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URETHROTOMY,

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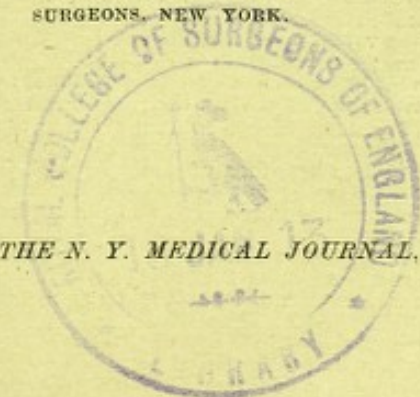
WITH REMARKS ON THE URETHRAL CALIBRE.

BY

FESSENDEN N. OTIS, M. D.,

CLINICAL PROFESSOR OF VENEREAL DISEASES IN THE COLLEGE OF PHYSICIANS AND
SURGEONS, NEW YORK.

[REPRINTED FROM THE N. Y. MEDICAL JOURNAL, APRIL, 1874.]



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1874.

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THE URETHRAL CALIBRE.

IN the early part of the year 1872 two cases of urethral stricture presented in my service at the Strangers' Hospital, which, from the fact that the first was the subject of impassable stricture at the bulbo-membranous junction, and that the second was suffering from a long, close, perineal stricture, admitting only the finest whalebone filiform bougie, and was further complicated by the presence of several perineal fistulæ, were decided to be appropriate cases for the external or perineal incision. The method of operation employed differed in some respects from that usually performed. The practice approved by authorities in such cases is to cut down upon a sound or other instrument which has been introduced through or down to the point of stricture, and then from without to incise freely all stricture-tissue until an instrument, sound or catheter, of the supposed normal dimensions of the urethra, can be readily passed through the urethra into the bladder. The modification of this procedure, in the cases above alluded to, consisted in making the external perineal incision in great measure subsidiary to the operation of internal urethrotomy. This plan was determined on for the first case with the idea of including in the same operation several strictures which were present in the straight portion of the urethra, as well as the impassable one for which the perineal incision was demanded, and for the second, to avoid the necessity of laying open the scrotum in the division of the long stricture, which was found to pursue a tortuous course through a mass of indurated tissue traversed by the perineal fistulæ.

The preliminary steps in this modified operation were taken as if the ordinary perineal section had been contemplated. An incision was then made down upon the anterior face of the stricture, aiming to enter the urethra by as small an opening as possible, and through this opening, as a new point of departure, the endeavor was made, in the first case, to introduce a fine, soft, filiform guide through the posterior stricture. Succeeding in this, the staff of Maisonneuve was entered at the meatus and passed down through and past the perineal incision and into the bladder; blades of the instrument, Nos. 2 and 3, were then slid down the staff in succession, cutting on the superior wall of the canal and dividing all remaining strictures. A large silver catheter was then passed into the bladder. In the second case the same plan was pursued, with like result, as far as the stricture posterior to the incision was concerned, and a large bougie was passed from the incision into the bladder: but there still remained the long and close stricture anterior to the perineal opening. A filiform guide was then passed from the meatus urinarius through the stricture and out of the perineal incision; the staff of the instrument of M. Maisonneuve was then screwed upon it and also passed through the urethra and out of the incision; this was followed by the blades Nos. 2 and 3 in succession; after which a full-sized catheter was passed through the entire urethra into the bladder.

The result of these operations proved highly satisfactory in both the cases alluded to, detailed accounts of which were published in the *New York Medical Record* of April 15, 1873.

Among the advantages which it seemed to me might be legitimately claimed for this modified perineal section, were—1. That it methodically included, in the same operation all points of stricture in the presenting urethra, with only a limited division of the external urethral walls, and yet one sufficiently extensive for the free discharge of urine and of the fluids resulting from the operation. 2. That all divided strictures, anterior to the perineal opening, were protected from contact with the urinary secretion after operation; thus obtaining the advantages of each operation, viz., external section and internal urethrotomy, and at the same time lessening the disadvantages if not the dangers of each as separately per-

formed. With the view of illustrating still further the value of the procedure above described, and in order to call your attention to some important imperfections in the modes of procedure ordinarily pursued in the treatment of urethral stricture, I beg leave to present the following case:

On the 31st day of July last, Mr. W. C. H., merchant, aged thirty-three years, presented at my office, with the history of a gonorrhœa thirteen years previous. This was severe in its accession, and, through the aid of strong injections, continued in a highly-inflammatory stage for fully one month. It was supplemented by a free, almost painless muco-purulent discharge, which, in spite of a variety of treatment, internal and by injections, continued, in a greater or less degree, through all the succeeding twelve years and up to the present time. He had his first trouble in urination seven years ago, after excess in wine and sexual indulgence. This resulted in an attack of retention of urine, which was relieved, only after several hours' effort on the part of the surgeon, by the introduction of a flexible filiform catheter. From that time he had frequently been obliged to resort to the introduction of the catheter, but had never since suffered from retention. For the last two or three years he had been troubled with occasional attacks of intermittent (urethral?) fever, but was not aware that he had ever been exposed to any malarial influences.

He passed his water *guttatim*, but says that, occasionally, he passes it in a fine, short jet, and that his condition in this respect has not varied materially for the last five years.

