

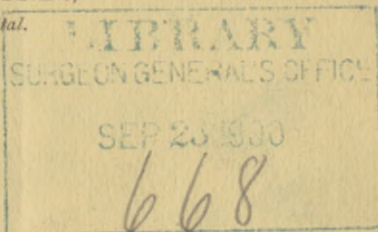
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Cabot.

With the Compliments of the Author.

PAPERS UPON
GENITO-URINARY SURGERY.

BY A. T. CABOT, A.M., M.D.,

Surgeon to the Mass. General Hospital.



- XIX. OBSERVATIONS UPON ACQUIRED HYDRONEPHROSIS.
XX. OBSERVATIONS UPON STONE IN THE BLADDER; RECURRENCE
OF STONE: CHOICE OF OPERATION.
XXI. ANOTHER SUCCESSFUL CASE OF URETERO-LITHOTOMY.
XXII. PERSONAL EXPERIENCE IN MODERN OPERATIONS FOR THE
RELIEF OF PROSTATIC OBSTRUCTION.

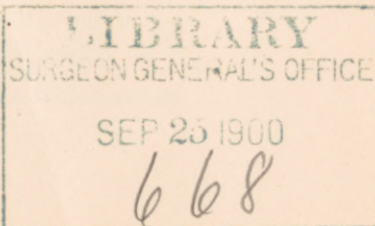
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OBSERVATIONS UPON ACQUIRED HYDRONEPHROSIS.¹

ANY obstruction in the urinary passages between the kidney and the outer air may cause an accumulation of urine in the renal pelvis and lead to a hydronephrosis. It is with the obstructions in the upper part of the ureter due to some acquired mechanical disarrangement of that tube that this paper has to do.

Whether these acquired, non-congenital cases of hydronephrosis are due in any part to congenital malformation or malposition of the ureter is a matter which in most cases must remain in doubt. For when these cases come to autopsy the acquired changes due to the pressure and displacement of parts by the great accumulation of fluid, mask and make doubtful the original condition.

Two forms of obstruction are found in these cases. These are valvular folds at the entrance of the ureter; and contortions of this tube in the first part of its course which favor the kinking and closure of it when the heavy kidney presses down upon it.

Taking first the valvular folds at the ureteral orifice: their etiology is somewhat doubtful. Virchow regarded the condition to be consequent upon a congenital oblique insertion of the ureter in the pelvis, while Simon thought that this slanting insertion was an acquired condition due to the stretching of the pelvis and the pressure of it down towards the ureter. Küster believed that an inflammatory swelling of the pelvic mucosa was necessary to assist Simon's displacement in forming a valve. He thought that the swollen mucous membrane was shifted somewhat on the submucosa and so partly pushed over the ureteral orifice.

Hanseman explains the valve formation by the pull of the kidney upon the comparatively immovable upper part of the ureter. It is

¹ Read before the Surgical Section of the Suffolk District Medical Society January 8, 1896.

plain that if this part of the ureter is fixed, as Englisch asserts, and the kidney then sags downward it carries the ureteral opening with it and produces a valvular condition such as is seen diagrammatically in the cut, at *b*.

This explanation seems applicable and satisfactory in many of the cases, and accounts for the not infrequent association of hydronephrosis with mobility of the kidney.

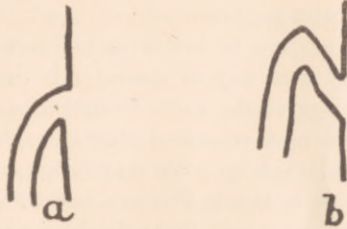
It also helps us to understand those instances in which by change of position an escape of the retained fluid is brought about. As the valve is usually formed by the falling of the kidney downward, Hansemann recommends raising of the hips of the patient in order to correct the condition. It is, however, to be remembered that the displacement of the ureteral orifice may be upwards or to either side if the pelvis dilates unequally in different parts, and in this case some other than the inverted position may straighten the orifice. He saw one case at autopsy in which a hydronephrotic kidney had the orifice so displaced upward that it was only made patent when the pelvis contained considerable fluid and so dragged the kidney down by its weight. This condition was tested by the injection of varying quantities of water and it was found that a certain amount of distention of the pelvis was necessary to alter the orifice so as to allow of the escape of fluid through it.

The effect of position in relieving such mechanical obstructions may also be helped by kneading and moving the tumor about, and in these ways relief may sometimes be obtained in those cases of intermittent hydronephrosis where the valve is not a very perfect one.

The hydronephrosis sometimes owes its origin to some temporary condition, as for instance, to the stopping of the ureter by a blood-clot, by an inflammatory swelling or by other pressure from without. If, now, this temporary cause is removed, the weight of the hydronephrotic sac may then be sufficient to keep up the obstruction by maintaining the valvular condition by the downward pull of the kidney. Under these circumstances a very thorough aspiration, by relieving the weight, may suffice to correct the condition, and, indeed, a certain number of cures are obtained in this way.

Drainage of the sac through an incision in the loin is a more efficient means of treatment in such cases, for the constant escape of the fluid

gives the sac an opportunity to shrink up and resume its more natural contour. Moreover, the nephrotomy gives the opportunity of drawing the kidney up to the loin and fixing it there, thus preventing any further sagging down.



a. Diagram of normal condition.
b. Diagram showing change produced when the kidney sags and carries the urethral orifice downward.

In this way cures have been obtained and the following operators have been fortunate with this method, more or less perfectly carried out: Weir,¹ Peters,² Tuckwell,³ Cabot.⁴

The disadvantage of this method of operating is, that, in case the obstruction for any reason remains, the patient is annoyed by a persistent urinary fistula. With the fear of this result in view and the valvular nature of the obstruction being recognized, it is natural that attempts should be made to obviate it by direct surgical correction of it. Unsuccessful attempts to relieve the valve at the entrance to the ureter were made by Simon⁵ prior to 1876, by Trendelenburg⁶ in 1890 and by Küster⁷ in 1891. In Simon's and Trendelenburg's operations the ureter was slit up for a considerable distance as it lay alongside the pelvic wall and then an attempt was made to unite the divided borders of the ureter to the lower part of the pelvis. Küster began his operation on the same plan, but finding a stricture, ended by resecting the upper end of the ureter. All these cases resulted fatally.

¹ New York Medical Record 1880, xvii, 294, and 1882, xxi, 477.

² Loc cit., 1882, xxi, 477.

³ London Lancet, 1882, ii, 141.

⁴ Boston Medical and Surgical Journal, February 22, 1883.

⁵ Chirurgie d. Nieren, vol. ii, Stuttgart, 1876.

⁶ Volkmann's Samml. klin. Vorträge, No. 355.

⁷ Archiv. f. klin. Chirurgie, Bd. xlvi, Heft 4, p. 850.

In May, 1892, Fenger¹ did a successful operation for valve formation by cutting through the fold that made the valve and so applying the sutures as to convert the longitudinal cut into a transverse wound. In this case he left a bougie in the ureter for two days and stitched up the kidney that was movable. Mynter² has since done a similar operation, likewise with good result.

These cases are too few to enable us to reach any decision as to whether this is the best way to correct this condition. We must remember the etiology of the valve formation, and must accept the fact that many cases have recovered after a simple nephrotomy with fixation of a movable kidney. We may feel, however, that if a distinct valve formation is found, Fenger's method of division may be practised without adding materially to the danger of the operation, for the chance of infiltration of urine must be slight when the tension is wholly removed by lumbar drainage. These operations are certainly attempts in the right direction, for they seek to re-establish the function of the kidney; while a nephrectomy, which is the last resort in these cases, is an unscientific proceeding when it removes an organ still doing good work.

