

ATROPHY OF THE PROSTATE

Atrophy of the prostate is uncommon. It may occur after the substance of the organ has been materially injured by abscess within or by pressure of a stone outside. Physiological atrophy of the prostate occurs in a certain proportion of old men. This atrophy Thompson observed 11 times among 164 persons over sixty years of age. Messer met with it 20 times in 100 cases (von Frisch), and others give still higher estimates.

The prostate fails to develop in eunuchs, and many authors believe that it atrophies after castration in later life. Idiopathic failure of development has also been observed.

In the atrophied prostate the glandular tissue is shrunken and wasted, and the stroma is but little affected.

Symptoms.—The symptoms of atrophy of the prostate are somewhat obscure. Both enuresis and retention have been attributed to it. Although I have met with it a number of times in old men I have never seen any symptoms referable to it. On the contrary, I have seen retention with atrophy of the prostate relieved by the removal of its cause—contracture of the neck of the bladder.

CHAPTER XVI

HYPERTROPHY OF THE PROSTATE

THE true nature and pathogenesis of hypertrophy of the prostate are not known. We can only describe it as a disease of the latter years of life, a chronic, non-inflammatory hyperplasia of all the tissues of the gland, but especially of the epithelial elements, diffuse in its character, and subject to inflammatory attacks and secondary fibrous metamorphosis.

ETIOLOGY

Age.—The one thing known about the etiology of prostatic hypertrophy is that it occurs at middle age, never giving any trouble before the forty-fifth year, and rarely appearing after the seventieth. Although individual cases have been reported at the ages of nineteen (Stretton), twenty-five (Englisch), thirty-seven (Thompson), etc., the disease cannot be looked for before forty-five. Lydston and others believe that the prostate begins to hypertrophy in the third decade of life, yet there is no clinical evidence of any such change until twenty years later. In fact, the patients begin to suffer, for the most part, between the ages of fifty and sixty.

To explain the relative infrequency of hypertrophy of the prostate after the seventy-fifth year, Thompson has advanced the theory that the physiological atrophy of old age makes itself felt at this time of life, so that if a man escape until then he is all the more likely to escape thereafter. This senile atrophy does not, however, promise any relief to the sufferer, for when once the urinary mechanism has been upset by the hypertrophy the secondary phenomena cannot be alleviated by any slight atrophy of old age.

Frequency.—According to Thompson's figures, 34% of men reaching the age of sixty have enlarged prostates, and less than half of these (15% to 16% of the whole) suffer from the disease. Many authors give far higher estimates. Thus Johnson,¹ in examining the prostates of 360 men, found hypertrophy present in 79%, yet only 16%

¹ Internat. J. of Surgery, 1899, xii, 98.

—Thompson's own estimate—suffered from the disease. This is only one example of the wide discrepancy in all the statistics relative to hypertrophy of the prostate, a discrepancy founded on confusion of prostatic hypertrophy with contracture of the neck of the bladder, more than on any other one thing (p. 317).

The size of the hypertrophy bears no relation to the age of the patient, nor, as we shall see, to the symptoms.

Pathogenesis.—Though no satisfactory theory has yet been advanced to account for hypertrophy of the prostate, many ingenious suppositions have had ardent defenders, and so require at least a brief notice.

1. *Arterio-sclerosis* (Guyon,¹ Lannois²).—The lesion of the prostate is supposed to be only part of a series of senile changes affecting the whole urinary tract and associated with general arterio-sclerosis.

Casper³ and Motz⁴ overthrew this theory by showing that sclerosis could exist without hypertrophy, and hypertrophy without sclerosis. The association of the two appears to be purely fortuitous.

2. *Fibro-myoma* (Velpeau⁵).—Velpeau suggested that there exists a biological analogy between the prostate and the uterus, and a histological analogy between fibro-myoma of the uterus and hypertrophy of the prostate. Thompson⁶ amplified and defended the theory, and it has recently received additional weight by the observed effects of castration upon uterine myoma and prostatic hypertrophy (p. 294).

