

demonstrated its mode of occurrence to the physiological section of the British Association in Dublin, in 1857.^a Dr. Gairdner's attention was first drawn to the point by meeting with cases like the present, "in which indications appeared, during the life of the patient, of regurgitation through the mitral orifice, but in which afterwards the valves appeared by no means insufficient." That this condition of the left ventricle is capable of producing a mitral murmur is indubitable; and it will, I think, explain fully the nature of many cases in which the endocardial murmur audible at the apex of the heart has hitherto been considered to be merely functional.

ART. IX.—*Cases of Lithotrity and of Lithotomy, with Remarks.*

By CHRISTOPHER FLEMING, M.D., M.R.I.A.; Surgeon to the Richmond Hospital; Visiting Surgeon to Steevens' Hospital; Lecturer on Clinical Surgery; Member of Council of the Surgical and Pathological Societies; Examiner on Surgery, Royal Coll. Surgeons, Ireland; Foreign Corresponding Member of the Society of Surgeons, Paris, &c.

THE presence of stone in the bladder always excites in the mind of the surgeon more or less of anxiety, not lessened by the consideration of the several expedients which may be required for its cure. That the disease is often to be met with must be admitted, if we place in the category the numerous cases of urinary calculi which spontaneously escape through the urethra, or the many calculi which are being easily removed from or through it; but if we limit our remarks to those hospital cases alone, which demand the operation of lithotrity, or that of lithotomy, the comparative unfrequency of the disease in this city, and, I may add, in the several provincial towns of Ireland, cannot be questioned.^b Such cases

^a See Dublin Hospital Gazette, October 1, 1857.

^b The irregularity with which cases of stone in the bladder appear in our hospitals in Ireland, cannot fail to have attracted attention, and it may not be inapposite to remark, both in reference to the unfrequency and irregularity of their occurrence, that nearly a century ago (1779), Mr. Dease, one of the ablest surgeons and most successful lithotomists which this city, or perhaps any country, ever produced, makes the statement, when writing on the subject of lithotomy, that in so large a city as Dublin, then containing a population of 200,000 souls, there had not been one operation for stone, for nearly two years, and that for four years subsequently there were only three cases cut for stone—and moreover, that the aggregate number of the cases cut in the course of ten years in all the hospitals then in Dublin, was only twenty-eight,

rank amongst the most important to be encountered in operative surgery, and hence a history somewhat in detail, of the progress and results of the respective operations which have been performed, possesses more than ordinary practical interest. The following cases, and the accompanying illustrations, are taken from a series of *Clinical Records of Injuries and Diseases of the Urinary Organs*, now passing through the press,* and are selected as well on account of the satisfactory results of the treatment adopted, especially in the cases of lithotrity, as of the presence of some peculiarities in their attendant symptoms. An additional value may, perhaps, be attached to them from the fact, that after a lengthened interval, the subject of each case is at present free from any symptoms of his former ailments. The old man who underwent the operation of lithotomy was in hospital some few months back with an attack of acute ophthalmia, and he had then no urinary complaint.

Explanation of Plate.

Figs. 1, 2, and 3.—Portions of fragmentary detritus of natural size and shape, occurring in Cases I., II., III. Small isolated calculus at upper margin of Fig. 1.

Fig. 4.—Six calculi of natural size and shape, removed at single operation of lithotomy—one of the calculi being broken to exhibit its internal structure, and colour.

Chemical Composition of the above.

Analysis by T. W. GRIMSHAW, M.B.

Fig. 1.—Dark portion, oxalate of lime; white portion, ammoniaco-magnesian-phosphate.

Fig. 2.—Oxalate of lime, with a slight outer incrustation of ammoniaco-magnesian-phosphate.

Fig. 3.—Lithic acid, and lithate of ammonia.

Fig. 4.—Lithic acid, and lithate of ammonia.

ten of which cases were successfully operated on by himself. Our statistics on this subject are both incomplete and unsatisfactory. I believe, however, I would exaggerate if I stated that the average *annual* number of cases of stone operated upon throughout Ireland in our several hospitals or infirmaries has exceeded twelve, even since the period alluded to.

* The delay in the publication of the above work is attributable to causes over which I have not had control. The several plates have now been completed, and many of them have been long since shown at the Pathological Society, at my clinical lectures, and also to many friends. Any claim to originality in their delineations is of comparatively minor importance to me—at the same time it has been deemed only just to myself to attach a special notification to each plate.

CASE I.—*Stone in the Bladder ; Deceptive Sensible Signs of its Presence, and Discovery of, by the Lithotrite ; Characters of the Urine ; Operation of Lithotritry ; Sudden and Violent Hematuria ; Peculiarities and Nature of Detritus ; Permanent Cure.*—A man, aged between fifty and fifty-five years, a carpenter by trade, applied at hospital, with much urinary distress, supposed to be attributable to protracted prostatic disease, the symptoms of which had existed for more than two years. His appearance indicated good bodily health. The irritability of his bladder was very great; the pain he suffered was considerable, and was most intense when the last drops of urine were being discharged. He especially complained of a constant uneasiness in the fore part of the penis, with a scalding sensation in the urethra, which obliged him almost incessantly to squeeze and compress the organ. He stated that there was often a sudden stoppage to the flow of the urine, when his paroxysms of pain became particularly severe, and that they were equally so on any rough movements, in walking or in driving. All pain was limited to the region of the bladder and rectum; there was occasional tenesmus; there was no lumbar uneasiness. The condition of his urine attracted his attention—it was muddy and slimy, and had a heavy disagreeable odour; it was passed at short and irregular intervals, in very small quantities, but reached an average amount daily. He mentioned that he had been repeatedly sounded for stone, and that none could be detected. I admitted him into the hospital in October, 1855.