We come now to consider the other form of obstruction due to mobility of the kidney. A tortuous condition of the upper end of the ureter may be associated with a very movable kidney. This happens so often that it is probable that the twisted condition of the ureter is dependent on the mobility of the kidney. Sometimes, too, an obstruction in the lower part of the ureter leads to a dilatation of the upper part of that canal, which in this case becomes tortuous and may lead to an actual torsion. If, now, at any time by twisting or kinking, a retention of urine is caused and leads to an accumulation in the pelvis, the heavy kidney pressing down towards the already twisted ureter aggravates the previously existing condition and produces a permanent stoppage. The point of obstruction in this case may be at some little distance from the pelvis.

Under such circumstances a good result may perhaps be attained by frequent aspirations which, emptying the kidney, allow of a shrinkage of the pelvis and in this way pull up the ureter into place. A nephrot-

¹ Transactions American Surgical Association, vol. xii, page 142.

² Annals of Surgery, December, 1893.

omy, however, offers a much better chance of cure, for by drawing up and fixing the kidney in the loin it tends to straighten the ureter and so to restore its calibre.

If, however, the ureter is so slack and tortuous that its condition does not seem to be remedied in this way, it might even be worth while to resect the upper part of the ureter and, after straightening the tube, to insert its upper end into the pelvis in the manner practised by Küster and recommended for correction of this condition by Tuffier.¹ This is, however, an operation difficult of performance and not devoid of danger. As a less dangerous proceeding, the writer would suggest that this tortuous condition can be corrected by inserting a bougie and leaving it *in situ* for several days. In this way the various curves of the canal are effaced while the pelvis is contracting and pulling it into shape. Furthermore, a moderate amount of inflammation is set up in the walls of the ureter which stiffens them, attaches them to the parts about and thus tends to keep the form given to the tube. The writer has carried out in one case this plan of operating and with so much success that he reports it as a suggestion for future trial. The history of this experience is as follows:

Miss H. M. A., thirty-two years of age, was sent to the Massachusetts General Hospital by Dr. Cooper of Northampton on March 25, 1895, with a cystic tumor of the abdomen. Catamenia had been irregular and rather scanty. For four years, from the time she was twenty-two until she was twenty-six, she suffered a great deal of pain in the right side of the abdomen. Two years ago she first noticed an enlargement in the abdomen a little to the right of the median line, and the past year she has had an increase of the pain, which has been almost constant and is more noticed for a week following the catamenia. She has never noticed any symptoms in connection with urination.

Examination showed that she was thin and pale, of a feeble muscular development. Nothing found in the chest. Examination of the abdomen when lying on the back showed a large, fluctuating mass in the right side extending up under the liver and going well down to the brim of the pelvis. When she stood up, this mass rested across the lower part of the abdomen just above the pelvis, and the region about the neighborhood of the liver was then empty.

¹ *Annales des Mal. des Organes Genito-Urinaires*, January, 1894.

The catamenial history had led to the diagnosis of an ovarian cyst, but the position of the tumor when she was on her back strongly suggested a hydronephrotic kidney. The examination of the urine was wholly negative. The great mobility of the tumor made it seem probable that if it were the kidney it must have a long meso-nephron, and there was danger that a puncture in the loin might traverse the peritoneal cavity. We thought it wise, therefore, to explore by an abdominal incision, which was done March 29th.

The tumor was found to be a large hydronephrotic kidney, which was extremely movable as had appeared by previous examination. With the hand in the abdomen guiding the aspiration, a needle was introduced through the loin and the sac entirely emptied. The abdominal wound was then closed. This operation was followed by no reaction, and the patient made a good recovery.

The examination of the fluid drawn gave the following result: It was of a pale, amber color, with a specific gravity of 1.007, and having a slight trace of albumin. The sediment consisted of brown, granular cells with occasional granular and fibrinous cylinders, like renal casts. The examination for urea showed that the fluid contained 1.01 per cent.

For at least a fortnight there was no sign of any refilling of the cyst, but at the end of that time the tumor began again to be noticeable in the loin. Examination of the urine soon after the operation gave a specific gravity of 1.020, a slight trace of albumin. In the sediment hyaline and granular casts, with fat adherent.

The patient was in a rather feeble condition during her convalescence, with edema of the ankles, which postponed further operative treatment. On May 7th, her condition being then pretty good, the kidney was opened in the loin, and after it was emptied the ureter could be seen emerging from the cyst by a funnel-shaped opening and running in a tortuous course downward towards the pelvis. There was no valvular appearance to the opening of the ureter, nor any condition which could be corrected by incision or other alteration of that orifice.

The mechanical condition which had led to the hydronephrosis appeared to be a twisting of the ureter at some point in its tortuous course, that point not being determinable after the sac was emptied

and the parts were lax. It being desirable, therefore, to efface, as far as possible, all of these abnormal twists and turns in the ureter, a gum-elastic bougie, about No. 6, French, was introduced and carried with some difficulty down through the ureter until it reached the neighborhood of the bladder. The sac was sewed to the edges of the wound through the muscles with continuous catgut. A drainage-tube was then introduced into the pelvis of the kidney, and the bougie was left *in situ*.

The recovery was rather slow, but, as far as the healing of the wound went, was uneventful. The bougie was removed at the end of three-and-a-half days, and the drainage-tube was out in nineteen days. There was a considerable escape of blood-stained urine through the tube, which was caught in a bottle and examined.

On May 8th the urine from the bladder had a specific gravity of 1.025 and contained an occasional pus cell and hyaline cast of large diameter. Twelve ounces were passed from the bladder, that is, from the left kidney, in this twenty-four hours.

May 11th (four days after operation). The urine draining from the loin had a specific gravity of 1.015, while that from the bladder had a specific gravity of 1.008.

May 13th. The urine draining from the loin and collected in a bottle measured eight ounces, some considerable quantity being lost in the dressings. It was cloudy with pus and blood, while the urine from the bladder was clear.

May 14th. The urine from the right kidney had a specific gravity of 1.010, while that from the left kidney through the bladder had a specific gravity of 1.008.

May 18th. The specific gravity of the fluid from both kidneys was the same, 1.010.

May 21st. The urine from the drain in the kidney contained 0.5 per cent. of urea; that from the bladder contained 1.39 per cent. of urea.

May 26th. The urine ceased to come through the wound, and the urine in the bladder began to contain a little blood and pus.

June 1st. The wound in the side having been drawn together on the previous day, there began to be pain in the abdomen, and on June 2d there was a chill and the temperature went to 105°. There was

soon an escape of urine and pus from the wound, and after this all went well. The sinus finally closed on June 21st.

The patient was seen and examined November 30, 1895. She had made a considerable gain in flesh and strength. She reported that in October she had an attack of dull pain in the right side, which lasted a week. The lumbar scar was solid. In the right renal region was an indefinite sense of resistance, but no defined tumor. The abdomen was so thin that any considerable enlargement could have been easily made out.

The examination of the urine at that time showed it to be acid, with a specific gravity of 1.017, and to contain no albumin. The sediment was considerable, and consisted mainly of vaginal cells and mucus with an occasional small round cell.

This case is interesting, first, because of the considerable degree of activity retained by a kidney so long affected by a very great dilatation. This is shown by the quantity and quality of the urine obtained through the loin, a quantity certainly underestimated owing to the necessary loss in the dressings.

