With the Compliments of the Author.

PAPERS UPON GENITO-URINARY SURGERY.

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

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DAVID CLAPP & SON.
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A CASE OF SEVERE AND THREATENING HEMATURIA FROM MOVABLE KIDNEY, WITH A DISCUSSION OF THE CAUSATION OF THIS CONDITION.[1]

It is not uncommon to see blood in the urine as a result of mobility of the kidney, but this blood is usually present in microscopical amount, rarely in such quantity as to give the urine a characteristic color.

A case in which the loss of blood from this cause reaches proportions to induce serious anemia is a great rarity, and it is on this account that the following case is reported:

Miss H., a spare woman of 43, was seen by the writer on April 6, 1901, in consultation with Dr. G. C. Howard. The patient remembered that in the past few years she had at times when tired noticed a dull pain in the abdomen. This was felt, she thinks, rather to the left of the median line. She had also during this period on several occasions seen a little blood in the urine. This condition was not persistent. The urine would be colored at one urination and the next time would be again clear. In December, 1900, she had hematuria lasting for two days. The urine during this attack was deeply colored, but did not contain clots. The urine was then clear to her observation until March 18, 1901, when the hematuria began again with considerable violence. The urine at first was bright red, but after the first few days became dark purple, almost black. It now also began to contain clots.

The patient was put in bed, and ergot and other hemostatics were administered, but the hemorrhage continued in unabating amount. An examination of the urine on April 6, 1901, showed a specific gravity of 1,012, and an alkaline reaction, between ½ and ¼% of albumin and a large sediment of normal blood, mucus and pus. At no time during this attack was there evidence of inflammation or much irritation in the bladder. The urine was passed about once in four hours in the day and about three times at night. The only discomfort experienced was during the passage of clots. Beside these local symptoms there had been a decided loss of appetite and the power to take food, while the strength had been steadily failing.

When I saw the patient on April 8 she was extremely pale and waxy in appearance, with a rapid, feeble pulse. She was propped up in a half-sitting position in bed. A bimanual examination of the pelvis was

[1] Read before the Clinical Meeting of the Massachusetts General Hospital Feb. 14, 1902.

negative. The bladder was carefully searched with a steel instrument, and between this searcher in the bladder and the finger in the vagina the posterior and lateral bladder walls were closely examined without the detection of any projecting vesical growth or, indeed, of any thickening of the bladder wall. This very thorough exploration caused no increase of the hemorrhage, nor did it change the urine by any brighter appearance of blood. The abdomen was thin, with no great rigidity of the wall, and at once the right kidney was felt, somewhat enlarged and in an abnormally low position. The lower pole of the organ reached to just above the brim of the pelvis and the upper pole was still covered by the edge of the liver and the ribs. The kidney was not very sensitive to pressure, although firm handling caused slight discomfort. It was not possible with moderate force to push the kidney up into place, and a persistent effort to accomplish this was not thought advisable lest some venous thrombus should be dislodged by such maneuvre.

In the absence of evidence pointing to any other explanation of the hematuria, it was believed to be due to the extreme congestion of the right kidney, caused by its downward displacement. It was further recognized that the patient's position in bed, half sitting and bending forward, favored the downward displacement and so tended to aggravate the congestion. It was further felt that the patient's extremely reduced condition was unfavorable for operation.

It was decided, for these reasons, to lower the patient's shoulders and to raise her hips so that the downward drag of the kidney should cease. If this measure failed, it was felt that an operation would have to be done as a final resort, in spite of the unpropitious condition of the patient. On the other hand, it was felt that if this change of position worked favorably and the loss of blood was stopped, that then the operation for fixation of the kidney could be done after the strength had been regained.

The patient was now laid flat upon the mattress and the foot of the bed was considerably raised. Dr. Howard subsequently wrote me that for thirty-six hours after I saw her there seemed to be rather more blood in the urine than before. At the end of forty-eight hours it showed a sensible diminution of blood, and a few hours later was wholly free from any red color. A considerable quantity of what appeared to be broken-down tissue had been noticed in the urine just before the hemorrhage ceased, and for two days thereafter the urine contained this fleshy material and much mucus. (Unfortunately, this material was accidentally thrown away without any microscopical examination. It seems probable, however, that it was decolorized blood clot mixed with mucus that had accumulated in the renal pelvis and escaped when the free flow through the ureter was re-established.) The urine then became quite clear with acid reaction. Specific gravity, 1.016, and a slight trace of

albumin. Three days later Dr. Howard allowed the bed to be lowered to a horizontal position for about four hours. On the following morning the blood had reappeared in the urine. From this time the position with raised feet and lowered head was maintained until early in May, when the patient, becoming very tired of the position, was allowed to sit bolstered up in bed for twenty minutes each day. The blood became at once noticeable in the urine, though in far less amount than before. From the time the bleeding ceased the patient began to rapidly gain strength and the appetite and digestion became satisfactory.

Finally, the patient became convinced that an operation for fixation of the kidney was necessary to enable her to get up with safety.

May 20, 1901, I saw her again at the Lawrence Hospital, which she entered for the operation. Under ether the kidney could be plainly felt projecting from beneath the ribs and reaching down to the level of the umbilicus. It was very much smaller than at my former examination, being now little, if at all larger than normal, and it could now be pushed quite easily into its proper position. An incision was made down along the outer edge of the quadratus lumborum muscle, exposing the kidney. The fat capsule was ample in size and scantily filled with fat. In it the kidney moved up and down freely. The surface of the kidney was of a milky color, owing to a very considerable thickening of the capsule proper. No further abnormality could be discovered. The thickened capsule was split along the convexity and slightly separated from the kidney. Its edges were then sewn tightly to the transversalis fascia with continuous stitches of chromicized catgut. The upper ends of these stitches were fixed in the fascia on the lower edge of the twelfth rib. The muscular layers were brought together with interrupted catgut stitches and the skin tightly closed with silkworm gut. Convalesence was uneventful. In a letter received from this patient on Feb. 4, 1902, she says: "I have not had any appearance of blood in the urine since the operation. I do not have any pain in the kidneys," but "have a dragging in the one that was operated on when I lie on my left side."

The condition in this case admits of no doubt. The position of the kidney at the first examination, the cessation of the hemorrhage after a favorable change of position, the renewed tendency to hemorrhage whenever a faulty position was resumed, and the final entire relief when the kidney was securely fastened in correct position, force one to believe that this was indeed a case of serious interference with the renal circulation due to the downward displacement of the kidney.

Many of the shorter treatises on this subject are wholly silent as to the occurrence of serious congestion from this cause, and even the more extensive monographs on the subject of movable kidney make very brief mention of the possibility of congestion being due to the interference with the vessels. Furthermore, when they mention it, they attribute this congestion to a twisting of the vessels; but the

present writer has yet to see the report of such a case in which it is made clear that any real twisting occurred.

The fact is, that little is known of the mechanism by which the circulation is obstructed in cases of movable kidney. It is a condition which does not lead to death, and during life the exact nature of the obstruction cannot be accurately studied. It is probable that it rarely depends upon real torsion of the vessels. Rotation of the kidney is an extremely infrequent condition. I have seen it but once, and that in a case where an attempt had already been made to fix the kidney. The lower pole of the kidney had been fixed and the torsion was caused by the falling downwards and forwards of the upper pole. In the vast majority of cases of movable kidney, the displacement is simply a slipping downward of the whole organ. When the downward drag begins to be really felt, it appears natural that it should produce more obstructive effect on the thin-walled vein, with its comparatively sluggish current, than on the thicker artery, with its vigorous flow. The anatomical arrangement, too, of the vessels in the right kidney is especially favorable to the production of congestion when the kidney slips downward, for on that side the vein is short, while the artery is long, coming from the aorta on the other side of the spine. Owing to this shortness of the vein, it feels the pull of the kidney, as it moves downward, before the longer artery does and in greater degree. Thus the return of the venous blood is interfered with before the arterial supply is materially affected, and the conditions are most favorable to a condition of active congestion. It would be interesting, in this connection, to have reports of any cases of pronounced congestion of the left kidney due to displacement. In the only case that the writer can recall of a left kidney that was noticeably enlarged in consequence of a displacement, it was believed that this enlargement was due rather to an intermittent hydronephrosis than to any especial congestion of the organ, and that belief was borne out by the immediate relief afforded by massage and replacement of the kidney in its proper position. In that case there was no appearance of blood in the urine to support the theory of any congestion.

Examination of literature on the subject confirms the impression that hemorrhage from this cause is a very rare condition. Rovsing[1]

[1] See British Medical Journal, Nov. 19, 1898.

reports a case of hemorrhage in a woman which appeared after lifting a heavy tub. Colon bacilli were found in the urine, and it was shown by examination that the bleeding was from the right ureter. The kidney was enlarged, rigid, and attached closely to the liver. The liver also showed a furrow which was believed to be due to tight lacing. Rovsing considered the bleeding in this case due to venous stasis by torsion of the pedicle in a misplaced kidney. The operation effected a cure.

In a rather hasty review of the literature on the subject, this is the only case which I have been able to find where the description of the condition is exact enough to convince one that it is really a hemorrhage due to a misplacement. The various textbooks on medicine and surgery are silent in regard to the occurrence of this condition. Morris, in his recent very complete consideration of the diseases of the kidney, mentions casually that blood shows itself very rarely in this condition, but makes no allusion to the possibility of so serious a congestion as is illustrated in the case just reported.

I have met with a number of cases of swollen and tender kidney in which the downward drag of the organ was the evident cause of the swelling. It is always difficult in such cases to accurately determine how far the swelling is due to congestion and how far it depends on an intermittent or temporary hydronephrosis caused by a kinking of the ureter. But the more I have seen these cases, the more clear I have been that congestion plays a large part in the production of the swelling.

It is plain that a kidney with short vessels would be quick to feel the effect of a downward pull, and in a kidney lying unusually high, it is conceivable that this pull might produce considerable obstruction to circulation before the organ came down low enough to be regarded as a movable kidney. Cases of hematuria are occasionally reported in which no cause can be discovered, and in which cutting down upon the kidney and splitting the capsule effects a cure. I have seen one or two such cases. May not some of them be instances of congestion from the downward drag which has not been recognized, but which has been corrected by the adhesions following the incision into the kidney?

This matter needs further study, and, unfortunately, the cases are

too rare to allow any one observer to have the opportunity to make an extensive study of them. It behooves, then, those seeing such cases to report them fully.

The improvement in the condition of the patient above described persisted for about a year after operation. She then began again to have discomfort in the kidney, and a surgeon in her native city, finding that it was still slightly movable, again fixed the kidney by operation. Since that time I have heard nothing.

Soon after this paper was read I met with another instance of this same condition. The history of this patient was as follows:

Mrs. F. A. K., a slight woman of 43, was seen by me on March 28, 1902, in consultation with Dr. Samuel Delano.

