

Lithotrity and lithotomy, with the use of ether in those operations / By J. Mason Warren, M.D.

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LITHOTRITY AND LITHOTOMY,

WITH THE USE OF ETHER IN THOSE OPERATIONS.

BY J. MASON WARREN, M.D.

WHEN ether was first introduced into use in surgical operations, it was thought by many that this substance would be found wholly inapplicable to the destruction of the stone in the bladder by crushing instruments. The objections raised were principally these: 1st. That, in order to preserve the integrity of the mucous membrane of the bladder, it was necessary that the patient should be possessed of his full consciousness, so as to give the surgeon warning when the coats of the organ were included in the instrument. 2d. That the operation might be pursued to a dangerous extent, unless information was given by the patient's feelings and powers of endurance, when it was proper to desist.

Such fears, as well as others which have been urged under similar circumstances, have, as will be shown by the following cases, proved fallacious. Not having observed any account of the application of ether to the performance of lithotrity, among the almost innumerable uses to which it has been applied, I have been led to bring together these instances and to present them to the public. From these records it would appear, that the facility thus afforded is as great as in any class of surgical operations.

In one or two of the cases, from the great irritability of the bladder and urethra, as well as from the extreme hardness of the stone, (which required a number of operations,) it would have been necessary to relinquish the idea of employing lithotrity without the assistance of ether. In those where the ether was not made use of, it will be found that other points of interest rendered their introduction advisable. The case of lithotomy is instructive, both on account of the manner of formation of the stone, and the great facility afforded by the ether in the exploration and operation.

But few cases are required to establish the fact, that by the use of ether lithotrity will be much simplified, and a resort to it frequently made in instances till now rejected.

CASE I.—J. W——, forty years of age, had for a year or two been troubled with difficulty in passing water, attended with ex-

treme irritability of the urethra, and from the latter cause had not been able to submit to an examination of the bladder by means of the catheter. At length, the distress being very severe, and the demand for an operation imperative, a catheter was introduced by his physician, and a calculus at once detected. The suffering from the introduction of the instrument was so agonizing, that he determined to submit to no further exploration, but requested Dr. J. C. Warren to visit him, and perform the operation of lithotomy.

After some conversation he was induced to take ether and undergo a second examination, which was done with so little pain and knowledge to himself, that he was persuaded to submit to lithotomy, which was performed by me in July, 1847. The patient being under the influence of ether, the stone was caught once or twice, and crushed without difficulty, causing the discharge of a number of fragments in the course of a few days.

At the end of a month the same operation was repeated, by which the entire destruction of the stone was completed. He was immediately afterwards enabled to resume the practice of his profession, which he continued a year. At the expiration of this time he was seized with the symptoms detailed in the following letter from his physician, Dr. A. L. Peirson, of Salem, where he resided and died, after a few days' confinement, on the morning of June 5th, 1848:

"J. W—— held court in Boston week before last. He had hematuria, and his general health suffered so much, that he was prompted to adjourn the court, but persevered till its term was finished, and came home on Wednesday, May 25th. His physician, Dr. Holyoke, saw him, and administered an infusion of uva ursi; and on Saturday, feeling as well as usual, he made arrangements for holding court at Martha's Vineyard, the ensuing week. He dined heartily on Saturday, and indulged imprudently at dessert in nuts and raisins. He probably took no wine, as he did not accustom himself so to do. On Saturday night he had a severe chill, with violent pain in the right hypochondriac and iliac regions.—These symptoms persisted, with some abatement, till Friday morning, June 2d, when I first saw him. He then had much nervous excitement, a pulse very rapid and rather feeble, tympanitis and abdominal tenderness, with acute soreness where the pain had been, and was hollow-eyed and anxious-looking. He took chloroform with great satisfaction, a moderate opiate, and a mild purge.

"My hopes and expectations were, that his difficulty was like what he often had experienced before from irritation, and which had always subsided after the employment of mild measures. I awaited the action of the alimentary canal, which I trusted would prove to have been the focus of irritation, causing sympathetic trouble in the urinary apparatus. He had one full evacuation, principally of fecal matter, with no change of symptoms that was satisfactory. The tympanitis, tenderness and frequency of the pulse diminished, and his pain wholly left him on Saturday, June 3d.—

His weak pulse, haggard look, and the failure of relief from the laxative, gave Dr. H. and myself the greatest alarm. He gradually sunk, and died at four o'clock on Monday morning, after twenty-four hours of mild delirium.