The function of this organ was well worth retaining even had the operation required been as severe as that of nephrectomy. When we take into account the far greater safety of a nephrotomy, the argument in favor of the more conservative method is greatly strengthened. If nephrotomy is done first in these cases, we have the opportunity to do a nephrectomy later if the occasion requires.

The second point of interest is the success which attended the treatment of the ureter. The restoration of permeability of the canal which was accomplished by the bougie and assisted by the fixation of the sac in the loin, seems to have endured for a sufficient time since operation (seven months), to lead to the hope that it may prove permanent.

How far this method may be relied upon in these cases must be shown by the accumulation of experiences. Also, it will be interesting to see whether the valvular obstructions at the renal orifice of the ureter can likewise be corrected in this way.

Dr. Christian Fenger¹ in his published case mentioned above, left

¹ In a private letter Dr. Fenger writes me that he has left a bougie in place in three other cases of combined valve and stricture. In these cases the bougie

a bougie in the upper part of the ureter for two days. This he did "partly with the same object with which we pass a sound through a meatus which we have cut, to prevent healing with restoration of the part cut; partly to keep the narrowest portion (operation territory) dilated during the first twenty-four to forty-eight hours, during the time when hemorrhage might leave a clot around the ureter and compress it."

The experience in my case suggests a question as to how important a rôle the bougie played in bringing about the success of this case of Dr. Fenger's, and we are led to wonder whether, combined with fixation, it would have been efficacious even without the division of the valvular fold. Tuffier reports that he has cured nine cases of intermittent hydronephrosis by fixation of the movable kidney approximately in its normal position. Others have had similar favorable experiences showing that these valvular obstructions are not always difficult to correct.

was left in the upper four to six inches of the ureter for from two to four days. In none of the cases did it do any harm. Encouraged by this experience of Dr. Fenger's, I shall try to keep the bougie in the ureter for more than three days in my next case, in order more certainly to get the desired effect in straightening and establishing the patency of the canal.

OBSERVATIONS UPON STONE IN THE BLADDER; RECURRENCE OF STONE; CHOICE OF OPERATION.

THE cases which I have used in this study of the recurrence of stone in the bladder comprise all of those of which I have notes. I find in these notes that I have done one hundred and thirty-five operations upon one hundred and nineteen patients. These operations divide themselves into one hundred and fifteen litholapaxies with four deaths, Thirteen suprapubic lithotomies with four deaths. Three lateral lithotomies with no deaths. Two median lithotomies with one death. Two vaginal lithotomies with no death.

This list only includes cases of formal operation under anesthesia and takes no note of the many instances in which a crushing and pumping operation has been done with or without cocaine for the removal of small recurrent stones or for retained fragments.

Among these patients are two instances in which a uric-acid stone has re-formed in consequence of the persistence of the diathesis that led to its original formation. On one of these patients I operated twice and upon the other three times.

There are nineteen instances in which a phosphatic stone has appeared some months or years after the removal of a primary stone. In two or three instances the primary stone was a uric-acid calculus, in all other cases it was phosphatic.

In six of these cases the previous operation had been done by some other operator.

This recurrence of a phosphatic stone may be due to the persistently alkaline condition of the urine. Several instances of this sort have come to my notice, the most striking of which was a case of multiple calculi in which within a fortnight of a thorough washing out the bladder would again contain from fifty to one hundred little, separate, well-formed stones. This tendency was finally overcome by frequent pumping out of the calculi combined with medical treatment directed to making the urine acid. While phosphatic stones may occasionally

depend in this way simply on the condition of the urine, it is much more common to see them as the result of some local condition.

In two or three cases the recurrence may perhaps be regarded as the result of an incomplete operation, leaving a fragment to serve as a nucleus for a new stone. This accident has usually been avoided by care in washing out the bladder with the evacuator, ten days or a fortnight after the litholapaxy. In some such cases several washings have been necessary before the bladder was found to be entirely free from calcareous matter.

In one case, of a woman; the projection into the bladder of two stitches put in by two other surgeons for the closure of the opening made in doing a vaginal lithotomy led to the repeated recurrence of calculi until the stitches were found and removed.

In two cases sacculated stones which lay concealed in pockets in the vesical wall gave rise to repeated stone formation in the bladder cavity. The removal of the stones loose in the bladder was followed in each case by such a cessation of symptoms that the presence of the encapsulated calculus was not suspected, but it was finally found by a cystotomy done for the purpose of discovering the condition to which the recurrence of the stone was due.

Finally, certain local conditions of the bladder wall favor the formation of stone and lead to constant recurrences until they are removed.

It is notorious that tumors and granulating surfaces within the bladder are prone to be encrusted with salts. The crystallography of stone formation is interesting in connection with these cases of calcareous deposit on granulating surfaces.

The crystals that exist in the urine do not tend to cohere and form a stone except in the presence of albuminous material. Rainey showed many years ago that the presence of colloid or albuminoid substances in a solution causes crystalline materials to become spheroidal in shape and to coalesce in rounded form. This is the law of molecular coalescence which has a very decided bearing upon stone formation in the bladder.

As long as the urine is non-albuminous, crystals of uric acid or oxalate of lime may form in the urinary passages, be washed along and discharged with the urine without forming a stone. But when albu-

min is present, either in the pus thrown out in consequence of some irritation or in the serum exuding from a granulating surface, we have conditions favorable to "Molecular Coalescence."

The following case is an interesting illustration of this method of stone recurrence:

M. V. B. M., fifty years of age, came to see me in the autumn of 1894, with considerable irritation of the bladder for which he was using the catheter by a physician's advice. At this time the symptoms did not strongly suggest a stone and the searcher could not be introduced on account of the extreme sensitiveness of the neck of the bladder. Palliatives were advised with resort to an ether examination if the symptoms persisted. He was seen again nine months later and the symptoms were then so suggestive of stone that he was etherized and a soft stone was crushed and pumped out. This calculus was so small that it seemed as if it must have been of recent origin.

The operation was an easy one and during convalescence it was found that the bladder emptied itself almost completely at each urination. Six weeks after this operation the bladder was pumped out thoroughly without ether and a small amount of calcareous matter removed.

Five months later he again had symptoms of stone and another phosphatic stone was removed by litholapaxy. This operation was done at the Massachusetts General Hospital and he was kept in the hospital for more than three weeks, during which time his bladder was carefully pumped out several times and entirely cleared of calcareous matter. He went out with the urine clear and acid. Soon after, however, it became evident that the stone was forming again. The constant reappearance of phosphatic stones in a bladder which completely emptied itself and in a urine which was never excessively alkaline seemed to indicate that there was some special cause for the deposit of calcareous matter. The patient now decided to submit to a suprapubic cystotomy for the purpose of discovering and, if possible, relieving the condition that so favored the recurrence of stone formation.

The bladder was accordingly opened. Its wall was found in a tolerably healthy condition and the prostate was not markedly enlarged and the post-prostatic pouch was not deep. Just posterior to the prostate and midway between the ureteric orifices was a little prominent

tumor with a roughened surface somewhat encrusted with lime salts. This was seized with a pair of cutting forceps and easily removed. Examination of this tumor by Dr. W. F. Whitney showed it to be a little myoma with an ulcerated granulating surface.

Since that operation, done two years ago, there has been no return of stone formation, and the patient has now gone to the Arctic regions in command of a whaling ship.

