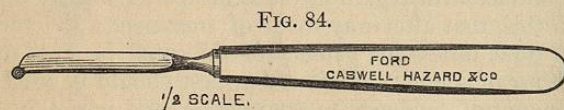


is always to be made downwards, or on the floor of the urethra, and the enlarged opening to be subsequently tested with a *bougie à boule* to ascertain if it be of sufficient size.

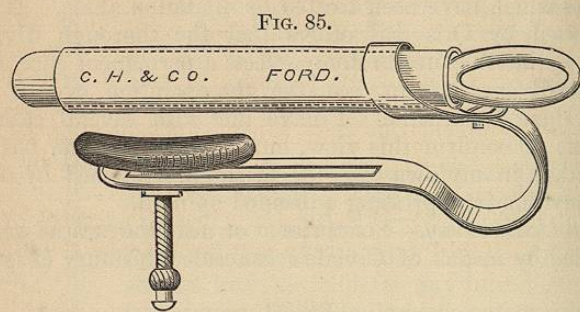
In practicing this operation, which I fear is becoming more common than is necessary, there are two points desirable to be borne in mind. On the one hand the operation must be done thoroughly in order to be efficacious. If the meatus or stricture is merely nicked,



the operation will have to be repeated, and, again, patency of the opening must be secured by the passage of instruments every day or two until the wound has healed.

On the other hand, great care should be used not to convert the meatus into a hypospadias, a result which is excessively annoying to patients and which is often followed by a persistent, nodular induration at the inferior edge of the cut.

In order to prevent hæmorrhage it is well to stuff the wound with styptic cotton, which may be allowed to remain until it comes away



Dick's sonde-tourniquet.

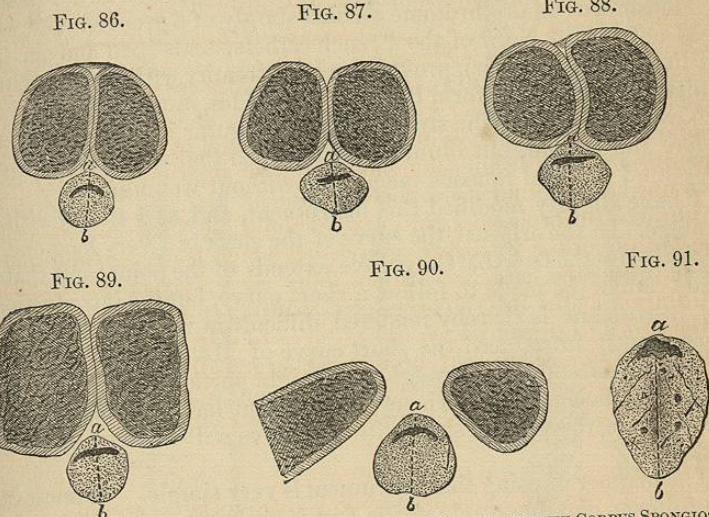
spontaneously and the urine is readily discharged above it. Should hæmorrhage, however, occur, it is in a situation where it may usually be readily controlled by pressure or by ice. Dr. Henry Dick<sup>1</sup> has invented an ingenious *Sonde-tourniquet* for this purpose (Fig. 85).

This instrument consists of a urethral canula, containing a plug which is to be withdrawn on the passage of the urine, and a screw-pad to effect compression on the external surface of the corpus spongiosum.

In incising strictures further removed than those in the immediate neighborhood of the meatus, the question arises whether the cut had better be made downwards or upwards. Each method

<sup>1</sup> Subcutaneous and Other Methods of Dividing Strictures of the Urethra, London, 1878.

has had its advocates and instruments have been made accordingly. Reasoning from the anatomy of the parts, there is less danger of hæmorrhage when the cut is made upwards, since the amount of vascular tissue of the corpus spongiosum overlying is much less than that underlying the urethra. The accompanying wood-cuts, for which I am indebted to the kindness of Professor R. F. Weir, exhibit sections of the penis, at various distances from the glans.



SECTIONS OF THE PENIS, SHOWING THE POSITION OF THE URETHRA IN THE CORPUS SPONGIOSUM BETWEEN THE GLANS AND THE TRIANGULAR LIGAMENT.