"The death of this gentleman was apparently caused by disorganization of the right kidney. It contained a small calculus in its concavity. A smaller one was found in the left kidney, being the only morbid appearance discovered in that organ. I send you both calculi. There was infiltration of pus, and purulent, sanious, serous fluid into the cellular tissue around the gland. A small patch of pure pus covered a spot on the thin edge of the liver. On laying open the ureter and infundibulum, which were considerably enlarged, a dark, smoky-looking circle, almost entirely sphacelated, surrounded each papilla. But little of the medullary portion seemed capable of performing its function. A quantity of sanious fluid, with hardly a character of urine, was found in the kidney. The bladder was perfectly sound, without a mark of inflammation, and was of natural size. There was no appearance of calculus, and only a few grains of the finest sand, such as he often passed."

CASE II.—*Calculus of Oxalate of Lime—Lithotripsy under Chloric Ether—Purulent Absorption.*—The three following cases occurred at the Massachusetts General Hospital, from the records of which Institution the minutes are in part derived.

Nov. 24th, 1847. John Kelly, 20 years of age, had for the last ten years been troubled with difficulty about the urinary organs, manifested by occasional pain in passing water, pains in the loins on stooping, or making any exertions. Eighteen months since he contracted a chancre on the frænum, which was followed by a bubo in the groin. He recovered from these in about six months.

Nine weeks ago, after exposure to wet and cold, he found much difficulty in passing his water, the stream being small, tortuous, and attended with a smarting pain at the end of the penis. Since the present disease he has had a serous discharge, which at times is mixed with blood. In this state he entered the Hospital, and on examination the urethra was found to be so contracted as hardly to admit the smallest sized bougie.

The stricture was gradually dilated by the introduction of bougies increasing in size, but notwithstanding the enlarged passage, and the free egress of the urine, the patient still complained of much pain at the extremity of the glans penis, and was obliged to pass his water ten or twelve times in the twenty-four hours.

From these symptoms I suspected the existence of some foreign substance in the bladder. The urethra being extremely sensitive, and the patient making a great outcry at any attempt to sound him, he was placed under the influence of chloric ether, and a curved sound introduced, by which I at once detected a stone.

Having waited a few days to allow the bladder to recover from the effects of sounding, on March 11th the operation of lithotripsy

was performed. The patient was first etherized with chloric ether, so that the muscular system was in a complete state of relaxation; half-a-pint of warm water was now injected into the bladder. A small lithotrite was then introduced, and the stone at once seized, but it proved to be too hard. This instrument was withdrawn, and a larger and more powerful one substituted; by which the stone, having been caught, was broken with repeated strokes from the hammer. Some difficulty was found, on withdrawing the instrument, in passing the seat of the stricture, on account of its jaws being clogged with sand, and therefore imperfectly closed. The patient was entirely insensible during the whole operation, and not the slightest contraction of the bladder impeded the necessary manipulation.

The continuation of this history, as derived from the same records, is in substance as follows:—

In an hour after the operation, the patient passed considerable urine, with several pieces of gravel, about one-half the size of a pea, and some fine sand, in all nearly half a teaspoonful. The urine contained a little blood, which was apparently from the urethra.

At 3 P. M. he had a severe rigor, lasting fifteen minutes; passed urine once since the last report, some gravel came away with it. 5 P. M. some small pieces of the gravel which had lodged in the urethra, were removed with the forceps. The bladder was washed out with cold water; cold compresses were also applied to the urethra, from which a little blood had been oozing.

At 8 P. M. he complained of headache, pulse full and hard. He was bled to 12 oz. with much relief.

At 11 P. M. pulse 120, soft; was sleeping quietly.

March 12th. Very comfortable; pulse 96. Some small fragments of calculi came away. P. M. pulse 140, some headache, no tenderness of bowels, and but little irritability of urethra; passage of urine free.

13th. He urinates freely, but has a little tenesmus on doing so. The smarting and pain are very slight; but little detritus in the urine. Twelve leeches to perinæum, with a warm bath and enema, were ordered.

