

Obscure diseases of the urethra / by E. Hurry Fenwick ; with special chapters on urethral carcinoma and calculus by J.W. Thompson Walker.

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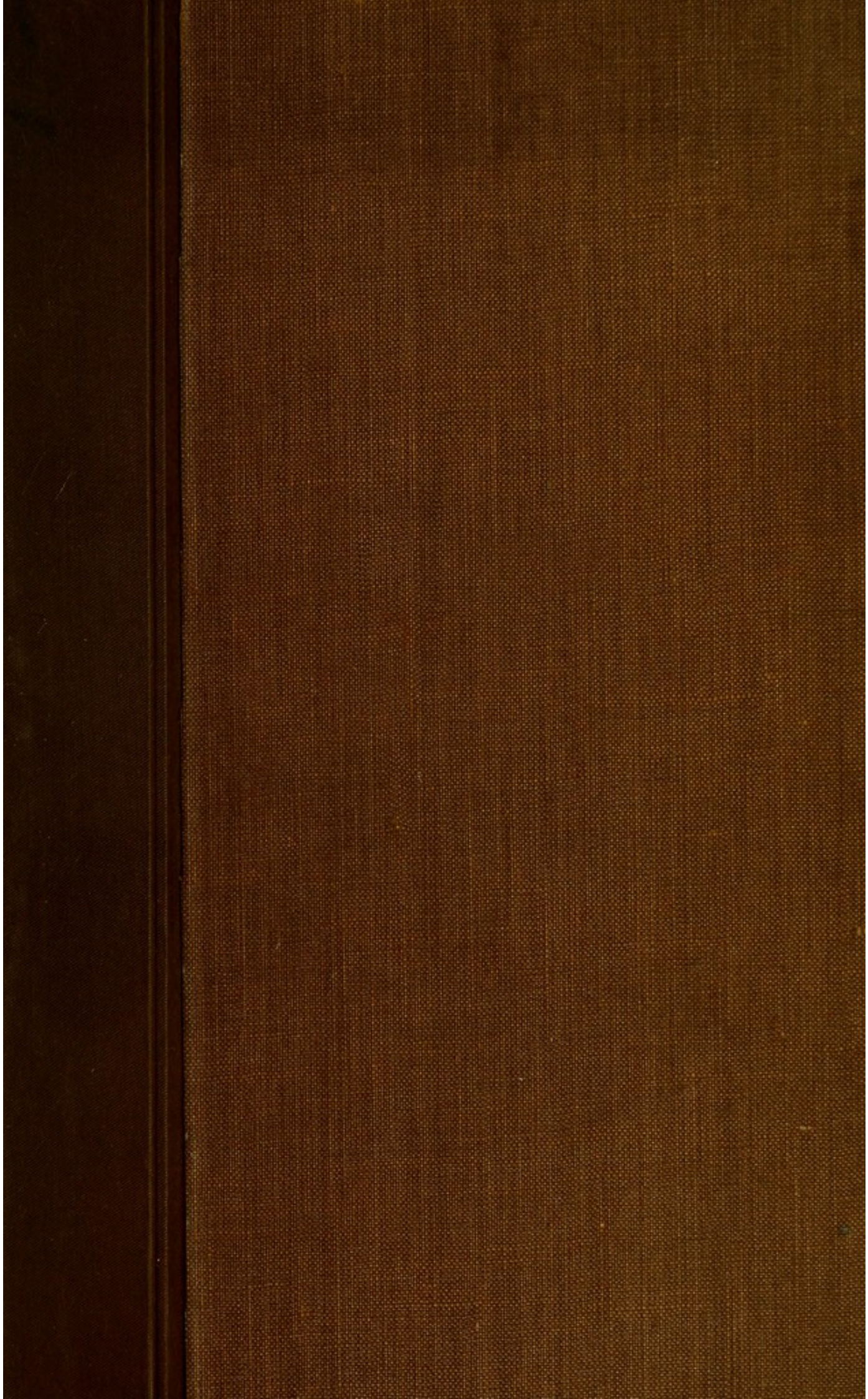
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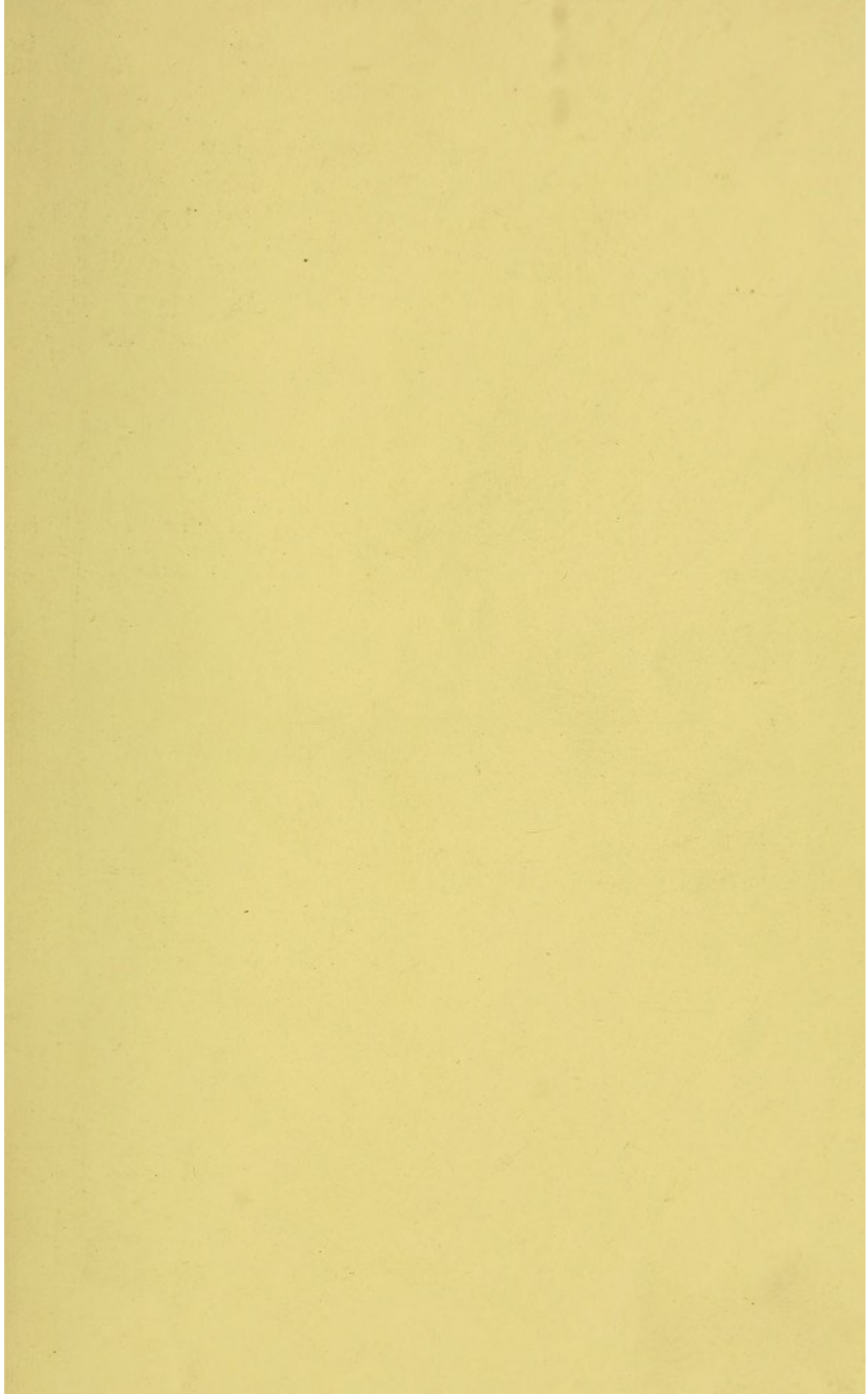
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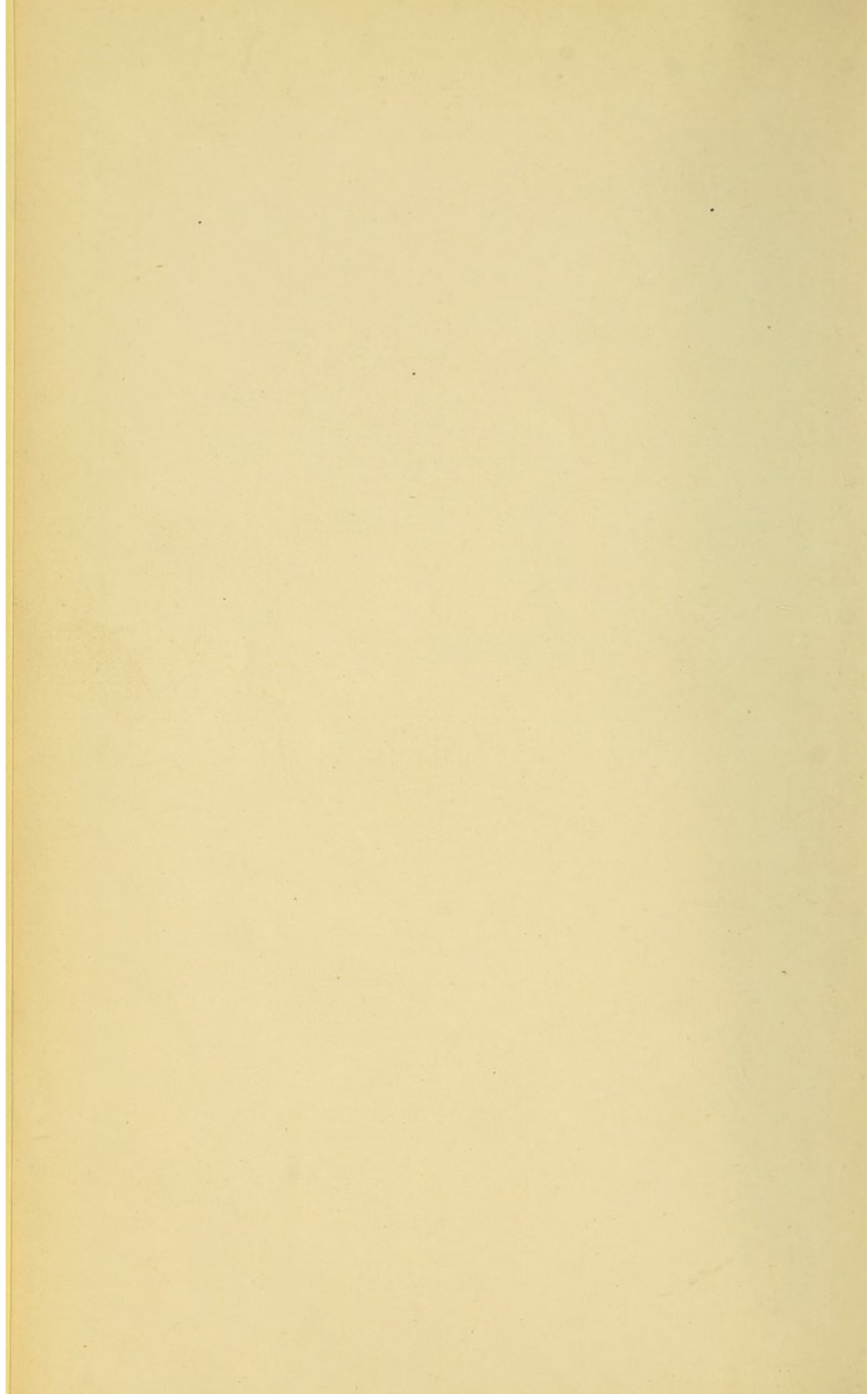
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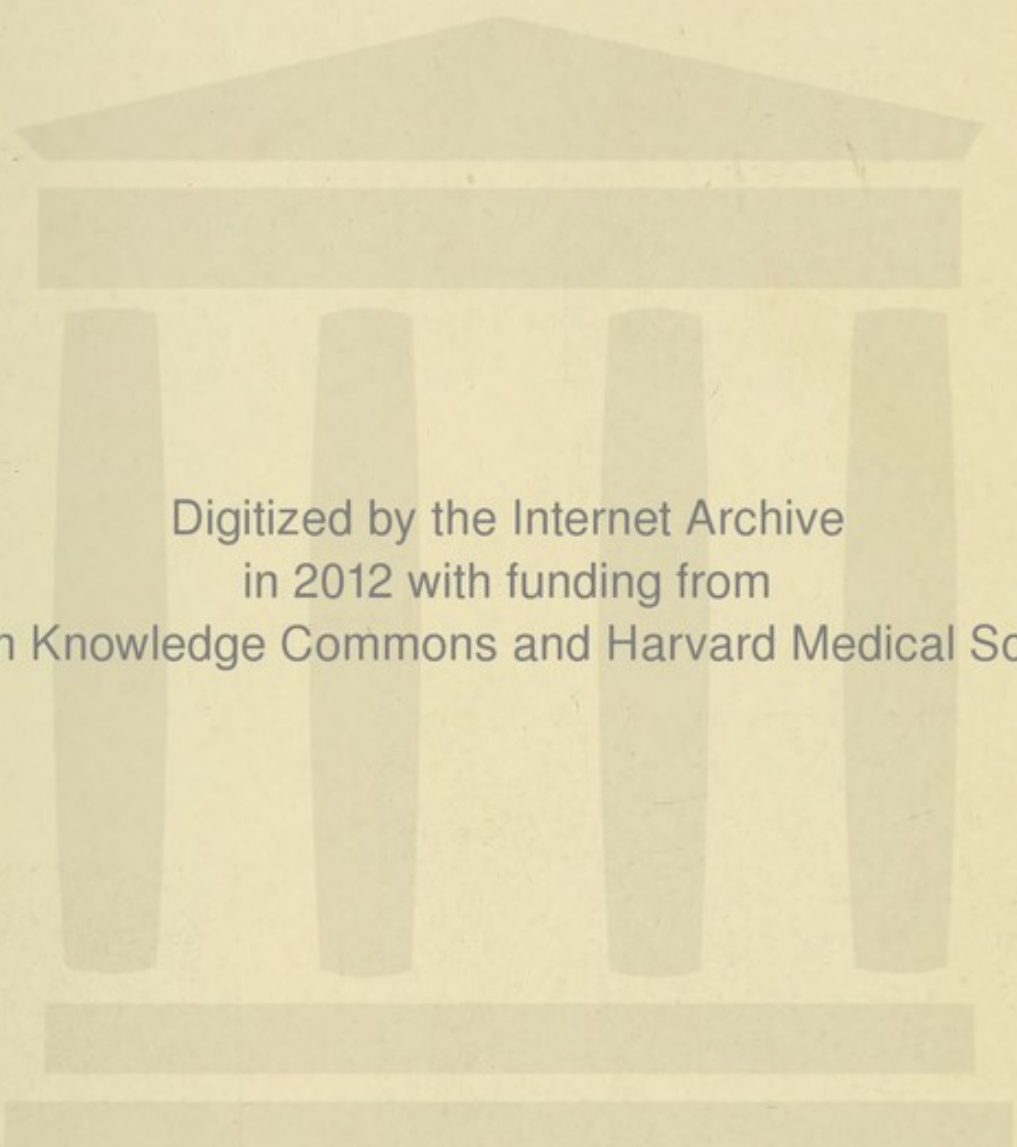
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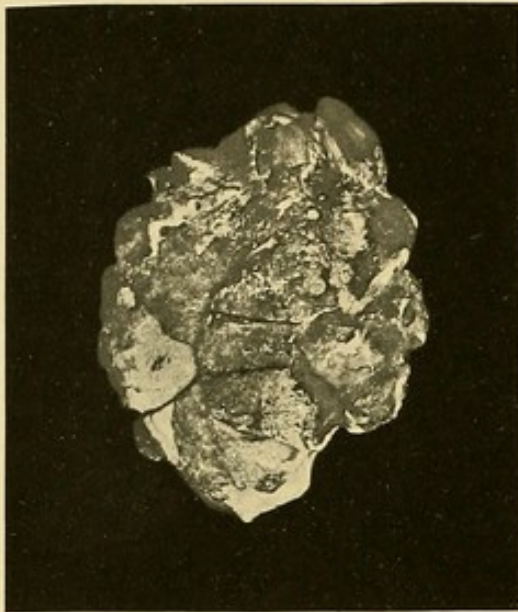


FIG. 1.
Multiple prostatic stone, comprising
thirty small stones.

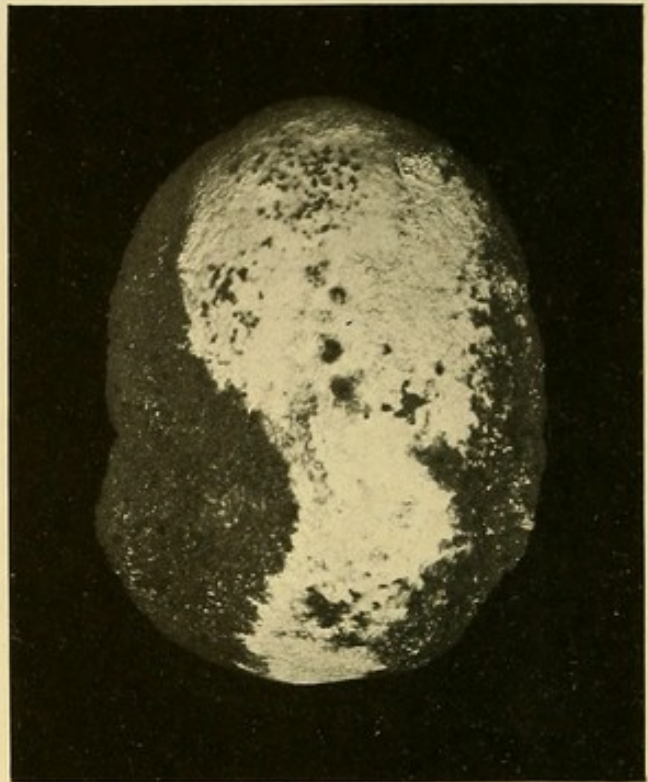


FIG. 2.
Single prostatic stone, filling entire capsule.

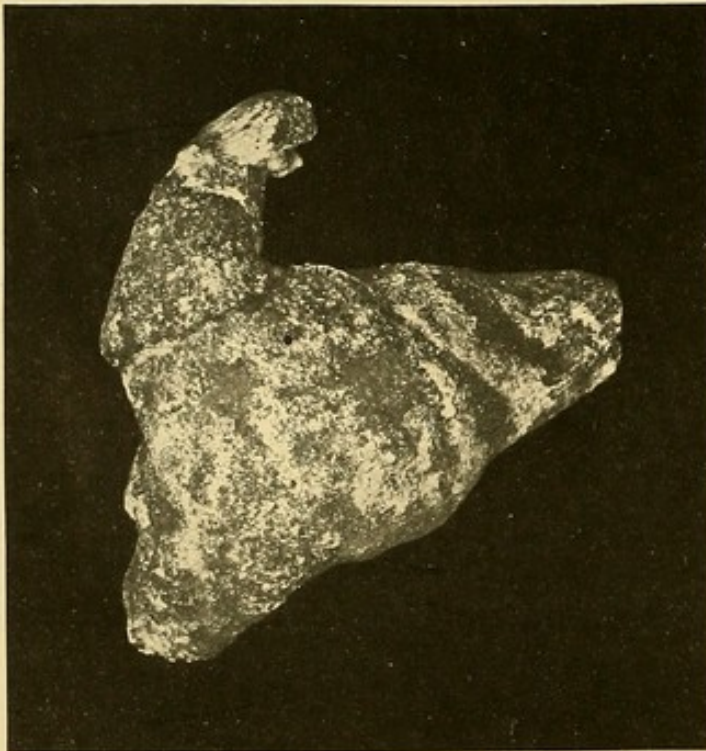


FIG. 3.
Bulbo-membrano-prostatic stone.



FIG. 4.
Compound glans urethral stone.

OBSCURE DISEASES OF THE URETHRA.

BY

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SURGEON TO THE LONDON HOSPITAL; SURGEON TO ST. PETER'S HOSPITAL FOR URINARY
DISEASES.

WITH SPECIAL CHAPTERS ON

URETHRAL CARCINOMA AND CALCULUS

BY

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LONDON

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BY THE SAME AUTHOR.

DIE VENEN DER VORDEREN RUMPFWAND DES MENSCHEN. With Prof. W. BRAUNE. (Veit & Co., Leipzig.) 1884.

THE ELECTRIC ILLUMINATION OF THE BLADDER AND URETHRA. Second Edition. (Churchill.) 1889.

THE CARDINAL SYMPTOMS OF URINARY DISEASE. (Churchill.) 1893.

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TUMOURS OF THE BLADDER. Jacksonian Prize Essay. Fasc. i. (Churchill.) 1897.

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ULCERATION OF THE BLADDER. Simple, Tuberculous, and Malignant. (Churchill.) 1900.

OPERATIVE AND INOPERATIVE TUMOURS OF THE BLADDER. (Churchill.) 1901.

GOLDEN RULES OF SURGICAL PRACTICE. Third Edition. (Wright & Co., Bristol.) 1892.



P R E F A C E.

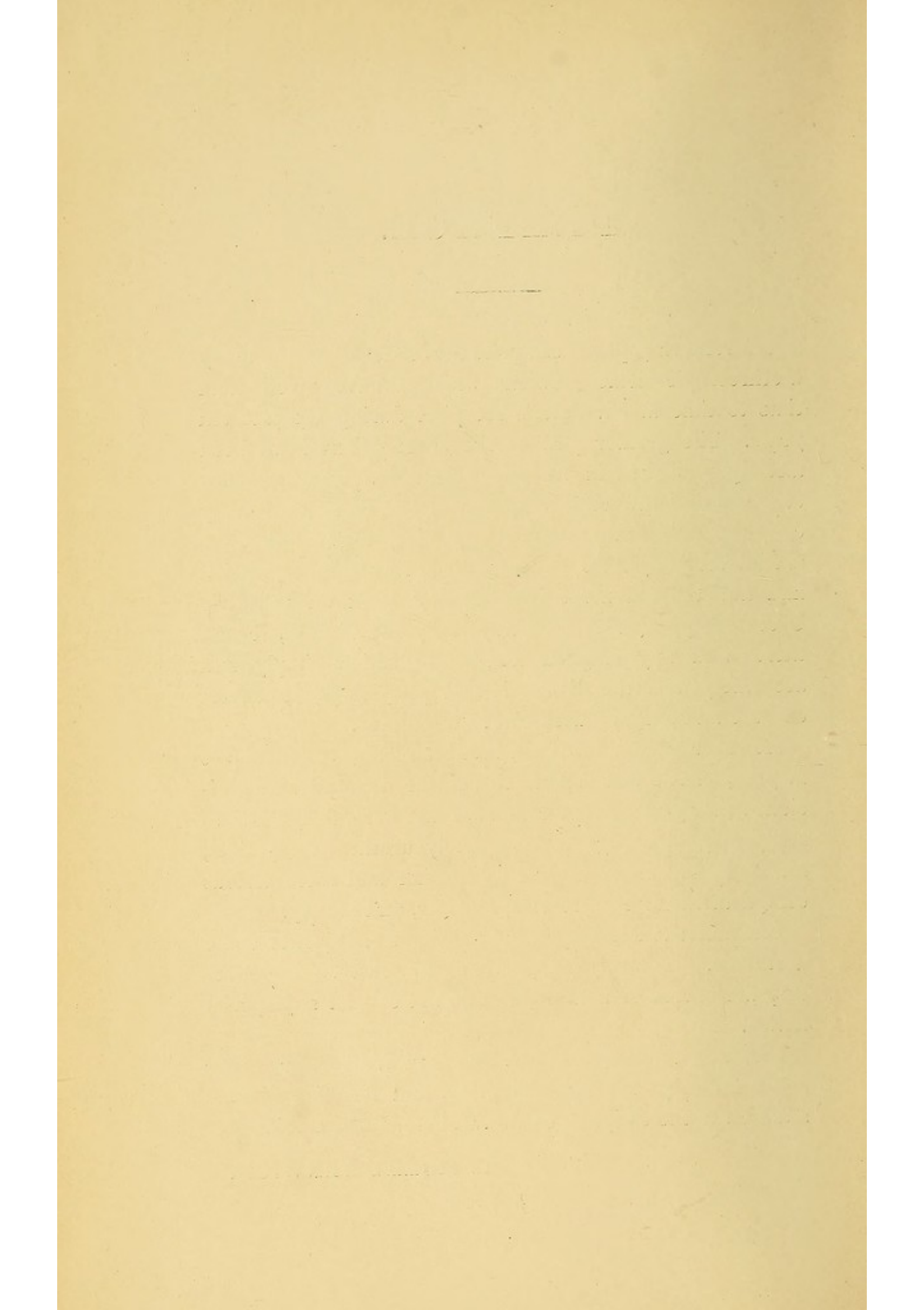
THE following pages comprise the substance of the many urethroscopic demonstrations which I have given from time to time at St. Peter's Hospital during the last ten years. The greater part of the observations have been already published in various periodicals. They are now collected and revised in response to the request of many of those who have attended my out-patient clinics. I should certainly have hesitated to act on this suggestion had not the second edition of my book on 'Electric Urethroscopy' (1889) been hopelessly out of date, or had there been any English text-book dealing simply and accurately with the diagnosis and practical treatment of obscure and chronic diseases of the urethra.

However insignificant and uninteresting this subject may be, no one who aspires to become a sound and judicious urinary surgeon can afford, I am sure, to neglect to study very carefully and completely urethral complaints, for they often bring in their train other and more serious complications of the prostate, bladder, and kidney.

I have not touched upon the hackneyed subject of acute urethritis. I rarely encounter such cases. Moreover they are barren of interest, and do not call for any special notice.

I am much indebted to Mr. Thomson Walker for seeing my manuscript through the press, and for his valuable addition to the chapters on urethral stone and carcinoma.

E. HURRY FENWICK.



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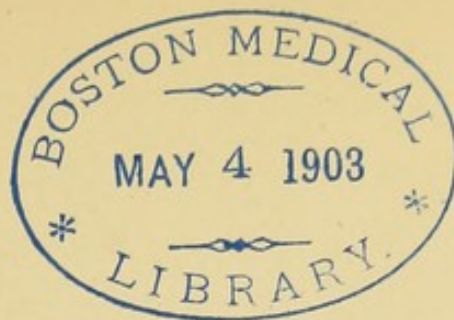
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OBSCURE DISEASES OF THE URETHRA.

CHAPTER I.

DESCRIPTION OF A PRACTICAL ELECTRIC LIGHT URETHROSCOPE.

No exact diagnosis of chronic obscure urethral disease can be made and no sound treatment can be effected without visual examination of the channel. Until 1888 the illuminant at the disposal of the profession, consisting as it did of a paraffin lamp, was of a low order and very inefficient. At that date, however, a simple, practical, and efficient urethroscope was designed by Leiter, of Vienna, by means of which the entire urethra could be brilliantly illuminated. This instrument will be readily understood by a glance at Fig. 1.

The instrument consists of three parts :

The lantern box carrying the reflector A.

The handle carrying the electric lamp and switch D.

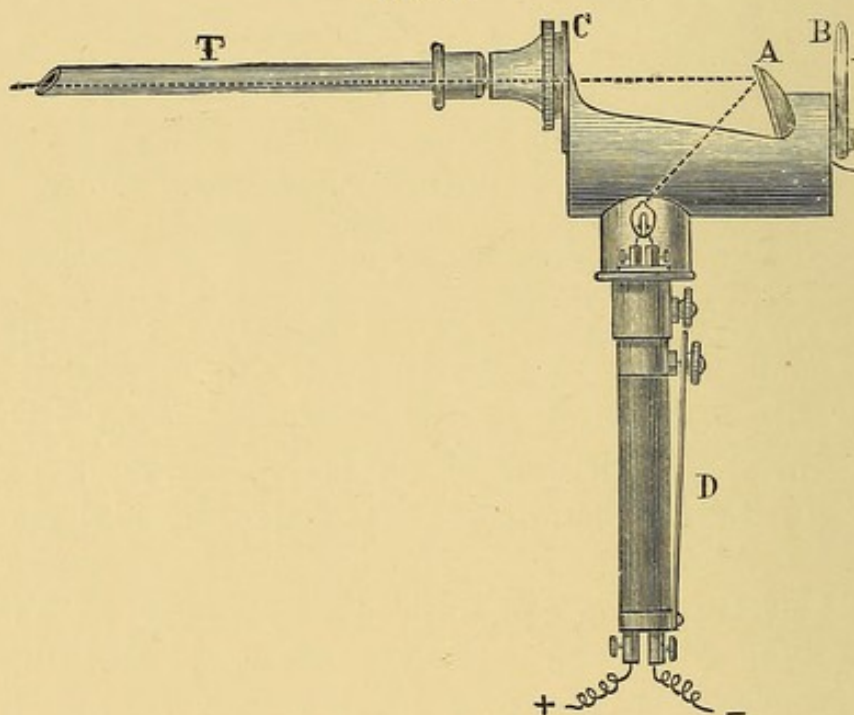
The urethral cannula or tube T, along which the light is projected.

B is an eye-piece fitted with suitable lenses for observers with short sight. It can be dispensed with.

Directly this urethroscope was made I commenced to employ it routinely on the very large material which attended my out-patient department at St. Peter's Hospital, London.

The light it threw on to the urethra was admirable. Every section of the urethra could be thoroughly examined, and every detail of its surface could be as easily studied as if the canal were exposed to bright sunlight. Any change could, with practice, be detected. But more than this; every diseased patch could be treated topically without withdrawing the cannula, for the reflector was so deeply placed in the lantern that bougies or stylets armed with wool or medicaments could

FIG. 1.



Lleiter's urethroscope.

be passed over its summit, A (after twisting away the lens B) and down the cannula in the very axis of the light. For months I worked assiduously with it, but my success was, contrary to my expectation, very small. I found myself hampered by the smallness of the field, by the lax urethra falling on to the end of the cannula, and by the deceptive changes which took place on undue pressure being exerted by the opening of the cannula upon the spongy mucous membrane of the diseased patches. About this time (1889) it struck me that if air were forced into the urethra the folds would be obliterated by

pressure, and on working at this idea I found that von Antal had already conceived and published the same expedient. I adopted the manœuvre at once, and was gratified to find that by it I obtained a long flat wall instead of a small circle of lax mucous membrane crowded into the end of a small cannula. I have used no other method since, considering the application of air for distension of the urethra to be absolutely necessary in

FIG. 2.

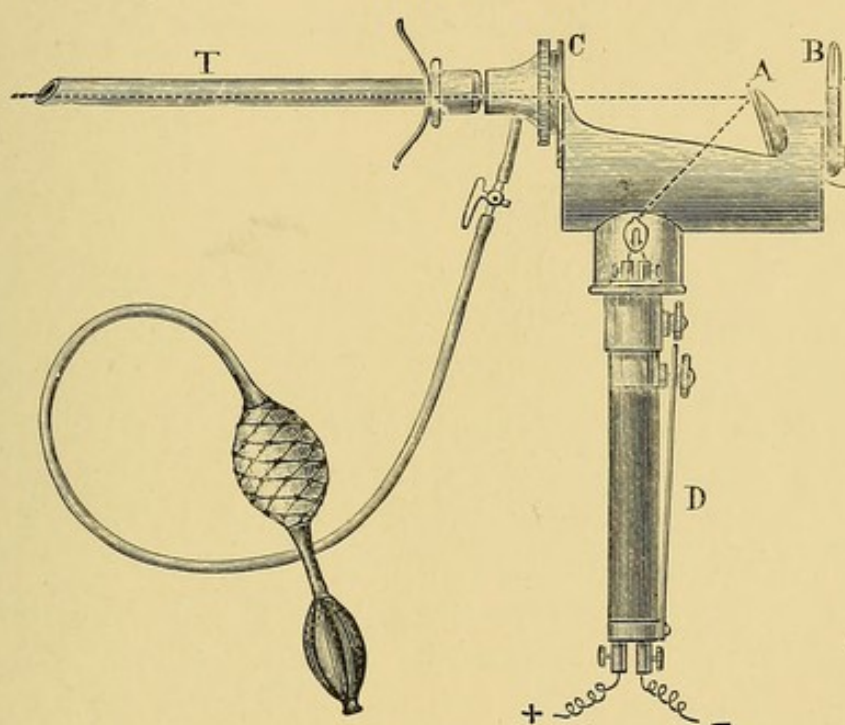
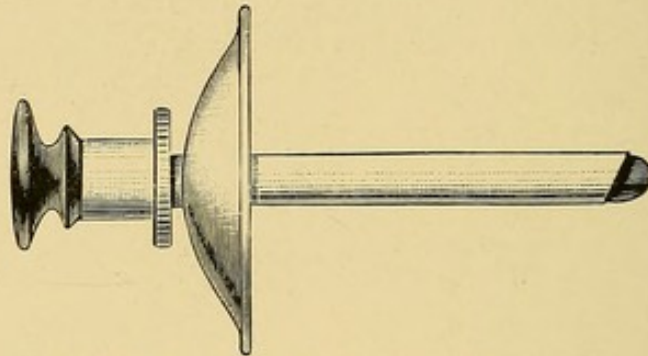


Diagram of Geza von Antal's aëro-urethroscope.

every case requiring inspection. Von Antal's air urethroscope is merely Leiter's pattern with a special nose-piece (Fig. 2). The nose-piece C is closed by an obliquely set glass diaphragm, so that air forced along the cannula T by means of the india-rubber ball cannot but distend the penile urethra up to the commencement of the deep urethra, that is where the compressor urethræ muscle tightly closes the channel. The cup at the proximal end of the cannula, which is not really necessary, serves to receive the convex glans penis, and effectually prevents

the in-driven air escaping from the urethra, unless, of course, a great pressure is exerted. The tap serves to regulate the amount of air found necessary. With the exception of the glans cup, the air-pressure balls, tap, and the glass diaphragm, the instrument is the same as

FIG. 3.



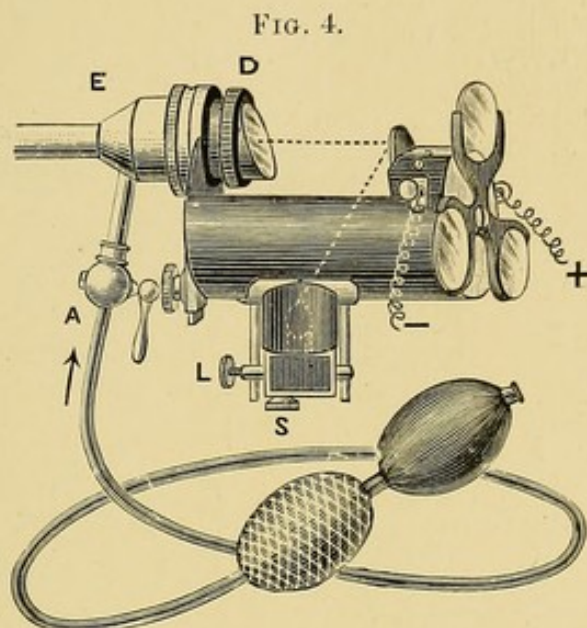
Urethral cannula for aëro-urethroscope.

the original Leiter (Fig. 1). It has one disadvantage. The glass diaphragm prevents any manipulation, such as swabbing, dusting, curetting, cutting, or cauterising of the urethra under the direct control of the light, all of which is possible with the open or windowless nose-piece. This difficulty was easily overcome. Leiter, of Vienna, made me a very handy instrument, partly at my suggestion and partly at Mr. Schall's. The diaphragm was only fixed by a bayonet catch or clip. Hence, when the granular patch, ulcer, or tumour was discovered by means of inflation, the end of the cannula was held firmly in position, the diaphragm (D) was removed, and the operation was proceeded with through the open tube, under the direct control of the electric light.

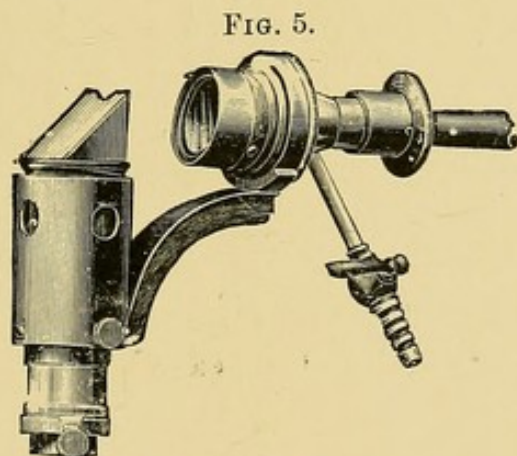
Mr. Wyndham Powell finally suggested a spring and catch, and every instrument is now fitted with this natty and convenient improvement.