This theory has been exploded by the modern recognition of the fact that the prostate is analogous to the uterus neither in development, in structure, nor in function, and that the hypertrophied prostate is not fibro-myomatous, but adeno-fibromatous.

3. *Sexual Senility* (White⁷).—“The function of the testis, like that of the ovary, is two-fold—the reproduction of the species and the development and preservation of the secondary sexual characteristics of the individual. The need for the exercise of the latter function ceases when full adult life is reached, but it is possible that the activity of the testis and that of the ovary in this respect do not disappear coincidentally, and that hypertrophies in closely allied

¹ Guyon's Annales, 1885, iii, 148.

² De l'appareil urinaire des vieillards, Paris, 1885.

³ Virchow's Archiv, 1891, cxxvi, 139.

⁴ Structure histologique de l'hypertrophie de la prostate, Paris, 1896.

⁵ Leçons orales, Paris, 1841, iii, 478.

⁶ On the Diseases of the Prostate, 4th Ed., 1873, p. 53.

⁷ Annals of Surgery, 1893, xviii, 152.

organs like the prostate and uterus are the result of this misdirected energy” (White and Martin¹). The facts adduced by White cannot be denied; but his theory, based upon the false prostatic-uterine analogy and the implied power of the testicle to cause hypertrophy of the prostate and devised to defend the cause of castration as a remedy for hypertrophy of the prostate, is a gratuitous assumption not borne out by the facts (p. 294).

4. *Congestion.*—A chronic congestion of the gland has been considered by many the chief predisposing cause of prostatic hypertrophy. Many varieties of congestion have been insisted upon. Some authors incriminate a pelvic congestion, such as is caused by gormandizing and a sedentary life, and expressed by hemorrhoids. Others insist upon chronic urethritis or sexual excess; and a few would even blame a too strict continence. As many cases can be adduced to support as to contradict these claims, but proof on either side is wanting.

MORBID ANATOMY

Microscopic Changes.—There are three recognised forms of prostatic hypertrophy—a diffuse, hard scirrhus form, a diffuse, soft adenomatous form, and a form characterized by the growth of encapsulated tumours within the gland. The earlier authors have been fairly well in accord on Casper's definition of these three forms, viz., (1) diffuse fibro-myomatous hypertrophy, (2) diffuse adenomatous hypertrophy, and (3) circumscribed fibro-myoma. Von Frisch retains this classification; but it seems no longer tenable in face of the works of Griffiths,² Motz,³ and Albarran.⁴

These authors recognise only one form of primary hypertrophy, a hypertrophy of all the elements of the gland, but mainly of the epithelial elements.⁵ The adenomatous hypertrophy may be diffuse or circumscribed. By a secondary congestive or inflammatory process this adenomatous prostate may then become sclerosed and replaced by fibrous tissue, leaving only a few traces of glandular tissue here and there to show the original nature of the growth. I shall follow this scheme, recognising an adenomatous and a fibrous hypertrophy, either of which may be diffuse or circumscribed, and both of which may be encountered in a given specimen side by side.

The most striking features seen in a section of a hypertrophied prostate are the discrete tumours, large and small, bulging from the

¹ Genito-Urinary and Venereal Diseases, 1898, p. 995.

² J. of Anat. and Phys., 1890, xxiv, 236.

³ *Op cit.*

⁴ Guyon's Annales, 1898, xvi, 1, 130, 225.

⁵ Griffiths has seen one pure myoma.

cut surface. These are commonly present in great numbers, varying from the size of a pea to that of a peach stone. Sometimes they are even larger, in which case they are often complex, each large tumour containing several small ones. They are soft and glandular or hard and fibrous, and they may be enucleated readily, leaving a smooth-walled cavity (Figs. 68, 69).



FIG. 68.—ADENOMA ENUCLEATED FROM A HYPERTROPHIED PROSTATE.

The hypertrophy may be due chiefly to these tumours or to a diffuse epithelial proliferation without any notable number of discrete tumours, or the greater part of the overgrowth may consist of dense fibrous tissue. Although one form or the other predominates and gives the growth its general character of multiple adenoma or fibroma, or of diffuse adenoma or fibroma, every specimen has a more or less mixed character, with here and there areas of normal gland tissue.