In P. M. had a chill; now complains of malaise, a pain in the shoulders, back of the neck, and weakness of the right arm. The countenance is better than yesterday; pulse 130.

14th. There is pain in the shoulders, with some superficial tendency. The urine is natural; but the passage of it is attended with some pain. There is no appetite.

On the 15th, another fragment of the calculus was removed from the urethra with the forceps.

16th. Pulse 120. The countenance is somewhat depressed.—He complains of great pain in the right shoulder and arm, as well as between the shoulders; also in loins and left side of back. He also has tenderness along the course of the left carotid artery; the

countenance depressed; bowels free. He has no trouble in passing urine, and but little soreness of the urethra.

17th. His looks are more depressed than yesterday; pulse 120; pains about the shoulder and neck continue the same. 8 P. M.—Since noon, the pulse has risen; it is now 200, perfectly distinct and regular, but weak. The countenance is anxious, the voice feeble. He complains of great pain in the back and shoulders, and of distress at the epigastrium. He was allowed to take a small quantity of wine every half hour.

18th. He is much the same; pulse 212, full, and stronger than yesterday.

19th. Countenance is better, pulse 180, stronger and fuller; skin quite warm and moist; tongue clear, thirst slight; relishes broth; no dejection; considerable flatus in the intestines. In the afternoon had pain in his neck and shoulders, also in his right foot. On examination a diffused swelling is discovered over the metatarsal bone of the little toe. A red patch had also formed over the sternal extremity of the left clavicle. Pulse 204, is sweating profusely; continue wine.

20th. Rather more feeble than yesterday. A plaster of the cerate of cantharides was applied to the inside of the right thigh.—Pulse 210. He passes water, by his own account, with more ease than he has done for two years. He continues to complain of great pain in his back and left shoulder, and of great distress about his heart. 21st. The pulse was 200.

22d. I opened an abscess over the tarso-metatarsal articulation of the left little toe, and found the bone denuded.

23d. Pulse 190. From this period the frequency of the pulse began to diminish, and he went on slowly improving until April 2d, when he was seized during the afternoon with a severe pain about the left clavicle and upper part of the left side of the chest. Great swelling had taken place in the part since noon, so as to almost bury the clavicle. It also extended up the neck of that side. The integuments over the clavicle were red and œdematous. He had great difficulty of breathing, and the pressure on the trachea almost produced suffocation. I immediately made a dissection down to the clavicle, but no pus could be discovered. The bone itself was evidently enlarged, and my impression from the symptoms was, that pus was forming in its interior.

The incision afforded him some ease by the abstraction of blood, and giving relief to the extreme tension of the surrounding integuments. A poultice was directed to be applied over the wound, and an opiate to be administered.

The pain was less on the following day. On the 21st of April, the swelling about the clavicle had nearly disappeared, but the inner third of the bone was felt to be enlarged.

From this period he slowly recovered, and left the Hospital free of complaint.

Remarks.—The operation in this case was rapidly done, with no violence to the bladder, as shown by the symptoms at the time and afterwards, none of which had reference to that organ. The stone was small, and not being aware of the hardness of it, I thought it would yield to a small instrument. The power of this not proving sufficient it was withdrawn, and another introduced; which, however, was so constructed as not to clear itself of the detritus or sand made by the crushing process. From this reason the instrument, which passed the obstruction, caused by the stricture, with ease, on its introduction, was arrested there on its withdrawal, from the jaws being imperfectly closed, and some force was required, though not amounting to violence.

It will be perceived that the fragments of stone all came away within a week of the operation. In three days after its performance he began to have pain in his shoulders, after which all the symptoms denoting purulent absorption manifested themselves. The pulse, for six or seven days after the 17th, remained constantly very rapid, ranging from 190 to 212. There seemed to be a tendency to the formation of pus in different parts of the body; it was found about the metatarsal bone in the foot, and was presumed to exist in the clavicle; from the latter it was probably absorbed without making any appearance outwardly.

This case will evidently come under the category of those placed by Velpeau and Civiale as instances of purulent absorption, sometimes caused by the simple introduction of a catheter, but more frequently in lithotomy by the irritation of fragments lodged in the urethra, and about the neck of the bladder.