She has had one child, now 11 years of age. In June, 1899, she had some œdema of the eye-lids, but the urine which was examined was negative and gave no evidence of any disease of the kidneys. At that time she weighed 101 pounds.

One year ago she had menorrhagia for three months, and at this time she noticed, for the first time, blood in the urine.

Menstruation then became normal.

The hæmaturia was, at first, intermittent, but gradually became more and more frequent till it finally was constant.

The urine, at the time of consultation, was brownish in color, specific gravity, 1,017, with a large trace of albumen and much sediment, chiefly normal blood with many large epithelial cells and a little pus.

Examination of the bladder was negative.

The right kidney was enlarged and somewhat tender.

Its lower pole reached considerably below the umbilicus, while its upper pole was beneath the costal border.

April 8th, 1902, the patient entered a private hospital.

The twenty-four hours amount of urine was found to be diminished, varying between 28 and 16½ ounces.

April 14th, 1902, under ether anæsthesia an incision was made in the loin.

The fat capsule was found abnormally adherent to the kidney. After this was separated the kidney was lifted out of the wound, and, beyond a considerable furrowing of the surface, nothing abnormal about it was seen or felt. The capsule was divided along the convexity and stripped back for about an inch on each side of the incision.

The edges of the capsule were then attached to lumbar fascia with chromic catgut. The wound was closed in layers with catgut, the skin being united with silk-worm gut.

On the day following operation the amount of blood in the urine was increased. From this time it steadily diminished till at the end of two weeks it had disappeared.

The daily amount of urine increased after operation, and after the fourteenth day it was normal.

The patient was kept on her back for three weeks and was then gradually got out of bed.

Convalescence was satisfactory with a normal temperature throughout.

Some time after she went home, on her climbing through a fence, requiring a violent and awkward stooping position, she had pain in her side and soon after passed blood. This did not, however, persist.

She had following this, some discomfort, and I examined her on Oct. 5, 1902.

I found the kidney low, and still slightly movable. The space between the edge of the ribs and the spine was very narrow, due to the pressure of the corsets which she was again wearing.

I advised her leaving off the corsets, and suggested further operation in case the discomforts were not relieved by so doing. Since then I have not seen her.

It was unfortunate that both of these operations were done at a time when I was fixing the kidney hy a method which has not given good results in my hands and which I soon after abandoned.

In these particular cases the capsule was split because it seemed as if relief of pressure in the congested kidney might be also of importance.

IDIOPATHIC ABSCESS OF THE KIDNEY.[1]

Abscess formation in the kidney may come about in a variety of ways.

(1) It may be due to injury. When the injury is of a perforating character the infection may reach the kidney from without, or from some wounded coil of intestine. Occasionally an injury which does not open communication between the kidney and some infected area causes an abscess; and this comes about by the conveyance of infection through the blood channels. The injury, by bruising and lowering the vitality of the tissues, furnishes a nidus in which micro-organisms circulating in the blood may find an opportunity for growth.

(2) An abscess may be induced in the kidney by the direct extension of inflammation from contiguous parts.

(3) An inflammation in the pelvis of the kidney often extends through the urinary tubules into the substance of the organ, and in this way abscesses of greater or less size may arise. The pyelitis which in this way precedes a pyelonephritis may be a primary affection, or may be secondary to inflammations in the lower urinary tract. Such extensions of inflammatory processes through the urinary passages make an interesting chapter in the study of renal disease.

I pass over these three most common methods of origin of renal abscess with a mere mention, because I wish to devote this short paper to a consideration of the fourth method of kidney infection, namely, through the blood.

Suppurative inflammations induced in the kidney by organisms brought to that organ by the blood are extremely rare, if we except those abscesses which result from the action of tubercle bacilli. These also I leave at one side. For the subject of genito-urinary tuberculosis is a large one, and a consideration of it here would completely over-

[1] Read before the Boston Society for Medical Improvement, March 4, 1901.

shadow the subject to which I now especially wish to draw your attention, which is the acute idiopathic abscess of the kidney, dependent upon the action of some of the more properly pus-producing organisms.

The parasites that we have especially to consider in this connection are the streptococcus, the staphylococcus pyogenes aureus, the bacterium coli commune, the pneumococcus and the typhoid bacillus. All of these micro-organisms circulate freely in the blood, and probably most of them are eliminated in some degree by the kidneys. That this is the fact in regard to the typhoid bacillus has been abundantly shown. The infection of the kidney probably comes about as a so-called terminal infection, in which little capillary tufts are plugged by emboli containing the micro-organisms. The greater number of cases of this sort occur in the course of general infections, such as pyemia and septicemia, when abundant infective material is circulating through the vessels. Infections arising in this way usually occur towards the end of life, and both kidneys are usually involved. The depressant effect of the toxins in the blood diminishes the force of the circulation, and thus enfeebles the nutrition of the tissues and makes them less resistant to the invasion of micro-organisms. The functional activity of the kidneys is also interfered with, so that the bacteria are less rapidly eliminated through the capillary loops. Conditions are thus favorable for a clogging of fine vessels and an infection of the tissues about.

The direct implantation of infective material in the kidneys is made still more easy where the heart is involved in the septic process. An ulcerative endocarditis throws into the circulation little septic clots which are too large to pass vessels even larger than capillaries, and wherever these lodge an abscess is pretty sure to form.

In all of these forms of inflammation the renal suppuration is secondary, and a primary ulcerative process is to be sought for, from which the general infection has been started. It is usual in these cases to find abscesses in both kidneys, and not infrequently in other of the parenchymatous organs. As death usually results in such conditions, the pathological nature of the process has been thoroughly studied and is well understood.

While the above is an accurate statement of the usual course and character of these infective, metastatic processes in the kidney, it

sometimes, though rarely, happens that an abscess or abscesses which are probably metastatic in origin occur in but one kidney. Instances of this sort are on record in which, death resulting, no source of infection could be found, and in which, therefore, it was once customary to regard the abscess as idiopathic in character.

The cases so interpreted, however, occurred at a time when pathological examinations were less searching than at present, and it is reasonable to suppose that small points of infection in the intestinal mucous membrane or elsewhere might well have been overlooked.

After having thus glanced over the pathology of such cases, I wish to report an observation of a patient affected by an extremely septic process of one kidney in which the infection was due to a pure culture of colon bacillus. The case is interesting, both on account of the rarity of the process, and also because it illustrates the occasional success of active surgical interference in such conditions.

R. A. R., thirty-one years of age, was seen by the writer on May 22, 1900, in consultation with Dr. W. O. Hunt, of Newtonville. The patient enjoyed good health up to the previous February, when he had a chill followed by moderate fever. He had at this time pain in the back, running down into the back of the left thigh. After two days spent in bed, the temperature became normal and the pain disappeared, and he was quickly in his usual state of health. On the 13th of May he was seized with pain in the back, mostly on the right side. This pain presently radiated down into the groin and testis. It was of a severity to require mild opiates for its relief. He had a moderate chill at this time, but was unaware of fever until the 17th of May, when he began to have high fever accompanied by vomiting. Dr. Hunt was now called, and he found the patient mildly delirious with frequently recurring chills, the temperature jumping from 97° F. to about 103.8° F. An examination of the urine showed it to contain albumin and pus in a moderate amount. For twenty-four hours before the consultation he had had no chills, but the ups and downs in temperature had continued. Upon examination, the right kidney was found to be enlarged and tender, the spot of acutest tenderness being in the back. Nothing abnormal could be detected elsewhere by physical examination. The diagnosis of an acute septic inflammation of the right kidney was made, and operation was advised. In order to carry out this recommendation the patient was removed to the Massachusetts General Hospital.

Examination of the urine at this time showed it to have a specific gravity of 1.017, and to contain a considerable sediment of pus and some blood.

On May 23d the patient was etherized and an incision was made in the lumbar region over the point of greatest tenderness, just outside the quadratus lumborum muscle. On opening the fat capsule the tissues within were found to be edematous, and on reaching the kidney a prominent soft area was found, which being incised gave exit to considerable quantity of blood-stained pus. The finger introduced into this cavity broke through softened tissue into what appeared to be the pelvis of the kidney. Another similar abscess was found and opened in the upper part of the kidney. Drainage tubes were introduced into both cavities, and the wound was packed rather snugly to check the hemorrhage which was considerable.

Cultures taken during the operation showed the pus to contain a pure culture of bacillus coli communis. This operation was followed by immediate improvement, but the temperature remained irregular for almost a month. The patient showed but moderate powers of recuperation, and his recovery of strength was slow. On July 18th he reported at the hospital with the wound entirely healed, and his general condition greatly improved. No examination of the urine was obtained at this time, but he had no symptoms indicating any persisting inflammatory condition.

He was heard from again in January, 1901, when his health was excellent.

The recovery of this patient precludes the possibility of knowing the precise manner in which the infection occurred. There was no evidence to indicate a probable primary source of infection. In the absence of any external lesion, through which micro-organisms might enter the circulation, it is plain that we must suspect the alimentary canal of having afforded somewhere a weak spot through which the colon bacilli effected an entrance into the blood vessels. Such an explanation is in accord with previously observed facts.

In regard to the treatment of such conditions there seems little or no room for difference of opinion. When the diagnosis of an acute septic process in the kidney is established, the evacuation of the pus should follow close upon the conviction of its existence.

In the presence of chills, high and variable temperature and delirium, together with the local symptoms of pain in the renal region, and with a swollen and very sensitive kidney to be felt, the diagnosis is not difficult. In most cases an examination of the urine gives confirmatory evidence by showing the presence of pus and a small amount of blood in the urinary sediment.

If an abscess has broken into the renal pelvis the amount of pus in the urine may be very great. The only conditions which may be confounded with this are: (1) An acute exacerbation of inflammation in a tuberculous kidney; (2) an acutely inflamed calculous kidney; and (3) a congested and hydronephrotic kidney due to mobility.

In either of the first two conditions there is usually a history of long-standing trouble. We cannot, however, rely wholly on this probability, for renal tuberculosis and calculus may be very insidious in their early stages. It is, however, extremely rare to see them take on sudden exacerbations of inflammation unless instrumentation has introduced a mixed infection into the urinary passages.

It may occasionally happen that an extremely congested and swollen movable kidney gives rise to symptoms closely simulating the above without the formation of pus.

I have, in a number of instances, seen the kidney enlarged and painful with an accompanying fever, and with nausea and vomiting, where the condition was shown to be an intermittent hydronephrosis with acute congestion. In one such case, of which I have full notes, the fever was quite high for ten days, often reaching 103° F. at night. Finally aspiration of the kidney was done to clear up the diagnosis. About an ounce of urine came at first, and then the needle drew only blood. This exploration was followed by an immediate improvement in symptoms, and convalescence was quickly established.