After rest and suitable treatment, the bladder was examined, and notwithstanding the adoption of every expedient, I failed to find any satisfactory evidence of the presence of stone. There was a solid, dull sensation communicated on moving the sound in the bladder, but not more than could be referred to the condition of the prostate gland, which was felt through the rectum, much enlarged. The character of the urine at this time little varied; it was usually alkaline, or very faintly acid; had a density of 1025 or so; its colour was turbid, its odour fetid, and its deposit viscid and tenacious. Any irritation produced by the examination of the bladder subsided, and the character of the urine, after a few days, improved. I now introduced an ordinary screw flat-bladed lithotrite in place of a sound, and not having felt any sensation of the presence of a stone, I gently opened the blades of the lithotrite, and instantaneously caught a stone measuring on the scale, about one

inch or so.^a The same dull sensation was communicated by the grasp of the stone as at the previous sounding. This examination produced comparatively little irritation; the bladder was afterwards less intolerant of urine; neither was it so of the presence of sound or catheter—on the contrary, the irritability was rather diminished; moreover, the condition of the urine was materially improved, particularly from the daily washing out of the bladder with tepid water; its colour, its reaction and odour, and its deposit, were specially improved. On examining the latter under the microscope, in addition to triple phosphate crystals, usual under such circumstances, numerous minute crystals of oxalate of lime were visible, intermixed with spherical masses of urate of soda, having projecting acicular crystals of uric acid attached to them.^b All these circumstances being taken into consideration, with the size of the calculus, the good bodily health of the man, and his remarkably placid disposition, I decided upon the selection of the operation of lithotrity.

17th October.—This morning (10, a.m.) I proceeded in the ordinary way to the operation of lithotrity on Heurteloup's bed, drawing off the urine in the bladder, injecting it with tepid water to the amount of about six ounces, and then introducing Weiss's screw fenestrated lithotrite—No. 14 in the blades, and about 13 inches the shaft. The instrument was rather large for the urethra, and did not work freely. However, I caught the stone, and had three distinct crushings without removing the lithotrite. There was no perceptible grating sensation communicated during the crushing; but that the stone was broken was evident, not alone from the presence of detritus on the lithotrite, but also from the presence of fragments which escaped through the steel evacuating catheter, and others which afterwards, on its removal, passed immediately with the urine. The man was placed in his bed, between warm blankets, and had a tumbler of hot negus. The amount of suffering experienced was so much greater than I expected, that I regretted I did not use chloroform, and yet I was disposed to attribute much to the large size of the lithotrite, which did not allow of its free sliding movement in the urethra.

^a In the eighteenth volume of this Journal there are some remarks of mine, accompanied with the woodcut of a sound and lithometer suited to the child. I have used the same form, of the requisite size and shape, for the adult, with much advantage.

^b Attention to the presence of those spherical masses of urate of ammonia (or soda, as named by some), with acicular uric acid crystals, in certain urinary deposits, such as in the case under consideration, will be useful in the diagnosis of particular forms of calculi.

About an hour after the operation there appeared to be some spasmodic effort to get rid of urine and detritus, but hot fomentations to the hypogastrium and to the perineum, and an anodyne draught, with hyoscyamus, relieved them.

3 o'clock, p.m.—On visiting the hospital I found the man out of bed, passing water, contrary to directions given him to empty his bladder whilst lying horizontally. About half a pint of urine escaped, slightly tinged with blood, and mixed with a good deal of soft detritus, but no particles of any size were visible. He was not in much pain, but yet did suffer from repeated and urgent inclination to pass water. He was directed to have his anodyne draught repeated, and to take throughout the day a demulcent drink, with tincture of hyoscyamus and muriatic acid. Hip-bath at bed-time.

Thursday, 18th, second day after sitting.—Passed the night pretty well, and suffered less pain than usual; paroxysmal attacks, in particular, less frequent; the urine escaped tolerably freely, and contained a good deal of soft powdery material, and also a few solid fragmentary particles—one about a quarter of an inch in length, and less in breadth. Does not feel thirst, and has desire for food. Takes his medicine. To have his anodyne at bed-time.

Friday, 19th, third day after sitting.—Complained much of uneasiness during night, and much scalding in passing water; amount of urine good, and quality better; considerable amount of detritus in deposit. Continue medicine; hip-bath and anodyne at bed-time.

Saturday, 20th, fourth day after first sitting.—Suffered last night from scalding along the urethra, and pain in the region of the prostate gland; no pain or uneasiness of any kind in the perineum on the firmest pressure; urine passed freely, and in fair quantity; much pulverulent detritus, mixed with mucus; no fragments.

Second sitting this day.—Operative proceedings as before; but an ordinary bed, with a firm mattress, and the provision of a rolled pillow under the pelvis, substituted for Heurteloup's bed, and found to be very manageable. Screw fenestrated lithotrite of smaller size introduced with perfect ease; large fragmentary portions separating its blades to nearly half an inch, quickly caught, and three distinct crushings made, with audible grating sound, and without removal of the lithotrite. A considerable quantity of detritus escaped through the evacuating catheter. No fragments. During this sitting, the man was very irritable and restless. A warm drink as before, and an anodyne enema, were directed.

Sunday, 21st, fifth day after first sitting.—Night spent pretty well, yet annoyed with constant burning sensation in the urethra and penis, particularly in the prepuce and glans; uneasiness about rectum; passed a considerable quantity of detritus, with some fragmentary portions; urine in large quantity; much deposit of mucus, with detritus suspended through it. Continue treatment.

Monday, 22nd, sixth day after first sitting.—Appears in better spirits, and expresses himself relieved. Passes water more freely, and in a larger quantity at a time. Only one solid fragment of detritus this day, remainder pulverulent, and mixed with mucous deposit, which latter is less in quantity than heretofore, and devoid of any tinge of blood. Continue treatment.

Tuesday, 23rd, seventh day after first sitting.—Report this day much as yesterday. No detritus of moment in solid portions; darting pains in penis less, also in rectum; quantity of mucus less, but tenacious, and full of pulverulent detritus.

Wednesday, 24th, third sitting.—Eighth day after first sitting. Again proceeded to operation. Chloroform, at his desire administered; effects of it most unsatisfactory; violent automatic movements and complete want of control before anesthesia produced. Steps of operation as at former sittings, and ordinary bed used. Civiale's scoop lithotrite (Charrière's), introduced, and many small fragments of stone crushed with perceptible grating. Detritus-catheter not used, as much of the fluid injected into the bladder escaped during the effects of the chloroform. Warm drink as before; an anodyne at bed-time; hip-bath as usual.