I use this instrument now mainly for cutting operations upon the urethra, for as the mirror is placed low in the lantern it does not interfere with the movements of bougie or stylets. For diagnosis and for localising disease I prefer one made by Mr. Schall, called the

Schall urethroscope, which has a more powerful lamp and a better reflector.* Personally I think it is especially



Hurry Fenwick's aëro-urethroscope.



Schall's urethroscope.

* With either urethroscope it is very essential that the lamp should be exactly in the focus of the mirror or lens, as otherwise no light will be obtained at the end of the tube. This must be borne in mind in placing new lamps in their position. After exchanging the lamps, a piece of white paper is placed on a table, and the end of the tube directed upon this paper. Now, while the lamp burns, it is moved up and down, until an intense and circular light falls on the paper, and when in this position it is fixed to the body of the instrument by means of a screw.

important to use a Schall pattern when examining the prostatic urethra.

The tubes or cannulæ used for the penile urethra are of various lengths and sizes. The ordinary five-inch

FIG. 6.



Urethral cannula for aëro-urethroscope.

tube will serve all practical purposes, although a short tube is sometimes of advantage in examining and operating upon the distal portion of the urethra. The size of tube is governed by the meatal calibre. The smaller sizes give a disappointingly limited field. As no advantage can be gained by the inflation of the membranous and prostatic urethræ I use the open nose-piece for these sections of the canal, and employ curved tubes with posteriorly placed open windows. Long straight tubes

FIG. 7.



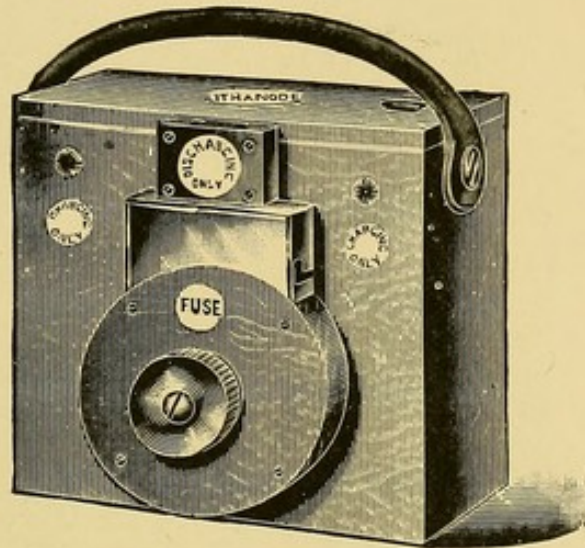
Prostatescope.

are also in vogue for prostatic work. But the pain caused by straightening the canal during their introduction, the tendency the tubes exhibit to slip out of the prostatic segment during manipulation, and the limited field which is exposed to view render them inferior to the elbowed form of cannula. The advantage claimed for them of examining the upper or anterior wall of the canal is more theoretical than practical, for it is found that in most, if not in all the cases, the brunt of the disease falls upon the floor, and in the majority it is confined to the region of the verumontanum. As in about 90 per cent. of cases the deep urethra becomes

affected in chronic gleet, these prostatic tubes are a necessity, for the orifices of the prostatic glands, and the verumontanum with its sinus pocularis, are easily and plainly made visible by them (Plate V, fig. 5).

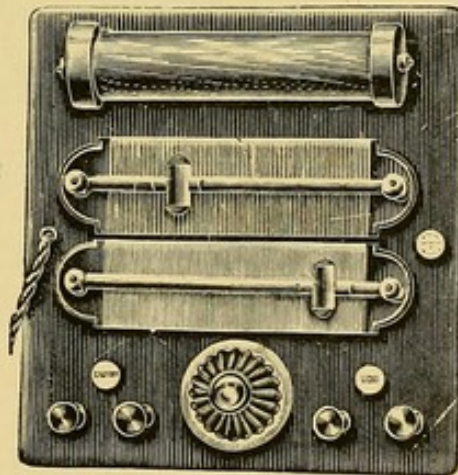
A word about the air balloon. The size usually sup-

FIG. 8.



A Lithanode accumulator storage battery.

FIG. 9.

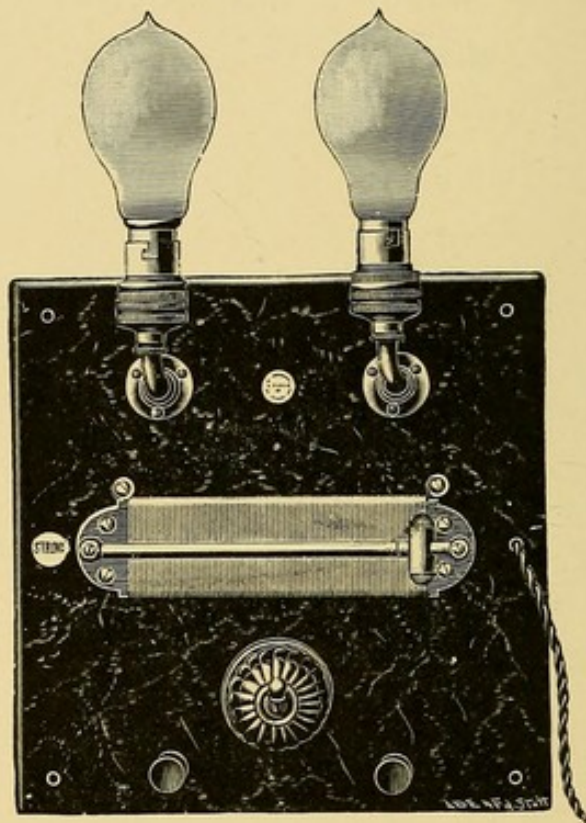


Transformer for the alternating current.

plied is useless. I always insist on having one the size of a small hothouse melon, for there is nothing more irritating than to find at a critical period of the examination that the air supply has failed.

The electric current is obtainable from primary or secondary batteries. I always use a lithanode battery for travelling (Fig. 8), and as I am able to charge it from the main (constant current) I have had no difficulty

FIG. 10.



Schall Transformer for continuous or alternating current.

with it. For consulting-room practice I obtain the current from the main (constant or interrupted), broken by a Schall transformer (Figs. 9, 10).

CHAPTER II.

THE NORMAL URETHRA (ANATOMICAL).

A SYSTEMATIC description of the urethra finds its place in the text-books and anatomical works ; here only a few points of practical importance will be noticed.

The urethra is divided by the "cut-off" muscle (constrictor or compressor urethræ) into an anterior part and a posterior or prostatic part.

The anterior urethra, embedded in the corpus spongiosum of the penis, is about six inches in length, but varies according to the turgid or lax condition of the organ. The proximal part is fixed ; it lies along the under surface of the triangular ligament, from which it receives an investment, and is embraced by the bulbo-cavernosus muscle. This is the *pars fixa* or *pars perinæalis* of the anterior urethra.

A strong fibro-elastic band, the suspensory ligament, descends from the front of the pubis and blends with the fascial sheath of the penis, and is continued onwards into the scrotal septum. Beyond this brace the canal lies in the penis proper, having a vertically downward direction in the lax organ, and possessing a free mobility.

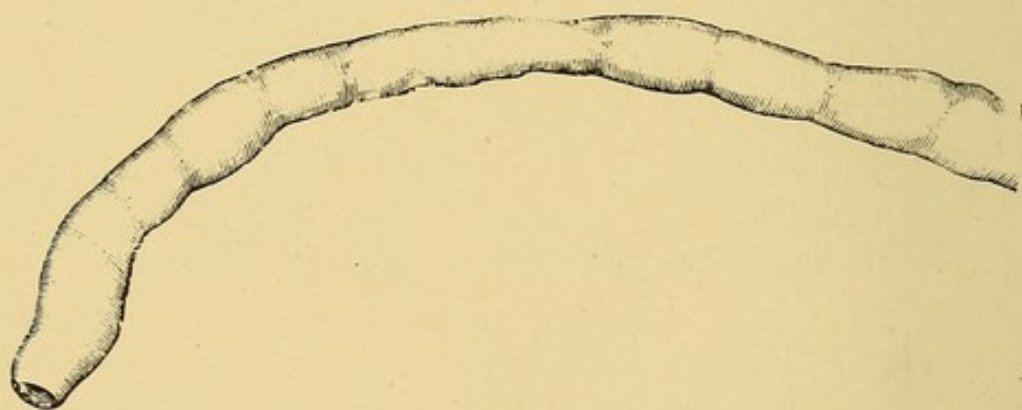
The junction of these two segments is the angle of the penis, and is supported by the suspensory ligament. Here there is a constant and well-marked fold in the urethral tube—the peno-scrotal bend,—which is increased by the pull of the abdominal muscles on the suspensory ligament. It is readily obliterated by bringing the penile urethra in line with the bulbous portion and stretching the penis.

The calibre of the anterior urethra.

The narrowest part of the urethra is the external meatus (21 to 28 French gauge*). For about one third to half an inch behind the meatus the tube expands, forming the fossa navicularis (30 to 33 F). At the base of the glans it is suddenly narrowed by a fold, said by Guérin to be most marked on the roof, but distension by air displays it nearly always as a ring, and casts of the urethra also demonstrate this circular arrangement. This valve of Guérin is present in 84 per cent. of cases, and the calibre will frequently be found smaller here than at the meatus (Plate II, fig. 5). Behind this the canal has a uniform calibre of 27 to 30 F. Distended with air its wall is seen to be intersected by numerous incomplete fibrous rings, which to the novice give the impression of strictures of ample lumen. They appear on the roof and side walls, the floor of the canal being smooth.

The mucous membrane on either side of these ridges is pouched in the distended urethra. In the collapsed tube these pouches may engage the point of a small or medium-sized bougie. The rings and pouches are readily demonstrated by making a wax cast of a normal urethra (Fig. 11).

FIG. 11.



Cast of the normal urethra, showing rings (Taylor).

In the straightened canal nothing marks the junction of the mobile with the fixed part of the urethra.

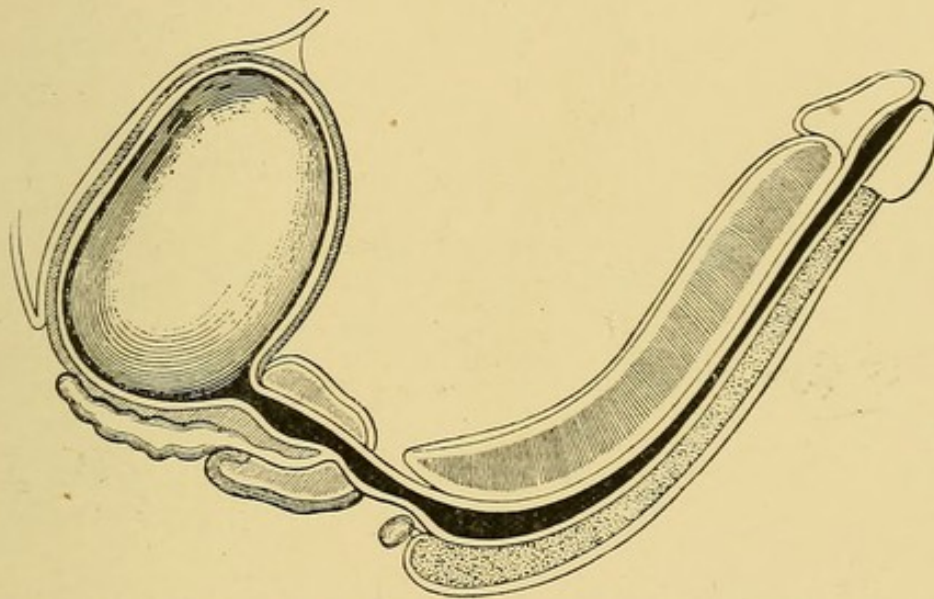
* The French scale is signified by the letter F, and the number of the instrument indicates its circumference in millimètres.

The canal now gradually widens until, in the bulb, it attains a calibre of 33 to 36 F.

According to Otis a constant proportion exists between the circumference of the penis and the calibre of the urethra. The ratio works out at about 5:2. Thus with a penis of 75 mm. (three inches) circumference a urethra of 30 mm. calibre may be expected.

At the level of the opening in the triangular ligament the floor of the bulbous urethra curves sharply upward to meet the membranous portion; the pouch-like dilatation of the bulb is thus formed, and a straight instrument allowed to travel along the urethra will impinge and lodge there. The membranous urethra thus appears to

FIG. 12.



The expansions and contractions of the normal urethra (Taylor).

open on the roof of the cul-de-sac of the bulbous urethra (Fig. 12). Much, however, depends on the condition of the muscular sheath of the urethra. With the well braced-up muscular tunic of a healthy young individual the cul-de-sac is but slightly marked; in the relaxed tissues of old age or disease, on the other hand, a shallow pouch is present. This is shown by the ease with which a steel instrument drops down past the

opening in the triangular ligament, and the success which attends the manœuvre of lifting up the instrument a little and supporting the perinæum.

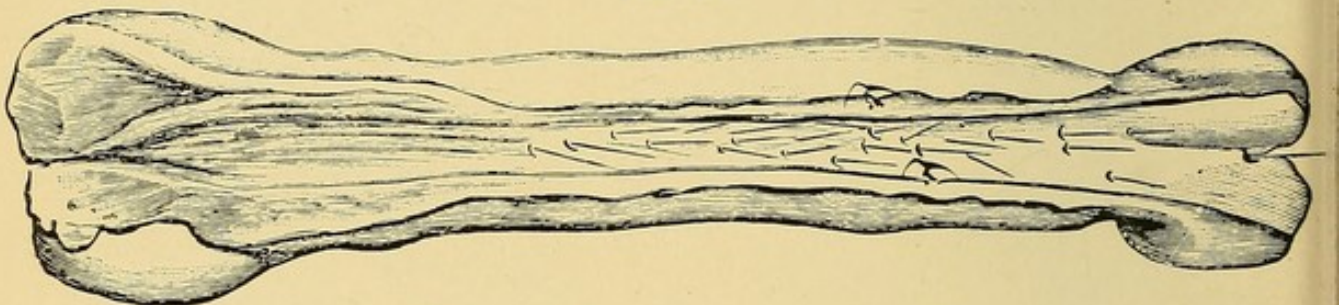
Depression of the free end of the urethoscopic tube is required to display the pursed-up opening of the membranous urethra.

The well-known rule in catheterisation, "keep to the roof," has its application in this position of the membranous aperture.

Openings and pockets in the anterior urethra.

Small mucous glands open into the canal by minute apertures (glands of Littre). They are seen as tiny pits in the mucous membrane, and are most numerous on the roof, although a few are also found on the floor. The

FIG. 13.



The urethra opened along the floor, showing the roof with bristles passed into the gland ducts (Taylor).

forward direction of their openings has given them a reputation as pitfalls in the passage of instruments. The majority, however, will only admit of the entrance of a fine bristle, and it is possible that their influence has been over-estimated. These glands penetrate into the submucous connective tissue, and are important factors in conducting inflammation to the periurethral tissues.

The lacuna magna is of greater capacity. It is apparently the duct of a similar gland, and is situated on the roof of the canal in the fossa navicularis, about half an inch from the meatus. Sometimes two or even more

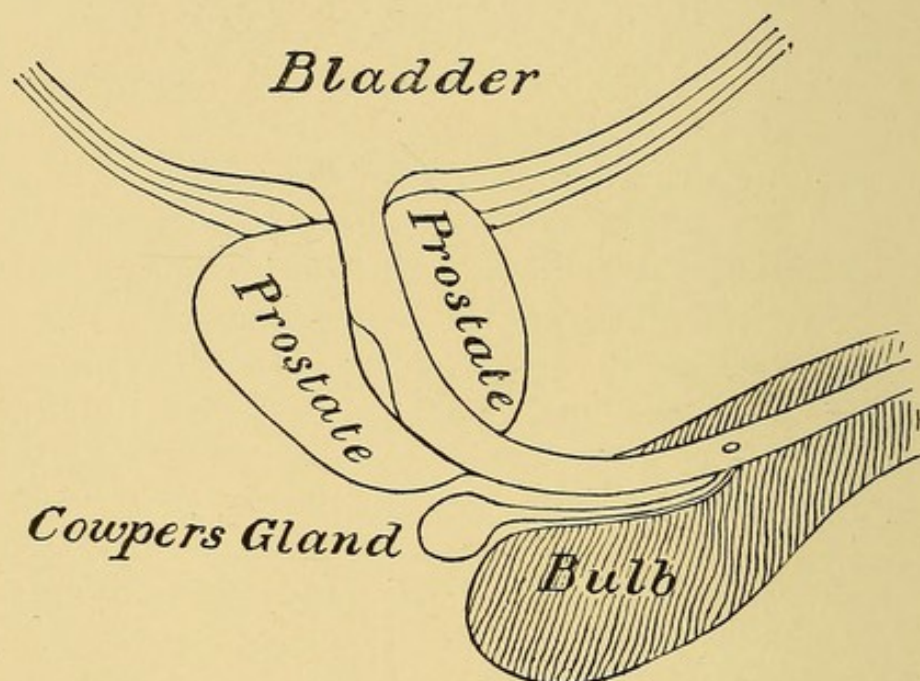
lacunæ are present in the upper wall of the first three inches of the urethra. On inflating the urethra by applying the nose of the aëro-urethroscope to the meatus these lacunæ may be studied. I have seen one so capacious that the lower edge of its orifice gave the impression of a bridle stricture (Plate II, fig. 5). About an inch in front of the opening of the membranous portion the ducts of Cowper's glands penetrate the floor of the bulbous urethra. Although usually minute, and most difficult to discover even under a good light, these orifices may sometimes be dilated and large (cp. page 23).

The anterior urethra is surrounded and its walls are maintained in contact by a special sheath of non-stripped muscle-fibre, while the bulbous portion is further supported by the encircling fibres of the bulbo-cavernosus muscle. These muscles have the important function of expressing the last drops of urine and ejecting the seminal fluid from the tube.

The membranous urethra has a calibre of 27 F., and is from half to three quarters of an inch long. This is the most fixed part of the canal, lying as it does between the two rigid layers of the triangular ligament, and receiving from each a fascial prolongation. Outside the circular non-stripped muscle of its wall lies the "cut-off muscle," the true sphincter of the urethra. The mucous membrane is here thrown into longitudinal folds. Taylor believes that any firm contraction of this muscle is the result of reflex spasm from rough instrumentation, but it must be noted that a greater resistance is felt here than in the anterior urethra even with the most delicate handling, and in patients in whom the urethra has long been accustomed to the introduction of instruments. This is only experienced at the distal end of the membranous canal. Here the muscle-fibres are massed and active. The rest of the membranous portion, although surrounded by muscle-fibre, is not firmly grasped, and offers no resistance to the passage of fluid from a Guyon catheter lying just within this distal bundle (see Fig. 16, p. 21).

The glands of Cowper lie under and a little to either side of the membranous channel, and their ducts have a course of one to one and a half inches before they open on the floor of the bulbous urethra (Fig. 14). The important part these glands play in urethral surgery will be alluded to later (page 58).

FIG. 14.



The relation of Cowper's glands and ducts to the urethra.

The posterior urethra.

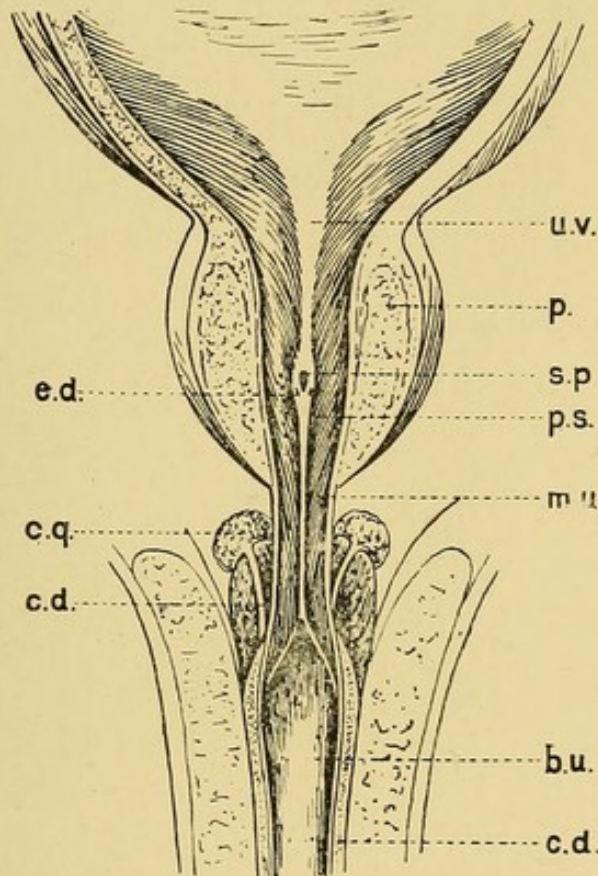
The posterior urethra is the meeting-place of the urinary and genital systems.

It traverses the substance of the prostate and is closed at its inner end by the sphincter of the bladder, at its outer by the sphincter of the deep urethra—the “cut-off muscle.” The plain muscle-fibres at the base of the prostate form a strong collar supporting the vesical sphincter, and prevent regurgitation of semen into the bladder during emission. At the apex of the prostate the muscular fibres are again collected ringwise around the urethra (Fig. 15).

The prostatic urethra is one and a quarter inches in length, and has a varying calibre of 30 F. at the apex,

45 F. at the middle, and 33 F. at the vesical end (Taylor). In direction the canal is nearly vertical, with a slight forward inclination below. Passing downwards from the

FIG. 15.



u.v. Uvula vesicæ. p. Prostate. s.p. Sinus pocularis. e.d. Opening of ejaculatory ducts. p.s. Prostatic sinus. m.u. Membranous urethra. c.g. Cowper's gland. c.d. Cowper's duct. b.u. Bulbous urethra (after Allen Thomson).

bladder along its posterior wall is a ridge, the uvula vesicæ, which becomes gradually more marked until it culminates in a small flat-topped hillock one and a half lines in height—the verumontanum, colliculus seminalis, or caput gallinaginis. In front of this the ridge gradually slopes to the level of the wall. The gutter-like depressions on either side are the prostatic sinuses, and into these the ducts of the prostatic glands (twenty to thirty in number) open (Fig. 15).

A slit-like dimple on the summit of the verumontanum

marks the orifice of the sinus pocularis or prostatic utricle. This tube passes upwards and backwards in the substance of the prostate for half an inch or more, and has an epithelial lining of columnar cells, surrounded by a tunic of plain muscle and fibrous tissue. The tube is single, with a slightly dilated extremity, or it is sometimes branched. It forms a pocket in which the remains of gonorrhœal inflammation are prone to linger.

On either side of this opening is a tiny red speck, the orifice of the ejaculatory duct. The anterior wall of the prostatic urethra arches over the verumontanum, and this part of the canal has therefore a horseshoe form. The prostatic glands are similar to those seen in the anterior urethra, and most of them open on the floor of the prostatic sinuses, although a few may be found on the ridge of the verumontanum. Those of the so-called middle lobe, the part of the prostate above the ejaculatory ducts and sinus pocularis, open above the verumontanum.

The lining membrane is highly sensitive, and it is from this part of the urethra that the afferent nerve impulse for the reflex act of urination starts.

In an over-full bladder the vesical sphincter is relaxed, and the prostatic urethra forms a part of the reservoir—a fact which is readily appreciated by observing the flow of urine from a catheter, the eye of which lies just within the “cut-off” muscle.

The curves of the urethra.

In the pendulous condition of the penis the urethra is sigmoid in form.

The penile portion is nearly vertical. At the penoscrotal angle the urethra turns sharply downwards and backwards, and at the posterior part of the bulbous urethra and the membranous portion it curves upwards, and is again vertical in the prostate. The latter is the subpubic curve, and is fixed. It is said to be more acute in spare individuals, and more obtuse in corpulent

(Thompson). In children it is more acute, and in chronic enlargement of the prostate it may be distorted. Thanks to the elasticity of the urethra and the surrounding tissues, it is possible to overcome this curve, and to pass a straight instrument into the bladder. Thus, when the beak of a sound or a lithotrite lies within the bladder, the canal is straight throughout its entire length.

CHAPTER III.

THE USE OF THE AËRO-URETHROSCOPE.

ONE of the elements in the successful diagnosis and treatment of obscure diseases of the male urethra consists in appreciating the shape of that canal when distended with air. On forcing air into the penile urethra, the entire canal, as far as the commencement of the membranous section, is inflated like the blown-out finger of a glove (see Fig. 11, p. 10).*

The membranous urethra is tonically closed by the strong circular fibres of the compressor urethræ—"the cut-off muscle,"—and air is prevented from entering the membranous urethra in fully eight cases out of ten. Hence a healthy compressor urethræ divides the air-distended urethra into three clinical segments :

1. The inflatable spongy urethra.
2. The tightly closed short membranous section surrounded by the sphincter muscle,—the compressor urethræ.
3. The patulous thick-walled prostatic canal closed at the proximal end by a weak vesical sphincter and at the distal end by an energetic urethral sphincter.

In a small minority of healthy urethræ, and in those men who have been accustomed to have the bladder

* The urethra seems to obstruct water-pressure perhaps less than air-pressure. I say seems, for no experimental data for comparison on a large scale have been made, and air escapes very easily alongside of the urethro-scope. In Janet's method (vesical irrigation without a catheter), the water-pressure has often to be raised to six or eight feet before the solution flows for the first time along the urethra into the bladder, and in some instances with this and even greater pressure the sphincteric obstruction is so obstinate that the method has to be abandoned.

washed out without a catheter (Janet's method), the compressor urethræ permits the free passage of air.

Apart from these cases the entrance of air into the bladder from an aëro-urethroscope is most noticeable in those who have suffered from chronic deep urethritis (the compressor urethræ having become inflamed or infiltrated), or from certain forms of spinal atony, and of course in those who have had external urethrotomy performed.

Method of using the aëro-urethroscope.

Let the patient pass water into two glasses* so as to clean out the channel as far as is possible, and then lie down on a hard couch of a convenient height. Theoretically, the urethra is less turgid in the horizontal position; practically, the observer has the urethra under better control. Some prefer to sit between the patient's legs as they hang over the end of the couch. The left forefinger and thumb squeeze the meatus from side to side, so as to demonstrate any little pin-point opening of a suppurating gland in the thickness of the meatal lip—a fruitful source of chronic gleet. The large air-balloon is first filled,† the first cannula (length, a quarter of an inch) is then taken from the carbolic lotion in which it should lie; it is fitted on to the nose-piece C, and placed, not inserted, on to the end of the uncovered glans, so as to cover that aperture. A movement of the index finger of the left hand releases a little air from the reservoir by turning the tap, and the urethra of the glans fills out taut under the eye of the observer. The surgeon now asks himself the following questions: What size cannula

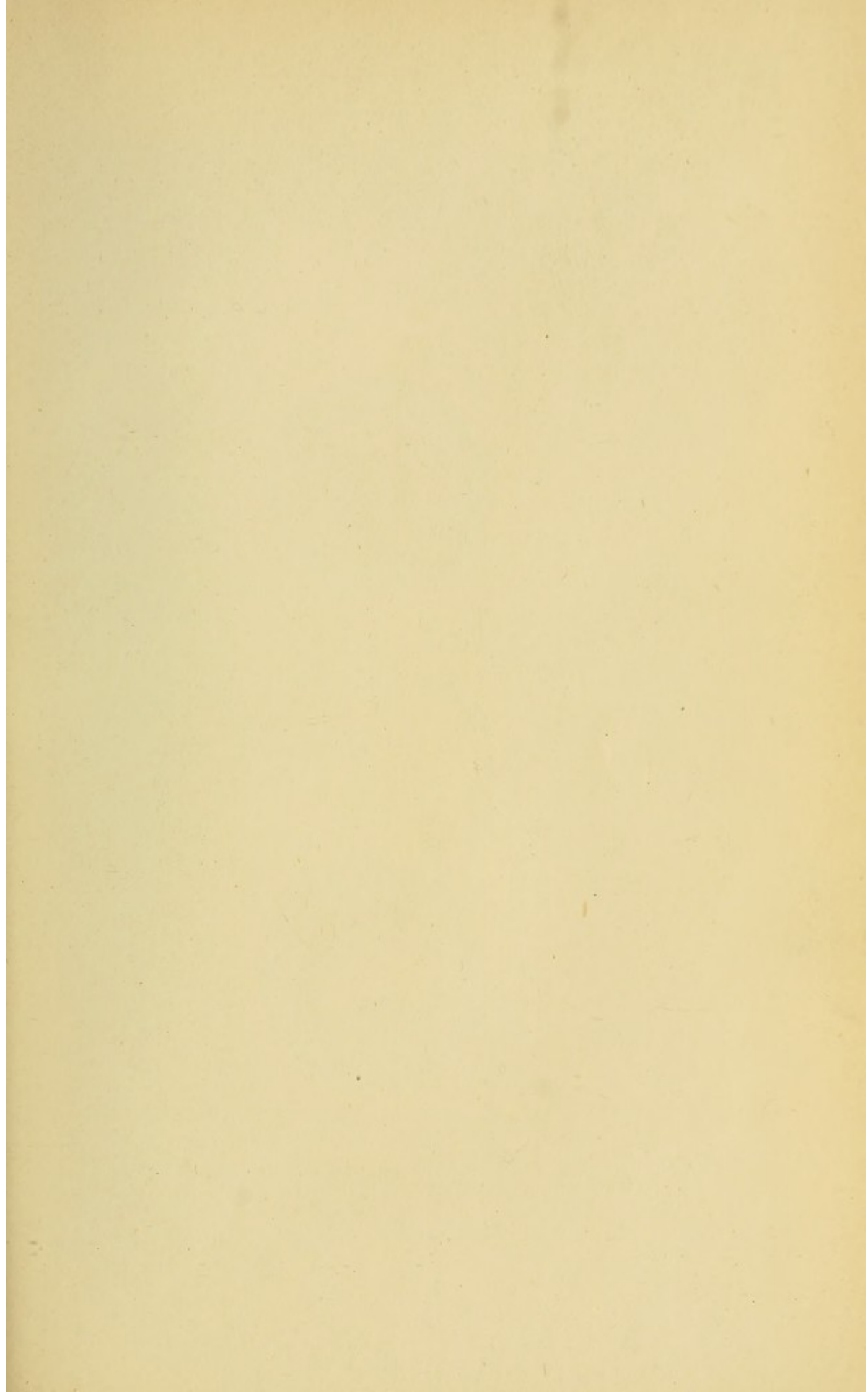
* I need hardly remind the reader of the value of this manœuvre.

† Should you suspect atony of the bladder in mid-adult life—for the urethroscope is not used in "prostatics,"—tie a piece of lint dipped in carbolic lotion (1 in 40) over the inlet valve of the feeding air-ball, and be sure your patient gets rid of the air before he leaves you.

will the meatus take? * Is there any congenital narrowing at the junction of the glans urethra with the penile urethra? Is the glans urethra reddened? for the vessels in a healthy mucous membrane empty and disappear under air-pressure. Is the sinus Morgagni on the roof patulous—inflamed? Presuming the meatus will admit any cannula over 18 F gauge, lay the urethroscope down and select the cannula which will enter without pain. Dip its point in pure olive oil, and pass it gently into and along the stretched urethra. If the patient calls out or complains at any point during the passage of the cannula, note the position of the cannula end at that moment, for probably the pilot has reached and is passing over a sensitive spot, an injected area, an enlarged and swollen gland, or a granular raised patch. If any obstruction is encountered stop at once. Apply the urethroscope, let some air enter, and examine to see if the obstruction be a ringed stricture, a thick fold of swollen mucous membrane, or whether you have merely permitted the penis to fall a little and the end of the cannula has impinged on the peno-scrotal bend.

Does the cannula travel to its hilt? Draw out the pilot, rigidly steadying the tube meanwhile with the left hand, and taking support with the little finger on the symphysis or with the wrist on the groin. This fixation with the left hand should receive careful attention. After a time it becomes a habit, but the beginner is likely to project the unguarded edge of the tube on to the delicate mucous membrane as he withdraws the pilot, or, just as likely, the weight of his hand rests upon the tube, and the membrane on which its end is lying suffers.

* In some cases the urethra only admits a tube of very small calibre, and the field is so restricted that thorough investigation of the mucous membrane is impossible. The meatus is usually the seat of obstruction, and a free meatotomy downwards becomes necessary for the use of the instrument. This cutting is not without advantage in many cases of persistent gleet, but the danger of forcing air into the areolar tissues should induce the operator to defer his examination to a later date.



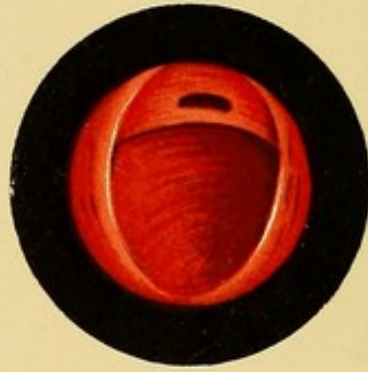


Fig. 5.

Valve of Guérin and Lacuna magna (Walker).



Fig. 6.

Arched opening of membranous urethra under air distension, showing sharp edge of opening in triangular ligament (Walker).

Therefore, fix the left hand and use it as a cannula holder, not the cannula as a hand-rest. Having gently removed the pilot with the right hand, if the light now be applied, a dark, unsteady, light-reflecting surface presents. This is the oil with which the instrument was lubricated, and which now lies at the bottom of the tube. Drop a cotton-wool tampon down the tube and soak up the oil. Adjust the urethroscope, switch on the light, turn the tap gently, and examine the face of the orifice of the membranous urethra, which, pursed up by the action of the compressor urethræ, is obstructing the entrance of cannula or air.

The orifice of the membranous urethra.

How does the orifice of the membranous urethra look? Under moderate distension it is a mere glistening point with red radii. The radii are reddish if healthy. If whitish, then there is trouble in the membranous urethra. Put more air-pressure on by turning the tap. You will

FIG. 16.

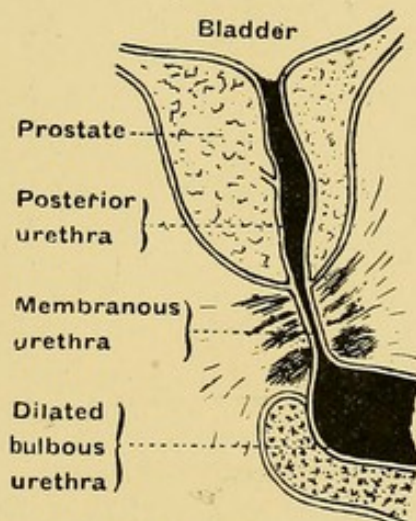


Diagram showing massing of the "cut-off" muscle at the distal opening of the membranous urethra.

see the obstructing wall balloon backwards until it forms a cone; or it may open a little, form a semicircular arch (Plate II, fig. 6), and a gulp of air will pass

audibly along, the patient calling out at the same time. Do not mistake the taut projection of the upper segment of the opening in the triangular ligament for a stricture of large calibre. One observation, not only of practical importance, but of interest: the membranous urethra is surrounded in its entire length by the "cut-off" muscle, in the grasp of which it is said to be firmly held. This is no doubt true from the anatomist's standpoint, but clinical experience shows that it must be modified. Only the muscular bundle immediately surrounding the distal opening is really active (Fig. 16). The rest of the muscle certainly surrounds the canal, but under ordinary conditions it exerts little or no pressure upon the walls of the tube. It is this distal bundle that forms the striking clean-cut edge of the arch seen on looking at the membranous opening under air distension. Place the end of a catheter or the bulb of a Guyon's syringe just within the grasp of this distal bundle, and the rest of the membranous urethra together with the whole prostatic urethra may be washed or drained.

The bulbous urethra.

Gently withdraw the cannula a quarter of an inch from the face of the orifice of the membranous urethra, and accustom yourself to examine the pre-membranous area, the so-called bulbous urethra. Under air distension it is ovate; by lifting or dropping the end of the cannula you will be able to examine the flat roof and the concave floor.

