

does not exceed 21 cm. ($8\frac{1}{2}$ inches) in length, a mere incision will set things right in most cases (p. 299).

The urethra is dilated chiefly by the growth of the lateral lobes

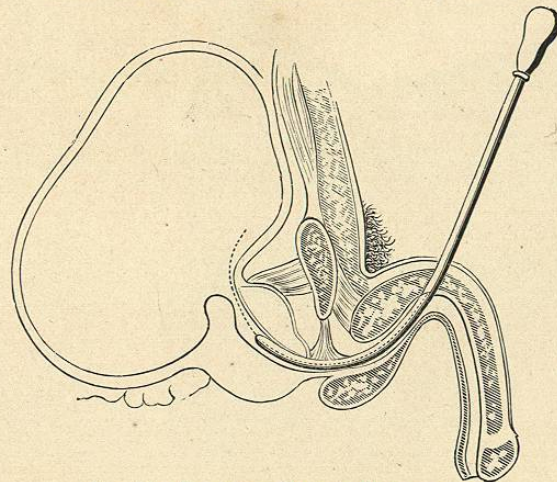


FIG. 74.—POSTERIOR MEDIAN HYPERTROPHY.
Compare the urethral curves in Figs. 74 and 75.

which enlarge on each side of it and spread it out on a vertical plane, so that, from being a transverse slit, it is altered to a vertical one, with perhaps a curve to one side or the other, where a projection in one lobe fits into a depression in its fellow of the opposite side. The dilatation may be so great that an ordinary sound can

be rotated quite freely within the canal, thus giving the false impression that the bladder has been reached. The curve of the urethra is lengthened. That is, its internal orifice is carried upward and backward, and the canal, instead of having the short normal curve, sweeps in a curve of much longer radius, a curve that will not transmit the ordinary steel sound, but requires special instruments with the long prostatic curve (Fig. 78). The urethra is further deformed by the presence of the bar, behind which the canal forms a distinct pouch, or by the projection into it of tumours from the various lobes, notably the middle lobe, which sometimes blocks the way completely after the fashion of a ball valve, or may allow the urethral current to flow in one or two streams at either side of its base.

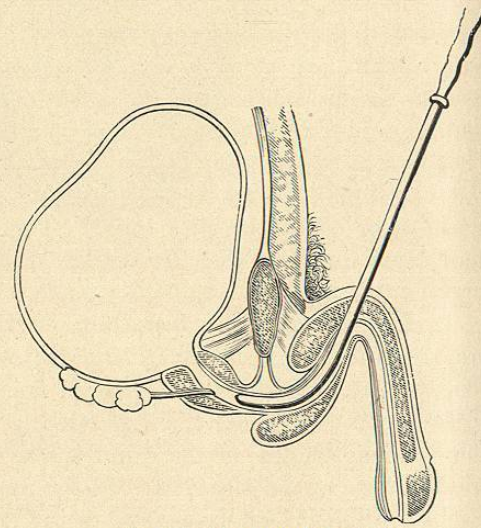


FIG. 75.—HEALTHY PROSTATE.

PATHOLOGICAL PHYSIOLOGY AND SECONDARY MORBID CHANGES

Retention, Congestion, Inflammation—these are the Fates of the prostatic.

Retention.—The causes of retention of urine are to be found both in the prostate and in the bladder. The prostate is primarily at fault. I do not remember to have seen retention of urine, whether complete or incomplete, in any prostatic who had not some obstruction at the neck of his bladder, some elevation of the urethral orifice (whether such elevation was absolute or merely relative to the bladder), by bar, middle lobe, or contracture of the neck of the bladder. These changes about the urethral orifice disturb its physiological relation to the bladder. When in the act of urination the bladder contracts, it forces the urine over the prostatic bar with great difficulty, and thus it is overstrained. To estimate the effects of this strain, the condition of the bladder at this time of life must be borne in mind. In the child the organ is ovoidal with the sharper end at its neck: it has no floor. But as adult life is reached it settles down into the pelvis. Its trigone becomes more and more horizontal. It acquires a floor. As age advances it tends to sag more and more. In the female it bulges down until it forms a cystocele. But in the male the bladder neck is supported by the urethral and prostatic attachments to the p \ddot{u} bes, and, as the bladder sags, it thus tends to pouch behind the prostate, the trigone swings around until it forms the anterior incline of this pouch—the *bas fond*, as the French call it. While there may be some *bas fond* without prostatic hypertrophy, without obstruction of the urethra, such a *bas fond* has no clinical significance. But when there is urethral obstruction, with an extra strain upon the bladder, and heightened vesical tension at a time of life when the muscles are becoming fibrotic and losing their energy, the result is a relatively rapid pouching of the floor of the bladder, a general weakening of its muscle, and an inability of the organ to empty itself completely. The *bas fond* is never dry; there is always some urine left in the bladder; in short, there is *partial retention* of urine. It is as though the bladder were a tank with the outlet upon one side instead of at the bottom. However often the water is allowed to drain off from the tank none of its contents below the level of the outlet pipe can escape and the tank cannot be completely emptied.