In every case of doubt it seems to me justifiable to explore the kidney by an incision. If an abscess is not found, but only a tense, congested kidney, an incision of the capsule along the convexity will afford, usually, great relief. If there is any question of the existence of a calculus the exploratory incision will afford opportunity for a thorough search and for the removal of the stone if one is found. If the kidney is movable and suffering from congestion or intermittent hydronephrosis, induced by the obstruction of the vessels and ureter, it can be drawn up and stitched in the loin.

Thus the operation offers promise of relief in each and every one of the conditions which is likely to give rise to similar symptoms. It has little or no danger attaching to it, and if an abscess is found, the operation done early will stand a far better chance of cutting short the septic process than it would if it were kept as a last resort.

THE SURGERY OF RENAL AND URETERAL CALCULI.

THE following notes are put together as a record of personal experience in the study and treatment of ureteral calculi.

The great majority of stones that escape from the pelvis of the kidney find their way down through the ureter and finally reach the bladder. The pressure of the urine behind them and the peristaltic movements of the ureter itself contribute to this result. With healthy organs, the stone, if not too large, is usually carried along in this way and finally discharged. The successful progress of a stone down the canal may, however, be arrested in a variety of ways. Such arrest may be due to peculiarities in the stone, to abnormal conditions in the canal, or to a cessation of the flow of urine.

Arrest due to the stone: It is readily understood that a comparatively smooth, rounded stone will be carried along the ureter more easily than a rough irregular stone. The rough stone clings to the ureteral walls by its projections and is harder to push along. Also, by reason of its irregularity of shape, it does not fill the canal so exactly as a rounded stone and does not so completely dam back the urine, but allows of leakage alongside it. The pressure behind it can never then be very great and thus the principal force favoring its expulsion is in great measure nullified. The size of a stone must also play a considerable part in causing its arrest. It is, however, a curious fact that a patient subject to attacks of renal colic will sometimes have a very hard time with a small stone and later will pass a much larger stone with comparative ease.

Conditions in ureter favoring arrest of calculi : Points of physiological narrowing exist in the ureter, and of these the most notable and constant is at the extreme lower end where it passes through the bladder wall. There is also a slight narrowing of the uterer at the brim of the pelvis and another at a point just below the kidney.

Organic strictures occur in the ureter. The irritation of the passage of calculi is one of the more potent causes of their formation. If a patient has had previous attacks of renal colic, particularly if in any of them the stone was arrested for a considerable time at one point, the existence of a stricture may be suspected at that point, and the arrest of a subsequent stone in that part of the ureter is likely to be permanent unless relieved by operation. Such strictures are likely to occur at points of physiological narrowing because it is at those places that stones are likely to be arrested and to cause peri-ureteral inflammation.

Conditions in the kidney favoring the arrest of calculi: There are, finally, certain conditions of the kidney which make the arrest of a calculus in the ureter more probable. Any condition which diminishes renal activity makes that kidney more liable to arrest of function under reflex or other irritation. It occasionally happens, therefore, that when the ureter is stopped by a stone, the kidney instead of continuing excretion and supplying urine to wash the stone forward suffers an arrest of excretion, and the pressure from behind entirely ceases. The cases in which we are immediately aware of this cessation of function are those in which there is but one kidney. When it stops work, complete anuria results.

When two kidneys are present, it is difficult to tell to what extent the function of the affected kidney is interfered with, but *a priori* it is to be supposed that excretion is often to a great extent inhibited in the kidney whose ureter is stopped or partially obstructed by a stone. I know of no case in which this question has been studied by ureteral catheterization or by segregation of the urines from the two kidneys. Similar inhibition of function is noticed experimentally when the ureter is closed in other ways. This cessation of excretion is more likely to occur in a kidney that is already partially disabled by disease. Kidneys that have long been afflicted with calculous pyelitis are, therefore, in a condition to have their function easily inhibited.

It is probable, then, that cessation of function in the afflicted kidney plays a considerable part in bringing about the arrest of a stone in the ureter.

I have notes of nine cases of ureteral calculus. In all of them the stone was so fixed in the ureter that it was quite evidently hopeless to

expect it to be moved along by natural forces. These cases may be classified by location of the stone.

At junction of upper and middle thirds of ureter, one case.

CASE I.—The patient was a young man.[1] The stone was the size of an orange seed with a rough surface. The pain was so great that the patient was rapidly becoming exhausted. The stone was removed through a lumbar incision. Ureter not satured, but quickly closed. Recovery uneventful.

In the lower part of the middle third of ureter, two cases.

One in a young man and the other in an old broken man. In both of them the stone remained fixed for a long time and in both of them the uterer finally gave way and an abscess was formed in the peri-ureteral tissues.

CASE II.—In the younger patient, the abscess extended upward behind the peritoneum and burst into the pleura. At this time I saw him in consultation, but he was already moribund. The autopsy revealed the above described condition.

CASE III.—In the older patient, I opened the abscess in the loin. The stone was not found at that time, but was discharged subsequently. The abscess closed down to a sinus which persisted until the patient's death some months later.

In the lower third of the ureter, six cases.

CASE IV.—In one case, that of a middle-aged woman,[2] the stone, a large one (190 grs.), was arrested about one and a half inches above the bladder. It was removed through an incision in the vault of the vagina and the patient made a good recovery. At that time I showed by dissection that the lower end of the ureter for about two inches could be reached through the vagina without injury to the peritoneum. This fact has since been confirmed by other operators.

CASE V.—In another case, likewise in a woman, the stone was lodged in the orifice of the ureter and projected into the bladder. It was removed by the finger introduced into the bladder through an opening in the vesico-vaginal septum. This stone was very irregular in shape with three branches, one of which was engaged in the ureter and the other two projected into the bladder. The patient gave a history of having previously passed a stone similar in shape, but somewhat smaller than this one.

In the other cases the stones were not accurately located.

[1] Reported in Boston Medical and Surgical Journal, Sept. 11, 1890.
[2] Reported in Boston Medical and Surgical Journal, Dec. 25, 1890.

In two of them the stoppage was so complete that the patients were suffering from anuria when seen. These cases have been fully reported.[1] Suffice it to recall here the fact that in both the stones were very small (estimated 5 or 6 grs.) and that they were dislodged by manipulations along the ureter in search of them.

CASE VI.—These manipulations in one case involved a median laparotomy and a lumbar incision through which the left ureter was explored bimanually.

CASE VII.—In the other case, a long lumbar incision extending down inside of the anterior superior spine of the ilium permitted of very thorough exploration.

The relief of anuria was immediate in both cases and the impression was that in each the stone had been caught at the intravesical orifice of the ureter and had been dislodged by the milking of the canal incident to our manipulations. Both of these stones were recovered from the bladder with litholapaxy pump.

CASE VIII.—The patient was the same old man (Case VI) upon whom I had, some months before, done a median laparotomy in search of the stone which was causing his complete anuria of eight days' standing. He had on this second occasion evidence of another stone arrested in the left ureter. This time it had not stopped the flow of urine.

Remembering the good effect of manipulation in the previous attack, I made vigorous massage from above downward along the line of the ureter. From that time his pain ceased and he shortly passed a stone considerably larger than the one that had caused the anuria.

CASE IX was that of a lady whom I saw in consultation. She had had one kidney removed and some years later, complete anuria had supervened with symptoms of calculus. The attendant surgeon examining felt a little mass through the vault of the vagina. He pressed and examined this with considerable force. A little later examining, he could not feel it. From that time the flow of urine re-established itself and she presently passed a little stone.

The experience of the above cases teaches that the extreme lower end of the ureter is the point where stones are arrested most frequently. When a stone is caught at this point, there is a considerable chance of dislodging it by manipulation. The ureter should in such cases be stripped from above downward as thoroughly as possible. In a thin person, this can be done through the abdominal wall with considerable effect. In a woman, vaginal manipulation of the lower end of the

[1] Annals of Surgery, May, 1903.

ureter should also be thoroughly done and in a man the rectal touch should also be essayed. It is very difficult, however, except in the thinnest subjects to reach the rectal wall above the ureteric orifices.

The two cases in which abscesses formed illustrate the danger of letting a stone remain too long. It is, nevertheless, true that cases have been frequently observed in which stones have remained fixed in the ureter for years without ulcerating through and leading to an abscess.

If a stone in the ureter cannot be dislodged by manipulation over the ureter, it must be reached in some other way. If it projects into the bladder it may be approached through that viscus. A cystoscopic examination may give valuable information as to how this can be accomplished. Young succeeded in loosening such a stone with the ureteric catheter introduced through the cystoscope.

Lewis[1] reports the passage of small stones from the ureter after uretero-catheterization, in which he thought that the catheterization and irrigation of the ureter contributed to this result.

In a case observed by me the patient, a physician, had had symptoms of stone in the left ureter for some days. With the cystoscope I saw that while the orifice of the right ureter was normal in every way that of the left was somewhat reddened, swollen and pouting and opened at the apex of a considerable projection on the vesical wall.

The patient was unable to wait at that time for an X-ray to determine the size and exact location of the stone, but arranged for this two days later.

At that time he came in with the stone in his hand. It was a little rough uric acid stone and had been passed the day after my examination.

Had I used the ureter catheter some claim might have been made that this had assisted in the passage of the stone. My own belief is that the manipulations over the ureter during examination may have helped the stone along. This deep massage was thoroughly made with intent to push the stone forward.

A stone projecting considerably into the bladder, but too firmly held to be dislodged by the ureter catheter, might be detached by

[1] American Journal of Urology.

other firmer instruments introduced through the urethra. An attempt to accomplish this in the male bladder may be made with the lithotrite with some little hope of success. Freyer reports such a case.

In the female bladder such an attempt might be reasonably expected to succeed. A pair of dressing forceps introduced through the urethra can be easily manipulated over the floor of the bladder and with a finger in the vagina to give counter pressure, minute objects can be picked off of the bladder wall. I have never used this maneuvre on ureter stones, but have thus removed a silver wire projecting into the vesical cavity. It was one of the stitches used previously by another surgeon in closing a vesico-vaginal opening. It had acted as a nucleus for a successive re-formation of stones until it was thus discovered and removed.

In Case V. I have little doubt that I could have removed the stone in this way had I realized its exact situation. Through a good-sized open cystoscopic tube also, such a stone could be readily approached in the female bladder. If manipulations through the urethra fail, the bladder can be opened suprapubically and the stone can be readily handled under the guidance of the eye. In the female an opening through the vesico-vaginal septum can be used for this purpose as was done in Case V. A stone somewhat higher up, which does not project into the bladder, must be approached from the outside. In the female, the vagina affords access to this part of the ureter, as was shown in Case IV. Since that case was published, Garceau, finding a stone in this part of the ureter difficult of access through his vaginal incision, opened the anterior cul-de-sac and with a finger through this opening pressed the stone down to where it could be reached and removed.

In the male, this lower part of the ureter is very difficult to reach. Young collected six cases from the literature of the subject in which stones in this part of the canal were removed through an extra-peritoneal incision and adds one case of his own, making seven cases in which this method was successfully used.