Thursday, 25th, ninth day after first sitting.—Expresses himself as not having suffered from the operation; passed some large and solid portions of detritus, one of which gave great pain, and caused some discharge of blood; in all other respects better; darting pains through penis less, and also uneasiness about the rectum and anus. Mucous deposit in urine as before, portions of it slightly tinged with blood; quantity of urine natural.

Friday, 26th, tenth day after first sitting.—Report favourable; principal painful symptoms subsiding; now can move about with more comfort. Urine acid, and with less deposit; any detritus which escapes is in shape of powder mixed with mucus.

Saturday, 27th, fourth sitting this day.—Eleventh day after first sitting. Chloroform demanded, and exhibited; same unsatisfactory effects. The bladder having been more tolerant of the presence of urine, and now often containing from four to six ounces, I hesitated

to inject any water, or draw off any urine, apprehensive of the effects of the chloroform. I introduced a lithotrite, acting without a screw, by manual pressure, but found the fragment of stone caught so hard and unyielding that I could not crush it. I at once substituted Civiale's scoop lithotrite (Charrière's), and succeeded in crushing, with a sharp and audible click, several fragments. No detritus-catheter was used. Treatment subsequent to operation as before.

Sunday, 28th, twelfth day after first sitting.—Spirits excellent; not the slightest injury from operation. Some complaint of pain in the escape of the larger portions of detritus-fragments, one of which became impacted near the orifice of the urethra, and required force to remove it. Amount of detritus considerable, and consisting of portions of variable size, some very sharp and angular, others thin and scaly; amongst them was one very remarkable, being apparently the nucleus of the original calculus, or a distinct calculus. Urine improved; reaction acid; no tinge of blood in deposit. Treatment as before.

Monday, 29th, thirteenth day after first sitting.—Excellent report; only a few portions of detritus, which were passed with ease; no appreciable amount of viscid mucus or blood; general expression of satisfaction. No impediment to escape of urine, and all pains subsiding. Irritability of bladder less; but as yet passes water every third or fourth hour. Appetite and general health good. Urine greatly improved; reaction distinctly acid; heavy odour removed; average density; mucous deposit less. Bark and nitro-muriatic acid; wine.

Thursday, 30th, fourteenth day after first sitting.—Most favourable report; almost all painful sensations removed, and irritability of bladder so much less that he is now only obliged to pass water twice during the night, and no anodyne is required. Amount of mucus in the urine much less, and less tenacious; no detritus visible in pulverulent form, or in fragmentary portions. He now is able to move freely about the wards without the slightest annoyance.

Wednesday, 31st, fifteenth day after first sitting.—More irritability of bladder last night and this day than for twenty-four hours previously; amount of urine passed at each evacuation between six and eight ounces; and though with deposit of mucus, yet latter not so copious or so adhesive as before. Sensation in neck of bladder as if some portion of the stone yet remained. Walked about a good deal during the day, and without inconvenience. No appearance of fragments, and very little detritus.

Thursday, Nov. 1st, sixteenth day after first sitting.—Report good; irritability of bladder less than yesterday; urine as above. Introduced large evacuating catheter (No. 16), and drew off not less than half a pint of limpid urine. Had sensation of a slight click from a shell of detritus, when last portion of fluid was escaping. Very little mucus or detritus in urine. Took a good deal of exercise during the day. No uneasiness experienced, and can pass his urine in any position.

Friday, 2nd, seventeenth day after first sitting.—Report equally favourable as regards absence of pain and irritability of bladder; quantity of mucus in urine much less, and no detritus worth noting. Sensation of particles of stone in the bladder continues. Civiale's scoop lithotrite (Charrière's), introduced; no detritus discoverable within blades of instrument.

Saturday, 3rd, eighteenth day after first sitting.—Walked about a good deal yesterday without annoyance; this day, spirits very good. Now wishes to leave hospital, as all painful and distressing sensations have disappeared, and he is anxious to resume his work. I examined most carefully for the presence of any portion of detritus, with sound, with lithotrite, and with the large evacuating steel catheter, after injecting the bladder. I even had recourse to Sir Philip Crampton's glass exhausting-apparatus, with his kind assistance, and I failed to discover a trace of any remnant of stone.

Monday, 5th, twentieth day after first sitting.—No appreciable annoyance felt from the above extended examinations. Anxious to return to his employment, and left the hospital this day at his own desire, having promised to report himself occasionally.

Saturday, Jan. 5th.—This morning this man applied as an out-patient, stating that he had been employed at his trade since he left the hospital (now two months past), that since that time, at irregular intervals, he had some irritability of his bladder, and that now, without suffering any previous pain or uneasiness, he had the sensation as if some of his urine had escaped involuntarily, when, on examination, he found his shirt largely stained with blood, and blood flowing rapidly from the urethra. Yet, notwithstanding, he would remain out of hospital under external treatment, being free from suffering, and not wishing to give up his work. In the meantime, the hematuria, being partially but irregularly controlled, ultimately became so severe that he was obliged to apply for re-admission into hospital.

He was re-admitted on the evening of Friday, the 11th January.

