

OTHER FORMS OF URETHRITIS.—There still remain to be considered three other forms of urethritis, which are important chiefly because they are occasionally confounded with gonorrhœal urethritis. Such mistakes can hardly occur except where a diagnosis is to be made between the later stages of an acute urethritis and the earlier stages of these other varieties. An inflammation of the urethra coming on after a definite period of incubation, accompanied by a profuse purulent discharge and showing the presence of intracellular diplococci, can hardly be mistaken. It is not to be denied that there are other diplococci in the urethral discharges, and that they may occasionally stand in an etiological relation, but these are very rarely capable of producing a profuse discharge, with other symptoms of acute infection. When we have to deal with a so-called "gleety" discharge, showing the presence of diplococci, the diagnosis cannot be so easily made, and it is also true that even the use of Gram's stain is not sufficient to distinguish between these organisms, and cultural methods alone are to be regarded as absolute. When, therefore, the importance of an accurate diagnosis is extreme, no staining or morphological distinctions are to be regarded as absolute. The most important question which the practitioner is called upon to decide is the distinction between a fresh infection and the lighting up of an old gonorrhœal inflammation. As is well known, this tendency to recur is very marked, even after the lapse of months or years. A "flare-up," so called, may generally be distinguished by its rapid onset, showing little or no period of incubation, its comparatively mild course, and its tendency to subside under mild treatment. Gonococci will generally be present in considerable numbers at first, but they rapidly disappear. These cases are to be distinguished from the cases of so-called "simple urethritis," which are due to infections of the urethra with other organisms. It is now beyond question that other organisms are capable of exciting urethritis, but they act rather as a local irritant and differ markedly from a gonorrhœal infection. They show little or no period of incubation, the discharge as a rule is muco-purulent, and they subside in a few days, with or without treatment. If the discharge be examined under the microscope a variety of cocci and bacilli may be found, and possibly intracellular organisms. The infection is frequently not pure, and mixed cultures are generally to be obtained. It is of the first importance that these cases should not be confused with a true gonorrhœal infection, as serious consequences might follow such a mistake.

Treatment.—These cases do well under mild astringent or antiseptic irrigations, and are to be treated locally from the very start. As a rule they subside in the course of a week or ten days.

CHANCROIDAL URETHRITIS.—The possibility of a chancroidal ulceration extending into the urethra as far as the fossa navicularis must be remembered. As a rule the diagnosis is accompanied by no difficulties, and the evidence of an ulcerative process generally extending out on to the glans will render the diagnosis easy. The treatment is that of chancroidal ulcers elsewhere.

SYPHILITIC URETHRITIS.—Intra-urethral chancres are not uncommon. Their presence is accompanied by a moderate purulent or muco-purulent discharge, which might be mistaken for an atypical case of gonorrhœa. Such errors may be avoided by palpation of the anterior urethra, which will show the presence of an indurated area, generally in the first inch and a half of the urethra. These are to be distinguished from peri-urethral abscesses, or so-called folliculitis, by their hardness, and by the absence of tenderness; often by their position at or near the meatus, and by the appearance of a roseola. The treatment is that of syphilis elsewhere.

STRICTURE OF THE URETHRA.

Strictures of the urethra may be congenital or acquired, but the vast majority of strictures with which the practitioner has to deal come under the latter heading.

CONGENITAL STRICTURES.—Congenital strictures of the urethra are rare. They are generally at the meatus and may be of extremely small calibre.

The *etiology* is obscure. Cases of stricture further back than the meatus have been reported as congenital.

The most generally accepted theory in regard to the causation of hypospadias and epispadias is that they are due to intra-uterine stricture with rupture and sloughing. If this theory be accepted it will clear up the etiology of congenital stricture.

The *treatment* is that of stricture in the adult.

ACQUIRED STRICTURE.—Spasmodic Stricture.—Under this heading we must consider the so-called spasmodic strictures, which, though not strictures in the narrowest sense of the word, are yet frequently productive of the symptoms of stricture. They are due to spasm of the muscular fibres in the urethra, producing more or less obstruction. By far the most common cause of spasm is a sensitive area due to inflammation, which may be sufficiently localized to be described as ulcer. This, when approached by an instrument, resents the interference, causing contraction of the muscular fibres and a consequent obstruction to the passage of the instrument. It may in this way give rise to signs closely resembling organic stricture, and is, to be distinguished largely by the history, which will as a rule show an entire absence of symptoms except when the urethra is examined with an instrument.

There are also cases of spasmodic stricture apparently of purely nervous origin. These occur in neurotic individuals, and are most pronounced when their nervous symptoms are prominent. The diagnosis is to be made only upon the history, an entire absence of inflammatory disease, and the demonstration of the absence of local areas of congestion. It is probable that, if put to this test, the number of spasmodic strictures of nervous origin will not be found large. Spasmodic stricture disappears under full surgical anæsthesia.