Examination showed the external genito-urinary apparatus fully developed; penis in flaccid condition, three inches in length, and three inches in circumference; from this I estimated the normal calibre of the urethra to be No. 30 f. Bulbous sounds detected stricture at the meatus, extending one-third of an inch, measured by No. 22 f.; one at one inch, No. 19 f.; one at two inches, No. 15 f.; one at three inches, No. 10 f.; six distinct bands from three inches to four and a half, defined by No. 8 f.; beyond four and a half inches, No. 1 filiform passes to six and a quarter inches; $\frac{1}{2}$ m. whalebone, closely hugged, is finally arrested at seven and a quarter inches. Examination of the urine shows freedom from albumen, an occasional pus-globule, a few epithelial scales from the ure-

thra and bladder; none from the ureters or pelvis of kidney. No casts. The foregoing measurement of stricture and condition of urine were rehearsed from time to time without the appreciation of any marked changes, and with no further progress toward entering the bladder up to November 4, 1873. On this date an operation was decided upon. Present Dr. George A. Peters, Dr. George W. Ives, the patient's family attendant, and Dr. J. De Forrest Woodruff.

ESTIMATED NORMAL CALIBRE OF URETHRA
CIRC. 30 MILLIMETERS

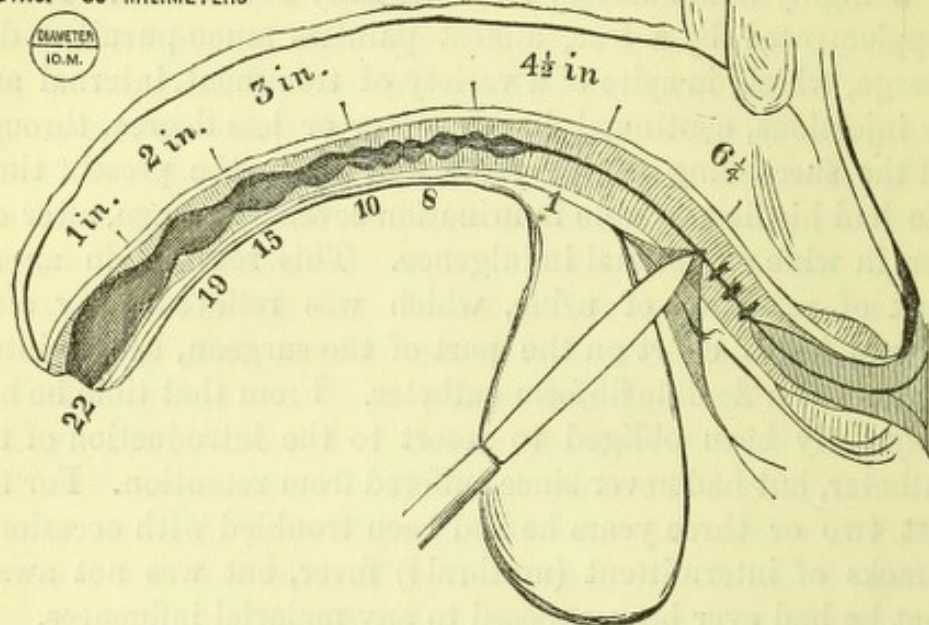


Diagram showing locality of the fourteen strictures in the case of W. C. H.

As the initial step in the anticipated operative procedure, ten grains of quinine and one-quarter grain of morphine were administered. The patient was then placed under the influence of ether, and the calibre and location of each of the strictures were verified (as compared with the measurements already given) by the use of bulbous sounds and bulbous filiform bougies. It was then decided that the modified perineal section was indicated as affording promise of most rapidly and certainly restoring the urethra to its normal calibre.

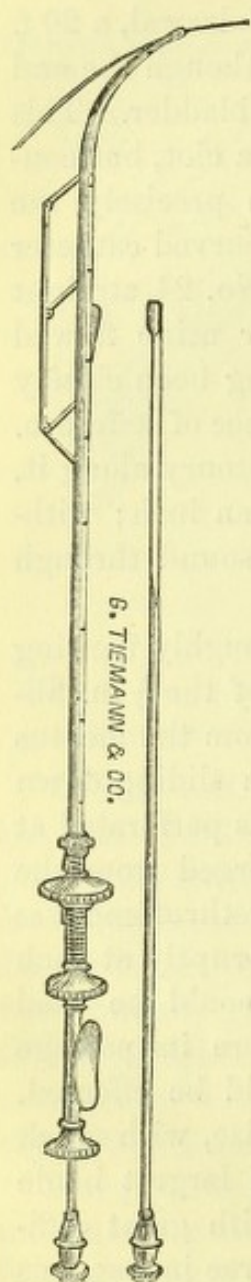
No. $\frac{1}{2}$ whalebone filiform bougie was passed down to six and a quarter inches, beyond which it could not be persuaded. With this as a guide (which was skillfully managed by Dr. Peters), I made an incision from a point just behind the scrotum to within an inch of the anus, cutting carefully down in line with the centre of the sub-pubic arch, until I came squarely

upon the whalebone guide. At this point in the operation the knife was laid aside, and with No. 1 silver-grooved probe, entering the urethra through the incision from before backward, I passed it readily into the bladder. I then introduced the staff of the urethrotome of M. Maisonneuve alongside the probe into the bladder. A slight pressure accomplished this, when the probe was withdrawn, and the largest blade of M. Maisonneuve (capacity 22 f.) was passed, distinctly arrested at three points on its course, and, on withdrawal, a 20 f. catheter was introduced. No urine flowed, although the end of the instrument was felt to be free in the bladder. This was withdrawn and found to be obstructed by a clot, but contained urine. No. 24 was substituted, with precisely the same result. It was then concluded that the curved catheter passed up above the line of urine present. No. 24 straight catheter was then substituted, and the clear urine flowed freely through it. The straight catheter having been closely embraced on entering, indicated some persistence of stricture. I then introduced a straight, probe-pointed bistoury along it, and incised dense cicatricial tissue for fully an inch; withdrew the catheter and passed No. 31 f. steel sound through the external incision back into the bladder.

