, Punjab, on the banks of the Indus, I have operated on 206 cases of urinary calculus. My experiences largely coincide with those of other Indian surgeons, but a few notes on so many cases may prove interesting.

LITHOTRITY.

My rule has always been to remove the stone by lithotritry. The following I consider contra-indications:

I.—In Boys.

1. When there is marked cystitis lithotomy drains the bladder and cures both diseases.
2. When there is much difficulty in passing instruments.
3. When the stone is too large or hard for the necessarily small lithotrite.
4. When there are indications of advanced kidney disease or great debility, the shock of the cutting operation seems less severe, probably because it is briefer.

II.—In Men.

1. When the instruments cannot be passed.
  2. When the stone is too large or cannot be grasped.
- I have never found one too hard, though frequently great force is required, and have even blistered my hands with the lithotrite. A former operation often renders the introduction of instruments difficult. Strictures can usually be dilated to admit of the passage of instruments, but in bad cases perineal section will cure both stricture and stone. I had one case of impermeable stricture and stone thus successfully treated.

As will be seen from the summary of cases, lithotritry was successful in the smallest boys; 48 cases were in boys under 10 years of age. Only one death occurred in a boy $3\frac{1}{2}$ years old, whose bladder was full of calculi, weighing in all 7 drachms; 15 of these cases were in children under 3, and all did well. In these cases the children were quite happy in a day or two, though sometimes irritation of the mucous membrane of the urethra caused pain on micturition for some days. In two cases urinary abscesses formed, but eventually all healed up. One case required two sittings. I often washed the bladder out again to make sure no fragments remained. This hardly ever happened, although small pieces were sometimes passed by the urethra after the operation.

In lithotritry the previous injection of a drachm or two of sweet oil into the urethra is an advantage, and with small boys there is less risk of scratching the urethra if the cervixes of the blades of the lithotrite are filled up externally with soap. Great patience and delicacy are obviously necessary with children. If the instruments cannot be moderately easily passed, lithotomy had better be resorted to. But I

usually found that the smallest boys' urethrae would admit a 6 to 8 lithotrite and a No. 7 cannula. But for a stone over 30 grs. this was slow work. I always tried to pass a full-sized No. 8 lithotrite, and this instrument crushed nearly all the larger stones in boys. In boys over 14 a full-sized lithotrite would generally pass. To be efficient, a lithotrite should have a large eye in the female blade.

In female patients there was no difficulty except that the bladder sometimes refused to retain fluid. A raised pelvis and a finger pressing the meatus upwards helped to obviate this, and of course greater care was necessary to avoid nipping the vesical wall.

LITHOTOMY.

I only performed lithotomy when the crushing operation was impossible or inadvisable. Naturally the mortality was higher in proportion—3 out of 36 cases as against 3 out of 161 cases of lithotripsy. Very many of our cases were unfavourable from debility, cystitis, malaria, etc. Two of the 6 deaths were only fatal indirectly. One old man contracted bronchitis, and died a fortnight after lateral lithotomy had been performed for prostatic calculi; and another old man died from diarrhoea some days after I had easily crushed a 15 drachm stone. He also probably caught a chill. The four deaths more directly attributable to the operation were chiefly from exhaustion. In fact, all were nearly hopeless before the operation. But I consider the removal of a stone imperative where there is any hope of recovery, and especially in boys. In bad cases we always insist on a period of preliminary treatment and rest. Thus many very bad cases are saved. The first of the four was an old man of 70, who succumbed on the third day after lithotripsy for a stone weighing 9 drachms. The second was a boy aged 7, with kidney disease. His urine was loaded with albumen, and its specific gravity was only 1007. He died the third day after I removed, by lateral lithotomy, a stone weighing half an ounce. The third was also a case of lithotomy in a small wizened child of 3. He was unfit for operation, but his friends had brought him a long way, and implored me to operate. The stone was small, but he died next morning from shock. The last case was the lithotripsy case in a boy of 3½, already mentioned. Malarial fever followed the operation, and he died on the fourth day. In this case lithotomy might have been better, as the crushing took a long time.

I do not see that any advantage would have been gained by the suprapubic operation in the cases where lithotomy was indicated, except possibly in one or two cases of old men with large smooth stones. Extraction through the perineum was difficult and healing of the wound slow. But not one of the deaths was likely to have been averted by the upper operation, and I consider the risks greater on account of the aseptic conditions necessary. These are very difficult to obtain under the conditions in which we so often have to work in India. In lateral lithotomy I find a probe introduced along the staff into the bladder from the wound a useful guide to the finger when the staff is withdrawn. Hæmorrhage from the prestatic veins was sometimes considerable, but we never had any recurrence or untoward symptoms from this cause. Hot-water injections always controlled it, and as a routine we always put in a small plug of lint soaked in compound tincture of benzoin for twelve or twenty-four hours after the operation.

