

then subsides; mean time, if the patient tries to pass water, he finds himself unable to do so. Soon the spasm relaxes and the urethra widens notably, so that a few hours later the patient can make water easily outside of the instrument. A knowledge of this fact relieves all fear of retention in connection with this style of treatment; the fear is, indeed, on the other side, for if a soft filiform instrument has been tied in, no matter how tightly it was embraced by the stricture at the moment of introduction, the chances are that at the second or third micturition it will be doubled up and washed bodily out of the canal by the volume of the stream of urine. This is not so apt to happen where there is also enlarged prostate, on account of the smallness of the stream and the atony of the bladder frequently attending that condition. After the instrument has been tied in for twenty-four hours, the stricture will readily admit a larger bougie. This should be tied in the same way. The stricture ulcerates superficially, but widens with great rapidity. After it has reached a certain size, it may be treated by dilatation as described above.

There are objections to the treatment of stricture by continuous dilatation. Some patients suffer torments if an instrument is tied into the urethra, while urethral fever and epididymitis are often caused by it. On the other hand, some patients support it with perfect impunity, even while walking around. If severe chills come on during continuous dilatation, it is prudent to withdraw the instrument; if the chills are mild, they may be disregarded. Strictures enlarged by continuous dilatation commence to recontract at once with great rapidity, unless they are kept dilated by the occasional use of the sound.

Finally, if the stricture is exceedingly tight, perhaps impassable, and retention has come on, caused either by the stricture or the prostatic enlargement, there is but one course left open. If warm-baths, etc., do not bring relief, and the bladder is found to be fully distended, the operation of tapping above the pubes must be performed, either with the aspirator or by incision, leaving a canula tied in (p. 130), the choice of the former operation resting upon the probability of an easy and speedy effective cure of the stricture, the urethra and prostate being treated after the bladder has been relieved. In these cases external perineal urethrotomy is too severe an operation, for the patients are all old men with more or less cystitis, coexisting with prostatic enlargement.

3. FISTULA WITH LOSS OF SUBSTANCE.¹

Fistulæ of the urethra with loss of substance may result from gangrene, abscess, phagedenic ulceration, simple ulceration (the tying in of a silver catheter for a length of time). They are seen usually as the result of infiltration and abscess complicating stricture. In this variety of fistula a hole exists in the floor of the urethra, through which its roof is visible. As has been shown, small fistulæ close on dilating the ure-

¹ All large fistulæ are considered here, whether complicating stricture or not.

thra. The same law which causes a traumatic stricture to close entirely, if all urine escape through fistulæ behind it, will the more certainly close a small fistula, unless from obstruction in front of it, and consequent distention of the urethra during urination, fluid be forced into its internal orifice. With loss of substance, however, dilatation of the urethra, though necessary for cure, will not alone suffice. If the opening is larger than a pea, its closure is often difficult, especially if it lie anterior to the peno-scrotal angle. The causes of failure here are three:

1. The thinness of the natural tissues furnishing only narrow edges for the union of flaps.
2. The difficulty of avoiding contact of urine with the cut edges.
3. The disturbance of the wound on account of changes in size of the organ (erection).

Where loss of substance, however, is not very great, if there be no urethral obstruction in front of the fistula, repeated cauterizations may effect a cure. In this way Sir Astley Cooper¹ closed a fistula as large as a pea with nitric acid, after two operations with harelip pins and interrupted suture had failed. He states that this plan will not succeed unless the integument is loose, and the scrotum forms part of the orifice of the fistula. Dieffenbach² prefers a concentrated tincture of cantharides for small openings, which he applies as follows: The urethra is distended over a full-sized bougie, and the tincture applied with a small brush to the inner border of the fistula. This manœuvre is repeated several times in the twenty-four hours. The epithelium as it loosens must be scraped away, and the tincture applied to the raw surface until healthy granulations have sprung up, which seem capable of closing the opening. Failing once, the treatment may be repeated.

If this is not sufficient, or if, at first, the opening seemed too large to warrant the simple application of caustic, its use may be combined with that of Dieffenbach's lace suture (Schnürnaht), which is applied as follows: After the epithelium has been removed by the application of the tincture of cantharides, as just detailed, and a large, soft bougie has been passed into the urethra, a small curved needle, not cutting at the sides, carrying a stout (waxed) silk ligature, is introduced with a needle-holder at about three lines from the border of the fistula. The point of the needle must not enter the urethral canal, but, after traveling a short distance in the substance of the corpus spongiosum, it is made to emerge through the integument at a point also about three lines distant from the edge of the fistula. The needle is reintroduced at the same puncture whence it emerged, and the same stitch is repeated often enough to carry the thread around the fistula at a distance of about three lines from it, and to make it finally terminate through the puncture in the integument where it first entered, thus leaving the two ends of the

¹ "Surgical Essays," London, 1819, p. 205.