FIG. 86, m. 0.010 below base of glans.  
 FIG. 87, m. 0.035 " " "  
 FIG. 88, m. 0.065 " " "  
 FIGS. 89, 90, 91, from the beginning of the end of bulbous portion of urethra to near beginning of prostatic portion, i. e., to where the overlying corpus spongiosum ends.  
 Lines a, b, sections of the corpus spongiosum, showing the relations of the urethra to the erectile tissue.

They represent the average of the appearances presented in sections of five penes, frozen in ice, or with gelatine injected into the spongy tissue of the three corpora.

Figs. 86 to 91 show how much greater is the thickness of the vascular tissue of the corpus spongiosum upon the floor than the roof of the urethra. The last one (Fig. 91) represents a section at the extreme limit of the bulb where it rests against the triangular ligament, and corresponds above to the membranous urethra. It would here appear that the danger from a section upwards, as we reach the bulbo-membranous junction, is almost nil. It is true that in the triangle, formed by the junction of the three corpora, two or three veins are found which might possibly be opened in a large upward section, but the hæmorrhage from them could easily be controlled. Since there are no arguments, so far as I am aware, in favor of a downward section, I believe the above considerations should prevail, and lead us

to make the section upwards in the median line in all urethrotomies posterior to the meatus and fossa.

The instruments invented for internal urethrotomy are legion in number, and we have no intention even to mention others than those we can best recommend. We believe that for all ordinary cases, likely to be met with in practice, two will be found sufficient, viz.: Maisonneuve's urethrotome for tight strictures; Professor Otis's dilating urethrotome for such strictures of larger calibre as will admit its shaft.

Maisonneuve's urethrotome consists simply of a grooved staff, which need not exceed No. 7 of the French catheter scale (two and one-third millimeters in diameter), provided at its extremity with a screw-point, to which is attached a filiform bougie. The blades, intended to slide in the groove and to divide the stricture, are triangular in shape, sharpened before and behind, but blunt at the apex, so that they may pass over the sound urethral mucous membrane without wounding it.

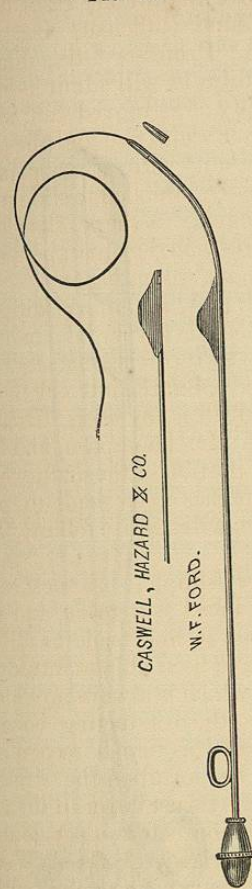
I have slightly modified this instrument, and, as I think, with advantage. In the original, the curve of the shaft is a very long one, necessitated by the fact that the groove extends to the point, and that the blade cannot be made to follow a short curve, but the introduction of the instrument is thereby rendered difficult in many cases. I have consequently introduced the short curve of Mr. Thompson, and had the groove extend only through the straight portion of the shaft, which is quite sufficient, since, whenever the point has been made to pass the stricture, the straight shaft with its groove will readily follow. (See Fig. 92.)

The manner of using this instrument is very simple. In most cases the filiform, flexible conductor is first introduced as a guide, and the shaft of the instrument is then screwed upon it, and made to follow it into the bladder. In many instances, I have been able to introduce the shaft alone, armed with the blunt point, which is always provided, when I have found it impossible to pass the conducting bougie. In either case, when the bladder is fairly entered, as may be recognized by the finger in the rectum, the penis is to be put upon the stretch, and the blade, usually the largest in the set, is thrust down to the extremity of the groove, dividing every obstruction before it. A double incision of the stricture is often made by my friend, Professor Weir, by rotating more or less the shaft of the instrument before withdrawing the blade, which then cuts the stricture at a different point as it comes out. The blade is now withdrawn, the bladder emptied of urine by the catheter, and other measures adopted which have already been mentioned.

