

RECURRENT INTERMITTENT RETENTION OF  
URINE OCCURRING WITH THE REMISSIONS  
IN A CASE OF PERNICIOUS ANÆMIA—THE  
FINAL RESULT OF A BOTTINI OPERATION  
FOR ASSOCIATED PROSTATIC HYPERTROPHY.

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THE interest in this case is the recurrent intermittent retention of urine dependent upon remissions or exacerbations of anemia in the course of a pernicious anæmia.

The purpose of this report is not to arrive at any definite conclusions, but to place on record an etiological factor producing intermittent retention of urine not heretofore mentioned, so far as the writer is aware. The case also illustrates the sequelæ of urinary retention; the benefit derived from a Bottini operation and the condition of the prostate three years following such an operation.

The changes in the blood during the course of the case are also of interest.

Male; widower; 47 years old; a native of New Brunswick; a teamster by occupation; entered the Boston City Hospital in the medical service of Dr. Henry Jackson, March 18, 1903. I wish to express my appreciation to this gentleman for the privilege of using the notes of this case while on his service.

*Family History.*—Father died of cancer of the throat; mother and wife with pneumonia; one child with tubercular meningitis. Two children living and well. No brothers or sisters.

*Past History.*—Measles in childhood. Otherwise always well. Denies venereal.

*Habits.*—Moderate use of tea, liquor and tobacco.

*Present Illness.*—For the past few weeks the patient has been unable to work on account of the fact that he becomes tired very easily. Headache has been a constant symptom, most

marked during the day. He becomes dizzy and gets out of breath on slight exertion. During the past week he has had difficulty in distinguishing objects, both far and near. During the past few weeks his appetite has been very poor and there has been a constant diarrhœa, not containing blood. Does not vomit. No cough. He has had several attacks of "palpitation of the heart," at which time he has felt dizzy and has been obliged to sit down. These attacks have lasted but a few moments, and have occurred after exertion.

There has been a gradually increasing frequency of micturition during the past five years, and four years ago he had complete retention, at which time he had to be catheterized regularly for three months. When he was not catheterized the urine dribbled away, but he was unable to pass any voluntarily. The patient states that he now passes his water six or seven times during the night and every hour or two during the day; that there has been increasing difficulty in starting the urine; that it comes slowly and drops directly from the meatus; and that dribbling follows the act. He states that the urine is cloudy and that a sediment settles to the bottom of the vessel. There has been no pain associated with urination, and he has never passed blood.

The patient states that he has not lost much weight. His chief complaint is weakness, headache, vertigo, and a difficulty in urination.

*Physical Examination.*—A well developed and nourished man with a yellowish pallor. Eyes: pupils, motions, and reactions normal, no arcus senilis; conjunctivæ, pale. Tongue: thick white coat, pale in color. Throat: very pale. Pulse: equal, regular, fair volume and tension. Heart: right border two fingerbreadths to right of sternum; left border in nipple line; apex in fifth interspace, nipple line; upper border, third rib; action regular; a soft blowing systolic murmur is heard at the apex and is transmitted into the axilla; the aortic second sound is accentuated. Lungs: good resonance, but numerous, sonorous, sibilant, and medium moist râles are heard throughout both chests. Liver dulness extends from the sixth rib to costal margin; edge not felt. Abdomen full, lax and tympanitic, not tender. In the hypogastrium a rounded tumor is palpable, extending half way to the umbilicus, which mass resembles a partially distended

bladder, both by palpitation and percussion. Extremities: moderate œdema about both ankles. Knee jerks and planter reflexes slightly increased. No glandular enlargement. There is a small inguinal hernia on both sides.

*Rectal Examination.*—Right lobe of the prostate slightly larger than the left. The median raphe is forced toward the left, the left lobe being normal in size. Both lobes smooth and of normal consistency, but the right lobe is rather less sensitive than the left. Both seminal vesicles are normal. Small external hæmorrhoids are present.

The urethra not instrumented. Temperature, 99°; pulse, 104.