Note the floor; mark well that no bluish projection rises from it like a miniature ranula. If such is seen you are dealing with a distension of the duct of Cowper's gland (p. 58), on one or other side. Finally, unslip the catch of the diaphragm of the nose-piece, and watch the mucous membrane as it relaxes. Press the diaphragm to and fill again with air. Is the mucous membrane lissom? Does it expand and fall together again quickly and in folds, or does a thickened succulent area drop in stiff

and plate-like? When distended and evascular from tension is there a reddened patch to be seen? If so, that patch needs treatment; it is infiltrated.

Now withdraw the cannula another half-inch and examine the floor carefully, keeping up air distension. A patulous orifice of one or other of Cowper's ducts is sometimes to be seen, in aspect like the flap of a valve in a vein. It is placed to one or other side of the floor, and under air-pressure its flap stands up tautly crescentic, leaving the channel visibly exposed (Figs. 17 and 18).

FIG. 17.

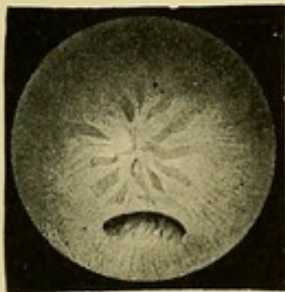
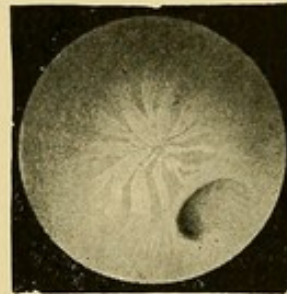


FIG. 18.



Patulous orifices of Cowper's ducts seen under air distension.

Remembering that all side channels from the main urethra serve as well-nigh impregnable burrows for bacteria to hide in, you are careful to treat these open ducts.

The peno-scrotal bend or fold.

Now withdraw the cannula still more. You are passing the peno-scrotal bend. Hold the penis out straight. Do not mistake the natural urethral fold caused by the suspension of the penis by its suspensory ligament for a stricture (Plate III, fig. 3).

It is true that this section is most often swollen after urethritis, and this swelling increases the thickness of the fold, which may mislead you into a prognosis that organic stricture will be suffered from in the future. Such swelling often clears up completely unless it is heroically and energetically treated.

The pars pendula.

You are now approaching that section in which Littré's glands, strictures of large calibre, granular patches and warts are most often to be found.

Keeping up air distension, glance along the flattened roof. Is a double row of small yellowish pin-heads to be seen? You have to deal with a rare form of urethritis.

The pin-heads are swollen glands of Littré. Each is surrounded by a fine area of congestion. Each gland will have to be scientifically treated. These glands may get their ducts so blocked as to form the minute ranulæ—detectable by their bluish bubble,—or one may extend like a miniature sausage along the roof. The latter condition is rare.

Usually, however, the glands are open; small pits with a red rim to them are plainly visible. It may or may not be that they harbour gonococci. It is best to make sure and not leave any enemy behind. Treat each, especially the bigger openings.

Note that a thin fold of the mucous membrane is caught up to a white knot or cicatrix point on the roof. This is "a stricture of large calibre." It indicates that one of the glands has sloughed out. Its bed and its immediate surroundings have cicatrised; the mucous membrane has been drawn up to repair the damage, and the string-like crescentic ridge on the upper wall results.

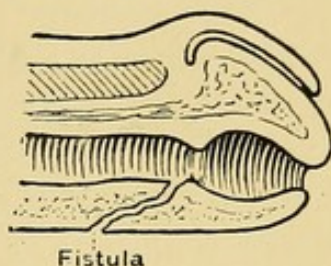
Sometimes they are seen to be merely bridges. Leave them alone unless there is a patch of red infiltration behind them.

Inflate and deflate. Watch the surface for thick vascular inelastic patches, for red-punctated, gonorrhœal, sessile warts. The latter are uncommon.

Lastly, examine carefully the floor of the urethra just behind the fold of Guérin at the junction of the glans urethra with that posterior to it. Here there is always an especially large gland, which may be inflamed, and when thickened can be felt like the head of a pin in

the urethral floor by passing the finger along the under surface of the penis. It may even suppurate and track to one or other side of the frænum, where it ruptures, and a channel the thickness of a fine needle is left (Fig. 19).

FIG. 19.



Fistulous track from suppuration of gland behind fold of Guérin.

This open channel continually reinflames and reinfects an otherwise healed urethra. It is probable that the congenital fold (Guérin's valve) on the floor of the canal, which is so often pronounced just in front of this gland, directs a slight but an intermittent backward urine pressure upon the inflamed gland, its duct dilates in consequence, irritates the mucous membrane overlying it, and determines inflammatory changes in it more readily than elsewhere.

Examination of the membrano-prostatic canal.

The urethroscopist will occasionally be forced to examine the posterior urethra, but in the successful treatment of gleet it will be found that this need not be done routinely. Speaking from my own experience, I venture to submit that the less the posterior urethra is examined with metal instruments the better for the patient.

I examine the anterior urethra routinely, but treat the posterior section in every case by means of injection through flexible catheters or by soluble medicated flexible bougies. If after three or four applications to

the posterior urethra no diminution in the symptoms is observed, I thoroughly investigate this part of the canal with the curved and straight tubes. But in doing this I invariably cocaineise or eucaineise the deep urethra.

It will be noticed that no mention is made of anæsthesia for the anterior urethra. Such is rarely required unless operative procedures are to be carried out; but in examining the posterior urethra it is different.

Be sure the bladder is emptied by the patient. Then pass a Guyon catheter (Fig. 20) into the membranous urethra, and syringe in half a drachm of a four per cent. solution of cocaine hydrochlorate, or of eucaine. I prefer the former, and during ten years' daily work with it I have had no bad result if no bleeding took place.* If I anticipate hæmorrhage I cocaineise first and then freely wash away the cocaine into the bladder.

Wait a few minutes in order to let the cocaine act; place the hips on a book or firm pillow.† Detach the air balloon, throw open the diaphragm in the nose-piece, take up a suitable curved cannula (the prostatoscope), and pass it along the urethra until you judge that the tip of the beak is within the orifice of the bladder.

Now withdraw the pilot; a little practice will reveal the verumontanum, which flops into the open window of the beak and stands like a miniature glans penis—a red, glistening cone.

* Pfister ('Berl. klin. Wochenschr.,' 1896, No. 14) relates that he was called to view the body of a patient who had succumbed, in the hands of a Polish doctor, to the effects of an overdose of cocaine. The following history was given. After the passage of an instrument with some difficulty—and evidently with laceration of the mucous membrane, for there was blood in the urine drawn off—a syringe of a 20 per cent. solution of cocaine was injected preparatory to sounding for stone. The patient died suddenly on the introduction of the sound. Kennan ('New York Med. Journ.,' 1895, p. 369) had a case of cocaine collapse lasting half an hour. He injected 4 c.c. of a 10 per cent. solution of cocaine before performing an internal urethrotomy. Two minutes after the operation symptoms of cocaine poisoning appeared, but the patient was well in thirty minutes.

† Small pillows of sand or cork shavings are valuable.

On its anterior surface the dimple of the sinus pocularis is often plainly visible. Note if its summit is warty, or if it is large, swollen, and tumid.

As you withdraw the urethroscope pay particular attention to the floor of the membranous urethra,—a long, slender, red, fleshy polypus is apt to be found on the floor.

In many instances it is due, I am sure, to some old tear of the mucous membrane in this position, the free part of the strip becoming rounded and fleshy.

Suppose you find that the prostatoscope does not enter the prostate well even with much depression of the outer end between the legs, do not persist. Examine the rectum; you will find by digital examination and by questioning the patient about his symptoms that the prostate has been inflamed, and that the obstruction to the entrance of the instrument is due to the stiffening and thickening of the gland. Persistence will only end in injury. Treat the case *without* the prostatoscope.

CHAPTER IV.

DANGERS AND FALLACIES IN THE USE OF THE AËRO-URETHROSCOPE.

It is an axiom—nay a rule without exception—that the aëro-urethroscope is not an instrument for the old. It is essentially fitted for detecting and accurately combating inflammatory changes of the urethra of the male up to the age of fifty. Let the golden rule be kept “Never use it in men over fifty whose symptoms indicate the commencement of atony of the bladder due to enlarged prostate,” for septic air, or even aseptic air, introduced must of necessity be retained, unless the catheter is used subsequent to the examination, and the result of air in a hitherto aseptic bladder is theoretically disastrous. If there is any suspicion of atony of the bladder use wet carbolic lint over the inlet of the air bulb.

(A) DANGERS IN THE USE OF THE AËRO-URETHROSCOPE.

It is, in my opinion, unwise to use air pressure after a meatotomy, an internal urethrotomy, or in dealing with a urethra in which a false passage has been recently made. Air will freely enter the circumurethral tissues under these conditions, and will produce surgical emphysema of the penis. The air will spread exactly like an ordinary extravasation of urine. I examined with inflation a patient who had had profuse bleeding from attempts at catheterism of a stricture some few hours before applying to me for relief. I was able to find the opening of the false passage with ease. It lay just below

the pin-point orifice of the strictured part of the urethra, and it appeared as a bloody-edged, ragged slit. But the patient called out almost immediately that something was running down the inside of his thighs, and I then became aware that air was passing freely through the opening of the false passage, and escaping into the tissues of the perinæum. There was no doubt but that the false passage was very extensive. No ill result ensued, but it is easily conceivable that damage of a grave description can be inflicted by unfiltered air passing over an inflamed surface, and opening up extensive cellular planes in the thighs, perinæum, and pelvis.

I am sure also that it is best not to employ air-pressure in *acute* inflammation of the urethra, for the air will only force the pus lower into the canal, and if the constrictor urethræ be weak, as sometimes happens, the inflammatory products will be blown into the deep urethra, and into the prostatic canal. I only use this instrument after the acute stage has subsided, and take care to have the urine passed just before the introduction of the cannula, in order to examine and operate upon a cleansed surface.

(B) FALLACIES IN THE USE OF THE AËRO-URETHROSCOPE.

The mere inflation of the urethra can cause certain changes in the contour and aspect of the mucous membrane which are liable to mislead. Moreover, the effects of the pressure of the open end of the cannula often cause the succulent mucous membrane to assume tints and shapes which at first prove deceptive.

Such fallacies merit a brief notice.

(a) *Fallacies due to inflation.*

(1) *Natural fibrous encircling rings.*—Here and there along the normal urethra are incomplete or complete rings of fibrous tissue, which surround the canal and lie close under the epithelial layer. When the lax mucous

membrane is stretched out by means of air-pressure these rings stand out taut and conspicuous, the mucous membrane being bulged outwards on either side of the thin fibrous band (see Fig. 11, p. 10). As the mucous membrane is rendered bloodless by the pressure, these bands are of a brilliant white, and they may be mistaken by a novice for ringed stricture. In fact, I cannot help thinking that surgeons may mistake and have mistaken these for large calibred strictures by the slight obstruction which they afford to the return passage of a very large, bullet-ended stricture-searcher.

(2) *The peno-scrotal angle or fold.*—The penis is braced up by means of the suspensory ligament, and thus forms in its flaccid condition an acute bend at the peno-scrotal angle. If the urethroscopist looks at this bend without pulling the penis out horizontally, and without making in this way the penile portion level with the deep part of the urethra, this bend will appear as a fold, and will look exactly like a thick and tumid stricture of the canal (Plate III, fig. 3).

(3) *Network fibres.*—In the normal bulbous urethra the floor is covered with sparsely arranged interlacing bands of fibrous tissue. On extreme air distension these white prominent bundles have the exact appearance of the commencements of stricture (Plate III, fig. 2). They disappear at once on slightly relaxing the air-pressure, whilst true incipient thickenings of the surface remain white and unpliantly stiff.

(4) *Paling of the surface from pressure.*—In the urethra, as in the bladder, any overstretching of the surface causes the mucous membrane to become unnaturally pale. By watching for a change of colour one can very rapidly fix upon any spot which has not been rendered pale by the air-pressure, for when the surface is diseased and congested its blood-vessels are not readily emptied, and even if they are depleted the surrounding stain of inflammatory exudation still remains visible. One is accustomed to consider those patches which do not

become pale on pressure as being unduly congested. In the majority of cases this is perfectly correct, but patches are met with, the relics of a subacute attack, where the injection is very slight, and in these the blood is readily driven out. They may be overlooked, therefore, if the urethroscopist is guided solely by colour. It is wiser, then, after a superficial search, to relax the intra-urethral air-pressure by permitting some of the air to escape by the side of the cannula. The mucous membrane will thereupon assume its normal tint, and the subacute patches will stand out in contrast redder and more injected than the rest of the surface.

The colour of the urethral mucous membrane varies from that seen inside the lip (buccal cavity) to an intense red, according to the degree of congestion. In most urethræ the main vessels are seen running longitudinally, and between these trunks are the fine intercommunicating networks of the smaller vessels. In some these trunks are larger and more prominent than in others, and in the former the surface is "sweaty," that is, there is an abundant supply of urethral moisture—a condition often met with in prolonged gleet. In health the surface is glistening, and the reflection from this natural mirror economises the light by increasing it. Where the epithelium has become changed or denuded the light is absorbed, and the observer at once notices the dull dark aspect of the surface. This lack-lustre appearance is in itself a hint which no urethroscopist can neglect or overlook.

(b) *Fallacies due to pressure of the open end of the cannula.*

If the end of the cannula be pressed against the mucous membrane instead of being held loosely and evenly in the centre of the inflated tube, it is apt to give rise to slight congestions, even bruising, which will deceive the observer and cause the diagnosis of infiltrated

patch, or congested patch, to be made erroneously, and probably injurious treatment for such traumatised areas to be carried out.

Rough passage of an instrument like the urethral cannula through a stricture of large calibre, or a urethral narrowing caused by succulency of the mucous membrane, tends to sleeve and strip up the epithelial layer and to leave a bald bleeding area. Not only does it cause an erroneous impression of the disease, but it leaves a ploughed-up furrow ready for the reception and protection of the many cocci which invest not only the diseased but also the healthy urethra.

Should such a stripping, scraping or bruising have been wittingly or unwittingly effected, a solution of nitrate of silver (gr. v— $\bar{3}$ j) must be at once sponged on and dried off quickly and completely.

By thus electro-plating the patch no great harm ensues. Indeed, in some instances the urethroscopist must denude the surface of its sodden epithelium before he can attack the deeper layers, and he does this best by the end of the cannula; but he never leaves a denuded area without coating the surface with some weak solution—silver nitrate, protargol, mercuric chloride—which leaves a layer of coagulated albumen behind.

(c) *Fallacies of the prostatic urethra.*

Some difficulty will be experienced when the swollen and often lax mucous membrane of the prostatic urethral floor is pressed up and into the open window of the prostatoscope.

So rounded and congested may be the ridge of swollen mucous membrane, as it is seen projecting into the window, that the observer may mistake it for the verumontanum, and fruitlessly endeavour to find the sinus pocularis on its face. The verumontanum lies deeper in, and always has a redder tinge and a more sharply cut contour.

Now and again the ridge of this swollen prostate floor

cheats one into the belief we have to deal with a prostatic ranula—a distension of one of the prostatic ducts. I believe these ranulæ always have a characteristic bluish colour, and if there is much doubt, I plunge in a harpoon knife before incising freely ; a drop of mucus, if it is a cyst, is sufficient to establish the diagnosis.

CHAPTER V.

CLINICAL HINTS AFFORDED BY THE AËRO-URETHROSCOPE.

The tonicity of the constrictor urethræ.—I have been in the habit of using air pressure to roughly estimate the "tonicity" of the compressor urethræ, and I have become more and more convinced of the utility and importance of this step. The long cannula is passed down the penile urethra until its end is situated about five inches from the meatus. On air being permitted to enter, the opening of the membranous urethra will be seen to be gradually thrust backwards. The mucous membrane at this point is gathered up into innumerable folds by means of the constricting action of the muscle which surrounds this part of the urethra (Plate V, fig. 1). As the pressure increases, the junction of the bulbo-membranous urethra becomes funnel-shaped, and the opening, which is firmly closed by the resentful spasm of the constrictor in its attempt to exclude the air, now resembles a firmly compressed mouth. In normal urethræ the pressure of a full air-bag will sometimes cause this orifice to open momentarily and to gulp down a mouthful of air, which gurgles audibly into the bladder, the patient usually exclaiming at the same time, not on account of pain, but from the discomfort and peculiar sensation such an introduction entails. In those urethræ with a tendency to so-called "spasmodic stricture," not a breath of air will pass the barrier. In a small majority of healthy men, and in those in whom the muscular layer has been apparently weakened by gonorrhœal inflammation of the superjacent surface, the air passes into the

bladder in long gushes. In these latter I never order fluid injections, for in such patients inflammatory complications in the neck of the bladder and testicle readily arise with such treatment.

In certain cases the patient complains of "water hanging in the tube" after micturition, and is greatly annoyed by the escape of half a drachm of urine dribbling out into the trousers a few minutes after urination has been completed. In these cases the tonicity of the compressor urethræ is never perfect. Air inflation shows it to be either intensely spastic, or incapacitated by inflammatory infiltration. The former condition points to superficial erosion of the surface of the deep urethra, which needs special treatment. The latter requires massage and faradic currents.

In certain cases of spinal atony, due to syphilitic lesions of the cord, the compressor urethræ is affected. I have not yet been able to obtain a large enough series to formulate an accurate law of diagnosis, based upon the action of this little muscle; but I believe it is worth while investigating the subject, and I therefore draw attention to it.

Gland-guides to the grade of urethritis.—In the penile urethra the openings of the urethral glands are often a useful guide to the stage and character of the urethritis. Even in the healthy "virgin" urethra the openings of the glands are readily seen, on inflation of the canal, as red depressed specks along the roof (Plate IV, fig. 4). After the surface has become inflamed, their appearance changes, and the difference in the aspect, roughly speaking, is of three types.

(1) On the subsidence of the gonorrhœa or urethral inflammation the orifices of the glands will be seen to be wider than normal, and to be surrounded by a delicate rose-coloured blush. As the gleet becomes chronic the pinkish edge becomes purple, and the opening is still wider.

(2) In a small minority (6 per cent. ?) of obstinate cases of gleet, the glands will be seen to be distended,

turgid with secretion, and white in colour, and they now appear like the swollen solitary glands in the small intestine. In the most aggravated form of urethral gleet they appear as slightly raised opaque pin-head sized points, placed in double rows along the roof, like so many buttons (Plate IV, figs. 2, 3). The projection is apparently due to hypertrophy of the surrounding tissue. I know of no class of gleet more obstinate or more unsatisfactory to deal with than that in which these periglandular swellings are visible. The thin gleety discharge, which is so intractable, apparently exudes from these glands. In some patients, who have "bursts" of pus for a day or two with intervening weeks of urethral health, it is often these glands which are the peccant factors, for, becoming over-distended with their secretion, they burst and give rise to a slight and transient circumjacent urethritis.

(3) Rarely—I may say extremely rarely—these glands seem to harden so much that they shell out like miniature adenomata.

Granular patches.—These appear at any part of the urethra, their favourite position being near the meatus. They are readily recognised by their velvety uneven papillary surface. The eye often catches the glint of the light which is reflected from the tops of the projections. They are able to induce varied reflex neuroses, as well as a distressing and obstinate gleet. The larger patches heal by gradual cicatrisation and production of stricture (Plate III, figs. 4, 5).

Ulcerations.—A superficial loss of epithelium is not uncommon, being especially found near the deep urethra. I cannot say that true ulcerations are often seen unless it be just within the meatus, or as the result of instrumental roughness. Primary tuberculous ulceration is, I am sure, extremely rare. Malignant ulceration is also rare.

Nacreous patches.—Such are sometimes met with in the form of splashes of white sodden epithelium. They usually betoken infiltration into the deeper tissues, and indicate the site of future strictures, or they betoken

FIG. 1.



Normal urethral
mucous membrane.

FIG. 2.



Network fibres.

FIG. 3.



Peno-scrotal
fold.

FIG. 4.



Granular urethritis.

FIG. 5.



Granular urethritis,
severe grade.

FIG. 6.



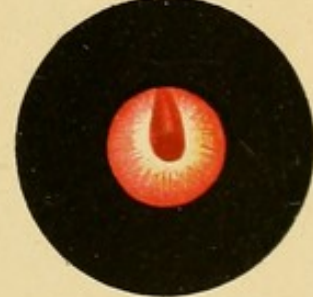
Stricture of large
calibre.

FIG. 7.

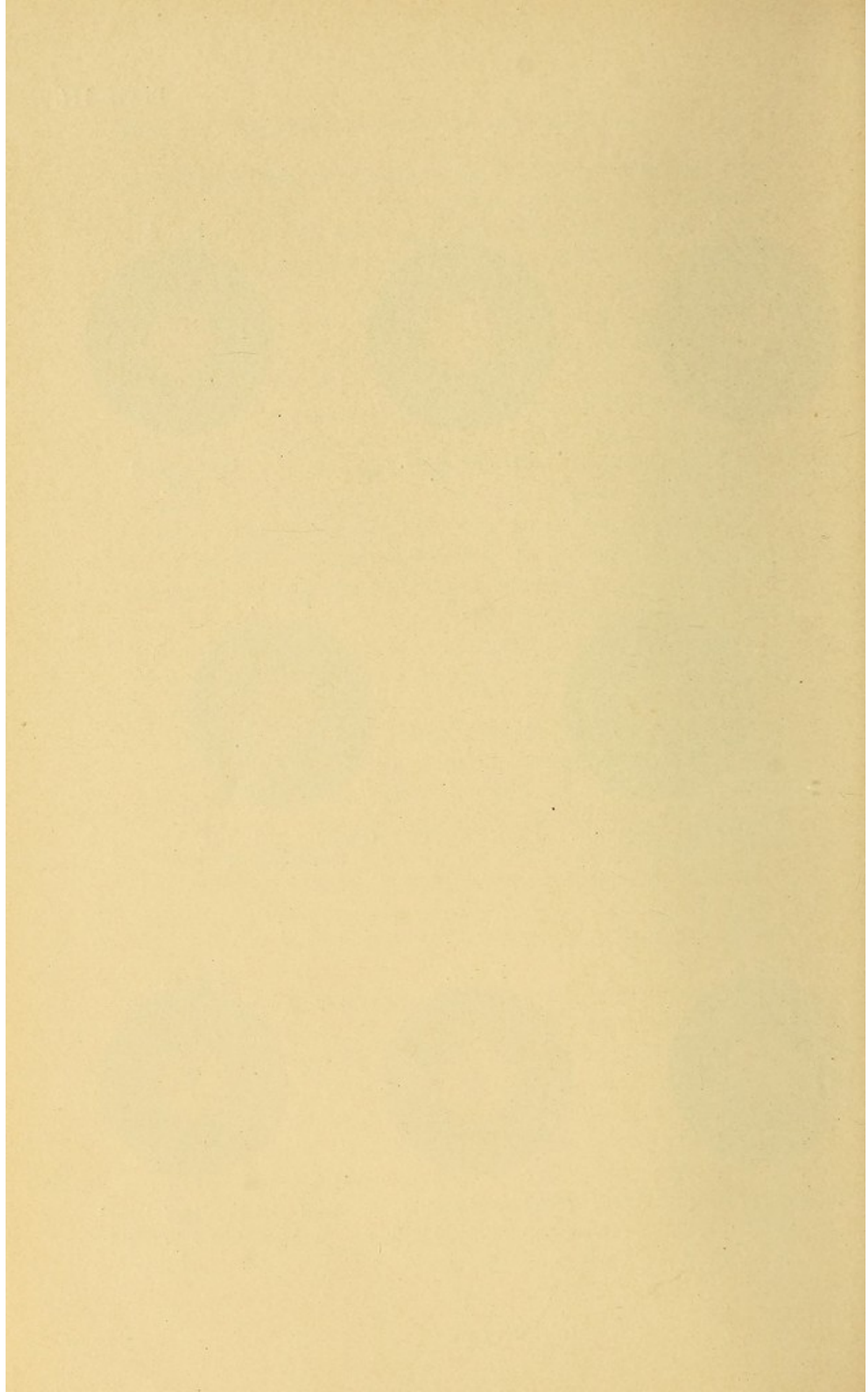


Stricture of medium
grade, central lumen.

FIG. 8.



Stricture after internal
urethrotomy upwards.



strictures already formed, and are evidences of that abundant proliferation of epithelium which covers the surfaces of the contraction. Occasionally they are evidences of lead acetate injections. I have known a few applications of a lead injection of ordinary strength, to deposit in the submucous tissues and to remain visible, in the form of white patches, for six months to two years. Presumably the areas affected were eroded when the lead was used, just as, in the same way, the cornea may absorb lead lotion if its surface has been abraded.

Œdematous folds. — These folds are perhaps best marked at the wrinkles which surround the opening of the deep urethra (Plate V, fig. 2). I have seen them most pronounced in syphilitic subjects. They usually prove obstinate.

Strictures.—The instrument is, of course, quite valueless in the general diagnosis and treatment of stricture, but it is helpful in preventing much useless worrying of the urethra, by establishing with certainty the existence or absence of stricture of “large calibre.” I suspect many strictures are diagnosed which do not really exist, and in many cases of chronic gleet the practitioner jumps to the conclusion that a stricture is present because the gleet is unusually obstinate. This is the outcome of the teaching that “all chronic gleet means stricture” — a false theory. Very often I am asked to examine for gleet due to stricture and find none present, and discover merely an œdematous or acutely inflamed sensitive granular patch, which bleeds on being touched, its circumjacent muscle spasmodically resenting the passage of an instrument (Hilton’s law).

Most often it is the opening in the triangular ligament which has baffled the practitioner by obstructing the passage of a flexible bougie, and has caused the erroneous diagnosis of stricture to be made.

It is surprising how a congenital fold (valve of Guérin), which is invariably found at the inner limit of the glans

urethræ, will keep up a gleet. Behind it is an irritating patch of congestion or of proliferating epithelium.

I believe it is this bar on the floor which so frequently determines the irritation, inflammation, and suppuration of the small gland which is so often found enlarged in this position.

Incipient strictures.—An incipient stricture of the urethra is readily seen on distension of the canal with air, for the mucous membrane is bulged in front and behind it. In very large and non-recent false passages, in which a difficulty has arisen in introducing an instrument, I have used the light with great success, passing an urethrotome guide into the real orifice of the stricture under the control of the eye.

CHAPTER VI.

CLINICAL STUDIES OF THE OBSCURER FORMS OF URETHRAL DISEASE.

ONE symptom is usually the cardinal symptom ; it stands out saliently among other signs of disease, either from its persistence or from the discomfort it induces. It is on account of some such symptom that the patient seeks advice, and the surgeon uses this symptom as his clue-line. Obscure chronic diseases will, therefore, naturally arrange themselves under certain prominent symptoms. Chief among these in their order of frequency and importance are—

- A. Puriform discharges (gleet).
- B. Diminution of the stream.
- C. Abnormal sensations.
- D. Appearance of blood.

A. THE CHIEF SYMPTOM IS SLIGHT URETHRAL DISCHARGE (GLEET).

The majority of diseases affecting the urethra are inflammatory, or find their origin in inflammatory changes. I propose, therefore, to consider this group first. The diagnosis of acute inflammation of the urethra and its side channels is easy, and the accepted routine treatment of such is sound. It cannot be contended that there is any obscurity of diagnosis, and rarely any difficulty in the treatment of the acute stages of urethro-prostatitis or seminal vesiculitis. It is, however, otherwise when the inflammation has almost subsided, and that area or those particular sections upon which the stress of the disease has fallen do not recover, and still throw off a small purulent discharge—a “gleet,” as evidence of quiet but progressive disease.

The more localised the area, *the more insensitive it is*. The longer it remains subacutely or chronically inflamed, the greater the difficulty in locating and treating it.

Finally, when several areas are affected; when deep-lying structures are implicated, when the diagnosis is uncertain and the treatment unsuccessful, such cases may be fairly classified as obscure, and any light which can be thrown upon them is a step towards curing the disease, and checking those wide-spread destructive changes which are apt to ensue in the *minority* of patients from the extremes of neglect or of haphazard heroic treatment.

THE CAUSES OF INTRACTABLE GLEET IN THE POSTERIOR URETHRA.

(a) *Posterior urethritis of a slight grade*.—The prostatoscope (elbowed urethroscope) demonstrates that the most *frequent* cause for those cases of gleet which drag on for months, is a catarrhal condition of the posterior urethra. It is known also as membrano-prostatic catarrh. The entire *surface* from the penile opening of the membranous urethra to the neck of the bladder is in a state of congestion. The mucous membrane is swollen and absorbs the light. It is redder than normal and bleeds easily. Its vessels empty badly with the pressure of the beak of the instrument; it is dotted here and there with swollen Littré's glands or flecked with pus threads. The verumontanum is not much altered in size or in colour in the slighter grades (if there has been no sexual excess). It must, however, be thoroughly understood that the prostatoscope is not an instrument for routine use.

Clinically.

1. The discharge may be very slight; merely a drop of yellowish pus in the morning, which has found its way through the compressor urethræ muscle, and has perhaps to be pressed up from the perinæum in order to be seen. Yet it is there, and troublesome both to patient and practitioner.

2. There may be no discharge visible, but the urine contains pus "flakes," "strings," or "threads" ("Trip-fäden," which are merely pus, epithelial cells, and mucus cohering in long or short pieces). The patient, under these circumstances, usually has more frequent calls to empty his bladder than natural.

3. There may be no discharge, but the urine contains a small quantity of pus and threads. The patient not only has a frequency and some urgency of urination, but also an ill-defined pain in one or other side or in the centre of the perinæum—a pain which, I believe, indicates the soaking of the inflammatory products into the deeper layers of the prostatic urethra, and implication of the seminal vesicles (cf. *Pain*, p. 116),—or instead of the pain, pus, and threads, the glands of the prostate may be so stimulated as to give rise to an excessive discharge of thin glycerine fluid, which is obviously an abnormal prostatorrhœa (for there is a normal prostatic glairy discharge under sexual excitement). This varies in amount; if it is slight and only noticeable at stool it is not of much moment, for it marks the decline of the disease and finally disappears. In others, however, it is profuse and constant, keeping the patient mentally, consciously, and physically miserable. The amount of this watery discharge—for the more watery it is the more obstinate it proves—is incredible.* The prostatic area secretes it in such quantities that the practitioner may be deceived as to its true character, and assure the patient it is the urine left in the urethra after micturition. I have known it called "incontinence of urine." Luckily these extreme cases are not often met with; any way they are nearly always controllable by electric currents to the prostate (cf. Treatment).

The cause of the chronicity lies in the compressor

* I have treated two out-patients who have shown me this thin, watery gleet dropping from the meatus like saliva from a dog's mouth at the sight of food. It was not urine, but apparently thin serous discharge. There was no stricture. No ordinary urethral injection or medicine affected the trouble. I regret to say I lost sight of the patients.

urethræ. It neither allows the *free* exit of the discharge nor the free inlet of injection. The front urethra is assiduously attended to and often cured, but it periodically becomes re-infected from the reservoir behind in the prostatic urethra.

(b) *Posterior urethritis (severe grades)*.—If the inflammation in the prostatic urethra, which is at first limited to the surface, is neglected or aggravated by exposure to cold, or excessive sexual excitement, or is irritated by injudicious use of alcohol, or by the traumatism of excessive cycling or riding, the sinuses and adjoining channels become affected, the submucous tissues implicated, and often the tissue of the prostate inflamed. This exaggeration of a tractable complaint takes place more readily in those patients who have inherited susceptible mucous membranes,* a class which I hold embraces those with a maternal family taint of phthisis, or with a paternal family history of Bright's disease.

The severer grades of posterior urethritis form striking objects when viewed with the prostatescope; but here also I only advise examination when other forms of treatment have failed, and the suspected prostate is not so infiltrated or warped by the soakage of inflammation as to obstruct the necessary *depression* of the handle of the prostatescope to allow the beak to pass along the prostatic urethra.

The most striking change is perhaps in the verumontanum. This is dark red, very swollen; the surface may be flecked with white and the opening of the sinus *pocularis patulous*. The sinus *pocularis* is often difficult to discover in these cases. The absence of light reflection from the inflamed mucous surface darkens the urethroscopic picture, which therefore shows less detail, and the swollen lips tend to overhang and occlude the orifice. I generally assume, rightly or wrongly, that the grade of severity of the posterior urethritis is indexed by the condition of the verumontanum. In my opinion it is to be

* They form a distinct clinical group, taking colds easily, suffering from over-wet eyes, bronchial catarrhs, diarrhœas, etc.

examined like a physician draws inferences from the tongue. In many cases it needs active treatment (cf. Treatment).

The mucous membrane of the prostatic urethra is similar in aspect. It is of a dark red, probably patched here and there with white. It bleeds easily and is very spongy. It is rucked up into soft, turgid ridges by the window edge of the prostatoscope, and often deceives the observer by mimicking in appearance the fixed prominence of the verumontanum; curious scar prominences are met with as time goes on. It is certain that the prostatic urethra has all the elements for the manufacture of organic stricture, and in a few instances I have found definite scars precisely similar to the scarring in the anterior urethra, but they do not materially affect the passage of urine; probably the dense tissue of the prostatic gland prevents soaking and submucous contraction. Oberländer* gives an excellent picture of such a case, the scar tissue being very marked.

Treatment.

The urethroscope is not needed in the milder forms of posterior urethritis; indeed, it is inadvisable. Bruising of the swollen mucous membrane by rough manipulation of the prostatoscope not only lights up latent or subacute mischief, but presses the discharge into the sinuses, and may determine an attack of inflammation of the gland itself, or even of one or other testicle.

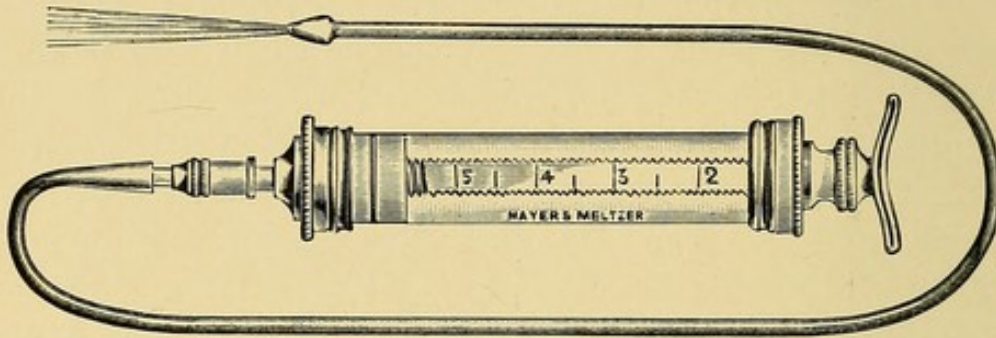
Many an attack of mild posterior urethritis will be cured by the simple expedient of carrying an astringent solution to and behind the membranous urethra. This is best effected by a Guyon catheter. (Author, 'Cardinal Symptoms,' p. 147.) (Fig. 20.)

The most reliable injection is some salt of silver such as the nitrate. A solution containing 5, 10, 15, or 20 grains to the ounce is used, and 10 to 15 drops are instilled at a time into the deep urethra, twice a week, the strength of the in-

* Oberländer, 'Lehrbuch der Urethroskopie,' Tab. viii, fig. E.

jection being gradually increased. If much pain results, inject half a syringe of a solution of cocaine (4 per cent.) before introducing the silver, or a hot *bidet* may be taken

FIG. 20.



Guyon syringe.

after the introduction of the solution. The practitioner should be especially careful not to allow any of the solution to flow into the penile urethra, unless the discharge complained of is free and obviously as much penile as from the deep urethra, and then only a 5-grain solution should be used.

It should be a rule that in chronic cases no injection of silver stronger than a 5-grain solution should be allowed to enter the membranous or penile urethra.* Moreover, it is important not to cauterise the membranous urethra strongly. As the solutions of silver or other caustic are increased in strength, the practitioner should be certain that the bulb of the Guyon syringe is lodged in the prostatic urethra, and is not embraced by the membranous urethra. Under this treatment both pus and puriform urine may disappear, and with it the slight frequency of micturition; but if *perinæal* pain co-exists, as it often does in the severer grades, it is more difficult to treat and less amenable.