The next step in the operation, after thoroughly incising the stricture at the meatus, was the passage of the $\frac{1}{2}$ m. filiform whalebone guide through the urethra, from the meatus down to and out of the perineal opening, then sliding down upon it the staff of a Maisonneuve (which was perforated at the extremity for this purpose),¹ it finally emerged from the perineal incision. The smaller blade of the urethrotome was then driven slowly down the staff, arrested abruptly at each stricture, and requiring all the force which could be used without bending the shaft of the knife, before its passage through the spongy portion of the urethra could be effected. This was followed by a blade of the second size, with much the same results. A passage of the third and largest blade was then attempted, but this, after passing with great difficulty, arrested at each of the strictures, up to three inches, was here arrested; and after a thorough trial, in which I was

¹ The filiform traversing the entire length of the staff.

efficiently supported by Drs. Peters and Woodruff, it was found impossible, on account of the density of the opposing strictures, to divide them with this instrument. The staff of Voillemier's divulsor was then introduced through the strictures and out of the perineal opening, and rapid divulsion made with the largest shaft (No. 30 f.). On examining the results of this last procedure, it was found that 28 f. bulbous sound was arrested at two inches. No. 26 passed, and defined



Dilating Urethrotome.

the posterior face of the stricture at two and a half inches; the same instrument was arrested again at four inches, finding slight resistance for half an inch, then passed freely down to the perineal incision. The (my) small dilating urethrotome was then introduced through the posterior stricture, turned up to 30 f., and the narrow blade of the instrument drawn through it. This urethrotome was then adjusted to the anterior stricture, which was in like manner incised from four inches to four and a half (viz., about one-half inch). No. 31 steel sound was then easily passed down through the entire urethra into the bladder; thus evidencing—as much as the introduction of an ordinary steel sound can do—complete division of all the strictures.

The patient rallied quickly from the effects of the ether, having been under its influence just one hour and three-quarters. The hæmorrhage occurring during the operation was slight, only two superficial vessels requiring ligature. At the end of a half-hour there was not the least oozing from either the wound in the perinæum or from the meatus; there was no complaint of pain subsequent to the anæsthesia; and, as I was leaving him, he emphatically expressed himself as feeling "*bully*."

From the date of the operation, November 4th, until the 10th, the patient, who was seen daily by either Dr. Ives or

myself, had not the least untoward symptom. He had an average pulse of 76, and temperature not above $98\frac{3}{4}^{\circ}$. His urine, over which he had complete control, was passed *entirely through the perineal opening* for the first three days, after which a small portion found its way through the anterior section of the canal. A conical steel sound, No. 24 f., was now (six days after the operation) passed through the extent of the urethra, and followed easily by Nos. 25 and 26 f. A slight gush of blood followed No. 26 f., but stopped in a few moments. On the 12th passed Nos. 28 and 30 f.; patient, as on the previous occasion, doing well; says he has not had an ache or a pain since the performance of the operation. Hæmorrhage occurred on the next day, following the act of micturition; this was evidently from about the middle of the spongy portion. Dr. Ives was called; eight or ten ounces of blood were lost before it was completely arrested.

14th.—Tenth day after operation. Wound in perinæum closing healthily; passes water about equally through it and through the urethra anterior to it; feels well, eats well; walks about his room, or sits in his arm-chair, with equal comfort. No further instrumental procedure was had until two weeks subsequently (viz., December 28th), when he called at my office, saying that he felt quite well in every respect, that his stream was full size, and that only a few drops came through the perineal opening; he had gained several pounds in weight, and was looking in good condition. Examination of the urethra detects a recontraction of the stricture at one and a half to two inches from the meatus, 17 f.; rest of canal apparently clear. Ordered ten grains of quinine.

December 4th.—Pass 17 f. easily, then 19 f., which was closely hugged.

6th.—Find the stricture at from one and a half to two inches composed of two firm bands close together; introduce small dilating urethrotome; expanded it to No. 28 f. with difficulty, on account of the great density of the strictures; draw the blade of the urethrotome through them from behind forward, and pass 26 f. conical sound readily down into the bladder. No. 26 f. bulb passes down to the membranous urethra and returns, without giving any positive evidence of further recontraction at any point. Patient took ten grains

quinine and then started for home, three miles distant, in the cars, with directions to keep quiet for the remainder of the day.

Two days subsequently (viz., December 8th) patient reports that there had been no hæmorrhage, no disturbance nor discomfort whatever following the operation, except slight smarting on urination; pass 25 and 26 f. conical sound with ease.

9th.—Patient calls to say that he had a smart chill, followed by fever and sweats, coming on about five hours after the introduction of the sound yesterday. Ordered five grains quinine to be taken three times a day.

12th.—Patient reports himself in good condition, having had no further trouble; a few drops of urine still exude from the perineal opening during micturition, but he passed *per urethram* a full and comfortable stream; 28 f. passes readily through the entire urethra.

15th.—Perineal incision completely closed; discharge quite gone; patient makes a full and satisfactory stream; repeat passage of 28 f.

22d.—Pass 28 f.; 29 f. attempted, but finds resistance from three inches increasing to four and a half; smart bleeding followed the withdrawal of 29 f. Ordered ten grains of quinine.

29th.—Patient reports that, on the morning following the passage of 28 f. and the partial passage of 29 f. at his last visit, he had a succession of severe chills, and bleeding with stoppage of water about half the length of the penis, after each urination; finally a clot was expelled, and he had no further trouble. To-day a very sensible contraction is found at three inches, which permits only the passage of 23 f.

January 8th.—Examination with bulbous sound No. 24 finds a recontraction at one and a half inch; one at two and an one-eighth, which arrests it; 17 f. only will pass, and is held on return at three inches. After which 23 f. conical sound is passed through the urethra without force, and followed with ease by 24 f.

