

the obturator. I have had a tube made 11.5 cm. long, for use in bladders which are drawn high up by pregnancy and tumors. The smallest size is for use under cocaine. I usually employ size 2 when the patient is under narcosis. The battery is dry and the conducting wires are insulated in a rubber-covered cord. The tubes and obturators are sterilized by boiling, the lamp by wiping with five-per-cent. carbolic-acid solution.

The great advantages obtained by this cystoscope are: a tube for inspection free from obstructions and free from light rays, either direct or reflected; the

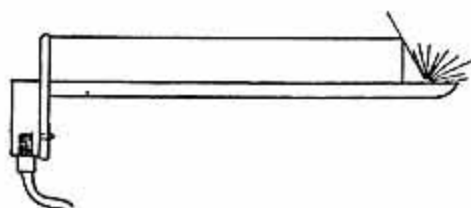


FIG. 1.—The Cystoscope. The obturator is not shown.

absence of necessity for focussing rays of light, which embarrasses the operator in his manoeuvres when a head mirror or lamp is employed; the passage of the rays of light directly to the object to be inspected; the absence of all the disadvantages inherent in the use of the cystoscope of Nitze; and, lastly, the perfect ease with which demonstrations can be made; absence of heat; absence of urine about the trigone; absence of the necessity for pumping out urine.

Posture of the Patient.—This plays a very important part in the examination of the female bladder. All of you who have seen a case of exstrophy of the bladder know the degree of the intra-abdominal force upon the bladder. When the bladder is empty this force usually presses the bladder into a triangular

AN IMPROVED METHOD OF EXAMINING THE FEMALE BLADDER, ADMITTING INTRAVESICAL OPERATIONS AND TREATMENT OF THE URETERS.

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It will not be necessary for me to detail the various methods of cystoscopy, nor to enter into a criticism of all of them. You are contemporary with their evolution, and are fully aware of the technique of the several procedures. After showing you these instruments for illuminating the bladder, for removing foreign bodies, and for catheterizing the ureters, I will make a demonstration on this cadaver. But a few words on the principles involved in the procedure may not be amiss.

Instruments.—As dilators I employ the straight male sound, from 25 F.—36 F. The cystoscope consists of a main tube for inspection, alongside of which is attached a smaller tube for carrying the lamp and the stem which holds it. The tube for illumination extends beyond the tube for inspection, and consequently the rays of light project beyond and outside the tube for inspection, no rays entering the latter. The light illuminates 100° of the bladder circumference, 260° being in shadow. The heat from the light is taken up by the metal of the tube. The lamp, lamp-holder, and wires are completely insulated. Neither urine nor other fluids can short-circuit the current when this apparatus is connected. The tube for inspection is perfectly free from rays of light as well as from the lamp, and therefore inspection is made of an illuminated object and not through rays of light (Fig. 1). The tube is also free for the purpose of making applications and passing the ureteral catheters, removing neoplasms and foreign bodies. The tubes measure: 0.6 cm. x 1 cm., 1 cm. x 1.3 cm., 1.2 cm. x 1.5 cm. Each tube is 8.7 cm. in length, exclusive of

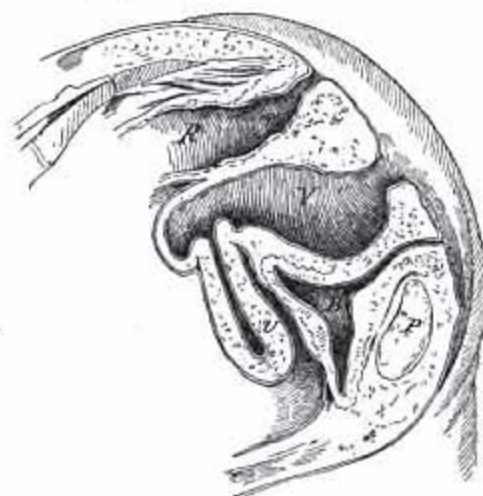


FIG. 2.—The Position of the Organs in the Knee-Chest Posture. (Frozen section by Berry Hart.)

