tainty. I would still further propose that all surgeons, as far as in them lies, should use their influence in *erasing* the numbers of all existing urethral instruments which are now marked with measurement figures other than those expressing measurements by millimetres in circumference, and having them *remarked* with the French figures *in circumference*. And finally, that all instruments hereafter ordered should be made and marked in conformity to the metric measurement by circumference. Dr. C. H. Thomas, of Philadelphia, in the Philadelphia *Medical Times*, June, 1879, in an article urging the necessity of a uniform scale of measurement for surgical instruments and apparatus, presented an ingenious contrivance of his own for ready and accurate measurement of instruments *by millimetres in circumference*. This is manufactured by Messrs. Gemrig & Sons, surgical instrument makers, No. 109 South Eighth Street, Philadelphia, who have generously offered to send this measureing scale gratuitously to any member of the medical profession desiring the same.

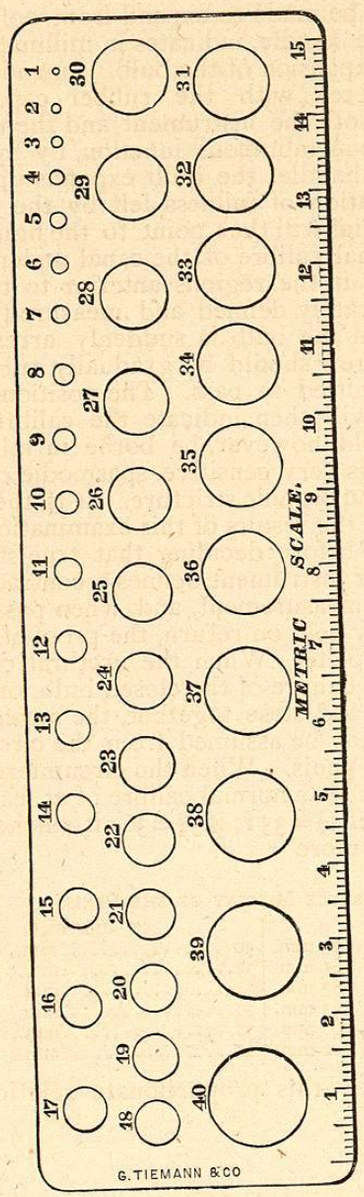
LESSON LII.

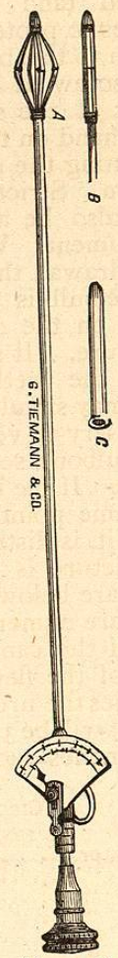
Urethral measurements—Necessity of the adoption of a uniform method—Note—Showing the want of some exact and common standard of measurement—Value of the urethrometre—Description of the instrument—Mode of using it—Proportionate relation between the size of the penis and the urethra—Table showing this relation—Verification of its correctness through actual measurements with the urethrometre of over one thousand cases—Difference in calibre between the bulbous urethra and the portion anterior—The bulbous sound—Usual locality of strictures—Stricture most frequent in the anterior portion of the canal—Statistics on this point—Solid steel sounds—Different varieties—Mode of introduction.

The Urethral Scale.—This is graduated by the French millimetre from 1 m. in circumference to 40. On the opposite side are the numbers of the English scale. "The scale for grading the sizes of instruments has never been very accurately fixed, except in France." * The French scale increases by one millimetre in circumference. This is a recognized standard scale in all countries at the present day, and the sizes of all other scales must be translated into this, in order to become intelligible in descriptions of cases. It is not rare to find urethræ with normal calibre of 40. The entire set, from 8 m. to 40, is absolutely essential to every surgeon who desires to make complete and accurate urethral measurements. The stricture which will permit say 25 of this scale to pass without obstruction, will often hold distinctly and firmly upon a bulb measuring 26 f. It is thus shown that the gradation of this scale is not too fine, and that no numbers can be dispensed with.