In a former paper, I suggested that stones might be removed from this part of the canal through a posterior opening like that used for removal of rectal cancer (Kraske). I established by dissection on the cadaver the possibility of exposing the ureter through this incision.

I have operated once upon a seminal vesicle through a Kraske

opening. At this operation, I found that the bleeding from the hemorrhoidal vessels was difficult to control and obscured the deep field of operation. It would seem, then, that the iliac incision is better adapted for operating effectively on this part of the ureter.

Stones in any part of the ureter above this point are readily reached through Israel's incision. This incision commences at the anterior edge of the sacro-lumbar mass of muscles, a finger's breadth below the twelfth rib, the cut is to be carried parallel to the rib as far as its tip. It then turns down towards the middle of Poupart's ligament until the line of usual incision for tying the iliac artery is reached, then turning towards the middle line, and ending on the external border of the rectus muscle. According to the seat of the calculus, the opening will be made on the posterior, middle or anterior third of this line.

The X-ray is a valuable method for determining the exact locality of a stone in the ureter. I have not had the opportunity to use it in any of my own cases, as it was not in use or available at the time I saw them. I have used it with good effect in the diagnosis of kidney stones and have seen it give good results in the localization of ureter stones in the practice of other surgeons. Most of my cases occurred also before the perfection of the cystoscope made it an available aid in diagnosis. Its value cannot be over-estimated, and while I now constantly use it in suspicious cases, I have not yet had the good fortune to locate a ureter stone by its aid.

A CONTRIBUTION TO THE STUDY OF HYDRONEPHROSIS.

MUCH confusion still exists in the minds of the profession as to the relations of false and true hydronephrosis. This study of personal cases is offered as a contribution towards a right understanding of these wholly distinct and different conditions which closely resemble each other clinically.

In true hydronephrosis the sac which contains the fluid is the distended pelvis of the kidney, and as the internal pressure increases, the parenchyma of the kidney becomes stretched and thinned, forming sometimes no inconsiderable part of the wall of the cavity.

In false hydronephrosis the fluid is contained in a sac outside the kidney.

The site of this collection of fluid exactly corresponds to the position of a hydronephrotic kidney and may lead to a mistaken diagnosis. So close is the similarity, in size, position, consistency and mobility that no case of traumatic hydronephrosis can be accepted as an instance of true hydronephrosis unless proved by dissection in operation or autopsy.

In the Boston Medical and Surgical Journal, February 22d, 1883, I reported a case of traumatic hydronephrosis which at the time I believed to be an example of true hydronephrosis brought about by some temporary stoppage of the ureter by blood clot or otherwise, due to the trauma. I wish now to review that case and to correct the mistake made in my original report of it.

CASE I. The patient was a boy of ten, who, three months before, had fallen down stairs and immediately after had passed bloody urine. Following this accident a tumor formed in the left renal region, was several times aspirated and a urinous fluid obtained. As it constantly refilled after aspiration an incision was made into it. The cyst wall was found immediately beneath the muscles. "The finger passed into the cavity felt" what I described in my report as "a soft nodular mass, probably the kidney, in the posterior part of the cyst." Drainage was introduced and as the boy made a quick and complete recovery no further examination of the condition was possible.

I supposed at the time that the sac opened was a greatly dilated renal pelvis and that the kidney was felt from the inside, as it were. This explanation never fully satisfied me, for the mass which was in the proper location for the kidney projected into an otherwise smooth-walled globular cavity; whereas in true hydronephrosis the distended kidney forms, as I have said, a part of the wall of the cavity and the only projections from it are the flattened papillæ and the walls separating the different calices which stand out and give that portion of the sac a multilocular arrangement.

Subsequent experience has convinced me that this mass was indeed the kidney (felt from the outside) which had been ruptured by the trauma, and that the cavity which I took, at the time, for a greatly dilated renal pelvis was an extra-renal cavity in which the urine was confined after its escape from a rent in the renal pelvis.

False hydronephrosis of this sort was not a well recognized condition at the time of my first experience with it. Since that time it has been somewhat investigated and is now better understood.

In many cases of renal contusion or rupture, a tumor is to be felt occupying the site of the kidney and extending down well towards the brim of the pelvis. This tumor is produced by an effusion of blood about the kidney. When the laceration of the kidney opens its pelvis this effusion contains urine, as well as blood.

Writing in 1901 Morris says, "The most characteristic effect of rupture into the pelvis of the kidney is extravasation of urine. This takes place principally in the neighborhood of the kidney, forming with the blood a large retroperitoneal tumor, more especially where a free passage along the ureter is interfered with; under these circumstances a large cyst may develop with a smooth inner wall containing urine mingled with detritus of blood." In another place he says: "Such a tumor, whether a hæmato-nephrosis or a circumrenal extravasation, is rounded in form and slightly movable both from side to side and in the antero-posterior direction."

It is interesting, in our endeavor to understand these cases, to study the anatomical conditions which confine this effusion about the kidney and prevent it from becoming diffused in the loose cellular space behind the peritoneum.

This post-peritoneal space is so loose and readily opened up that it

might be expected that, if urine and blood were poured freely into it, they would quickly spread and form a diffused extravasation. In some cases of extreme violence this occurs, but usually the effused fluids are confined about the kidney in the form of a clearly defined tumor. This limitation of the effusion cannot reasonably be explained in all cases by the formation of a limiting wall of "inflammatory formation" (Morris) for it is observed in cases where the effusion is very rapid and a circum-renal tumor is apparent within a few hours of the injury. It is inconceivable that a strong limiting wall should form by inflammatory or other action so quickly.

This limitation of the effusion must then be due to the confining action of an already existing membrane.

My observation of cases, together with careful dissections have convinced me that the wall of the cavity in these false hydronephroses is the fibrous outer wall of the so-called fat-capsule of the kidney.

This tough capsule plays an important and beneficent part in thus confining effusions about the kidney. When the effused fluid is urine, extensive urinary infiltration is prevented; while in cases of hemorrhage from a ruptured kidney the blood presently fills this capsule tightly and by its own internal pressure brings the bleeding to a standstill.

The subsequent history of one of these cases will vary according as the effusion contains urine or not.

If the effusion consists of blood alone it will usually disappear by absorption. When absorption is slow, aspiration of the serous part of the haematoma may hasten its disappearance.

When the effusion contains urine it may form a false hydronephrosis such as I described above. Such a false hydronephrosis in which the fluid is mainly urine, if not cured by one or two aspirations, as has not infrequently occurred, may be confidently expected to yield to a simple incision with drainage.

A mixed effusion of blood and urine may lead to suppuration, and is pretty certain to do so if any inflammation exists in the kidney or its pelvis at the time of the accident.

In a healthy patient such a mixture of blood and urine may, however, disappear and cure itself.

The following case illustrates this condition:

CASE II. A young man while playing football was thrown against a wooden bench and suffered a severe contusion of the right loin. This was followed by haematuria and a tumor presently appeared in the right side which simulated a greatly enlarged kidney. It was elastic and somewhat tender to palpation.

I saw the patient in consultation with Dr. Chas. E. Abbott, of Andover, Mass., on about the third day after the accident. There was now an indistinct sense of fluctuation in the tumor. I introduced an aspirating needle and drew off seven or eight ounces of a watery fluid, dark purplish red in color. This did not reduce the size of the tumor materially, but it made it soft and flaccid. Aspiration was stopped by the plugging of the needle with old blood clot.

An examination of this fluid on the following day showed it to contain abundant urea, and to be evidently a mixture of urine and blood.

Supposing, at that time, that such an effusion of urine must necessarily lead to suppuration, I expected to receive a summons within a few days to open and drain the sac, but contrary to expectation the tumor steadily decreased in size and finally disappeared.

It is questionable whether this disappearance of the effusion is due entirely to absorption or whether drainage through the rent in the renal pelvis plays an important part in its removal.

Passing from this false hydronephrosis to true hydronephrosis I have an interesting observation to report in which both conditions, the false and the true, co-existed in connection with one kidney.

CASE III. J. S. W. Jr., a well developed boy of 11 years, was seen by me March 20th, 1897, in consultation with Dr. E. H. Stevens of Cambridge. His history was as follows:

Since the age of one and a half years he had had repeated attacks of severe abdominal pain. At first these came every week and lasted several hours. Gradually they became less frequent but were of longer duration. Presently it was noticed that a fullness appeared in the left loin with each attack and disappeared when the pain subsided. These attacks were usually accompanied by vomiting and by high fever.

The last previous attack was seven months ago and lasted about two weeks. Two weeks before I saw him he began to have pain in the left side, and presently a tumor in that side was noticed. The pain was of moderate severity until four days ago, but since then it has been very severe. Two days ago Dr. Stevens aspirated the tumor and drew off eighteen ounces of fluid of specific gravity 1006 and containing urea.

The tumor rapidly refilled and when I saw the patient it was as tense as ever, and the boy was suffering great pain. It extended well up under the ribs and downwards to the brim of the pelvis.

Operation was advised, and under ether we opened the tumor widely in the lumbar region. A large quantity (not measured) of bloody fluid escaped, and it was then seen that the fluid was contained in a sac the

wall of which seemed to be the outer layer of the fat-capsule; and at the bottom of this sac lay a collapsed hydronephrotic kidney with a rent in its wall 3-4 of an inch in length, which opened the kidney through the thin wall of one of the calices. This opening was enlarged, and the finger, introduced, showed the whole kidney to be reduced to a thin-walled sac with numerous irregular pockets.

An examination as careful as could be made with a rather poor light failed to show which pocket represented the pelvis, and the ureter could not be made out.

The kidney was drawn up and sutured to the lumbar fasciæ in the hope of thus straightening the ureter; and the rent in the kidney was closed by a continuous cat-gut suture.

For two days the boy was comfortable and then he began to have severe pain in the side, and the swelling was found to have returned to almost the same size as before operation.

It was found that the tumor now was the greatly distended hydronephrotic kidney, which had filled up tensely since the rent in its wall had been closed.

It presently became necessary to puncture the kidney and put in drainage. The wound soon healed down to the tube, and with a bottle attached to a swathe to collect the urine he kept pretty comfortable for two years.

In March, 1899, he entered the Massachusetts General Hospital to have an operation for closure of the fistula. At this time he had about ℥xxx of urine each day from the bladder and ℥xx from the opening into the kidney.

The urine coming from the renal fistula was of very low specific gravity, while that from the bladder was normal in character.

A nephrectomy was now done. When the ureter was reached it was found that just after leaving the pelvis it was looped over a little artery which ran direct from the aorta to the lower part of the kidney.

The wall of the ureter was very thin at the bend where it was caught up over this vessel, and the calibre was so narrowed that the finest probe could not pass.

The operation was successfully completed, although the separation of the sac was difficult on account of firm adhesions.

The boy made a good recovery and has been perfectly well ever since.

This was properly a case of congenital hydronephrosis. Although the dilatation of the kidney did not make itself noticed until some years after birth, the condition that led to it was a congenital one.