M. Voillemier objects to Maisonneuve's instrument on the ground that it is liable to wound the healthy mucous membrane, and instances the case of a patient who died of cholera shortly after the operation, and in whom the urethra was found to be incised from the meatus to the bladder. He proposes to remedy this difficulty by means of a shield which covers the blade in its passage through the healthy urethra, and which can be withdrawn as soon as the stric-

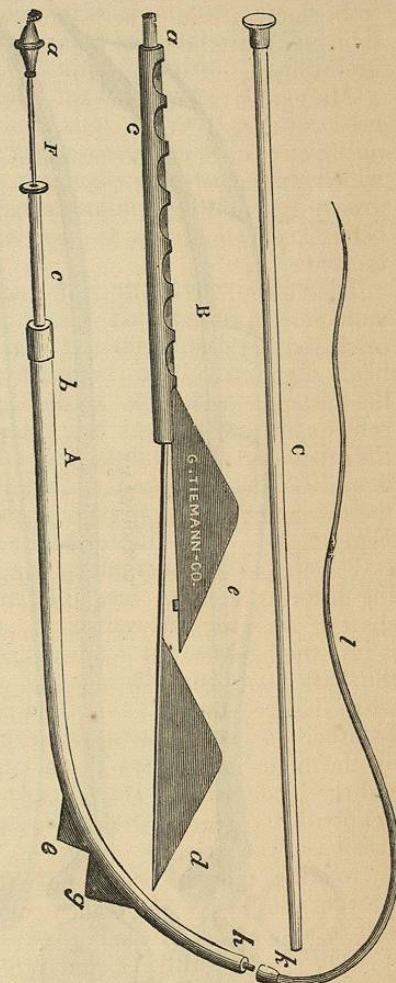
ture is encountered. I have used Maisonneuve's instrument in a large number of cases, and have had no reason to believe that, when properly made, it is open to the objection urged; moreover, on trial

FIG. 92.



Maisonneuve's urethrotome modified.

FIG. 93.



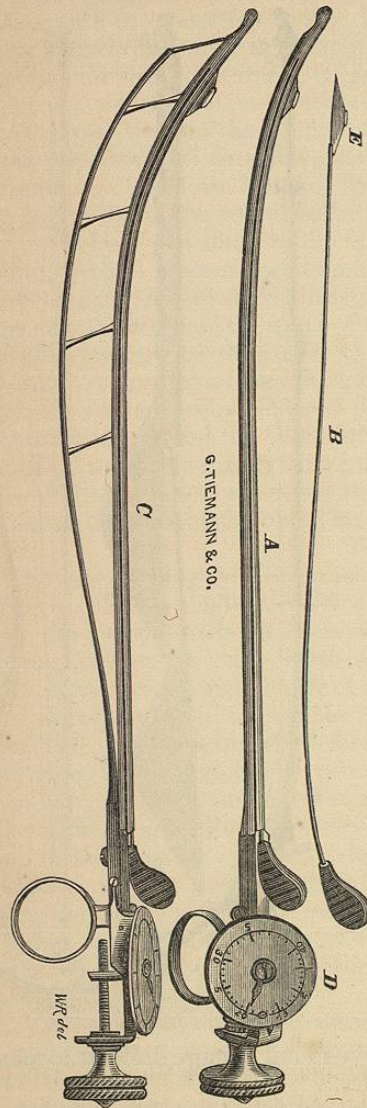
Voillemier's urethrotome.

of Voillemier's instrument, I have found it more difficult to manage, and very liable to get out of order.

Professor Otis has produced several dilating urethrotomes, known by instrument-makers as Nos. 1, 2, 3, and 4. Woodcuts of Nos. 3 and 4, the one curved and the other straight, are here given. The latter is sufficient, as the instrument should only be used in the

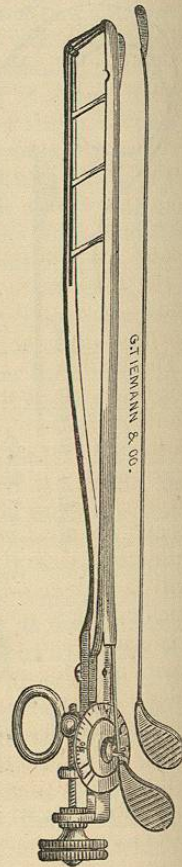
straight portion of the urethra. These instruments consist of a pair of steel shafts connected together by short pivotal bars, on the plan of an ordinary parallel ruler. They are separated by means of a

FIG. 94.