*Urine Examination.*—Pale and turbid; sp. gr., 1005; alkaline; a trace of albumin; no bile or sugar; urea, .78. Moderate amount of sediment, which shows pus and squamous epithelium. No renal elements or crystals.

*Blood Examination.*—Leukocytes, 6000; red cells, 1,625,000; Hgb. 25 per cent.; marked poikilocytosis, macrocytosis and polychromatophilia. A differential count shows: Neutrophiles, 79 per cent.; basophiles, 19 per cent.; eosinophiles, 2 per cent. Three megaloblasts. One mast cell.

The patient was given Fowler's solution, iron preparations, and urotropine. He continued to run a temperature about normal and a pulse around 100.

*Blood Examination.*—Three days following entrance: Leukocytes, 8000; red cells, 1,200,000; Hgb., 15 per cent. Marked macro-, micro- and poikilocytosis and polychromatophilia; twelve megaloblasts and four normoblasts.

Five days following admission the patient complained that he was unable to pass any water. A tumor was evident over the pubes extending to the umbilicus and urine was issuing from the meatus in drops.

*Urethral Examination.*—A bougie à boule, No. 28 Fr. was passed to the anterior layer of the triangular ligament and withdrawn without meeting obstruction. A soft rubber catheter, No. 12 Fr., could not be passed into the prostatic urethra. A coudé, No. 12 Fr., was passed into the prostatic urethra, where it deviated about 30 degrees to the left during its passage through this portion of the urethra. Forty-five ounces of urine were withdrawn, and no hæmorrhage resulted. The coudé was tied in

position and siphon drainage established. The bladder drained well for four days, and was irrigated daily with a 4 per cent. boric acid solution, the twenty-four hours' amount of urine ranging between 38 and 45 ounces.

The examinations of the urine made were as at entrance. After the bladder had been drained for four days the catheter was removed because it became plugged with sediment. Following the patient was able to pass but a very small amount of urine at a time, and the bladder was constantly overflowing. A residual urine of 38 to 42 ounces was found at several different times.

The patient's chief complaint after being in the hospital one week was the retention of urine, and it was believed that the obstruction was due to prostatic hypertrophy.

Fourteen days after admission a cystoscopic examination was performed by the writer through the courtesy of Dr. Henry Jackson and Dr. Abner Post.

*Cystoscopic Examination.*—A soft rubber catheter, No. 12 Fr., was passed into the bladder, meeting obstruction in the prostatic urethra; 800 cc. of dirty urine withdrawn; bladder cleaned in about twenty minutes; bladder capacity, 850 cc.

The deep urethra and bladder were cocainized by an ounce of a 4 per cent. solution; 250 cc. of sterile water was introduced as an examining medium.

A simple concave, indirect cystoscope was introduced easily to the apex of the prostate. When forced into the prostatic urethra, it met obstruction and the beak deflected to the patient's left to about 30 degrees, and remained so during its passage through the prostatic urethra into the bladder. The bladder wall showed large roughæ deeply injected with many flacks of adherent fibrine (*chronic cystitis*). The trigone was distinct, and also deeply injected. Both urethral orifices were found with an areola of dark congestion about them. They were normal in size and functioning at a normal rate. The urine ejaculated was clear. The vesical surface of the prostate showed two distinct clefts to the right of the median line. (See Fig. 1.)

There was slight intravesical projection of the right lobe. No growths or foreign bodies seen.

*Binannual examination* performed with the cystoscope in the bladder and the finger in the rectum. The prostate showed the right lobe to be slightly larger than the left. The consistency

rather firmer than normal. The left lobe normal in size and consistency. The surfaces of both smooth. The bladder wall is slightly thickened. The prostatic tissue posterior to the urethra not more than 1.5 cm. Tissue to the right of the prostate urethra over 3 cm.

Rotation of the beak over the vesical surface showed the right lobe to project about 2 cm. above the vesical orifice. The elevation was gradual in its decline anteriorly and posteriorly.