The stone was analyzed by Dr. Bacon, one of our most distinguished chemists, who gave me the following note of its constituents: "It consists chiefly of oxalate of lime; it also contains considerable uric acid, and a small quantity of carbonate of lime. The concentric layers are very numerous. In some fragments under the microscope, I counted from ten to twenty, or even more layers, in the space of one-fiftieth of an inch. The radiated structure is also seen under the same circumstances, the radii being still finer than the layers which cross them at right angles."

CASE III.—In the two following cases of vesico-vaginal fistula a calculus formed, either from a phosphatic deposition upon the catheter becoming detached, (thus acting as a nucleus,) or from the collection of calcareous matter about the edge of the fistulous opening.

S. S.—, 27 years of age, entered the Hospital April 3d, 1848, and gave the following account of herself. She had been confined three months previous; the child was large and had been dead for some time. After having been in labor thirty hours, during which time the pains were severe, the forceps were used, but without success; she was told that they had slipped from the head of the child. About ten hours after the trial of the forceps, she was delivered

without assistance. The delivery took place on Monday at noon; she had then passed no urine for several hours, and none came from her until Tuesday afternoon, when a catheter was used, and about three pints drawn off. From that time until March 31st, urine ran from the vagina constantly; on this day, without known cause, the urine was retained; her physician could find none with a catheter, and none flowed until the next day, when "something gave way, and some thick white matter was discharged," since when the urine has flowed as before.

A large discharge of very offensive matter from the vagina continued for several weeks after labor. She has not menstruated since confinement, but every month has severe pain in the back, and bearing down sensation in the pelvis. At such times she thinks the urine is more abundant.

April 3d. The catheter being introduced, about an ounce of very thick muco-purulent matter came through it. The instrument was directed to be left in the bladder. On examination, the vagina was found to be obliterated to within half an inch of the external organs; at the lower part of this obstruction was an opening, through which the urine escaped.

7th. The patient having been placed under the influence of the chloric ether, the callous edges of the fistulous opening were thoroughly cauterized with a prepared stick of the potassa cum calce. She suffered no pain from the application. The subsequent position was upon her side, having in the bladder a large catheter provided with a shield, and constructed for the purpose.

By the 17th of April the fistulous opening had contracted, the urine continuing to pass by the canula. The edges of the fistula were touched occasionally with the nitrate of silver, and in the course of another month it was completely obliterated.

On May 26th, the patient having complained frequently for a week before of pain in the back and loins, with difficulty of urinating, I passed a catheter, and immediately detected a calculus. The lithontriptic instrument was introduced, and the stone at once caught and crushed. On the following day all the fragments had passed in the urine.

This patient is now, April, 1849, in the enjoyment of good health, except at the period of menstruation, when she has a severe attack of pain in the hips and abdomen, attended with hysterical symptoms lasting usually four or five days, and requiring the use of leeches, purgatives, warm baths, and other debilitating remedies, before the system is relieved. I have once or twice examined the uterus by the rectum at these periods, but found no perceptible fulness or projection of this organ into the bowel.* A question arises how these

*May 10th.—This patient for the last two weeks has been suffering under a paroxysm of unusual severity. The pain is so violent as to resist the use of almost any quantity of narcotic substances. She has had one or two attacks of vomiting, in which a large quantity of blood has been ejected. She makes the most earnest appeals for relief, and is willing to submit to any operation by which

symptoms are ultimately to terminate ; a point to which I shall have occasion to advert in the following case.

CASE IV.—*Vesico-Vaginal Fistula—Phosphatic Calculus.*—A. L——, æt. 32, entered the Hospital March 9th, 1848. Fourteen weeks since she was delivered by forceps, after a labor of four days. During this period she was for the greater part of the time insensible from the effects of narcotic substances. The child was delivered on Tuesday.

On the following Thursday there was incontinence of urine, and it flowed constantly from the vagina, never passing by the urethra, or collecting in the bladder.

She has not menstruated since her labor, nor has she had any difficulty at the period when the menstrual secretion should appear. There has, however, been much milk in the breasts, but varying in degree ; she has not noticed any relation between the quantity secreted and the catamenial period.

On examination of this patient the external organs were found excoriated by the urine, which was constantly dribbling away from her. The vagina was somewhat contracted throughout its entire length, but more especially at about three inches from the external organs, where there was a very marked constriction. Behind this was a longitudinal slit, with callous edges, on the anterior wall of the vagina, through which water was seen issuing from the bladder. A small irregular opening existed in the posterior part of the vagina near the situation, or in the place of the os uteri, which had entirely disappeared.