As a result of this vesical derangement, and because of the low vitality of its adenomatous structure, the prostate, perhaps still bearing the scars of ancient battles with the gonococcus, is very

subject to attacks of *acute congestion*. A Christmas dinner, an exposure to cold, particularly of the legs, a slight alcoholic excess, may bring on acute congestion in a prostate that has given no previous trouble. The patient may have had a little retention of urine quite unconsciously, until some day his acute congestion comes and he cannot pass water. Perhaps he succeeds in relieving himself by dint of hot baths and straining; perhaps his urine has to be drawn from him. The attack may be lasting, or transitory, it may or may not terminate in inflammation; in any case, it causes a temporary *complete retention of urine*, increases the chronic partial retention, and enhances the effects of this retention upon the upper urinary organs. And the constant pressure of the retained urine produces in turn a *chronic congestion* of the prostate.

The Bladder.—The bladder is far from healthy. Its walls, instead of being smooth on the surface and of even thickness, are thickened in some places, thinned in others, and the mucous membrane is thrown into irregular ridges by isolated bundles of hypertrophied muscle, while between these ridges it is bellied out into pouches or diverticula. In general, the cavity of the bladder is dilated or contracted, its wall thickened or thinned, but in all cases, even when the thickened muscular wall bears every sign of great strength, an examination of the muscle tissue reveals that, although there be some real hypertrophy, the bundles of muscle fibres are surrounded and infiltrated by a notable amount of fibrous tissue, sufficient evidence that the bladder is fighting a losing battle (p. 341). Clinical evidence of this soon appears in the guise of a veritable atony of the bladder (p. 344). Many French authors, following Guyon and Lannois, consider this sclerosis of the vesical muscle a feature of the *sclérose urinaire*, natural in old age; but English and American writers attribute the sclerosis, as well as the macroscopic changes in the urinary organs, entirely to the triad of retention, congestion, and inflammation. According to this more plausible view no special *sclérose urinaire* need be invoked.

The Ureters and Kidneys.—After the bladder has begun to feel the effects of its futile struggle, and is undergoing the changes just noted, the upper urinary organs feel the distention. The ureters begin to dilate, first at their vesical orifices, then higher and higher up. In places they attain 2 and 3 times their normal size. Next, the renal pelvis, with the surrounding kidney substance, gives way before the ever-increasing pressure. A hydronephrosis—usually small—is established, and the renal parenchyma slowly and silently atrophies (p. 544).

Congestion.—The prostate is surrounded by a plexus of veins so large and so closely interwoven as to suggest the cavernous spaces of an erectile tissue. (Cf. Guépin.¹) A similar, but smaller, plexus gives erectile power to the verumontanum and the floor of the prostatic urethra, and the gland itself is pierced by numerous branches connecting those plexuses. These groups of veins form one of the connecting links between the portal and the inferior caval systems. Such is the basis of prostatic congestion. An organ so bathed in venous blood falls an easy prey to active, *acute congestion*, the result of exposure to cold, overeating, overdrinking, overexertion, sexual irritation; or to passive, *chronic congestion*, from pressure of residual urine, from overdistention of the bladder, or from the torpidity of intestine so common with advancing age—in fact, due, fundamentally, to that general sluggishness of the pelvic venous circulation that shows itself under the form of varicose veins of the leg, hemorrhoids, and chronic constipation. The congestion is always more marked at night. Whether this is due to spinal or to local congestion is not clear; clinically, however, the congested prostate is always more irritable by night than by day. Hence the characteristic nocturnal frequency of urination of the prostatic.

Inflammation.—We have seen how easily retention leads to congestion. Congestion and inflammation are even more closely allied. It would be to no purpose to recite here the whole tale of inflammations spreading from the prostate and the prostatic urethra to the surrounding tissues and to the remotest corners of the genital and urinary tracts. Suffice it to say that the prostate may become inflamed spontaneously, or as the result of instrumentation, and that any and all of the genito-urinary organs may be infected from it, while the bladder and kidney are necessarily involved soon after the prostatic inflammation is established. This train of *ascending urinary inflammation* once it has become chronic does not disappear so long as the obstacle to urination remains; and in the great majority of cases it is to this that the patient ultimately succumbs, unless relieved by the surgeon.

Phosphatic vesical *calculus* is a common result of the combined retention and inflammation.

In the more advanced stages of prostatic disease the patient gradually fails under his *urinary toxemia* and *septicemia* (p. 561).

¹ Guyon's Annales, 1897, xv, 305.