² "Die Operative Chirurgie," Leipsic, 1845.

thread emerging from the same cutaneous orifice, the thread itself lying in the corpus spongiosum, and the urethra not having been punctured by the needle. By gently pulling upon the two strings, the raw edges of the fistula are now brought together. The ligature is tied, the knot sinking into the cellular tissue; the sound is withdrawn, and water-dressing employed. The patient urinates through a catheter. In three or four days the ligature is cut and gently drawn out. Two operations may be required, the first rendering the fistula smaller, the second obliterating it. This procedure is applicable to all fistulæ of the spongy urethra of less than one-sixth inch diameter.

Where the opening is larger, urethro-plasty is required. Urethro-plastic operations are very unsatisfactory in their results, even in the hands of the best operators, for the reasons already given. For the proper method of operative procedure each case must be made a study by itself, and the flap so chosen that it may be ample in size and sufficiently thick. In the present treatise it is impossible to give even by name all the operations which have been proposed, much less to describe them. For such detail those interested are referred to Dieffenbach,¹ where fourteen different methods are described.

The excellence of one operation, however, the sliding flap or bridge method of Dieffenbach, and variously modified by Nélaton and others, is worthy of outline from its frequent applicability to small fistulæ anterior to the scrotum. A large bougie is introduced into the urethra, and upon it the integument of the penis is incised transversely or longitudinally, by two parallel incisions, situated respectively nearly an inch from the edges of the fistula. The fistula is made somewhat elliptical by incisions which freshen its edges. The integument between the incisions is now thoroughly detached from the corpus spongiosum, commencing at the fistula. When the incisions have been transverse, the flaps are also well dissected up laterally, so that the edges of the fistula may be approximated laterally without causing tension of the edges after they are united. The advantage claimed for transverse over lateral incisions is that, if urine escape from the urethra, it may more readily find its way out without detaching much of the flap. The flaps approximated laterally are united by the twisted suture at once, or may be left to granulate and brought together by pins, after a few days, for the purpose of getting secondary adhesion.

By this operation two raw, flat surfaces are brought together laterally instead of two thin edges. A soft catheter of moderate size should be introduced four or five times daily, but on no account should a catheter be tied in, as this is more likely to defeat than to further the object for which it is used, as shown by Thompson.² For although a catheter, when first introduced, may fill the urethra, yet soon it begins to act by "continuous dilatation," and the urethra becomes larger. Then capil-

¹ "Die Operative Chirurgie," Leipsic, 1845.

² *Op. cit.*

lary action begins between the wall of the urethra and the outside of the catheter, and a little urine is sucked up, necessarily wetting every portion of the urethral wall and coming into contact with the wound.

Regarding the success to be expected in operating upon fistulæ with loss of substance, it may be stated, as a general rule, that, the farther they lie from the neck of the bladder, the more difficult are they to close. In the perinæum the natural thickness of the tissues is of great advantage. If an attempt is made to close a very large fistula anterior to the perinæum by a plastic operation, it would always be advisable to follow the suggestions of Ségalas and Ricord,¹ namely, to open the urethra through the perinæum, as the first step of the operation, and allow the urine all to flow by that route, or to pass a catheter into the bladder through some preëxisting fistula in the perinæum. The advantages of such a course are obvious.

SUMMARY OF TREATMENT OF STRICTURE.

1. Alkalies, diluents, and rest, are serviceable in most cases of stricture—sometimes indispensable if there be any serious complication.
2. All uncomplicated strictures, not highly irritable or resilient, should be treated by dilatation with soft instruments up to No. 9, conical steel sounds afterward; reintroductions being made every fourth to eighth day—the older the stricture the longer the interval as a rule, and intervals of one week being most serviceable in the majority of cases.
3. All strictures at or near the meatus must be cut.
4. Resilient, very irritable, and, as a rule, traumatic strictures are best treated by divulsion, if they lie below four and one-half inches from the meatus, otherwise by internal urethrotomy. When a resilient stricture cannot be divulsed, it should be cut—internally.
5. Impassable stricture may usually be overcome—where there is no retention—by time, patience, and skill, with whalebone bougies. If finally proved impassable, the treatment is external perineal urethrotomy.
6. Retention is treated by hot baths, ether, opium; tincture of the sesquichloride of iron; failing these, by puncture above the pubis with the aspirator or through the rectum to gain time; or by external perineal urethrotomy without a guide.
7. For stricture complicated by abscess, infiltration, or many and large fistulæ and for extensive traumatic stricture, external perineal urethrotomy.
8. For infiltration, free incisions, stimulants, supportives, with thorough external division of the stricture.
9. For fistula with loss of substance, local cauterization, lace suture, or plastic operation. Where there is no loss of substance, complete dilatation of the stricture is soon followed by closure of the fistula

¹ Monthyon Prize of French Academy, 1841.