The patient was thoroughly etherized with chloric ether, as it was found almost impossible to make the slightest examination, on account of the extreme sensibility of the parts. The speculum of Ricord was used both for the examination and the operation. The edges of the fistula were now cauterized so as to produce a slough, with the potassa cum calce, and a catheter introduced. This instrument, which had been made for the purpose, was half an inch in diameter, five inches long, with a shield an inch from its external orifice.

The patient suffered but little from the caustic, and no urine passed through the fistula for several days. It was touched occasionally with creosote ; and on the 18th, no urine having passed through the fistula for some time, the catheter was omitted, and she was allowed to walk about.

On the 23d of April, she reported that no urine passed by the vagina. When the catheter was first omitted, the water dribbled away from the urethra, which from long disuse had apparently lost its power of retention. This power, however, was by degrees restored again.

that point can be attained. From the entire obliteration of the vagina, and absence of fulness in the rectum, there seems to be no spot at which the uterus can be safely reached.

On May 7th an examination was made both by the vagina with a speculum, and by the bladder with a catheter. The fistulous opening was hardly perceptible. In the bladder was found a calculus, apparently about the size of that mentioned in the preceding case. Immediately I sent for a lithontriptic instrument, with which the stone was easily caught and crushed. On the following day the fragments of the stone came away with the urine. They were found to be composed of the phosphate of lime.

This patient remained in the Hospital until the latter part of May, when she had the full command over the urine. During the whole of this time there was no appearance of the menstrual secretion; but at stated periods, at an interval of four weeks, an increased secretion of milk took place in the breasts.

I have recently seen this woman. She stated, that she had been well since she left the Hospital. About three months since, nearly a year after her delivery, the catamenial function was restored, and has remained regular since. This must have had its exit at the orifice, which took the place of the os uteri, and which undoubtedly at the commencement was partially occluded.

On over distension of the bladder, a small quantity of urine was found to escape from the vagina. An examination with the speculum proved the old opening to have closed; and that the urine appeared to escape from the same fissure in the uterus with the catamenia.

In connection with this subject, it may be interesting to advert to one or two other cases of vesico-vaginal fistula in regard to the same particular. For I have not been able to find that any author has given the results of his experience, as to the probable manner in which the menstrual fluid makes its escape, in cases where the orifice is obstructed by the sloughing and inflammation following difficult labors, which has occurred in about one-half of the instances under my observation.

In one case of sloughing of the bladder and occlusion of the os uteri, in which I operated a year since by sutures, the fissure was completely cured. The menstrual secretion has never been restored. Once in four weeks, at the catamenial period, the patient is seized with the most distressing pains in the uterine region, attended with sickness and sometimes vomiting. These symptoms continue for a week, and cause the utmost distress. I have repeatedly examined the supposed seat of the os uteri, to determine if any projection took place at these periods, with the idea of puncturing, but have never had any encouragement by the appearance to justify an operation.

In another woman, where the whole lower half of the bladder was lost by sloughing, the same symptoms were manifested. At one of these periods, at the distance of a year from their commencement, the pains became violent and forcing, as in labor. At this moment a rupture of some part of the uterus into the vagina took place, and the patient was, as she states, at once deluged with blood,

so that long-continued fainting took place, from which she was with difficulty recovered. The menstrual function has since gone on regularly.

Although these remarks may seem irrelevant at the present time, yet if they should elicit information from any other sources on this interesting subject, they will not be without their good result.

In regard to the formation of calculus, in these two cases, it cannot be attributed to any negligence in the use of the catheter, as it was regularly withdrawn and cleansed, once or twice in the twenty-four hours. I should rather be disposed to attribute it to the collection of the phosphates, in and around the fistulous openings, as we sometimes see after cases of lithotomy.

CASE V.—*Cystic Oxide Calculus—Lithotrity*.—J. C——, aged forty-three, of Montgomery County, New York, applied to me in July, 1848, and gave the following history of his case: Seven years ago he was seized with a violent pain in his side, which was attributed by his physician to the passage of a calculus through the ureter. Shortly afterwards, a calculus, of the size of a pea, was voided with his urine.