For actual urethral measurement we have *the Urethra-meter*.—With this instrument an accurate measurement of the normal urethral calibre may be made, in any case, within the compass of the instrument, the

* "Genito-urinary Diseases." Drs. Van Buren and Keyes, New York, 1875, p. 111.





URETHRA-METER.

bulb of which can be made to expand from 20f. to 45f. The dial, near the handle, indicates in millimetres the exact amount of expansion of the bulb. Introducing it closed (and covered with the rubber cap, which serves to protect both the instrument and the urethra) down to the bulbo-membranous junction, by means of the screw at the handle, the bulb expands up to the point of the sensation of fullness felt by the patient. The hand on the dial will then point to the figure representing the normal calibre of the canal under examination. Strictures in the regions anterior to the bulb may also be accurately defined and measured by this instrument. When the bulb is suddenly arrested in withdrawal, the screw should be gradually turned until the bulb is permitted to pass. The position of the hand on the dial will then indicate the calibre of the stricture. It should, however, be borne in mind that when the urethra is very sensitive, spasmodie contraction may simulate an organic stricture. It is, therefore, necessary to verify the results of this examination with the bulbous sound before deciding that true stricture exists. If the latter instrument defines a contraction at the same point, by measurement, and, when passed beyond it, is distinctly held on return, the proof of organic stricture is complete. When the urethral contractions are below the calibre of the closed bulb, or when they are numerous and close together, the normal calibre of the canal may be assumed from the circumference of the flaccid penis. When the circumference is 3 inches the urethra has a normal calibre of at least 30 f; if $3\frac{1}{4}$ it will be 32 f; if $3\frac{1}{2}$=33 f; if $3\frac{3}{4}$=36; if 4 inches=38; if $4\frac{1}{2}$ inches=40, or more

CIRCUMFERENCE MIDWAY OF THE PENIS.

OF PENIS.	OF URETHRA.
3 inches, or..... 75 mm.	30.....mm., or more.
$3\frac{1}{4}$ " "..... 81 mm.	32.....mm., " "
$3\frac{1}{2}$ " "..... 87 mm.	34.....mm., " "
$3\frac{3}{4}$ " "..... 93 mm.	36.....mm., " "
4 " .....100 mm.	38.....mm., " "
$4\frac{1}{4}$ to $4\frac{1}{2}$ " .....105 to 112 mm.	40.....mm., " "

The correction of this proportionate relation has

been verified by the author's careful measurement in over one thousand consecutive cases, without meeting with a single exception, in infancy, childhood, adult life, or old age

In the measurements of one hundred cases of supposed normal urethræ, with the urethrometer, the measured difference between the bulbous urethra and the part anterior to it was—

In	35	cases	1	millimetre.
"	21	"	2	millimetres.
"	18	"	3	"
"	6	"	4	"
"	2	"	5	"
"	2	"	6	"
"	2	"	7	"
"	1	"	11	"
"	13	"		no difference.

The average difference in the one hundred cases was $2\frac{5}{100}$ millimetres, and the calibre of the ante-bulbous portion averaged 32.95.

It may therefore be made use of with confidence as a basis in procedures:

The Bulbous Sound.—This is intended solely for detecting the size, length, and locality of the urethral strictures. After ascertaining the normal calibre of the presenting urethra, a bulbous sound of corresponding size should be well oiled and presented at the meatus. If it passes in readily, this may be accepted as representing the normal calibre. If only a smaller size will enter, the difference between this size and that indicating the normal calibre will show the exact amount of contraction at this point. Figures on the handle indicate the exact size of the bulb; frequent verification by means of the scale will aid in preventing errors of measurement.

For convenience of description and study, strictures may be divided into two classes, viz., strictures of large calibre, and strictures of small calibre.

Those permitting the passage of the urethrometer with cover, say 18 to 20, and all above that size, are classed as strictures of large calibre; all those below that size are termed strictures of small calibre.