Glandular Elements.—“The glandular elements of the prostate hypertrophy in some acini more than in others, and a certain pressure is thus exerted on the surrounding tissue. The *culs-de-sac* become stretched and narrowed about the spheroids of hypertrophied glandular tissue. Those

nearest the spheroidal bodies lose their epithelial lining and appear as mere slits. If these peripheral slits are multiple the spheroids may be enucleated. As we progress farther from the little tumours the glands show the effects of pressure less and less, and their epithelium, at first flat or cuboidal, is finally quite normal. . . . We have never seen these tumours formed exclusively or even principally, of muscular tissue, as noted by Virchow. On the other hand, we have seen tumours composed chiefly of new connective tissue or fibrous tissue. Yet they seemed not to differ radically from the others, for a careful examination shows that they are formed alike, but that, in the case

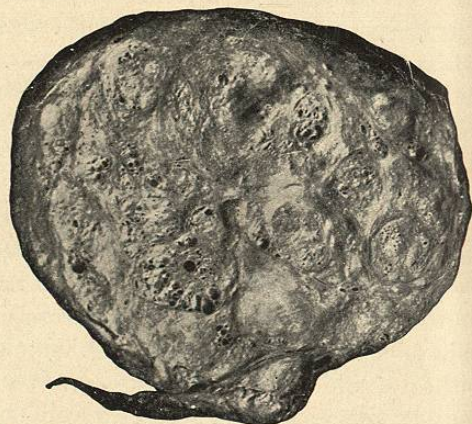


FIG. 69.—SECTION OF A LARGE PROSTATIC ADENOMA, SHOWING ITS COMPOSITE CHARACTER.

of the fibrous spheroids, the glandular tissue has undergone an inflammatory atrophy. In such cases numerous atheromatous vessels, and the contours of the obliterated *culs-de-sac* may be discerned” (Motz).

The same lesions may be made out in the diffuse forms of hypertrophy, with the difference that the little areas of epithelial proliferation are not surrounded on all sides by the slit-like acini, and hence cannot be distinguished as tumours, nor can they be enucleated.

Stroma.—The muscular and the interstitial tissues of the prostate hypertrophy with the epithelia, but in a purely secondary manner. Hypertrophy of the stroma never occurs independently, but only in connection with, and to a greater or less degree subsidiary to, the epithelial proliferation.

The secondary changes by which the hypertrophy becomes fibrous have been noted above. The capsule is thickened, as are the trabeculae that run from it among the tissues of the gland, and there are areas of sclerosis about the atheromatous vessels.

Macroscopic Changes.—Inasmuch as the hypertrophy may concern any or every part of the organ, a number of varieties of hypertrophy exist and may be tabulated as follows:

		Thompson. ¹	Pré-dal. ²	Desnos. ²	Motz. ³	Watson. ⁴	Total.
Total hypertrophy.	General	74	7	17	8	14	120
	Notably median	19	23	..	1	..	43
	Notably lateral . . . . .	..	..	..	5	..	5
	Notably unilateral	19	..	5	2	..	26
							194
Partial hypertrophy.	Lateral only	5	15	12	10	4	46
	Anterior commissure only	3	..	..	..	..	3
	All but the median lobe	3	..	..	..	..	3
	Median only . . . . .	..	19	14	..	9	42
	Median and unilateral . . . . .	..	..	..	1	2	3
	Pedunculated tumour . . . . .	..	..	..	..	1	1
							98
		123	64	48	27	30	292

This table shows that all parts of the gland were involved in 65% of the cases, while at least one lateral lobe was enlarged in 84%, both

¹ *Op. cit.*, p. 39.

² Desnos, *Maladies des voies urinaires*, 1898, p. 386.