Organic Stricture.—The two prime causes of organic stricture are trauma and gonorrhœal urethritis.

Traumatic stricture has already been discussed under rupture of the urethra and will not be further mentioned here.

While it is not to be denied that urethritis of other than gonorrhœal origin is at times sufficiently severe to be capable of producing true organic stricture, cases in which such has actually occurred are extremely rare.

PATHOLOGY.—The trouble begins with the loss of a small portion of the mucous membrane, which results in the failure of the tissues to protect the deeper parts, and as a result they become infiltrated with urine. This sets up an inflammatory exudate in the submucous layer, with the deposit of fibrous tissue. It is stated upon good authority that the fibrous tissue here formed differs from scar tissue in other regions by showing a greater tendency to contract. This may be real or due to the fact that in many cases infiltration has taken place about the whole circumference of the urethra, and that a very moderate amount of contraction at any one part will produce a very decided contraction of the whole. It is also to be remembered that the process of formation is an extremely slow one, and, therefore, that the scar is laid down layer upon layer in the endeavor to protect the deeper parts from the extremely irritating urine which infiltrates it. In this way a concentric scar is formed, and we need not suppose any exceptional qualities in the fibrous tissue in order to show an extremely persistent tendency to contract.

CHANGES IN OTHER ORGANS.

Changes in the Urethra.—The changes in the urethra itself due to stricture and yet not immediately at the point of stricture, are due to the fact that the urethra behind the point of narrowing is not completely emptied. The condition begins by the retention of a drop of urine behind the stricture—leading to irritation and frequently a slight discharge, which is often referred to as a "gleet."

This is nothing more than the attempt on the part of the mucous membrane to protect itself against the irritating properties of the urine. As the process goes on and the narrowing becomes more complete, there is dilatation of the urethra at this point, which may become extreme. With this dilatation goes a decrease in vitality of the tissues, with consequent maceration and perforation of the mucous membrane, leading to a small abscess, which may go on to the formation of a fistulous opening behind the stricture and in extreme cases to extravasation of urine. The abscesses and fistulae thus formed may be multiple, and the cause of multiple fistula formation is not necessarily the presence of multiple strictures. Multiple fistulae may and frequently do exist with but one stricture. This is due to the fact that, as the fistula becomes chronic, much fibrous tissue is deposited along its walls, which then contract and the fistula no longer serves to drain the cavity from which it started. The infection then extends in another direction, with the formation of a new fistula, and the process may go on until several are formed, giving rise to the condition known as "a watering-pot perineum."

Extravasation of urine is due to a rupture of the urethra behind a stricture, and differs in no way from that which occurs from traumatic rupture of the urethra.

Changes in the Bladder, Ureters, and Kidneys.—With the increasing obstruction in the urethra comes a hypertrophy of the bladder, with not infrequent sacculation, and unless this hypertrophy absolutely keeps pace with the obstruction there comes a time when the bladder is not completely emptied, and there is residual urine and a condition favoring cystitis. The number of cases in which some residual urine is to be found is probably much larger than is generally supposed, and is stated by some writers as high as sixty per cent. With the occurrence of residual urine of any amount there comes a back pressure upon the ureters and pelvis of the kidneys, resulting in dilatation and thereby favoring infection not only of the ureter and pelvis, but also of the secreting portions of the kidney. In this way arise the conditions known as pyelonephritis, or "surgical kidney," rendering any surgical operation risky.

VARIETIES OF STRICTURE.—It is customary to describe the anatomical characteristics of a stricture as one of three varieties.

A stricture which is extremely narrow and resembles a band constricting the urethra is spoken of as linear.

A wider band, which constricts a moderate amount of the urethra in a symmetric manner, is spoken of as an annular stricture.

A stricture of greater length, which has narrowed the urethra unequally in its different parts and has, therefore, pushed the portion of the canal which remains patulous first to one side and then to the other, is spoken of as tortuous.

These varieties are not of great importance in the treatment of stricture, for in some cases all three varieties may be present in one patient, and it is difficult, without the use of complicated apparatus, to decide exactly as to the particular class to which a given case belongs.

Strictures are also divided, according to their diameter, into strictures of large and strictures of small calibre. This is a distinction which, in the light of our present knowledge, might properly be abandoned. The term of "large calibre" was introduced by Otis and his followers, who regarded any narrowing of the canal below that calibre, established by an arbitrary scale, as evidence of stricture. To-day it is generally admitted that many so-called strictures of large calibre should properly have been regarded as physiological narrowings of the canal, and, as the term carries with it no important distinction, it should properly be abandoned. For practical purposes, only the strictures which were termed by Otis "strictures of small calibre" are to be regarded as organic strictures at all. It is always proper in describing a stricture to speak of it as a large or a small stricture, but when these expressions are used they are not intended to refer to the term "stricture of large calibre," which has

come to carry with it an especial meaning, and is not to-day believed to be in accordance with the facts.