The usual locality of stricture: Out of 258 strictures, 52 were in the first quarter inch of the urethra; 63 in the following inch, viz., from $\frac{1}{4}$ to $1\frac{1}{4}$; 48 from $1\frac{1}{4}$ to $2\frac{1}{4}$;

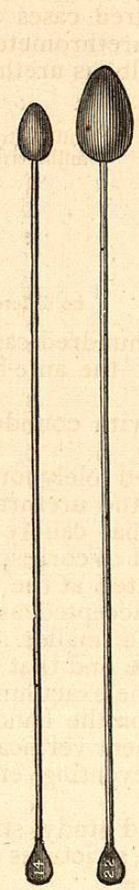


FIG. 6.

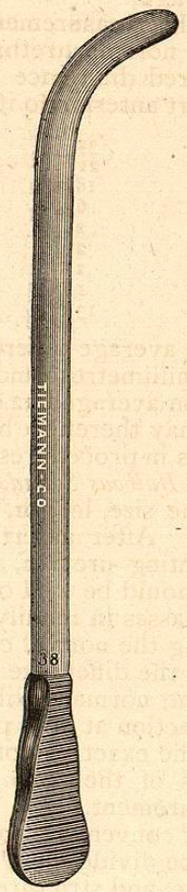


FIG. 9. THE AUTHOR'S SHORT-BEAKED SOUND.

48 from $2\frac{1}{4}$ to $3\frac{1}{4}$; 19 from $3\frac{1}{4}$ to $4\frac{1}{4}$; 14 from $4\frac{1}{4}$ to $5\frac{1}{4}$; 8 from $5\frac{1}{4}$ to $6\frac{1}{4}$; 6 from $6\frac{1}{4}$ to $7\frac{1}{4}$.

In another series of 357 strictures only 5 were deeper than 5 inches. (See Otis on Strictures, pages 97 and 317. Putnam's Sons, 1882.) In 446 strictures reported by Prof. Bevan, 89 per cent, or 399 strictures, were found anterior to 4½ inches.

It was formerly claimed, that the great majority of urethral strictures is found in the vicinity of the bulbous-membranous junction, and various possible causes for their frequency in this locality were cited.

By the above statement it will be seen that they occur, as would naturally be expected, in greatest frequency where the inflammation begins the earliest, and rages the hottest, and gradually diminish in the deeper portions of the canal.

Solid steel sounds of various curves are habitually used for purposes of diagnosis preparatory to the more thorough examination by means of the bulbous sound and the urethrometer. For examining the deep urethra it is better than either, as any bulbous instrument is certain to be more or less firmly held on introduction and retained by the anterior and posterior borders of the triangular ligament. There are three varieties, known as the Thompson or Van Buren curve, the Beinike curve, and the short beaked sound, the latter of which I most frequently use and recommend.

Mode of Introduction.—Taking up the penis carefully so as partially to include the glans between the first two fingers and thumb, and taking up the sound lightly as you would a penholder; introduce it well oiled pretty much by its own weight, turning it slowly if any halting occurs, in this way releasing its point from any obstructive folds of mucous membrane or engagement in a false passage, or natural sulcus. The larger the instrument used the less liable to arrest from such causes. Always begin with the largest instrument which the meatus will permit. In cases of contracted orifice a division may be necessary before any satisfactory introduction can be effected.

As the sound is advanced gently draw up the penis on the sound, to meet it, keeping handle of the instrument well down as the abdomen is approached, thus

avoiding arrest by the anterior border of the triangular ligament; then carry the handle slowly and well back until the instrument, following the deep urethral curve, passes well into the bladder. In cases of doubt as to a cause of arrest in the deep urethra, promptly pass your forefinger into the rectum. The obstruction may arise from a muscular fold just within the vesical orifice called a bar of the neck of the bladder, or it may be from recent or chronic enlargement of the prostate gland. In either case the finger will discover it and aid in the passage of the instrument. If spasmodic stricture is suspected, gentle pressure with the end of the sound against the face of it and continued for 5 or 10 minutes will often overcome the spasm. The same measures may be used under profound anæsthesia. Even this will not always relax the spasm of certaim forms of urethrismus. Therefore, while there is still a doubt from any cause the matter should be held in abeyance until further effort under more favorable conditions shall result in a solution of the difficulty.