13th, 14th.—Defined recontraction at two and a half to two and three-quarter inches; pass 24 f. and 25 f. with ease; from this date up to the present no examination has been made, and the patient, who appreciates the fact that there are features of rare interest and value to our profession in his case,

has kindly consented to submit himself to an examination of his present condition in your presence.¹

It will be worth our while to pass in review some of the most salient points in this case, several of which seem to me to possess a rare interest and value.

First in order seems to be the occurrence of an extraordinary number of distinct strictures in the same urethra. One at the meatus, defined by bulbous sound No. 22 f.; one at one inch from the meatus, defined by bulbous sound No. 19 f.; one at two inches from the meatus, defined by bulbous sound No. 15 f.; one at three inches from the meatus, defined by bulbous sound No. 10 f.; six distinctly-recognized bands from three to four and one-half inches, No. 8 f.; one apparently extending from four and one-half to six and one-quarter inches, permitting the passage of only No. 1 f. to six and one-quarter inches, and from this to seven and one-half inches, hugging one-third closely; three bands distinctly arresting the blade of the urethrotome when passing from the perineal urethral opening backward through the membranous portion of the canal: this makes in the aggregate *fourteen strictures*, distinctly defined and recognized by each of the gentlemen present and assisting in the original operation.

In order to appreciate the rarity of this point in regard

¹ In order to facilitate the examination and to relieve the patient from the annoyance of repeated explorations, a committee, consisting of Prof. Alfred C. Post, Dr. James M. Minor, and Dr. L. De Forrest Woodruff, was appointed by the President of the Association to examine the case of Mr. —, presented by Dr. Otis. No. 17 f. bulbous sound was first carefully introduced by Prof. Post in passing it down the urethra; this was distinctly arrested at the points of stricture, at two and one-half and two and three-quarters, before mentioned, and also as distinctly defined on withdrawal of the instrument. The result was likewise confirmed by the remaining members of the committee. Dr. Otis then introduced, in full view of the Society and without force, No. 24 f. conical steel sound through the strictures and into the bladder, the patient asserting that not the least pain was occasioned by this procedure. The removal of No. 24 f. was immediately followed by No. 25 f. with the same ease and freedom from discomfort. The attention of the Society was then called by Dr. Otis to the interesting and important fact here demonstrated, that, while the bulbous sound No. 17 f. defined the strictures distinctly, No. 25 f. steel sound failed to give any evidence of their presence.

to multiple strictures, I will quote from a late edition of Sir Henry Thompson's work,¹ concerning the number of strictures found in a single urethra: "Occasionally," he remarks, "several separate strictures may be observed in the same subject. John Hunter records an instance where he met with *six* strictures in one urethra: Lallemand mentions one with *seven*. Colot saw one with *eight*. Ducamp says there are rarely more than two, but that he has seen *four* or *five*. Boyer thought that *three* could exist together. A case is reported by Leroy D'Etiolles in which he found *eleven*; "but," Sir Henry further remarks, "it is necessary to state that this number rests only on the evidence afforded by the passage of an exploratory bulbous bougie (that is, a small gum-elastic sound with an olive-shaped extremity two or three sizes larger than the stem) on the person of a *living* patient. . . . The strictures," Sir Henry says, "to use the author's words, '*were for the most part in the spongy portion, about two and one-quarter lines distant from each other,*'—"a condition," says Sir Henry, "which would perhaps be better described as *a series of irregular contractions* than by any statement of the exact number of the strictures. Rokitansky speaks of *four*, and does not record a higher number as having come under his own personal observation." . . . "My own researches," he further states, "have not led me to recognize numerous independent strictures in one urethra. *Three* or at most *four* distinct contractions I have seen, but such instances are very rare."

With the exception of M. Leroy D'Etiolles, Sir Henry Thompson does not inform us as to the methods of exploration in use by the various authorities he quotes—which, it seems to me, must greatly affect the value of their observations; and, in regard to the method of M. Leroy D'Etiolles, he casts an imputation of inaccuracy upon it by stating that the evidence of the existence of *eleven strictures* in a single urethra, which he claims to have demonstrated, rests *only* upon the evidence afforded by the bulbous sound; and, as if this were not sufficient to discredit the possibility of eleven strictures coincidentally existing in the same urethra, he says, *even if they were defined by the bulbous sound, that they were not strict-*

¹ "Strictures of the Urethra," London, 1869, p. 68.

ures at all, in his opinion, but simply "a series of irregular contractions" of the urethral calibre. John Hunter's statement that he met with *six* is accepted—even Colot's, who claimed to have seen *eight*; but M. Leroy D'Etiolles, who claims *eleven*, is not accepted as having recognized strictures, but has been deceived by *irregular urethral contractions*.

Why, it may be pertinently asked, with his acknowledged skill and great experience, has Sir Henry Thompson only been able to find *four* strictures in a single urethra, and is evidently slow to accept the occurrence of a greater number in the practice of other surgeons? A satisfactory explanation may be found on page 147 of Sir Henry's work on Strictures of the Urethra, where he gives directions for the exploration of the urethra with the view of ascertaining the presence or the absence of stricture. "In order to effect this object," he says, "a flexible bougie of medium size, that is, from No. 7 to 9 of the English scale (16 to 18 French), is to be used, while as to form, it should be *rather slightly curved, and blunt, not conical at the point*." . . . "Whatever the patient may say," he further remarks, "this rule is *always* to be adhered to. If a small instrument is employed, it might pass through the stricture without giving any sign of its existence, and so fail to detect it; but, *if a No. 8 bougie* (16 French) *passes easily into the bladder, we may be satisfied that no stricture or at most a very slight contraction only exists*."