Saturday, Jan. 12th.—This morning I inquired carefully into his symptoms, and found that the hematuria was very severe; that the blood escaped, mixed with urine, and that a thick stratum of it lay, coagulated, at the bottom of the urinal. The urine was acid, was of ordinary density, and there was no appreciable amount of mucus in it. The bladder was so tranquil that he was able to retain his urine for six or seven hours, and the stream was never interrupted as heretofore. The amount of bleeding from the urethra was now considerable; it trickled freely from the urethra, and was not influenced by pressure along the track of that canal. I examined carefully for any irregularity, fulness, or tenderness, to indicate the presence of a fragment of detritus. I could detect none; neither was there any indication of such in the prostatic portion of the urethra, as ascertainable through the rectum. The stream of urine was not uniform, and the sensation was that as if the blood in the urethra interrupted it. Rest was enjoined, ice applied to the perineum, and iced drinks were given internally in conjunction with large doses of gallic acid. The urine was carefully examined. The blood appeared to be universally mixed with it, at the same time that the tinge was deeper at the end of micturition; there was no pain, no forcing or straining of the bladder, and there was no mucus of any moment. The density of the urine was about 1020. I could detect no detritus in the deposit. In the absence of retention of urine, or any sensation of obstruction of any moment in the urethra, I did not introduce a catheter. In the course of the day the hemorrhage suddenly increased, and at the same time a sensation was felt as if a portion of calculus was escaping along the urethra; bleeding now was still more violent, the blood highly arterial in colour, and the penis became almost fully erect; an urgent desire to pass water supervened; a sudden interruption to the stream took place, when a large shell of stone was found impacted near the orifice of the urethra. It was with some difficulty removed; it was very sharp at its edges and angles, and measured in its longest diameter at least a quarter of an inch. The first pain experienced since the commencement of the hemorrhage was now, when this fragmentary detritus-portion blocked up the canal of the urethra; and on its removal the hemorrhage and all other symptoms ceased, and after a few days the man would leave the hospital.

About a month afterwards he called at the hospital, stating that

he was perfectly well, and I have from year to year repeatedly seen him since, perfectly free from any urinary complaint.

Fig. 1 in the plate exhibits, of their full size and shape (many conchoidal), several fragmentary portions of detritus collected in this case. The distinct calculus alluded to is also visible, and it is questionable whether this is to be considered as the nucleus of the original calculus, or whether it may not have been a separate calculus altogether. The weight of the fragmentary detritus collected, when dried, was nearly two drachms. The remarkable want of correspondence between the rational and the physical signs of stone in the bladder, as tested by ordinary sounding, is most important to bear in mind, as errors in diagnosis may otherwise occur. It appears to be satisfactorily accounted for by the amount of viscid mucus present in the urine, as a calculus enveloped in such coating (if it even were a mulberry one) will not communicate to any metallic instrument the sharp click of a calculus situated in non-mucous urine. I have known the same deceptive sensation produced by coagulated blood around a stone, and this, more than once, deceived in the operation of lithotomy, when much hemorrhage had taken place into the bladder, and much annoyance was hence experienced, in what I may at present term the forceps, or last trying stage of that operation. The stone will be within the range of the forceps, and perhaps within its grasp, and the surgeon will not feel it under such conditions. The knowledge of such contingency is hence obviously of much practical importance.

I may here allude to the case of a little boy in hospital at this period, with stone in the bladder, accompanied with unequivocal signs, both rational and sensible, upon whom I performed the operation of lithotrity. I had procured a child's *brise-pierre* from M. Charrière, of Paris, and first used it as a lithometer and sound; at the blades it corresponded with No. 8 on the ordinary scale, in the shaft it was not more than No. 6. I ventured to crush the stone, which was not larger than a garden pea. The force required was considerable. The sound elicited was sharp and loud. The child, although fully under chloroform, was by no means manageable, as repeated straining efforts of the bladder were being made, exactly as in a fit of the stone. Some detritus was removed in the lithotrite, but evidence of any subsequently was most unsatisfactory, from the difficulty of collecting it; and I may remark that the lithotrite was a blade-lithotrite, *unfenestrated*; indeed, I have not seen any *fenestrated* lithotrite suited to children. My impression respecting

lithotrity was so unfavourable that I have not since adapted it in boys. The urine in this case, and the detritus, indicated the lithic calculus, the most frequent in the child. This child, now aged ten years, lives in the neighbourhood of the Richmond Hospital, and has never since had a symptom of urinary complaint.

CASE II.—*Stone in the Bladder ; Rational and Physical Signs ; Characters of the Urine ; Oxalate of Lime Calculus ; Operation of Lithotrity ; Peculiarities of Detritus Fragments ; Permanent Cure.*—A young man, aged twenty years, was sent to me from the County Meath, labouring under marked symptoms of stone in the bladder, from which he had suffered for very many years. He was of medium frame and stature, and his general health was excellent. Now his desire to pass water was hurried and frequent, and seized him in irregular paroxysms, which were brought on by any rough movements. He did not observe that the stream of urine was at any time suddenly interrupted during micturition; neither did he, at the end of it suffer any additional pains. His penis was enormously developed, and was almost persistently in a state of semi-erection. He never had hematuria, and any change in the appearance of the urine had not attracted his attention. Such was his condition on his admission into Richmond hospital in April, 1861.

There was no difficulty in detecting the presence of a stone in the bladder, and from the sharp ringing sound elicited during the examination, it was concluded that the stone was principally oxalate of lime. The character of the urine tended to confirm this opinion. Its colour was a light straw, its reaction acid, its density about 1020, its odour not disagreeable, its deposit was that of a peculiar semi-transparent tomentous mass* which I almost always find to indicate the presence of oxalate of lime, and there was no appreciable amount of mucus.

The stone was caught easily with the lithotrite, and found to measure about one inch, but any extreme accuracy regarding its size was not attempted, the man being very irritable, and his bladder and urethra being equally so. The question of lithotomy could not

* This peculiar deposit is accurately outlined in one of my plates. When it is once carefully studied, it will be found to be almost conclusive as to the presence of crystals of oxalate of lime. Indeed, if such specimens be examined, in the recent state, even with the naked eye, under a strong sunlight, minute scintillating points will be visible through the deposit, and these, under the microscope, will be found to be oxalate of lime crystals.

be entertained, as the man was determined not to submit to any cutting operation, and indeed, from the size of the penis, I was not an advocate for it. Lithotrity was hence decided upon, and after some preparatory treatment I proceeded to accomplish it.