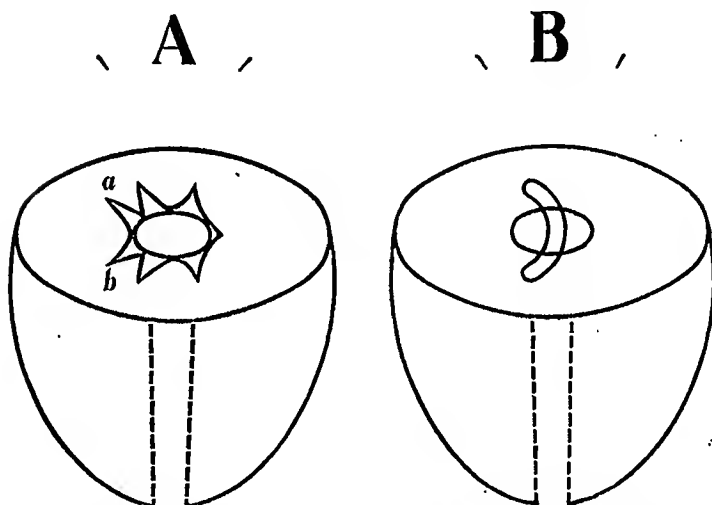


FIG. 1A.—Diagrammatic record of the cystoscopic fields at the vesical outlet, showing two clefts, *a*, *b*, a short distance to the right of a median line.

B.—The actual shape of the vesical orifice determined by transposing the inverted cystoscopic pictures recorded in A, showing the encroachment of the right lobe upon the urethra, deviating it to the left, narrowing it laterally and lengthening it antero-posteriorly.

The prostatic urethra was but slightly lengthened. In withdrawing the instrument the beak was rotated about 30 degrees to the left, where it remained during its withdrawal through the prostatic urethra. The passage was even and the resistance continual.

Part of the distending medium was passed voluntarily by the patient immediately after examination. It contained no blood, but was slightly turbid.

The patient voided his urine rather better for three days following the cystoscopic examination, as is so often the case,

but at the catheterization which was practised night and morning, the residual urine ranged between 28 and 36 ounces, and without the catheterization, the bladder became overdistended and dribbled constantly. The anæmia continued about the same, the patient's general condition not being improved.

*Bottini operation*, twelve days following the cystoscopic examination, performed through the courtesy of Dr. Henry Jackson and Dr. Abner Post.

The operation was performed under local cocaine anæsthesia. The 1.2 cm. blade was used. The right lateral lobe was incised at a mid-point for a distance of 1.75 cm. at the rate of one minute to the cm. out, and 30 seconds of the first cm. back, and one minute on the last .75 cm.

There was no pain during the operation except at the last .25 cm. going back. The cautery blade could not be heated beyond a dull red heat, because of some defect in the electrical connections.

It was originally intended to make two other incisions in the right lateral lobe, one on either side of the median incision. The operation was considered to be incomplete, and the patient was returned to the ward with the idea of repeating the procedure when the electrical apparatus was repaired.

*Following Operation.*—No suppression followed. The patient began to void his urine voluntarily. The urine was voided in three- or four-ounce amounts at short intervals. The urine contained considerable blood and bits of sloughing tissue for about a week. These gradually disappeared.

Ten days following operation, the patient was catheterized for the first time, and a residual urine of 12 ounces was obtained. A soft rubber catheter, No. 18 Fr., was passed without difficulty. There was so much improvement in the patient's condition that further operative procedure did not seem advisable at that time.

The residual urine was tested every three days, and five weeks after operation was reduced to 6 ounces. The patient held the urine at longer intervals, from three to four hours, and passed it but twice during the night. The urine started easily, and passed freely, but the dribbling after urination persisted. Examination of the urine was not different from that at the time of admission, except that the sediment contained a small amount of detritus, and a few blood corpuscles.

*Blood examination* at this date, five weeks after operation, was: Leukocytes, 5,622; red cells, 1,340,000; Hgb., 25 per cent.

The patient had gained considerably in strength, despite the fact that the blood examination was not materially changed during his stay in the hospital.

The improvement in the function of urination seemed to relieve the patient of most of his symptoms except weakness, and he desired to be discharged from the hospital.

