

urethra, where repair begins stricture commences. It may not manifest itself by retention, or, indeed, by any symptom which the patient observes for four months or for several years, but it is there none the less.

If the injury has been slight, or the canal only partly involved, no appreciable symptom may occur for years (ten or twelve), as when boys have been kicked at school, have fallen on a fence, or been thrown upon the pommel of a saddle. The point of importance is this: traumatic stricture comes early because the violence causing it is greater (usually) than the violence of simple inflammation of the urethra. Let the violence be trifling, and the interval may be exceedingly long.

With this understanding, then, the deductions to be drawn from the above statistics are confirmed by daily observation: namely, that the symptoms of stricture appear earlier after a traumatism than after gonorrhœa, the date of their appearance measurably proportionate to the extent of the injury, and that the greatest divergence is noticeable after gonorrhœa. It is totally exceptional, however, for symptoms of organic stricture to come on "immediately after or during the attack" of gonorrhœa—as Thompson states occurred in ten of his cases—unless stricture existed previous to the attack, unnoticed by the patient, as sometimes undoubtedly occurs (*see Case X.*).

IRRITABLE AND RESILIENT STRICTURE.—A stricture is said to be irritable when it is sensitive, easily excited to inflammation from slight causes, rebellious to the use of instruments, fretting as it were under their employment. A resilient stricture (so named by Syme) is one which, without being necessarily irritable, is elastic, India-rubber-like, contracting quickly after being dilated, sometimes to an extent greater than existed before the use of the dilating instrument (*see Case XV.*). Traumatic strictures are sometimes of this type, as are strictures following strong injections of nitrate of silver.

CHAPTER VI.

STRICTURE OF THE URETHRA.

Instruments and their Use.—Filiform Bougies with Manceuvres alone, and as Guides.—Bougies.—Bulbous Bougies.—Catheters.—Sounds.—Scale.—Advantages of Steel Instruments.—Instruments for Divulsion with Manceuvres.—Instruments for Internal Urethrotomy with Manceuvres.—Perineal Urethrotomy with and without a Guide.—Rectal Puncture.—Supra-pubic Puncture.—Dieulafoy's Aspirator.

BEFORE passing to the diagnosis, symptoms, and treatment of stricture, it is better at once to describe the instruments to be used, the methods of manipulating them, and the operations in which they are employed, in order to avoid endless repetition.

Great mechanical ingenuity has been displayed in the construction

of instruments for the detection and treatment of stricture. Such of them will be mentioned as are considered best suited for these objects. Space will not allow a description of more than the type instruments of each class.

The instruments which it is necessary for the surgeon to possess in order to be able to meet the requirements of all cases of stricture are: different varieties of bougies, sounds, and catheters with a scale; instruments for divulsion, internal and external urethrotomy; trocars, canulæ, and an aspirator.

BOUGIES.

FILIFORM OR HAIR-LIKE BOUGIES are such as measure one millimetre or less in diameter—size No. 2 (one millimetre diameter) being the smallest size that can be accurately measured on a scale-plate. There are three varieties of filiform bougie: the French, English, and whalebone. They are all made conical, narrowing down to a fine point, and gradually increasing for an inch or two until the full size of the shaft is reached. The whalebones are olive-tipped.

FRENCH FILIFORM BOUGIES are of three varieties. They are black, and made of a gummy material spread smoothly over a woven frame. Some are entirely so composed, and in choosing these it is well to select the stiffest. Others are furnished centrally with a fine copper or lead wire running down to the point. These can be bent and twisted into spiral form at their extremity, to facilitate introduction, and avoid lacunæ and false passages; while in the third variety (Benas bougies) the central wire is replaced by a fine whalebone shaft to give it greater firmness.

Of these bougies, the first named, those without any central shaft, are often provided with a little metallic cap upon one end, furnished with a female screw, so arranged that it may be screwed upon the end of another instrument. By means of this ingenious device, when one of these bougies has been made to penetrate a stricture, and has reached the bladder, some other instrument which it is desirable to use for rupturing or incising the stricture, or drawing the urine, may be screwed into it and then pushed forward, following its guide through the stricture into the bladder. The filiform bougie coils up in the bladder, doing no harm there, and is withdrawn with the larger instrument. The device is due to Maisonneuve; it has been largely applied by others.