Tuesday, 7th May, 10 o'clock, a.m.—This day the first sitting took place. I did not use Heurteloup's rectangular bed; I found a common hospital bed, prepared as in the former case, to answer all requisite purposes. The man was very timid, and apprehensive of pain. However, I did not give him chloroform. Before my visit to hospital, according to his statement, he had passed about four ounces of urine, so that I was satisfied with injecting about the same quantity of tepid water into the bladder. I now introduced with perfect ease, and with trifling pain, Weiss' improved fenestrated lithotrite, of No. 13 size. Pressing the instrument gently towards the back part of the bladder, and with equal gentleness raising the handle, whilst I kept the shaft steadily fixed, I lifted the movable blade of the lithotrite to the distance marked in the measurement above noted, when, approximating it towards the fixed blade, I at once felt that I had caught the stone. Getting a firm grasp of it, and drawing the lithotrite a short distance forwards, I commenced the screw movement. During its working, which required much force, an irregular grating sound was audible, when a loud crack followed, which alarmed me as to the safety of the blades of the lithotrite. It is no exaggeration to state that this sound was distinctly heard at a considerable distance in the operating theatre. The sound was an abrupt sound, unaccompanied by any crushing sensation in the closing of the blades. Again the blades were separated, and during a second screw movement the same result followed. I ceased from any further manipulations, and removed the instrument. In about ten minutes afterwards he passed nearly half a pint of urine in an uninterrupted stream, in the erect posture, and with tolerable ease; there was not visible the slightest tinge of blood. He was ordered a draught with tincture of hyoscyamus, a tumbler of hot wine negus, and a hip-bath.

Four o'clock, p.m.—I visited the hospital, and found this man comparatively free from any complaint, and extremely difficult to be kept confined to his bed. He had passed water once in large quantity, and without much uneasiness, but with the sensation that the stone was broken, and that the broken pieces were grating against each other. No detritus had passed. Demulcent drinks; hyoscyamus draught and hip-bath at bed-time.

Wednesday, 8th May, day after first sitting.—This morning the report was not very good; he had not a hip-bath as directed; he suffered a good deal through the night, particularly at the end of micturition; he had no rigor, but the pulse was quick, and he had some thirst. The urine passed in the glass urinal was acid, muddyish in colour, and threw down an opaque deposit, in which very many minute particles of detritus, of a dark colour, were visible. Saline draughts, with tincture of hyoscyamus, were directed, and a hip-bath at bed-time.

Thursday, 9th, second day after first sitting.—Better night; benefit from hip-bath, but yet much pain at the end of micturition; no feeling of obstruction in urethra; pain referred to about the root of the penis; passed water more frequently than usual; urine much as noted; no detritus of any moment.

Wednesday, 15th, eighth day after first sitting.—Two days back, at his desire, chloroform was administered, and the effects were so unsatisfactory that all operative interference was necessarily suspended. The vesical irritation produced was considerable for many days; calls to make water were more frequent both night and day, and pain was always referred to the perineum, immediately in front of the anus. No fever could be said to be present, but there was much irritability and sensitiveness. Under local and general treatment these symptoms subsided, and now a second sitting was decided upon.

Second sitting.—He was removed to the operating theatre, and placed in proper position, under the influence of chloroform. Previous to its full anesthetic effects I proceeded to inject the bladder with tepid water, and although doing so with the utmost gentleness, so violent a vesical paroxysm was produced that the urine and fluid injected were forced out along the side of the catheter. I withdrew it when under full anesthesia. Reinjecting the bladder I proceeded with the operation, using Weiss' fenestrated lithotrite, No. 14 in size at the blade, less in the shaft. It entered the bladder freely. Portions of stone were easily and quickly seized, and crushed with varied force—some appearing to fly from under the lithotrite, whilst others were audibly cracked. All this was effected in a short space of time, and without the escape of any urine during the sitting. The man awoke out of his sleep, had an anodyne draught and some sherry negus, and was placed in bed. The urine was not drawn off, neither was he urged to pass it after the operation.

4 o'clock, p.m.—Visited the hospital, and found that a considerable portion of detritus had escaped; particles distinct, angular, and of different sizes, presenting, on examination of the different surfaces, evidences of the ordinary mulberry calculus. Some fragments are accurately outlined in the plate in Fig. 2, nodulated externally, in apparently aggregated masses of globular form, and in size about that of an ordinary garden pea, all as if cemented together and covered by snow-white glistening particles of oxalate of lime and triple phosphate. On the outer surface of many of these fragments there was a beautiful appearance somewhat resembling pearl-spar crystals, in some parts being as if transparent, in others opaque, the former being more particularly visible in strong sunlight. The section of many of those fragments presented a laminated and undulating appearance. Hip-bath; continue anodyne.

Thursday, 16th, ninth day after first sitting.—This morning good account, passed fair night; scalding and pain in passing detritus, especially some large fragmentary pieces; in other respects tolerably easy; no pain in or about region of bladder; sensation uncomfortable in perineum as before, and distinct sensation of obstruction from fragments in urethra; will not permit any interference to remove them.

Friday, 17th, tenth day after first sitting.—Report cheering. Very large portions of detritus, one sharp and angular, and so large as to pass with difficulty through No. 16 on the guage scale; it escaped by itself after repeated efforts to dislodge it, and was followed by some hemorrhage; its several edges were sharp, irregular, and laminated, and evidently consisted of an oblique chip, including much of the outer surface of the calculus. General condition comfortable; sensation that no more of calculus remained; at the same time there was pain in micturition, and especially at latter end. Examined specimen of urine passed with the portion of detritus—colour, brownish; odour, natural; density, 1018·20; reaction, acid; deposit copious, opaque, brownish-yellow, slow in forming, with supernatant fluid clear. Under the microscope, blood corpuscles and pus corpuscles were distinctly visible, also some crystalline colourless masses, with a few octahedra of oxalate of lime.

4 o'clock, p.m.—Comparatively free from pain, but yet some at end of micturition; passed two large coagula of blood, darkish and clotty; no detritus traceable. Demulcent drinks, with nitromuriatic acid; hip-bath if required.

Wednesday, 18th, eleventh day after first sitting.—Tolerably

quiet, but yet no pain after micturition; urine dark chocolate-colour throughout, with some flakes of coagula floating through it; copious deposit; acid reaction; no detritus of moment; if any, pulverulent. Continue medicine.