Otis's dilating urethrotome, No. 3.

FIG. 95.



Otis's dilating urethrotome, No. 4.

screw at the handle, near which is a dial indicating the extent of their divergence. The upper bar of the instrument is traversed by a ure-

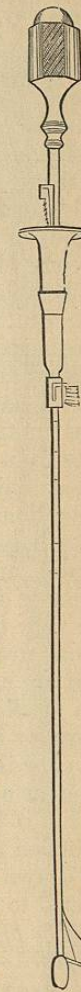
throtome, terminating in a thin, narrow, spring blade, which, when at the extremity of the groove in which it runs, is concealed in a slot. The instrument, with its contained urethrotome, having been passed down beyond the site of the stricture, and dilated until the stricture is made tense, the handle of the urethrotome is withdrawn, causing the blade to rise from the depression in which it was concealed, and the stricture is divided upon its upper wall from behind forwards. The advantages claimed by its inventor for this instrument are: that it attacks a tense instead of a flaccid stricture; that its incisions are made at a predetermined point, depth, and extent; that it is especially adapted to strictures of large calibre; and that it combines great strength with ease of manipulation—all of which I have found to be true.

Civiale's urethrotome was, for a long time, the favorite one, and is still preferred by Sir Henry Thompson. A glance at the accompanying cut will be sufficient to understand its construction. The terminal bulb, in which the blade is concealed, equals about No. 16 or 17 (about 7 or 8, of the English scale), and hence the instrument cannot be used when the passage is of less size. The blade cuts from behind forwards, and either above or below the canal, as the operator may prefer.

I cannot close these remarks upon internal urethrotomy, without expressing the opinion that the tendency of the present day is to underrate the skill and experience required for its performance, to undervalue its dangers and inconvenience to the patient, and to resort to it with unnecessary frequency. It may not require such skill as is demanded for the extraction of cataract, and which ought to delegate that operation exclusively to specialists, but it requires an amount of care, skill, and experience, not possessed by every practitioner of medicine, or every man calling himself a surgeon. I will quote a case in point:

Mr. A., aged 38, was operated on by Dr. X., a surgeon of this city, at the latter's office for three strictures, situated respectively at one inch, two inches, and four inches from the meatus. Maisonneuve's urethrotome, with the blade cutting *downwards*, and provided with a guide, was employed. The first and second strictures were cut easily, but the last with difficulty and with the use of some force. Considerable hæmorrhage followed immediately upon the operation, and, on the following day, Dr. X. was summoned to patient's house. He had had a chill, was al-

FIG. 96.



Civiale's urethrotome.

<sup>1</sup> Otis, op. cit., p. 37.

most pulseless, and in such collapse that it was thought he would die that night. The scrotum and penis were much swollen, and incisions made into these parts gave issue to a bloody fluid, which was evidently mostly urine. At the end of a week sloughing began, and progressed until the anterior surface of the scrotum had come away, together with the under surface of the penis from the base of the frænum to the peno-scrotal angle, exposing the urethra to this extent, its upper wall alone remaining. The patient finally recovered, and was relieved of his hypospadias in one of our hospitals by means of several plastic operations. In this case it is probable that the steel shaft of the instrument did not follow the guide, and was thrust through the urethral wall.

This operation is also not free from danger to life, although this depends in a great measure upon the seat of its performance. Those surgeons who limit it to the first two or three inches of the urethra may be able to report a large number of cases without a single fatal result, but, if this limit be exceeded, deaths will often follow as a consequence, even when great caution has been used; and instances of this kind are every little while coming to our knowledge in a quiet way. I have myself lost two patients from septicæmia following internal urethrotomy for strictures situated about four and one-half inches from the meatus, the one occurring four days and the other fourteen days after the operation.

The minor evils liable to follow the operation, as urethral fever, hæmorrhage, incurvation of the penis, etc., are by no means inconsiderable, and will receive attention in the section on the Consequences of Operations on Stricture.