LOCATION OF STRICTURES.—There are three points in the urethra at which organic stricture is most commonly to be found.

First, the region of the bulb.

Second, the region of the peno-scrotal angle.

Third, a point at the posterior limits of the fossa navicularis.

True stricture of the membranous urethra is rare except in cases of rupture of the urethra.

Stricture of the prostatic urethra is probably unknown.

SYMPTOMS OF STRICTURE.—Organic stricture of the urethra may exist without symptoms; in fact, in the early stages most strictures do not attract the patient's attention.

A gleety discharge with the constant presence of shreds in the urine is a very constant symptom of stricture.

Slight burning or irritation and slight frequency of urination are commonly observed, but they are by no means constant.

Dribbling at the end of the act of urination is common, and due to the inability of the urethra to contract regularly and empty itself.

Irregularities in the shape of the stream of urine are popularly supposed to be important, but as they are largely due to the shape of the meatus they need not be given much importance.

Difficulty in starting the stream is a more common symptom and, though likely to be due to other causes, should always attract attention.

Frequency of urination in marked degree and of constant character is a late symptom, due to changes in the bladder resulting in the accumulation of residual urine.

Retention of urine is a comparatively late symptom, but may occur with strictures of moderately large calibre, especially after careless instrumentation, exposure to cold, or excesses in alcohol. In these cases it is due to an acute congestion of the mucous membrane, which is usually temporary.

DIAGNOSIS.—The diagnosis of stricture is to be made only by a careful local examination of the urethra, such examination having been suggested by almost any one of the above-mentioned symptoms. It is wise to carry out such an examination in a routine way, and the following routine is suggested, not because of exceptional value, but because it has been found valuable in practice:

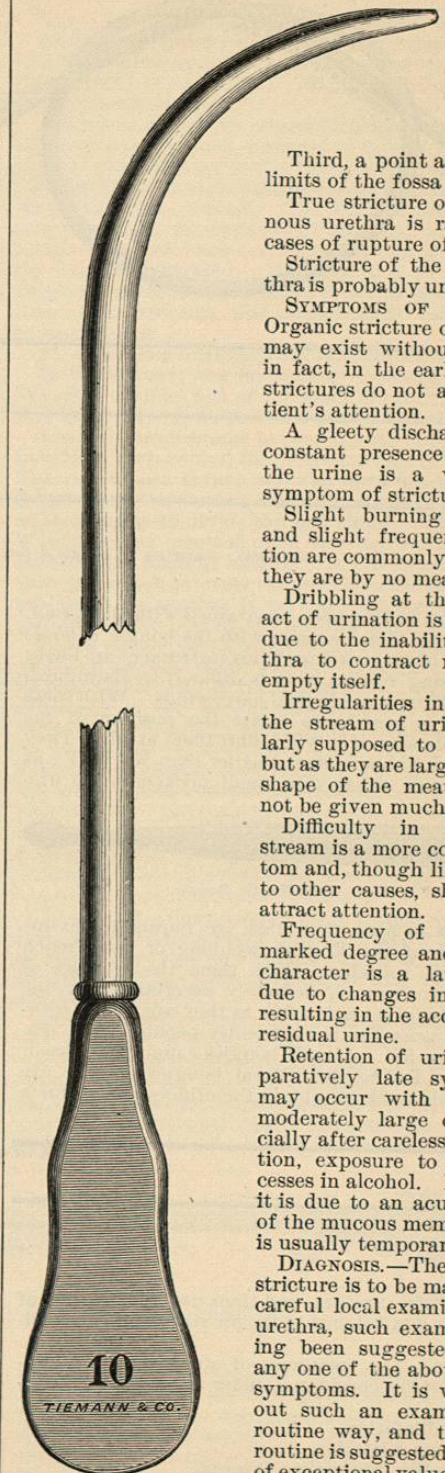


Fig. 4842.—Curved Steel Sound.

Examination should be begun with a sound as large as the meatus will comfortably admit. If this is arrested a smaller size may be tried, but stiff instruments smaller than 18 or 20 F. cannot be regarded as safe. The pres-