The case was a striking one because the stone formed in an acid urine and in a bladder that emptied itself at each urination. These facts forced us quickly to the belief that some local condition was responsible.

In many cases of enlarged prostate we have a similar condition of ulceration on projecting outgrowths. I find among my cases five in which such a condition was demonstrated either by operation or autopsy. Doubtless other cases of recurrence were due to a like cause but were finally overcome by keeping the urine acid and by irrigation with solutions of nitrate of silver and nitric acid to favor healing of the ulcerated patches.

It has frequently been urged by advocates of cutting operations that recurrence of stone is especially prone to occur after litholapaxy owing to incompleteness in the operation. My experience does not coincide with this view; for the cases of recurrence after litholapaxy have with one or two exceptions, been shown to be due to a general diathesis or to the local conditions described above. The suprapubic operation, too, is far from being exempt from the opprobrium of failure to prevent recurrence of calculous formation. I have seen three instances of stone recurrence after suprapubic removal. One patient had an experience which was interesting in this connection. He had a stone removed suprapubically in 1892. He had a second stone removed by suprapubic incision in 1895. In 1896 he had a stone removed by litholapaxy, and after that he had small stones removed by Chismore's evacuating lithotrite without anesthesia about once in three months. He finally consented to have the bladder opened a third time for the removal of the third lobe, which was believed to be ulcerated. The condition suspected was found and removed, with relief from stone formation and also with restoration of the function of urination. This case has been reported at length elsewhere and only so much of it is repeated as has a bearing upon the question of stone formation.

The conclusion that I would draw from the study of these cases of recurrence is that the constant reappearance of a phosphatic stone in the bladder usually indicates the existence of some local cause which should be sought and removed.

The suprapubic route affords the best opportunity for inspection and for the operative treatment of any condition found. When that condition is an ulcerated projection from the prostate it should be thoroughly removed and the lower edge of the urethral opening should be so cut down as to bring it well to the floor of the bladder.

RATE AND CAUSES OF MORTALITY. CHOICE OF OPERATION.

It is also of interest to study in these cases the rate of mortality and the conditions under which death occurred. Comparative rates of mortality, however, cannot be judged, as the number of cases in which a cutting operation was done is small and the cases selected for lithotomy were, in several instances, in a serious condition, owing to prostatic obstruction and the advanced inflammatory conditions of the bladder and kidneys. The operation, too, was often not a simple cystotomy but included the removal of a portion of the prostate or the difficult extraction of an encysted calculus from its pocket.

The patients were as a rule old. The average age of those upon whom litholapaxy was done was sixty years and a month. This is calculated from ninety cases in which the age is recorded. My recollection of the cases in which the age was not recorded enables me to say with confidence that they would not have materially altered the average above obtained.

The average age of those subjected to suprapubic cystotomy was a little over sixty-two years.

Two of the four deaths after litholapaxy were due to pneumonia consequent upon a chronic bronchitis that existed at the time of the operation. These patients were feeble men, one sixty, the other sixty-nine years of age. The third patient was seventy-one years of age and had complete obstruction in the prostate, and the urine was suppressed, so that the contents of the bladder at the operation consisted almost wholly of stringy mucus, and he never secreted any urine after that time.

The fourth case was that of a woman sixty-two years of age. A

hard stone weighing a little over an ounce was removed by litholapaxy and at the same time some glands in the neck, which were extensively tuberculous, were curetted. The patient did very well for a time. The temperature fell to normal and recovery seemed assured, when she gradually began to fail and died six weeks after the operation, death being due rather to the tuberculosis than to the operation.

No one of these deaths can be directly ascribed to the operation. But even if they were all counted as deaths from litholapaxy the rate of mortality would be a little less than three and one-half per cent., which is very low considering the advanced age of the patients.

Certainly this experience justifies the feeling that litholapaxy is the operation of choice which can be offered to these patients as comparatively devoid of risk.

The suprapubic operation would then be reserved for those patients in whose bladders other conditions (foreign body, sacculated stone, ulcerating projections) exist which require an opening into the bladder for their proper treatment.

Of the four deaths after suprapubic cystotomy two occurred in old men of seventy-two and seventy-seven years, in whom a great diminution of urine existed at the time of operation and a progressive cessation of this function steadily progressed till the time of death.

One old man of seventy-two with an abundant urine of 1.005 specific gravity was operated by suprapubic section on account of sudden profuse hematuria. A very small stone was found and the bleeding was wholly stopped, but although the wound did extremely well he presently became mildly delirious and died uremic.

The last case was that of a man of sixty-one who had a sacculated bladder, two diverticula of which contained stones. These diverticula were on each side close to the ureteric orifices and so placed that the stones pressed upon the ureters and occluded them. One of these stones, which projected into the cavity of the bladder, was found and removed. The other one, which lay at the bottom of the deep, narrow pocket with a very minute opening into the bladder, was not found. This patient lived about a month after the operation and slowly died of suppression of urine due to pyelo-nephritis.

The death after median lithotomy was in the case of a very feeble man who had been leading a very exhausting life as a missionary in a hot

climate and who, on his voyage home, had a small stone become wedged in his prostatic urethra leading to great and constant tenesmus and much inflammation at the neck of the bladder. The operation really consisted rather in a prostatomy than a cystotomy, and the patient slowly died of septic conditions in the wound, probably started by the inflammatory conditions which existed before the operation.

All these deaths after cystotomy were in bad subjects and might, in almost every case, be said to have occurred in spite of the operation rather than in consequence of it. Still it is my feeling that two or perhaps three of these patients might have survived a litholapaxy had the operation been possible.

Some years ago I expressed the opinion that litholapaxy should be the operation of choice in the treatment of stone in the bladder and that a cutting operation should be resorted to only under special conditions, then enumerated, which made the crushing operation impossible or especially difficult and dangerous. My added experience of about one hundred cases confirms me in my feeling that litholapaxy is much the safest operation for the removal of stone and that it is usually competent to work a complete cure.

In cases where it fails of a cure a further search for the cause of repeated stone formation should be made—by suprapubic cystotomy when necessary. If before operation we have good evidence that a local condition exists which favors calcareous deposits this may be a sufficient reason for selecting a suprapubic operation at the outset. Certainly in a case of aggravated prostatic obstruction demanding relief from that condition a suprapubic operation is demanded, and the coincident presence of a stone, while aggravating the symptoms and increasing the need of relief, does not in any way affect our choice of operation, which is directed at the more important and fundamental condition.

ANOTHER SUCCESSFUL CASE OF URETERO-LITHOTOMY.*

In the *Boston Medical and Surgical Journal* for September 11, 1890, I reported a case of operation for the removal of a stone lodged in the middle portion of the ureter.

At that time a brief reference was made to another case in which a stone was removed from the lower portion of the ureter in a woman. As this stone was reached and removed in a manner not hitherto employed, so far as I can learn, I will give a more complete report of the case.

Mrs. S., a rather stout woman of thirty-nine, was seen by me, May 15, 1890, in consultation with Dr. J. L. Williams and Dr. W. A. Morris. She had for fifteen or sixteen years been subject to attacks of renal colic, always on the left side, and almost always followed by the passage of stones.

The last severe attack was in December, 1888, but since that time she had had a number of slight attacks during which she had passed twenty or more small stones. The attack in which I saw her began five or six weeks before my visit, and had continued ever since, with pain of varying intensity.

The urine was at times much diminished in quantity, and for several days before the consultation had been very scanty (from four to six ounces a day). It had, during this time, been loaded with urates. On that day it had become more abundant and less thick.