³ *Op. cit.*

⁴ *Operative Treatment of the Hypertrophied Prostate*, 1888.

in 83%. Hence, in 84 out of every 100 cases the prostatic enlargement may be diagnosed by rectal touch. My own clinical observation would lead me to put the percentage even higher. Desnos's cases of hypertrophy ranged in weight from 23 to 85 grammes (the normal prostate weighs 20 grammes). Much larger tumours are occasionally met with, but in the usual run of cases the prostate is smaller than an orange.

The most notable changes associated with hypertrophy of the prostate are (1) bulging of the posterior surface of the gland, (2) elevation of the urethral orifice, (3) production of a middle lobe, and (4) lengthening and distortion of the prostatic urethra.

1. **Posterior Enlargement.**—We have seen that in a large proportion of cases the lateral lobes of the prostate are enlarged. Such

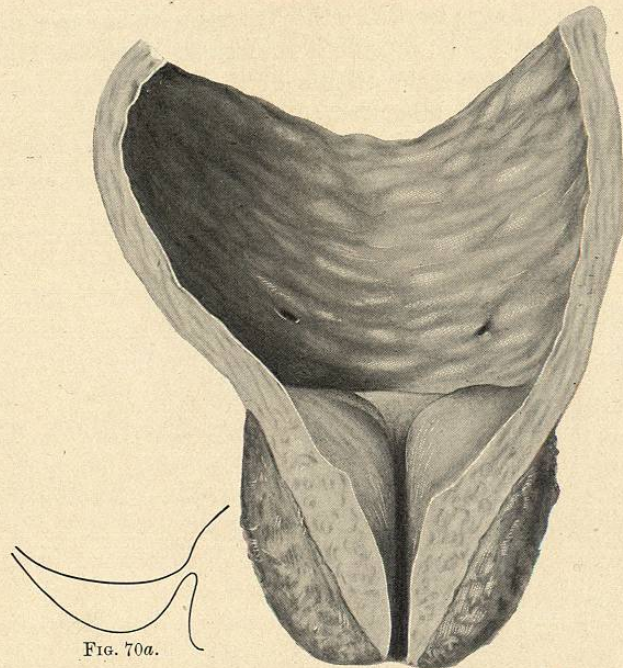


FIG. 70a.

FIG. 70.—BILATERAL HYPERTROPHY OF THE PROSTATE WITHOUT MEDIAN ENLARGEMENT. The sagittal section (70a) shows the elevation of a fold of mucous membrane between the lateral lobes.

an enlargement may always be felt by rectal touch. The examining finger, instead of impinging upon a scarcely perceptible organ, encounters a large mass, perhaps the size of a plum or a mandarin orange, perhaps so much enlarged that its upper border cannot be reached. To estimate the size of the growth the finger is swept over

it from side to side, into the sulci between it and the lateral wall of the rectum, and, if possible, over the top of the tumour. Its pro-

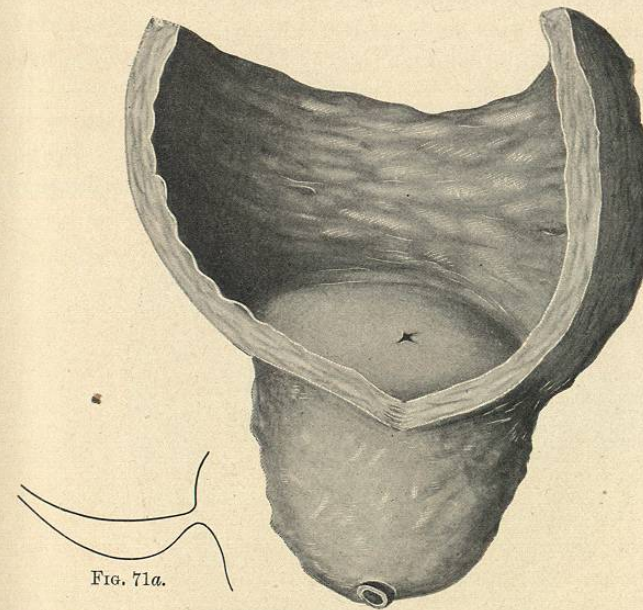


FIG. 71a.

FIG. 71.—GENERAL HYPERTROPHY OF THE PROSTATE, THE MEDIAN AND LATERAL LOBES FORMING A SINGLE MASS.