form. When the viscus is thus shaped it is impossible to make a proper cystoscopic examination of its interior. The reason for this is found in the folds which the mucous membrane assumes when the bladder is empty. Therefore, it is very desirable to distend the bladder so as to straighten out the rugæ and make a plane surface of its interior. This is done by either fluids or air. Of the first I need speak no further than to ask you to consider that first simple proposition of your elementary physics which deals with the passage of light rays from a light medium, the air, to a denser, water. Thus, direct inspection through an open speculum of a water-filled bladder is impracticable; and when fluids are employed some form of

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closed tube must be used, with the attendant difficulties of treating the bladder when diseased conditions



FIG. 3.

are found, of catheterizing the ureters, and of removing neoplasms and foreign bodies. We are, therefore, compelled to employ some method which will distend the bladder with air and secure an unobstructed view of the entire bladder wall.

When Kelly first brought out his method it marked a distinct advance. Upon first seeing him employ this I was struck with the embarrassment caused by the constant presence of urine, and by the inadequate distention of the bladder. Furthermore, the light by which the organ was illuminated was a reflected light. The first position he used was the dorsal with elevated hips, but no release of intra-abdominal pressure was secured. I saw this at once and devised in February, 1894, my table which secured the proper posture. This I have used ever since. Kelly changed the posture of his patients to the knee-chest, the one he now employs and the one I wish to contrast with mine (Fig. 2).

"In virgins and nulliparæ the bladder walls balloon out so much upon atmospheric distention that the base is carried up toward the sacrum, and becomes so markedly concave that the ureteral openings can scarcely be seen; the observer has to drop the handle of the speculum to such an extent that he is obliged almost to bring his head under the pelvis to find them. This difficulty will be obviated by first introducing into the vagina a little speculum which lets in the air and causes the anterior vaginal wall to drop down, bringing the base of the bladder into the plane of vision. If the distention is still too great after this manoeuvre, the difficulty may then be overcome by introducing within the vagina a cotton pack large enough to hold the anterior wall down, or a small inflatable rubber bag, or an instrument shaped like a spatula with a strongly curved handle to make pressure on the vaginal wall and bring the ureteral orifice into view."

I quote Dr. Kelly's words, for he can express these disadvantages of the knee-chest posture better than I. But even when the embarrassing recession of the ureters has been overcome by distention of the vagina, the element of focussed light is present. All the disadvantages of the three methods of examining the bladder which I have mentioned are done away with by the procedure I offer you.

The patient is put on the back in the lithotomy posture (Fig. 3). With straight sounds I dilate the urethra to a 30 or 36 F. But no dilatation is needed when the smaller tube is used under cocaine. I then introduce the obturated speculum and evacuate the urine.

In women who have flaccid abdominal walls or who have marked prolapse of the anterior vaginal wall it is advisable to pass the catheter immediately before they are placed on the table; for after such are on the table in the lithotomy posture the bladder is not easily emptied. The bladder having been emptied, the table is lowered into the requisite angle, usually about 45°. The uterus now sinks away from the pubes and drags with it that portion of the bladder which is covered by peritoneum (Fig. 4). This, being attached also to the pubes, is straightened out. At the same time the cervix sinks away from the vulva and the base of the bladder is also straightened. The bladder assumes the shape of an open equilateral triangle with rounded corners. The extent to which this gravitation of the pelvic viscera takes place is readily seen by inspecting the suprapubic area. This will be found much sunken. The advantage of this posture over the knee-chest is due chiefly to the straight lines which the vaginal segment (in which the ureteral orifices are found) and the pubic segment assume.