The patient had a good appearance, with moist tongue, quiet and steady pulse and normal temperature. She was perspiring rather freely.

The pain in the region of the left kidney, and running down towards the bladder, was intermittent and spasmodic in character.

* Read before the Boston Society for Medical Improvement, October 27, 1890.

In the left lumbar region was a distinct tumor about as large as two fists, which was sensitive to pressure. There was also a point of tenderness deep in the left side of the pelvis. By vaginal examination, a little hard mass was found in the left broad ligament close to the cervix uteri. This felt about as large as the last joint of the forefinger, and it was very sensitive to pressure. The palpation of it during the examination started a spasmodic pain in the left side, that had a bearing-down or expulsive character.

A sound introduced into the bladder could be carried to within about three-quarters of an inch of this little hard mass, but could not be brought in contact with it by the most careful bimanual manipulation.

Dr. Williams had examined Mrs. S. a few days before, and was sure that at that time this hard mass could not be felt. It therefore seemed that the calculus must have moved some distance down the ureter during the time that had elapsed since the examination.

In view of this fact, and also encouraged by the increase in the amount of urine in the preceding twenty-four hours, we decided to wait and see if nature, aided perhaps by manipulation with the finger per vaginam, would not be sufficient to propel the calculus into the bladder, from which it could be easily removed. Soon after this the husband of the patient was taken suddenly sick and died, and owing to the disturbance on this account, nothing was done or thought of for some time. Finally, towards the end of June, the patient entered the Massachusetts General Hospital for operation, if such seemed desirable.

On July 1st the calculus could be felt in exactly the same place where it had been detected by examination in May.

On July 4th the patient was etherized for operation. An incision was made over the calculus through the vault of the vagina just to the left of the cervix uteri. The calculus was easily reached, the grating of the knife upon it being distinctly felt during the first incision.

After the end which presented had been thoroughly uncovered, it was found that the rest of the calculus was so tightly grasped by the tissues about that it could not be easily extracted. In fact, the presenting end broke to pieces under the grasp of the forceps with which extraction was being attempted. After trying many manipulations in vain, a blunt hook was passed up alongside of the calculus into the ureter behind, then turned and hooked over the upper end, and traction with

this, aided with the finger pressing the tissues aside, finally accomplished the removal of the stone.

The moment it came there was a rush of pus from above. This pus was of ordinary thickness, apparently not much thinned by urine. Probably from ten to twelve ounces escaped. A T-shaped rubber tube was introduced into the ureter through the opening made. After the pus had fully escaped, the tumor in the abdomen was found to have disappeared. The patient made a good recovery, and the urine, which was very scanty just after the operation, gradually increased in quantity until it became sufficiently abundant. Drainage through the fistula was kept up for some time, and finally, when the drainage-tube was removed, there seemed to be no tendency for the opening to close, there being a constant, moderate discharge of pus through it. She recovered strength slowly, as is usual in those cases where the kidneys are seriously involved. She left the hospital on the 25th of July. She continued to gain strength after getting home, and finally was able to be about as usual, doing her ordinary work.

She was last heard from in November, 1890, and at that time there was still a fistula in the vagina, discharging a small amount of pus. No urine ever came through the fistula, showing that the long distension of the kidney during the complete stoppage of the ureter had sufficiently destroyed the cortex, to stop excretion. If at any time the escape of pus into the vagina becomes a serious annoyance, it can be stopped by the removal of what remains of the kidney.

The stone that was removed weighed one hundred and ninety grains. It was elongated, and evidently made up of two stones which had become attached together, as there were two nuclei, one at each end of it. This case shows that a calculus lodged in the lower part of the ureter in a woman can be safely reached through the vault of the vagina without injury to the peritoneal cavity. This is an important fact; for this lower end of the ureter, where it narrows just before entering the bladder, is a not uncommon point for the lodgment of a calculus.

PERSONAL EXPERIENCES IN MODERN OPERATIONS FOR THE RELIEF OF PROSTATIC OBSTRUCTION.

IN a paper written in 1896, at the request of the Executive Committee of the American Surgical Association, and read before their meeting at Detroit, I stated that I thought the time then too early for the formation of positive opinions as to the merits of the various operations for the relief of obstruction in cases of hypertrophied prostate. At that time the recorded cases were few, and many of them had been under observation for but a short time since operation, and conclusions as to the final result were often impossible.

It is this question as to the permanence of results which, next to the question of immediate mortality, has the greatest interest for us. To hasten the final correct solution of this question it is very desirable that surgeons dealing with this class of cases should put on record all observations coming within their opportunity, both of patients operated upon by them, and of those seen by them after operation by others. In this way only can we speedily accumulate the data necessary for a correct judgment.

This is my reason for presenting a short résumé of my own experience in this field of work. The present success that attends the use of our modern soft catheters in cases of prostatic obstruction has reduced the number of cases in which I have had to resort to operation to the few which follow:

SIX CASES OF PROSTATECTOMY.

CASE 1. — W. D. was seen by the writer in September, 1892, at which time he was sixty-five years of age. He was first troubled with frequent urination *thirteen years* before. Three years later he was forced to begin the catheter life, which had thus lasted for ten years. Within the year before he was seen he had begun to have a good deal of pain in the rectum and glans penis. At the same time the fre-

quency with which he had to use the catheter increased, so that for a short time before entrance he was drawing his water two or three times an hour. The urine was ammoniacal, and contained much roypus.

September 17, 1892, he was operated by suprapubic incision. The third lobe projected backward into the bladder, forming a tumor the size of a hen's egg, ulcerated on the surface. This was cut off level with the proper bladder face of the prostate. One month later the suprapubic opening was sufficiently closed to enable the patient to pass urine normally (the first time in ten years).

This patient has been seen at varying intervals since his recovery, the last time five years after operation. The urine has been passed completely by natural efforts, the frequency being from five to eight times in the twenty-four hours, and the urine has remained clear and acid.

CASE 2. — C. E. L. began to be troubled with pain in urination and with increased frequency in 1888 or 1889, at which time he was forty-six years of age. In 1891 he had retention after a long march with the Grand Army of the Republic. This was relieved by the catheter, but returned some days later and troubled him more and more until 1892, when he was obliged to establish the catheter life, after this time passing no water by the natural efforts. In 1895 he had symptoms of stone, and litholapaxy was done on May 23d of that year.

At this time rectal examination showed a prostate of moderate size. The litholapaxy afforded him some relief, but on May 4, 1896, he re-entered the hospital with pronounced symptoms of stone. He was advised now to have the stone removed by suprapubic incision in order that the prostate might be dealt with at the same time. Consenting to this, he was operated upon on May 6th. Four stones were removed, and it was found that the obstruction at the orifice of the urethra was due to large projections into the bladder from both lateral lobes. These were cut off with rongeur forceps, and were found to consist of prostatic tissue with dilated glands. Three weeks after operation the suprapubic wound was sufficiently closed to enable him to begin to pass water without the use of a catheter, and from that time on he passed the greater part of his urine in this way, using the catheter

about once a day in order to secure one thorough emptying of the bladder.

In January, 1897 (nine months after operation), he wrote that he was able to pass his water without the use of the catheter, but could not wholly empty the bladder. Some days he could very nearly do so; on other days he could not more than half empty the bladder naturally. He was then urinating about every two hours.

In May, 1898, he was again much troubled by pain and frequent urination. He re-entered the hospital, and a small stone was crushed and pumped out. After this he was again comfortable and was able to pass water with ease.