It is an interesting speculation whether it was the assumption of the upright posture which, causing a downward sag in the kidney, tightened the loop of the ureter over the artery and caused an obstruction which had not shown itself during the horizontal life of the child.

Besides the last case in which a congenital obstruction of the ureter by looping over a vessel caused the hydronephrosis, I have seen one case of congenital hydronephrosis in which the obstruction seemed to be a valvular one at the junction of the ureter with the renal pelvis.

CASE IV. A poorly developed boy of four had had a swelling in the left lumbar region since birth. One month previously this tumor had been aspirated and urine had been obtained. It rapidly refilled again and the day before I saw the child he had suffered from pain in the abdomen followed by vomiting. The child was pale and anemic, with quick pulse and respiration rapid and superficial. The temperature had been considerably raised for some time.

When I saw him the abdomen was distended by a tumor, which lying mostly to the left of the median line, extended out and filled the flank, reached well across the middle line, up under the ribs and down over the pelvis.

Fluctuation by wave was distinct over this tumor and its character, its position and the previous aspiration of a urinous fluid from it made the diagnosis of hydronephrosis sure.

It was felt that the child was rapidly failing and that immediate interference was demanded. He was not strong enough for an extensive operation, consequently a nephrotomy was quickly done and drainage established.

In opening down to the sac a cavity was opened containing several ounces of chocolate colored fluid.

It was thought that this was due to leakage from the puncture made with the aspirating needle.

The sac was then opened and a large quantity of a similar chocolate colored fluid was evacuated. The interior of the cavity presented the sacculated appearance of a hydronephrotic sac in which no traces of the kidney could be made out at the time. Drainage tubes were introduced.

The child was much relieved by this operation and made a slow recovery.

A month and a half later the temperature which had remained irregular and somewhat raised since the operation, fell to normal. The child seeming now in good condition, a nephrectomy was done and the hydronephrosis was enucleated and removed. The sac was quite adherent and the peritoneum was opened during the operation. It was closed by a continuous cat-gut suture and in no way complicated the result. The boy made a good recovery. The sac presented nothing peculiar. The upper end of the ureter made a nipple-shaped projection into the pelvis in such a way that it was quite clear it must have acted in a valvular manner to close the exit. The ureter was otherwise normal in size with no dilatations.

This case afforded a good illustration of the occasional benefit of a nephrotomy as preliminary to a nephrectomy.

Acquired Hydronephrosis. The cases of acquired hydronephrosis that I have met with have all of them resulted apparently from mobility of the kidney. I refer here to the cases of unilateral hydronephrosis appearing long after infancy, and I exclude many cases of distention of the kidney in which the contained fluid has been purulent, also those in which both kidneys have been distended owing to obstruction in the lower urinary passages.

In a number of the cases that I have seen the distention of the kidney has been only moderate in degree and has disappeared under the influence of posture with raised hips and lowered shoulders. I have also seen manipulation greatly assist in the reduction of a kidney distended in this manner.

I have had two cases in which operation has brought about a cure of hydronephroses of considerable size in kidneys which showed mobility.

In neither of them could a distinct valve formation, such as Fenger has described, be made out. The ureter was, in each case, found to be tortuous just below its emergence from the pelvis, and the obstruction seemed to be due to a folding of it upon itself.

There was nothing to indicate which particular twist of the ureter had been the seat of the obstructive pressure. It is easy to see that an obstruction of this sort may act intermittently until the enlargement of the kidney is sufficient to cause a firm pressure against the kink and make the obstruction a permanent one.

In one of these cases intermittent attacks had been a marked feature. In the other, although the mobility of the kidney was very great, no history of intermittent pain or tumor could be obtained.

The point of especial interest in the two cases of this sort upon which I have operated is, that the simple measure I adopted for straightening the ureter seems to have been efficient in restoring the permeability of the canal so that no subsequent filling up of the kidney occurred.

This measure was to insert a bougie through the ureter down beyond the portion that was tortuous.

In this way the various curves of the canal are effaced while the pelvis is contracting and pulling it into shape. Furthermore, and this is I believe most important, a moderate amount of inflammation

is set up in the walls of the ureter, which stiffens them, and attaches them to the parts about and thus tends to keep the form given to the tube. This explanation of the manner in which the bougie may accomplish the permanent correction of the obstructing condition, was first given by me in an account of my first case reported to the Surgical Section of the Suffolk District Medical Society in January, 1896.

This case was seen seven months later, and at that time there was no sign of any refilling of the sac, showing that the patency of the ureter had been satisfactorily restored.

The second case only confirmed the good opinion of this procedure I then formed; for the result has been most satisfactory and there is no sign of recurrence at the end of one and a half years.

I append to this article a brief report of these two cases.

In both cases the kidney was fastened in the loin by stitches attaching it to the rib and the fascia.

The end of the bougie was brought out through the opening left for drainage, and it was removed at the end of three days. It was my intention in the second case to have kept it longer, but the bougie was so acted on by the urine that its surface showed a tendency to scale off, and on this account it was removed earlier than had been intended.

This method of treatment is not presented as a substitute for plastic operations upon valves, for these have demonstrated their value in cases of oblique implantations of the ureter upon the side of the pelvis, and also in cases of nipple-like projection of the upper end of the ureter into the pelvis such as was found as a congenital condition in Case IV.

The use of the bougie, however, as I have described it, is of value in those cases where the seat of obstruction cannot be determined, owing to the multiplicity of twists in the ureter and the impossibility of telling at which bend the closure of the canal occurred.

Miss A., 32 years of age. A thin, pale woman. Two years before she had first noticed an enlargement of the abdomen a little to the right of the median line, and in the past year had suffered considerably from abdominal pain, which had been almost constant and was noticed more for a week following catamenia. She had never noticed any symptoms in connection with urination.

Examination of the abdomen showed a large, fluctuating mass, which

when lying on her back, lay on the right side, extending up well under the liver and extending 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.

The catamenial history led to the diagnosis of ovarian cyst, but the position of the tumor when she was on her back, strongly suggested a hydronephrotic kidney. Examination of the urine was wholly negative. The great mobility of the tumor made it seem probable that if it were the kidney it had a long meso-nephron, and there was danger that a puncture in the loin might traverse the peritoneal cavity. We therefore thought it wiser to explore by an abdominal incision, which was done March 29th, 1895.

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 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 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 cat-gut. 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.

This patient was seen seven months later, and although there had been at times some discomfort in the abdomen, there was no sign of any filling up of the kidney.

Mrs. B., 54 years of age, was brought to me in May, 1905, by Dr. G. C. Smith, of Boston.

The patient gave a history of pelvic and low abdominal pain intermittently during middle life. This had ceased five years previously, at the time of the menopause.

For some (uncertain number) years has had attacks of pain in epigastrium accompanied by nausea and vomiting, with some chilly sensations. In the past year these attacks have come more frequently (once in five weeks), but have been somewhat less severe than formerly.

There is, at times, some sense of discomfort in the right side and down the leg.

There has been no noticed disturbance of urination nor have there been any symptoms referable to the bowels.

Examination of the patient showed an elastic mass in the right side of the abdomen close below the liver. This mass was pushed downward by inspiration, and could then be held down by the fingers thrust in above it so that it did not rise on expiration, but left a space between it and the liver.

The diagnosis of hydronephrosis was made and an operation advised.

This was done on June 15th, 1905.

A lumbar incision was made along Israel's line and on reaching the kidney it was seen that the pelvis was greatly distended with the body of the kidney above it.

A trocar drew over a pint of pale, clear urine. The sac was then incised and the opening into the ureter was found. No valvular condition was found and a urethral bougie about No. 12, French size, was passed down to the bladder without encountering any resistance.

This bougie was left in situ, a drainage tube was placed in the sac, alongside of it, and the opening was closed down about them with a continuous cat-gut suture.

The kidney was then fastened to the fascia and to the lower rib with Pagenstecker sutures placed after Guyon's method.

The patient made a good recovery, the bougie being removed from the ureter on the third day.

A comparative examination of the urines during convalescence was of some interest as indication of the functional activity of the hydronephrotic kidney.

The urine drawn from the sac at operation showed a specific gravity of 1006, no albumin, and a rare granular cast.

Two days later the specific gravity of the urine from the nephrotomy tube had risen to 1012, while the urine from the bladder had specific gravity of 1019. Three days later they were, from nephrotomy, 1009, from bladder, 1011. Four days later, from nephrotomy, 1008, from bladder, 1010.

The quantity of urine from the hydronephrotic kidney was very nearly the same as from the other, showing that its functional activity was but little impaired.

The patient made a good recovery. One year later she wrote to me that she had had since the operation four attacks of epigastric pain similar to those before. She said, however, that the tumor in the side had not reappeared in connection with these attacks. She expressed herself as feeling well, and said that she had gained twenty pounds in weight during the year.

This patient was seen eighteen months after operation. She had at this time been more than six months free from any discomfort whatever. There was no sign of any enlargement of the kidney, and she weighed thirty pounds more than at the time of operation.

A NOTE ON CYST OF THE PROSTATE.[1]

CYSTS of the prostate that reach a size to make their presence known are exceedingly rare. They may be classified as follows:

1. Echinococcous cysts. Belfield[2] could find but three authentic instances of an echinococcous cyst originating in the prostate. Thompson, in 1883, could find but one reported case; and in that was doubtful as to its prostatic origin.

2. Retention cysts due to the distention of occluded prostatic glands.

3. Cystic dilatation of the utricle. This is occasionally found in children, and Englisch is reported to have found this condition five times in seventy autopsies on the newborn.

4. Cysts or cystic cavities may form in connection with cancer of the prostate.

The two cases that I have to report belong in classes 2 and 4 as above. I will first describe the cyst occurring in connection with carcinoma.

E. P., eighty-seven years of age, had been under my observation for a number of years with complete prostatic obstruction, and had latterly suffered considerable pain, felt during emptying the bladder, and especially in the withdrawing of the catheter. He developed in the latter part of September, 1904, a considerable increase of prostatic swelling which simulated an abscess, and was opened through the rectum on Oct. 7, 1904.

The trocar entered a cavity containing about two ounces of a glairy watery fluid which seemed to occupy the greater part of the prostate gland. The cavity was opened and drained.

The patient succumbed to a pyelo-nephritis seventeen days later. Autopsy revealed a cancer of the prostate in rather an early stage. Besides the cavity which had been opened was another smaller pocket which was itself pouched as if made up of several smaller cavities

[1] Printed from Transactions of the American Association of Genito-Urinary Surgeons, 1906.

[2] System of Genito-Urinary Diseases, etc. Morrow.

which had coalesced. This was filled with thick, opaque, yellowish-white fluid which contained epithelial cells, leucocytes and debris, but no bacteria.