When painful sensations are experienced in the *perinæal* region, it will be found that the application of iodoform alternating with the silver will prove of value.

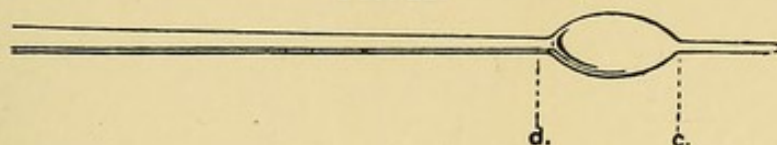
There is a right and a wrong way of applying iodoform. The wrong consists in allowing part of the solution to

* Failing the application of the solution, the patient can be instructed how to use a *prostatic* antrophor (cf. Appendix).

escape from the meatus. The leakage of this smelly drug at once renders the patient an object of suspicion to his neighbours. If the iodoform is well placed it is swept away after a few hours by the first urination, and no one is the wiser.

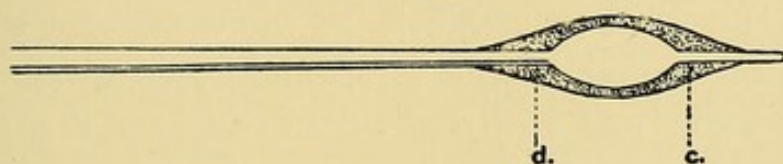
A bougie with a pear-shaped tip (Fig. 21) is smeared with

FIG. 21.



A pear-shaped bougie à boule for iodoform.

FIG. 22.



The same coated with iodoform.

a minute portion of a mixture of cacao butter and iodoform so as to fill up the inequalities of the pear end (c and d), causing the end to be olive-shaped (Fig. 22). This is dipped in cold oil to harden and lubricate, and is passed into the deep urethra and allowed to remain there for three minutes in order to melt off the medicament. The bougie is then withdrawn, and the patient uses a lavatory next time he urinates. But supposing neither deep Guyon injections nor the use of iodoform have checked or cured the discharge, it is wise to resort to severer methods. In such cases the prostatoscope or the very long urethral cannula is of use.

Thus the patient empties his bladder, his prostatic urethra is cocainised, the stylet of a silver catheter is tipped with solid nitrate of silver,* and the surface of the prostatic

* I use specially prepared platinum points, but any wire will do if it is straightened and stiff enough. Only the point is dipped in the platinum cup which contains the cooling silver nitrate. In severe cases I leave a little piece (the size of a pin-head) in the post-montanal space—that is the depression

urethra is lightly cauterised through the prostatoscope under control of the eye. I say *lightly* because it is better to administer the remedy two or three times lightly than once severely. When the silver has been applied thus gently to the entire prostatic urethra, the action may be checked by running a pledget dipped in salt and water down the prostatoscope and pressing it on to the surface.

One little point in the technique is worth attending to. It is wiser to commence *behind* the verumontanum in the post-montanal space and work forward, than *vice versâ*. By this means there is no chance of the silver mixing with any moisture and becoming pushed into the bladder upon the beak of the prostatoscope.

If the orifice of the sinus pocularis is patulous, or its lips swollen more than the rest of the verumontanum, it is wise to take another stylet, very lightly coat a quarter of an inch of its end with the silver, and pass it along the sinus.* It enters usually a quarter of an inch. It must be remembered that the sinus pocularis is an excellent harbourage for gonorrhœal remains. Note that after any strong nitrate of silver application the patient is warned he may bleed a little next day.

Treatment for excessive prostatorrhœa, with or without perinæal discomfort.

In those cases where there is much watery discharge, and the practitioner has satisfied himself that it is not urine drippings, the electric current will probably prove of use.

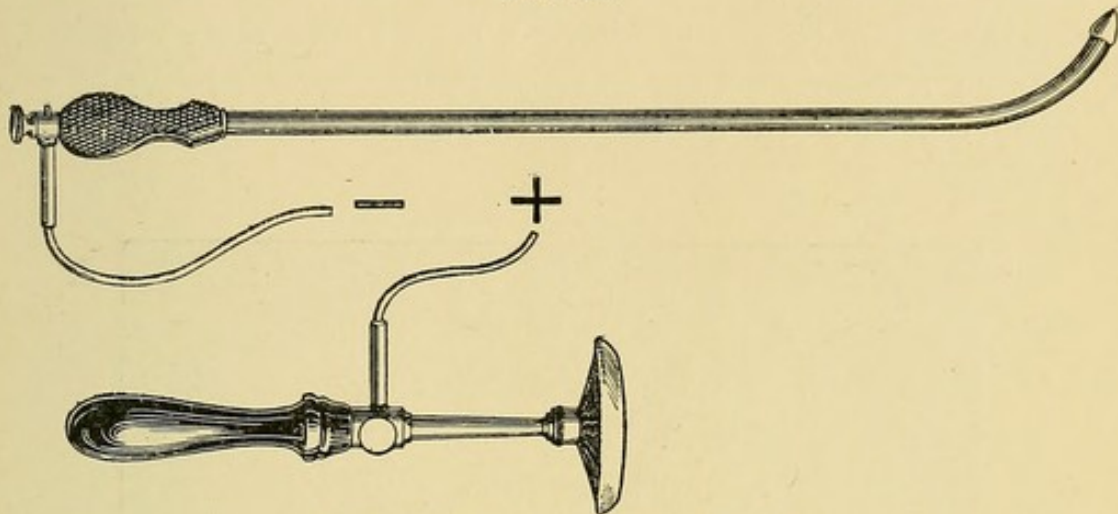
A negative electrode is gently passed along the urethra until the point lodges in the prostatic urethra. The

between the uvula vesicæ and the verumontanum. It works forwards. Stylets for this use and a little platinum cup on a wooden handle can be obtained at Montague's, 101, New Bond Street.

* Even a skilled urethroscopist may be unable to catch the glint of the orifice of the sinus pocularis, for the orifice may be displaced by swelling, or overhung, or tightly closed. If the orifice cannot be seen, let the middle of the verumontanal face be selected and tried with the point.

positive pole of the battery is wetted and placed on the thigh or back. A current of three to five milliampères, as gauged by the galvanometer, is now passed through the

FIG. 23.



Urethral electrode and skin rheophore.

circuit for three or five minutes. This is repeated in a week for three or four times. Usually by this time the patient will notice a sensible diminution in pain and discharge.

If the prostate, *per rectum*, is found slightly bigger and tougher than normal (more fibrous and less elastic); if also the prostatoscope or any curved instrument has to be much depressed before it can be introduced, the practitioner may be sure that inflammatory changes have soaked freely into the prostatic tissue. Massage from the rectum is here useful, especially if it is accompanied by ergot and rectal suppositories; it is carried out thus:

The patient bends to a right angle over the back of a chair, or rests the thorax upon a high table or surgical couch. The surgeon's right forefinger, well lubricated, is introduced into the rectum and gently pressed over the posterior surface of the prostate from the periphery to the central sulcus. At first the touch is light, but later firmer pressure may be employed. The *séance* lasts five minutes, and may be repeated twice or at most three times a week.

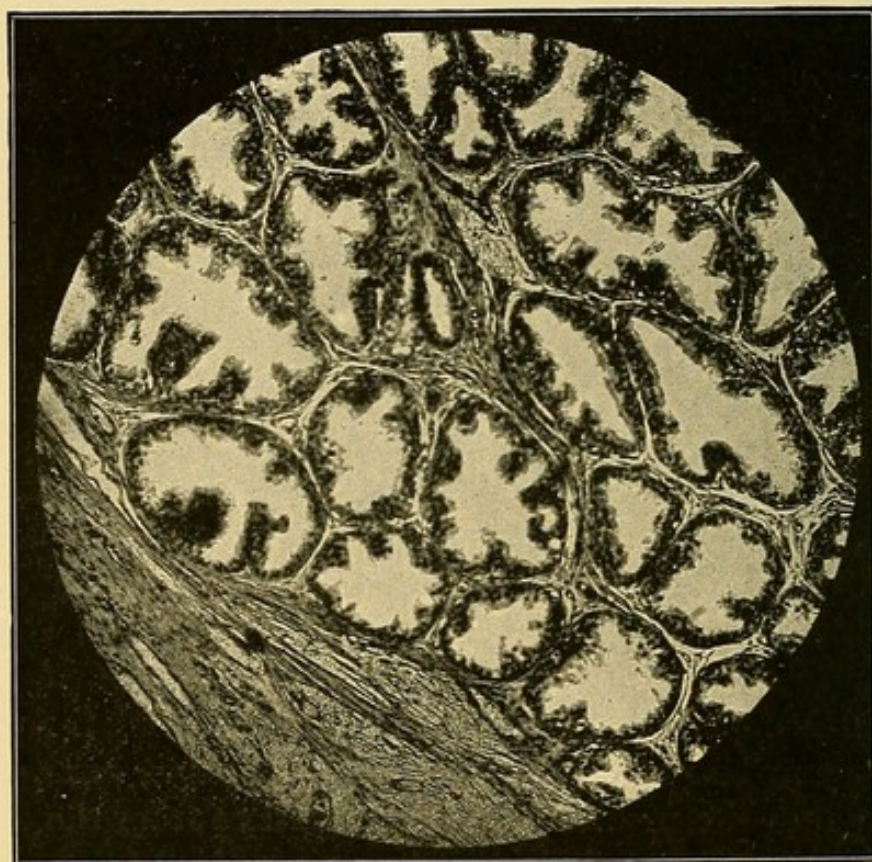
I invariably impress upon patients affected by severe

grades of surface prostatitis, or by interstitial prostatitis, the necessity for much patience.*

Enlargement of the verumontanum ; excision.

On a few occasions where I have found the verumontanum greatly swollen and the patient complaining of a recurrent sense of obstruction to the urine, and continuous

FIG. 24.



Microscopic appearance of an enlarged verumontanum.

annoying tickling and itching in the deep urethra, with evidence of deep gleet, I have removed the verumontanum by means of a guillotine which is merely a prostatescope with a sharpened window. The swollen verumontanum is allowed to enter the prostatescope through the window, the instrument is steadied, and

* The parenchymatous inflamed prostates (in which the gland swells enormously, resembling a small apple *per rectum*) do not trouble the patient to anything like the same degree as the interstitial variety.

with a sharp push the verumontanum is sliced off. In some instances—those in which the removal is a real necessity—it slices off like a thickened œdematous tonsil. There is but little bleeding. Generally I do this slight operation under ether, for even with cocaine* there is considerable pain, and without it the suffering is severe.

Removal of the verumontanum does not influence the sexual apparatus. One or two patients complained that the semen tended to flow into the bladder. Its removal must, however, be but seldom necessary.†

I have had these enlarged verumontanums examined microscopically (Fig. 24). It is interesting to note the similarity between their structure and certain of the prostatic median lobes.

* I do not advise cocaine when a raw place is left through which the drug may possibly be absorbed.

† It will be found in prostatic atrophy after castration that the verumontanum becomes white and very small.

CHAPTER VII.

CAUSES OF INTRACTABLE GLEET IN THE ANTERIOR URETHRA.

I. *Congested patches.*

IN the pre-electric light days it used to be taught that the abnormality most frequently met with was a granular condition of the mucous membrane similar in appearance to that seen in the palpebral folds of the conjunctiva. I am convinced that this erroneous view was held partly because insufficient illumination was employed, and partly because the urethra was examined in the *undistended state*.

The most frequent cause of chronic gleet, next in order of frequency to those surface prostatic changes I have just described, is patchy congestion of the mucous membrane.

The general inflammatory wave passes off, but leaves here and there obstinate congested and infiltrated patches, which prove fruitful sources of slight gleet. *They are nearly always hyper-sensitive.* Such patches often co-exist with posterior urethritis, but are perhaps less frequently met with than the latter, because the anterior urethra is more often treated. The favourite position for these patches is on the floor of the peno-scrotal bend. On distending the urethra with air, dull-surfaced, uniformly red patches are seen. They may be flecked with white. The surrounding areas are white and evascular from the air tension, and form contrast pictures. On releasing the air by opening the diaphragm of the nose-piece, these congested areas fall into the end of the cannula. They ought to be carefully watched during the relaxation, for in proportion to the depth of the infiltration, so is the stiffness in relaxation. Now the degree of congestion and depth of the exudation varies according to the age and severity of

the original attack or its treatment. At first the patches are merely surface changes, and very many heal spontaneously or on treatment without further trouble. But the small minority pass through further stages and changes.

As time goes on, in months or years a small percentage of these areas of congestion thicken, the mucosa getting more and more infiltrated, and finally, when the stage of contraction sets in, a stricture forms. The gleet disappears because of the obliteration of the surface vessels of the diseased areas. But this spontaneous cure of the gleet usually occurs before any marked diminution of the stream is noticed, that is, gleet disappears while the stricture is of *large* calibre, and the patient, freed from all symptoms, congratulates himself upon his cure. In two or three years, or sooner (if another attack of inflammation is incurred), the stream diminishes and the diagnosis of stricture is readily made. Such cases have given rise to the belief that chronic gleet invariably produces stricture. I venture to assert that *chronic gleet is not synonymous with stricture*, and believe that many an erroneous diagnosis is given on this axiom. Unfortunately a hasty conclusion that stricture is present in a case of gleet entails much future discomfort and even danger upon the patient. A well-to-do patient may carry through life a diagnosis of stricture and a black or steel bougie, to the use of which he will obstinately cling, under the belief that he is keeping his "stricture" open. Probably he will only fret a sensitive mucous membrane into a state of irritation and stricture. I repeat, many inflammatory thickenings merely involve the superficial layers of the mucous membrane, and do not invade the submucous tissue, and if wisely treated do not contract to form stricture.

Treatment of congested or exudation patches.

Congested patches are best treated under control of the electric light, for more powerful astringents and caustics

can be used locally than dare be applied to the whole urethra in the form of an injection. Moreover less pain is caused by the careful and exact local application of a caustic than by permitting it to flow indiscriminately along the channel on the slender chance of effecting some good.

The deep red patch is detected, its position is marked on the skin roughly with a wetted aniline pencil, the organ being flaccid at the time,* its extent is noted, the depth of the congestion and the implication or non-implication of the submucous layer is roughly estimated (*vide* page 50). Air is permitted to distend the urethra; the patch, if it be a small one, is covered and gently pressed upon by the end of the cannula; the air is released by unlatching the diaphragm; the swab, already dipped in the solution selected, is carried on to the patch, held there for a few seconds, withdrawn, and a dry swab carried down to absorb any superfluous fluid. Hence only the diseased patch is attacked. The solutions most useful are the nitrate of silver and the iodine pigment.

I generally employ five grains of the silver to the ounce to commence with, and in obstinate patches even apply fifteen grains to the ounce, rarely more, being the more careful to localise the application and to check undue action by salt water with the stronger solutions.

The iodine liniment (B. P.) or the Tinct. Iodin. (Edin. Pharm.) is very useful. I cannot give any indication for the employment of either silver or iodine in preference to the other. I think, however, the caustic is more useful when the surface is spongier and more inclined to be granular, and the iodine when the exudation is thick and deep.

In addition to this treatment, in aggravated cases I make the patient *gently* rub the areas marked with the aniline pencil with Ung. Hydrarg. or other ointment of

* I invariably stretch the penis to find the patch; keep my eye on it as I relax the penis, moving the cannula on if the patch glides out of view. When the penis is quite relaxed I mark the spot with the pencil on the under surface.

absorbent character, the massage alone being useful; an occasional application of iodine pigment to the aniline areas is also of value. All applications result in an increase of the discharge for a day or two, and the patient should be warned of this.

Electrolysis.—In some cases the patch proves obstinate; it is over-sensitive. In such cases electrolysis will be found of value. The negative pole electrode is placed on the patch (see Fig. 23, p. 47) and gently rubbed on it for three minutes, a 5-milliampère current being employed. In very obstinate cases, where it is obvious that stricture will form, I cut through the patch on the dorsum or on the floor with an electrolytic knife (Fig. 25) or an ordinary Maissonneuve urethrotome.

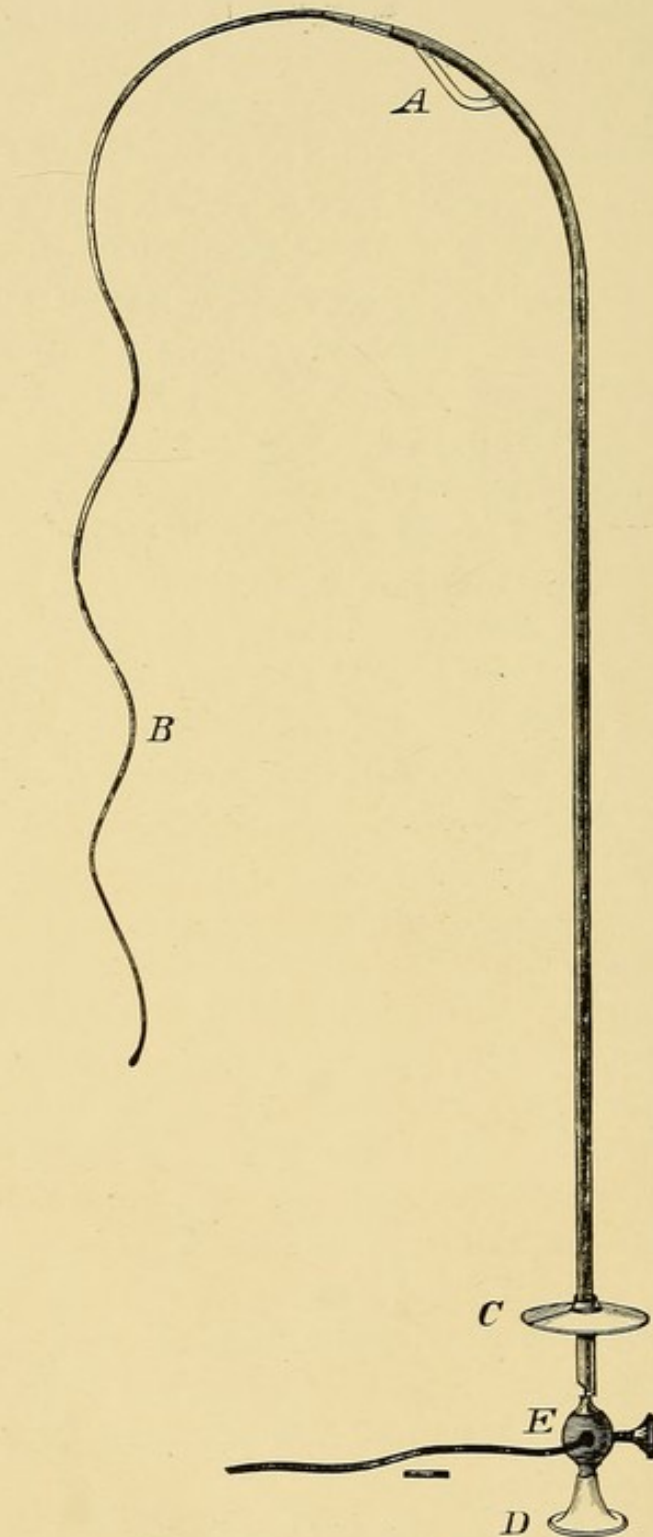
If the electric light is not available, an urethral cannula is passed gently along the canal until the patient complains of pain, when the progress of the cannula is at once arrested, and the surface is then swabbed in a similar way. This is not so exact, but it is a fair substitute. It would pay practitioners to obtain a long urethral cannula and a swab carrier for these cases.

II. *Granular urethritis.*

Contrary to the accepted teaching, I am forced to believe that true granular patches are rare, probably the oil-lamp urethroscopists were deceived by bad illumination. Granular patches are aggravated congested areas, only the surface is more succulent. I have found them most often in the penile urethra, the most frequent sites in this section being the peno-scrotal bend and in the glans urethræ. They resemble almost exactly the "granular lid" aspect. They pass through the stages of succulent hypertrophy, absorption, and scarring, and are most liable to form stricture of the urethra.

Treatment.—The treatment is the same as for congested patches; usually, however, it has to be more energetic, and yet should be judicious. I occasionally touch the most

FIG. 25.



Electrolytic urethral knife (Jardin).
D, A. Platinum blade running in staff C. B. Filiform guide.
E. Connection with negative pole of battery.

prominent hillock of the succulent mucous membrane with solid silver nitrate, conveyed in minute portions on the end of a stylet. Failing this, I incise longitudinally with a little knife, making the incision very superficial, and leaving the urethra alone for a fortnight after. The scarring of the incision empties the vessels and the surface flattens.

III. *Pathological changes in the urethral glands.*

(a) The meatal lip gland. A reddened thickness of the meatal lip often gives the observer a hint to press each lip and ascertain if there is a minute suppurating point marking the orifice of an inflamed gland. I have known cases diagnosed as chronic gleet, which have proved obstinate and annoying for months, cured by discovering one of these minute glands and by running a heated needle-point into its orifice.

(b) A more common nidus for the remnant of a urethritis is the lacuna magna. In fact, if the orifice of the pocket appears at all small or reddened, it is wise to treat it as if it harboured disease. I usually find it is best shown by applying the *nose* of the urethroscope over the meatus and blowing up the glans urethra. It appears on the roof a little way within the meatus as a dimple or a recess of varying depth, bounded below by a sharp crescentic fold. It is well seen in Plate II, fig. 5, where the tube of the aëro-urethroscope, placed just within the orifice of the meatus, displays a well-marked valve of Guérin at the sides of the urethra, and behind this the crescentic fold on the roof bounding the lacuna. I usually treat it by electrolysis. It is surprising how long a gleet may be kept up by the irritation of leakage from this small pocket.

Littre's glands.

In chronic gleet the observer will often be struck by the size of the orifices of the glands of Littre which line the urethra. Those on the roof seem more apparent.

Small red-edged circles, which are obviously faint depressions, line the roof and floor of the penile urethra. I cannot say that there is any safe guide in the colour or patulous condition of the ducts as to whether they are diseased or not. If they are very congested I routinely put an electrolytic blunt needle-point into each (page 58), but as often as not I have been disappointed in believing that I have cured the disease by treating them and not interfering with other parts. Moreover when I have treated obvious patches and neglected these orifices I have cured the patient. I usually recommend each gland to be treated by electrolysis if the discharge is very obstinate and the orifices of the glands decidedly patulous and inflamed, on the chance of rooting out disease.

A single inflamed Littre's gland.

Occasionally a patient presents himself with the following history and symptoms.

Dating from some slight but obstinate urethritis a marked tendency to recurrence of the discharge has been noticed. Generally excessive sexual congress has been blamed for the recrudescence. At each reappearance a more or less tender point has been felt in the penile urethra, and a small knot in the under surface has been discovered there, generally by the patient himself. The knot is often difficult to find, but is made most apparent by stretching the organ. It varies in size from a pin head to a small swan-shot, according to the state of the canal, diminishing if the flush of urethritis is subsiding. It is hardly if at all sensitive to the touch, but the passage of the urine over it serves to keep the patient alive to the fact that there is something "wrong" at that point. The position is most often at or about the junction of the glans with the remainder of the penile urethra, but it may be anywhere along the penile urethra; rarely is it found in the perinæum.

On passing the urethroscope tube down to the spot, it

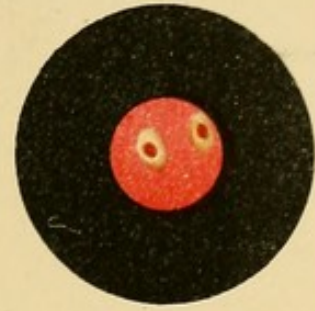
FIG. 1.



FIG. 2.

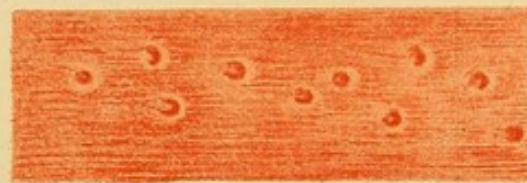


FIG. 3.



Urethral glands in chronic urethritis.

FIG. 4.



Normal mucous membrane of anterior urethra showing gland orifices (after Oberlaender).

FIG. 5.

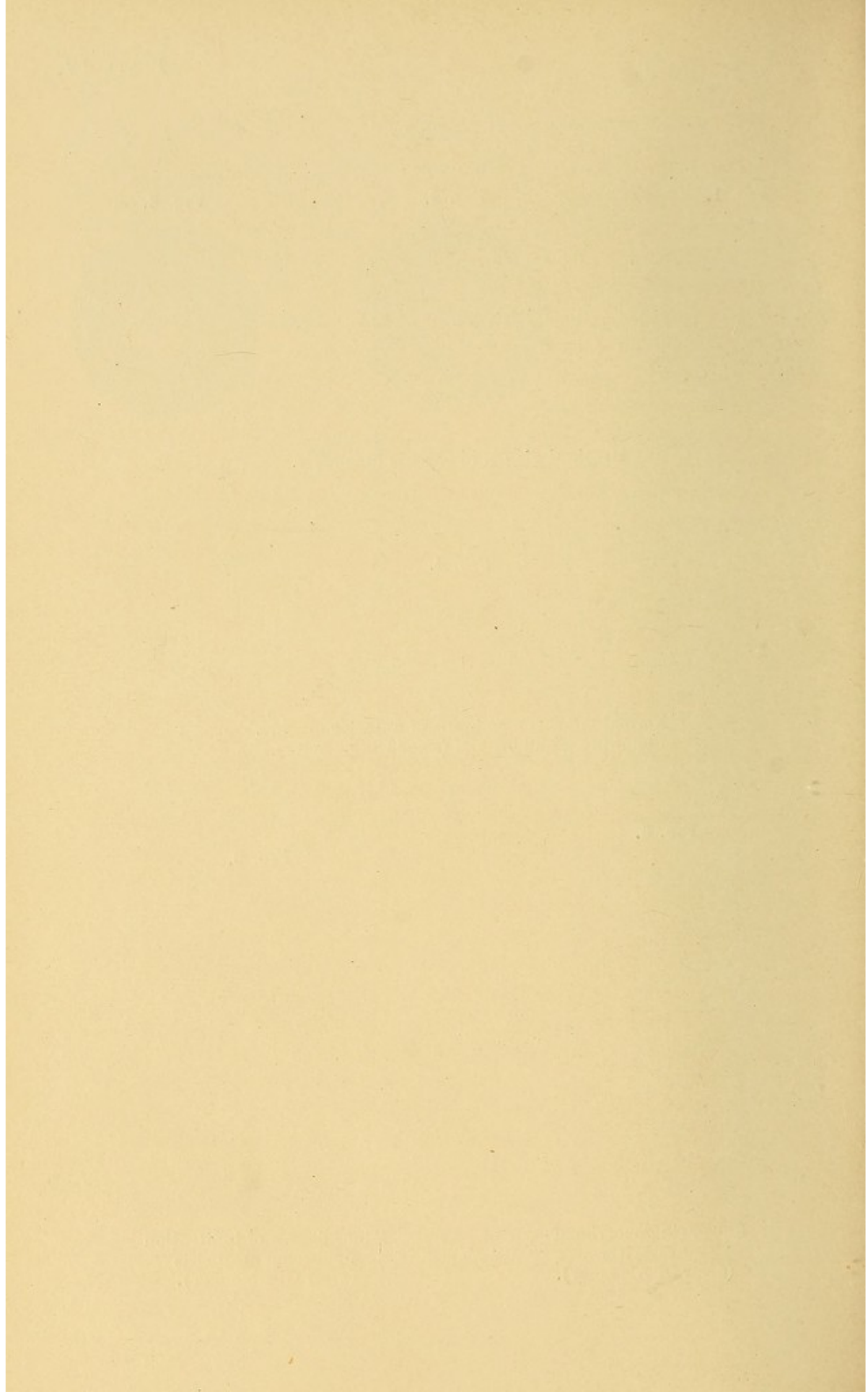


Subacute gonorrhoeal urethritis (after Oberlaender).

FIG. 6.



Minor degree of infiltration in chronic urethritis (after Oberlaender).



is obvious that the knot is a chronically inflamed, blocked gland. On moving the end of the cannula, the little whitish split-pea sized plaque tilts up on slight pressure with the finger on it from below, and a dark point about the centre can sometimes be made out, which marks the orifice of the gland.

For months such a gland will remain well—unfeetable—the surrounding inflammation dying down, the hardness disappearing, and all being apparently well. Upon any irritation, however, such as the incidence of urethritis, the passage of a dirty instrument, the presence of a catheter *en demeure*, or an attack of influenza, the gland re-inflames. In some instances it forms a small sub-urethral abscess the size of a monkey nut. In one case in my hospital practice a large perineal abscess, which needed opening up very freely and which left a most intractable fistula, was the result.

Such isolated glands are best treated by the electrolytic blunt needle (cp. page 58) and iodine paint or mercury ointment on the skin. I place more reliance on the former, because it cuts out the gland, and its contained cocci or bacilli.

Glandular urethritis.

In some cases, however, all Littré's glands with the peri-glandular tissue become infected. This disease is known as *glandular urethritis* (*urethritis chronica glandularis*), and when met with is most obstinate and most difficult to cure, for the gleet is constant and may be in fair quantity. Luckily the disease is rare. The mucous membrane round Littré's glands and the crypts of Morgagni is swollen. On looking along the dorsum of the distended urethral tube, the observer will see a double row of whitish-yellow pin-heads projecting but slightly from the surface. These are swollen glands. The ducts may or may not be plugged; if they are blocked, the glands become like small cysts, and project into the

urethra. The cyst finally breaks, the cavity contracts and draws the thin mucous membrane together at one point. This finally forms one variety of the so-called "stricture of large calibre," and these strictures are consequently found most marked on the dorsal part of the urethra.

Treatment.—The cure of glandular urethritis is uncertain. The most reliable and exact method is to insert into each of the small openings a fine platinum blunt point connected with the negative pole of a constant battery, and to place the pad-electrode of the positive pole on the thigh. On passing a current of two to five milliampères for five to thirty seconds the gland is destroyed. Three, four, or even more glands may be taken at a sitting.

The cannula is placed over the gland which the operator has selected for attack, and the diaphragm is unlatched. The long blunt needle is passed down the cannula and its point guided into the open mouth of the gland. The electric current is then switched on. In a few seconds the gland will turn white, whereupon we know that sufficient destruction has been caused and the current must be switched off. I use the positive pole where I want to obtain a rapid, caustic, and destructive effect, in which case I only attack three or four glands at a sitting.

Failing this method, probably internal urethrotomy on the roof with a Civiale urethrotome is the best substitute. The scarring of the incision in the middle line tends to atrophy the glands.

IV. *Adenomatous condition of urethral glands.*

There is a rare form of disease of Littre's gland of the bulbous urethra, of which I have only met with two instances. The gland turns quite solid and on a little pressure the contents pop out like little hard whitish seeds. I do not understand their clinical position.

V. *Blockage of the ducts of Cowper's glands causing retention-cysts.*

I believe that in discovering retention-cysts of Cowper's glands to be not infrequent in the adult, I have chanced upon an important clue to one of the causes of some of the more obscure and chronic affections of the deep urethra. It is true that several cases of cyst of Cowper's glands have been found in infants upon *post-mortem* examination, and that three probable cases of this disease in adults have been recorded in the literature, but it has not been shown that small-sized retention-cysts do occur in the young adult, and may remain for months unsuspected as being the cause of chronic change and definite irritation of the urethral mucous membrane.

Since I have used the aëro-urethroscope I have examined some hundreds of urethræ in the inflated condition, and have paid particular attention to the pathological history of the smaller glands (Littre's) which line that canal. I have already mentioned (page 57) those changes which chronic gleet evokes in these minute mucous glands; how they become inflamed, secrete pus, and empty themselves through their ducts; how, in other instances, they become distended with mucus from blockage of their ducts and burst into the urethra by the side of these outlets, or slough out bodily and leave little pits in the wall covered by a hanging bridge of fibrous tissue; how in every case as the gland bed heals, the mucous membrane around it becomes thickened and contracted, and transformed into a fine rib or semi-ring of dense fibrous material. The knowledge thus gained in watching the minuter glands has been of much service in tracing the changes in the larger mucous glands, the glands of Cowper.

Some years ago* my attention was suddenly arrested, during an aëro-urethroscopy, by seeing an ovoid swelling on the floor of the bulbous urethra. The mucous membrane covering the elevation was smooth and shining, and

* See 'Brit. Med. Journ.,' Jan. 4th, 1896.

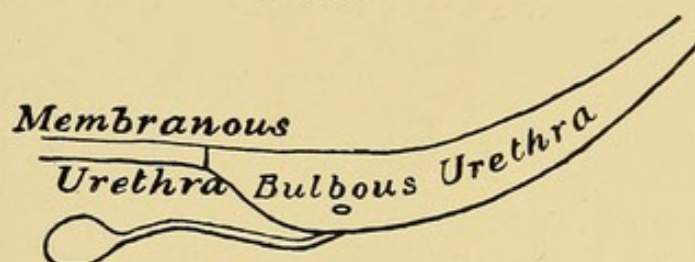
that at the margins was congested. The appearance of the projection reminded me at once of a ranula, and, as I knew that the glands of Cowper emptied themselves in this position, I recognised that I had to deal with a retention-cyst of one or other of these small glands. I dipped my fine urethral knife into the tumour, guiding it through the cannula under control of the eye, and evacuated about a drachm of mucus streaked with milky pus. The edges of the incision gaped at once, and on re-inflation I saw that I had laid open a loculated cyst, which extended backwards beneath the membranous urethra. This patient was only sent to me for consultation, so that I lost sight of him, but I have been fortunate enough to meet with other cases, some twenty in all, and these have afforded me fair opportunities of studying the gross changes in the cysts, and of speculating upon the influence which the diseased glands appear to exert upon the superjacent mucous membrane.

The gross changes which ensue upon blockage of the duct of Cowper's glands.

Cowper's glands are two pea-sized yellowish-white bodies, which are situated between the layers of the triangular ligament and beneath the membranous urethra (see Figs. 14 and 26). They are embedded in the lower fibres of the compressor urethræ muscle, close against the anterior layer of the triangular ligament. Their ducts pierce this ligament, course beneath the mucous membrane of the floor of the bulbous urethra for about an inch or more, and then open either separately on each side of the median line or join together in a common orifice. Careful aëro-urethroscopy will sometimes reveal their slit-like openings in this position if inflamed (Fig. 26), but if normal they remain invisible. On blockage of the duct, either by inflammation or scarring, the gland becomes distended with mucus, and the duct dilates. Gradually an ovoid or loculated cyst the size of a haricot bean or damson forms below the membrano-bulbous urethra, and projects

upwards on to the floor of the bulbous section (Fig. 27, *a*). Probably the greater part of the swelling is at first merely a dilatation of the duct itself, but as the tension increases and no relief is obtained, either surgically or spontaneously, the cyst extends backwards, makes its way through the deep or posterior layer of the triangular ligament, and bulges upwards on to the prostatic urethra. My knowledge of its capacity for further enlargement ceases here,

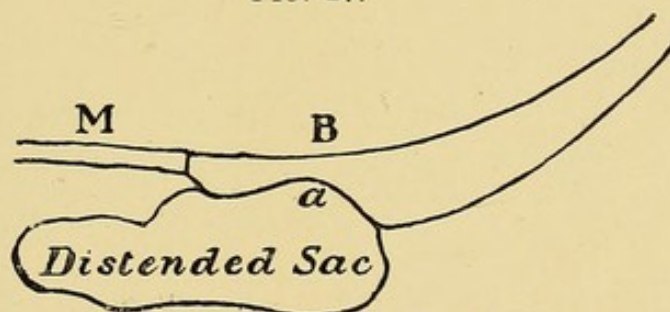
FIG. 26.



Cowpers Gland

Relation of Cowper's gland and duct to the membranous and bulbous urethra.

FIG. 27.



Cyst formed by distended Cowper's duct.

for I have only encountered the lesser grades of these retention-cysts, but if one may judge from three cases recorded in the literature by Gubler,* Englisch,† and Lane, much larger proportions may be assumed. In one (which I take to be an example of retention-cyst) carefully detailed by Mr. Arbuthnot Lane‡ the cyst measured

* Gubler, 'Des glandes de Méry et de leurs maladies chez l'homme,' Paris, 1849.