Yellow English filiform bougies are used in the same manner. Two cautions are necessary in regard to the employment of this species of urethral guide:

1. The little metallic cap upon the bougie should always be examined before it is used, to make sure that it is firmly attached to the bougie. They become loosened by time, and, if a defective instrument be used, there is danger of leaving the bougie behind in the bladder.

2. If the stricture be very tight, it will sometimes happen that, after the instrument, which has been screwed into the bougie, has followed its guide up to the strictured point, the metallic cap of the latter will refuse to enter there; the bougie will double up just in front of the cap, and, if force be used, a false passage will be made alongside of the stricture. The English bougies are stiffer and less liable to this accident than the French.

The deduction is, use the utmost gentleness in following the guide into the bladder, and, if the screwed instrument does not run smoothly along, desist, and choose some other plan for overcoming the obstacle.

Soft filiform bougies are also constructed two feet long, to serve as guides, by being introduced into the bladder, and then threaded through

a soft French gum-elastic catheter open at both ends (Fig. 26). Over such a guide a catheter may sometimes be safely conducted into the bladder. The same device is employed by the French in the shape of a small flexible catheter, provided with a filiform point eight inches long. The point is introduced as a filiform bougie, and the catheter pushed after it into the bladder. This is equivalent to the other device of a conical catheter, so arranged as to screw into an armed (screw-tipped) filiform bougie (Fig. 27).

THE ENGLISH FILIFORM INSTRUMENTS are a little stiffer than the French. They are of a yellow color, made of a woven fabric, and covered with varnish. A modification

has recently been introduced into such of these instruments as are designed to serve as conductors, in order to prevent the tendency to double up in front of the stricture

in the manner above narrated. This modification consists in the insertion of

a piece of whalebone into the axis of the instrument for an inch or more in front of the cap, so as to give it additional firmness at this point.

WHALEBONE FILIFORM BOUGIES are thin, hair-like strips of whalebone, very smooth, conical, with slightly bulbous points. By dipping them into hot water, the end may be variously shaped (an expedient employed in difficult catheterism in the last century)—twisted into spiral, bent into zigzag (Fig. 28), a modification which is of vast assistance in threading tortuous strictures and escaping false routes and lacunæ.



Fig. 26.

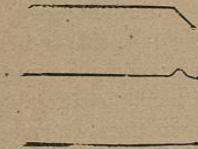


Fig. 28.

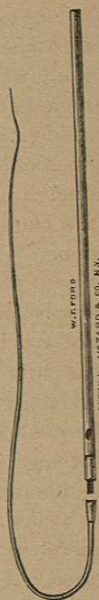


Fig. 27.

The instrument may be rotated during its passage, and its point be thus presented at different portions of the circumference of the canal, so as finally to engage it in the orifice of the stricture. These bougies, about two feet long, are also used as guides for larger instruments, not by being screwed upon them, but threaded through a metallic loop made for the purpose, upon the under side of the instrument which they are to guide—an adaptation of Desault's principle—the latter being known as "tunneled" instruments.¹ Whalebone instruments are easy of introduction, and capable of rendering most important service as guides, but three cautions are necessary in their employment for this purpose:

1. The guide should be two feet long. No cracked, bent, fissured, or frayed-out instrument should ever be used.

2. In employing a whalebone as a guide, it should be first introduced into the bladder, then threaded into the instrument to be guided, and the latter pushed gently down to the strictured point, while the whalebone is held stationary at the meatus. If force be used here, the slender guide may double up and a false passage be made; but this may always be avoided by gently and continuously retracting the guide, as the conducted instrument is passing the dangerous point, and until it reaches the bladder. The length of the guide (two feet) easily allows this to be done.

3. The loop of the instrument to be conducted should always be amply large, and be smoothed off in front so as to have a rounded and not a cutting edge; and, if the movement of extracting the guide, as the tunneled instrument is being introduced, cannot be performed as above described, both instruments should be withdrawn; for, if the one be pushed forward forcibly, or the other pulled back, there is danger of cutting off a portion of the whalebone and leaving it in the canal—an accident which has occurred in very competent hands.

Whalebone bougies may be made of any size. The larger ones are useful in treating strictures situated in the pendulous portion of the canal. Gutta-percha bougies should never be used in the urethra. They become brittle by age, and are liable to break.