The sagittal section (71a) shows the elevation of the urethral orifice.

jection may thus be fairly estimated and its general character of elasticity or hardness determined. In shape the mass is usually quite globular. It may be furrowed down the centre, showing that the overgrowth has chiefly affected the two lateral lobes, but has spared the posterior commissure. One lobe may be more hypertrophied than the other. Small phleboliths may be felt upon the gland, or hard nodules within it.

2. **Elevation of the Urethral Orifice.**—When bladder and prostate are normal, the urethral orifice practically lies on the same level as the trigone and the floor of the bladder. But every form of prostatic hypertrophy disturbs this relation. If the growth is purely lateral, whether on one or both sides, the tumour lifts a fold of mucous membrane at the urethral orifice (Fig. 70). If there is general hypertrophy, the posterior commissure projects upward into the bladder, pushing the urethra before it and forming the so-called *bar at the neck of the bladder* (Figs. 71, 72). The *third lobe* (Fig. 73) acts in the same way. Finally, the chronic posterior urethritis, so often met with in this disease, may cause a true *contracture of the*

neck of the bladder (p. 317) with increased elevation of the urethral orifice.¹

In order of clinical frequency the causes of elevation of the urethral orifice are: (1) Bar and contracture with about equal frequency, (2) the third lobe, and (3) rarely, the lifting of the orifice between lateral projections.

3. **The Third or Middle Lobe.**—This term is loosely used to indicate any projection into the bladder, be it bar or tumour. Properly speaking, the middle lobe of the prostate is a distinct outgrowth

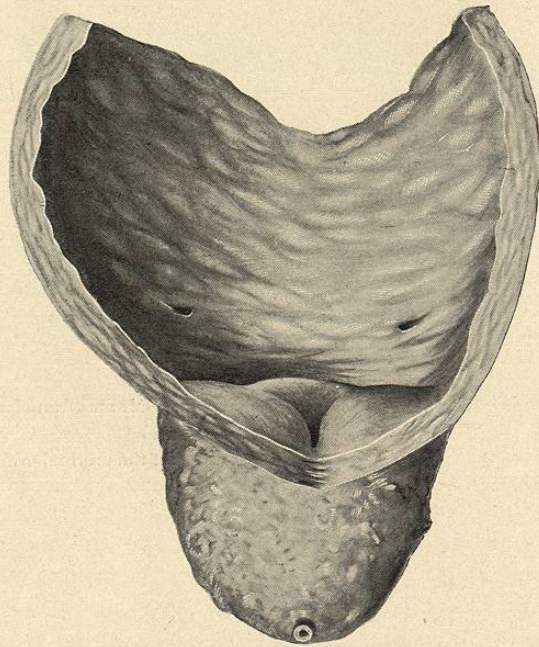


FIG. 72.—GENERAL HYPERTROPHY OF THE PROSTATE, WITH RELATIVELY SLIGHT MEDIAN ENLARGEMENT IN THE FORM OF A BAR.
The sagittal section is similar to 71a.

from the neck of the bladder or from the floor of the prostatic urethra (Fig. 73). This tumour springs from the posterior commissure of the gland, and was supposed to originate within it. But Jores² showed that "its first beginning occurs in the accessory prostatic glands which lie just under the mucous membrane, and the projec-

¹ Rochet (Traité de la dysurie sénile, Paris, 1899) gives some space to the consideration of those unusual forms of hypertrophy in which the upper lobe is chiefly affected, and there is no elevation of the urethral orifice. Such a case was also illustrated in the previous edition of this treatise.