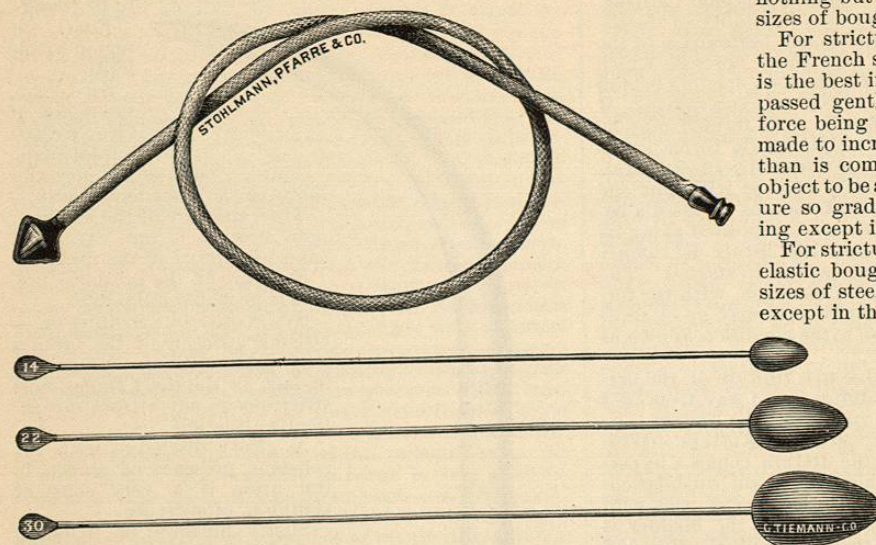


Fig. 4843.—Varieties of Bougie à Boule.

ence of stricture having been ascertained with the sound, examination may then be made with the bougie à boule (Fig. 4843). The larger sizes of this instrument are likely to give confusing results, as it is difficult to distinguish physiological from pathological narrowings. With these instruments it is possible to locate the position of the stricture and its size, if it will admit them at all. They are not of much value in sizes smaller than No. 10 F., as the points become engaged in small pockets in the ure-



Fig. 4844.—Gum-Elastic Bougie.

thra. If sizes smaller than this are required, flexible bougies, either of the English webbing or the French make, are most valuable. With them the presence of organic stricture can be definitely ascertained by the peculiar gripping sensation felt as they are being withdrawn. This sensation is sufficiently peculiar to be distinctive if once felt. If soft bougies cannot be passed, resort must be had to the filiform bougies. These are extremely liable to be caught in the orifices of the ducts

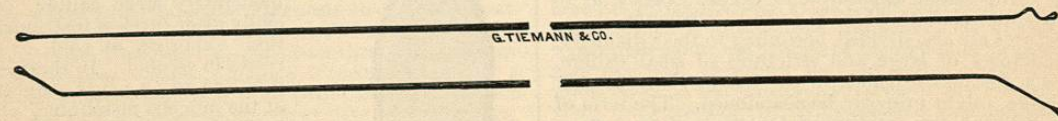


Fig. 4845.—Filiform Bougies.

and glands of the urethra, and their use is a matter of some difficulty and belongs to the province of the specialist.

TREATMENT.—The treatment of stricture of the urethra may be briefly considered under three general headings:

1. Gradual dilatation.
2. Continuous dilatation.
3. Urethrotomy, internal or external.

Gradual dilatation is the treatment of election in all cases above No. 10 of the French scale. In many of the

more chronic cases it will fail and must be replaced by some more radical method, but an attempt at cure by this means is never out of place except in cases in which retention has either occurred or is threatened, or in which nothing but a filiform bougie or the small sizes of bougies can be passed.

For strictures of a calibre 18 to 20 of the French scale the conical steel sound is the best instrument. This should be passed gently through the stricture, no force being used and no attempt being made to increase the sizes more rapidly than is compatible with comfort. The object to be attained is to dilate the stricture so gradually as not to cause bleeding except in most moderate amounts.

For strictures below 18 F. the soft gum elastic bougies are safer, as the smaller sizes of steel sounds are deadly weapons except in the hands of the very expert.

Gradual Dilatation.—

The possibility of dilating a stricture by the passage of instruments of increasing size depends upon the stirring up of a mild grade of inflammation in the stricture, thus promoting absorption and softening the scar. For this reason instruments should be passed at such intervals as give the best results in individual cases.

The interval will vary from three to six or seven days, and the attendant should be guided by the facility with which the sizes can be increased. The average interval will be about once in five days. After dilatation has been carried up to 28 or 30 F. the interval should be extended as rapidly as possible without the occurrence of recontraction. In this way it may soon be increased from weeks to months, and a condition attained when the patient can either pass an instrument for himself, or visit his surgeon once or twice a year to see that the calibre has been maintained.

Any instrumentation should be followed by a thorough washing of the urethra, to remove as far as possible dangers of infection.

This form of treatment will fail in cases of old stricture with much scar-tissue formation, particularly those which bleed very readily, and in which each gain in size is accompanied by corresponding damage to the mucous membrane. If, after a moderate trial of one or two months, no notable gain has been attained, it is better to resort to some more radical form of treatment than waste further time in what is likely to prove a hopeless task.

There are also a certain number of what are known as "resilient strictures," which, though they can be dilated

up to or above 20 F., cannot be kept at this figure except by constant treatment, and show a very marked tendency to recontract. Under these circumstances, after a fair trial of gradual dilatation, resort should be had to cutting operations.