CASE 3.—H. T., seventy years old, was seen by the writer in 1896. He had been troubled with difficulty of passing water for the past ten years. Since 1887 he had depended wholly on the catheter. In 1886 he began to have pain and more frequent need for catheterization. At the time the prostate was large, hard, and irregular in shape. Examination under ether showed the presence of a stone, which was removed by litholapaxy. After several months, however, the pain began to return, and a suprapubic operation was done, five stones removed, and a ring of projections around the bladder end of the urethra was cut away. After this his pain was decidedly relieved, and he has had no recurrence of stone; but he still relies on the catheter to empty the bladder.

In this case of an old and frail man it was not deemed advisable to do an extensive operation on the prostate, and only the portions that projected into the bladder and were ulcerated were cut away. It was not expected that the power of urination would be restored, but the case is reported here in order that mention should be made of every operation of the nature of a prostatectomy done by the writer.

CASE 4.—W. T. D., sixty years of age at time of operation. Obstruction to urination and frequency began at fifty-five. The trouble was gradually progressive until at fifty-nine the patient suffered much with pain in the back and testes. A catheter was passed and drew about a pint of urine. For a year now he depended almost wholly on the catheter, passing practically no water by the natural efforts. At the end of this time, July 6, 1897, he had a sudden hemorrhage into the bladder. The clots were removed, and under constant drainage the bleeding stopped and the urine became clear and acid.

On July 13, 1897, a suprapubic cystotomy was done. The urethra was occluded by a third lobe, of considerable size, with projections also from both lateral lobes. All of these projecting masses were thoroughly removed with rongeur forceps. Hemorrhage was considerable, but was controlled. The bladder was drained by two tubes through the suprapubic wound. Recovery was uninterrupted and satisfactory.

As the suprapubic wound closed it was found that the patient had recovered the power of voluntary urination. Two months after operation he was urinating naturally every two to three and a half hours in the day, and was not up in the night, and the amount of residual urine was two ounces.

At the end of seven months he noticed that the urine came a little harder and the amount of residuum varied from three to six ounces. At this time a No. 30 French sound was passed.

On April 20, 1898, the patient wrote that he was holding his water all night after passing the catheter in the evening. The residual urine varied from two to six ounces. During the day, after passing the catheter in the morning, he held his water until noon and then passed it every two or three hours until bedtime.

CASE 5. — T. McC., sixty-eight years of age, entered the Massachusetts General Hospital March 17, 1898, having had difficulty in micturition for eighteen months. For a year he had depended entirely on the catheter. At the time of entrance he had a profuse hematuria. Examination showed an enlarged prostate, hard and somewhat irregular in shape.

A suprapubic incision was made on March 22, 1898. Upon opening the bladder much blood and many large clots escaped, and an ulcerated and projecting third lobe of the prostate was found. The patient being in a poor condition the bladder was packed with gauze and two drainage tubes were inserted. This effectually checked the hemorrhage.

On April 7, 1898, his condition being much improved, the wound was dilated and the enlarged third lobe of the prostate was cut away. Drainage was provided by two tubes. Convalescence was satisfactory. The suprapubic wound slowly contracted, and closed on May 16th. After this the patient passed urine freely by the natural efforts.

This patient was seen in August, 1898, and although he had considerable cystitis, the bladder completely emptied itself by the natural efforts.

CASE 6. — E. D. B., age fifty-eight, entered the Massachusetts General Hospital February 2, 1898. For nine years he had had frequent micturition and bladder tenesmus. On the advice of a physician he had used a catheter for over eight years, three or four times in the day and twice in the night, using a soft-rubber instrument. Several times within the past year he had found small stones in the eye of the catheter. He had also had hematuria several times.

He was operated upon February 5, 1898, by suprapubic incision. No stones were found in the bladder. The enlarged middle lobe of the prostate was cut out. Pathological examination of the fragments removed showed them to consist of dense fibrous tissue, in which were imbedded many large dilated gland acini. On March 10th the patient passed about four ounces of urine naturally. By March 16th the patient passed nearly all of his urine by the urethra and catheterized himself twice a day. When discharged on the 22d he was passing increasing amounts of urine daily, although a small amount still escaped by the suprapubic opening. Soon after getting home the suprapubic opening closed, and he began to pass all of his urine *per urethram*.

Mr. B. remained comfortable through the summer and autumn. As cold weather approached he began to suffer some discomfort in the bladder. Presently he began to pass a little gravel, and a small fistulous opening appeared in the suprapubic scar.

On March 6, 1899, several small phosphatic stones were crushed and pumped out. Immediately after this operation Mr. B. again became entirely comfortable.

FIVE CASES OF ORCHIDECTOMY.

CASE 7. — J. W., age seventy-five, had been troubled with difficulty of urination for five years. When seen by the writer in Dec., 1894, he was using the catheter regularly and was unable to pass water without it. At this time a stone was found in his bladder, which was removed by litholapaxy, and at the same time orchidectomy was done, with the hope of relieving the prostatic condition. This

operation was followed by a maniacal condition, which persisted for two months. He first passed water voluntarily forty-three days after operation. He gradually got better and left the hospital, passing a small part of his water himself, but requiring the use of a silver catheter for the removal of the greater part of it. He continued well for some little time, but toward the end of May he took a long ride in a carriage, which again started acute bladder irritation, and he gradually failed and died.

At the autopsy the prostate was found to be about the size of a hen's egg, and the third lobe about the size of a pullet's egg, projecting upward and backward into the bladder. On its apex was a calcareous deposit firmly adherent. In the post-prostatic pouch there was considerable fine calcareous gravel.

CASE 8. — J. E. S. was seventy years of age in May, 1893, when he was seen by the writer, who removed, by litholapxy, a phosphatic stone as large as a pigeon's egg. Previous to this operation the patient had used a catheter occasionally; after it he depended on the catheter for a time and then resumed urination by the ordinary efforts. In November, 1894, he was passing urine every hour in the day, then passing the catheter at bedtime and resting quietly all night. Residual urine at this time was about two ounces. During that winter, while in the South, his bladder was very troublesome, and he came north to seek relief from the cystitis.

In January, 1895, orchidectomy was done by Dr. Fowler, of Brooklyn. He made rather a tedious convalescence, but when seen by the writer again in July, 1896, he expressed himself as very comfortable. He was at this time passing water every one or two hours in the day. At night he slept until 4 A. M. The residual urine at this time was still two ounces, but the irritation was much less than formerly.

CASE 9. — T. O'B., sixty-seven years of age, first noticed difficulty of urination in the spring of 1895. Soon after this he began to have pain in connection with urination, and the urine six months later became muddy. The frequency of urination was constantly increasing, so that by May, 1896, he was passing water every twenty minutes, and was in a good deal of pain in the interval.

Examination showed a prostate the size of a lemon, hard but smooth. The bladder was distended so as to be felt as a tumor

reaching well up toward the umbilicus. The catheter drew fourteen ounces of residual and was then withdrawn, although the urine was still running steadily. His mental condition was dull.

On the sixth of May, under cocaine anesthesia, double orchidectomy was done. The cords were tied with animal tendon, but these ligatures slipped later in the day, and the wounds had to be opened and the cords tied with silk. Before these were secured he had bled considerably, but not excessively. For two days he was in a delirious condition, but then began to improve, and on the fourteenth (eight days after operation), showed decided improvement in urination, holding his water from three-quarters of an hour to an hour. Ten days after operation, examination of the prostate showed a very marked diminution in size, and the catheter drew but ten ounces of residual urine. A month later the residual urine had fallen to five ounces. He was then urinating ten or twelve times in the day and three times in the night.