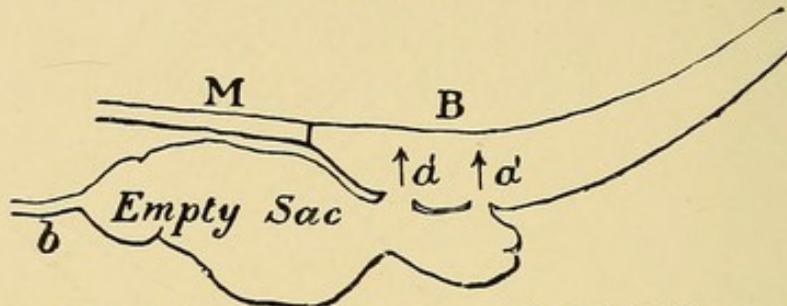
† Englisch, 'Wien. med. Jahrb.,' 1883, p. 289.

‡ Arbuthnot Lane, "A Compound Diverticulum in connection with the Prostatic Urethra," 'Pathological Transactions,' vol. xxxvi, p. 288.

2 inches by $1\frac{1}{2}$ inches. It had burst into the prostatic urethra.

To return to my own notes. Either from temporary access of inflammation, or tension necrosis, the cyst bursts

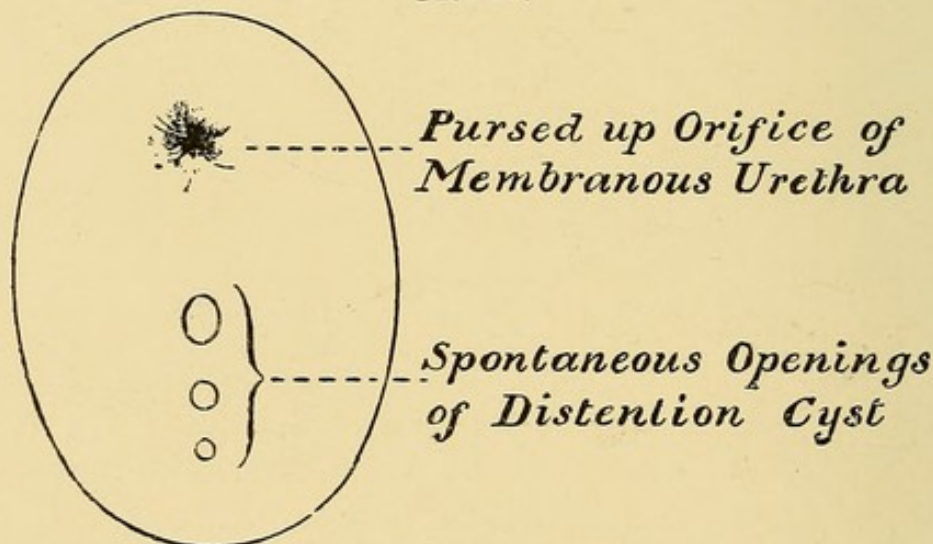
FIG. 28.



Remains of cyst after spontaneous rupture into the bulbous urethra.

into the bulbous urethra (Fig. 28, *a a*), rarely into the prostatic canal. One, two, or more thin-edged oval openings remain, and on inflating the canal they can be clearly distinguished on the floor of the bulbous urethra (Fig. 29). Through these orifices the inner aspect of the empty cyst

FIG. 29.



Enlarged aëro-urethroscopic view of floor of bulbous urethra.

may be viewed, its shining white loculated interior standing out in strong contrast to the red succulent mucous membrane beneath which it is placed. In some cases, after incising the opening, a No. 18 or 20 (French gauge)

cannula may be inserted into the sac and its interior inflated, so that the off-shoot channels which pass posteriorly from it can be studied. In some cases where the duct has suffered most and temporarily (?), only a thin oval opening is detected, and the track of the dilated duct can be distinguished passing backward from it along the floor of the urethra by the gleam of whitish light which traverses the thin diaphanous wall.

Little by little, unless a surgeon thrusts the point of a bougie into the sac through its mouth and tears up its roof-wall, contraction takes place, but the duct and orifice probably remain patulous for years.

I have some suspicion, which is difficult to translate into a certainty, that the mucous membrane in front of these openings is fretted and sclerosed by the escape of the discharges and regurgitations from the sac. I have seen strictures form in this position. I am sure also that the muscles—the compressor urethræ and the accelerator urinæ—suffer to some extent by inflammatory transudation, for their energy becomes impaired, and the urine is not freely ejected in micturition as it should be in health.

The symptoms of retention-cysts of Cowper's glands.

The symptoms of inflamed prostate, subacute cystitis, and stricture, may be present coincidentally with those evoked by retention-cyst of Cowper's gland, for the gonorrhœal invasion which affects the ducts attacks also the adjacent areas of the urethra. It is somewhat difficult, therefore, to assign to their proper quarters the symptoms evoked by inflammation of these separate areas. As far as I am able to judge, the symptoms which arise from retention-cysts are—

(1) A chronic milky gleet, slight, but persistent. It had been present in my cases from two to six years, and in evidence of its being largely dependent upon the presence of the cyst, it was at once reduced upon incising and evacuating its contents.

(2) A distinct though slight obstruction to the free passage of urine. Apparently this was due to the spasm which the gland excited in the compressor urethræ, for on inflating the bulbous urethra the orifice of the membranous canal was tightly compressed, and the entrance of air was strenuously resisted. Part of the obstructive feeling might have been due, of course, to the narrowing of the tube from flattening of the inferior wall of the membranous urethra by pressure of the cyst. This obstruction was at once relieved by incision.

(3) A dull heavy weight and pain on one or other side of the median line of the perinæum at the margin of the anus, somewhat similar to the pain of chronic prostatitis, and likely to be mistaken for it. This pain is liable to exacerbation by cold, alcohol, etc.; under these circumstances it spreads to the tuber ischii and down the inside of the leg of the same side. Pain over the sacrum and corresponding groin is also complained of.

These three symptoms are much increased just before the spontaneous rupture of the sac, and great relief to all is experienced on the appearance of a little rush of mucus and pus and blood from the meatus.

When the cyst has emptied itself there is a sense of tickling or fly crawling in the deep urethra, and the patient has to lift up his perinæum with his hand at each micturition to empty his canal; but of course all these symptoms are experienced in other troubles in the deep urethra; none are only characteristic of distension of Cowper's gland duct.

The chronicity and frequency with which these cysts are observed.

One of my cases presented a fully distended cyst one and a half years, another two years, and another six years after contagion. I am quite unable to say how long they had been in existence, but, judging from the symptoms, I should believe it was a matter of many months. I am also unable to hazard even a suggestion about the fre-

quency of these cysts. They cannot be common, for I have only met with about twenty examples, and yet I may easily have overlooked many before I became alive to the importance of the disease.* It is surprising that it is not more common, as the bulbous urethra forms a sort of depressed trap in the urethral water-pipe, and irritating fluids perforce lodge here.

The causative influence of these retention-cysts upon deep urethral disease.

I submit, with some confidence, that retention-cysts of Cowper's glands must have given rise to faulty diagnosis in the past, such as spasmodic stricture, chronic prostatitis, and false passage of the bulbous urethra. Putting aside the obvious ease with which such mistakes might occur, the cases which have come under my notice had had these incorrect diagnoses given them by surgeons of acknowledged skill. Again, there is no doubt that the retention-cyst is capable in itself of creating and sustaining a chronic gleet discharge. I believe that this and other inflammatory conditions of Cowper's glands are important factors in the development of organic stricture of the membranous and bulbous urethra. It is reasonable to suppose that the mucous membrane overlying an inflamed sac will become secondarily affected by it, and that the inflammatory infiltration will ultimately lead to contraction. I have seen definite white fibrous deposits overlying the site of these sacs, and even over the course of the inflamed ducts. This would explain the causation of those infrequent cases of organic stricture of the membranous urethra. It has always been difficult to understand how chronic change

* Elbogen ('Zeitschr. f. Heilk.,' 1886, vii), from a post-mortem examination of the urethra in 494 adults and 151 children, concluded that cysts of Cowper's glands or ducts occurred in 2·3 per cent. of male bodies. He found them present in children of from 7 days to 4½ months, and in adults from 17 to 60 years. The right side was affected in 7, the left in 6, and in 4 the condition was bilateral.

can affect a part like the membranous urethra, which is kept permanently closed against the lodgment of irritating discharges by the tonic contraction of its embracing muscle, the compressor urethræ. Inflammatory transudation from an underlying inflamed structure, however, would readily induce those muscular, submucous, and mucous changes which on contraction would form a dense organic stricture.

Retention-cyst as a cause of extravasation.

On blowing out the thin-walled cysts, and remembering how frequently stricture of the urethra is situated immediately in front of their open orifices, I at once realised how easily extravasation of urine would take place through the wall of that part anterior to the triangular ligament if any extra pressure of urine was exerted upon the urethral tube at this spot. Mr. Arbuthnot Lane* has, I find, anticipated me in this suggestion, but without the same strong grounds for this theory. My cases may form, therefore, the important missing link in the elaborate chain of reasoning he has so admirably put together to support his theory of the causation of extravasation of urine through sacculæ in the urethra.

Treatment.—I have incised cysts which have not burst by means of a fine harpoon knife introduced through the urethral cannula. I have then introduced a cannula bodily into the cyst, and have pencilled the whole wall with solid nitrate of silver, and have limited and checked the action of the caustic by means of a swab of salt solution or of cocaine hydrochlorate.

Probably before the cyst gets very large the obstructive tension induces necrosis and an opening forms spontaneously. For some years I have been treating these cysts, which I have opened or which I have found open, by a better method than the caustic stick. I have intro-

* Arbuthnot Lane, "Extravasation of Urine and Sacculation of the Urethra," 'Guy's Hospital Reports,' 1886, p. 29.

duced into the opening a small pin-head positive electrode and carried it to the very end of the cyst sac. I have then switched on a current of 5 to 10 milliampères, and thus lightly and exactly cauterised the entire inner wall of the sac. After a few weeks I have repeated this. It is interesting to note how the cyst contracts and becomes innocuous as a producer of gleet under this treatment.

Literature in addition to that mentioned in the text.

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Certain conditions which are difficult to classify, but which fittingly complete the consideration of the subject of gleet, may be introduced here.

Threads; flakes (Tripperfäden). — Many terms are used to designate the white scraps or threads passed in the urine of a small percentage of those who have suffered from chronic urethritis. It is often more difficult to localise their source than the site of an actual discharge, and they are certainly more difficult to cure, for they frequently continue long after all visible discharge has disappeared. They are, of course, mere filaments of dried muco-pus, and may or may not harbour actual gonococci. Nor can they be accepted as an evidence of urethral disease, for they may come from any section of the urinary tract. I venture to give the results of a careful clinical study of these scraps, but before I do so I wish to mention that the practitioner himself may produce one variety by means of injection. Suppose a zinc permanganate injection is used over-strong,* say $\frac{1}{4}$ grain to the ounce. The practitioner may notice in some patients square or oblong transparent flakes. If he will examine these he will note that they are slightly pink-coloured, cast-off epithelial squames, without pus, and on leaving off the injection this cloud of flakes will disappear. Such pseudo-flakes are easily recognised. They are merely the scarf-skin of the urethra, and are transparent because they are moist. They are not of any importance, except as conveying a hint for a change in the strength of the lotion, and are valueless in estimating the presence of inflammation. This latter is demonstrated by the true thread.

* The general strength is gr. $\frac{1}{8}$ to the ounce. This is often too strong for some, too weak for others. The fact is, every urinary mucous membrane varies in its tolerance of fluid other than normal urine. Plain boiled water is sufficient in some to produce a discharge of leucocytes.

The true thread of chronic inflammation of a urinary mucous membrane.—The true thread is derived from unhealed patches of inflamed mucous membrane, but it must be distinctly stated that only a small percentage of patients present this symptom, and that when it is present it is distinctly unfavourable for *rapid* cure of the accompanying gleet. The urine passed first thing on rising contains the best sample for examination, for the long hours of rest have permitted the inflammatory products to accumulate, and the first flow of urine washes that accumulation away.*

There are three forms of thread—the urethral, vesical, and ureteral. I do not pretend to be able to distinguish with certainty between the ureteral and urethral.

The ureteral are usually much more slender, more transparent, and shorter than the urethral. They follow upon the transit of calculus from the kidney, and are present in some forms of tubercle of the pelvis of the kidney. They are probably evidences of the loss and regeneration of the epithelial lining. They are rare, require no treatment, and I only mention their occurrence because of the danger of jumping to a conclusion that a patient has suffered from chronic urethritis on the evidence presented by a few threads in the urine.

The vesical thread is chiefly found in tubercle. It is more often a speck or white point than a real thread in the earliest stage of the disease. It resembles in appearance minute bread-crumbs; later on these are replaced by threads, which are nearly always broader and more ragged-edged than urethral threads, and point clinically to the lifting up of the mucous membrane by ulceration and separation of the necrotic *submucous* tissue like the

* It must be remembered that they easily disintegrate on shaking up the urine. Thus it is useless to bottle a sample and send it by post; the urine will only arrive clear. I usually advise a patient to pass the first part of his urine on rising into a 2-oz. wide-mouthed, glass-stoppered bottle, over-filling it, and then to cork it. If no air is present in the bottle there is less chance of breaking up the threads.

fringe of a shawl. They are well seen by the cystoscope before they are detached from the vesical wall. Other symptoms of advanced vesical tuberculosis serve to fix their origin and character, and tubercle bacilli (if the urine is acid) will be found in their meshes.

The thread of chronic urethritis.—The entire urethra from the meatus to the bladder mouth may supply the threads observed in a patient who has lately suffered from an attack of urethritis. The greater number originate in the anterior urethra.

The anterior urethral thread.—These are long—always long in comparison to the prostatic thread. Moreover, they are specifically lighter and float, while those coming from the prostate are shorter, thicker, and sink readily to the bottom of the glass or bottle. They are more easily cured than the prostatic. Should the practitioner wish to demonstrate the source of urethral threads, let him advise his patient to inject an adhesive colour solution,* like catechu and opium, the first thing on rising, before passing urine.† If this solution is injected and held in for thirty seconds it will coat and colour all the dry muco-pus adhering to the urethral wall, and the first rush of urine will clear out coloured threads, and probably small, thick, short, very white threads. The latter come from behind the compressor urethræ muscle, which has barred the injection from entering the prostatic urethra.

To detect the thread attached to its site by examination with the aëro-urethroscope, or any urethroscope, is a matter of extreme difficulty and needs real skill. Many expect to see definite white heaps on the wall—to swab them off—and to apply some astringent accurately to a reddened subjacent area; they regard these flaky

* Author, 'Brit. Med. Journ.,' p. 12, pt. i, 1894.

† ℞ Zinci Acetatis, gr. iv;
Tinct. Catechu, ℥viiij;
Ext. Gummi Rub. liq., ℥vj;
Liq. Opii Sedat., ℥vj;
Aquæ, ʒj.

threads as being analogous to croupous or diphtheritic deposit on the fauces. There is no analogy. It is true a distinct desquamative urethritis does occur, and that true casts of the urethra may be seen and peeled off by means of a blunt electrode or alligator forceps, but the condition is rare. I have alluded to such cases in another place (p. 89).

The long urethral threads are loosened by the urine from proliferating patches of the mucous surface, and may be carried by the urine stream and adhere in their transit to any part of the urethra. To detect with the eye a white thread upon the surface is not tantamount to localising its site of origin.

Many of these long wavy threads before they are swept off by the stream of urine are not thread-like in shape, but exist as a thin translucent carpeting of inflamed surfaces—surfaces which are dry and covered with proliferating epithelium and leucocytes; intermixed with and overlying this surface layer is often some mucus from a neighbouring inflamed gland. This layer is detached by the urine, swept off, rolled as it goes, and becomes white from the accumulation.

A thread can be *made* by the end of the cannula in a urethra which supplies threads. Let the cannula be passed under the eye—a regular roll of white surface will be seen accumulating as the open end scrapes along the urethra; or again, gentle massage of the prostate, if the prostatic urethra is desquamating, will produce an abundant supply in the next sample of urine. It is best not to examine for threads, but to treat with some weak astringent solution (copper, silver nitrate) any reddened patch that can be seen on distension. Especial care has to be taken to swab behind each thickened ring of mucous membrane and also to dabble the prostatic urethra freely.

Summary.—I wish to make the following points:

1. Threads may not always be urethral, nor should a previous urethritis be diagnosed on the mere presence of very fine threads. They may be an indication of descend-

ing renal calculus, or advanced stages of tuberculosis of the bladder, or other diseases of the upper urinary tract.

2. Urethral threads are not always due to actual gonorrhœa; any form of urethral inflammation, marital urethritis, or impacted urethral stone, may produce them.

3. The longer thin "pennon" flakes are anterior urethral. The short thick white threads are usually posterior urethral.

4. Aëro-urethroscopy does not enable the site of the thread to be easily selected. It is wiser to have the threads washed away and to treat raw surfaces.

5. The colouring method for distinguishing between anterior urethral and posterior urethral threads is worthy of trial.

6. The prognosis of a case of gleet with co-existing threads is less favourable than one without threads. Usually threads indicate the necessity for patience and perseverance both on the part of practitioner and patient.

Sweating urethræ; congested urethræ.

The patient complains of a very slight discharge of clear glycerin-like fluid, varying from a drop in the morning on rising to the constant presence of the same throughout the day. The discharge has no yellow or milky character; microscopically it is clear mucus. Urethroscopically very little, if any, abnormal appearance can be seen. The entire urethral vascular system may seem fuller than usual when no air distension is used, but on admitting air the vessels empty. All the glands are open, and their orifices look congested even with air distension. There is no sensitive patch, no narrowing. The case may probably be summed up as a "sweating" urethra, one in which the vessels are toneless and leaking, in which the numerous glands lately excited to increased function by congestion have not yet recovered their normal action. There is but little good in topically treating such a canal.

The patient needs general toning. Probably you will find that the eye has a watery aspect, and that he has suffered from what are called "sensitive mucous membranes;" a blister to the perinæum, change of air to the eastern coast, sea-water or cold douching, regulation of the bowels, and an exhibition of iron* and cantharides are usually sufficient. Even these measures may be unnecessary, for the discharge often spontaneously ceases; but if it does not, and if these measures fail, the application of constant electrical currents, either by a pad round the entire penis connected with the positive pole, or intra-urethral electrodes conveying a negative current of 3 to 5 milliampères to the deep urethra, should be tried.

Subacute inflammation of the seminal vesicles.

There is an increasing tendency at the present time, I believe, to give undue prominence to gonorrhœal invasion of the seminal vesicle. It is taught that they are *frequently* attacked. In my experience this is not so; in fact, I place the complication last in my list of the causes of intractable gleet. I admit that cases do present themselves with all the symptoms of subacute prostatitis after gonorrhœa, in which the vesicles are swollen and tender, but they are comparatively rare. When they do occur they are a source of difficulty to the surgeon and misery to the patient. The symptoms produced are not characteristic, and unless a careful rectal examination be made it is likely that the patient will drag on for years without obtaining relief. In most cases there is a chronic urethral discharge, often, no doubt, due in part to the chronic

* It is perhaps necessary to point out that iron in small doses (say 3—5 minims of the tincture) not infrequently resuscitates an almost healed discharge, just as arsenic will in some people, acting probably in the same way as stimulants or coffee. If iron is given, it is best given strong. I generally find 10 minims of the Liq. Ferri Dialysat. of value, especially when mixed with 5 minims of Tinct. Cantharidis.

posterior urethritis which may co-exist, but frequently derived solely from the inflammation of the vesicular wall. An important and somewhat characteristic point is the intermittence of the discharge. For a few days or even weeks the patient believes himself rid of his gleet, and then there is a rush of discharge.

Persistent pain, slight in degree but worrying in its constancy, is invariably present. It may be confined to the urethra, the perinaeum, the bladder, or the testicle, but it frequently has a wider distribution, affecting the rectum, sacrum, lumbar region, thighs, or other regions. It is increased by exercise and by shaking, by sexual excitement, and by instrumental interference.*

In these patients there is almost invariably some degree of disturbance of the sexual function. This may take the form of increased sexual desire, priapism, and frequent emissions. The emissions leave a dark or bloody stain on the clothing, or a yellow tinge from purulent discharge. In others—and this is usually found at a later stage—there is a diminution in the sexual function.

There is often some burning after urination, and there may even be an increase in the frequency of the act. In some individuals the general health suffers to a marked degree, and the patient becomes moody and depressed. The diagnosis rests upon the discovery of full or over-full vesicles which are tender to the touch, or the presence of inflammatory infiltration surrounding them.

Massage may be adopted, but it requires the greatest gentleness, and it is absolutely contra-indicated if the patient has any evidence of tuberculosis, or if there is any epididymitis present. In these latter cases any massage will aggravate and disseminate the disease.

If the vesicle continues to be the source of pain and other methods of treatment have failed, it can be removed by a perinaeal incision (comp. art. "Pain").

* A more detailed description will be found under the heading of "Pain," Chapter XIII.

CHAPTER VIII.

SYPHILIS OF THE URETHRA.

THERE are certain rare diseases of the mucous membrane, such as syphilitic affections and benign growths, which cause urethral discharges. They must be considered separately.

Three forms of syphilis affect the urethra : the primary sore ; secondary congestions ; tertiary ulcerations.

The primary sore.

It can but seldom happen that the practitioner will encounter a true localised chancre of the urethra far from the meatus. I have on one if not two occasions found a chancre within an inch of the meatus, the orifice not being involved ; but in neither case could I diagnose it until marked cutaneous secondaries appeared. In fact, I was treating the patient as a case of gonorrhœal infection, and the hardness which I felt an inch down the urethra as diffuse suburethral inflammation. I attempted to examine with the urethroscope, but failed, because of the extreme meatal swelling. The appearance of a characteristic rash solved the difficulty of diagnosing the hard lump in the urethra. The meatus in neither case was unusually large, nor do I understand why the infection was located so far down. I should accept with reserve any history of primary chancre of the deep urethra, unless an instrument or an injection had been used. I can conceive a catheter, bougie, or even a syringe, with its point infected from a syphilitic

lesion, carrying the poison down the channel of the urethra. In the tertiary stages the mucous membrane of any part of the urinary channel may be affected with a low form of ulceration.

The urethritis of secondary syphilis.

It is probably a matter of common knowledge that a slight urethritis occasionally appears when the secondary rash is developing. I believe it will be found that in most of these cases an attack of urethritis has been previously suffered from, and the congestion of the deep urethra which may be found in such cases is nothing more than a febrile or constitutional upset.

I have met with precisely similar symptoms in typhoid,* epidemic influenza, and other specific fevers.

No treatment is really necessary for the urethritis in secondary syphilis. The discharge is transitory and will disappear with the exhibition of mercury. I have never seen any characteristic lesion in this stage.

Tertiary syphilitic lesions of the urethra.

There is no doubt that gummatous ulceration of the urethra does occur, and that not infrequently, but more especially will it be met with in the lower orders, where neglect and intemperance go hand in hand.

I have notes of a fair number of cases, most of which I have been able to suspect from the symptoms, and have proved my diagnosis to be correct by the curative powers of iodide of potassium.

I do not assert that the ulceration of the mucous membrane is primary. I believe that the gummatous

* A young man applied to me at the London Hospital out-patient department in 1884 for treatment of a sudden, unaccountable, but mild attack of urethritis. As he looked very ill, and had a temperature of 103°, I admitted him at once. He died a few days after from perforation of the intestine, and marked typhoid lesions were discovered in the gut.

material invades the deeper layers of the urethral lining, and subsequently breaks down and opens into the urethra, causing symptoms of urethritis and later of stricture.

On stretching the penis and feeling along the urethra the sensation of a succession of hard ridges and knots will be noted.* Each knot or ridge is composed of gummatus material, and on examination with the urethroscope it will be seen that the site of each will be marked by a thick ridge or bulge of the urethral wall. These folds may or may not be inflamed and ulcerated. Perfect inflation is difficult—almost impossible. The appearance suggests aggravated chronic multiple stricture with ulceration.

In nearly every case I have met with, typical syphilitic ulcer scars on the nose, forehead, legs, or elsewhere have been found.

It is interesting to notice how iodide and opium with a generous diet and the addition of Maltine suffices to clear away these hard, thick ridges and knots, and to check the urethritis. A soothing injection of boroglyceride is sufficient to keep the channel clean while the gummata are absorbing.

Such cases usually form tortuous strictures when all the deposit has been absorbed.

(Edema of the mucous membrane.

I have on several occasions seen a peculiar change in the mucous membrane of the orifice of the membranous urethra in patients who have had syphilis some years previously, and who have consulted me for intractable gleet. It consists in a white, œdematous aspect of the folds made by the action of the compressor urethræ; I have known stricture form here, but whether the œdema is the precursor or the effect of the contraction, I am unable to say. There may be some analogy between

* Some are really very like old rubber gas-tubes with the inlaid circular wire broken at intervals.

this condition and the tendency to syphilitic change noticeable in mucous membranes at or very near other sphincter openings.

I have treated these cases with mercury ointment smeared on a bougie which was passed along the urethra, and have also ordered the ointment to be rubbed into the skin of the perinæum, whilst iodide has been exhibited by the mouth.

CHAPTER IX.

BENIGN GROWTHS OF THE URETHRA.

BENIGN and malignant growths are only met occasionally in the urethral channel.

The variety most often encountered is the ordinary papilloma, *the urethral wart*.

It used to be held, and indeed is still maintained, that warts are only found near the meatus, and the histories of those cases in which warts are found in the bulbous or deep urethra are viewed with suspicion.

My own fairly large experience of twenty-two cases shows me that any part of the urethra is liable to warty growth, but that the penile urethra is the most usual site, and that in the prostatic or membranous urethra the true wart is extremely rare.

The aspect of the wart when seen by means of the aëro-urethroscope is characteristic, and the smallest speck can at once be detected. Even a minute splash of wart is slightly different in hue from the normal mucous membrane, being of a redder colour. As the wart grows larger rays of red vessels are seen upon it, and the variation of light and shade upon the papillæ and indentations of the lobules arrest the eye at once; all are sessile, soft, and succulent. The nearer the meatus the more numerous are the splashes. I believe two factors are essential for their appearance and increase; a marked inherited tendency to sessile warts of the skin, the hand, and the prepuce being the best index, and a continual irritating urethral discharge, not necessarily of a copious or puri-

form character.* There may only be one or two small warts projecting from the mucous membrane. Under air distension the larger warts resemble tiny raspberries adhering to the wall. It may sometimes happen that on a second examination they seem to have completely disappeared, but, when it is remembered that their bulk depends largely upon their rich blood-supply, it is evident that an increased air tension or the pressure of the tube may readily empty their vessels and render them inconspicuous and difficult to find. A subsequent examination will reveal them unchanged in size and situation.

In other cases the warts are large † and massed together in the penile urethra. They have a firmer consistence and a paler colour than the smaller growths.

The urethral mucous membrane bearing these papillomata may show any of the changes met with in chronic urethritis.

Scattered wart-like projections may be found in the neighbourhood of urethral strictures, but it is in the more superficial rather than the deeper inflammations that the true papillomata tend to form.

Without the urethroscope and any meatal wart, those studding the deeper urethral sections may be overlooked. There are, however, a few clinical symptoms which lead one to suspect the presence of urethral warts. Should any patient suffering from an obstinate gleet show a decided tendency to form warts upon his hands or prepuce, should he, moreover, complain of twisted stream, and bleed on the slightest touch with the bougie, the meatal lips should be separated and the glans urethræ examined as far as possible for the presence of the "sentinel" wart. One patient described his sensations as if "pumping through seaweed." As long as the warts remain the gleet cannot

* Apparently the pedunculated warts on the skin of the body, neck, and thighs are sometimes seen in those suffering from villous growths of the bladder. Urethral warts may be coincident with vesical papillomata. See a case by Spangaro, 'Il Policlinico,' March 15th, 1898.

† Grünfeld removed through an endoscopic tube a wart 25 mm. long and 13 mm. broad ('Wien. med. Presse,' 1877).

FIG. 1.



Normal opening of membranous urethra.

FIG. 2.



Edematous folds at opening of membranous urethra.

FIG. 3.



Catarrh of prostatic urethra.

FIG. 4.



Multiple warts in anterior urethra (after Oberlaender).

FIG. 5.



Normal verumontanum showing orifice of sinus pocularis (after Oberlaender).

FIG. 6.

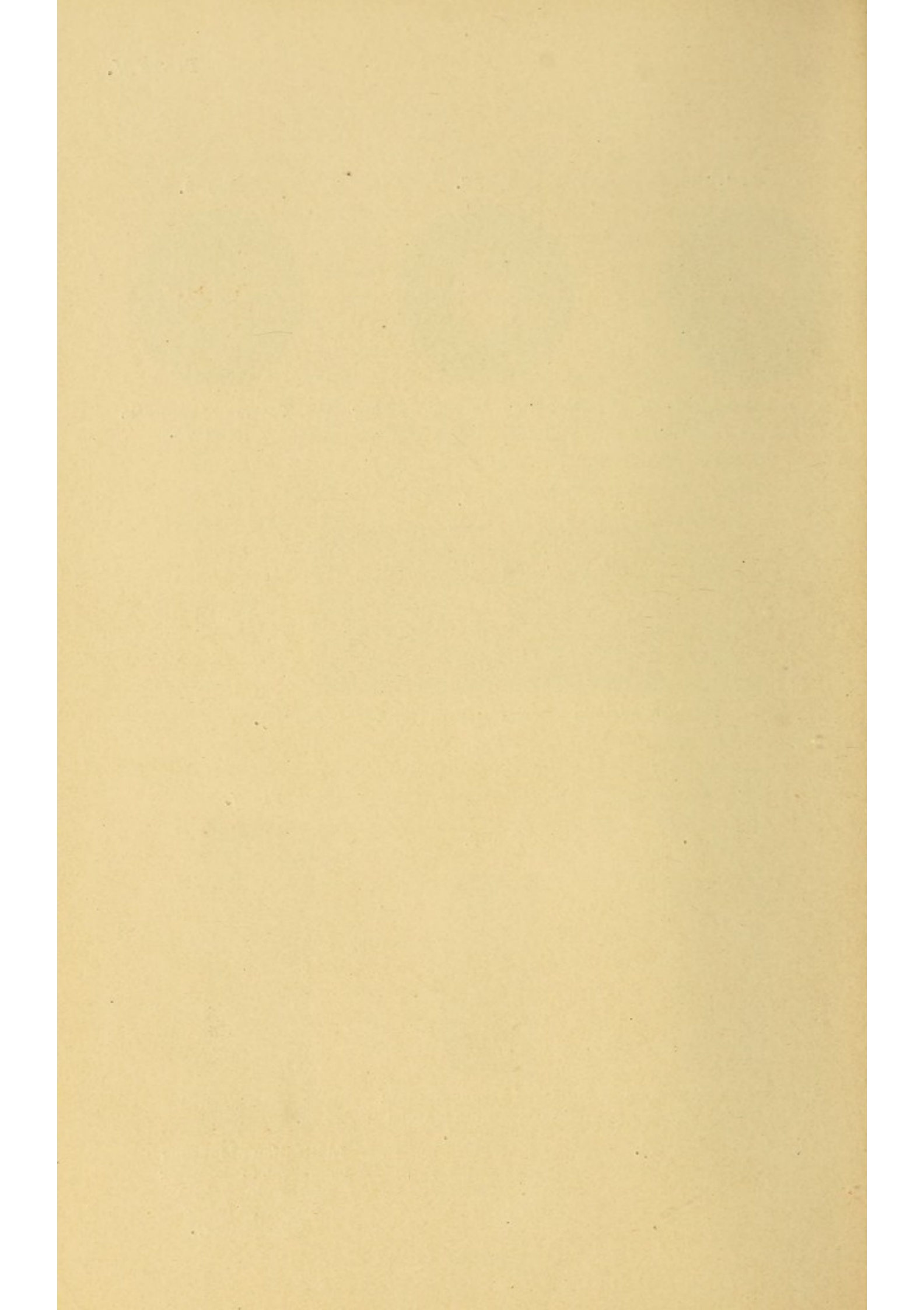


Enlarged verumontanum and hyperæmic mucous membrane.

FIG. 7.



Infiltration of mucous membrane of posterior urethra in chronic urethritis (after Oberlaender).



be cured. Most of the cases I have met with have had chronic intractable gleet for months, or even two or more years. The warts were discovered on examining routinely, and were removed. I should counsel that if there is any reason to suspect urethral warts the patient be treated by means of the urethroscope in the following way :

The urethra is cocainised or eucainised. The cannula end is placed against the meatal edge of the wart under control of the eye. The penis is now stretched, and whilst the urethra is thus rendered taut with the left hand, the right gives the cannula a sharp push against the base of the wart. By this means it is shorn off the wall and caught in the cannula. A fine pair of alligator forceps removes it from the tube, the bleeding surface is dried, swabbed with iodine liniment, and the cannula is passed on to attack in a similar way the next wart or collection of warts. I have removed as many as twenty-five warts at one sitting without much subsequent pain. Occasionally they are very obstinate and recur, despite the most careful treatment, and in this they resemble urethral papillomata in women. In several cases I have had to operate more than once, and this in spite of the fact that the greatest care was taken to sweep the mucous surface clear of the growths.

All other methods are unsafe and inefficient with the exception of Ebermann's,* for they fail to remove the wart thoroughly, and in nearly every case much damage is done to the healthy surrounding mucous membrane.

* Dr. Ebermann ('St. Petersburger medicin. Zeitschrift,' Bd. viii, 1865, p. 252) has an ingenious method of removing these and other urethral growths. This consists in introducing an endoscopic tube, the end of which is closed, but its side is furnished with a large oval eye. The polypus or growth is first entangled in this eye, and a second tube, the extremity of which is open and sharp, is passed into the former, and the polypus cut off. On withdrawing the latter tube the wound is cauterised with nitrate of silver. I object to this method, for the base of the growth is *always* left, and the cautery, to be severe enough to eradicate it, destroys the submucous tissue and produces stricture.

The prognosis of warts.—I am unable to agree with the belief that they wither when the gleet disappears. I am sure they do not, and even Oberländer* acknowledges having seen them after ten years' duration. I have never met with warts in such masses as to block the urethra or deform the penis, but Roger † relates a remarkable case in which the vegetations, which formed dendritic club-shaped villousities from the size of a pin's head to that of a pea, extended from the bulb to the meatus, gradually distending the urethra; the penis measured two inches and two fifths in circumference at the level of the bulb. The walls of the canal were greatly thickened and indurated. The patient had suffered from dysuria, which amounted to retention for twenty-four hours before death from phthisis. The enlarged and lengthened penis was latterly in a state of semi-erection.

Fibrous polypi of the deep urethra.

The membrano-prostatic urethra occasionally gives rise to polypi. Clinically there are two varieties, and it is necessary to draw a marked distinction between them. I venture to divide them into—

False fibrous polypus.

True fibrous polypus.

False polypus.—On passing a tube into the membranous urethra of a patient who is complaining of gleet, and who, I may add, has been treated by bougie dilatation, a vivid red finger-shaped polypus, generally the size of a large grape-stone, may be noted sliding into the orifice of the entering cannula. When the edge of the tube reaches the neck of the polypus it will suddenly be erected by the pressure, turn over, and disappear, only to repeat the manœuvre in the reverse order as the tube is withdrawn.

In the earlier part of my work I used to regard these polypoid growths as true polypi. In fact, a microscopical

* Op. cit., p. 160.

† 'Gazette hebdom.,' No. 32, 1860, p. 555.

section may show an epithelial surface and a thickish core of fibrous tissue ; but latterly I have arrived at the conclusion, rightly or wrongly, that they are merely the relic of a stripping up of the mucous membrane by the edge of the eye of a catheter or tip of a bougie, and that the loose tag remaining in vascular attachment becomes rounded in shape and of a vivid red colour by the beating action of the issuing stream of urine. They certainly perpetuate gleet and induce uncomfortable perinæal sensations far beyond their intrinsic merit.

They are difficult to remove. I have met with fully ten cases, and have never been able to remove them at one sitting, even under anæsthesia. I generally slide the polypus into the *straight* tube, and endeavour to grasp its neck with fine alligator-jawed forceps. As they are of tough consistence this manœuvre frequently fails, so that latterly I have used the fine electric urethral cautery,* passing the point along the tube, and resting it on the neck of the polypus before closing the circuit.