He has a number of times since passed calculi; and on one occasion, after a severe paroxysm of pain, says he could tell distinctly the moment when the calculus entered the bladder; he arose from his bed immediately, and passed the stone.

Three months since, while engaged in ploughing, he felt a pain in his bladder, the commencement of the sufferings which have continued to increase until the present time. He is obliged to pass his water frequently; it is occasionally bloody. He cannot ride in a carriage without extreme pain; in walking, he is compelled to move very slowly.

I sounded the patient with a small lithotrite, and at once detected a calculus. This being embraced by the jaws of the instrument, gave a measurement on the scale of an inch and a half. Some irritation of the bladder followed this examination, which was made after the fatigue and excitement of a long journey, and it was necessary to keep him quiet for some days, and use remedies, before any operation could be performed.

On July 13th, the bladder being injected with half a pint of warm rain water, the stone was immediately seized with the crushing instrument, and broken by means of the screw without much difficulty.

15th. He had suffered no inconvenience from the operation, and in fact feels relieved. A quantity of sand and fragments of stone have passed with the urine.

The operation was repeated on the 18th, 23d, 26th, 29th, and August 2d. After each operation the patient passed a number of fragments, and once or twice it was necessary to remove by the forceps portions which had become lodged in the fossa navicularis, and were too large to pass easily the external orifice of the urethra. On Aug. 3d, a fragment, which had been engaged in this way, and which it

was found impossible to extract entire, was seized by a powerful pair of dressing forceps, crushed, and thus extracted piecemeal.

On the 9th he returned home well, and on the 25th I received from him a letter, in which he stated that he had experienced no difficulty in passing his water, and was otherwise in good health.

Dr. Bacon kindly made an analysis of the stone, which is contained in the following note :—

“ The calculus, of which you sent me fragments yesterday for analysis, proves to be of a rare and interesting kind. It is composed of *cystine* or *cystic oxide*.

“ The yellow portions consist of cystine in a state of purity, with the exception of a trace of phosphate of lime. In the white friable parts, which appear to be interspersed in the yellow masses without forming regular layers, the cystine is mixed with much phosphate of lime and a little triple phosphate.

“ Your specimens agree pretty closely in physical characters with the description given by authors of this very uncommon form of calculus.”

CASE VI.—*Oxalate of Lime Calculus—Lithotrixy*.—P. C——, 15 years of age, applied to me in October, 1848, with symptoms of great irritability of the bladder, such as usually accompany the existence of a foreign body in that organ. At this period he declined all examination, although I at once warned him of the probable nature of the disease.

In November, nearly a month afterwards, finding that no remedies had any effect in relieving his sufferings, he submitted to the operation of sounding, and I detected quite a large calculus.

His mother gave the following history of his case: He had been troubled in the urinary organs from infancy. When three years old he had a violent attack of pain in the region of the right kidney, for which he was leeches and blistered. He recovered for the time, but afterwards was seized with a pain lower down on the same side, attended with difficulty in passing water, and with bloody urine.—From that time to the present he has almost constantly been troubled about these parts. The last summer, for one or two weeks, the symptoms seemed almost entirely to disappear, but for the past three months they have all been aggravated. He is obliged to pass his water every half hour, and in his sleep it escapes involuntarily. He cannot get into bed without assistance; cannot walk fast without pain; passes blood occasionally. His appetite is good, and, considering the suffering he has undergone, the flesh is firm, strong, and of good color.

On account of the size and hardness of the stone, and the age of the patient, I advised the operation of lithotomy, but the parents would not listen to a cutting operation, where any other method was available. I, therefore, determined to etherize the patient, make an attempt with the crushing instruments, and if the stone was found to

resist farther than was thought safe, to relinquish this operation, and advise lithotomy, which his friends would probably consent to when the former was found to be impracticable.

On Nov. 16th, the first operation was done, Drs. Minot, Adams and McGowan assisting me. The patient was placed under the influence of chloric ether. An attempt was made to introduce the catheter, for the purpose of injecting the bladder, but as soon as it reached that organ a violent contraction took place, so that the instrument was embraced, and all manœuvres of it prevented. The etherization was then pushed to total insensibility, which is usually manifested by the occurrence of stertorous breathing, and the perfect relaxation of all muscular actions. The bladder was now injected with the greatest ease, the crushing instrument passed in, and the stone seized. It measured one and a half inches. Attempts were made to crush it by means of the screw, but this was found impossible, on account of its hardness. The hold was therefore relaxed, the stone seized in a new position, more on one side, and was then broken down without any great violence. The fragments were then crushed a second and even a third time.