Thursday, 19th, twelfth day after first sitting.—Report favourable; good night; pain in micturition less; blood disappeared; disposed to get up and walk about; condition of urine much as yesterday, with very slight trace of blood in deposit; no detritus of moment.

Friday, 20th, thirteenth day after first sitting.—No special complaint; no return of hematuria; some more frequency in micturition, and more pain at end of it; attributed to walking too much; no detritus of moment. Continue acid, and bath at bed-time.

About this time he became very irritable and unmanageable, and would not submit to any additional sitting unless under the influence of chloroform. Its effects were decidedly injurious, and increased intensely all his urinary suffering so much, that any interference in way of operation was wholly inadmissible. Ultimately, however, the symptoms became less severe; at irregular intervals different portions of detritus escaped in the urine, and it assumed a more healthy character; there was much less mucus in its deposit, and there was no appearance of blood. He now became dissatisfied, and wished to leave the hospital, when I persuaded him to remain, and again submit to treatment.

Thursday, June 6th, fourth sitting, 10 o'clock, a.m., thirtieth day after first sitting, and sixteenth day after third sitting.—Operation in ordinary bed as before. Chloroform necessarily exhibited; full anesthetic effects produced. Bladder not injected, urine having been retained for some hours. Flat-bladed lithotrite, No. 14, 15, introduced; many fragments easily caught and crushed; pulverized as much as could be. Warm negus and anodyne draught given before effects of chloroform fully disappeared. Directions to remain in bed, and not to pass water until inclination to do so.

4 o'clock, p.m.—Called at hospital. Saw urine passed an hour after sitting; quantity about six ounces, and not a trace of blood in supernatant fluid or in deposit; much detritus, some in large masses about size of small pea, escaped without pain or much of forcing. Demulcent drinks; to have anodyne and bath at bed-time if required.

Friday, 7th.—Most satisfactory report; detritus escaping freely, and in less quantity; sensation as if all portions of stone had now been removed; some tenderness and scalding along the track of the

urethra, and after micturition; all other symptoms improved. Treatment as before; add to demulcent drinks nitro-muriatic acid.

12th June, thirty-five days after first sitting, sixth after fourth sitting.—Such decided improvement in all symptoms that he determined to leave the hospital this day. No detritus during the last two days; no irritability of bladder; no uneasiness of any moment; note of urine satisfactory. Left hospital.

August.—Letter from, stating that he was quite well.

May, 1863.—Called at hospital; remains free from any symptom of his disease; in rude health.

In Fig. 2 in the plate, portions of the detritus which escaped spontaneously through the urethra in this case are very truthfully delineated. Their size, and their peculiarly angular form, are by no means exaggerated, they are most accurate. Their outer, irregular mulberry surfaces, can also be recognized, with the frosty coating mentioned in the details given; and the laminated appearances of the lateral sections will be also visible to some with the naked eye, to others with a lens. The weight of the detritus, collected and dried, was within a few grains of three drachms. The great density and weight of those several fragments are very remarkable.

CASE III.—*Irritable bladder, with Recurring Attacks of Retention of Urine; Supervention of Rational Signs of Stone in the Bladder; Sensible Signs; Conclusive Character of the Urine; Operation of Lithotrity; Nature of the Detritus; Cure, with Recovery of the Functions of the Bladder.*—A man, a mason by trade, and aged between sixty-five and seventy years, was sent to me from the County Cavan, with symptoms of urinary disease, which distressed him for more than two years. The irritability of his bladder was very great at the commencement, and ultimately terminated in occasional attacks of retention of urine, occurring at irregular intervals. He was now admitted into one of our county infirmaries, and whilst there was taught to relieve himself from retention of urine by the introduction of a catheter when required; upon these symptoms, latterly, others very painful supervened. He often had incontinence of urine, as well as retention, and the catheter often failed to give him relief as before; he required its use more frequently; during its introduction, particularly as it reached the bladder, his pains were excessive, and still after the urine was drawn off he suffered acutely. His urine, moreover, became muddy

in colour and heavy in smell. He applied at hospital with a recommendation from his medical attendant, and I admitted him in May, 1863.

His journey to town increased in intensity all his symptoms. His urine as passed at that time was clouded, feebly acid, in density about 1018, and it had a fetid odour. Its deposit, on resting, was opaque; contained urates in large abundance; its supernatant fluid was clear, and there was no albumen. Under the microscope, granular bead-crystals of urate of ammonia were visible in the deposit, intermixed with some tabular plates of uric acid crystals, and some mucous corpuscles, apparently pus corpuscles in size and outline.

The bladder was then tolerant of the presence of urine; the man was in fair bodily health for his age; he was apparently a placid person; and the prostate gland was not more enlarged than to be expected at his period of life.

Satisfied with the presence of stone in the bladder, from the rational signs detailed by the man, expecting its physical signs from the account of his medical attendant, and concluding the nature of the calculus present from the character of the urine, I introduced as a sound, and as a lithometer, a fenestrated screw lithotrite of ordinary size (No. 14), intending merely to measure the stone if found, and purposed to defer the crushing process until a future day. I at once caught the stone in the ordinary horizontal position of a patient lying in his bed. The sound from it was an audible sharp sound; it measured an inch or so, and out of the grasp of the lithotrite I could not shake or loosen it by any manœuvre. I had no alternative—I worked the screw at once, and crushed the stone. Many distinct crushings of the broken pieces were accomplished at the same moment, without any difficulty, when I removed the lithotrite. I had not injected any fluid into the bladder, neither did I now use the evacuating catheter. The bladder bore the several manipulations well, and voluntarily discharged itself about twenty minutes afterwards without much uneasiness, the urine being mixed with much pulverulent detritus. Any irritation produced was slight, and was easily controlled by mild anodyne treatment.