Continuous Dilatation.—The term "continuous dilatation" is applied to a method occasionally applicable to strictures of small calibre, through which only the smallest instruments can be passed. It may be tried on any passable stricture before resorting to cutting operations, but is likely to prove successful only in a small number

of cases. A filiform bougie may be passed through the stricture and fastened in place. After the lapse of twenty-four to forty-eight hours it will be found that a larger instrument can be inserted. These small solid instruments in the urethra do not interfere with the passage of urine. By gradually increasing the size every few days, with the patient, of course, under constant observation, it may be possible to obtain a calibre sufficiently large to warrant the employment of gradual dilatation. It is to be remembered, however, that this treatment is applicable only to a small class of cases under constant observation, and requires considerable skill and an intimate knowledge of the treatment of stricture in order to be successful.

URETHROTOMY.

General Preparation for All Urethral Operations.—Whenever possible any urethral operation, with the exception of meatotomy, should be preceded by a preparation as for any major surgical operation. Bowels, diet, etc., should receive careful attention. Urotropin in doses from ten to fifteen grains in twenty-four hours should be given for a day or two previous to operation.

Anæsthetics.—Meatotomy may always be done with cocaine anæsthesia. For all other urethral operations full surgical anæsthesia is in general to be preferred. Internal urethrotomy may be done under cocaine, but the anæsthesia is not certain to be complete and the surgeon is likely to feel hurried and to do the operation less thoroughly.

Before any cutting operation the exact position of the stricture should be ascertained by means of bougie à boule.

The operations upon the urethra coming under the head of urethrotomy may be divided into two general groups:

INTERNAL URETHROTOMY AND

EXTERNAL URETHROTOMY.—**Internal Urethrotomy.**—This procedure becomes the operation of election under the following general conditions:

1st. Stricture of the meatus. All narrowings of the meatus sufficient to be pathological are best treated by cutting operations, as dilatation in this region is likely to be both painful and unsuccessful.

2d. In strictures anterior to the bulb, large enough to admit the necessary instruments, under the following conditions:

- (a) When gradual dilatation, tried for a sufficient length of time, has failed to give good results.
- (b) In case of so-called "irritable strictures," namely, those followed by increased discharge, increase of spasm, urethral fever, etc.; also in the so-called "resilient strictures."
- (c) The presence of urinary fistulæ and other suppura-

tive peri-urethral complications not requiring perineal section.

(d) To admit the passage of instruments prior to operations within the bladder, as in litholapaxy or before operation on an enlarged prostate, to permit urethral drainage.

There are two general types of internal urethrotomy: 1st. The operation cutting from before backward. For this the Maisonneuve and modifications of this instrument (Fig. 4846) serve as a type. Briefly described, the operation is as follows:

A filiform bougie is passed through the stricture and the instrument is then attached to this as a guide. The shaft is passed down to the anterior face of the stricture and the knife is then pushed forward until all stricture tissue has been divided. The knife is then withdrawn into its sheath, the instrument removed, and a bulbous bougie or sound passed to ascertain that all the scar tissue has been divided. The objection to operations of this type are that it is difficult to divide the whole thickness of the stricture, and consequently the cutting has to be repeated.

2d. Operation cutting from behind forward.

In this country the instrument invented by Otis, and Wyeth's modification of the same, are much more generally used. These do their cutting from behind forward.

The Otis urethrotome is passed until the cutting blade is half an inch behind the posterior face of the stricture. The instrument is then screwed open until the stricture is put upon the stretch, when the knife is withdrawn so as thoroughly to divide the scar tissue. The instrument is then further screwed open in order to insure full dilatation at the point of incision. A full-sized sound should then be passed in order to ascertain whether or not the calibre of the urethra is normal. This operation is applicable to any part of the urethra anterior to the bulb.

In the portion of the urethra between the bulb and the posterior limits of the fossa navicularis all cutting should be done on the roof in the median line. Strictures in the fossa and at the meatus should be cut upon the floor. Strictures behind the limits above mentioned should not be treated by internal urethrotomy except when combined with external, on account of the danger of wounding large vessels and giving rise to primary or secondary hemorrhage. In all operations within the urethra, except at the meatus or of very minor degrees, it is wise to tie in a catheter for the first day or two. This serves the double purpose of preventing hemorrhage and avoiding a possibility of infiltration of urine.

Meatotomy.—Operations within an inch of the meatus may be done with a blunt-pointed straight bistoury, and, as above mentioned, all cutting should be upon the floor. If preferred, the Otis instrument may be used in the reversed position.