² Virchow's Archiv, 1894, cxxix, 224.

tion into the bladder is due at first to the hypertrophy of these alone." Later, the hypertrophy of the pars intermedia usually forms

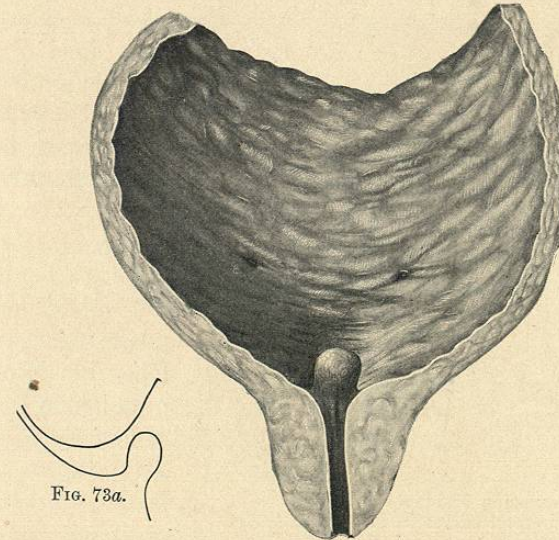


FIG. 73.—PEDUNCULATED MEDIAN ENLARGEMENT.

The sagittal section (73a) shows an obstruction quite as pronounced as in 70a and 71a, but less lengthening, and distortion of the prostatic urethra.

the base of the tumour with the third lobe as its apex. These outlying glands are usually situated at the urethral orifice "directly beneath the mucous membrane and between the circular fibres of the bladder and the middle isthmus of the prostate" (Alexander¹). There are a few similar glands lying along the floor of the urethra, and occasionally these become hypertrophied and form projections in the floor of the urethra itself. The middle lobe is rarely more than 2 cm. in diameter. It will be observed that some median enlargement is noted in 81% of the tabulated cases (p. 253).

4. **Lengthening and Distortion of the Prostatic Urethra.**—The prostatic urethra is altered in length, size, and curve (Figs. 70a, 71a, 73a, 74, 75). *The urethra is always lengthened* by the increased size of the prostate, whether the hypertrophy be general or circumscribed. But the lengthening of the canal is not very great, unless there is a middle lobe or a prostatic bar to be surmounted before the bladder is reached. This is an important point in relation to prostatectomy, since a long urethra means that a great deal of tissue must be removed to enable the bladder to empty itself, while, if the urethra

¹ Med. Record, 1899, lvi, 982.

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

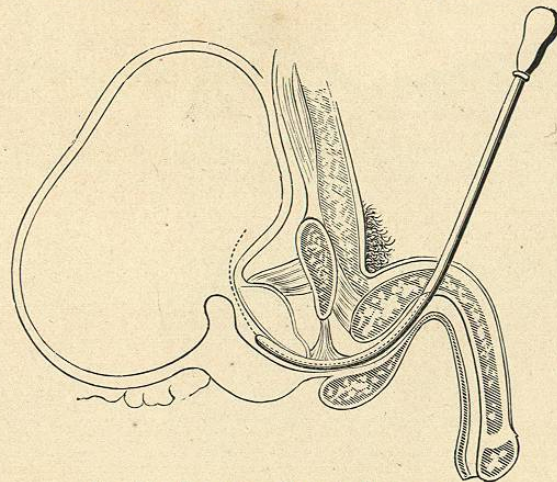


FIG. 74.—POSTERIOR MEDIAN HYPERTROPHY.
Compare the urethral curves in Figs. 74 and 75.

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.

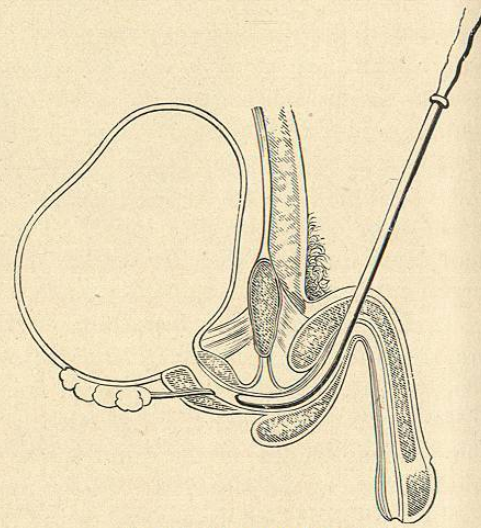


FIG. 75.—HEALTHY PROSTATE.

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