"This bougie," he goes on to remark, "may be graduated in inches, for the purpose of noting at what distance from the external meatus obstruction is found." Accepting this to be the best method of ascertaining the locality and calibre of the urethral strictures (which I am very far from doing), I am only surprised that even Sir Henry was able to demonstrate the existence of *four* distinct strictures in a single urethra; and, if the same method was pursued by Hunter, Colot, Ducamp, and others, I am sure the number they claim was found in *post-mortem* examination; for I do not hesitate to say that, with a straight or curved bougie, with simply a blunt end, such as advised by Sir Henry, no living surgeon could demonstrate the existence of more than three or four strictures in any one urethra; and I will say, furthermore,

that such a method is *unreliable and imperfect for the diagnosis of even a single stricture*. Sir Benjamin Bell, who invented the ball-probe, was aware of this fact, and M. Leroy D'Etiolles, who modified this invaluable instrument—resulting in the flexible, olive-pointed bulbous bougie—was, through its use, enabled on the living subject to demonstrate the presence of *eleven* distinct strictures in the same urethra. Sir Henry Thompson distinctly states that, *if a No. 8 E. bougie (21 French) passes easily into the bladder, we may be satisfied that no stricture, or at most a very slight contraction, exists*. This teaching it seems to me of the *utmost importance to combat as erroneous, and leading to disastrous errors in the diagnosis and treatment of urethral stricture*. I am the more strongly impelled to take this position from the perusal of a recent *brochure* on strictures of the urethra by Dr. T. B. Curtis, and to whom, for this paper, the Civiale prize of two thousand francs was awarded during the past year. Dr. Curtis, the honored pupil of M. Guyon, of Hospital Necker, and of M. Voillemier, may be safely accepted as mirroring truthfully the views of the French school of urethral surgery at the present time. In this paper he remarks, in regard to the treatment of strictures by dilatation, page 46: “*The treatment shall be considered terminated when you shall have made to enter without effort No. 21. You will thus have restored to the canal the calibre of 7 millimetres (diameter), which represents the normal calibre of the canal of the urethra, which is more than sufficient for the purposes of micturition;*” and with infinite *naïveté* he goes on to say: “*But the mission of the conscientious surgeon is not yet terminated. Although he may have the right to send his patient away as cured, he ought not only to have restored the strictured urethra to a calibre which can suffice for the passage of urine; it is still his duty to put his patient in a position to give himself the consecutive treatment, without which all strictures, by whatever manner treated, will relapse almost infallibly.*”¹ We have here laid down, on the authority of both the English and the French schools, the exact capacity of the human male urethra. Sir Henry Thompson, representing the English urethral interest,

¹ The *Italics* are my own.—F. N. O.

states it to be No. 8 English, which is equivalent to No. 17 of the French scale. No stricture can be permitted in any urethra where the No. 8 English bougie finds easy passage. Dr. Curtis, as the laureate interne of the Hospital Necker, and the successful competitor for the two thousand francs prize of Civiale, in 1873, may well be accepted as representing the present status of urethral science in France; and he states, under the ægis of his distinguished masters, that the *normal calibre of the human male urethra is equal to 7 millimetres in diameter*; that, when a presenting urethra, the previous subject of strictures, more or less numerous or pronounced, shall have been brought by various kinds of dilatation, or divulsion, or incision, or what not, up to a calibre of 7 *millimetres in diameter*, "the conscientious surgeon" has a right to dismiss him as cured. How is it, then, with the poor unfortunates, who cannot conform their urethræ to the procrustean bed of the French and English schools, who find themselves in possession of urethræ, the calibre of which extends to the size of 8, 10, or 12 millimetres in diameter instead of 7; or 20, 22, and 24, of the English scale, instead of 8 or 9? Evidently the difference between the *established normal standard* and the figures just named (if they were within the range of possibility) *might* be occupied by stricture-tissue, which, although it might not be recognized by the No. 8 *blunt-ended bougie*, might nevertheless exist, and would inevitably be detected by a bulbous sound of a calibre corresponding with the size of this apparently extraordinary canal—*extraordinary*, if we are willing to admit the size of the meatus to be a sure indication of urethral calibre, without noting variations caused by congenital and pathological narrowings. A careful examination of several hundred urethræ, within the past twelve years, by means of the *metallic bulbous sound* (which I presented to the profession in 1861), has demonstrated to me that, while I have seen occasional extremes, varying from 20 to 40, the *average calibre of the male urethra is not less than 30* of the French scale, or 18 of the English scale; and that the great majority of strictures which are sources of grave annoyance, and call imperatively for treatment, are *above* what is set down by the French and English schools as worthy of

consideration. Within the past two years I have, in more than one hundred cases, recognized distinct bands of stricture in urethræ, where the English bougie of No. 8 and even the French of No. 21 could be readily passed down through them into the bladder *without giving the least evidence of contraction at any point*; and I have frequently demonstrated this fact not only in my clinique at the College of Physicians and Surgeons, but to a large number of my professional friends in my private practice.

On the 30th of December last I invited Dr. Bumstead, the distinguished author of "Bumstead on Venereal Diseases," to see a patient, fifty years of age, at my office, with a view of examining the calibre of his urethra. The flaccid organ was three inches in length from the meatus to the pubis, and three and a half inches in circumference midway of the organ. In Dr. Bumstead's presence I introduced into and through a *normal* meatus a metallic bulbous sound 32 millimetres in circumference, and then passed it down without the least force to the bulbo-membranous junction. Dr. Bumstead withdrew it, and pronounced the normal calibre of the urethra equal to 32 millimetres in circumference. I then introduced, in the same manner, bulbous sound No. 34; this also was introduced and withdrawn by Dr. Bumstead, with a similar result. The *normal* calibre of this particular organ was thus shown to be 34 millimetres.