External Urethrotomy.—External urethrotomy becomes the operation of election for the great majority of all strictures at or posterior to the bulb, which require anything more than gradual dilatation. It will be seen, therefore, that the operations anterior to the bulb are amenable to internal, those posterior, to external ure-

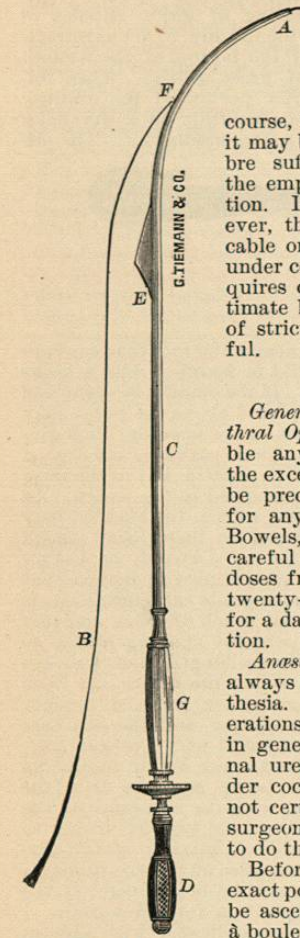


Fig. 4846.—Teevan's Modification of Maisonneuve's Urethrotome.

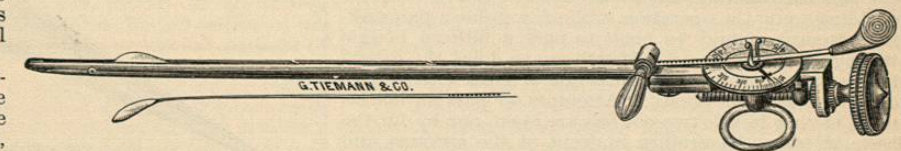


Fig. 4847.—Otis Dilating Urethrotome.

throtomy. This operation is particularly adapted to tight strictures of the bulbous portion, with or without urinary fistulæ; to traumatic stricture; and to all so-called impassable strictures. The type of operation in external urethrotomy will vary with the possibility of passing a guide through the stricture. It has become customary to speak of all operations done with a guide

as simply "external urethrotomy." When no guide can be introduced the term "external urethrotomy without a guide," or perineal section, is generally adopted.

External Urethrotomy with a Guide.—All the precautions above mentioned with regard to the preparation of the patient and location of the stricture should be observed. Full surgical anesthesia is necessary. The operation most generally done is that modelled after the operation originally described by Syme. It is briefly as follows:

The patient is placed in the lithotomy

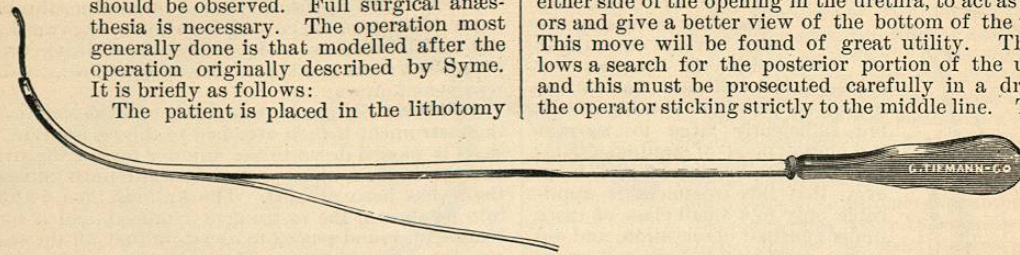


FIG. 4848.—Gouley Tunnelled, Grooved Guide.

position. A grooved guide is passed, care being taken to ascertain that it has entered the bladder, and is held strictly in the middle line. The knife is then introduced in the middle line of the perineum, about half or three-quarters of an inch in front of the anus or behind the stricture. With the blade of the knife turned upward, it is pushed rapidly forward until it strikes the groove of the guide, when the cut is continued upward, completely dividing all stricture tissue from behind forward. The guide is then withdrawn and a full-sized sound passed to make sure that the stricture is completely divided. This is withdrawn and a catheter is tied in place in order to drain the bladder and form a smooth surface around which the wound may heal. In regard to the length of time during which this catheter should

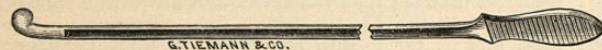


FIG. 4849.—Wheelhouse Staff.

remain in place much difference of opinion exists. Many of the best authorities advise that it should be removed after two or three days, long before the wound is healed and while urinary leakage will still occur freely. It has seemed wiser to me to leave the catheter in place for a week or ten days, or even two weeks, until the wound is nearly closed. It may be necessary to remove the first catheter and replace it by another, but I believe that smooth healing without complication is more likely to be obtained by the adoption of this course than when the catheter is removed in a few days and the urinary fistula allowed to close as best it can.

External Urethrotomy without a Guide.—Perineal Section.—This operation is among the most difficult and tedious of the operations of surgery. It should never be undertaken except by a surgeon who is prepared for a major operation. The best light, the best assistance, and the best surroundings should always be secured. Before deciding to do the operation without a guide a painstaking attempt should be made to pass a filiform bougie through the stricture, for, if this can be done, the operation is converted instantly from one of great difficulty to one of perfect simplicity. Attempts to pass an instrument having failed, two courses are open, one by far the best: to open the urethra in front of the stricture and attempt to find the opening in the stricture (Wheelhouse operation), or the knife may be boldly plunged into the apex of the prostate behind the stricture and the urethra opened at this point (Cock's operation).