MANŒUVRES.—Regarding the method of introducing filiform bougies, a few words will suffice. Their fine points are liable to catch, chiefly in the lacuna magna (Fig. 8), but also in any of the numerous sinuses of Morgagni, in any false passage, or against membranous bands and folds of the urethra, in the tortuous turnings of a stricture, or in the softened reticulated membrane behind it (Fig. 29). With the whalebone bougie—often with any filiform instrument—these obstacles may be generally surmounted. There are two special manœuvres for accomplishing this:

1. When an instrument catches, partially withdraw and slightly

¹ Refer to note under "Perineal Section with a Guide."

rotate it, pushing it forward while making the rotatory movement. This device rarely fails in finally engaging the instrument in the orifice of the stricture, especially if the filiform point be bent or twisted in any direction (spiral, zigzag), so that its extremity may lie outside of the axis of the shaft of the instrument (Fig. 28).

2. An excellent method of finding the orifice of a stricture, especially where false passage exists, consists in cramming the urethra full of

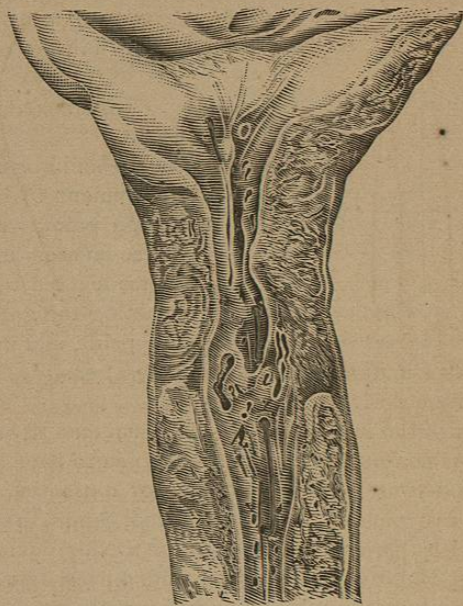


FIG. 29 (Dittel).—Showing Lacunæ and False Passages in which the Points of Filiform Instruments are liable to be caught.

filiform bougies, engaging their points in all the lacunæ and false passages, and then trying them, one after another, until that one is pushed forward which is presenting at the orifice of the stricture, when it will at once engage.

The use of filiform bougies in threading tight strictures is greatly facilitated by first injecting the urethra full of warm oil. Filiform bougies, intelligently used, make impassable strictures the greatest rarities in a surgeon's practice.

BOUGIES.—Of other bougies (not filiform) the French and English conical only need be described—the blunt are not useful, nor are the olive-tipped of as much service as the simple conical. French conical bougies are black, woven, and covered with gum. They come of all sizes, and are necessary in the treatment of stricture up to size 8 or 10. The olive-tip is of advantage in the large, objectionable in the small

sizes. When choosing olive-tipped bougies, preference should be given to such instruments as are rather stiff, but have a long, slender, flexible neck, supporting the bulb. When held vertically, bulb upmost, and touched upon the olivary tip, the neck should yield at once (Fig. 30, A). Such an instrument will guide itself safely and override obstructions.



FIG. 30—A.

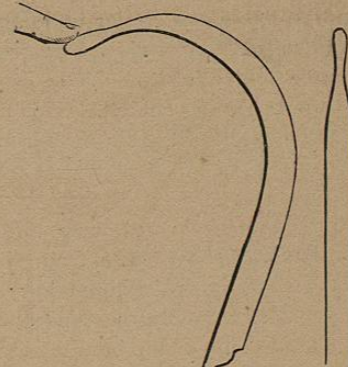


FIG. 30—B.

The olivary points found on the English conical bougies are useless, as far as any advantage derived from the bulb is concerned, from a neglect to make the neck of the instrument flexible (Fig. 30, B).

English yellow bougies are smoother and stiffer than the preceding. They keep much better in the changeable climate of New York. All of the foregoing instruments are introduced without a stylet, by simple direct pressure with (perhaps) rotation.