True fibrous polypus.—Fibrous polypi of the prostatic urethra are met with and have been described.† I have never met with a case except as a museum specimen. I have several times seen the verumontanum lobulated, as if affected by outgrowth, but on section such lobules proved to be either a *bifid* verumontanum or a true gonorrhœal wart crop of small size.

* Both forceps and electric cautery must be specially long and fine.

† Burckhardt, 'Beiträge zur klin. Chir. zu Tübingen,' 1889, p. 320, Case 3; Oberländer, 'Lehrbuch der Urethroscopie,' p. 161.

CHAPTER X.

CONGENITAL DIVERTICULA ; DOUBLE URETHRA ; POUCHES ; URETHRAL CASTS.

It sometimes happens that the lacuna magna is not merely a shallow pouch, but a long fine pocket. In such cases, so long as the light is not used and the sinus probed, no suspicion will arise that any abnormality exists. To such an extent may this sinus be enlarged and lengthened that I have known it admit a 6 F bougie for $4\frac{1}{2}$ inches without an effort. My first case occurred some years ago in an Austrian gentleman, who was very anxious to be rid of a four years' gleet. He had consulted specialists in Vienna and other Continental capitals, undergoing a variety of treatment, but with no benefit. It struck me that the orifice of the sinus of Morgagni seemed unusually large, and I picked up a 6 F bougie and passed it in. To my surprise it went $4\frac{1}{2}$ inches, and it was only after prolonged examination with cannulæ that I convinced myself I had to deal with a long tube distinct from, but in juxtaposition to, the roof of the urethra. I introduced a probe coated with solid nitrate of silver, and after slight reaction my patient was cured.

I met with my last case about Easter of this year (1898). I started to perform internal urethrotomy,* the meatus being curiously thick and deformed. The fine bougie—the urethrotome guide—was abruptly but softly checked

* I have done this operation in severe chronic stricture of the urethra over one hundred times, and in my case-books are considerably over a thousand patients whom I have treated by dilatation. I may claim, then, to be facile with fine bougies, and yet this mistake was made.

at 3 inches. I turned down the end—a routine manœuvre—and tried again; this time with the result that it travelled another inch or so before it was arrested. The obstruction felt different. It was hard and solid, such as one is accustomed to encounter in neglected cases of stricture. On removing the bougie and inserting another, I was again softly checked at 3 inches. After repeating this several times, I slit the meatus down in order to examine with the urethroscope, for I felt certain from the sensation I received from the guide bougie passed with the end turned up that I had slipped into a false passage. On separating the meatal lips I noticed a large sinus of Morgagni, which admitted a No. 6 F bougie easily for 3 inches. I cut it down into the urethral roof and divided the stricture in the usual way. The result was excellent.

Double urethra ; double-barrelled urethra.

This is a rare condition. I have only met with one such case. A patient who had been attending an hospital weekly, and who had had a solid steel bougie, No. 12 E, passed each week for the cure of stricture and gleet, bleeding on each occasion after the instrumentation, applied at St. Peter's as an out-patient. On blowing up the urethra I was surprised to find a thick vertical septum commencing at the hinder limit of the glans urethræ. The septum was swollen and ulcerated. This latter condition was probably produced by the surgeon, who doubtless had found some obstruction to the passage of the steel bougie, and had forced it into one or other of the two passages. The right passage admitted a No. 8 E, and the left (patient's left) a No. 12 E. As this septum did not exist for more than two inches, I divided it transversely, and the gleet was cured in a few weeks by injections.

Probably the injection had travelled more easily down

one barrel than the other, and the patient failed to cure the gleet by this means until the septum was divided.

Pouches in the urethra.

Pouchings of the *entire* urethral wall exist behind every stricture, even those of largish calibre, varying in size according to the impediment. I specially mention the fact that the entire urethral wall suffers, because there is a difference between the urethral and the vesical pouchings. In the latter, as is well known, true hernia of the mucous membrane occasionally forms between the musculature of the viscus. As far as I can judge from the cases I have dealt with, the pouches encountered in the urethra are, with one exception (p. 87), bulgings of the *entire* wall, and in this respect they are analogous to dilatations of the ureter and the renal pelvis.

Cases are recorded in which penile pouches occur without obvious stricture. I believe it will always be found that some impediment is present in the deep urethra, though the penile urethra may be free, and patients not infrequently grip their penis by the glans in order to get what they variously term "steam up," "pressure on," "a spate."

The following case* is a good example of a penile urethral pouch and its symptoms:

The patient, whose age is 57, has suffered from stricture for the last eighteen years. A year and a half ago the difficulty of micturition culminated in extravasation of urine, for which he was admitted into the London Hospital under the care of my colleague, Mr. McCarthy. A perineal incision was made, and one large irregular stone and seven small faceted ones were removed from a pouch of pus and urine, which had taken the place of the urethra, immediately behind the obstructing stricture. The patient passed through a very grave crisis, but finally

* Author, 'Proceedings of the Medical Society of London,' 1887.

recovered, and left the hospital with a firm cicatrix in the perinæum. Some months after he applied at my outpatient department for constant dribbling of urine. A large hen's egg sized pouch of the urethra was found, situated $2\frac{1}{2}$ inches from the meatus, and quite unconnected with the incision scar mentioned above.

The patient did not remember this pouch at the time of the operation, but the rôle it played in the dribbling of urine was evident. On evacuation of the contents of the bladder the pouch became distended, and retained about three ounces in its cavity when the urine had ceased to flow. Every movement of the thighs upon the penis now ejected a small quantity of urine. The pouch was slightly inflamed, for the urine was ammoniacal and loaded with triple phosphates and pus. I have seen three similar cases.

An exception.—In the floor of the bulbo-membranous area a true hernia or diverticulum may be formed by backward pressure of urine. Two factors are required to produce this; one, a tight stricture situated a little in front of the position of the orifice of Cowper's duct, and the other a congenitally large-orificed duct. As the latter is rarely met with, and as stricture is not so common in this position as it is a quarter or half an inch further towards the bladder, true dilatation of Cowper's duct into the form of a sacculus detectable on perinæal pressure is not often seen (cf. page 59.)

Without any basis for a dogmatic statement, I venture to add a suspicion that some at least of the perinæal abscesses encountered in the region of the bulb in cases of stricture are due to backward pressure, then distension, inflammation, and suppuration of Cowper's duct. For how is it so many perinæal abscesses may be evacuated without opening the urethra? On examination of these a thick-walled cavity is found, and a fine communication with the floor on one side or other of the urethra in the bulbous area.

Prognosis of pouches of the urethra.

A penile pouch is amenable to treatment, provided it is not inflamed. Once it is inflamed it is most difficult to cure.

All pouchings, even herniæ, no matter in what part of the urinary tract they exist, tend to contract when the back pressure which has produced them is removed.

Thus a distended renal pelvis diminishes to an extraordinary degree as soon as it is drained through the loin. I removed 80 oz. of blood and urine from a renal pelvis, and after a few months of loin drainage the pelvis had contracted so greatly that I shelled the kidney out as a small, shrivelled orange-sized cyst. It was difficult to believe that it originally held so large an amount. I have emptied vesical herniæ of large stones and urine, and watched them gradually contract. Urethral pouches are not exceptions to this rule. They contract when the stricture is removed.

Should, however, the mucous membrane of the pouch be chronically inflamed the result is less perfect. A cure cannot be anticipated. The reasons for this are obvious; inflammation, in addition to pressure, is tantamount to free soakage of inflammatory products, which glue the pouch in its new position.

Two points are worth remarking:

The re-establishment of back pressure, even when that is of a slight character, causes the reconstruction of a pouch. Hence, if the cure of the obstruction is not sound and permanent, the cure of the pouch is impossible.

Resection of the inflamed wall, in order to reduce the size of the pouch, is of doubtful value, and will probably result in permanent fistula. The great secret of curing pouches in the urethra is free division of the stricture, subsequent use of a bougie, and topical applications of weak silver nitrate to the floor. The tissues around the pouch may be drained by a superficial incision, but the pouch had better not be opened.

Urethral casts (desquamative urethritis).

Probably most medical men can recall instances of patients passing a more or less complete cast of the urethra, the macerated dead white slough resembling the finger of a glove, two or three inches or more in length. I have seen several very perfect specimens. One was passed without much pain by a man who had taken an enormous dose of copaiba oil. Another and a very thick cast was brought to me by a patient whose discharge had been treated amateurly by a friend with a very powerful injection. But casts are not always perfect. They are usually detached and come away in thick pieces, which are very puzzling to the practitioner, and incline him to view the case as one of vesical growth. One case which was sent me with this diagnosis was most obscure.

S. F—, æt. 46, applied to Dr. Ptolemy Colmer for retention. A catheter was passed, and a "piece of flesh" came away in the eye of the instrument. On inquiring into the history it was ascertained that the patient had had a very small stream for two years, a little blood having lately been passed at the end of the stream. I examined cystoscopically, but found the bladder free and healthy in every respect. There was no evidence of renal growth. Had the patient not been very positive about the "pieces of white flesh" which he passed from time to time I should have felt inclined to send him home without further examination, but the man was so insistent on the difficulty in urination that I subsequently passed the urethroscope. Emerging from the reddened orifice of the deep urethra I saw what I took to be the apex of a white polypus, but on pushing the straight tube along the deep urethra I saw that I was peeling off an adherent thick white cast like diphtheritic membrane.* Finally I detached a finger-like piece three quarters of an inch long, which Mr. Targett

* Such casts have to be carefully distinguished from those white patches which result from the deposition of lead acetate in the submucous tissue. The latter are found all along the urethra in some patients who have used lead acetate injections for gleet, and an eroded urethra has absorbed the lead. On careful examination it will be seen that the surface covering these patches reflects the light, and that the white material is buried beneath new epithelial formation.

examined and reported to be merely epithelial elements and blood-cells. I kept in touch with this patient several years, and he continued well without symptoms.

This freedom agrees with other cases I have had, about six in all. Once the membrane has been completely removed, and the surface swabbed with iodine, it does not recur.

Occasionally a case is met with unexpectedly in the course of a urethroscopy. The urethral mucous membrane is seen to be of a dead white colour, and the cannula in its progress down the urethra (or along the membranoprosthetic urethra, for it is most often met with in that section) strips up and peels off a regular false membrane. The surface underneath does not always bleed; in fact, it is surprising how much of this tough elastic membrane can be removed without hæmorrhage. Such cases used to be dignified with the title of croupous or diphtheritic membranes, but their chronicity and the absence of any causative organisms only render this name misleading.

Occasionally the cardinal symptom is not gleet, but a sense of obstruction to the urinary flow. This may even amount to retention, if the cast be large and partially detached.

CHAPTER XI.

(B) CONDITIONS PRODUCING OBSTRUCTION TO THE URINARY FLOW.

I. *Stricture and false passages.*

THE instrument is not of any practical value in *ordinary* uncomplicated stricture of the urethra. Here the practitioner has the contraction under control of flexible bougies, but I know of no instrument which will so efficiently demonstrate the exact condition of a tortuous contraction as the aëro-urethroscope. This was not the case with the ordinary Leiter urethroscope.* Nor can I conceive of a more certain or exact method of avoiding false passages, the instrument being used only when the false passage has to some extent healed over (cf. p. 28).

In fact, if there is any difficulty in passing instruments, even in out-patient practice at St. Peter's Hospital, I invariably examine with the light, and see where the difficulty has arisen and which way the point of the flexible bougie must be turned.

Supposing a patient, such as the following,† applies

* On demonstrating this instrument in 1888 I said: "It is certain that with so simple and practical an urethroscope as Leiter's, and with a greater visual knowledge of urethral diseases, we shall have fewer false diagnoses of stricture, and therefore fewer instances of normal urethræ 'worried into stricture' by unnecessary and harmful instrumentation. But it is equally apparent to any medical man accustomed to frequent manipulations of urethral bougies that delicacy of touch is of much greater value and importance in the *practical* and successful treatment of stricture than the electric light."—'Proc. Med. Soc.,' 1888, vol. xi, p. 343.

† H. C—, æt. 36, had suffered from stricture for some time. He states that he was seized with a sudden retention, for the relief of which a surgeon passed a silver catheter of the smallest size nearly up to the hilt (?), but no urine came through the instrument. He was relieved by a hot bath. He applied to me for treatment, and I attempted to introduce a black elastic

with a history of stricture in which instruments have been passed but the bladder has never been reached, and only blood withdrawn. A cannula is passed, the orifice of the false passage is exposed by very gentle inflation (cf. p. 28), and detected by the bloody or irregular edge which it presents. The end of the cannula is moved off it and the real orifice is detected, pin-pointed and air-admitting. This is kept covered by the end of the cannula, and a fine bougie run down the cannula and through the stricture under control of the eye.

Two decided objections to the use of the aëro-urethroscope in stricture are obvious.

It is only in *single* strictures that the method is of immediate use, and strictures are nearly as often multiple as single.* In such cases if there is any real difficulty, sooner than do perinæal section I prefer to treat and enlarge the anterior stricture sufficiently to admit a cannula, before dealing with the false passages and the deeper lying contractions.

The second objection is, that in every case of stricture bougie, but the instrument always slipped into the wrong track, which commenced at the triangular ligament just in front of the stricture. On passing the cannula two orifices were seen: an eccentrically placed orifice leading to the bladder, and a second eccentrically blood-edged slit, the opening apparently of the false passage. The stricture was covered, a No. 6 French was passed without gripping, and the bladder was readily reached.

* Thus, taking two of my out-patient attendances at St. Peter's Hospital in 1888 as being a rough average, 38 cases of stricture attended, and of these 16 were shown to have multiple constrictions.

In statistics of 550 cases of organic stricture of the urethra which had been under my care, and of which careful notes had been taken up to 1895, the proportion of single to multiple strictures was nearly 2 to 1.

In those strictures noted as "multiple"—

2 strictures co-existed in 112 cases (75 per cent.)			
3	„	„	28 „ (5·4 „)
4	„	„	8 „
5	„	„	2 „
7	„	„	1 „

An urethroscopic cannula would demonstrate the opening of the most anterior of these strictures, but the orifices of those more posteriorly placed would have to be engaged by the bougie, guided by the sense of touch.

of the urethra of small calibre there is weakness of the compressor urethræ, and air enters the bladder without let or hindrance. The observer may fill the patient's bladder unconsciously, incautiously, and much distress may ensue if a catheter cannot be subsequently passed to evacuate the air. If I am forced to use the aëro-urethroscope in such cases, I get an assistant to make pressure on the membranous urethra from the perinæum.

II. *The "stammering" bladder and urethra.*

All are familiar with the clinical picture of the young male patient who cannot urinate if anyone is looking at him, but who has to retire, or even enter a water-closet before he can empty his bladder. Sir James Paget first drew marked attention* to this form of obstruction to free urination, which he aptly termed "stammering of the bladder and urethra." He pointed out that it may be known by observing the exact parallelism between the difficulty of expelling urine and that of expelling the air in the ordinary speech stammering. His clinical pictures of the slight and severe grades of the trouble are graphic and worth quoting. Sir James says, "The patient can often pass his urine without trouble, especially at customary times and places, and when he does so the stream is full and strong, and he has nothing the matter with him. But he is in trouble if anyone is looking at him or if he is hurried, as at a railway station. At other times he suffers all the distress that he might have with a very bad urethral stricture. He cannot pass a drop of urine; or after a few drops there comes a painful check, and the more he strains the less he passes; and then complete retention may ensue, and over-filling of the bladder." "I might add," says Sir James, "many more notes of seeming caprices of the stammering bladder

* Sir James Paget, "Stammering with the Urinary Organs," 'Brit. Med. Journal,' 1868, vol. ii, p. 437; 'Clinical Lectures,' p. 80, 2nd edition.

and urethra, but it may suffice to say that nearly all the phenomena of stammering speech find in them a parallel. In both alike there is usually a history of the difficulty having been felt in early life, in both alike are observed the strong influences of habit and association of ideas; the effect of transient changes in the vigour of the nervous system; the need of a justly and yet almost unconsciously measured exercise of the will that it should be neither more nor less than enough; and the influence of distraction of mind. And equally in both classes of patient may be noticed the coincident general sensitiveness of the nervous system and the family relationship with persons who suffer various other forms of nervous disorder."

Subsequent writers upon this subject have rather tended to confuse it by including under the term of "stammerer" quite a variety of cases of difficult urination which, I submit, do not rightly belong to the class.

In my opinion it would be better to let the term "true stammering of the bladder and urethra" be confined to that class of patient, male or female, in which urination cannot be effected at will, although all the organs for the completion of the act are *sound and anatomically perfect*, and to let the term "false stammering" include those cases of inflammation or senile enlargement of the prostate, or atony of spinal origin, or of urethral stricture which suffer from a nervous stammering,* but in which there is

* Mr. Reginald Harrison says, "Who has not seen patients annoyed beyond measure by that condition which has been so graphically described by Sir James Paget as 'stammering with the urinary organs'? One such stammerer, an elderly gentleman with a large prostate, I attended for a long time. He used to spend his days in selecting words, the repetition of which, he thought, during micturition, favoured the act. He kept a list of these words by his side, crossing one off when it appeared to him to have lost its effect, or was supplanted by one more potent. Many words were coined for this purpose. It was impossible to refrain from a smile on seeing, as I had often to do, micturition being performed whilst a word was rapidly repeated as if invoking the assistance of some ancient deity who was spe-

a distinct structural change, a deviation from health which induces that reflex inco-ordination in those muscles which regulate the expulsive effort.

1. *True urinary stammering.*

The patients, as Sir James Paget says, usually notice a difficulty of passing water at will when they are young. Most of my cases have commenced stammering before or about the age of puberty. The trouble may remain slight and stationary, amounting only to "shyness" in micturition, but occasionally it increases after puberty, and in a few isolated instances becomes severe. It is with this severe class that I wish to deal, for it seems to me that neither the nature of the disease, nor the appreciation of the remote dangers of the obstruction, nor the common-sense treatment of the obstruction is rightly understood.

It is generally believed, if I may judge from an impression which the literature conveys, that the sphincter of the bladder does not relax as the detrusor contracts. This is not so. It is generally the compressor urethræ which is spasmodically contracted, and not the vesical sphincter.

Sir James Paget has expressed his belief that "in cases of long-continued urinary stammering, some of which began in very early life, and some of which he had known for many years, he had seen no indication of any supervening disease. I question if this optimistic opinion can be accepted in severe cases, for dilatation of the ureters and cystopyelitis must arise in course of time.

Nor can I concur, if the case be of any severity, in the suggestion that the patient should "try and educate himself to a calm control of his muscular power," and "on any occasion of failure should get what help he can cially interested in such matters. And yet to the end of his life my old and valued friend believed in the efficacy of this proceeding."—'Lectures on Surgical Disorders,' p. 36, 4th edition.

from such mental tricks" as will induce a co-ordinated action of the muscles for urination. Nor is it wise, in my opinion, to fall back upon the use of the catheter, "not only that he may thus relieve himself in case of absolute need, but that he may be free from the enervating dread of helpless retention."

In slight cases this advice may be judicious enough, but in severe examples it is hardly creditable to surgery to permit a functional disorder to continue until it induces a fatal organic disease, nor is it an evidence of progressive surgery to fall back upon the catheter with its attendant discomforts and dangers without an effort at operative and permanent relief.

Clinical notes on a severe stammerer of the bladder.

The real and practical question is, what causes the obstruction to urination, and how can it be remedied? I submit that in many cases the cause of the obstruction is due to reflex tonic spasm of the compressor urethrae, the "cut-off" muscle, and the cure of the trouble is effected by a longitudinal section of that muscle.

This can be proved by a very simple manœuvre. A terminal-eyed catheter is passed until its eye rests in the membranous urethra of a severe urinary stammerer. The patient is now told to urinate, which act he performs with facility through the catheter and before every one. If the spasm lay in the sphincter of the bladder no urine would of course flow through the prostatic urethra. Sometimes, while the eye of the catheter lies within the membranous section, it is energetically gripped by the compressor, and in some cases a distinct clonic spasm of that muscle will ensue, and the patient and the practitioner can feel the twitchings of the fibres in the deep urethra. Moreover, it energetically repels all air inflation from the aëro-urethroscope or water injection by Janet's method. Lastly, I have proved that section of this muscle restores the patient to

free and healthy urination, if the bladder has not become atonied by neglect.

Latterly I have merely cut through the compressor urethræ without opening the urethral tube, and the result has been the same. It is interesting to note how the subsequent condition of the severed muscle will bear evidence to the truth of this statement.

When the patient has quite healed, and finds himself able to urinate comfortably, he notices that there is always a "pull" upon the perinæal scar just before urination, as if the muscle was still endeavouring to close the membranous urethral tube, but was unable to effect it, its circular action having been impaired by the longitudinal scar of fibrous tissue left by the operation. If the patient delays the call to urination and the bladder becomes stretched, positive pain will be evoked in the membranous urethra by an attempt at spasmodic contraction. It is, of course, to be understood that in stating this I have only been dealing with pure cases of stammering bladder in the young adult—cases in which there has been neither sexual congress nor abuse. Other cases of stammering I will allude to immediately. The following cases will serve to illustrate the condition of true stammering bladder.

Case 1.—A gentleman æt. 21, studying medicine, was sent to me as a case of stone. He had the utmost difficulty in urinating. There was urgent and frequent desire to micturate, but no relief. When the bladder got very distended he was able to pass it with much straining once in twenty-four hours. Acute spasms followed the evacuation of the bladder.

His history was as follows:—Since the age of two he had had trouble with micturition. Up to thirteen there had been nocturnal incontinence and inability to make water in the day when he desired to pass it. From the age of seventeen increased difficulty.

January 14th.—The compressor urethræ was cleanly divided on a staff. Prostatic urethra was not touched. The bladder was drained seven days with a catheter. Result good. At the end of nine months the urination remains perfect and painless.

Case 2.—E. P—, æt. 20. A gradual but increasing difficulty in urination for six years—cannot pass water at all if he is watched; sometimes finds it impossible even when alone; has had to wait hours. The period at which the bladder has responded has varied from three quarters of a minute to eight hours. Tenotomy of compressor urethræ without opening of urethra; catheter tied in for two days; immediate great relief; complete recovery.

What the cause is for the difficulty in urination in this class, and why sometimes the patient finds the act easily accomplished and at other times impossible, is not clear; it may be found in the varying composition of the urine. But the expression of reflex excitability can be annulled by division of the compressor urethræ.

2. *False stammering.*

All are aware that spasm of the compressor is induced in a small percentage of cases of stricture of the bulbous urethra. The relief often afforded by perinæal section in such cases is due, perhaps, not so much to drainage of the bladder as to division of an excitable compressor urethræ. I would go a step further, and suggest that some of the misery of tuberculous ulceration of the bladder is induced by reflex spasm, and that probably much of the relief supposed to result from perinæal drainage for this disease is due to division of the compressor urethræ. And lastly, that in some at least of those cases in which a digital exploration of the bladder is made and nothing found, great relief is afforded to the patient by the manœuvre of cutting through this excitable muscle.

I submit that in some of the cases of vesical irritability in women which are relieved by exploration of the bladder with the finger, the result is due to overstretching the sphincter muscle, the analogue of the male compressor urethræ.

A fallacy.

It is not uncommon for male patients with a history of prostatitis to complain of having "to wait" before

they can urinate, and also of having a sense of obstruction to the stream when it is started. This "latent period" and sense of obstruction is due to inflammatory swelling of the neighbourhood of the urethral orifice of the bladder, and is in no way connected with true stammering, nor are these symptoms in any way benefited by section of the compressor urethræ.

CHAPTER XII.

CONDITIONS PRODUCING OBSTRUCTION TO THE URINARY FLOW (continued).

III. *Urethral Calculus.* [J. W. T. W.]

CALCULI are found in the urethra under varying conditions. They seldom originate in the canal; most often their period of occupation of some portion of the urethra is an incident in their migration from the kidney or bladder.

Calculi can only claim to be "urethral" when they have remained for some time in the canal. It is convenient, however, to consider first those cases in which a calculus is suddenly arrested in the urethra. These, from their frequency, are apt to be regarded as the prototype of urethral calculus; they are, however, better considered under the following head:

(1) *Calculi impacted in the male urethra.*

Sudden arrest of a calculus in some part of the urethra, during the process of its expulsion from the bladder, is not uncommon.

The accident may happen at any age, but it most frequently occurs in children,* where all the necessary factors are present. The bladder is powerful, easily excited, whilst its shape encourages a foreign body to drop into the sensitive prostatic urethra. It is not surprising, therefore, that impacted stone in the urethra is the most frequent cause of retention of urine in children.

* 28·6 per cent. of cases of stone in the urethra are ten years of age or under; 13·4 per cent. occur between the ages of eleven and twenty years. (Kaufmann, 'Krankh. d. männlich. Harnröhe u. d. Penis,' 1886.)

In the adult, on the other hand, the accident is much less likely to happen. The bladder has now a base, and often a post-trigonal pouch, which forms a trap for the calculi. In the aged it is but rarely encountered, because the bladder is weakened whilst the orifice is obstructed by alterations in the shape of the prostate.

It may, however, come about in another way, for one or several fragments of a large stone may be left behind after a litholapaxy, and later be caught in the urethra during micturition; or during an equally slovenly operation for stone a piece may be washed out of the bladder into the urethra by the force of the suction bag, or even dropped out of the eye of the catheter and left in the prostatic urethra. This is, of course, rare with the present thorough operation at one sitting, but it was not uncommon in the days when several crushings were performed at intervals.

The symptoms of such an accident, whether spontaneous or operative, are intensely acute. During the act of micturition the patient may feel some body enter his urethra from the bladder. There is sudden stoppage of the stream, intense pain, and continued ineffectual straining, often with the passage of a few drops of blood. On the introduction of a metal catheter or sound the foreign body is encountered and recognised by the sensation it imparts. In adults there is often a previous history of lumbar pain and ureteral colic, followed by bladder symptoms, such as frequency of micturition and pain. In children such a history can seldom be obtained.

There are two narrow points in the male urethra, and at one of these the migratory stone will be arrested. The first is the membranous urethra, further narrowed by spasm of the "cut-off" muscle; and the other is the external meatus, or just at the base of the glans. These distal stones are easily recognised and readily removed, slitting the meatus downwards if necessary, or crushing the stone with polypus or urethral forceps. The deeper stones give more trouble. They are pushed back into the bladder and there crushed. If there is any difficulty in effecting this, it

is wiser to desist and to remove them through a small perinæal incision than to lacerate the prostate by rough manipulation.

The same acute series of events does not usually supervene where a stone is suddenly arrested by a stricture of the urethra. In this case the lower urinary tract is to some extent already accustomed to back pressure, and the dilatation behind the stricture allows the stone to drop back, so that obstruction is rarely complete or acute.

(2) *Urethral calculi.*

True urethral calculi are those which have remained in the urethra long enough to show some changes in their size and structure, and to have made some impression upon their surroundings. They are best grouped according to their situation in the anterior or posterior urethra. They may be further subdivided into those originating in the urethra and those deposited in the urethra from the bladder.*

Primary urethral calculi are very rare, secondary calculi are more common.

(a) *Calculi in the anterior urethra.*—Primary urethral calculi are always phosphatic. Calcium phosphate, magnesium phosphate, or calcium carbonate, and sometimes ammonio-magnesium phosphate enter into their composition. Those arriving from the bladder or kidney contain uric acid, oxalates, or other ingredients found in renal or vesical calculi. This forms a nucleus, usually of small size, around which phosphates are deposited in layers.

A calculus lying in the urethra accommodates itself to some extent to the shape of the canal. Fresh deposit of phosphates takes place in layers, and always in greater abundance at the proximal end (that nearest the bladder). The nucleus thus becomes eccentric, and lies near the distal

* 37 per cent. of the stones found in the urethra belong to this class. (Kaufmann, 'Krankh. der männlichen Harnröhe u. d. Penis,' 1886.)

end of the stone. Where several calculi* are present the points of contact are worn and faceted, the one segment fitting accurately into the other, and sometimes giving the form of a ball-and-socket joint (Plate I, fig. 4). In multiple stones of secondary origin only one member of the series possesses a nucleus of foreign origin (uric acid, etc.), it would therefore appear likely that the other members are formed from particles chipped off the first-formed stone.

The mode of origin of primary stones in the anterior urethra is apparently little understood, for none of the writers on this subject venture upon definite statements.† It is well known that phosphatic crusts are prone to appear on any rough surface in the urinary tract, be it an inflamed renal papilla projecting into the kidney pelvis, an ulcer, benign or malignant, the healing bladder wound of a suprapubic cystotomy, or a suture end or fragment of a catheter remaining in the bladder. The same holds good in the urethra, although here the urine is in contact with the rough surface only for a very short period three or four times during the twenty-four hours. Still more likely, of course, is the deposit to take place if, from some obstruction, the urine tends to "hang" in the tube. Thus it is that bare patches behind a stricture may be encrusted with phosphates or the wall of urinary fistulæ powdered with deposit.

It seems likely that some small portion of phosphatic deposit detached from such a surface forms the nucleus of a stone originating in the urethra, and that, once free, this piece of "grit" receives fresh deposit until a stone of considerable size is formed.

* In 75 per cent. of all cases of calculus in the urethra there is a single stone; in the remaining 25 per cent. the number varies from two to as many as 320 (Civiale's case). (Kaufmann, loc. cit.)

† Stones formed around foreign bodies introduced from without, such as a piece of wood (Chopart, 'Traité des maladies des voies urin.,' t. xi) or a needle (Rizzoli), cannot be looked upon as primary. Belfield's ('Wien. med. Wochenschr.,' 1881, p. 701) discovery of microscopic crystals lying in the mucous glands of the urethra was very probably the result of an error in the preparation of the specimens, and not from deposit of uric acid. Very beautiful rosette crystals may thus be produced.

There is an interesting variety of stone formed in the urethra which corresponds with this method of origin, although its clinical history is very different.

I have observed the following case, which is an illustration :

A young labourer received a blow on the perinæum with a block of wood, and at the time a little blood issued from the meatus. When examined he had not yet attempted to make water. The meatus was blood-stained, and there was tenderness in the perinæum. A silver catheter, after a little difficulty at one point in the bulbous urethra, passed into the bladder and drew off urine slightly tinged with blood. The instrument was tied in for three days and then removed. The patient then passed his water naturally, with at first a slight scalding in the region of the bulb, and later without abnormal sensation. After some weeks (three or four) he returned with the statement that he had experienced sudden difficulty while making water, and that the stream diminished but did not stop, and he believed that there was something in the canal. A hard body was felt lying at the base of the glans, and a calculus was removed with forceps after a little manipulation. The concretion, which was phosphatic, had the shape of a segment of a thick ring, rather less than half the circumference being represented. In thickness it measured about one eighth of an inch, and in breadth rather more. A fortnight later the same series of events took place, and a somewhat similar calculus was removed. This stone was not so perfect as the first, but in placing the two with their curved ends in apposition an almost complete ring was obtained. The case was unfortunately lost sight of.

It is evident that in this case there was a rupture of the urethra, although probably one part of the circumference escaped. A deposit of phosphatic material took place on the raw surface, which must have been of considerable extent. The calculus thus formed had become dislodged and carried along the urethra by the stream of urine.

The important factor in these cases is the presence of a raw surface on which the phosphates are deposited, and in this they fall in line with the phosphatic incrustation of any ulcer or fistula of the urinary track.

The presence of a stricture of the urethra is an important factor in the ætiology of urethral stone. A small

calculus expelled from the bladder which would in the natural state of the urethra safely pass out,* is arrested at the narrow part, and lies in the post-strictural pouch (cf. p. 86). There the retained urine facilitates the deposit of phosphates upon its surface, and the concretion rapidly increases in size. While the stone is to some degree moulded to the shape of the containing cavity, its pressure, as it increases in size, dilates and distorts the tube, so that in time a large sac is formed containing the stone and still allowing of the passage of urine. Sometimes fistulæ are present, opening from the pouch on the perinæum, and in these cases the stone may extend along the fistula as well as backwards towards the bladder.

The following case formed one of a series of urethral calculi shown by Mr. Hurry Fenwick at the Pathological Society of London :†

W. S—, a tailor æt. 49, asserts that since a boy he has always passed a fine stream of urine, taking twice as long to empty his bladder as anyone else. There is an obscure account of an injury having been sustained in the perinæum. Seven years previous to his coming under my care he began to strain greatly in micturition ; fæcal incontinence thereupon supervened. After two years' misery and pain (*i. e.* five years ago) "he was straining one day when he burst inwardly," and he gives a graphic description of extravasation commencing in the perinæum and mounting almost instantly to the pubes. Perinæal section was promptly performed, to his great relief. He then passed "cakes of cement" through the perinæal wound. No attempt was made to dilate the stricture which had been the source of the trouble, and for five years he had passed the major part of his urine through the fistula in the perinæum left by the operation. Dr. Anderson, of Uxbridge, had had charge of the patient for six weeks before he sent him to me, and had dilated the stricture to No. 8 French gauge.

On examining the perinæum a nipple-shaped opening was found

* A calculus not larger than 5 to 6 millimetres, and without rough projections, may traverse a healthy urethra at the expense of only a few superficial erosions. (Forgue, art. "Urèthre," in 'Traité de chirurgie,' Duplay et Reclus, Th. vii.)

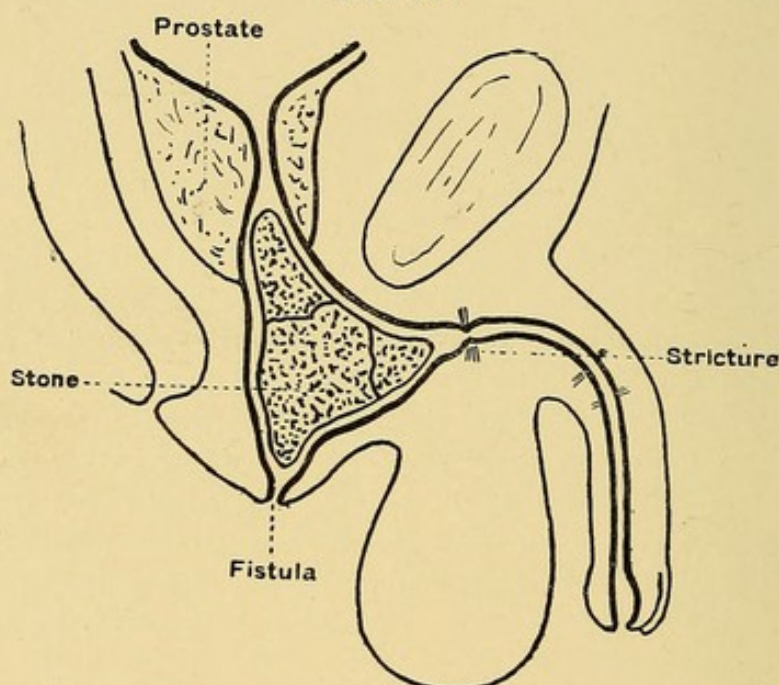
† E. Hurry Fenwick, "Urethral Calculi," 'Trans. Path. Soc.,' vol. xli, 1890.

in the middle of a very bulging convex surface; on grasping this perinæal protuberance, the grating of faceted stones was distinctly felt. Under ether I enlarged the perinæal opening, and found it to be the orifice of a sac of pyramidal shape (Fig. 30).

Entirely filling this sac, and partially adherent to its inner wall lay, apex downwards, the conical piece of stone which forms the largest of the articulated concretions removed (Pl. I, fig. 3).

Having detached the adhesions and removed this pyramidal piece, I noticed that its basal angles were faceted like the carpal end of the metacarpal bone of the thumb. Reintroducing my finger, I discovered two prolongations of these basal angles: one, the longer,

FIG. 30.



Urethral calculus in a post-strictural pouch extending into the prostatic urethra. (Fenwick.)

filled the prostatic urethra; the other projected itself along the spongy part of the urethra. These were removed, and the bladder sounded and found free from stone. The urethral strictures, three in number, at $2\frac{1}{2}$, 3, and $4\frac{1}{2}$ to 5 inches, were cut with the urethrotome to No. 24 French gauge, and a catheter passed along the natural passage and tied into the bladder. He recovered with an obstinate fistula. These articulating calculi are shown in Pl. I, fig. 3; the largest piece measures 2 inches from base to apex, and $3\frac{1}{2}$ inches in its widest circumference, whilst the entire length of calculus itself is $2\frac{1}{2}$ inches measured from the prostatic to the

perinaeal terminations. Its composition is lime phosphate. Weight 1 oz. 44 grs.