The cystoscopic examination at this time, six weeks following operation, was as follows:

*Cystoscopic Examination.*—The bladder was entered with a soft rubber catheter, No. 18 Fr. The residual urine was 3 ounces; urine nearly clear; bladder washed clean in two minutes; bladder capacity, 400 cc.; 320 cc. of sterile water as examining medium. A simple, concave, indirect cystoscope passed without difficulty into the prostatic urethra, through which it passed with a deviation of about 10 degrees to the patient's left. The bladder rugæ distinct, but small, partially perhaps because of the large degree of distension by the examining fluid. The bladder wall was slightly injected everywhere; trigone distinct and but slightly injected. Both uretal orifices normal in appearance. The urine ejaculated clear. The vesical surface of the prostate as in Fig. 2. The right lobe, the one which was incised, shows a concavity which is rounded in outline throughout nearly its whole anteroposterior diameter. The limit of the convexity on the vesical surface is visible, showing that more tissue has been destroyed in the middle of the lobe, and that the destruction has not quite extended to the peripheral edge of the lobe.

*Binual examination* with the cystoscope in the bladder and the finger in the rectum showed the tissue posterior to the urethra to remain about 1.5 cm. and the left lobe to remain about 2 cm., but the latter is more prominent than the right lobe, which is less than 2 cm. on its vesical surface. The elevation which was present on the right lobe at the previous examination is absent, the cystoscope not being drawn in during its rotation. The left lobe, by rectum, is larger than the right. The right lobe, however, still remains the harder. There is no induration and the surfaces are smooth. The median raphe is still slightly convex to the left.

*After Discharge from the Hospital.*—On September 1, 1903,

three months after the patient's discharge from the hospital, an examination of the bladder showed a residual urine of but 3 dr. The patient passed his urine but once during the night, and held it for from three to five hours during the daytime. There was no pain, and no difficulty in starting the urine, which came in a fair stream and which had more projection than at any time since he had been under observation. There was practically no

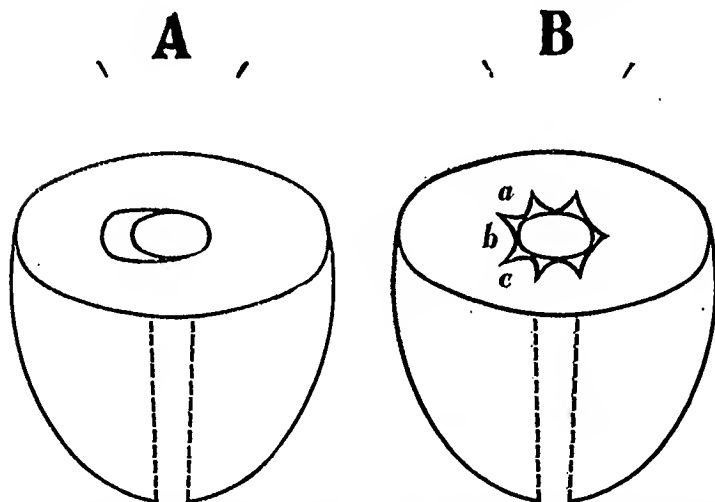


FIG. 2A.—Diagrammatic record of the cystoscopic fields at the vesical outlet, showing three deep convex fields, *a*, *b*, *c* in the right lobe.

B.—The actual shape of the vesical outlet determined by transposing the cystoscopic pictures recorded in A, showing the enlarged vesical outlet produced by sloughing away of the tissue about the incision. (Compare with photograph of the specimen.)

dribbling. The anæmia was much improved. The white cells were 6,500; red cells, 3,500,000; hæmoglobin, 45 per cent.

In November, 1903, the patient was readmitted to the Boston City Hospital on the service of Dr. John L. Ames, because of a return of the anæmia and its associated symptoms. I wish here to express my thanks to Dr. Ames for placing the record at my disposal.

*Blood Examination.*—Leukocytes, 8,000; red cells, 912,000; Hgb., 25 per cent.; achromia and poikilocytosis marked. Differential count: Neutrophiles, 67.6; basophiles, small, 22.5;



basophiles, large 5.3; eosinophiles, 4.6; no normoblasts or megaloblasts.