Wheelhouse Operation.—For this operation a special straight grooved staff terminating in a hook, invented by Mr. Wheelhouse, is frequently used (Fig. 4849).

With the patient in the lithotomy position, this staff, with its groove upon the floor of the urethra, should be passed down to the face of the stricture. It is then in-

trusted to an assistant, to be held strictly in the middle line, and the urethra is opened at the point where the staff shows the face of the stricture to be. The staff is then turned so that its hooked extremity catches the upper angle of the wound and draws it upward. Mr. Wheelhouse advises the placing of guide stitches in either side of the opening in the urethra, to act as retractors and give a better view of the bottom of the wound. This move will be found of great utility. Then follows a search for the posterior portion of the urethra, and this must be prosecuted carefully in a dry field, the operator sticking strictly to the middle line. The ori-

fice will frequently be found nearer the roof than the floor and every likely pocket should be searched with a probe until the right one be found. If the bladder be distended with urine, pressure with the hand above the pubes may force a few drops of urine out at the opening, thus giving the key to the situation. Time, patience, and a good light are the prime requisites to success, but in the most skilful hands hours may be consumed in the search. In case of failure, after prolonged search, the bladder may be opened above the pubes and an instrument passed through the urethra from behind forward, or Cock's operation may be done. I am inclined to believe that suprapubic cystotomy and retrograde catheterization is an operation which has been too much dreaded, and that it may frequently be done without running a risk so great as that taken by a prolonged and fruitless search for the urethra. When the orifice has been found, a probe-pointed gorget or grooved director should be passed to the bladder and the stricture divided along the floor or dilated with a proper dilator. After this a full-sized steel sound should be passed to the bladder, it being made to turn the corner at the urethral opening with the assistance of the gorget. This having been done, the bladder should be washed out and a catheter tied in place to secure permanent drainage. Some authorities advise the drainage of the bladder with a perineal tube brought out at the perineal wound and left in position for a few days. I believe that, except in cases complicated with abscess formation or enlarged prostate, an in-lying catheter will secure sufficiently good drainage and promote a more rapid healing of the wound.

Cock's Operation.—This operation may be dismissed with the comment that to plunge a knife blindly into the tissues in order to open a urethra, the position of which is uncertain, is not to-day a sound surgical procedure.

MISCELLANEOUS METHODS OF OPERATION.—Divulsion.—The operation of divulsion, though still practised by some of the best genito-urinary surgeons, hardly comes

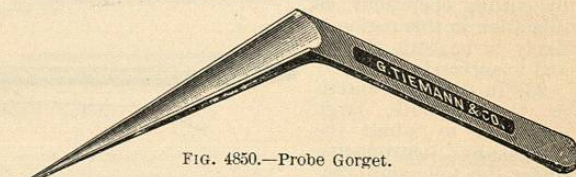


FIG. 4850.—Probe Gorget.

up to the standard of modern accuracy. It is impossible to tell in exactly what direction the splitting force will be exerted, and the rent may occur in an undesirable place. It seems to have no obvious advantages over a carefully practised internal urethrotomy, and is capable of giving bad results through the formation of excessive scar tissue.

Excision.—A considerable number of surgeons have

practised the operation of excising well-localized strictures through a perineal opening. These have been treated by an attempt to bring the ends of the urethra together, by grafting, and by plastic operations. In some of the best cases, however, the ends of the urethra have been left separated and allowed to granulate up over an in-lying catheter. The operation appears to have given excellent results in properly selected cases.

Electrolysis.—The application of electricity to the absorption of strictures has been enthusiastically advocated from time to time. Its advocates have, however, generally been enthusiasts whose results have not been verified by general experience, and it may be confidently asserted that electricity cannot be expected to cure organic stricture of the urethra.

PROGNOSIS OF OPERATIVE TREATMENT OF STRICTURE.—Internal urethrotomy is frequently referred to as a trivial operation, devoid of danger. This statement, however, cannot be allowed to stand in the face of statistics, and a practitioner advising the operation must reckon with a mortality in the vicinity of two per cent., when all cases are taken into consideration. While this is not a large mortality, it is sufficiently important to emphasize the necessity of doing the operation only when it is distinctly indicated.

Uncomplicated cases of external urethrotomy should not have a mortality higher than that of internal urethrotomy. The possibility of complications is, however, considerable, as the strictures of the deep urethra, to which this operation is applicable, are more likely to have affected the other urinary organs, thereby increasing the risk of any surgical operation.

Perineal section is an operation of considerable mortality, which cannot be accurately stated, but is probably in the vicinity of fifteen per cent. This is due to the fact that the cases are much less favorable for operation on account of the frequency of pyelitis and pyelonephritis, and the mortality is not directly due to the operation itself, but to conditions antedating the operation. It must, however, be considered as a distinctly dangerous operation, but the mortality should never deter a properly qualified surgeon, as the conditions which call for it are certain either to prove fatal or to leave the patient in a condition less favorable for operation.