The stones already described were lying within the lumen of the urethra. There are, however, other stones of the anterior urethra which lie, strictly speaking, outside the tube. The diverticula in which these calculi lie are usually the result of a periurethral abscess; sometimes they take origin in a false passage. Their communication with the urethral lumen remains, and a part of the calculus may even project into the canal, as in the following case.* Sometimes, however, the track leading into the urethra is very fine and difficult to find.

J. W—, *æt.* 67, a tailor, has lived a sedentary life for thirty years; has suffered from difficulty in micturition for eight or nine years. Three years ago he passed blood at the end of the act. He urinates now every two hours, and suffers pain, which he refers to the penis, during the passage of water, and which becomes intense on the completion of the flow. On placing the hand on the post-scrotal region a hard body is felt in the position of the urethra; this body can be traced forwards along the urethra towards the glans. It is moveable to and fro, and gives the hand the impression that it is moving within the urethra. In shape it is like a small banana.

On passing a sound, the foreign body is struck at two and a half inches from the meatus, and its calculous nature is at once detected. But it is apparent from the examination that only a "nose" of the body projects into the canal, though the calibre of that channel is much pressed upon and narrowed by the volume of the extra-urethral body.

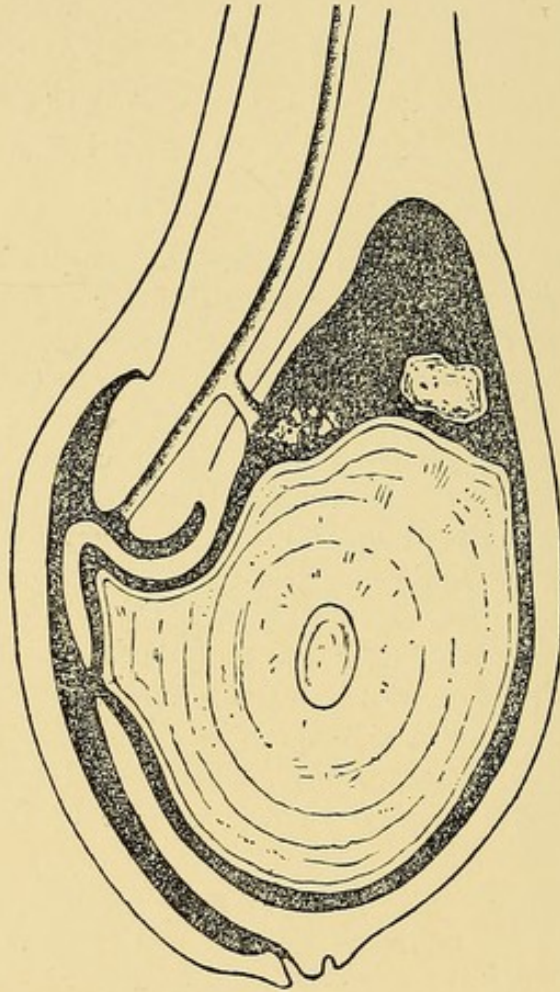
An incision was made in the perinaeum upon the posterior end of the calculus, and the sac containing it was opened. By means of a director and forceps the adherent sac wall was gradually peeled off the stone, its surface becoming gradually cleared as pressure upon its anterior end forced it into view. The bladder was then sounded; no stone was detected. The "nose" of the sac stone, which projected freely into the urethra through an orifice in the sac, was found marked off from the body by a narrowish neck. In shape the stone resembled a miniature Egyptian mummy. Its composition was phosphate of lime.

Calculi may arise in para-urethral pockets at the anterior

* E. Hurry Fenwick, 'Urethral Calculi,' *loc. cit.*

part of the penile urethra. Korn* has described a case in which the penis was shaped like the tongue of a bell. A marked degree of phimosis was present, and the globular form of the end of the penis was produced by a large rounded stone lying below the glans penis in the cellular

FIG. 31.



Preputial urethral calculus (after Korn).

tissue at the root of the frænum, and covered entirely by the elongated prepuce. A fistulous communication was present between the sac and the urethra, opening at the base of the glans, and another opening led from the lumen of the phimosis into the sac (Fig. 31).

* Korn, 'Inaug. Diss.,' Leipzig, 1865.

In a somewhat similar case described by Vanzetti* a fistula opened on the surface.

Only three such cases of stone occupying a pouch in the region of the fossa navicularis are recorded.

Mr. Fenwick removed a curious articulating double stone from the glans urethra of a Jew. The patient had been conscious of the foreign body for some years, and had regarded it as a natural aid to coition. (Plate I, fig. 4.)

(b) *Calculi in the posterior urethra.*—Calculus in the prostatic segment of the urethra forms an even more interesting and difficult problem than that found in the anterior part of the canal, for the prostate gland itself must be looked upon as capable of giving origin to concretions which may project into the urethra, and which serve further to complicate the question of pathogenesis.

These calculi are best considered anatomically, and may thus be grouped into—

1. Those lodged in the urethra.
2. Those partially buried in the prostatic tissue.

1. *Calculi lodged in the prostatic urethra.*

These calculi, although from their position they are surrounded by the prostate gland, cannot be looked upon as prostatic calculi in the strict sense of the term.

Like those in the anterior urethra, they may be primary or secondary in their origin.

“Secondary” calculi descend from the bladder, and include those acute cases of impacted calculus in which the stone is arrested behind the “cut-off” muscle. The latter give rise to the severe symptoms already described (p. 101). They are readily recognised by means of the metal sound, and their treatment has been indicated.

Setting aside these migratory stones, whose size, shape, and composition are unaltered by their short residence in the urethra, there are other secondary calculi which occupy

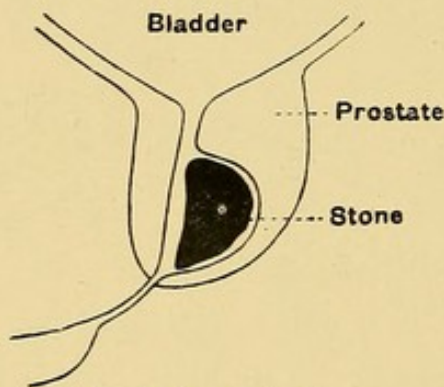
* Vanzetti, quoted by Kauffmann, ‘*Krankh. der männlichen Harnröhre und des Penis,*’ 1886.

the prostatic urethra for a lengthened period, and receive additions to their size and alterations in their outline, and at the same time leave an impression upon the prostatic canal.

These calculi descend from the bladder, and originally most of them consist of oxalates or uric acid. Around this nucleus phosphates are deposited. With the increase in size the prostatic urethra dilates and a large mass may be formed (Fig. 32); sometimes several stones are present.

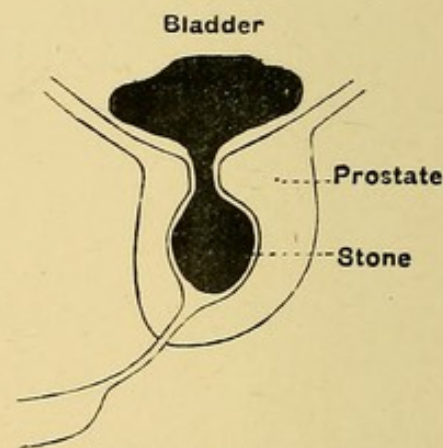
Continued growth may now take place in one of two directions, either distally or proximally. Like the calculi

FIG. 32.



Calculus in prostatic urethra.

FIG. 33.



Urethro-vesical calculus
(mushroom calculus).
(After Pasteau.)

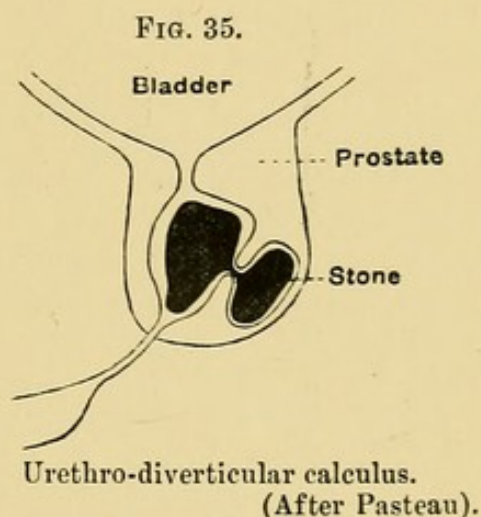
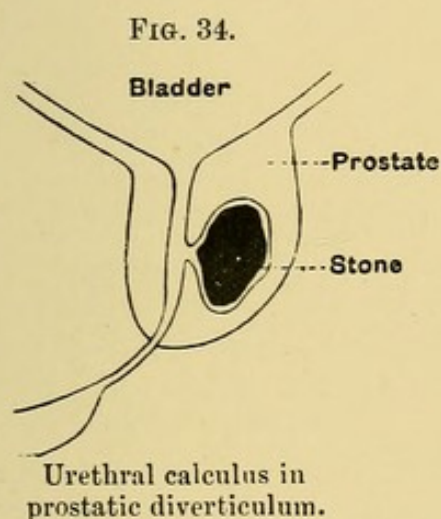
of the anterior urethra, however, progressive deposit takes place, as a rule, at the proximal end, where the urine first impinges upon the stone. In time the stone projects through the sphincter vesicæ into the bladder cavity, and a rapid increase in size now takes place at the part constantly bathed in the vesical urine. A curious mushroom form is thus produced; the stem lies in the prostatic urethra, and is often bulbous (*en noix*), the cap of the mushroom is the bladder portion (*en champignon*), and these are connected by a neck often attenuated by the pressure at the sphincter ring (Fig. 33). Sometimes

an hour-glass shape results ("*calculs en sablier*"), the prostatic and vesical portions approximating each other in size. Voillemier* has illustrated a beautiful example of the mushroom variety.

Some of these calculi are apparently primary in the prostatic urethra; their composition is entirely phosphatic.

2. *Calculi connected with the urethra, partially buried in the prostatic substance.*

A calculus may be found occupying a pocket in the prostatic substance, which communicates with the prostatic urethra by a fine opening; several calculi may fill the



pouch, which is sometimes so large that the prostate seems to be a mere shell (Fig. 34).

There are other cases in which the calculus lying in such a pocket is united by a neck with a calculous mass in the prostatic urethra (Fig. 35) ("*uréthro-diverticulaire*" †). Whatever the pathogenesis of these concretions may be, their connection with the urethra justifies their inclusion under urethral calculi. These calculi differ somewhat

* Voillemier, 'Malad. des voies urin.,' Paris, 1881.

† Pasteau, 'Annal. des Maladies des Org. gén.-urin.,' 1901, p. 416.

in their formation when a series of cases is examined. A large collection of pea-sized faceted stones may be present, and a few of these may be discharged with the urine from time to time. The finger introduced into the rectum encounters a mass which crepitates under palpation. Or, again, there may be a single calculous mass which on closer examination proves to be a collection of stones varying in size and shape and bound together with phosphatic cement substance (Pl. I, fig. 1). In other cases the calculus has evidently from its earliest existence been single, and has gradually increased in size by deposit of phosphatic material upon the single nucleus (Pl. I, fig. 2).

The following case* is a good example of multiple prostatic stones occupying a pouch in communication with the prostatic urethra :

W. F—, æt. 28, was admitted into St. Peter's Hospital with incontinence, day and night, of three months' duration. The patient asserted that he had attended St. Bartholomew's Hospital five years ago because his water was thick, but he got well and kept in good health until four months ago, when he began to pass blood and very thick urine, consequent, he believed, upon a fall downstairs. Frequency of micturition was simultaneously experienced, and this rapidly increased in severity until he was forced to pass water every half-hour, day and night, and even then urine flowed away involuntarily in the intervals. I discovered a calculus in the prostatic canal with the sound, and verified its position by rectal examination. The prostate *per rectum* felt a mere capsular shell spread over a bag of small stones, which grated freely one against another.

I performed a *boutonnière*, and found projecting into the prostatic canal the sharp nose of the calculus. The neck of the prostatic sac was detached from the adherent stone little by little by means of the finger, and the broadly faceted calculi were finally extracted with necrosis forceps.

The composition of these stones throws some light on their origin. They form three groups.

(1) Uric acid enters into the formation of a few, and

* E. Hurry Fenwick, 'Trans. Path. Soc.,' vol. xli, 1890.

these may safely be considered as having arrived in the prostatic urethra from the bladder or kidney.

(2) Some again are entirely phosphatic, and it is probable that these are developed in the urinary passage, and have secondarily become buried in the prostate.

(3) There are others for which a purely prostatic origin may be claimed. In the prostate of adults, and especially of old men, one finds almost invariably brownish-black granules, which show on section concentric lamination around a central granular nucleus. Whether these little bodies originate from condensed prostatic fluid (Mercier) or in amyloid degeneration of the gland cells (Stilling and Launois) does not greatly matter. Their analysis shows a very large percentage of organic matter, and it is important to note that the nucleus of some of the calculi found in pouches communicating with the urethra has a very similar composition.

As to the manner of production of the pouches containing calculi which have migrated from the bladder, only theoretical considerations can be advanced. A small stone in the prostatic urethra may by pressure form a pocket for itself, or it may be trapped in some pouch already present. A partially healed false passage and the depression left by a ruptured prostatic abscess have been said to form receptacles for these secondary stones, but clinical evidence in support of this statement is wanting. Pasteau* considers that the gland ducts and prostatic lacunæ form a natural series of diverticula which may arrest small migratory calculi. Experience in the endoscopy of the prostatic urethra does not give support to this idea. The gland ducts are too minute to harbour the smallest calculus.

Symptoms of urethral calculi.

Obstruction to the urinary flow is the most important symptom of urethral calculus. In some cases stricture has already been present for some years, and the obstruction

* Pasteau, loc. cit.

may be attributed to this cause. During the treatment of the stricture, however, the grating or click of the instrument upon the stone is certain to arrest the attention of the surgeon.

It should be remembered that phosphatic encrustation may occur behind old-standing, neglected strictures, and that a metal instrument will grate over the surface as it might over a calculus. Careful examination from the perinæum or rectum with a sound in the urethra will suffice to clear up such a case.

There are some cases where the calculus lies in a sac communicating with the urethra only by a small opening, and in these cases a sound passed along the urethra gives no warning of the presence of the stone. These para-urethral calculi should not be forgotten in the diagnosis of a hard perinæal lump with urinary obstruction where the passage of a metal instrument gives no information.

When the calculus lies in the anterior urethra the patient may learn that by assuming certain positions or by manipulation he may obtain a freer passage for his water, but eventually the calculus reaches a size when this is no longer possible, and he must seek surgical aid.

Petit* describes the case of a boy who, even when obstruction was very severe, could make water when lying on his back.

In the case of a man of fifty-four years urination could be very slowly performed by depressing the penis and at the same time exercising lateral pressure upon the bulbous urethra.†

Where the stone lies in relation to the bulbous urethra a swelling, sometimes of large size, is present in the perinæum, and the hard calculous mass is readily detected. Sometimes where several are present they may be made to grate against each other. The calculus may be discovered in probing a urinary sinus in the perinæum in a case of stricture.

* Petit, 'Traité des maladies chirurgicales,' 1774, t. iii, quoted by Forgue.

† Kaufmann, *op. cit.*, p. 101 (Schmidt's case).

In a case recorded by Zeissl* the urethroscope assisted in confirming the diagnosis, but in most cases little additional information will be gained by the use of the instrument.

In some cases small stones have been repeatedly passed by the urethra. In a case reported by Mr. Arthur Court† each introduction of an instrument through a very narrow stricture was followed by the discharge of a quantity of muco-pus, and several calculi from a large collection at the bulbous urethra. As many as nine stones were passed on one occasion after removal of the catheter. In all twenty-four calculi, weighing twenty-six grains, and composed of calcic carbonate and phosphates, were passed.

There is usually a purulent discharge, and sometimes a drachm or more of purulent fluid may be discharged at a time from the urethra.

When the posterior urethra is the seat of calculus, some difficulty may arise from the presence of symptoms resembling those of vesical stone. Thus the following symptoms have been observed:—frequent micturition and pain during, or at the end of the act, and passing along the urethra, and rarely the passage of some blood; vesical and rectal tenesmus may be present with intense pain. The introduction of a sound will demonstrate the presence of calculus before the point of the instrument enters the bladder, and on rectal examination there is tenderness in the region of the prostate, and pressure may cause considerable pain. The finger will detect an induration of the gland, or, if the calculus is large, a hard mass is felt occupying the position of one or other lobe of the prostate. Sometimes grating may be felt when several calculi are present. The X rays sometimes give useful information.

Treatment.—The treatment of urethral calculi has been incidentally touched upon in describing the cases in the preceding pages. Where it is possible, of course the best

* Zeissl, 'Ueber die Steine in der Harnröhre des Mannes,' Stuttgart, 1883.

† Court, 'Lancet,' 1896, vol. i, p. 1561.

method is removal by the urethra by means of specially constructed forceps.

In cases of true urethral calculi, however, the stone has usually reached too great a size for this method even to be discussed, and moreover a narrow stricture often bars the way. The stones in the perinæal or penile portions of the urethra are cut down upon directly, and the sac cleared out. Stricture if present is treated by internal urethrotomy or by cutting from without. The internal method is best where several strictures are present in the penile urethra (see p. 106).

Calculi in the prostatic urethra if small may sometimes be pushed back into the bladder and there crushed, but the larger stones and sharp fragments deposited there out of the litholapaxy evacuating catheter necessitate a perinæal incision for their extraction.

After the removal of a urethral calculus, the bladder should always be examined by the sound, or in the cases of prostatic calculi by the finger, to make sure that there is no vesical stone.

CHAPTER XIII.

(C) CONDITIONS PRODUCING URETHRAL PAIN.

Urethral neurosis ; urethral pain independent of micturition.

It is common enough to meet with patients who complain of urethral pain on urination. Such a symptom is usually of minor importance, and accompanied by other predominating and well-known clinical features which indicate the disease. Moreover the urethral pain subsides upon the removal of the cause.

But there are patients whose cardinal, often whose only symptom, is an irritating subacute urethral pain independent of urination. It is a pain which is obscure in its causation, unremitting in its character, and, often as not, unrelievable. Moreover this form of pain is productive of much mental suffering, is destructive to business, to energy, and to pleasure. Luckily the patients who suffer thus are few in number, for their relief forms the most difficult problem in urethral surgery.

The subject of constant urethral pain is not one which commends itself to the notice of the profession. It is, in fact, rarely believed in ; certainly it is often misinterpreted ; nor has it received that study which is commensurate with its importance. It is so much easier to decline to seriously consider the complaint of a robust-looking man when he worries us, or wearies us, with a vivid description of a suffering of which we can find no clinical evidence, and from which we can trace no visible depreciation of health. It is simpler, rather, to regard him as a

neurotic or a neuralgic, and to deflect him to a *confrère*, than to study and attempt to relieve what we believe to be merely hyperæsthesia or the exaggerated ache of a morbid fancy.

Yet the suffering is real, it often endures for years. The causation is baffling in its obscurity, the treatment is most unsatisfactory. I submit, whilst I attempt to treat the subject, that this chapter in urethral surgery needs careful revision. I cannot, I regret to say, delineate it accurately, for though my clinical observations have been many, post-mortem examinations of such patients as I have watched for years have been wanting, for they live long, and without such minute means of research accuracy cannot be arrived at.

The subject of continuous urethral pain will be found to group itself most conveniently into those localities in which the maximum point of pain is experienced. This arrangement will permit of three divisions, which in their order of frequency will stand in the following relation :

1. Perinæal pain group.
2. Glans pain group.
3. Penoscrotal angle pain group.

1. PERINÆAL PAIN GROUP.

Nearly all non-tuberculous men between twenty and forty years of age, who suffer from a continuous pain in the perinæum in front of the anus, have a history of gonorrhœa or some form of urethritis ; in fact, when a man complains of constant perinæal pain he will generally volunteer the suggestion to his doctor that it originated in an attack of urethritis.

There are rare exceptions, of course, one of which is vividly impressed upon my mind. A young policeman complained of a perinæal pain of so constant and so agonising a character that his life was unbearable. He could not walk, nor could he even stand without suffering. I saw him in consultation with his surgeon, my opinion

being sought upon the condition of the seminal vesicles, and whether their removal would cure the patient. Both vesicles were large and full, but not nodular or sensitive. I considered that the perinæal pain was not caused by the vesicles, and that it would not be relieved by their removal. The patient was operated on and both vesicles were removed. I obtained leave to watch the case. At first it seemed as if a successful result would ensue. The patient was easier. One day the gentleman in charge of the case pointed out to me a large pulsating swelling in the position of the cœliac axis, and inquiries elicited the history that the patient had received a severe blow in that position a year previously, and had suffered from back-ache ever since. Two weeks after the operation the patient suddenly collapsed, and on post-mortem a large aneurism was found to have eroded the upper lumbar vertebræ and to have burst into the left pleura. The perinæal pain was obviously caused by aneurismal pressure on the lumbar nerves.

Again, in cases of urinary tuberculosis, and in certain rare cases of locomotor ataxia, a prominent symptom complained of is perinæal pain, but apart from such cases, the commonest cause is posterior urethritis.

Constant perinæal pain.

A constant perinæal pain in a young adult male generally denotes a past inflammatory attack of the prostatic gland* with or without the implication of the seminal vesicle,† or in some cases, less seldom met with, a chronic Cowperitis. The inflammation in most cases is a septic

* *Mem.*—Generally speaking, the position of the pain affords a rough clue as to which part of the prostate is *mainly* affected. That of the prostatic urethra is felt supra-pubically, if one may rely on the symptoms of a patient whose prostatic urethra is being stretched. If the prostate is inflamed towards the rectum a burning pain is felt in that canal. If the gland has suffered more towards the apex, then the perinæum pain seems more frequent.

† Fine clinical demarcation between prostatic pain and seminal vesicular pain is not yet accepted. It appears to me that generally the prostatic pain

urethritis. It may be of purely gonorrhœal origin, but I submit this is uncommon. It matters not, however, what the original poison was, provided the inflammatory exudation has soaked through the walls of the urethra and has implicated the fibrous sheaths encasing either or all of the bodies named (prostate, vesicle, or Cowper's gland). The nerves become affected or *compressed*, and constant pain is the result. My reasons for locating the nerve implication to the peri-glandular tissues, apart from anatomical considerations, are as follows:—First, the exact analogy which such pain bears to fixed renal pain—the result of true capsular adhesions from patchy interstitial nephritis; secondly, the relief which is afforded by separating the prostate and vesicle from its peri-rectal connections; thirdly, because in operating I find the peri-capsular connective tissue often very dense and difficult to dissect if the disease has been of long duration, and very gelatinous with inflammatory exudation if the onset has been recent; and lastly, the marked increase in the pain on jolting, for these abrupt movements cause the prostate to suddenly sag down in its prostatic sling.

Brief clinical description.

A young man who complains of fixed constant perinæal pain* has a singularly uniform history to relate.

Either the perinæal pain appears months after an urethritis of the mildest character, or it has immediately is perinæal, and the pure seminal vesicular pain is more abdominal, inguinal, and thigh. Here is a case in point:

L. R—, æt. 38. After an attack of gonorrhœa ten years ago this patient had had constant pain in the right supra-pubic region, right inguinal, right testis, right thigh, with occasional bursts of pus along the urethra. His mental condition was deplorable. I removed the right seminal vesicle, and he asserted that he was free from all his old intolerable trouble. I lost sight of this case.

* Fixed perinæal pain may be produced by encysted calculi of the bladder, or by a large fibro-papilloma in the bladder, and fixed rectal pain by calculi in a post-prostatic or post-trigonal pouch; but it is presumed that such and other causes are eliminated by careful and extended examination.

followed upon a chance sexual relation without any resulting urethritis, or at most with the transient appearance of a small amount of urethral pus.

The latter class—that in which perinæal pain suddenly and rapidly supervenes upon an illicit connection without any evidence of a resultant urethritis—is difficult to explain. It will be found that there is nearly always a previous history of long-continued obstinate gleet in such cases; in other words, that soakage through the walls of the deep urethra had already taken place, and that it needed but the congestion of a coition to break into the nerve area, or that septic material (“dry” clap) had invaded the deep urethra unobserved, and had there completed the nearly finished invasion of a prior urethritis.

Be this as it may, the patient complains that after months of an obstinate gleet, or even immediately upon a coition, he experienced an uneasiness, an aching, even a tenderness in the centre of the perinæum just in front of the anus; that this pain has increased as time went by; that the relief which was at first afforded him by diet, change of climate or drugs, is no longer felt; that in process of years other areas have gradually become affected, though he feels conscious that the pain wave originates in and spreads from the perinæum. Thus he has pain in the tuber ischii, in the sacrum, in the inside of the thighs (the adductor regions). A burning pain is felt two inches up the anus, the rectum being affected by continuity. Still greater chronicity is tantamount to further extensions, so that finally after years the patient complains that no part of his body is free, even his scalp and the back of his head, his back, arms, shoulders, thighs, calves, and the soles of his feet suffer.

The pain, like all other pain, is liable to occasional exacerbations. As a rule it is slight, and it would be bearable and perhaps unnoticed if there was a limit to its duration. But its very persistency, its locality, the consciousness of its origin, frets, irritates, and depresses

the patient, and absorbs his thoughts, until interest in home, or work, or business slackens. Such men often become more and more incapable of mental and physical exertion, and as time goes on and moody broodings are indulged in they become drones in the community—male hysterics—a burden to themselves and those around.

Clinical examination.

The first step to be taken is to localise the position of the pain.

Having received the complaint of the patient as to the general position of his pain, it is advisable to have the exact site in the perinæum pointed out, for it is often very difficult to determine whether the prostate alone is the cause of the suffering, or the seminal vesicle, or both, or Cowper's glands, so blended are these three in the sexual function, so continuous are their anatomical relations, and so liable are they to be involved as a whole.

A one-sided pain rather points to a vesicle or to a Cowper's gland, a central pain to bilateral infection of the posterior and lateral prostatic glands, and of the prostatic tissue and capsule by way of such glands.

The appreciation of tenderness on pressure is the next step.

1. *Cowper's glands.*—These are *unfeelable in health*, but may be found if inflamed a little to either side of the central point of the perinæum, just in front of the anus, as hard pin-head to pea-sized bodies. Either or both bodies may be tender on pressure. The patient complains of a difficulty in sitting long—he sits on one hip in a one-sided affection,—local tenderness being induced, but this is not characteristic. With these local signs there may be, and often is, a redness on the floor of the bulbous urethra around the orifice of the ducts of Cowper's gland—a redness which is not obliterated by full pressure of the bag of the aëro-urethroscope. It must not be expected that the orifices of the ducts will be seen. They are hidden in the slight

swelling which surrounds the ducts,—a swelling which points to peri-glandular exudation.

In such cases there is generally a drop or bead of yellowish-white gleet in the morning, but no diminution in the stream, nor is there any frequency of urination.

2. *The prostate.*—The anterior rectal wall is now carefully palpated with the greased finger, to ascertain the size and consistence of the prostate. If the interlobar sulcus is unusually tender in its upper half, then the ampullæ of Henle,* which run parallel with the upper third of the sulcus, may be suspected. If the tenderness is met with more markedly in one lobe—and pressure must be exerted equally upon both lobes in the examination,—then it is to be surmised that one or more prostatic glands have become affected. The practitioner must not expect a “large” prostate, or one which carries any evidence of inflammation in its size or consistence. The invasions which result in pain are so gradual that there is but little general thickening. It might be expected that the huge acutely inflamed prostates (parenchymatous prostatitis) which the finger finds obstructing the bowel, like an apple or orange in the *early* periods of acute gonorrhœa, would assuredly lead to neuralgia. Not so—the capsule is over-stretched; pain is not noticeable.†

I repeat, it is the small prostates whose lobes differ in consistency which mark the cases of prostatic neuralgia, not the upraised, flat, cake-like prostates which are the final stage of acute parenchymatous prostatitis.‡

In prostatic neuralgia the pain may be one-sided, but it is more often central. Gleet may be noticed, tenderness on sitting also. Slight pain during the act of seminal ejaculation is usually present. The urine may

* The ampulla of Henle is the dilated end of the combined vas deferens and seminal vesicle.

† Compare the final loss of pain in over-stretching of other fibrous capsules, glaucoma, testitis.

‡ It should be noted that in the early stage of carcinoma of the prostate perineal pain is likewise wanting.

be thready and often phosphatic, the act of micturition unduly frequent. The urethroscope but rarely affords any reliable clue. The verumontanum is usually large and gelatinous, and the mucous membrane seems to bleed easily, but these appearances are illusory.

3. *The seminal vesicles.*—I submit it should be laid down as a general rule that full, soft, normal-walled vesicles, which are easily felt, do not denote disease. Marked tenderness with fulness is, I submit, a point of some significance, for it indicates either that the outlet is partially obstructed, or that the wall of the vesicle itself is inflamed.

If, then, a vesicle is found to be extraordinarily tender, and if it can be readily felt, a more careful cross-examination as to the areas of pain should be made in order to ascertain whether the pain corresponds to the distension. For the area of the pain induced by an inflamed vesicle is slightly different from that caused by the prostate or Cowper's gland. It affects the lower belly above the inner third of the corresponding Poupart's ligament. Moreover, in vesiculitis, the urethral discharge is often intermittent in its appearance, the patient going for a day or two "dry," then a slight leak or even a sudden rush denotes the emptying of a vesicular collection. The bladder may be irritable from the propinquity of the vesical wall to the wall of the inflamed vesicle, and emissions cause pain at the time of the ejaculation. Priapism at night is not uncommon.

The third step consists in instrumental examination of the bladder.

Lastly, it is often sound policy to distrust the history of the patient as to the original cause being an urethritis, and to examine the bladder carefully with sound or cystoscope. But let this caution be borne in mind: it is impossible to predict the result of the use, however gentle, of solid instruments if the prostate gland is at fault. In some cases the patient is conscious of relief; in others, and I believe they form the majority, the

pre-existing pain is much accentuated, and when roughness is exercised the result to the patient is deplorable, and the practitioner is never forgiven. There is no patient who is so conscious of harm having been effected by the use of the sound, as he who is the victim of prostatic neuralgia. Other diseases of the bladder, such as tubercle, carcinoma and villous papilloma, are made infinitely worse, I will admit, by rough instrumentation, but the patient is not conscious of the extent of the injury, nor do the painful symptoms which result remain for long.

For my own part, I prepare such patients carefully for examination. They are placed for some days on urotropine, given Contrexville so as to distend the bladder with clear urine. They are then cystoscoped under cocaine anæsthesia, and are immediately put into a hot Sitz bath.

Treatment.—Having made a rough working diagnosis as to the particular part affected, whether it be the prostate, or vesicle, or Cowper's gland, the practitioner directs his energy to affording relief. Various grades of suffering, of course, require different methods of attack, but in any case it is wise, I believe, to take a hopeful view of every case, and to impart that hope to the patient. Moreover, as in every case the pain is increased by constipation, the greatest care is taken to procure a soft and free motion daily. As pain is accentuated by jolting, exercise is curtailed, bicycling being especially forbidden.

Minor grades.—Eucalyptic ointment rubbed nightly into the perinæum affords relief to a limited number of slight cases. This, combined with the exhibition of ergotine and hyoscyamus, bromides, or phenacetin, are often sufficient in the slighter cases to relieve the patient. Change of air has often a magical effect. It does not matter apparently where the locality is, provided the climate is dry and warm. No cycling, riding, or motoring should be allowed. Hot and cold douches directed on the perinæum, though difficult to get, are often beneficial.

Medium grade.—If the disease has proved obstinate,

gentle massage of the prostate, with or without electricity, should be employed.

Personally speaking, I consider the addition of the electrical current beneficial. It will be well, however, to give a few hints about massage. The one essential element is *gentle* pressure. The patient is placed in the knee-elbow position, his bladder being *unemptied*. The forefinger, well lubricated, is introduced into the bowel, the pulp is laid upon the prostate gland and the sulcus defined. Each lobe is then massaged with a light stroking movement of the finger from the periphery to the central sulcus. The choked gland ducts are thus relieved, congestion is reduced, and fresh blood is supplied to the atonic organ; all the necessary adjuncts for the repair of inflammatory mischief are thus provided.

The lobes having been thoroughly but gently kneaded for two minutes the sulcus is now attacked, the finger pressing the upper third of the groove from above downwards, so as to empty the gutter-like channels which lie under it. Each vesicle is similarly treated, always remembering that the object of the manipulation is to empty the contents into the prostatic urethra through the ampulla of Henle.

The first sitting should be short—three minutes at most,—and it should be repeated thrice a week. It is often found that this treatment affords some relief.

The addition of the electrical current demands the application of the wet negative pad to the wrist of the masseur. His entire hand is then covered with a surgeon's india-rubber glove with an oval piece of the index cut out so that the pulp of the forefinger is free. Glycerin is used as a lubricant, or white of egg. The positive pole is applied to the supra-pubic region of the patient, and a current (measured by the galvanometer) of 5 to 10 milliampères is passed through the hand of the operator to the patient.

Finally, should the origin of the neuralgia appear to be Cowper's glands, the negative pad is applied in front

of the anus and the positive over the pubes, and a stronger current is passed through for three to five minutes.

I have used prostatic rheophores with some apparent benefit (*vide* p. 47).

Severest grades.—But supposing all efforts are unsuccessful and the patient still clamours for relief, what further course can be advised?

In aggravated cases I have stripped off a ribbon-like length of the prostatic capsule, and extirpated the seminal vesicle, having previously performed vasectomy on the same side. I have even removed both testicles. Have these procedures benefited the sufferers? In most cases the patients have been relieved. Some who have suffered ten, or even twenty years, declare themselves free. Much depends, I am sure, on the operator being thorough in his work. It is so easy to remove part of a seminal vesicle and to leave the major part. Moreover, it is not sufficient merely to dissect out such a vesicle; the connective tissue which surrounds it must be cleared away as well. I do not believe the writer who asserts upon the experience of two cases that vesiculectomy is easy. It often is, but I have met with vesicles which were absolutely impossible to remove, even on post-mortem; nor is it sufficient merely to remove a fine strip of the prostatic capsule, the periprostatic tissue must be dissected away as well. Even with the greatest care there are patients who are only slightly relieved by operative interference, and who still continue to suffer.*

The following illustrative cases are added, but it must be remembered that the suffering is met with in all grades of severity, from a slight inconvenience to persistent and incapacitating pain.

1. *A type case of moderate severity.*—G. W—, æt. 44. (Sent by Dr. Bluett of Harrow.) Two and a half years ago he had illicit

* One writer on vesiculectomy quotes a case which he describes as a complete success. His patient consulted me with the article cut from the medical journal in his hand. He was suffering severely, and was not cured until vasectomy on the side the vesicle had been removed was performed and a long course of electro-massage had been undergone.

intercourse. Three days after he noticed an urgency to urinate, and the act was repeated frequently. *There was no urethral discharge*; there was no night irritability.

A month or six weeks after the coition he experienced pain in the rectum. This was relieved at first by lying down. In fact, if he only lay down on the hearth-rug for a few minutes it was easier. Gradually the irritability of the bladder decreased, but the rectal pain remained and a perinæal pain was added.

He now has pain in the rectum, in the perinæum, in both testicles, and along the penis independent of urination.

Sometimes all the pains are present, but usually it is only in one of the situations. No urethral discharge. Prostate and vesicles intensely tender in spots. Some relief by treatment.

2. *Type of a severe case.*—H—, never syphilis. No gouty history. Was forty-one years of age when he came under my notice in June, 1890, and he sees me occasionally still (1901).

His history when I first saw him was as follows:—Eighteen years ago gonorrhœa; an obstinate but slight gleet discharge continued for some years. Two or three years after onset he noticed a burning heat, which almost amounted to pain in the rectum; this became constant. Then a constant, heavy supra-pubic pain, which fluctuated in severity according to his work—extra work bringing it on. Rest on his back eased it, but it returned after he had been some hours on his legs. His treatment at the hands of various medical men, two being of high professional standing, comprised—Repeated blistering, supra-pubically and perinæally. Liberal *porte-caustique* application to prostatic urethra, which induced profuse hæmorrhage. Iodoform, which almost maddened him with “itching.” He derived no benefit from a long course of galvanism under the late Dr. Stevenson.