URETHRAL CASE OF INSTRUMENTS.

It is advisable to introduce here a list of such instruments as will be necessary to make up a case suitable to meet the requirements of such maladies, demanding instrumentation within the urethra, as are ordinarily encountered by the general practitioner:

Gauge.

Conical steel sounds, Nos. 9 to 20, inclusive.

One long and two short whalebone filiform guides.

Thompson's probe-pointed catheter, modified by Otis.

One silver catheter, short curve, size No. 12.

Two silver catheters, with long prostatic curve, sizes No. 10 and 16.

Thompson's divulsor, tunneled.

Civiale's concealed bistoury.

Civiale's urethrotome.

Gouley's catheter-staff, size No. 10.

Urethral forceps.

Cupped sound, size No. 12.

Four English yellow elastic catheters, assorted.

Conical (not olivary) soft bougies, sizes Nos. 1 to 12, inclusive.¹

Half-dozen different-sized olivary French catheters.¹

Four Mercier's elbowed catheters, assorted.¹

Bulbous bougies, sizes Nos. 3 to 20, inclusive.¹

CHAPTER IX.

DISEASES OF THE PROSTATE.

Anatomy.—Function.—Deformities.—Injuries.—Atrophy.—Hypertrophy.—Bar at the Neck of the Bladder.—Symptoms and Results of Hypertrophy.—Course of Symptoms from commencing Irritability up to Retention, Atony, Stone, Uræmia, Death.

ANATOMY.—The prostate (*προστάτης*, *standing before*), somewhat improperly called a gland, is a body composed mainly of unstriped muscle, placed like a sphincter around the first inch of the urethra and the neck of the bladder. It contains multilobular mucous glands in its substance, and is tunneled by the two ejaculatory ducts—the common canal formed by the union of the duct of the seminal vesicle with the vas deferens on either side. The ejaculatory ducts open, in the floor of the prostatic urethra, on the sides of the little crest in the median line called *veru montanum*. Here, also, most of the ducts of the mucous glands of

¹ These instruments should not be kept in the general case, as they are liable to soften and stick together in warm weather.

the prostate open. The latter secrete a bluish mucus, which serves to dilute the semen. Both the glands and their ducts, in late adult life, habitually contain certain small solid deposits, called prostatic concretions, formed in concentric layers, which seem to have no special significance, though they often exist in vast numbers, and of considerable size. They are occasionally encountered in the urine. The lower part of the prostate is surrounded by a few striped muscular fibres—the external vesical sphincter of Henle.

The prostate is a muscle. Its main function is to contract on the semen after the latter has collected within and distended the prostatic sinus. This contraction is coincident with the venereal orgasm. It is spasmodic in character, throwing out the seminal fluid in successive jets. The seat of the venereal orgasm is in the nerves of the mucous membrane lining the prostatic sinus, as proved by the fact that it is sometimes excited by the passage of a sound through the prostate, and is not destroyed by amputation of the glans penis.

The prostatic utricle, the analogue of the cavity of the uterus, is a little depression lying in the floor of the prostate beneath the *veru montanum*, opening by a small vertical slit in front of the summit of the latter. This cavity and the orifices of the mucous follicles, dilated by hydrostatic pressure in cases of tight stricture, are apt to catch the fine points of filiform bougies introduced through a stricture.

The base of the prostate embraces the neck of the bladder, and surrounds the vasa deferentia and necks of the seminal vesicles. The prostate lies below and directly in front of the neck of the bladder, inclosed by a fibrous capsule, in relation with the pubes in front, the rectum behind, and held in place mainly by the pelvic fascia—or posterior layer of the triangular ligament—and the pubio-prostatic ligament in front. There is never any fat between the rectum and prostate. A large plexus of veins surrounds the prostate in front, and above as well as (partly) below.

The prostate is composed of two lateral lobes, and only two. They form one symmetrical body, and never continue distinct in man, as they do in some animals. Thompson,¹ quoting Morgagni, Santorini, Hunter, Cruveilhier, and others, as well as concluding from his own minute investigations, decides absolutely against the existence of any third or median lobe in the healthy prostate.

In shape and size the organ resembles an Italian chestnut. Its weight is about half an ounce. It lies with its apex looking forward, and may be readily felt during life through the rectum. The finger can always reach above its posterior border, unless the organ is decidedly enlarged.

The prostate is a genital, not a urinary organ. Like the rest of the genital apparatus, it is small before puberty, and becomes notably de-

¹ "The Enlarged Prostate."