During the operation the patient was very quiet. He voided the water before he became conscious, and was left in a tranquil sleep. A warm hip-bath was directed, and the free drinking of gum Arabic and water.

20th.—He has suffered more or less from pain in the bladder since the operation. A number of fragments of the calculus have been passed, which, on being analyzed by Dr. Bacon, were found to consist of the oxalate of lime, combined with the triple phosphate, showing itself in glittering transparent crystals. The latter seemed to have been deposited on the surface, and were exceedingly sharp and irritating to the touch.

For the last four days the boy has been up and about the house. To-day the operation was again repeated, the stone seized, and at first seemed to resist the action both of the screw and hammer, but with a little perseverance it was finally crushed by means of percussion. The urine that passed after the operation was a little discolored with blood, produced apparently by the action of the sharp edges of the calculus on the mucous coat of the bladder, as there were never at any period traces of its coats on the instrument.

Professor May, of Washington, was present, and assisted me in this operation.

The following day he voided quite a number of pieces, and among others apparently the original calculus which had passed from the kidneys; it was of a lightish brown color, about the size of a small bean.

The operation was repeated six times at intervals of a week. The time devoted to the seizing of the stone was generally about five minutes. From the great hardness of its composition it could not be crushed into sand, as is the case with the phosphatic and uric acid

calculi, but the fragments were large, and required each to be seized separately and crushed.

Twice in the course of this period portions became engaged in the orifice of the urethra, and it was necessary to administer ether, and extract them, as the parts were so excessively sensitive that nothing could be performed without the assistance of this agent.

Finally, the last fragment of the stone, which for some days had been lodged in the neck of the bladder, and which I had once pushed back, became suddenly fixed at the membranous part of the urethra, so as to entirely obstruct the course of the urine.

In order to effect the dislodgment of this remnant, the patient was etherized with chloric ether. Hunter's forceps were now introduced, and after some manœuvres, and with considerable difficulty, the stone was at length caught, and drawn to the fossa navicularis. From this spot it was found impossible to extract it without laceration of the urethra; the hold on it was therefore relinquished. Forceps were now introduced, and attempts made to break it, which at first were ineffectual, on account of its extreme hardness; but by perseverance, and by breaking it away gradually, this was at length effected, and the whole removed. No bad effects followed this apparent violence inflicted on the urethra. From that time the symptoms of stone were entirely relieved, and the patient has now perfectly regained his health.

At present, he passes water no oftener than natural, which is remarkable, considering the constant irritation kept up in the bladder for a period of thirteen years.

The following case of stone, in which the operation of lithotomy was performed, possesses some interest, both from the manner of the formation of the calculus, and from the great assistance afforded by the ether in the examination of the bladder and the subsequent operation. This case has already been referred to by Dr. J. C. Warren, in his "Remarks on Etherization."

CASE VII.—On November 7th, 1847, I saw, in consultation with Dr. Morrill, a little child of Mr. Colbeck, four years of age, affected with symptoms of some foreign substance in the bladder. The child was thin, delicate, and tall of his age. The history of his present disease was as follows:—

Two years and a half previous, as the child was making water in the street, another boy, in attempting to wrest a knife from him, pulled him over and dragged him through a heap of gravel. When taken up by his mother, a quantity of this substance was found adherent to the glans penis. For twenty-four hours he had an almost complete stoppage of water. At the end of that period an examination being made, disclosed a small bit of gravel lodged just within the orifice of the urethra. It was removed by a knitting-needle, and immediate relief obtained.

Some months after the preceding occurrence, the child began to complain of difficulty in passing his water, attended with frequent

desire to evacuate the bladder. These, with intervals of ease, have continued till within a few months. Since then the symptoms have become much aggravated, so as to make it imperative to have active measures taken for his relief; the sufferings both by day and night being almost constant, and the calls for evacuating the bladder incessant.

All attempts at an introduction of a sound being resisted by the patient, he was etherized, and I at once discovered a calculus. At a subsequent period he was again sounded, and the stone detected.