Dr. George B. Magrath, who made the pathological examination, found a general carcinomatous change in the prostate. He says: "A section through the posterior portion of the left lobe, including the wall of the cavity entered by operation, shows a structure consisting of islands of epithelial cells to a considerable degree arranged as tubular glands, and also" in places "without definite arrangement and disposed in the form of columns, chains and small irregular areas between the meshes of a rather sparse connective tissue stroma. The cells vary widely in size and in shape. Many of them are fatty degenerated. Some of the glands are dilated, presenting the form of small cysts; in others the epithelium is thrown into papillary folds. Near the edge of the section there is considerable lymphathic and interstitial infiltration with epithelial cells. The edge corresponding to the wall of the cavity is made up of a weak granulation tissue containing but few blood vessels, and made up for the most part of a thin layer of young connective tissue cells interspersed between which are a few leucocytes."

The condition of the cyst wall was largely due, no doubt, to inflammatory changes occurring after it was laid open.

I have been unable to find in the literature any other instance of this condition.

My second case was probably a retention cyst, though as the patient recovered no opportunity was given for an exact study of its pathology. The case, however, was of great interest clinically.

E. T. W. was under my care in 1899 for a chronic urethritis following gonorrhœa. When nearly well he suffered a relapse after exposure, but finally recovered to the extent that the gleet wholly disappeared.

In 1904, being now forty-six years of age, he came to see me again, complaining of frequent urination with a feeling of pressure in the bladder after the act. An annoying desire to pass water existed most of the time. The urine was slightly cloudy, with shreds in the first part. The prostate felt like a normal gland, and massage brought but a drop or two of cloudy fluid.

A No. 27 (French) sound passed easily into the bladder.

A month later, the symptoms continuing, I tested the residual urine, and drew ten ounces after he had just passed three ounces. This test was made at a time when he was uncomfortable from having held urine unusually long.

A cystoscopic examination was made a short time after this, and projections from the prostate were seen to the left of and behind the urethral orifice. At this time he had but three ounces of residuum.

I advised an operation, but Mr. W. understanding that a loss of sexual function might follow this operation decided to postpone interference.

He continued reasonably comfortable until the late summer of 1905, when he had much more obstruction, and finally a stoppage requiring the use of a catheter. After this he could pass but little urine without a catheter, and the use of the instrument was difficult on account of a spasmodic condition of the deep urethra.

The cystoscope now showed a projecting tumor on the left of the internal meatus. This was smooth, and had a translucent look with little distinct vessels on its surface. I remarked to my assistant that it looked like a cyst, and I should think it one if I had ever heard of a cyst in that locality. The following day I opened the bladder. The tumor was about the size of a cherry. It projected well into the bladder, and also against the urethra, which it tightly closed. On seizing it with a pair of sharp-edged forceps to lift it up, it ruptured and collapsed. The character of the fluid could not be made out as it at once mixed with the blood in the bladder.

The wall of the cyst was lifted up and cut away with scissors. The interior was then seared with a Paquelin cautery.

The power of urination was fully restored by this operation, and he remains quite well now after the lapse of seven months.

Should such a case present itself again, I am of the opinion that it could be adequately dealt with through the urethra with a Bottini cautery.

Belfield reports having met a cyst like that which I have described, and in a rather hasty search of the literature I have failed to find other similar cases, though cystic dilatations of these glands of insignificant size are of common occurrence in old prostates.

MODERN OPERATIONS FOR COMPLETE REMOVAL OF THE PROSTATE.

At the present time two methods of complete prostatectomy are being urged by earnest advocates: one is the suprapubic method, and the other the perineal; both of these methods usually permit of thorough removal of the prostate.

The choice between them should be based on the relative mortality of the operation, the quickness of recovery, and upon the degree of restoration of function obtained by each.

In order to decide these points and make a wise selection between these operations, it is therefore important to assemble statistics which shall give us reliable data both as to mortality and as to after condition.

Something is also to be said in regard to the technical difficulties which surround each operation.

I operated first by the suprapubic route, because it was an easy method of approach to the gland, requiring but little dissection. Since, however, I began to use the perineal operation I have gradually used it more and more, and I now find that I regard it as the method of choice, and I apply it to every case in which the removal of the prostate is the prime object of the operation.

This change of practice has come about because I have found that, although it takes a somewhat longer dissection to reach the prostate by the perineal route, the opportunity for accurate inspection and exact operative procedure is so much better as to wholly outweigh the added difficulties of the dissection.

Some operators consider it of no consequence whether the prostatic urethra is torn much or little during the operation. The fact that good results are obtained when all of the urethra within the prostate is torn out with the gland leads many to think that it matters little what happens to the prostatic urethra any way.

Diagrammatic drawing, showing above, a flap of mucous membrane left by shelling out a prominent third lobe, and below, a remnant of the urethral mucous membrane extending back into the cavity from which the prostate has been removed — either of which would tend to form a valvular closure of the urethra.

I cannot share this view, for I believe that when the prostatic urethra is for the most part preserved in its proper relations, not only is the healing and restoration of the parts more speedy, but the chance of satisfactory restoration of function is more sure.

Young has cited facts to show the retention of sexual power when the utricle and seminal ducts are spared. I believe that the restoration of satisfactory urination is more sure when the prostatic urethra has not been seriously torn.

One cause for lack of success in complete prostatectomy has been from the formation of flaps of mucous membrane, which have afterwards acted as valves to hinder urination. These flaps form in two places: at the vesical outlet, and at the apex of the prostate, where it joins the membranous urethra.

If the prostate is enucleated from above—the mucous membrane is broken through with the finger at the vesical outlet, and through this opening the gland is stripped out. Working from above downwards—it must not infrequently happen that a portion of the urethra towards the apex of the prostate is left, while the portion of the urethra towards the bladder is thoroughly removed. This part of the urethra which is left projects back into the cavity from which the prostate has been shelled out. It forms, as it were, a cuff. It may be readily seen that with the current of urine flowing down from above, this cuff of mucous membrane, by folding from side to side, may readily close the opening of the urethra with an obstructing valve.

Operating through the perineum with a wide incision, which allows the parts to be brought into view, the various steps of the operation are under the guidance of the eye, and the difficulties above described are easily avoided.

The enucleating finger entering at the apex of the prostate separates the gland from its outer capsule, then from the vesical side, and lastly strips it off from the urethra. This separation of the gland from the urethra is done from within outwards, can be assisted by the scissors and blunt dissector, and preserves the urethral wall for the most part.

Up to this stage of the operation the only damage done to the urethra has been the opening through which the tractor was introduced and usually some tearing of its floor. The roof of the urethra is left intact. There is no cuff of mucous membrane which can roll in and form a valve.

In a difficult case, when the urethral wall is torn more than is usual, the rent is so disposed that any flap that is formed is attached about the orifice of the bladder, so that the urine as it flows out does not double it up in front of the stream, but rather washes it out flat and escapes by it.

If now there is a third lobe which has a broad base, it can be readily removed through the cavity left by the removal of the lateral lobes.

If a very prominent third lobe is peeled out without removing the mucous membrane covering it a large loose flap is left which may act as a valve and obstruct the vesical orifice just as the third lobe itself did.

When there is a pedunculated third lobe I prefer therefore to pull it out from the urethra and to cut it off with the thermo-cautery, removing its mucous membrane with it.

In some cases there are several projections into the bladder, all of which can be dealt with in the same manner.

By cutting off these pedunculated outgrowths *in toto* we avoid the formation of flaps of mucous membrane, which may afterwards act as valves. The vesical opening left after the removal of the lateral lobes is ample for the handling of a good-sized third lobe.

I have found the lithotomy scoop a useful instrument in pulling down these projecting growths, and have never been seriously hampered by want of room to properly deal with them.

Three times in the past three years I have encountered small obstructing prostates which could not be enucleated. One of these I approached from above, and finding a bar at the neck of the bladder I cut and cauterized it as deeply as seemed safe with so small a prostate. This operation was followed by but little improvement.

The other two cases I treated by perineal prostatectomy. Finding that the glands would not peel out I cut them out piecemeal with rongeur forceps, and then with a finger as a guide in the bladder I cut away the bar bit by bit till nothing was left but soft mucous membrane. In both of these cases the restoration of urination was thoroughly good.

My personal experience then has been that the restoration of function is more complete and lasting after the perineal than after the suprapubic operation.

The control of hemorrhage I have found distinctly easier by the perineal route.

A strip of gauze can be snugly packed into the prostatic capsule and then the end can be brought down through the outer wound, which it should not fill tightly, for too much pressure against the rectal wall may produce sloughing and lead to a fistula.

In the suprapubic operation it is difficult to apply packing so that it will stay in place and continue to exert pressure against the bleeding surface without so filling the base of the bladder as to exert injurious pressure on the ureters and to cause great discomfort to the patient.

In one case of suprapubic prostatectomy I had great difficulty in controlling the hemorrhage, and lost my patient owing, as I thought, to the interference with the kidneys caused by the tight packing.

Convalescence after perineal prostatectomy is much quicker and more comfortable than after the suprapubic operation.

The tubes can be removed on the third to the fifth day, and after this the patient soon passes his own water with little or no involuntary leakage. At first the larger part of the water comes through the perineal wound, and serves the good purpose of keeping this thoroughly washed out. Occasionally, for a few days, the urine comes away involuntarily through the perineal wound. This soon ceases, however, and usually, by the end of a fortnight, the greater part of the urine is passed *per urethram* with little or no escape through the perineum.

It has happened in one or two of my cases that after taking out the tubes the patient has been unable to void the urine. In these cases the catheter is easily introduced through the urethra and drainage kept up for a few days in this manner, at the end of which time the power of voluntary urination has been invariably restored.

In some few cases the patients preferred to have the catheter retained till the tenth or twelfth day on account of the comfort of keeping the dressings dry.

The in-lying catheter does not interfere with getting the patient out of bed, and it is our practice to get them up as soon as possible, for they seem to do better when moving about.

Mortality. In the past four years I have operated on thirty-five cases by perineal prostatectomy.

Two cases have died; one three days after operation, the other at the end of a month.

The histories of these two fatal cases are as follows:—

CASE 14. E. F. S., aged 77. Entered the Hospital March 26, 1905, with a history that he had been for ten years troubled with frequent urination.

Four weeks before entrance he began to feel as if he did not empty the bladder.

Three weeks ago the urine stopped. He then resorted to the catheter, which has been used ever since.

Two days ago he began to have difficulty in using the catheter, and he has now gone fourteen hours without having any urine drawn.

The greatly distended bladder was emptied, and constant drainage was instituted.

At the time of entrance the urine was 1,027 specific gravity and showed a trace of sugar. Quantity of urine was only 19 ounces in the first twenty-four hours; the next twenty-four hours it rose to 35 ounces; and six days after entrance it rose in twenty-four hours to 85 ounces, falling back, however, to 55 and 42 on the following days.

The patient was troubled with bronchitis of a chronic nature. Operation was put off in the hopes of somewhat improving this condition. However, his condition was so uncomfortable and manifestly getting worse that operation was undertaken on April 11th.