On Saturday evening, January 10, 1874, I invited Dr. Gurdon Buck and Prof. Thomas M. Markoe to examine with me the urethra of a patient, twenty-four years of age, who had never been the subject of gradual dilatation, but who had been operated on by me with the (my) dilating urethrotome for three strictures in the straight portion of the canal. The meatus, which was originally contracted to 24 f., had been incised two months previously. The length of the flaccid organ was four inches; the circumference, midway of its length, was four inches. In the presence of these distinguished surgeons I introduced No. 36 f. bulbous sound down to the bulbo-membranous junction. This procedure was repeated by Drs. Markoe and Buck in turn, and the urethra was recognized by them as possessing the *normal calibre of 36 millimetres in circumfer-*

ence. Previously to this trial I had announced the presence of an abnormal contraction at one and a half inch from the meatus, which was detected by the No. 36 bulb on the morning of the same day. Neither Dr. Buck, Dr. Markoe, nor myself, was able to distinguish this alleged contraction. Taking the ground that the introduction of the sound in the morning had made the contraction less salient, I took the bulbous sound next in size, which (through a mistake on the part of Tiemann & Co.) had been made of a circumference of 40 f. instead of 37 f. I pressed it gently against the orifice for a minute, when it entered and passed readily down to one and a half inch, when it was arrested firmly by the contraction before alluded to. Dr. F. D. Sturges and Dr. J. Deforest Woodruff had verified with me the passage of No. 34 f. bulbous sound in the same case a few days previous.

Do you ask, of what value is the recognition of urethræ of such enormous calibre as those just cited? Simply, I answer, to demonstrate the *absurdity of fixing, upon the dictum of any man or school, a standard calibre for the human male urethra; to show the necessity of making every urethra a law unto itself*, and to enable the surgeon to judge of the greater or less degree of contraction, in any given urethra, *by the normal calibre of that individual urethra*, as ascertained by interior measurement. In the case presented to you to-night, is it for a moment supposed that his fourteen strictures, ranging from No. 22 f. to one-half of a millimetre in circumference, and extending from his meatus to the prostatic portion of the urethra, came without indication or warning, until the passage of urine was interfered with?

From his original gonorrhœa, contracted more than twelve years ago, up to the time of his first trouble of micturition, five years ago, he was scarcely free from a chronic urethral discharge, and any surgeon, previous to that time, and subsequent to the inflammatory condition which initiated the trouble, with proper instrumental means, and sufficient intelligence, could have demonstrated the presence of stricture, and by a suitable treatment could have arrested the contractile urethral disease in its inception. His gleet was treated by internal remedies and injections: as well have attempted to remove a ligature

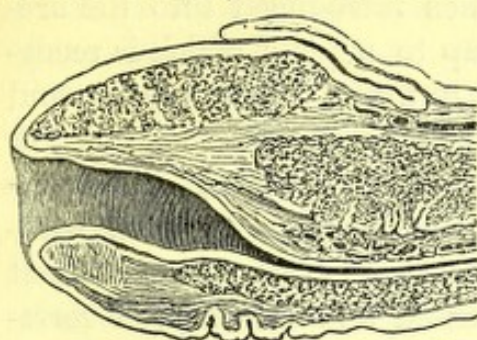
tied *around* his penis, by internal remedies and injections, as to essay the cure of an *internal* cord, the result of inflammatory deposit in the urethral walls. Chronic urethral discharge, commonly called gleet, is the signal which Nature hangs out to notify the intelligent surgeon that an obstruction to the normal working of the muscular apparatus of the urethra has occurred; that plastic material, laid down in the antecedent inflammatory condition, has begun to contract the normal urethral calibre, whether it be 20 or 40 millimetres in circumference, and that nothing short of a complete restoration of the normal calibre of the canal will afford a permanent cure. Sandal-oil may stop it for a time; injections of innumerable variety may, any one of them, temporarily remove it; but a little vinous or venereal excess will reproduce it, and thus the case goes on; getting, as many such cases will affirm, *a new clap for every woman they look at*, until finally an attack of *retention of urine* calls attention to the fact that the patient has strictured urethra.

One of the chief stumbling-blocks in the way of the surgeon in recognizing urethral stricture is the contracted meatus. Authorities concur, as a rule, in asserting that the meatus is the *narrowest portion of the urethral canal*, and yet this is usually accepted as a *test* of its calibre. This opening is subject to great natural variations, in organs of about the same general proportions. The well-developed penis, in a dozen cases, may vary in regard to the size of the congenital meatus, from the calibre of No. 8 or 9 millimetres in circumference, to 32 f. or 34 f. It is important to recognize the fact that the meatus bears, necessarily, *no* proportion to the actual size of the urethra. If symptoms of stricture are present, such as *persistent urethral discharge, etc.*, or if any chronic irritation of the genito-urinary apparatus present, the meatus should be freely incised, and a thorough examination of the canal with the bulbous sounds should be made.