The patient had been growing weak for about ten days, and during this time had noticed an increasing difficulty in performing the act of urination.

A large soft rubber catheter was passed into the bladder without difficulty, and 12 ounces of residual urine was withdrawn.

The ease with which the catheter was passed showed that the prostatic urethra was of fairly large calibre.

*Urine Examination.*—Pale; slightly acid; slight trace of albumin; sp. gr. 1.010; small amount of sediment consisting of a small amount normal blood; some pus; a few hyalin casts, with blood and renal cells adherent; occasional brown granular casts; much squamous and round cells epithelium.

The residual urine constantly increased in amount with the progression of the anæmia, and six weeks later the right kidney could be felt when the bladder was full but not so when empty. The residual urine had reached 36 ounces, and the twenty-four-hour amount ranged between 85 and 100 ounces. The anæmia at this time was most pronounced.

*Blood Examination.*—Leukocytes, 8,800; red cells, 656,000. Differential count: Polymorphonuclears, 73 per cent.; basophiles (small), 6 per cent.; basophiles (large), 18.5 per cent.; eosinophiles, .5 per cent.; transitional, .1 per cent.; two megaloblasts and one normoblast.

*Urine Examination.*—Pale; neutral; sp. gr., 1.008; slight trace of albumin. Considerable sediment, consisting of pus, normal blood, some small round cells and squamous epithelium; some neck of bladder cells; no casts.

As the anæmia began to improve the patient experienced less difficulty in the act of urination, and after a stay of three months in the hospital the anæmia had greatly improved and its symptoms were absent. The residual urine at this time had dropped to 10 ounces.

*Blood Examination.*—Leukocytes, 11,300; red cells, 2,928,000. Differential count: Polymorphonuclears, 71.2 per cent.; large mononuclears, 6.2 per cent.; small mononuclears, 17.3 per cent.; eosinophiles, 4.5 per cent. Eight mast cells and no blasts.

During the next month the anæmia continued to improve, and the residual urine dropped to five ounces.

There was again a remission of the anæmia and the residual urine gradually increased in amount as the general weakness progressed.

He was admitted to the Long Island Hospital April, 1904.

The general physical examination was as noted at the City Hospital. The blood examination at this time was: Leukocytes, 6,400; red cells, 472,000; Hgb., 10 per cent.; some poikilotytosis and achromia. Differential count: Basophiles, 32 per cent.; neutrophiles, 68 per cent. No eosinophiles or blasts.

The bladder was overflowing constantly and an effort to urinate resulted in the passage of only a few drachms. There was no obstruction to the passage of a No. 18 Fr. soft rubber catheter.

*Urine Analysis.*—Pale; acid; sp. gr. 1014; slightest possible trace of albumin; no bile or sugar. Considerable sediment, consisting mostly of pus. Occasional calcium oxalate crystals and a few small and large epithelial cells.

This attack of anæmia was not so pronounced nor did it persist as long as his previous attacks, and six weeks after his admission to the Long Island Hospital the red cells had increased to 1,616,000, there was only slight achromia, one megaloblast and no normoblasts, and the Hgb. had risen to 30 per cent. At this time the bladder emptied itself except for two drachms. Micturition occurred every two hours during the day and but twice at night. The stream was a little slow in starting, came in fair volume with but little projection and there was slight dribbling after the act.

*Urine Examination.*—Normal color; normally acid; sp. gr. 1011; slightest possible trace of albumin. Small amount of sediment, chiefly pus, with occasional squamous epithelial cells.

The patient continued to gain in strength, and in July, 1904, he was out daily and able to do light work. The Hgb. at this time was 75 per cent. The bladder emptied itself except for three drachms. Urination occurred every four hours during the day and once or twice during the night. The stream started without difficulty, was of good volume, and had fair projection. A No. 20 Fr. soft rubber catheter could be passed into the bladder without difficulty. The urine was normal in color with but little sediment.

The patient's general condition remained good, and in Jan-

uary, 1905, bladder symptoms were absent and the residual urine was but three drachms. The blood examination at this time showed red cells, 2,960,000; Hgb. 45 per cent. Differential count: Neutrophiles, 81 per cent.; basophiles, 18 per cent.; eosinophiles, 1 per cent. One normoblast and three megaloblasts.