In July the residual urine was only three and one-half ounces. In the middle of September it was only two ounces, and a little later there was only nine drachms. He was at this time passing water every two hours in the day and only up twice in the night. The prostate was at this time about the size of a pullet's egg, some portions of it being harder than others. It did not have, however, the nodularity of a malignant prostate.

In November, 1897, he re-entered the hospital in the service of Dr. J. C. Warren. He had then for six months been having more trouble with frequency and pain in urination, and the residual urine at this time was found to be seventeen ounces. He was much improved by his stay in the hospital, but at the end of eight days left, in consequence of trouble in his family, and has not been seen since.

CASE 10. — S. H. W., seventy-five years of age, was seen in October, 1894. At this time he had symptoms of stone, and by litholapaxy several uric-acid stones were removed. At this time urination was free, and there was little, if any, residual urine. The prostate was enlarged to the size of a pullet's egg. It was not tender to the touch and its surface was smooth.

Considerable discomfort in urination was felt through the years 1895 and 1896, and in the autumn of the latter year there was so much pain

that an ether examination was made to determine whether there was any recurrence of stone. Nothing was found, but following this exploration there was a rise of temperature, with pain and tenderness about the right kidney. A week later there was a complete stoppage of urine, requiring the systematic use of the catheter. The quantity of urine fell from one hundred ounces in the twenty-four hours to fifty ounces, and the patient's general condition being such as to excite apprehension, constant drainage through a catheter was established. There was now an immediate improvement, and the temperature soon fell to normal, the quantity of urine again rose to the neighborhood of one hundred ounces in the twenty-four hours, and the pus, which had been considerable in it, quickly disappeared.

One testicle was now removed under cocaine anesthesia, and a week later the other was similarly removed. The wounds healed quickly by first intention. On the day following the second operation the permanent catheter was removed and he passed a catheter about every two hours. At the end of five days he began to pass some urine by the natural efforts, and from this time he was able to partially relieve the bladder in this way. At the end of three weeks the amount of residuum was only half an ounce. He at this time urinated about once an hour.

Urination continues to be frequent and associated with some pain, but he has been much stronger and more comfortable since adopting the habit of wearing a soft-rubber catheter for constant drainage at night, so that his sleep is not disturbed.

CASE 11. — J. G. H., sixty-nine years of age, was seen in consultation with Dr. Lathrop, of Dover, N. H., May 28, 1898. For six months he had been troubled with frequency of urination — no pain. Latterly, the obstruction had become so great as to constitute serious difficulty in starting the stream, especially at night. On the morning of the day that I saw him Dr. Lathrop was obliged to draw the water for the first time, drawing one and one-half pints.

Examination showed the prostate enormously enlarged, extending beyond the reach of the finger and filling the pelvis from side to side. Its surface was smooth and regular, suggesting a condition of extreme hypertrophy. A soft-rubber catheter and a silk coudeé were both tried, but failed to pass. Orchidectomy was advised, on the ground

that the obstruction seemed to be from the lateral pressure on the urethra.

After the patient's return home he resumed spontaneous urination, which was accomplished, however, with considerable straining.

Two days later orchidectomy was done under cocaine anesthesia. Following this operation he had complete stoppage, and constant drainage was established through a catheter. Frequent efforts were made to dispense with this, but it was not possible to do so for more than three weeks. The power of urination was very slowly re-established, and during convalescence the symptoms pointed strongly to the existence of a subacute pyelitis.

Mr. H. was seen in August. He had recovered strength very slowly and was still feeble.

In October he was very weak and evidently failing. At this time Dr. Lathrop discovered a tumor pushing up out of the pelvis. The nature of this swelling was never positively settled, but Dr. Lathrop thought that it appeared like a new growth rather than a collection of pus or other fluid. The appearance of this tumor makes it probable that this was a case of malignant growth in or near the prostate, and this is good reason for the failure of the orchidectomy.

UNILATERAL ORCHIDECTOMY.

CASE 12. — A. L. began in 1890 to be troubled with considerable difficulty in urination, he at this time being about sixty-one years of age. Examination showed that residual urine to the amount of four ounces existed. Resort to the catheter led to some little irritation of the urethra, and after some trouble with cystitis it became necessary to permanently establish the catheter life. Since that time he has depended upon the catheter for passing the water.

In 1896, on returning from Europe, he took cold on board the steamer, and this was followed by inflammation and suppuration in both testes. The right testis quickly recovered on evacuation of the abscess. The left one became chronically inflamed and had to be removed. For a short time after this operation Mr. L. found himself able to pass an ounce or two of urine, but this power was soon again lost, and he returned to his catheter life as before. Since that time he has been in good health, having no inflammatory trouble with his bladder, and expressing himself as extremely well.

FOUR CASES OF ORCHIDECTOMY FOLLOWED LATER BY
PROSTATECTOMY.

CASE 13.—J. T. A., sixty-six years of age, in 1896 consulted me by the advice of Dr. J. M. T. Finney, of Baltimore. He first began to be troubled with difficulty of urination in 1890, and finally, in October, 1892, was obliged to adopt the permanent use of the catheter. In May, 1892, he was operated upon by Dr. W. S. Halsted, in Baltimore, for stone in the bladder, by suprapubic cystotomy. At this time Dr. Halsted found some outgrowth of the middle lobe of the prostate, the whole gland being considerably enlarged. In July, 1895, Mr. A., being again troubled with urinary irritation, applied to Dr. Gordon, of Portland, by whom he had an orchidectomy done. About a month later, a stone being discovered in his bladder, it was removed by suprapubic cystotomy. At this time, on opening the bladder, Dr. Gordon found the prostate much shrunken.

He was first seen by the writer June 19, 1896, at which time he was again suffering from symptoms of stone in the bladder. A searcher, being introduced, touched a stone. In using this instrument the prostatic urethra seemed long and rather rigid, so that it offered some resistance to its passage. At this time the prostate, with the finger in the rectum, seemed to be of moderate size, and had a firm resistance. The stone was removed by litholapaxy. For some months Mr. A. was comfortable, but then had a return of irritation, and again a small, soft calculus was crushed and pumped out. The next year this crushing and pumping out of calculous matter was repeated two or three times, and when it was evident that a strong tendency to the reformation of stone existed, the opinion was given Mr. A. that he had an ulcerated third lobe of the prostate upon which this calcareous matter was forming. He, however, preferred not to undergo a third suprapubic operation for its removal, and persisted in the plan of palliation, by the occasional removal of soft stones, until the autumn of 1897. He then decided to follow the writer's advice, and have a cutting operation done for the removal of the third lobe, and for this purpose consulted Dr. J. M. T. Finney, of the Johns Hopkins Hospital, as he preferred to have the operation done at home.

Dr. Finney wrote me later that he operated on October 15, 1897.

He found the middle lobe of the prostate about the size and shape of the last joint of his thumb. This covered the orifice of the urethra like a ball valve. It was ulcerated upon its upper or urethral surface, and had particles of calcareous material adherent. In the posterior cul-de-sac, which was rather deep, was perhaps a half ounce of sand and gravel. No stone of any size existed. The rest of the prostate had entirely atrophied, so that a finger in the rectum and a finger in the bladder appeared to have but the thickness of the bladder and rectal walls between them. Dr. Finney excised the middle lobe of the prostate flush with the bladder wall. The hemorrhage was slight and readily controlled by gauze packing. Recovery was uneventful, and since that operation Mr. A. has passed the greater part of his urine by the natural efforts. He says the expulsive action seems to be improving, but is not yet strong enough to enable him to thoroughly empty the bladder.