In view of the above considerations, the surgeon may well avoid internal urethrotomy, unless decidedly called for, and when other means are unavailable. Knowing what I do of the operation, if I had a marked and annoying stricture in the anterior portion of the urethra, or if I had an obstinate gleet which no other means would relieve, or if I were the subject of one of those tormenting neuralgias dependent upon stricture *that we read of*, I would have my stricture cut; but if I had only a "stricture of large calibre," presenting no obstruction to the urine, and occasioning no inconvenience, no argument drawn from possible ills in the future could persuade me to be subjected to the knife, and—*what a surgeon would not have done to himself he has no right to recommend to others!*

*Rupture.*—Of late years, the rupture of stricture, which was formerly advocated by Perrève, has become quite generally known, chiefly through the labors of Mr. Holt, of the Westminster Hospital, London.

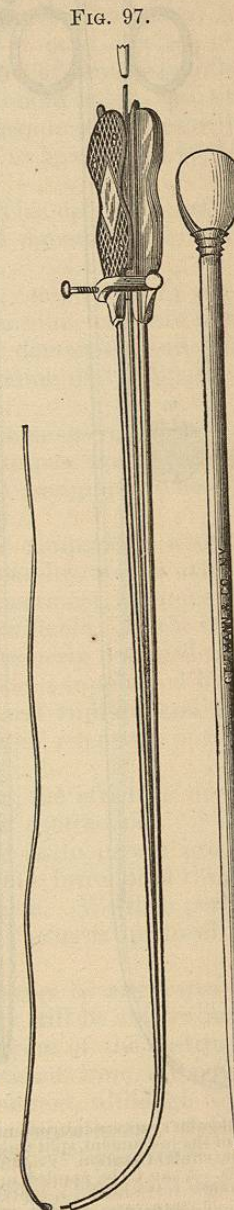
Mr. Holt's instrument, a modification of that of Perrève, "consists of two grooved blades fixed in a divided handle, and containing between them a wire welded to their points, and on this wire a tube (which, when introduced between the blades, corresponds to the natural calibre of the urethra) is quickly passed, and thus ruptures or splits the obstruction."

The instrument, as originally proposed by Mr. Holt, possessed certain defects which I have endeavored to remove. It was evident to

others as well as myself, that the expansive power of the instrument was insufficient; that even when the largest tube of the set was employed, there were some strictures which would merely stretch as it passed, without being ruptured, and which would afterwards show the marked tendency to re-contraction which always follows rapid dilatation. The remedy for this was evident,—to allow wider separation of the blades, and to be supplied with larger tubes, one of which, after slitting up the meatus, could be selected corresponding in size, not to the external orifice, as Mr. Holt advises, but to the calibre of the spongy portion of the urethra.

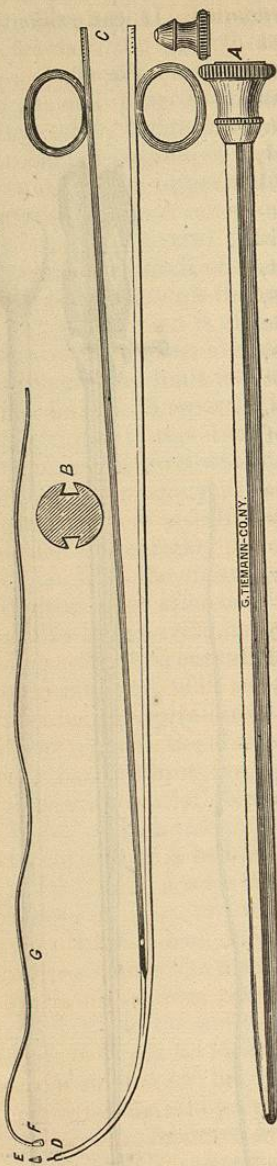
The other changes which I have introduced consist in having the point of the instrument at a right angle to the shaft, following Mr. Thompson's curve, with a view of facilitating its introduction, and in adding a filiform attachment to serve as a guide for the shaft which is equal in calibre to No. 11 (three and two-thirds millimeters in diameter). As previously stated the bougie-attachments are also made to fit other urethral instruments employed for incision, etc., so that the choice of the operation is still open after the guide has passed the obstruction. The instrument thus modified is represented in Fig. 97. I do not think anything is gained by having the central wire hollow, as the capacity of tube thus formed is too small to allow of the passage of the urine, and the instrument ought not to be in the hands of any one who has not other means of judging whether he has entered the bladder or not. The instrument may, of course, be used without the bougie-attachment, its screw-point being protected with a cap provided for the purpose.