The daily records taken in this case would be only tedious to recapitulate from their great similarity to those already noted; the several sittings required, and the intervals between them were nearly the same; the effects, as shown by the deposits, both

fragmentary and pulverulent, were much the same, and their final results, though occasionally interrupted, were equally satisfactory. The man was able to empty his bladder without the necessity of a catheter, he was free from any painful sensation about the bladder, and the urine had gradually acquired a healthy condition. The last portion of fragmentary detritus was rather tedious in being removed. It was, however, ultimately and most satisfactorily so, and on this occasion the bladder was injected as largely as it could tolerate, and certainly to the extent of containing at least eight ounces of tepid water. This amount of fluid was thrown in with a gum elastic bag of requisite size, provided with a conical shaped ivory tube, which accurately filled a catheter (No. 8), almost straight, and with small openings, so that the fluid could necessarily only enter the bladder very slowly and in very minute quantities at a time. Civiale's scoop lithotrite (Charrière's), with the fixed blade hollowed or spoon-shaped, and the movable short and abrupt, was now introduced, and struck the particle of stone, when, by a sharp and sudden turn of the disk, the particle was caught and pulverized. After this sitting all symptoms of uneasiness quickly subsided, and the man left the hospital in about a week afterwards, in the beginning of August, free from his former sufferings, and able to empty his bladder without the necessity of a catheter. His urine was not as free from mucus as might be wished, but yet was from day to day improving in every respect. I had a letter from him two months subsequently, stating his comfortable condition and freedom from his former symptoms, and I have lately heard from his neighbours that he continues well.

In Fig. 3 an outline is given of the appearances of the portions of fragmentary detritus collected. Their size and resemblance in shape to those in Fig. 1 will attract attention, and also their chemical composition. The weight of all, when dried, was about two drachms.

The necessity for reporting the daily progress of the above cases may be questioned by some, and yet it is very desirable that the young surgeon, or the advanced student (for whom alone these records are intended), should be acquainted with the several contingencies likely to arise in the progress of any operation he may contemplate. The operation of lithotrity is of rare occurrence in our hospitals; and as they are often the most reliable, and, if necessary, the more legitimate places for clinical investigation, it is desirable to place the results observed on record. Many useful reflections must

suggest themselves in considering the history and progress of these cases, both previous and subsequent to their treatment; and it does so accidentally happen that rarely, indeed, could a series of cases be adduced more instructive and more demonstrative of the great value of the operation of lithotritry, even under the very unpromising circumstance of advanced age, and of nature of calculus, apart from other embarrassments, rendering extremely questionable a favourable issue. Successful as was the result of these cases, it is possible that the cure might have been more rapidly effected, and with perhaps less of suffering on the part of the patient, under the present advantages of more modern lithotritry. Now, the bed of Heurteloup is considered obsolete; the injection of the bladder before operation, or its being emptied after operation, conditional; the position of the patient in some degree optional, and that of the surgeon in respect to his patient often equally so; the selection of lithotrite, and mode of introduction, optional or conditional; the manner of seizing or crushing the stone, or the fragment of stone, shall I say, fanciful; the removal of the detritus, fragmentary or otherwise, spontaneous as regards the bladder, or mechanical, slow or abrupt, as effected by the surgeon; and ultimately the number and repetition of the lithotrities conditional. Such is a hurried summary of the particulars of the several steps of the operation of lithotritry as usually performed. The operation now is very rapidly accomplished, and it is not surprising that it should be so, when we consider the improvements latterly made in the mechanism of the several appliances required. In none have these improvements been more manifest than in the light and beautiful lithotrites of Weiss, so commonly used at present. Whether fenestrated or not, the improvement made in them, both as regards size and details of construction, are incomparable, they facilitate and expedite the uses of those instruments, and admit of their more general introduction from their varied size. They possess the great advantage of retaining the stone or fragment of stone between the blades, during the moment of changing the sliding into the screw movements, and this without the necessity of any alteration in the position of the hand of the operator, from a provision whereby a slight movement of the thumb accomplishes the object. Moreover, with their fluted and cylindrical handles (suggested by Mr. Thompson) they also possess the great advantages by which, with a slight movement of the finger, the most delicate turning of the blades laterally, or even to complete rotation if requisite, may be accomplished; and moreover,

a firm and immovable grasp of the instrument taken, and thus the crushing of the hardest stone be as safely as certainly secured. Other advantages derivable from the special form and action of the blades of those valuable instruments must attract attention when investigated. It would be out of place here to enter into the consideration of them. With the instrument in hand they can be carefully studied, when the influence of the slightest elevation or depression of the handles of the lithotrite, or deviation from the proper direction of the shaft, will show the necessity for continued attention on the part of the operator to those minute particulars, as indicating the position of the blade, whether closed or open, and directing their safe and successful application. A few passing remarks may be permitted, in conclusion, respecting the position of the patient and that of the operator, the selection of the lithotrite and its mode of introduction, and its manipulation in the bladder, and the removal of the detritus. I prefer that the patient should be placed opposite me, either on a table of requisite height, with or without provision for the elevation of the pelvis, or, as I often find very convenient, at the foot of his bed, arranged as may be considered best. In the selection of the lithotrite, as to number I am guided by the calibre of the urethra, always providing that the sliding portion of the shaft shall have free space for loose movements, and I select either the lithotrite fenestrated or with entire blades, according to the special object in view.