Double orchitis now supervened. Irritability of the bladder ensued, and he noticed severe pain on ejaculation of semen.

When the pain in the rectum and perinæum became severe he felt as if his legs were tied round with cord, and that they would burst below the ligatures.

Free internal urethrotomy was performed; symptoms greatly aggravated. After this he came under my care.

I noted his condition in 1890 as follows:—A man wasted, highly nervous, face expressive of much suffering. Heat and burning pain in rectum, always present more or less, the longer he stands the worse it gets. Exercise aggravates it. After coition it is agony. He cannot walk now because the recto-perinæal pain becomes intoler-

able, and "all his body sympathises." If he stands for more than an hour a feeling of "pins and needles" and then numbness comes on in the thighs, and extends down to the ankles. This is relieved by a hot bath. He passes water every hour and a half, day and night. Stream good. I suggested double orchidectomy. He at once gave permission in writing. Six months after the operation the pains diminished; he put on flesh, started work, but he still had pain.

At the end of the year he came imploring me to do something more. His life was a burden to him, he was worried with constant erections and frequent emissions (*sic*), after each of which all the burning rectal and perinæal pain was increased.

I considered that the orchidectomy had not caused any shrinkage of the vesicles, and proposed removing them. I mention here that I was familiar with this operation, and did not anticipate much difficulty, as there was no evidence of tubercle. The patient agreed. The transverse perinæal incision was carried between the rectum and the prostate, and the vesicles attacked. After an hour's hard work in an endeavour to dissect out the vesicle from dense connective tissue, an attempt in which the rectum was entered and then probably the bladder, I was forced to desist, as the anæsthetist (Mr. Woodhouse Braine) considered his condition did not permit of any further interference.

The patient healed promptly and soundly and was much improved, but still complained. After six months I again attempted to dig out the remains of the vesicles, but again failed; every part seemed transformed into the densest connective tissue.

From this date the patient improved. He still suffers, but he works, enjoys life, is fat and healthy-looking, and he assures me (July, 1901) that he has had decided relief from the last two operations.

*Perinæal ache due to chronic Cowperitis.**

The pain in the perinæum which arises in septic inflammation of Cowper's gland is somewhat similar both in character and position to that which is noticed in prostatic or prostatovesicular inflammation. If a differentiation may be hazarded, it is that the pain of chronic Cow-

* This is a condition entirely different from that known as distension of Cowper's duct (p. 59). In chronic Cowperitis the gland is minute, and the duct opening is not visible with the urethroscope.

peritis is one-sided, it can be accurately located by the patient with the tip of the forefinger. It is increased by pressure upon or manipulation of the perinæum, the maximum of pain being caused by pinching between the finger and thumb a small pea-sized body found just in front, but to one side, of the anus. The pain is usually relieved by exercise and increased by sitting down. It is apparently more often accompanied by slight and transient difficulties with the act of urination (? spasm). Direct applications to the perinæum, such as iodide liniment and eucalyptic ointment, afford more relief in this than in the pain of prostatic inflammation. In obstinate cases I have cut out the gland with benefit.

2. GLANS PAIN INDEPENDENT OF MICTURITION.

Constant pain in the end of the penis around the corona is not common. It seems probable that it is very often due to compression of the nerves in the neighbourhood of the prostate by inflammatory exudation.

In many of the cases it can be traced to a gonorrhœal or septic invasion of the prostate; in others it is associated with prostatorrhœa, the result of excess. In some cases* it accompanies deep ulceration of the bladder wall. It is also noticed in the early stages of enlargement of the prostate, and in these instances it seems to me to be due to some slight venous obstruction of the prostatic plexus. It is very difficult to treat.

* I had one patient under my care whose pain had lasted twenty years. The orifice of the urethral canal was of a deep bluish hue (argyria), due to the constant application of nitrate of silver. Another who had suffered for twelve years, and had been in two London hospitals and sounded under ether, was examined with the light, and an erosion was found just within the meatus; it was touched with iodine and the patient was immediately relieved. Another saw me every few weeks for five years, and always insisted on being cauterised just within the meatus, as this was the only relief he could obtain from a constant gnawing pain at the opening of the canal.

Constant pain in the meatus may be due to some irritation just behind the fold of Guérin (compare page 25), but usually it is sympathetic, and the expression of prostatic nerve suffering. Counter-irritation to the meatus appears to relieve this.

It should be borne in mind, however, that reno-ureteric causes also exist for meatal pain. One lad who complained bitterly of a constant pain at the tip of the penis came under my care in March, 1896, and I regret to say he was not finally relieved until 1901. I first found a large stone in the right ureter two inches from the bladder. This I removed without any diminution in his symptoms. After some years he returned, and I was surprised to find by means of the X rays that a stone was also impacted in the left ureter three inches from the bladder. I removed this, and with it the pain in the tip of the penis disappeared. It is noteworthy that the right ureter at the site of the calculus was free and uninflamed, whilst the left ureter in the neighbourhood of the calculus was much thickened and densely adherent to the surrounding structures.

3. CONSTANT PENO-SCROTAL PAIN.*

This is sometimes a marked feature in single ulcer of the bladder, whether the erosion be simple or tuberculous in its nature. The ulcer is usually situated near the ureteric orifice.

Lateral penile pain, often of a most obstinate character, is noticeable after prolonged coitus reservatus.

* Cf. Author, 'Ulceration of the Bladder,' p. 17.

CHAPTER XIV.

(D) CONDITIONS GIVING RISE TO THE APPEARANCE OF BLOOD.

I. *Varix of the prostatic urethra.*

I HAVE never yet met with a non-congenital* varix of the anterior urethra, though of course dilated veins in spongy folds of the mucous membrane are not uncommon. I have, however, noticed a varix in the prostatic urethral floor of a gentleman of fifty years of age. He was complaining of causeless and painless recurrent urethral hæmorrhage. The varix rose like a nævus in colour and shape into the window of the prostatoscope, it emptied on pressure being made on to it, and filled when it was released. I suggested perinæal section, but the patient got better by the instillation of nitrate of silver, and on subsequent examination the nævus seemed flatter and had become hard. It probably became inflamed, and the subsequent contraction brought about a cure.

I question whether many of the "prostatics" who complain of blood staining their shirt irrespective of urination do not suffer from small varicosities of the veins of the prostatic urethra. When a "prostatic" suffers from spontaneous bleeding from the prostate into the bladder, the site can usually be detected on, or just behind, the edge of the median collar or lobe of the en-

* I have seen a congenital venous nævus of the entire penile structures in a young lad, the mucous membrane of the urethra being also affected. The organ was enormous and when erect portentous in size. He had suffered from two hæmorrhages from the prepuce quite alarming in their severity.

larged prostate, and the hæmorrhage is proved to emanate from an over-stretched venule.*

II. *Malignant growth of the urethra.*

I have only once diagnosed, or indeed seen, a malignant urethral growth with the urethroscope. There is much difficulty in diagnosing the condition with the aëro-urethroscope, because of the bleeding, and if any doubt existed as to its character a piece could be removed by means of the sharp-edged scoop cannula.† I have also met with a very acute bulky malignant growth, which obviously originated and spread from the urethral mucous membrane with startling rapidity.

The case is reported in the 'Transactions of the Pathological Society' (vol. xliii, 1892), and is of sufficient rarity and interest to merit repetition.

The patient, æt. 47, was taken into the London Hospital under my care on September 12th, 1891, with hæmaturia and persistent priapism. Ten days previously, being then in perfect health, he was struck forcibly in the crutch by the sudden shifting of a piece of iron, over which he was stooping straddlewise. Ten minutes afterwards he felt sick and passed bloody urine. He went home and to bed, suffering severe pain across the lower part of his belly, with a frequent desire to micturate, but experiencing great difficulty in voiding urine. The bleeding continued. Three days after the blow the penis began to swell on the left side, and he had pain referred to a spot situated an inch from the meatus. The organ gradually got larger and curved to the right.

Present condition (fourteen days after the accident).—"Penis enormously swollen, curved to the right groin. The left corpus cavernosum is occupied by a row of hard, knotty masses, which are exquisitely tender. The left side of the perinæum in the neighbour-

* It is interesting to note how stretched the veins of the lax mucous membrane of the vesical orifice may become. Here it is that most of the so-called "piles" of the bladder are to be found. (Cf. Museum, Upsala, Spec. 1229, 1388.)

† An ordinary cannula which has its lower edges so thinned as to act as a scoop. I use it when fibro-papilloma and ordinary papilloma are dense, and cannot be scraped off the mucous membrane by the ordinary cannula.

hood of the bulb is swollen and lumpy, being similar in this respect to the left corpus. He is very anæmic but well nourished; he is passing water every half-hour with pain and much difficulty. The urine is very bloody and contains pus. The temperature is normal. The prostate is of normal size *per rectum*."

The blood gradually ceased, the difficulty in urination diminished, but on the 28th of September it was noted that the right half of the penis had become involved, and that the penis was quite erect and straight. The small flaccid glans penis was thrust out, uncovered by prepuce, from the enormously distended corpora cavernosa.

The expediency of performing the Thiersch-Gould operation of removing the penis was discussed and rejected on account of the acuteness of the malignancy.

October 7th.—Urine is passed every two or three hours, day and night. The penis is still larger; it now measures eleven inches in circumference at the level of the suspensory ligament, and seven inches midway between the point of the glans and this spot. The swelling in the neighbourhood of the bulb has also increased very greatly, and the entire perinæum is occupied by a knobby, hard mass, which measures six and a half inches across from ramus to ramus at the post-scrotal angle.

30th.—The dorsum of the penis has become swollen and œdematous; there is increased difficulty in urination, and more tenderness of the penis on pressure.

November 1st.—Gangrene of the under surface of the penis.

2nd.—Sudden retention. A boutonnière was performed and the bladder drained, with great relief.

6th.—The penis has sloughed freely, and now only a narrow strip of skin is left upon the dorsum to cover a raw stump of erect malignant growth. Perinæum is breaking down and fungating out.

10th.—Amount of urine is beginning to decrease, and the patient is getting weaker.

22nd.—Died two months and three weeks after the blow on the perinæum.

Autopsy.—The penis is merely a gangrenous malignant mass, with a strip of skin along the dorsum. The corpora cavernosa and corpus spongiosum are transformed into an indescribable slough, in which no trace of the urethra can be found. The same condition is seen in the perinæum, most of this region being replaced by an open, fungating, sloughy growth. Both ischio-rectal fossæ are filled with the same growth, but here the breaking down is not so visible. The prostate is untouched, but the membranous urethra is surrounded by small pea-sized deposits of growth, and its wall is

infiltrated with the same material. The bladder is small, but no part of its structure is implicated. The left kidney is healthy. On the right side of the spinal column, and firmly attached to it, opposite the position of the right kidney, is a huge, soft, carcinomatous mass, which weighs, on being dissected away, 3 lbs. 3 oz. Apparently it springs from the glands in this situation and has grown outwards, for the right kidney is entirely transformed into carcinoma, and is almost lost in the *outer* edge of the tumour. No calculi can be found. The vena cava is compressed and its calibre occluded. In the right lobe of the liver are a few small deposits, and a few are also found in the under surface of the lower lobe of the right lung. The other organs are healthy.

Microscopic examination of the tumour by Mr. Targett showed it to be a squamous epithelioma.

[It is surprising to find that malignant disease of a channel so exposed to irritation, so frequently the seat of developmental anomalies, and liable to such extreme variations in its blood-supply, should so rarely be the seat of malignant disease.

Marcus Beck, in 1892, could only extract ten cases from the literature of the previous ten years, and to these he added a case. In only five of the cases was the diagnosis confirmed by microscopy. Wassermann, in a thesis published in 1895, collected forty-four cases, of which twenty were male and twenty-four female.* Oberländer, on the other hand, believes that there are only sixteen authentic cases published at the present time (1900).

In the male subject the growth takes origin in the bulbous urethra, and more rarely near the external meatus.† The prostatic urethra may be affected by extension of the growth from the bulb. These tumours are found in men of fifty years or over.

In the majority of cases the tumour originates in a urethra the seat of chronic urethritis or stricture, while urinary fistulæ are also present in a few.

* In several of these cases the diagnosis was not confirmed by microscopic examination.

† Case reported by Fuller, 'N. Y. Journ. of Cutaneous and Genito-urinary Diseases,' April, 1898.

As a result of long-standing inflammation, the columnar epithelium of the urethra is transformed into squamous epithelium, and the horny layer of this is often found heaped up in white plaques in the neighbourhood of strictures. Small patches of leukoplakia similar to the more extensive condition found in the tongue in chronic glossitis are thus produced, and one might compare this to the so-called "precancerous" stage of lingual epithelioma. Hallé has traced the development of urethral epithelioma from these patches of leukoplakia.*

It is possible, as Beck and Harrison have suggested, that some of the growths originate in perinæal fistulæ or the skin around them.

In its earlier stages the surface of the malignant growth may be deep red and irregularly nodular, resembling a raspberry,† or it may present a villous formation.‡ The corpus spongiosum and corpora cavernosa are invaded, and the tissues of the perinæum become infiltrated by the malignant growth. Later the tumour breaks down, and a cavity with irregular friable walls is formed communicating with the urethra. The skin of the perinæum or penis becomes involved, fistulæ form, and processes of the growth protrude from these openings.

Symptoms.—In the early stages of its development the symptoms of cancer of the urethra are obscure, and the difficulty of diagnosis is materially increased by the presence in many cases of stricture and urinary fistulæ.

A hard nodular swelling in the perinæum surrounding the urethra has drawn attention to the growth in several cases. When stricture is present this will probably be mistaken at first for periurethral inflammatory infiltration. At an early period the nodule is movable, and its

* This transformation of columnar into squamous epithelium as the result of chronic inflammation, and the subsequent development of epithelioma, is found elsewhere in the body. The bronchi may thus be the seat of a squamous epithelioma.

† Oberländer's case.

‡ Fuller's case was of this nature. It was situated in the glans urethræ.

intimate relation to the urethral wall may be recognised ; later it infiltrates the perinæal tissues and spreads towards the skin.

Rectal palpation confirms its connection with the urethra, and shows that there is no tendency to spread towards the rectal wall.

When the patient comes under observation there may be an abscess pointing at the perinæum, and only when this is opened and its contents and walls examined is the malignant nature of the swelling revealed. In other cases perinæal fistulæ have already formed when the patient is first examined. The spontaneous development of perinæal abscess and fistulæ in a patient over fifty, when there is no history of gonorrhœa or trauma, should therefore be looked upon with suspicion.

Increasing obstruction to the urinary flow is always a marked symptom. When stricture is present the difficulty of micturition may at first be attributed to this cause, but rapid increase in the obstruction and hæmorrhage occurring each time a bougie is passed are important signs of malignant disease.

Copious hæmorrhage has occurred in some of the cases, and irregular hæmorrhages, apart from instrumental interference, have been a feature in others.

On passing a sound the point may be felt to enter a cavity with rough, irregular walls.

Slight and transient pain on passing water is usually present even in the early stages. As the growth spreads the pain becomes more severe, and radiates into the testicles and down the inside of the thighs. In a case observed by Legueu at the Necker Hospital, the pain was so intense that the patient looked forward with terror to each act of micturition.

Oberländer, of Dresden, was the first, and I believe the only observer and diagnoser of urethral carcinoma in its earliest stage. His case is briefly as follows :

F—, 72 years old, had suffered for thirty-two years from stricture of the urethra, and on consulting Oberländer was only able to half

empty his bladder, but this was improved by the dilation of the stricture, which stretched from the middle of the pars pendula to the membranous urethra. Three years after the dilatation Oberländer discovered in the bulbous urethra a hard and smooth-surfaced growth the size of a hazel nut. It was freely movable. It was thought at first to be callus.

After a month or two regular bleeding took place on catheterisation, and the lump could be felt to be lobulated; one part was the size of a chestnut and another the size of a cherry.

Oberländer took away a piece of the projecting growth by rubbing its urethral surface with a wad carrier, and Professor Dr. Neilson examined it microscopically. It proved to be a rapidly growing carcinoma, and it was excised from the perinæum by Hofrath Dr. Rüpprecht. Six months after there was no return of the growth.

Four and a quarter years after the operation some hæmorrhage occurred after using the catheter. The urethroscope was again of service in diagnosing a recurrence of the growth and localising it to the prostatic urethra. A second operation was performed, but the patient died on the twelfth day. The tumour of the prostatic urethra was similar to that removed from the bulb four years previously.*

The urethroscope has been used in a few other cases, but without the success which attended Oberländer's examination.

In a case described by Grünfeld in which a tumour of the prostatic urethra was inspected by this means, the growth was probably only secondarily urethral. Berkeley Hill examined the case reported by Marcus Beck, but the urethroscope only revealed a small papillary projection overlapping the edge of a stricture, and did not help in the diagnosis. It is possible that air distension might have given a better view of the tumour in this case.

A purulent urethral discharge is sometimes present, and in two cases described by Bosse it was the initial symptom. It is, however, of little diagnostic value; nor can the discovery of epithelial cells and *débris* in the discharge be looked upon as important.

* 'Centralbl. f. d. Krank. d. Harn. u. Sex. Org.,' 1900, Bd. xi, H. 9, p. 454.

There is sometimes great swelling of the penis and scrotum, and this has rapidly led to sloughing and gangrene. (Cases of Mikulicz, Schustler, and Hurry Fenwick.)

Malignant urethral tumours pursue a very rapid course; the average duration of life after diagnosis of the tumour is stated at six months. In the later stages the groin glands enlarge, and cachexia may be a marked symptom. (Poncet's case.)

These growths must be distinguished from carcinoma of Cowper's glands.

The latter are extremely rare, only three undoubted cases having been described. Like urethral carcinoma, they form a swelling in the perinæum, but they develop most markedly towards the rectum, and they may be felt by the finger in the rectum to have a characteristic situation behind the bulb. There is no difficulty in micturition, and an instrument passes readily into the bladder. Obstruction and hæmorrhage only occur in the latest stages, when there is also pain on defæcation and on sitting and walking.

Treatment.—When the diagnosis is made the growth has usually spread too far, and is extending too rapidly for operation. In such cases the intense pain caused by attempts at micturition is greatly relieved by establishing permanent supra-pubic drainage.

Should a case come under observation in an early period of development, when the growth is still limited, the Thiersch-Gould operation may be performed with some prospect of success.

Rüpprecht performed a much less extensive operation in Oberländer's case. The growth was about the size of a hazel nut, and was removed with $1\frac{1}{2}$ —2 centimetres of the urethra on either side of it, and the cut ends of the urethra united. Perfect union took place.

Four and a half years later the tumour recurred in the prostatic urethra, and the patient died on the twelfth day after a second operation.

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CHAPTER XV.

DISEASES OF THE FEMALE URETHRA.

THE female urethra has a short straight course, and its function is solely that of a urinary passage ; it does not therefore present such clinical opportunities for the observation of obscure disease as the male canal. Some of the affections to which it is liable, such as dilatation and prolapse, are peculiar to the sex.

Congenital malformations are extremely rare, and need not, therefore, be considered in detail.

The diseases are most conveniently grouped under their cardinal symptom, as follows :

- (a) Conditions producing chronic purulent discharge.
- (b) Conditions producing incontinence or obstruction.
- (c) Conditions producing pain.
- (d) Conditions producing hæmorrhage.

(a) CONDITIONS PRODUCING CHRONIC PURULENT DISCHARGE.

Chronic urethritis.

Chronic urethritis is usually a sequel to an acute attack of gonorrhœal inflammation, although it is sometimes difficult to obtain a clear history of the original onset.

Symptoms and diagnosis.—The condition is often overlooked, for chronic endocervicitis or endometritis frequently co-exist, and the symptoms produced by the uterine inflammation mask those of the urethral disease. Often the patient complains of nothing more than a slight burning during the act of micturition, or a sensation of itching. Sometimes there is some increase in the

frequency of micturition, and there may be recurrent attacks of a moderate purulent discharge with some scalding on passing water.

On parting the meatal lips a small bead of pus may be seen adhering on one or other side just within the orifice, and pressure may produce another drop. This discharge comes from one of the large mucous glands which are found immediately within the orifice. On introducing the finger into the vagina some tenderness is detected along the line of the urethra, and on pressure along the anterior vaginal wall towards the outlet a small quantity of yellow discharge escapes from the meatus.

Examination is somewhat facilitated by the use of the non-inflating urethroscope, for by this means the extent of the disease may be gauged, and the areas locally treated. The mucous membrane may be found diffusely congested throughout the entire length of the urethra, with here and there a minute dark red pinhead-sized swelling denoting a blocked gland, or the disease may be limited to a few circumscribed patches of congestion. Sometimes the urethral gland ducts are seen as minute yellow points surrounded by an area of deep red congestion (glandular urethritis).

The regions most often affected are the neighbourhood of the external meatus, and the proximal end of the canal close to the vesical sphincter.

Treatment.

Silver nitrate solution (5 grains to ℥j) or Lin. Iodi should be applied accurately to the diseased areas by means of cotton-wool pledgets passed along the urethroscopic tube. Care is taken to dry the surface with a fresh pledget before withdrawing the tube. The application should be repeated every three or four days.

Glandular urethritis is best treated by inserting the point of a fine electrode into the ducts, and passing a five-milliampère current for a few seconds.

Periurethral folliculitis.

In some cases small red projections about the size of a pin's head are found surrounding the external meatus, and on pressure a tiny bead of pus will exude. A very fine probe may be guided into the ducts of these follicles, and in some will pass for one eighth of an inch or more. The condition causes very little discomfort, amounting, as a rule, only to a slight itching or burning. Sometimes a fine fistulous track results from the rupture of such a follicle into the urethra near the meatus.

Treatment.

Small glandular abscesses surrounding the meatus should be slit open with a fine-bladed scalpel, and the wall touched with a point of solid nitrate of silver.

Suburethral abscess; urethral diverticulum.

In this condition there is a sac in the urethro-vaginal septum which contains pus or purulent urine (Fig. 36).

FIG. 36.

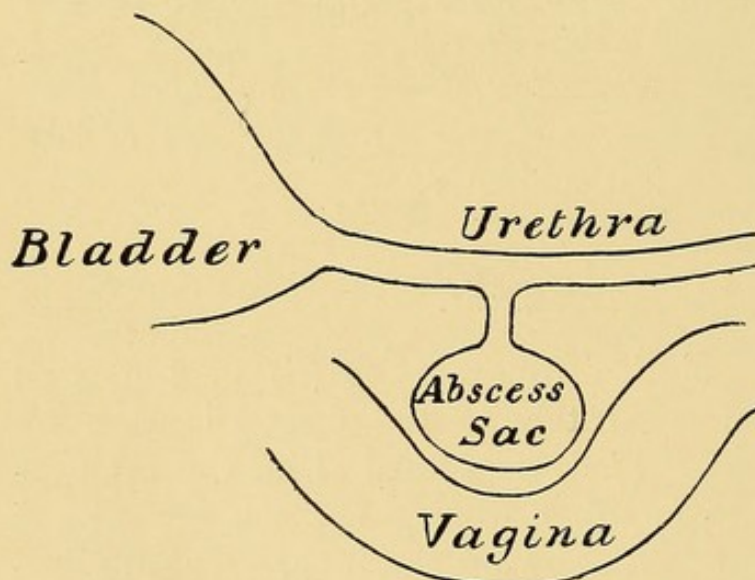


Diagram of urethral diverticulum. (Fowler.)

The cavity communicates with the urethra by a small slit in its inferior wall. In some cases it is lined with mucous

membrane resembling that of the urethra, but ulcerated and destroyed in places. In others the inner surface is covered with squamous epithelium, or the wall may consist of fibrous and granulation tissue. The sac bulges into the vagina, producing a swelling in its anterior wall, which varies from the size of a walnut to that of a hen's egg. In exceptional cases it may extend as high as the base of the bladder, and approach the external meatus at its lowest point.

Symptoms of urethral diverticulum.—The patient is usually a young married woman, and gives a history of a chronic purulent discharge of some years' standing: There is pain on micturition and on connection, and often a feeling of weight and fulness in the vagina. The only symptom which may lead one to suspect the true nature of the case is the repeated sudden discharge of a quantity of pus independent of micturition. The urine usually contains pus, but in some cases it remains clear.* A swelling is found presenting at the vaginal outlet, and evidently connected with the anterior vaginal wall. It is elastic to the touch and very tender, but there is no thinning of the vaginal mucous membrane like that found in true vaginal cysts. On pressure the swelling diminishes in volume, and at the same time pus escapes from the external meatus.

On urethroscopic examination a careful search will sometimes display the small slit-like opening in the lower urethral wall, and from it pus wells into the tube.

Treatment.—The best method of treatment is to lay the sac freely open by an incision through the vaginal wall, and after carefully removing the lining membrane with scissors and the sharp spoon, to pack the cavity with gauze.

Excision of the entire sac is difficult, owing to the surrounding adhesions. Kelly had a successful result in one case in which he performed the operation, but in a

* See a case described by Hey ('Practical Observations in Surgery'), and quoted by Kelly ('Operative Gynæcology,' vol. i, p. 305, 1898).

second he was less fortunate, the patient being left with an urethro-vaginal fistula, which required subsequent operation.

(b) URETHRAL CONDITIONS PRODUCING INCONTINENCE OR OBSTRUCTION.

Dilatation of the urethra.

The canal sometimes fails to resume its normal calibre after forcible dilatation for diagnosis or operation in vesical disease. This is nearly always an indication that the surgeon has acted unwisely. This untoward result is especially liable to occur when a tuberculous bladder in the advanced stage is digitally examined. In such a case great distress is caused by the complete incontinence of urine which results.

Coitus per urethram is another cause of dilatation, but here the function of the vesical sphincter is less seriously interfered with. The patient as a rule only complains of a temporary incontinence. In these cases there is usually a congenital narrowing of the vagina. A large stone forced through the urethra from the bladder has been known to cause dilatation.

In the slighter grades of dilatation urine only escapes on coughing or sneezing or on some unusual exertion, but in severe cases there is constant dribbling.

Treatment of dilatation.—In recent cases any laceration of the wall should be carefully sutured and attention paid to keeping the canal clean by weak antiseptic and astringent lotions. In a few weeks the tone of the sphincter may be recovered. In the lesser grades of dilatation the pressure of a pessary may give some relief. Where atresia of the vagina is present this condition should first receive attention.

When the dilatation is well marked and of long standing, nothing short of operation will give relief to the distressing incontinence. There are several methods

(Frank's, Pawlik's, Gersuny's, and others) from which the surgeon may choose, but none of them, it must be confessed, can be implicitly relied upon to give certain and lasting results.

Stricture.

Owing to its short, straight course and extreme dilatability the female urethra is rarely the seat of stricture. Gonorrhœa and sloughing after labour are causes which may bring about a narrowing of the tube.

The stricture consists of dense fibrous tissue, and is found either at the vesical end of the tube or in the neighbourhood of the external meatus.

Gradually increasing obstruction to the flow may draw attention to the condition, or sudden complete retention may occur after exposure to cold or alcoholic excess.

The diagnosis is readily made from the obstruction to the passage of instruments, and the thickening of the urethral wall at the point of stricture may be felt through the anterior vaginal wall.

Treatment.

The post-gonorrhœal form of stricture is usually suitable for interrupted dilatation by bougies, although in some cases it is necessary to incise it with a fine-bladed knife. If extensive vaginal cicatrices are present a plastic operation will be necessary.

(c) URETHRAL CONDITIONS PRODUCING PAIN.

Urethral caruncle.

Pain is the cardinal symptom in urethral caruncle. The suffering caused by these growths is quite out of proportion to the size of the tumour. Exquisite pain accompanies each act of micturition and radiates to the pelvic organs and down the thighs. It is sometimes so intense that the patient will go for long periods without emptying her bladder. In extreme cases the general

health suffers, the patient loses flesh and becomes morose and depressed.

Rupture of the dilated vessels of the growth sometimes takes place. The amount of blood lost is usually slight and this symptom may be absent; sometimes, however, the loss is considerable.

The diagnosis is attended with no difficulty, for the caruncle is situated at the external orifice of the urethra, and is seen at once on separating the labia. It is usually sessile and occupies the posterior, or sometimes the lateral, margin of the meatus.

The growth has often a finely nodular, raspberry-like surface, but in some cases it is flattened and rugose. Rarely there is a pedicle, and the polypus projects between the labia.

Microscopically.—The tumour is composed of fibrous tissue supporting numerous and sometimes dilated vessels. The surface is papillary, and is covered by squamous epithelium, the horny layer of which may be heaped up in places.

Nerve-fibres are not easy to find with ordinary staining methods. They are neither excessive in number nor of large size.

Treatment.—The only satisfactory method of treatment is complete extirpation. Any portion of the tumour left behind forms a starting point for recurrence. If, however, the excision is radical, no further growth need be feared.

These tumours often extend a little way up the urethra, and should be carefully followed up to ensure complete removal. The dissection need only be carried to the submucous layer, for they show no tendency to infiltrate.

Prolapse of the urethra.

In young children, and more rarely in old women of sixty or seventy years, the urethral mucous membrane may slide down within the rest of the urethral wall, and

protrude from the external meatus. The mucous tube becomes everted and forms a deep red or bluish mass, in the centre of which is the opening of the urethra. The sensitive mucous membrane thus exposed to friction and irritation becomes inflamed, œdematous, and ulcerated, and may even slough. On raising the everted edge, the tumour can be traced to its point of attachment at the position of the external meatus, and a sound introduced into the central opening passes into the bladder.

The only condition likely to be confused with this is a prolapsed ureter protruding from the external meatus. Both of these rare conditions have a central lumen, but a probe may be passed into the bladder cavity *alongside* the prolapsed ureter, whereas in the prolapsed urethra, the only way of reaching the bladder is by the central lumen.

Treatment.—The mass may sometimes be reduced through the external meatus by steady pressure under local or general anæsthesia. If this is successfully performed a pad should be placed over the meatus, all straining and coughing avoided, and quiet ensured by a suppository of opium and belladonna.

Should attempts at reduction fail, or recurrence take place after successful reposition, the best method of treatment is excision of the ring of prolapsed mucous membrane and careful suturing of the cut edges.

(d) CONDITIONS GIVING RISE TO HÆMORRHAGE.

Malignant growths.

Carcinoma is very rare, and only a few cases of sarcoma have been described. The former commences in the mucous membrane at or near the external meatus in women between forty-five and sixty years of age.*

* An exception to this is the case described by Dr. Thomas ('Amer. Journ. of Obstet.,' 1877) of an urethral cancer in a woman twenty-nine years old.

Some cases are described as having a peri-urethral origin.

The prominent symptom is hæmorrhage. Occasional darting pains are sometimes complained of, but pain does not seem to have been a marked feature in any of the cases. Later the tumour breaks down and there is a foul watery discharge.

Little difficulty should be experienced in diagnosing the condition. An irregular infiltrating tumour is found projecting from or surrounding the urethral orifice and extending for a varying distance up the wall of the canal.

In the peri-urethral form the urethra is converted into a rigid tube, and obstruction to the urinary flow may be present. The passage of a catheter readily gives rise to hæmorrhage.

Sarcomata are usually bright red, lobulated tumours protruding from the external meatus. The cases described have been in women over fifty years, with the exception of a myosarcoma which was found in a child of three years.*

It should not be forgotten that in sarcoma of the female bladder, polypoid masses frequently extend along the urethra and project from the meatus.

Treatment.—Where the disease is limited to the neighbourhood of the meatus free removal presents no great difficulty. McGill † performed a more extensive operation in a case where the carcinoma had encroached upon the bladder base. He provided for permanent supra-pubic drainage and freely removed the tumour. The patient returned home in five weeks with the excision wound completely healed.‡

* 'Galabin, 'Trans. Lond. Obstet. Soc.,' vol. xxxviii.

† 'Lancet,' 1890.

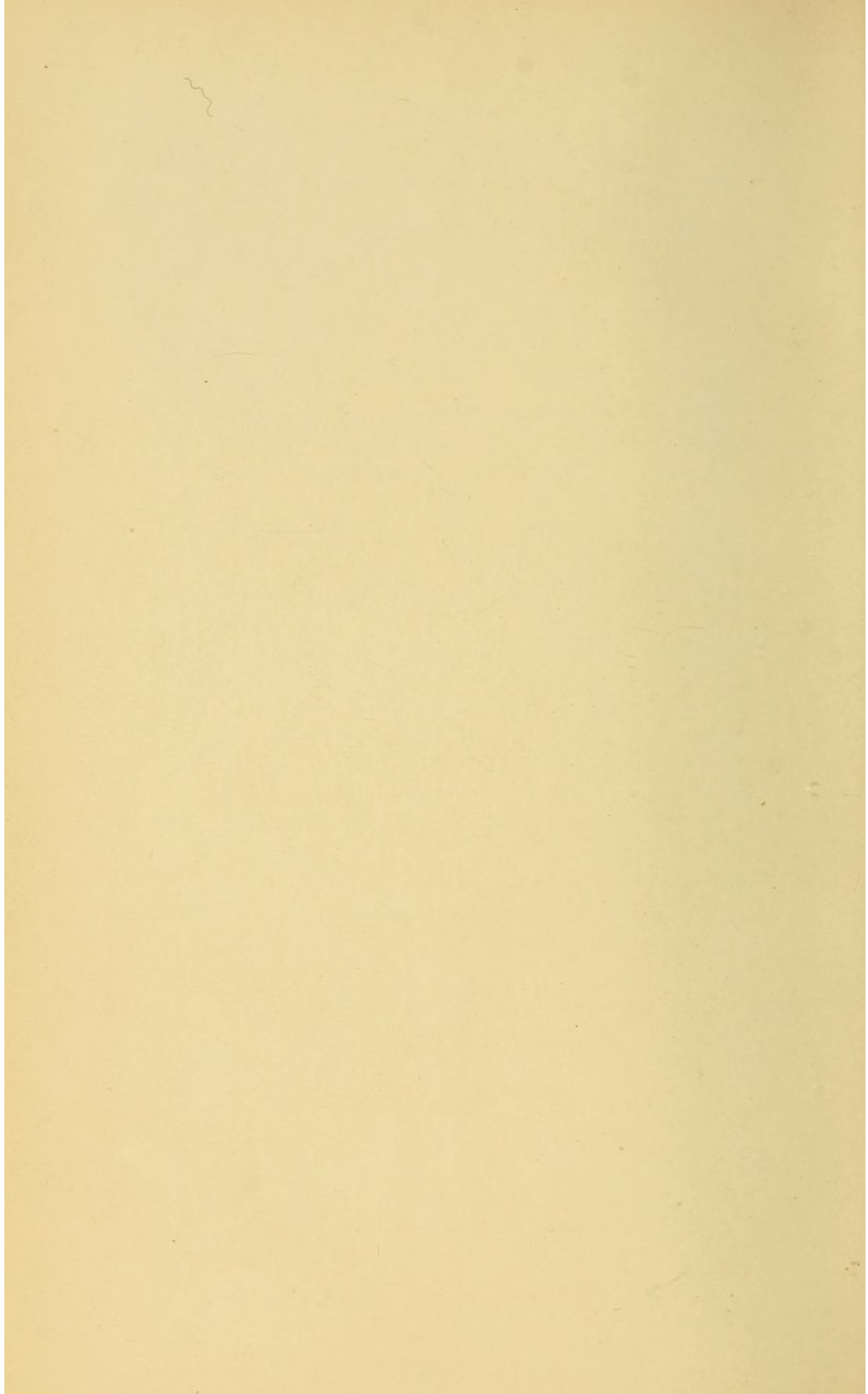
‡ One of us examined this patient whilst in the Leeds Hospital. The condition of the case then was satisfactory, but it was lost sight of.

METHOD OF USING A "PROSTATIC" ANTROPHOR.

THE patient is first directed to pass water in order to flush the canal. The antrophor is lightly washed with water to remove the talc which protects the remedy, and while still wet is dipped in oil and then passed along the urethra until the medicated end is felt to have fully entered the prostatic urethra. The patient lies down for ten or twenty minutes, when the spring is gently pulled out and thrown away, and a pledget of cotton wool is used to arrest the sticky substance oozing from the meatus.

At first two are used a day, the number being diminished as the gleet decreases.

In very sensitive patients an injection of a 10 per cent. solution of cocain may be given before introducing the antrophor.



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