The normal meatus urinarius is well represented by Henle,¹ who has been more minute and definite in his anatomical researches in regard to it than any anatomical authority with which I am familiar. Thus, as the accompanying plate rep-

¹ "Handbuch der systematischen Anatomie des Menschen," von Dr. J. Henle, p. 417.

resents, there is no abrupt enlargement after passing the external border, such as is seen in the usual representations of

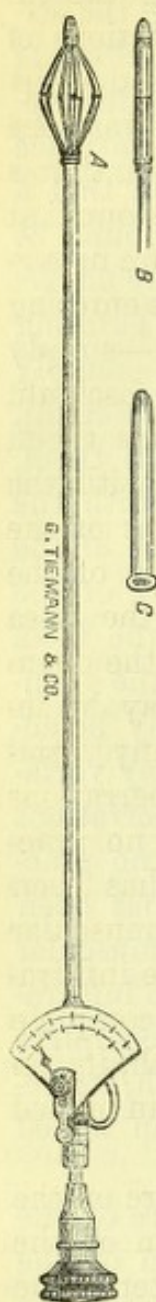


Vertical Section of the Anterior Portion of the Penis.

the urethra, and in his description he is entirely at variance with those who claim that a sort of sphincter is found at the meatus. There are no *circular* muscular fibres entering into its composition—simply horizontal muscular fasciculi, or plates, as he terms them, which surround the opening, and are continuous with the muscular structure of the urethra. Vertical sections of the penis from the junction of the glans with the body of the penis show a nearly uniform calibre throughout the fossa navicularis, to its external boundary at the meatus, the opening of which is of corresponding calibre. This may be accepted as the normal condition of these parts, and any variations from such uniformity may be considered aberrations from the normal condition. These are, as a rule, of no practical importance, unless the tissue composing them has been invaded by inflammatory action; in which case the muscular layer being disabled, to greater or less extent, by the infiltration of plastic material, its office of aiding in the complete emptying the urethra of urine being interfered with, its retention and subsequent decomposition may prove an added source of irritation.

In order to gain a definite knowledge of the calibre of the urethral canal, in cases with or without contraction of the meatus, I have devised an instrument which I term the *urethra-metre*, or dilating bulbous sound, which I now present.

It consists of a small, straight canula, size No. 8 f., terminating in a series of short metallic arms, hinged upon the canula, and upon each other. At the distal extremity where they unite, a fine rod, running through the canula, is inserted. This rod (which is worked by a stationary screw at the handle of the instrument), when retracted, expands the arms into a bulb-like shape, 10 millimetres in circumference when closed, and capable of expansion up to 40 millimetres. A thin rubber stall (Fig. C), drawn over the end of the closed instrument,



Urethra-metre.

protects the urethra from injury, and prevents the access of the urethral secretions to the interior of the instrument. When introduced into the urethra and expanded up to a point which is recognized by the patient as filling it completely—and yet is easily moved back and forth—the index at the handle will then show the normal circumference of the urethra under examination. In withdrawing the instrument, contractions at any point may be exactly measured and any want of correspondence between the calibre of the canal and the external orifice be readily appreciated. Among the advantages to be claimed for this instrument are: 1. Its capacity to measure the size of the urethra and to ascertain the locality and size of any strictures present, *without reference to the size of the meatus*. 2. It enables the surgeon to complete the examination of several presenting strictures by a single introduction of the instrument, and by reduction of its size avoid the irritation which usually attends the withdrawal of the ordinary bougie or bulbous sound.

Returning to the case of aggravated multiple stricture above related, it will have been observed that, notwithstanding the easy passage of a No. 31 solid steel sound, through the entire urethra, after the operation, there was an *immediate tendency to recontraction*; that within a comparatively short period, the presence of stricture was again definitely recognized. I do not call your attention to this important fact on account of its novelty, for every surgeon of experience has too frequently observed it; and every writer on stricture has recorded it in terms the most emphatic; some even going so far as to state, as does Mr. Wade¹ (quoting the illustrious Dupuytren), that, “whatever care may be taken in the dilatation of strictures, *the dilatation is but temporary in the greatest number of persons, and the contraction has always a tendency to return.*” Sir Benjamin Brodie says (*op. cit.*): “After a patient has conceived

¹ Wade on “Stricture of the Urethra,” London, 1860, p. 352.

himself to be cured and every symptom of the disease vanished, it is not an uncommon thing for him to suffer a relapse, and in all probability a relapse of far greater danger than the previous attack. . . . From what," he asks, "does this arise? From his not continuing," says Sir Benjamin, "at regular intervals, to pass an instrument (sound) notwithstanding the disease should seem to have disappeared. To pass it once in two or three weeks is enough, but *it must never be thrown aside as useless, during the lifetime of the patient, if he desires to be freed from his troublesome affection.*"

Dr. T. B. Curtis, in his prize Essay previously quoted as representing the views of the leading French surgeons, says, page 46, "*All strictures, by whatever manner treated, and in appearance cured, will relapse almost infallibly.*"

It is, however, an accepted fact that a certain but *very limited* proportion of strictures are permanently cured by each of the various methods—dilatation, division, divulsion. We may again ask, with Sir Benjamin Brodie, from what does *this* arise? The answer is, simply, that, *to prevent the return of stricture after operation, the stricture must first have been thoroughly sundered at some point*—that those strictures which have been *permanently cured* (and in this number I do not include those facetiously termed *cured*, where the patient is obliged to use or have used a sound every two weeks for the balance of his life, but those that never reappear after operation) have been so sundered, either by rupture through dilatation more or less rapid, by divulsion, or division. The reason why the treatment of stricture after the usual methods is imperfect—that there is always a tendency of the stricture to return—arises from the fact that, as in the case cited, the strictures were not *completely sundered* at any point—that they were *distended*, not *completely divided*. All urethral strictures are composed of elastic tissue, and any operative procedure that falls short of *complete* division of the constricting band *can never produce more than temporary results*. As long as No. 8 of the English and No. 21 of the French scales are accepted as representing the *normal* calibre of the human male urethra, and as long as *curative* treatment ceases when this calibre has been reached, there will never be *radical, permanent cure of urethral stricture*. Sooner or later, how-

ever, it is certain to be accepted that urethræ vary in size in different individuals just as widely as any other constituent portions of the human body, and that, consequently, stricture of the urethra is a *relative term*; that, while No. 8 bougie English or No. 21 French will determine the presence or absence of stricture in a urethra of corresponding calibre, it fails to recognize stricture in urethræ of larger size and which has been positively demonstrated in certain cases to reach as high as 36 or even 40 millimetres in circumference; and that, *complete* division of stricture, *of whatever calibre*, having been accomplished, *recontraction may be prevented*, and that, thus, strictured urethræ can, by appropriate treatment, be with certainty restored to their normal dimensions, without fear of subsequent recontraction.