In using this instrument the shaft should be passed fairly through the stricture, so that the latter may feel the full force of the rupturing tube. The point of the tube selected is then to be placed upon the wire



Author's modification of Mr. Holt's instrument.

FIG. 98.



Voillemier's rupture-instrument. D C, shaft of the instrument, split throughout the straight portion. F G, filiform bougie. E, cap to be applied in case the bougie is not used. A, rupturing-tube. B, transverse section of the same, showing the grooves for the reception of the blades of the shaft.

between the blades, and to be thrust down *as rapidly as possible* to the end, in order to insure rupture and not mere dilatation of the contraction. Before withdrawing the instrument it is to be rotated so as to separate still further the sides of the rent.

Mr. Holt believes that by this method the mucous membrane of the urethra "is not torn but simply dilated, and the submucous deposit, the cause of the obstruction, is *alone split*, hence the trifling hæmorrhage and the impossibility of infiltration of urine." I entertain doubts of the correctness of this view, and the lining membrane of the canal has certainly been found to be lacerated in several instances of post-mortem examination; but, however that may be, this is one of our best means for the treatment of certain strictures.

Voillemier's rupture-instrument may also be recommended. I have had the tubes made larger than in the original instrument; my largest tube equals No. 29, and the smallest No. 25 of the French scale.

The instrument appears to possess one decided advantage over Mr. Holt's. The tube, instead of sliding upon a central wire between the blades, is provided with grooves on either side for the blades to play in, and thus, as shown in the cut, a transverse section of the instrument is circular instead of oval, and the rupturing force is spent equally upon the whole circumference of the canal.

As previously stated, rupture is adapted to such strictures of the subpubic portion of the canal, as are too irritable to admit of dilatation, or which exhibit a strong tendency to recontraction. It may also be used to advantage in cases of retention of urine dependent upon strictures in this situation, when fortunately an instrument, either preceded or not by a guide, can be passed through the obstruction.

CAUSTICS.—Caustics in the treatment of stricture have been superseded to such an extent by other and more valuable means, that they have at present but few advocates, and I would fully indorse the following opinion of them expressed by Sir Henry Thompson: "I consider the application of nitrate of silver or of caustic potash to a permeable stricture to be unnecessary as a means of cure, since other and better modes of treatment for such contractions exist; and that 'impermeability,' so called, is a condition always to be overcome by the careful use of simple instruments, and not to be attacked by any caustic or escharotic agents whatever."

EXTERNAL PERINEAL URETHROTOMY.—This operation may be required or deemed advisable under several circumstances, which may be stated in a few words.

1. In cases of impassable or tight stricture, complicated by retention or infiltration of urine or by abscess, immediate recourse to external perineal urethrotomy is often urgently demanded, and offers the best if not the only chance for the preservation of the life of the patient.

2. Under less pressing circumstances, the same operation may be required when repeated attempts have failed to pass the obstruction, when the stricture is extensive and of traumatic origin, or when numerous fistulous passages exist.

Such instances are, however, but few in comparison with the whole number of strictures met with, and the employment of external perineal urethrotomy as a general method of treatment, recommended by the late Mr. Syme, cannot be considered justifiable. Great irritability and resilience of the contraction were formerly regarded as indications for its use, but, in such cases, it has been supplanted by the improved methods of internal urethrotomy and rupture, and these will also be found sufficient in some instances of retention, in which perineal section was formerly resorted to.

At the time of performing this operation, the stricture may be found to present either one of three degrees of contraction:

1. It may be sufficiently patent to enable us to pass a grooved sound, which will serve as a guide to the knife introduced through the perinæum in its division of the obstruction. We then perform what is often called "Syme's operation," or "external perineal urethrotomy with a guide."

2. Failing in our attempts to pass the stricture by any instrument inserted through the natural channel, we may still be able to accomplish the same, after opening the urethra in front of the obstruction, and thus still avail ourselves of a guide passed from the perineal incision through the contraction. This method, although by no means new, has been perfected by Mr. C. G. Wheelhouse, of Leeds, and is called by English surgeons "Wheelhouse's operation."

3. Finally, neither of the above attempts having succeeded, the only recourse left is to open the urethra posterior to the stricture, which possibly may then be passed from behind forwards; or, in other instances,