THE BULBOUS BOUGIE (*bougie-à-boule*) is an instrument essentially necessary for the accurate diagnosis of stricture. They are found of French and English make. The latter are apt to be too stiff. They consist of a flexible, woven shaft, headed by an acorn-shaped extremity, of a diameter much greater than that of the shaft. They are sized according to the diameter of the head. A set of them, running from 3 to 20, is required. Any thing too tight for 3 (1½ mill. diam.) may be said, practically, only to admit a filiform instrument (size 1). In choosing bulbous bougies, they should be selected with nicely conical short head and an abrupt shoulder (Fig. 31).¹ Instrument-makers have them of all varieties, with very pointed, even oval heads and no shoulders—occasionally with two or three bulbs. These are not useful. For economy's sake, an instrument with fixed curve has been constructed of steel, having a small shaft, and terminating in a screw upon which may be screwed acorn-shaped heads of different sizes, also of steel. This instrument is better than no bulb-



FIG. 31.

¹ For the method of using the bulbous bougie, see DIAGNOSIS OF STRICTURE.

ous sound at all, but not much superior to an ordinary blunt sound. It is too clumsy for delicate manipulation. Metallic bulbs on slender wires are better, equally durable, and excellent for the pendulous urethra; but the woven French instrument is more delicate, and the best for all cases.

It may be said at once, of all woven instruments, that the English are more durable and easier to keep than the French. The latter will not stand the heat of a New York summer, unless specially protected. They soften and stick to each other and to the case in which they are kept—thus becoming ruined. This may be prevented by dusting them with French chalk or keeping them in a cool place, in hot weather.

CATHETERS.

Silver catheters do not wear out, and it is well to have a case of them on hand, of short curve, from size 7 to 14. They should be made slightly conical, and have a flattened wooden or other handle, to facilitate manipulation, marked with its number on the side of the handle corresponding to the concavity of the curve of the instrument. The handle should be immovable on the shaft, at right angles to the plane of the curve of the instrument (Fig. 32). No one not accustomed to manage difficult cases can use a silver catheter without a guide of a less size than No. 6 without risk of false passage.¹

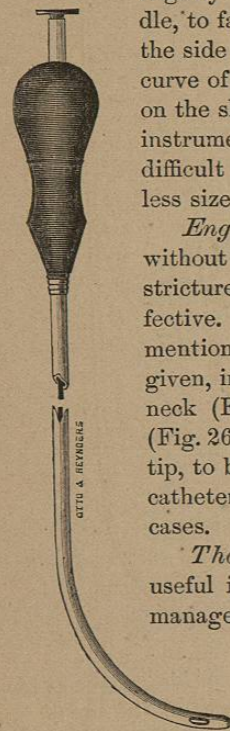


FIG. 32.

English yellow elastic catheters of small sizes, conical, without bulbous point, may be useful in the treatment of stricture where the expulsive power of the bladder is defective. Three varieties of French flexible catheter may be mentioned: the flexible olivary, particular attention being given, in choosing the instrument, to the flexibility of the neck (Fig. 30 A); the flexible catheter, open at both ends (Fig. 26); and a flexible instrument armed with a metallic tip, to be screwed upon a filiform guide (Fig. 27). All soft catheters should be introduced without a stylet, in ordinary cases.

Thompson's probe-pointed catheter is an instrument very useful in skilled hands, very dangerous if not judiciously managed. It is made of silver, from size No. 3 to any size desired. It is conical, and should be eleven inches long. Those of English make are too short. The last two inches beyond the eye are of solid soft silver, much smaller in size than the shaft of the catheter, and slightly olivary at the tip; in fact, it is a malleable silver probe upon the end of a small silver catheter. The

¹ Nothing short of fracture of the penis, where compression is needed, will justify the tying into the urethra of a metallic instrument for more than a day or two at most. If

probe may be bent to any desired curve. For greater security, a rod of metal, exactly filling the calibre up to the solid probe-point, may be screwed into the catheter, making it practically a solid silver probe-