In the knee-chest posture the bladder can be made to dilate somewhat by air, but both the pubic and vaginal segments are thrown into curved lines. In the knee-chest posture the bowel and vagina being closed, as the air rushes into the bladder the pubic segment actually falls further anterior than normal, while release of the intra-abdominal pressure from the anterior plane of the pelvis acts just as would a

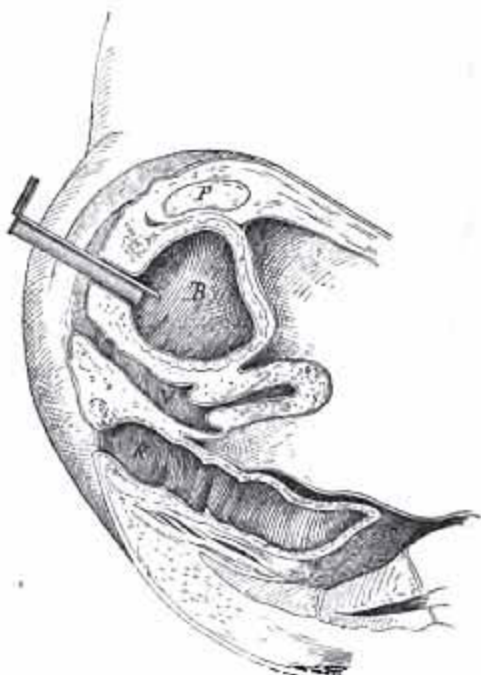


FIG. 4.—Shows the Effect of Atmospheric Pressure on the Bladder in my Posture. (Pryor.)

bladder overdistended by urine; the cervix falls backward, and the vaginal segment of the bladder approaches the sacrum and rectum, thus concealing the ureters.

Gravity in the knee-chest posture militates against

a symmetrical dilatation of the bladder. If you open the vagina at the same time you do the bladder, as is often necessary before you can see the ureters, of course the posterior pelvic plane moves up and the difficulty is partially overcome.

When you place a patient in the knee-chest posture and open the vagina, the posterior vaginal wall recedes toward the sacrum (Fig. 2). Leave the vagina closed, but allow atmospheric pressure to act on the interior of the bladder, and the vaginal walls are practically one. Thus the anterior vaginal wall recedes toward the sacrum with the posterior, and the ureters are dragged out of easy access and view. With my position no such thing occurs, for the uterus, tending by gravity toward the pelvic brim, becomes partly an abdominal organ and symmetrically opens the bladder as air is admitted to the latter. You can experimentally defeat this by holding the uterus in the pelvis with the closed fist on the belly before lowering the table; and you can overcome the obstruction to the descent of the uterus, in fat women, by lifting up the belly fat after the table is lowered.

There should be no restraint by clothing or dressings as the table is lowered.

Inspection.—I first examine the ureteral orifices and the trigonum, for there we find most of the lesions. I then sweep the instrument over the lateral vesical walls, and by turning the handle down make the light illuminate the pubic segment. I know of no other method by which every portion of the bladder wall can be inspected. Since I have begun employing this method I have found lesions above the trigonum sufficiently often to convince me that no search of the bladder should be considered thorough which does not embrace all its cavity. In catheterizing the ureters for the purpose of securing separate specimens in ureteral and kidney lesions, I have been able to secure sterile urine from both ureters even when acute cystitis existed (*bacillus pyogenes*). This will show with what ease the ureteral orifices can be cleansed and the ureteral catheters passed without touching the sides of the cannula. My cases I will not detail, as they will not aid in my explanation of the physics of the questions I introduce. As a method of demonstration to students it is most excellent. I have shown both ureters to sixty men and passed the ureteral catheters within an hour.

A question of priority is always raised when a presumably new method or instrument is shown. My table and posture I devised in 1894. I bought Chetwood's urethroscope in November, 1899, and at once saw its defects as applied to the female bladder. I gave an instrument maker my order with a written detailed statement of what I wished, and received the first week in December, 1899, my perfected instrument. I made demonstrations with it to my classes and showed them the ureteral orifices and bladder mucosa during December, 1899.

The idea of a separate tube for the light alongside the tube for inspection is borrowed from an old cystoscope which employed this arrangement for the purpose of sucking out the urine while reflected light was thrown in. Otherwise in every way the instrument is original as is the posture.