This I do not assert unadvisedly or rashly, as the records of more than fifty cases, occurring in my own experience, will demonstrate. Several of these cases, in which five and six strictures were present two years ago, and then thoroughly divided, have been carefully examined by me, within the last month, and can be shown to-day, free from the *slightest evidence of recontraction*. This goes far to prove that complete division of stricture, with appropriate after-treatment, will give complete immunity from recontraction. The results of operations with the *dilating* urethrotome, presented by me to the profession at a meeting of the New York Medical Journal Association more than a year ago, have remained permanent; that is to say, *that the strictures operated on, having been thoroughly divided, were afterward completely absorbed*. These results were subsequently published in the NEW YORK MEDICAL JOURNAL of March, 1873. One of the cases (Case III.) there reported, presenting originally five distinct strictures, including one at the meatus—defined by 24 f.—was operated on in January, 1872, and the completeness of the operation was demonstrated by the passage of a 30 f. bulbous sound through the urethra, and was withdrawn without giving evidence of the slightest obstruction at any point. This was one of four cases (comprising operations on eighteen bands of stricture) critically examined in February, 1873, by a committee of surgeons composed of Dr. Henry B. Sands, Dr. J. W. S. Gouley, Dr. Robert F.

Weir, Dr. Thomas T. Sabine, and Dr. Frederick D. Sturgis, of New York, and Dr. Frederic D. Lente, of Cold Spring, N. Y., with the 30 f. bulbous sound at first, and subsequently with 31 f., *without being able to detect any contraction, at any point, in any one of the presenting urethræ*. I am able to afford this Society further proof of the absolute absorption of the above-mentioned strictures, by presenting this case (No. III.) to you for a reëxamination to-night, more than two years subsequent to the operation, in which five distinct strictures were completely divided. In the case of multiple stricture presented, it will be remembered that while 25 f. solid steel sound was easily passed through the urethra without detecting any stricture, No. 18 f. bulbous sound was arrested at the stricture-points. I propose, therefore, in order to put the crucial test to this case, to examine the urethra with No. 30 *bulbous sound*. This, you now observe, passes readily and easily through the urethra, and is withdrawn without the slightest retention at any point.

I now pass the case over to your committee for the verification of my examination. (Drs. Post, Minor, and Woodruff, having confirmed fully the absence of stricture by introduction and withdrawal of the bulbous sound No. 30, and so reported to the Association, Dr. Otis resumed.) In order to show more fully the complete absorption of the stricture-tissue in this case, I now take a larger bulb than has at any time been used. The urethra, when free from stricture, is very distensible, and hence, by a little pressure, will admit an instrument above the normal calibre. Thus, as you see, this larger bulb, pressed firmly, not violently, against the meatus, now enters and passes without perceptible difficulty through the urethra. The size of this bulb is 34 millimetres in circumference.

In closing this somewhat desultory paper, I would like to be distinctly understood as claiming, that stricture, as ordinarily met with, is *absolutely within the reach of curative measures*; that, if completely divided, and this division maintained by suitable means until healing of the parts has occurred, no *recontraction* can ever take place; that dilatation, temporary or permanent, is *never more than a palliative measure*, unless carried to a point sufficient to *completely rupture the stricture*; that the division of stricture is not more hazardous, to say the least, than permanent dilatation—

that is, by introduction of dilating instruments, which are required to remain *in situ* for hours or days—or than rapid dilatation, which requires instruments of increasing sizes to be introduced at one sitting; and I may venture to say scarcely more likely to produce trouble than temporary or transient dilatation, as usually practised by surgeons, which is simply to pass a sound or bougie gently through the urethra, and to be immediately withdrawn; the same to be reintroduced, at intervals of two or three days or weeks, for the rest of the natural life of the unfortunate patient. I will here call your attention to a point in the history of Mr. W. C. H., whose numerous strictures have been presented to you this evening, which, in relation to the foregoing *résumé*, it seems to me is very instructive; viz., that his urethral chills, occurring on two occasions during the progress of the case, each time followed the easy and gentle introduction of a No. 29 f. steel sound; while the *division* of stricture was not followed, in either instance, by any such untoward result. This gives me an opportunity to state that, in nearly two hundred operations with the dilating urethrotome,¹ performed by me on urethral strictures, chiefly in the straight portion of the urethral canal, within the past two years; beyond four troublesome but not serious cases of after-hæmorrhage, I have met with scarcely an untoward result. Slight chills have occurred in but six cases, and these were all associated with operations upon strictures in the curved portion of the canal.

Among the inferences to be drawn from the foregoing cases and remarks are, first, that stricture may be present before difficulty in urinating occurs; second, that it is always present when *gleet* is present—that *gleet, as a rule, means stricture*; third, that dilatation of strictures is, at best, but a temporary expedient; valuable in close stricture, where urination is interfered with, and the stricture is too close for the introduction of instruments for completely dividing it; but that dilatation is not only without permanent value, except in such cases, but that *it is pernicious*, inasmuch as, while it is never curative, it takes the place of curative measures; fourth, that nothing short of complete division of strictures can ever result in radical cure.

¹ An instrument which first dilates the stricture, and then divides it; first presented by me to this Society early in 1872.