In cutting into the prostate, considerable pus escaped and was pressed out during the subsequent enucleation.

The patient made a good recovery from ether, but on the following day the temperature rose to 101, and at night reached 103. The quantity of urine in that twenty-four hours was 20 ounces, and the specific gravity 1,018.

On the 13th of April, the temperature remaining up, the patient showed cyanosis, and rales were found at the base. The quantity of urine in this twenty-four hours rose to 40 ounces and contained 1.3% sugar.

On the 14th the patient became unconscious. The quantity of urine rose to 90 ounces, with 3% sugar, and having a specific gravity of 1,028.

The patient died in the afternoon, and, unfortunately, an autopsy could not be obtained.

CASE 15. P. P., aged 61. Entered the Hospital April 10, 1905.

At the time of entrance the patient was stupid and urine was tinged with blood. Patient said that he had always urinated well till five weeks ago, when he was seized with acute retention, and catheterized. Since that time he has dribbled his urine in small quantities, with an occasional catheterization.

At the time of entrance the bladder extended above the umbilicus, and the catheter introduced drew 40 ounces without emptying the bladder. Three hours later 20 ounces were drawn, and in the evening of that day he was placed on constant drainage.

Two days after entrance the quantity of urine was 100 ounces in the twenty-four hours, specific gravity being 1,010.

On April 20th perineal prostatectomy was done, following which he passed 100 ounces of urine, with a specific gravity of 1,017.

After this the quantity of urine fell till, on April 24th, it was 50 ounces in twenty-four hours, with a specific gravity of 1,018.

He now became flighty in his mind, pulled out his tube, and had a catheter introduced through the urethra. He was gotten out of bed, thinking that this might improve his condition, but, although the quantity of urine became fairly good, he gradually became more and more feeble, and died on May 18th, one month after operation.

The symptoms in this case were somewhat difficult to understand, and a neurologist who saw him in consultation thought that his condition indicated a previous apoplectic seizure, which had left some mental deterioration.

Case 14. The first of these patients with chronic bronchitis and glycosuria well illustrates the condition of broken health in which many of these patients come to the surgeon.

Case 15 did not die as an immediate effect of the operation, but from some toxæmia, as I thought, originally, due to the obstruction in the prostate, with its secondary effects on the kidneys. In both cases, however, the operation failed to keep them alive, and they should be rated in the mortality risk.

They give a death rate of 5.5% in this small series of cases.

This is somewhat higher than the mortality rate in the statistics of some operators, and higher, I believe, than the normal risk of the operation.

I have now had twenty-one successive recoveries, due in part, doubtless, to increased skill in operation and to experience in after treatment.

Young reports sixty successive cases without a death.

In no one of the thirty-three cases that recovered was there a failure to restore the power of voluntary urination, and in no case was there incontinence.

In one case (Case 8) the bladder was distended by 83 ounces of urine when he came under treatment.

At first after operation the residual urine was 17 ounces; it had fallen to 5 ounces one month later.

He was then lost sight of. He had been freed from the constant thraldom of the catheter, but found its occasional use of advantage in keeping the bladder clean.

Case 9 had a residuum of 15½ ounces before operation, and one month after operation was passing urine with a little discomfort and had a residual urine of from 4 to 6 ounces; he was then lost sight of.

It is to be remembered that in many cases of prostatectomy the full measure of improvement is not reached for several months.

From these cases, and from others, I have received the impression that a certain proportion of these patients whose bladders have been long distended lose the expulsive force to such a degree that they are afterwards unable to completely void the urine even when the obstruction is wholly removed. This is due not only to the induced atony of the walls but also to the sacculation which forces portions of the mucous membrane out between the muscular bundles so that the sacculi have no contractile tissue in their walls and so are unable to empty themselves when the bladder closes down.

It remains to speak of my experience with rectal injury, which is constantly urged as an opprobrium of the perineal operation.

In Case 5 the vigorous traction of a retractor tore a rent about an inch long transversely across the rectal wall.

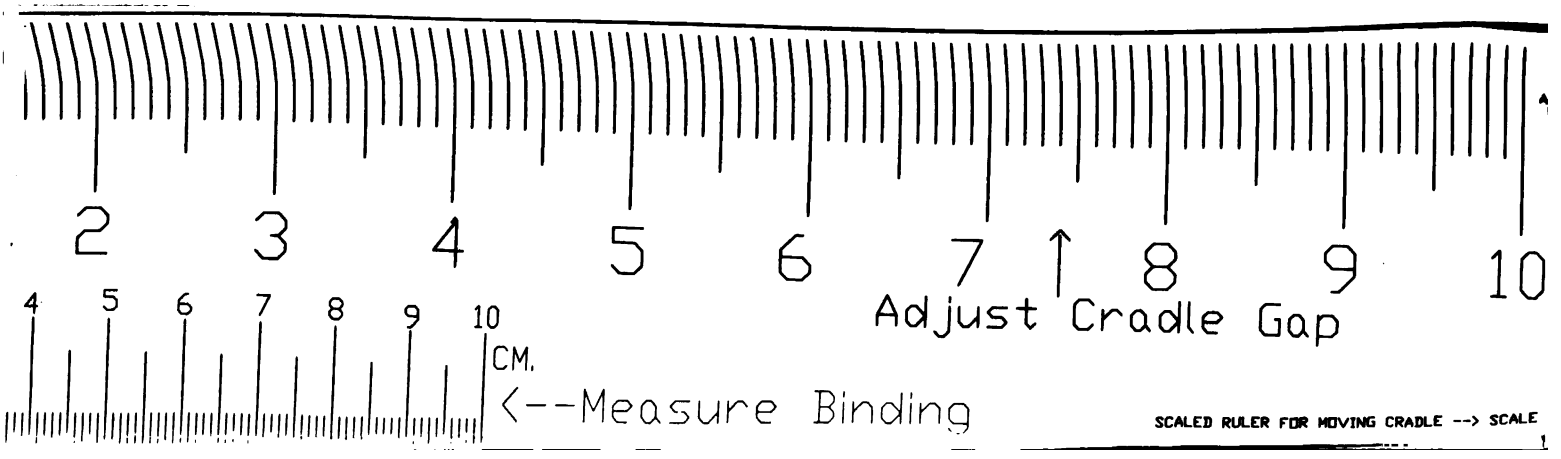
It was closed with a double row of chromic gut stitches, and healed by first intention without causing any trouble.

Since that experience I have always covered the rectum with the end of a gauze sponge beneath the retractor, and have found this a perfect protection.

In Case 17, an old and broken man of 78 who had had a partial prostatectomy by the suprapubic route eight years before, was greatly troubled by a persistent suprapubic fistula. For six years he passed water unsatisfactorily by the natural efforts, but for two years he had returned to the use of the catheter.

In the hope of relief from his fistula he decided upon further operation.

The effect of the former operation seemed to have been to fix the prostate rather high in the pelvis so that it was more than usually difficult to reach from the perineum. The hemorrhage was no more than it often is, but the already feeble condition of the patient caused apprehension on this score, and after he was in bed an extra gauze was packed into the outer wound. The pressure of this led to a 'ough in the rectal wall which caused a fistula that was slow to heal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and greatly prolonged the convalescence. Voluntary urination was re-established and the suprapubic fistula closed, but there continued to be a considerable leakage into the rectum.

In both of these cases the injury to the rectum was due to lack of experience on my part, and in both cases the difficulty was preventable.

Preparatory Treatment. It often happens that these patients reach the surgeon in a condition very unfavorable for operation. The two fatal cases illustrate this. Other cases which seemed equally unfavorable were so improved by preparatory treatment as to bear the operation perfectly. Case 25 was an example of a severe cystitis with probably pyelonephritis and certainly uræmia, who required one month of preparation before operation could be safely undertaken.

CASE 25. Mr. F., 63 years of age. Seen by me May 11, 1906.
For two years he had had increasing frequency and difficulty in urination.
Six weeks before I saw him the difficulty of urination had greatly increased and required the constant use of a catheter.
For several days he had had fever and nausea.
He was of feeble muscular development though he had had but little illness during his life.
Examination showed him to be mentally confused with a feeble, irregular pulse, a dry, brown tongue, anorexia and persistent nausea.
The bladder could be felt moderately distended and the prostate was smoothly and evenly enlarged.
The catheter passed easily and drew about a pint of very cloudy urine, and at the end about 2 ounces of pus flowed out.
The catheter was fastened in for constant drainage.
Liquid diet with as much water as he could comfortably take.
First twenty-four hours, 60 ounces of urine, much clearer than had been drawn at entrance. Specific gravity 1008, albumen trace. Urea 19 grammes.
The urine quickly increased in amount up to 120 ounces and his power of taking food improved, but slight occasional nausea with a dry tongue persisted for a long time.
Finally at the end of a month, during most of which time the amount of urine had remained above 100 ounces, the tongue cleared off, the pulse became steady at about 70 and perineal prostatectomy was done.
Pathological Report, glandular hypertrophy with retention cysts.
Convalescence was slow but steady.
This patient was up in five days, but the wound healed very slowly.
Reported in November: "Passes water four times in day, once in night." "Feels like a boy."

Case 12 was an instance of glycosuria which was so improved by treatment that a prostatectomy was well borne.

The accompanying table gives the essential details of this series of cases.

SARCOMA OF THE PROSTATE, WITH A REPORT OF TWO CASES.

SARCOMA of the prostate is so rare an affection that it is barely alluded to in most of the standard treatises on genito-urinary diseases. Even down to very recent times it is not differentiated from carcinoma, and the two are considered together under the general heading of "malignant disease of prostate."

Virchow in his classical work on tumors has no word about sarcoma of the prostate.

Fenwick[1] divides malignant diseases of the prostate into two classes. Class A includes the hard, distinctly carcinomatous tumors, while Class B comprises tumors of a very soft malignant type. He makes no distinction between sarcoma and carcinoma, but says of the soft malignant type, "Little need be said about this rare disease. I have met with with six cases in fifty (of malignant prostate). Growth is extremely rapid, and usually the first indication of its presence is rectal obstruction or retention (of urine). The growth breaks through into the rectum so that the examining finger plunges into a bleeding fungous mass."

Belfield[2] includes sarcoma under cancer of the prostate. He attempts no clinical distinction.

White[3] gives it a little more than half a page. He states that "while it may occur at any age, it is most frequent in early life. It is the only form of malignant tumor affecting the prostate in childhood. The symptoms are those of urinary obstruction with usually hæmaturia and pyuria. The tumor is semi-fluctuating. The disease usually runs a rapid course.

[1] Primary malignant Disease of the Prostate Gland. Edinburg Medical Journal, July, 1899.

[2] Hand-Book.

[3] American Text-Book of Genito-Urinary Diseases.

The prognosis is unqualifiedly bad, and operative treatment is to be thought of only to relieve pain by affording drainage to the bladder.