On November 16th, an operation having been determined on, the child was fully etherized, and a sound being placed in the bladder, the stone was felt by all the gentlemen present; viz., Drs. Warren, Townsend, Morrill and Parkman. Lithotomy was immediately performed by the bi-lateral method; the incision of the prostate being made with a straight probe-pointed bistoury. The stone was removed by a large polypus forceps.

No bad symptoms followed the operation. On the following day the water passed by the urethra; on the third by the wound; and continued to do so for a week, when it resumed its natural course.

On page 95 of the "Appendix to Etherization, with surgical Remarks," already alluded to, will be found a description of the stone, with some comments upon its presumed method of introduction, by Dr. J. C. Warren, in these words:—

"The stone was about half an inch long, the fourth of an inch thick, and in form of a flattened oval. It was sawn by Dr. J. B. S. Jackson. The exterior layer consisted of a whitish deposit, the sixteenth of an inch in thickness, and composed apparently of triple phosphate. The layers within this were of a brownish color, like that of the phosphate of lime, and were about half a line in thickness. In the midst of these was a harder substance, about a line in diameter, which appeared to be silicious. Its outline could not exactly be distinguished from the surrounding layers of brown deposit.

"The retrograde passage of the apparent nucleus into the bladder may excite surprise, unless we take into consideration the inverted action of the urethra, by which bodies received into it are so often conveyed from without into this organ, where they serve as the nuclei of stones. The introduction of this nucleus may receive an additional explanation from the fact, that the gravel-stone, removed by the mother, prevented the passage of urine forced into the urethra by the strong contractions of the bladder, and this not escaping, was driven back by the contractions of the urethra, carrying along the inner stone, which formed the nucleus.

It will be evident, on a review of the above cases, that lithotrity would have been impracticable in the first, second and sixth instances, had it not been for the great assistance afforded by etherization. The quietness with which the preliminary examinations were allowed, may be strongly contrasted with the manner in which these are frequently done, amidst the struggles of the patient, and the violent

contractions of the bladder; while the surgeon is left dissatisfied and uncertain, and finds himself obliged to make one or two repetitions before a sufficiently accurate diagnosis can be made to warrant him in proceeding to a surgical operation.

I was much struck by this fact shortly after etherization was introduced among us, when called in consultation to a female laboring under the symptoms of stone in the bladder. It was agreed that she should be sounded, and, if a stone was discovered, that lithotrity under ether should be done on the following day. The sounding produced the most severe suffering, on account of the extreme irritability of the mucous coat of the bladder, added to the natural sensitiveness of the patient. A stone was struck, and, by the introduction of a finger into the vagina, the sound being in the bladder, it could be embraced by the instrument on one side and the finger and the vesico-vaginal septum on the other. It was apparently adherent; but in consequence of the contractions of the bladder, and the struggles of the patient, the operation was rendered extremely difficult.

On the following day I visited her with the intention of performing lithotrity, but found, however, that, during the night, owing to the violent expulsive efforts produced by sounding, and which had continued afterwards, the calculus had become detached and expelled: it was about the size of a bean. As some of the symptoms of stone persisted, it was determined to make another examination, to satisfy ourselves that the bladder was free from any further foreign substance. At this time ether was given, and every part of the bladder explored with the catheter, without the slightest complaint from the patient. No obstruction was made to the free use of the instrument by the irritability of the bladder, which had on the day previous so much impeded the necessary manœuvres.

Although the experience of lithotrity under the use of ether is thus far limited to a few cases, yet we think these are sufficient to show that this operation will probably assume greater importance, and come into more general use, now that a repetition of the requisite manipulation can be made without suffering. In many cases which hitherto must have been submitted to lithotomy, on account of the extreme irritability of the organs concerned, lithotrity will hereafter be adopted in preference.

The case of cystic oxide calculus given above is interesting from the extreme rarity of this kind of stone. M. Civiale, whose great experience is well known, in his work on the stone and gravel, published in 1840, states that he has met with but four cases of it. In the Hunterian Museum, out of six hundred and forty-nine calculi, it appears by the catalogue there are but three of the cystic oxide.

It has been stated that an hereditary disposition existed in many of these cases; two of those under the care of M. Civiale were brothers. In the present case this disease was not inherited, according to the account of the patient.