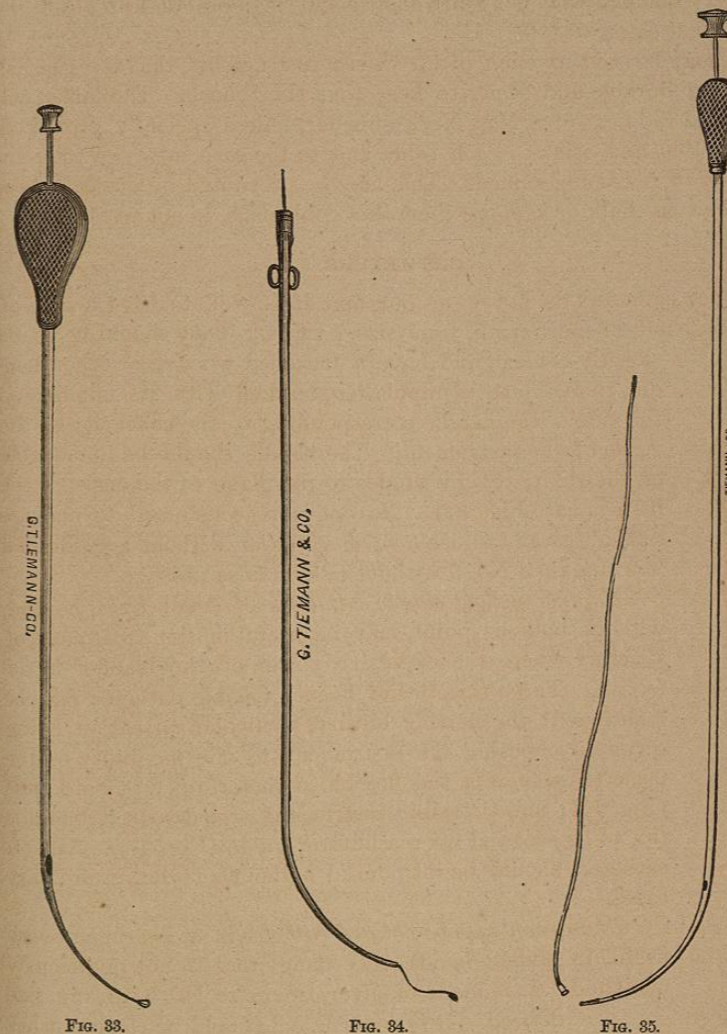


FIG. 33.

FIG. 34.

FIG. 35.

pointed sound (Fig. 33). There seems to be some danger of the breaking of this instrument at the eye, unless care be used in bending it. Consequently it has been modified by Otis, by being made hollow through-

this rule be neglected, ulceration of the urethra is a necessary consequence, the points of greatest ulceration being at the peno-scrotal angle—under the suspensory ligament—at the meatus and in the bladder, where the point of the catheter touches.

out, open at its tip, and with a wire exactly filling up the whole canal. The eye at the tip is the main advantage, since the instrument may be used over a whalebone guide two feet long (Fig. 34). As suggested by Bumstead, this instrument may be used screwed upon a filiform soft bougie (Fig. 35). All solid instruments having a fixed curve are introduced as is the sound (p. 32).

SOUNDS.

The most necessary instrument for the treatment of stricture is the steel sound; for, whatever means be used to cure the stricture, rarely can that cure be maintained without the help of the sound.

Steel sounds are conical or blunt. It is well to have a set of both kinds, but the former only are necessary. They should be made of the short curve (page 31), that one which is based upon the natural curve of the fixed part of the healthy adult urethra. The hardest steel is used in their construction.

They are capable of a high degree of polish, and are smoother than any other instruments used in the urethra, metallic or soft. The conical instruments to compose a set run between Nos. 9 and 20 inclusive. The conicity of No. 9 runs through four sizes (that at its point is No. 6), of No. 10 11, 12, 13, through five sizes, of No. 14 through six, and all other instruments, from No. 15 on, run through seven sizes, the largest instruments going through over eight and nine numbers, the full size of the instrument being in every case reached just at the end of the curve. Thus No. 16 would measure 10 at its tip, penetrate 11 of the scale-plate for a distance of about four lines, penetrate 12 for about half an inch, 13 for an inch, 14 for an inch and a half, 15 for two inches, and, gradually enlarging around the curve, just fit 16 as the shaft becomes straight (Fig. 36).

Blunt instruments have a spherical extremity and fit the same aperture of the scale-plate throughout. Both instruments measure—shaft and curve—about nine inches, the flattened handle two and one-half inches. Upon this latter the number is stamped, and, if desired, the diameter of the instrument and the corresponding French size. Small conical sounds with a tunneled extremity are serviceable, with a whalebone filiform bougie as a conductor (Fig. 37).