CASE 14. -- J. R., age sixty-seven, had had difficulty in micturition, and had used the catheter for three years. He then entered the Massachusetts General Hospital in September, 1895, and was operated upon by Dr. F. B. Harrington, who did a litholapaxy and double orchidectomy. He was much relieved by the operation, and partially regained the power of voluntary urination, still, however, requiring the catheter every four hours.

The prostate was not notably changed to the rectal touch when he left the hospital, one week after operation.

On May 11, 1896, he entered the hospital again, under the care of the writer, having had a gradual return of symptoms. He had then returned to the use of the catheter for three and a half months. For two months he had had considerable hematuria, and was then using the catheter every hour. The prostate was as large as a horse-chestnut. On May 13, 1896, a stone was found and crushed. After this operation the power of voluntary micturition was again partially regained.

He re-entered the hospital, for the third time, March 16, 1898, having been comfortable until five or six months previously, when he began to have pain, and again had to depend wholly on the catheter which he used every hour. At this time the bladder would hold only about two ounces. On March 19 the bladder was opened by suprapubic incision, but no stone was found. The prostate was not enlarged,

but across the urethral orifice there was a band of tissue, forming a bar at the neck of the bladder, which was cut away. Recovery from this operation was uneventful. The suprapubic wound soon closed, and the power of voluntary urination was almost wholly regained, the catheter when used occasionally showing only half an ounce of residual urine.

CASE 15. — J. B., seventy-seven years old. He had had difficulty of urination for six years, with burning and occasional passage of gravel. He had used a catheter for four years, and had been wholly dependent on its use for three years, passing it every two hours in the day and somewhat oftener at night. In October, 1898, double orchidectomy was done, and was followed by some relief of irritation, but without restoration of micturition.

He entered the Massachusetts General Hospital in April, 1898. Physical examination showed a much enlarged prostate. The urine was very scanty, foul smelling, and loaded with muco-pus. Mr. B. was a very sick man, with dry tongue, utter inability to take food, and the mental hebetude of a patient already uremic. On April 9, 1898, he was operated by a suprapubic incision. There was much hemorrhage from the bladder wall. Thirteen stones were removed, and a mass about the size of the last joint of the thumb, projecting from the prostate below the urethral opening, was cut away. Other smaller projections, encroaching on the prostatic urethra, were also removed.

The patient bore the operation well, but the urine remained scanty, and the evidences of uremia became more marked. He gradually failed, and died on the fourth day after the operation.

The masses removed from the prostate proved to be encapsulated firm tumors. On microscopical examination they showed a structure largely composed of muscular and fibrous tissue, in which were embedded irregularly-shaped spaces filled with epithelial cells of atypical forms.

The growths nowhere showed any infiltrating tendency. They seemed to be adenomatous in character, but one pathologist thought them carcinomatous.

Against this view was the fact that these little growths were scattered through the prostate, and in every instance were cleanly encapsulated, as carcinomata are not.

CASE 16. — Mr. T., sixty-eight years of age, had been troubled with urinary symptoms for ten years. He began the constant use of the catheter in 1895. In 1897 the symptoms became so severe that an operation was advised, and on the seventh of August, 1897, orchidectomy was done by Dr. J. W. Elliot, at the Massachusetts General Hospital. He was somewhat relieved of pain and irritation after this, but depended wholly on the catheter until September 26, 1897, when, after eating onions, he began to pass urine naturally. He now adopted an onion diet, and began to pass water quite freely, using the catheter but once a day.

In March, 1898, he again began to have pain and difficulty in urination. This increased through the spring, until in May he was confined to the bed with much pain and tenesmus. At this time he was seen by the writer in consultation with Dr. Jones, of Southboro. An operation was advised, acceded to, and the bladder was opened above the pubes. Below the urethral orifice, and to the left of it, were considerable projections, which were ulcerated and encrusted with lime salts. These were freely cut away, and some bits of calcareous matter that lay free in the vesical cavity were removed. Drainage was established above the pubes. The patient made a good recovery, as reported by Dr. Jones. The suprapubic tube was kept in, however, for six weeks, thus establishing a fistula that was slow to heal. When this finally closed, the power of voluntary urination was restored.

It is not my intention to offer any positive conclusions drawn from cases so few in number. It may be profitable, however, to make a brief résumé of the results, and to point out certain ideas suggested by them.

Of the cases of prostatectomy, eight (Nos. 1, 2, 4, 5, 6, 13, 14, 16) recovered the power of urination in a very satisfactory degree.

One (Case 3), upon whom a confessedly imperfect operation was done, did not recover the power of voluntary micturition, and one (Case 15), an old uremic man of seventy-seven, did not live long enough to decide this point.

Of the cases of orchidectomy, five (Nos. 8, 9, 10, 14 and 16) were more or less distinctly improved in the power of urination. Three of these (Nos. 9, 14 and 16) afterwards relapsed and showed as much obstruction as before the operation. In one case (No. 10), while the

power of expelling urine was restored, the intolerance of the bladder remained and the frequency of urination was excessive.

Three cases (Nos. 7, 13 and 15) obtained no relief from the obstruction after orchidectomy.

In one case (No. 11) the subsequent course seemed to show that a malignant growth existed in the prostate and that the case was, therefore, beyond the relief of any operation.

Perhaps the most interesting observation of all is that among these patients there are five (Cases 7, 13, 14, 15 and 16) in which an orchidectomy failed to satisfactorily relieve obstruction and in which the mechanical reason for this failure was afterwards investigated either by operation or autopsy.

In four of these cases (7, 13, 14 and 16) the obstruction was found to be due to outgrowth into the bladder, or across the urethral orifice, of prostatic tissue that was not removed by the shrinkage following the orchidectomy. In my paper before the American Surgical Association I suggested that cases of this sort were suitable for prostatectomy rather than for orchidectomy, and the experience of these cases bears out this assumption.

In Case 15 the obstruction was also found to be due to the encroachment on the urethra of little tumors in the prostate, which, not having shrunk after orchidectomy, were found and removed by the prostatectomy. While this case, then, is not properly to be included among those of hypertrophied prostate, in which orchidectomy failed of relief, it distinctly was a case which, having all the clinical aspects of hypertrophy, was suitable for prostatectomy and not for orchidectomy.

In three cases (13, 14 and 16) out of the four that had a prostatectomy after orchidectomy the restoration of function after the obstructing tissue was finally cut away was marked and satisfactory. The fourth patient (case 15), profoundly uremic before operation, died before the effect on urination was clear.

In my former paper another conclusion, drawn from a study of the statistics then available, was, that "the functional results of the two operations seem at present to be as nearly equal as possible, and the tendency to relapse shows itself in about the same proportion of cases after either operation."

This conclusion, which seemed true in the light of events up to 1896,

is not borne out by my personal experience as embodied in the above report.

My present feeling is, that prostatectomy offers a distinctly better prospect of relief than orchidectomy, and is especially applicable in the cases where the obstruction is due to the growth into the bladder of prostatic projections which encroach on the urethral orifice.

In Cases 3 and 4 it is probable that the result would have been better had the lateral lobes of the prostate been thoroughly removed, either through the bladder or by the perineal route in the manner advocated by Alexander.

