lithotomy recommended. Three months later, on September 8th, 1886, the patient entered the City Hospital. His condition at that time was about that described, except that he had had diarrhœa for several days.

Under the use of salicin, restricted diet and cleanliness, his condition was so far improved as to allow Petersen's operation to be performed on the fourth day after entrance. For two days before the operation unsuccessful attempts were made to wash out the bladder with a warm solution of boracic acid.

Operation. The usual antiseptic precautions were used. The patient was etherized. A pyriform-shaped bag, well greased, was introduced into the rectum and inflated. The bladder was injected with about ten ounces of warm solution of boracic acid. A rubber ligature around the penis was powerless to keep the bladder distended, as the greater part of the injected fluid came away through the fistulous openings. The distension of the bladder was therefore very imperfect, and the advantages of rectal distension not fully attained. A vertical incision four inches long, was made in the median line above the symphysis: after division of skin, linea alba and fascia transversalis, the knife was dispensed with. The bladder was found readily down in the pelvis, and was now seized with tenaculum and held while an incision of about one and a half inches long was made. Two stout ligatures were at this stage passed through the edges of the wound in the bladder and given to an assistant to hold. The finger was inserted into the bladder and detected the presence of two stones. Both fore-fingers were now introduced in the manner recommended by Sir Henry Thompson, and an effort made to extract the stones but without success. The wound in the bladder was enlarged, lithotomy forceps introduced, and another effort made to dislodge the stones from a pocket in the thickened walls of the bladder; the air bag was now removed from the rectum and the finger of an assistant passed within the sphincter lifted the stones, which were then seized by lithotomy forceps and extracted. A large quantity of gravel-like detritus was removed and the bladder thoroughly irrigated. No attempt was made to suture its walls; ligatures were allowed to remain for twenty-four hours. Two sutures were passed through each angle of the wound, a thick pad of iodoform gauze applied with pressure. The peritoneum was not seen during the operation. The fistulous opening in the perineum was curetted and packed with iodoform gauze. The subsequent care of the case resolved itself into irrigating the bladder, attention to personal cleanliness and supporting the patient. No symptoms of cellulitis or extravasation of urine appeared. Urine came through abdominal wound in diminished quantity until October 6th, when the wound was practically healed. The temperature never exceeded 99°. Great relief from pain followed the operation with marked improvement in the general health of the patient. The fistulous opening in the penile part of penis healed over, that in the perineum is not quite healed, but no water comes through it. The patient was discharged from the hospital October 16th. The stones that were removed were very different in appearance; the larger being quite rough and crumbly on surface and of a dirty grayish color, the other being smoother, harder, and heavier in proportion to its size. Total weight, eight hundred and twenty-seven grains.

A CASE OF SUPRA-PUBIC LITHOTOMY.¹

BY A. T. CABOT, M.D.

THE patient, a man of forty-nine years, entered the Massachusetts General Hospital, September 7, 1886, with the following history: He was in good health up to eight years ago, at which time he began to have pain and difficulty in micturition. This trouble gradually increased, the pain being often very severe after passing water, and urination became very frequent. He has noticed blood in the water but once.

During the last two years his sufferings have been extreme; he has been confined to the bed much of the time, and has become addicted to the use of opium.

During the last eight months his stream has been getting very small, and he has been in the habit of using bougies to obtain relief. Attempts by physicians to reach the bladder have been unavailing, and have caused considerable bleeding from the urethra.

He was, at entrance, very much emaciated, and was troubled by chronic diarrhœa, which was accompanied by great pain through the rectum and bladder. The urine, which passed in a very small stream, almost by drops, was extremely foul, ammoniacal, and loaded with pus. A stricture arrested the sound behind the scrotum; the prostate was somewhat enlarged.

On September 11th, ether was administered, a fine filiform bougie was, after some difficulty, passed through the stricture, and it was divulsed. A searcher was then introduced, and a large stone was felt.

The lithotrite did not pass easily, but was caught in false passages, one of which was of considerable length. After a long, careful trial, it finally entered the bladder and grasped the stone, which was hard, and measured two inches in the diameter seized.

It was evident that with so large and hard a stone, and with a urethra offering such obstacles to the passage of instruments, litholapaxy would be unwise, and the size of the stone made the supra-pubic incision the preferable one among cutting operations.

No rectal colpeurynter was at hand, so that nothing further was attempted on that day.

September 15th (two days later), supra-pubic lithotomy was performed as follows: The patient being etherized, a gum-elastic catheter was introduced, and a rubber band was tied snugly around the penis, to prevent the escape of water. The bladder was emptied, washed out, and then filled with a two per cent. solution of boracic acid. Without any forcing, it held sixteen fluid-ounces, and even then, the supra-pubic region was tympanitic to percussion.

The colpeurynter, which had been introduced into the rectum, was now slowly filled with water until fourteen fluid-ounces had been thrown in. As the rectal bag filled, the bladder could be felt more and more distinctly above the pubes, and the percussion over it became duller, though never reaching flatness.

An incision three and a half inches in length was made from the symphysis pubis upwards, and was carried down between the muscles into the prævesical space. The peritoneum was then seen to reach down nearly by to the pubes.