URETHRAL CALCULUS.

Two of the cases of urethral calculus are noteworthy. The case for which penile urethrotomy was necessary healed by first intention after I sewed it up. Another case is a warning. A small boy was brought to my house, and I sounded a small stone in his bladder. I had no lithotrite at hand, so arranged for the operation next morning. When he came, I found the stone impacted about midway in his urethra. It would not go back, and with great difficulty I extracted it by the meatus. Twelve hours later I was called to see him, and found great œdema of the penis, especially of the prepuce, together with retention. I circumcised the boy and passed a catheter. The acute symptoms subsided, but a scrotal abscess and fistula followed. All subsequently healed up, but in this external urethrotomy would have been preferable. For extracting a stone through the meatus the different patterns of urethral forceps are useless. I always find Lister's ear-scoop most

efficient. If its rigidity would not be impaired it might be lengthened for the urethra.

The following is a brief table of the cases:

Urethral calculi extracted through the meatus	...	4
" with incision of the meatus	...	7
" by external urethrotomy (1 perineal,	...	2
1 penile)	...	161
Vesical calculi removed by lithotripsy (male 153, female 8)	...	36
" perineal lithotomy (3 median, 33 lateral)	...	206

Three cases of lithotripsy died and 3 cases of lithotomy. Total deaths, 6.

153 Lithotrities in Males. Relative Ages and Weights.

No. of Cases.	Age (Years).	Average Weight of Stones.	Weight of Largest Stone.	Deaths.
2	1½	11½ grs.	15 grs.	
13	2-3	31 grs.	2 drs. 45 grs.	
9	3-4	76 grs.	7 drs.	1
7	4-5	64 grs.	1½ drs.	
17	5-10	18 drs.	5 drs. 10 grs.	
11	10-15	2 drs. 22 grs.	1 oz. 1½ dr.	
7	15-30	2 drs. 20 grs.	4 drs. 10 grs.	
19	30-40	4 drs. 39 grs.	2 ozs. 2 drs.	
15	40-50	3 drs. 45 grs.	1 oz. 5 drs.	
14	50-60	5 drs. 10 grs.	2 ozs.	
19	60-70	4 drs. 26 grs.	2 ozs.	1
10	70-80	1 oz. 1½ dr.	2 ozs. 6 drs.	1
1	Over 80.	2½ ozs.		
9*				
153				3

* Unrecorded. All recovered.

Eight of the above were over 2 ozs. in weight with no death, and 15 between 1 and 2 ozs. with 1 death.

36 Perineal Lithotomies. Relative Ages and Weights.

No. of Cases.	Age (Years).	Average Weight of Stones.	Weight of Largest Stone.	Deaths.
2	Under 3	70 grs.	1 dr. 40 grs.	
2	3-4	94 grs.	2 drs. 41 grs.	
7	4-5	78 grs.	2 drs. 10 grs.	1
12	5-10	2 drs. 28 grs.	4½ drs.	
3	10-15	2 drs. 11 grs.	4 drs. 10 grs.	
1	15	2 drs. 5 grs.		
1	45	2½ ozs.		
1	56	2 drs.		
3	60-70	2½ ozs.	4½ ozs.	1
1	75	4 ozs.		
3*				1
36				3

* Unrecorded.

Two cases were over 4 ozs. in weight, 3 between 2 and 4 ozs. These all recovered; but 1 case, in which the stone weighed 15 drs., died. The composition of the stones was as follows:—Uric acid 144, oxalate of lime 14, phosphates 5, mixed uric acid and oxalate 18, mixed uric acid and phosphates 11, mixed oxalate and phosphates 1, and cystine 1. The composition of 12 is unrecorded.

A METHOD OF STERILISING SOFT CATHETERS.

By HERBERT T. HERRING, M.B., B.S.,

I PROPOSE to deal with the sterilisation of soft catheters and their lubricants, considering first the various methods now commonly adopted, and then describing a process I venture to think more efficient. Whatever plan is selected, it should be rapid and easy of performance, and the catheter when prepared should be uninjured and free from chemical irritants. If in addition to these essential points it is possible to lubricate the instrument at that time, and afterwards to preserve it for future use, many sources of infection would be abolished.

Among the many systems, the one most generally employed is to plunge or keep the instruments in some antiseptic fluid, as in solutions of carbolic acid, mercury perchloride, or potassium permanganate. A more recent method is to expose them to the continuous action of antiseptic