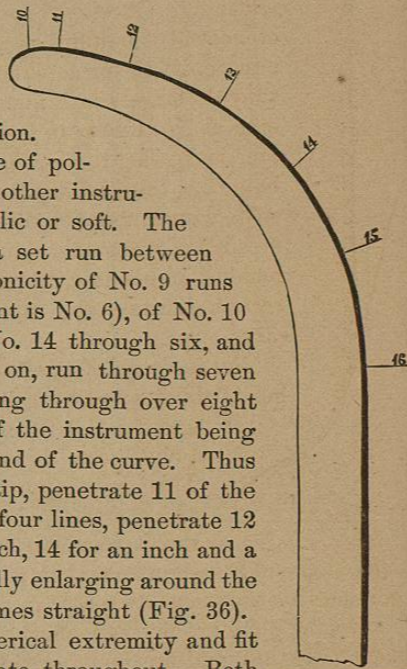


FIG. 36.—The mark -16 is placed in the plate a little too far from the point.

SCALE.

The scale for grading the sizes of instruments has never been very accurately fixed, except in France. The English scale, which has been, until recently, the favorite wherever the language was spoken, is arbitrary and inaccurate, varying so much that instruments marked with the same number may be found to differ two millimetres in diameter.

The tendency of late years, in this country as well as in England, has been to adopt the French scale, simply because it was fixed and immutable. The only valid objection to this scale is, that it involves too many instruments in a case for the ordinary surgeon, entailing needless expense in procuring them and care in keeping them in order, with no compensating advantage, since *with conical instruments* the increase in diameter of only one-third of a millimetre for a size is unnecessarily minute. If the profession were still using blunt instruments (as they do largely in France), then the French scale—commencing at No. 1 with an instrument one-third millimetre in diameter, and going to No. 30, ten millimetres in diameter, each size being one-third millimetre larger than the one below it—such a scale would undoubtedly be the proper one to follow. Bumstead has adopted it, but is obliged to advise the student, in making up his case, to procure only every other size between certain limits—the intermediate numbers being unnecessary.¹

An increase of one-half millimetre diameter for each number is the best rate of progression for conical instruments, and it is this feature which characterizes the American scale. No. 1 is one-half millimetre in diameter. This is an appreciable size, it is easy to remember as a starting-point, whence on each following number is one-half millimetre larger in diameter—*ad*

infinitum. All instruments below No. 2 are filiform—not capable of accurate measurement on a scale.²

On the plate are marked off the size and diameter of each instrument (Fig. 38), and on the other side (Fig. 39) approximately the corresponding size according to the French scale. The scale stops at 21, simply because an instrument of that size is often wanted, but very rarely any thing higher. As a rule, no conical instrument of metal

¹ *Op. cit.*, p. 316.

² As instruments of less than 1 mill. diam. cannot be accurately measured on a scale plate, it was at first decided to make this size No. 1; and the earlier copies of this work so represent it. The change is made to facilitate a reduction to French sizes. As now arranged, any size can be expressed in its corresponding French number, by adding to it one-half of itself. 10 Am. = (10 + 5) 15, 20 = 30, 7 = 10½. French numbers are made American by subtracting one-third: 30 Fr. = (30 - 10) 20, 12 = 8, 3 = 2.

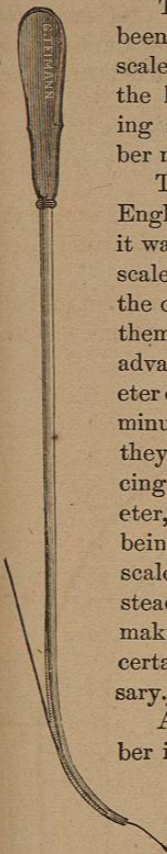


FIG. 37.

should be used in the urethra without a guide of a size less than No. 9, the point of which is very small (No. 6). In passing a conical instrument,