At first this was not easy to draw up, but after incising a thin fascia below it, which seemed to be the prolongation of the transversalis fascia (fascia propria of Velpeau), the left forefinger could be hooked under

¹ Reported to the Boston Society for Medical Observation, October 4, 1886.

the peritoneal fold, and this was easily drawn out of the way while the bladder was incised.

The finger of the left hand then followed the knife into the bladder, and by it the vesical wall was readily held up while the incision was enlarged to the necessary extent. The stone was then seized and extracted. It was very hard, heart-shaped, and weighed 1,180 grains.

There was no hæmorrhage of any account. Two rubber drainage-tubes were introduced, and as the water was allowed to escape from the rectal bag, they were carried down with the floor of the bladder as it sank into the pelvis. They were then secured in place by stitching them into the lower angle of the wound, and the bladder having been again thoroughly washed out, an antiseptic dressing, with iodoform gauze next the wound, was applied.

The drainage-tubes were left of sufficient length to be carried over the side of the bed into a bottle, and by their syphon action they kept the bladder empty. The dressing was changed daily, and irrigation was practised twice a day with a boracic solution. The double tube made this possible without disturbing the dressing.

For the first twenty-four hours after the operation there was considerable pain, probably exaggerated by the patient, and more difficult to control on account of his previous morphia habit.

It is of interest to note how slight and of how short duration was the fever following the two operations. The morning following the division of the stricture the temperature was 101°. The next morning it was normal, and in the evening following the operation for stone it reached 102.4°, but after that never exceeded 100°.

On account of the disabled condition of the urethra, the drainage was kept up longer than would usually be necessary. One tube was removed on the twelfth day, and the remaining one on the fifteenth day after the operation.

A sound (about No. 25 French) was passed, and slipped easily along into the bladder without catching in any of the false passages. The wound rapidly contracted, and the greater part of the urine passed by the urethra.

On the twentieth day after the operation the patient was up and about, with only a small, fistulous opening where the wound had been, and on the twenty-sixth day he went home by his own wish.

There is some interest attaching to the indications for the selection of the appropriate operation in this case. The effect of false passages in increasing the risks of a litholapaxy I have never seen mentioned, and yet, in case of a stone of any considerable size, their existence so complicates the operation as to add greatly to its dangers.

In the case that I have reported, had the stone been of moderate size and of soft consistency, its removal could have been effected with perhaps two introductions of the lithotrite, and two more of the evacuating tube, and with care, this amount of manipulation would have been possible without serious injury to the urethra, but with a stone of the size found, the repeated introduction and prolonged use of instruments would have been required, and would have caused great damage to the parts. Lithotomy was, therefore, indicated, and the size of the stone made the suprapubic method preferable.

RECENT PROGRESS IN PATHOLOGY AND PATHOLOGICAL ANATOMY.

BY WILLIAM F. WHITNEY, M.D.

THE PHYSIOLOGICAL FUNCTIONS OF THE MARROW AND ITS RELATIONS TO DISEASE.

THE interest which has been aroused of late years from the discovery by Bizzozero and Neumann of nucleated red corpuscles in the marrow and the changes which have been noticed in it in association with pernicious anæmia have induced Geelmuyden¹ to take up the subject.

It has been known for a long time that in mammals during their foetal condition the red-blood corpuscles were provided with nuclei, and that this is a persistent condition in the lower vertebrates. In the fœtus they are found in blood, but in the greatest numbers in the liver and spleen, and these two organs have been regarded, therefore, as their place of development. They occur first in the marrow in extra uterine life, while they disappear at this time from the blood and organs. From these premises Bizzozero and Neumann naturally drew the conclusion that this was the source of their supply after birth.

Before giving the results of his own work a brief description of the generally-received details of the kinds and structure of the marrow is given, as essential to a clear understanding of the subject.

Three sorts have been distinguished. The yellow or fatty, the red or lymphoid, and the gelatinous marrow. The last is found only under pathological conditions: the first occurs in the adult, in all the bones of the extremities, even in the spongy ones; while the red marrow is restricted to the bones of the trunk, namely, the vertebral column, ribs and sternum.

The cells of the red marrow vary greatly in form and character. If a fresh preparation is examined in a three-fourths per cent. solution of common salt there is seen a mass of round cells of all sizes. The protoplasm of these is partly homogeneous and in part contains a number of refractive granules. In close relationship with these stand the so-called nucleated red-blood corpuscles. These are small, more or less hyaline cells, more or less colored with hæmaglobine. At times they contain two distinct nuclei and the cell body shows indication of a line through the middle as if about to increase by division. Sometimes the nuclei are found partially protruding from the protoplasm, and even look as if lying free in a saucer-like depression. The author does not assert that the nucleus is lost in this way, but he has found nothing to support the older theory that it breaks up into granules and is dissolved, undergoing in this way, a sort of atrophy. Large granular cells with a complicated nucleus, called myeloplakes, are always found in the marrow. These lie imbedded in the parenchyma and are to be distinguished in many ways from the osteoclasts lying close to the walls of the medullary spaces. Besides these there are spindle and star-shaped connective tissue cells, more or less rich in protoplasm, in large numbers.

Of especial interest are the pigmented cells and those containing blood corpuscles, in as far as they represent marked degeneration of the latter. The number thus contained may vary from one to twenty, but in rare instances as many as fifty have been counted in a single cell. In these all the steps of de-

¹ Virchow's Archiv., Vol. 105, p. 136.