If an early diagnosis were made radical cure might be attempted. Czerny operated by the suprapubic route, scraping out a sarcoma of the prostate with improvement in the urinary symptoms." The duration of this improvement is not reported.

H. R. Wharton[1] reports a case which resembled in the location of the tumor the case upon which Czerny operated, and also one of those which I shall presently report.

Dr. Wharton's patient was a man of 35 who for more than a year had had occasional pain in passing water. Never hæmaturia. There was a history of an old stricture that had been dilated.

The bladder could not be reached through the urethra, and there being a prominent elastic tumor above the pubes, a trocar was plunged into it without obtaining any urine.

Perineal puncture by the unerring thrust of Cock obtained a little urine, but the patient shortly died.

At autopsy an irregular tumor, weighing five pounds, filled the pelvis. This tumor had evidently originated from the prostate and the bladder was pressed up in front of the upper portion of it. The omentum, liver and spleen showed secondary growths.

Microscopically this was a typical, small round celled sarcoma.

Jacobson[2] reports a case in which malignant disease of the prostate was removed suprapubically with perineal drainage. It quickly recurred and the patient died six months later. Whether this was sarcoma or not is not clear.

Schalek[3] reports a case in a boy in which a large growth involving the bladder was removed and the ureters were inserted into the rectum. This patient died five days later.

Proust[4] concludes that among the different forms of malignant tumor of the prostate, sarcoma gives the best results after operation. He cites the case of Socin-Burckhardt which survived five years (4½ before any recurrence); that of McGowan which survived four years;

[1] Philadelphia Medical News, November, 1882.
[2] Annals of Surgery, March, 1901.
[3] Pragn. Med. Woch., November 2, 1899.
[4] Huit. Session de l'Association Francaise d'Urologie, Paris, 1904.

that of Fuller which survived eleven months, and that of Verhoogen which survived nine months.

He says that it is in the cases of limited, sometimes encapsulated sarcomas which grow slowly that the operation gives the best results.

In the rapid growths of childhood, the results of operation have been uniformly unfavorable.

The two cases that I have to report are the only ones occurring at the Massachusetts General Hospital in which the diagnosis of sarcoma of the prostate was made. The first one is interesting because it was encapsulated and a long period of relief has followed the operation.

J. K., aged 75, was sent to the Massachusetts General Hospital on April 19, 1904, by Dr. H. H. A. Beach, and was entered in my service. Patient had always been in good health. Fifteen years before had had an attack of retention, requiring catheterization. Since then until the beginning of the present illness, he had been very well, except for an occasional slight difficulty in starting water. One year ago this difficulty became more pronounced and he began to notice an increased frequency of urination. Presently, he noticed a sense of fullness in the bladder which continued and increased up to the time I saw him, when he was passing water about every hour. The night before entrance at the Hospital the difficulty in urination became very troublesome, and blood appeared in the urine. Blood also leaked away from the urethra between urinations.

Examination showed a well developed and nourished man; no abnormal sounds about the chest; rather pallid; pulse 90 of good character. The abdomen full, with dullness extending from the pubes half way to the umbilicus, in which region a tumor somewhat masked by the thick abdominal wall was felt. A thin stream of blood mixed with urine leaked away from the urethra constantly. Examination by rectum showed the prostate to be enlarged and flattened out behind, not hard. Attempts to check the hemorrhage by tying in a catheter and by local measures having failed, operation was advised. Patient finally consented to this on the 21st of April.

Suprapubic incision brought us down upon a tense tumor resembling the bladder, but on plunging the knife into this, it was found to be solid, and on enlarging the opening was found to be filled with a grayish friable material, which was spooned out in large masses. After this had been to a great extent removed, the bladder wall was made out behind the tumor. A sound passed through the urethra served as a guide and the bladder was opened upon it. The greater part of the tumor having been spooned out, and the whole cavity in which it lay having been thoroughly curetted with finger nail and scoop, two tubes were introduced into the bladder, and the patient was removed to bed. The operation was done somewhat hastily as the patient did not bear the ether very well. Convalescence was rather slow but satisfactory.

The vesical hemorrhage ceased at once, and as the wound contracted considerable loosened portions of the growth were thrown out.

The walls of the cavity in which the tumor had lain finally granulated up and the suprapubic wound closed in a solid and satisfactory manner about the middle of June, almost two months after the operation.

The tumor was examined by Dr. W. F. Whitney and found to be a small spindled celled sarcoma.

One year later this patient reported in good health, with no sign of recurrence.

It is commonly noted in all descriptions of sarcoma of the prostate that the disease is very rarely secondary.

The following case was one of the exceptions to this rule, in that the tumor of the prostate was secondary to one in the testis.

Unfortunately, the observation was made at a time when microscopic examinations of tumors were often omitted, and we therefore lack the final proof that the tumor was a sarcoma.

The clinical history and behavior of the growth were so characteristic of sarcoma, however, that no doubt was felt as to its character.

T. K., aged 26, entered the Massachusetts Hospital on January 5th, 1884, with a tumor of the testis which was removed by Dr. Henry J. Bigelow. No microscopical examination of the growth was made.

Mr. K. reëntered the Hospital on October 24th, of the same year, and was put in my care by Dr. Bigelow. He reported that for four or five months he had had burning before urination and that the stream had become small. Two months before entrance, he had intermittent paroxysmal pain which bore no relation to urination. One month ago, the urine began to come with so much difficulty that it passed only with painful straining, and presently he was forced to a catheter to void it at all. At the time of entrance he was drawing his water with a soft rubber catheter, No. 10, of the French scale.

Three weeks before entrance passed blood, which came in small clots for three successive urinations. Two similar attacks of bleeding since then.

November 2d, hematuria again reappeared.

November 7th. Examination was made of all shreds and material passed from the bladder, but nothing significant was found; neither villi nor abnormal cells. He was sounded and the bladder wall was found to be trabeculated, but no stone was touched.

The prostate was examined and found to be large, and irregular in shape. The pain and frequency of urination rapidly increased, so that on November 12th it required three grains of morphia to keep him reasonably comfortable.

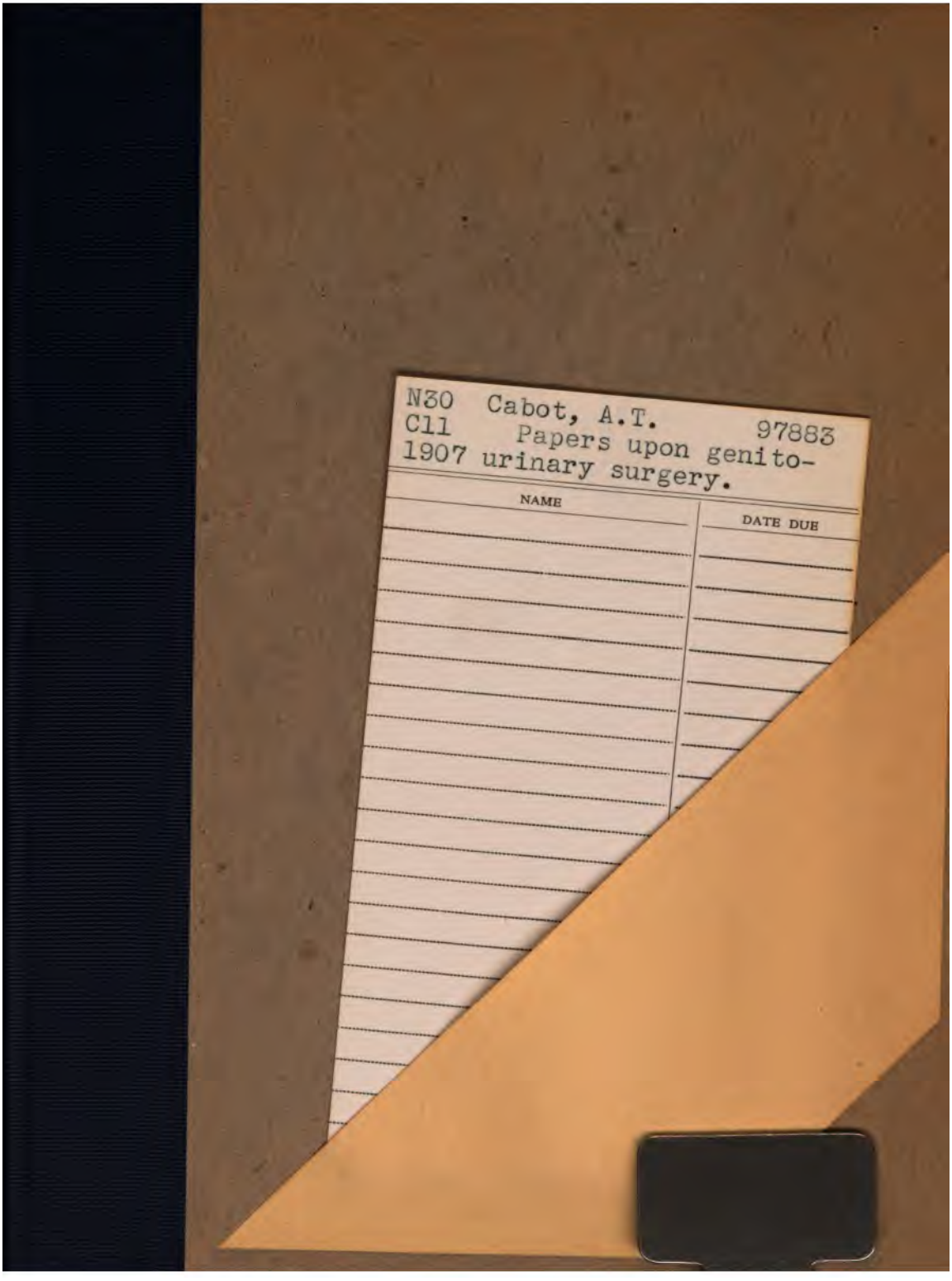
It was decided to do a suprapubic operation to supply drainage to the bladder, and I did this on Nov. 17th. A tumor was felt in the prostate and projecting into the bladder. The portion within the bladder showing a villous character. The patient died on November 24th.

Autopsy showed a tumor of the prostate and bladder with gangrenous cystitis, pericystitis, pyelo-nephritis, and also some suppuration behind the kidney. There was also a tumor the size of a lemon just below the

pancreas and right kidney and behind the peritoneum. Section of this tumor showed it to be somewhat infiltrated with pus.

This case is an interesting one as showing the secondary implication of the prostate, due no doubt to extension of the disease by the transmission of cells through the vas or lymphatics to the prostate. The foul condition of the urine at the time of operation led to the speedy appearance of pericystitis which brought the lethal ending.

The tumor noticed in the region of the right kidney is especially interesting as that is the point where secondary growths following sarcoma of the testis are apt to appear. The writer has seen three or four such cases, and the reason for it is quite evident in that the lymphatic supply to the testis connects with the glands in this neighborhood and not with the glands in the pelvis or inguinal region.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