In May, 1905, bladder symptoms were absent and there was a residual urine of two drachms. The patient's general condition was good and he was discharged from the hospital.

The patient did light work and remained in fairly good general health for four months. He was readmitted to the Long Island Hospital in August, 1905, on account of a remission of the anæmia and its accompanying symptoms. The patient had lost much in general condition and had complete retention of urine.

This attack of anæmia was pronounced in severity and his general condition remained poor, and the bladder had to be emptied regularly by the catheter for nearly four months. The red corpuscles dropped as low as 1,408,000 and the Hgb. to 15 per cent. The urine became very turbid, the albumin increased, and there was much sediment, consisting of pus, squamous epithelium, casts and renal elements.

About four months after readmission to the hospital there was a gradual improvement in the patient's general condition and the red cells reached as high as 2,400,000 and the Hgb. 50 per cent. At this time the bladder emptied itself except for one ounce.

This improvement was of short duration, the anæmia returned and the patient became very weak. There was complete retention of urine.

*Blood Examination.*—Red cells, 1,004,000; Hgb., 20 per cent.; marked achromia and poikilocytosis. Differential count: Basophiles, 30 per cent.; neutrophiles, 67 per cent.; eosinophiles, 3 per cent.

The patient failed rapidly from this time on, became uræmic, and died one week later.

Following is the autopsy report of the urinary tract, made by Dr. S. B. Walbach, pathologist at the hospital, and also a photograph of the specimen (Fig. 3):

*Kidneys.*—Both kidneys tightly adherent to surrounding fat and muscle tissue. The left kidney is apparently one-third smaller than the other. Both are soft, lobulated, fluctuant. On section both are found