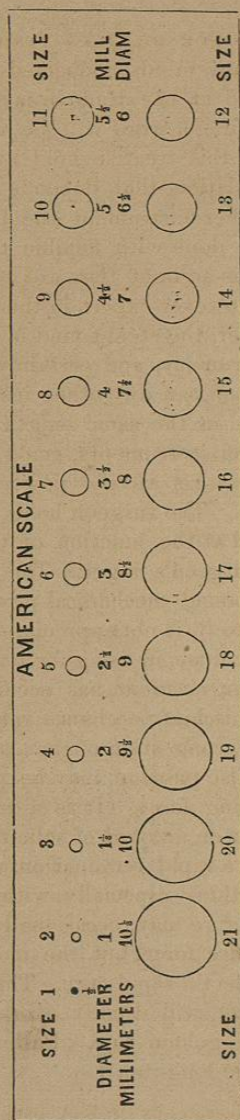


FIG. 38.—American Scale, Front.

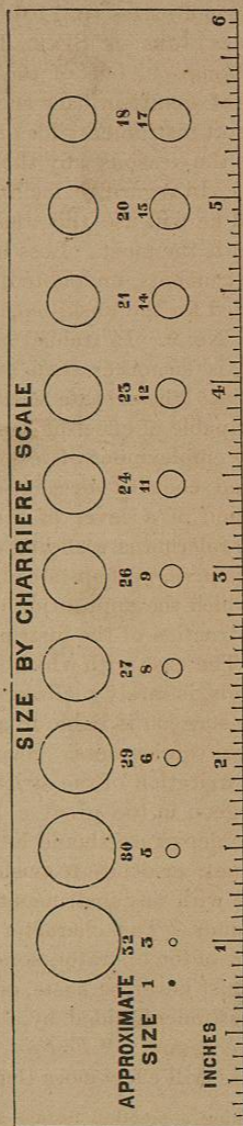


FIG. 39.—American Scale, Back.

the surgeon has the advantage of using a wedge, as well as a lever, and, by carefully inserting any given conical steel instrument through a strict-

ure, he practically does (with less violence) the same thing as if he passed 4 to 7 different blunt instruments (according as he uses a large or small sound), since the conicity of the sounds runs through four to seven or more sizes (p. 110).¹

ADVANTAGES OF STEEL INSTRUMENTS FOR DILATING STRICTURE.— Since Thompson, one of the most brilliant minds connected with the subject of genito-urinary surgery, decided at one time in favor of the use of soft instruments for dilating stricture, a word will be necessary to state the reasons why the authors of this treatise hold a contrary opinion. In regard to facility of manipulation, that depends on practice, and he will use this, that, or the other instrument the best, who has used it the most. Less harm can be done with flexible than with solid instruments, undoubtedly, and on this account they are to be recommended for the unskilled, and for all, however expert, in the low sizes—below No. 9. In trained hands, however, the steel sound is perfectly safe; it is smoother than any soft instrument, and certainly can be passed into the urethra with less pain than can any other instrument, and is capable of effecting more dilatation, in the same length of time, with the employment of less force.² Steel instruments, made with the curve and conicity already described, possess all the powers of the wedge, and of a lever of the first order. The surgeon holds the long arm, the fulcrum is a sliding one, situated at the junction of the shaft with the curve, perhaps steadied by the surgeon's finger. The immense power which the application of this compound mechanical principle, in the construction of the instrument, gives to it, is not appreciated by surgeons. The ease with which harm may be done, in using force with conical sounds, is rarely realized until after an accident has occurred, and then the surgeon is liable to ascribe the mischief to chance rather than to his own carelessness. Swelled testicle, congestion of the neck of the bladder, irritation of the stricture, even false passage, may be produced by a surgeon in too great a hurry, or using force. It is a rule, from which no departure should be made, either on account of solicitation by the patient, or desire to push the case to a rapid termination, never to use force with any instrument in the urethra—especially with conical steel sounds. The character of the stricture may, occasionally, in the judgment of the operator, sometimes require force, but the motive for its use must never be haste, or desire to effect a rapid cure. The weight of the instrument, aided by a little coaxing, will usually exert all the power necessary. "*Festina lente*," is the golden rule. Patience and gentleness will effect more than force in the long-run.

¹ Following a practical feature adapted to scale-plates by Dr. E. A. Banks, of New York, the plate is made six inches long, and marked in inches. Markings in millimetres and centimetres might be added.

² Patients tested, at the same sitting, with soft and steel instruments, almost invariably complain less of the latter.