RESULTS OF TREATMENT.—The ultimate results in the treatment of stricture of the urethra may be considered from two points of view:

- 1st. As affected by the position of the stricture, and
- 2d. By the method of treatment.

Position of the Stricture.—In general it may be said that the outlook for radical cure decreases with the distance the stricture is situated from the meatus. Stricture at or near the meatus, if treated by a proper cutting operation, is practically always entirely relieved. Strictures of the pendulous urethra can generally be radically cured. Strictures of the bulbous and membranous urethra generally require the more or less continuous use of instruments in order to maintain a full calibre.

Method of Treatment.—Gradual dilatation will radically cure a certain number of cases of stricture of the anterior urethra. The exact proportion cannot be accurately stated, but in the majority of cases the full calibre of the urethra is maintained only by the occasional passage of instruments.

Internal urethrotomy is more likely to produce radical cure in properly selected cases of stricture of the anterior urethra. The percentage of cures cannot with certainty be stated at over fifty per cent., and in extensive or narrow strictures it is not notably more successful than gradual dilatation.

External Urethrotomy and Perineal Section.—Strictures of the deep urethra requiring external urethrotomy or perineal section are rarely, if ever, radically cured by operation. A certain amount of recontraction is to be expected, and permanent cure should never be promised to the patient, though it may occasionally result. The old saying, "Once a stricture always a stricture," is nowhere more applicable than to the deep urethra.

Complications of Stricture of the Urethra.—The most serious complication requiring surgical treatment is abscess formation and infiltration of urine. The direction which the septic processes will take has been already described under the section on rupture of the urethra. Where the rupture takes place owing to an organic stricture of the urethra, the process is likely to be more insidious in its onset, but none the less disastrous in its consequences. Extreme destruction of tissue in the region of the bulbous and membranous urethra and in the loose tissue of the scrotum occasionally takes place. The treatment should consist in free incision and drainage of all accessible infected areas, together with relief of the stricture.

Hemorrhage.—Hemorrhage in operations for stricture of the urethra, either internal or external, is rarely serious. When occurring in internal urethrotomy it can be efficiently controlled by the passage of a full-sized catheter to the bladder, followed by pressure along the urethra against the catheter. This can sometimes be exerted by a T-bandage, pressing the parts snugly against the pubes, or by winding a narrow bandage or strip of adhesive plaster about the penis.

Hemorrhage following external urethrotomy can be controlled by pressure or by packing the wound. Care should be taken to ascertain that leakage is not going on backward into the bladder, as evidenced by the occurrence of clots in the urine coming through the catheter, or by failure of the catheter to drain. Should the hemorrhage taking place in this direction be alarming, it may be controlled by the distention of the deep urethra with a perineal tube, combined with packing the wound. These hemorrhages may be primary or secondary, and are rarely of serious note.

Septicæmia.—It is extremely rare to-day that serious general infection follows operations upon the urethra except where rupture of the urethra or abscess formation has already occurred. Much of the improvement is probably due to the use of urinary antiseptics, of which urotropin is at present the most valuable. However, in isolated cases extremely virulent streptococcus infections occur, which are as a rule rapidly fatal. Treatment should be addressed to supporting the patient's condition, and will probably have little effect upon the result.

Hugh Cabot.

URICIDIN is a granular salt containing the sulphate, chloride and citrate of sodium, the citrate of lithium, and other salts. It is made by adding 20 parts of sulphuric acid and 4 parts of hydrochloric acid to sufficient clarified lemon juice to represent 50 parts of citric acid. This is then nearly neutralized with sodium bicarbonate, 1 part of lithium carbonate is added, and it is evaporated down and granulated. It is employed in teaspoonful doses in gout and rheumatism.

W. A. Bastedo.

URINARY BLADDER, EXTIRPATION OF.—HISTORY.—The first operation for removal of the bladder was made by Bardenheuer, in 1887, in the male. The first operation in the female was made by Pawlik, in 1888. Since that time more than a hundred cases have been operated upon. In this country the operation has been done by many different surgeons, both in the male and in the female. In the female, Martin, of Chicago, was the first to operate, his first operation being in 1892. The bladder was removed with a uterine fibroid. He has also operated on several other cases. Mann,* of Buffalo, has operated on three cases, the first one in 1900. C. C. Frederick, of Buffalo, E. Reynolds, of Boston, and A. Laphorn Smith, of Montreal, have each operated once. The operations upon the male for exstrophy have been quite numerous.

INDICATIONS.—The indications for the performance of this operation are: first, incurable disease of the bladder, such as cancer and tuberculosis; second, exstrophy; third, incurable disease of surrounding organs which has begun

* Trans. Amer. Gyn. Soc., 1901.