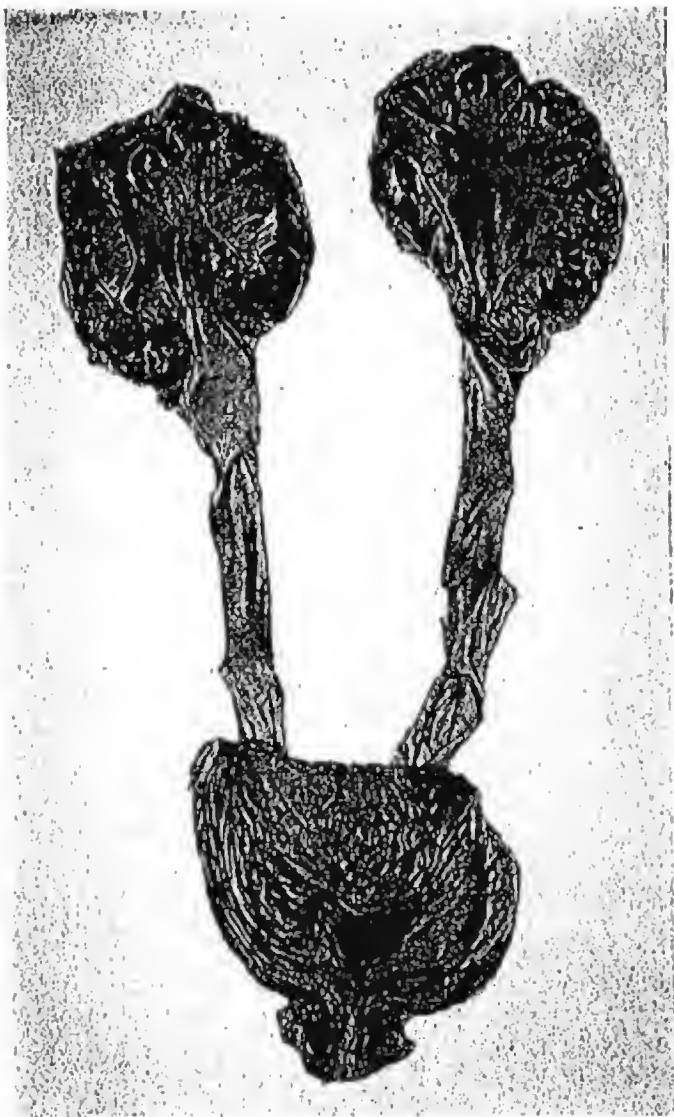


FIG. 3.—Note the crescentic area outlined by dots at the right of the apex of the trigonum, extending into the prostatic urethra to the right of the verru montanum, which is the area of incision of the Bottini operation. Note that the urethra on this side of the verru montanum is greater than on the left, and that the prostatic urethra is unobstructed throughout. Note the thickening of the bladder wall and pronounced surface markings. Note the dilatation of the ureters etc., hiding pelvices and calyces, and the small amount of renal parenchyma.

to consist of a series of peripherally arranged cavities 0.5 to 2 cm. in diameter, communicated with enormously dilated pelves. The surrounding parenchyma is very thin, averaging 1 to 3 mm. thick. The pyramids are atrophied and not demonstrable except in the lower pole of the right kidney, where the cavities are smaller. The capsules are much thickened, dense, white, about 0.5 mm. thick, and cannot be separated from the kidney. Both kidneys contain thin greenish yellow puriform material. The lining of the pelvis in places is thick, and injected, giving a velvety appearance.

*Ureters.*—Both are greatly dilated with much thickened walls. Circumference ranged from 3 to 4 cm. Both show ballooning just before entrance into the bladder. The left ureter leaves the pelvis of the kidney by a tortuous, S-shaped route. Ten cm. above the bladder orifice there is an obliquely placed constricting ridge, projecting into the lumen, reducing the circumference at this point to 2 cm. The right ureter, 20 cm. above the bladder orifice, on posterior wall, has a diverticulum running upwards for 2 cm. This recess has about the same calibre as the main lumen of the ureter, which is constricted here to about 2 cm. The wall between the ureter and recess is thick and on section appears as if formed from the fusion of the walls of adjacent limbs of a loop.

*Bladder.*—Contracted. Contains about 60 cc. of greenish yellow puriform material with abundant coagula. Walls are thick, trabeculated. Mucous membrane is folded, injected, velvety. Some greenish discoloration. Orifices of ureters are prominent and allow easy passage of probes. To the right of the apex of the trigonum is a crescentic cicatrix extending into the urethra.

*Prostate.*—Not large, rather flabby, prostatic urethra is large, lined with scar tissue continuous with cicatrix and bladder. The verum montanum is pushed to the left, and there are two parallel folds of mucous membrane running from it to the apex of the trigonum. The channel to the right of the verum montanum, that which is lined with smooth dense white tissue, is 3 cm. long. Below this the urethra is normal.

#### REMARKS.

The feature of this case which it is desirable to emphasize is the five repeated attacks of intermittent urinary retention associated with the relapses of the anæmia. Concurrent with the changes in the blood and weakness of the general muscular system the bladder wall has lost its contractile power and retention of urine has resulted. As the anæmia has improved and the muscle system has regained its tone the bladder symptoms have diminished and have even been absent. The retention has gradually improved with the patient's general strength

and between the anæmic attacks the bladder has been able to empty itself, except for a drachm or two.

Of course the changes in the upper urinary tract—the hypertrophy of the bladder wall, the dilatation of the uterus, kidney pelvices and calices, and the infection and destruction of the kidney tissue dependent upon the prolonged intermittent intravesical pressure—have still remained.

The case also illustrates the value of the Bottini operation in affording relief to prostatic obstruction by incising the obstructing portion of the gland in a class of cases which will not stand general anæsthesia or the shock and convalescence attending prostatectomy.

That the Bottini operation was of benefit in overcoming the obstruction in the prostate and that these changes in the upper urinary tract were not due to an obstruction to the out-flow of the urine is evident from the fact that between the anæmic attacks the patient was able to start his urine easily, that it flowed freely in fair volume and that the bladder was emptied of its contents except for one or two drams.

The post-mortem specimen shows a patent prostatic urethra at the site of the operation, and demonstrates that the new channel made by the Bottini incision has not become, nor shows any tendency towards becoming obliterated during the three years time.