If, as a lithometer to measure a stone, the blades should be plain—equally so, but shaped according to the objects in view, if for crushing or pulverising fragments; but if at a first sitting and to break a stone, the lithotrite must be fenestrated. During its introduction I latterly always place myself between the thighs of my patient, taking care that they shall be widely separated, and firmly supported, with the legs and feet properly placed. After some trials I find this position preferable to any other. Doubtless, the lithotrite may be introduced, when used as a lithometer, as the ordinary catheter, but for lithotrity purposes I prefer the position I mention. I always take care to have the abdomen fairly exposed, so that the umbilicus may be held constantly in view as an unerring guide to the safe direction of the instrument. I pass it with my right hand into the urethra, and press it onwards towards the perineum, at the same time drawing forwards the penis to the extent required. I now having reached the perineum, transfer the lithotrite to my left hand, when, gently depressing its handle, or

even allowing it to fall with support by its own weight, the bladder is immediately reached. In this latter movement I fancy I have often found it a good plan to divert the mind of the patient from this—the most important, and often the most painful movement in the operation—by making gentle pressure with the palm of the right hand over the pubic region, or with the ends of the fingers over the perineum in the seat of the angle of the lithotrite, and so to assist its onward passage. The amount of depression of the handle of the instrument above alluded to must be measured by the presence or absence of prostatic disease, or by that of the bar-like ridge at the neck of the bladder. In either case the depression required may be considerable, and in both a certain amount of additional force is necessary to secure the satisfactory entrance of the instrument into the bladder. The depth to which it should be passed will much depend on the same contingencies. The subsequent manipulation must be conducted with the greatest caution and gentleness. By some surgeons the stone will be seized instantaneously, and in any position of the patient; whilst by others, select what position they may, the greatest difficulties and perplexities will arise, and very often there is a complete failure in catching the stone. I have noted in the history of the cases detailed, that it is well to open the lithotrite whilst engaged in the operation to the extent to which the movable blade had reached on the scale when the stone was recognized. If this be attended to it will prevent the partial separations of the blade which are as useless as they are often most injurious.

Those directions for seizing and crushing the stone—which are now fully detailed and discussed in all the recent works on surgery, and in none more satisfactorily and clearly than in the article on “Lithotrity,” in the fourth volume of Holmes’ *System of Surgery*—I cannot now further consider. It seems some improvement was called for in the detritus or evacuating catheter, when the use of such might be advisable, and I give a woodcut, executed by Mr. Oldham, of one which I have found useful (Figs. 1, 2, and 3). Its size may vary, but to be efficient it should not be under 14 or 16 on the scale. Its curve is short and abrupt, and one large opening exists on its concave surface, near its extreme end. There is a strong stilette, with a ring at one end and a chain attached to a firm pellet at the other; this stilette and chain fit the catheter loosely, and its length exceeds that of the latter by an inch or so. The advantages of this instrument I have found to be, that

Fig. 1.

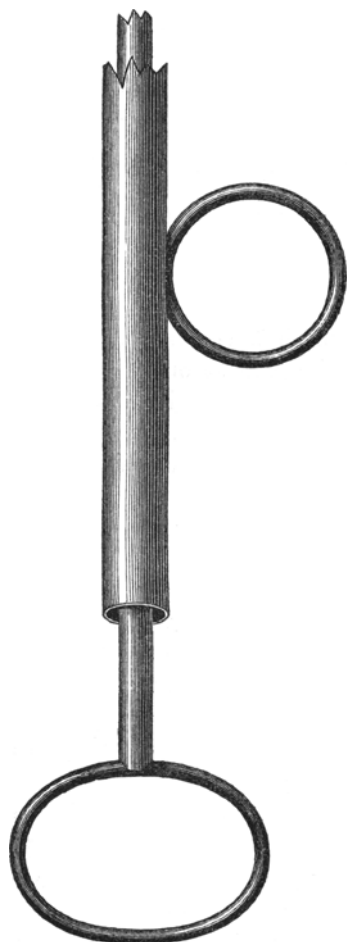


Fig. 2.



its short curve admits of its extremity being turned safely towards the ordinary situation of detritus in the bladder, and hence that it may be more satisfactorily commanded and influenced by injection thrown in. The provision in the stilette will admit of its pulverizing or clearing detritus without at the same time interfering with the spontaneous escape of urine or other fluid from the bladder. To this catheter may be attached the several varieties of syringes in use, and amongst them that which has been recently recommended, and which may be termed a "flushing syringe." I have had a wood-cut executed of an addition to this syringe (Fig. 4), which

Fig. 3.

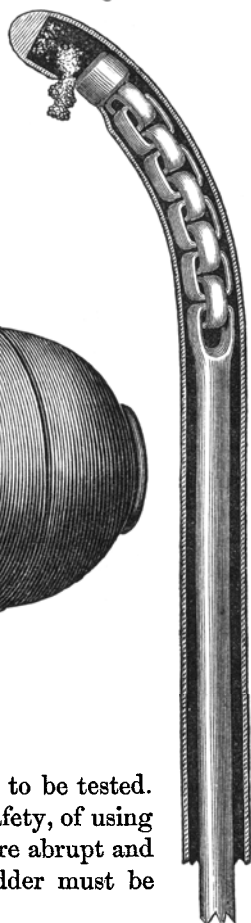
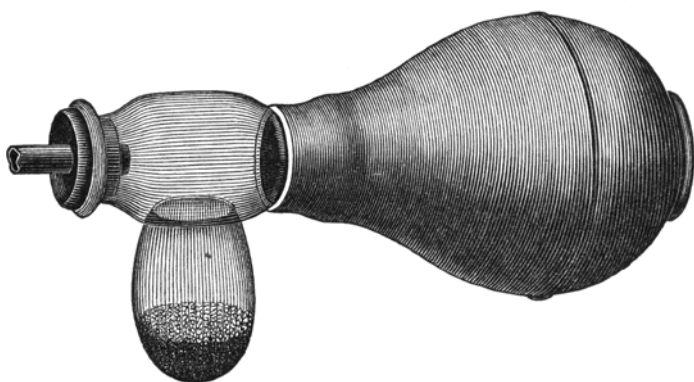


Fig. 4.



may, perhaps, be found efficient, but it is yet to be tested. I doubt very much the efficiency, if not the safety, of using such class of syringe in urinary diseases, where abrupt and sudden changes in the capacity of the bladder must be produced.

The history of the case of lithotomy identified with Fig. 4 in the Plate is, of necessity, deferred. Suffice it to say, the operation was the lateral operation—the several calculi delineated were removed within a few seconds, and the recovery of the man has been perfect. His age was beyond 60. He was admitted into the Richmond Hospital in September, 1859, and left, free from all urinary suffering, in the early part of the November following. He has had neither retention or incontinence of urine since; and he has on many occasions presented himself at the hospital free from his former complaint.