penis than does the size of the esophagus with that of the neck. The objection to Dr. Otis's practice is that it involves an unnecessary and harmful amount of cutting, since, as a rule, the patient can get well without it, and the operation leaves the canal defective in expulsive power. The last drops of urine dribble away drop by drop, to the great inconvenience of the patient. Moreover, though this wide cutting cures strictures of the pendulous urethra, it does not cure deep strictures. The latter get well sometimes under all varieties of treatment—in most instances they require the occasional use of sounds for an indefinite period.

Yet Dr. Otis's work deserves the highest praise, in that he has shown us what great sizes may be attained with safety. And although he has not proved that his treatment is always essential, he has proved it most desirable in strictures of the anterior urethra incurable by a moderate course of sounds. Only recently Albarran and Guiard in France have insisted that some strictures must be dilated above 23 French!

Urethrotomy.—If at any stage of dilatation the stricture rebels and will not be dilated any further, the urethrotome must be resorted to.

Choice of Urethrotomy.—As was mentioned in describing the operations, external section is best suited to deep strictures, internal section to strictures of the pendulous urethra. There still remains a choice of instruments for internal urethrotomy, which choice is simply a matter of taste. For my part, I like Civiale's urethrotome for strictures near the meatus, Otis's dilating urethrotome for any other stricture large enough to admit the instrument, and Maisonneuve's urethrotome only for those strictures through which an Otis instrument will not pass.

After-treatment.—The after-treatment depends upon the location of the stricture.

If the stricture is in the pendulous urethra, the surgeon may feel confident that a cure persisting three months will prove permanent. When the stricture has been dilated fully, so that there are no longer any large shreds in the urine (unless from the posterior urethra), the patient may be dismissed to report in two weeks. If at that time there is no recontraction, he may be dismissed for a month, and again for two months, when his cure may be pronounced permanent. If, however, there is a relapse on any of these occasions, biweekly visits must be renewed, and the patient's cure insured by higher dilatation or a further cutting.

If the stricture is in the bulb the matter is different. In all such strictures, except those soft bands that yield to one or two passages

of a sound, recontraction will almost inevitably take place, unless the cure be maintained by the patient. This is easily done, and no intelligent patient objects to it. In a few lessons he acquires the art of gently passing a sound upon himself, and he should be seriously cautioned to perform this trifling but important operation at first weekly, then fortnightly, then monthly, studying his own case to determine how long an interval he may allow without sensible recontraction of his stricture. In this way, in some cases, the use of instruments may be gradually abandoned; in the majority, it will have to be continued indefinitely, at intervals varying from a week to a year. Thus the cure becomes radical. The surgeon is responsible for the cure only on condition that the patient carries out this plan; or, rather, the patient is responsible for the permanence of his own cure, and this he must be made distinctly to understand.

2. **Stricture of Small Calibre.**—To this class belong strictures admitting any instrument less than No. 15 French. They are considered separately, not because they require different treatment, but in order to emphasize the fact that they are better treated with soft than with steel instruments. The danger of making a false passage in an obstructed urethra with a small metallic instrument cannot be overrated. No one can appreciate the ease with which a false passage is made until he has himself made one. Indeed, it is not very uncommon for a patient or a surgeon, not well acquainted with the urethra, to make a false passage, and to go on dilating it instead of the stricture, wondering meantime that the size of the stream is not increased nor the symptoms alleviated. A surgeon who knows every line of the urethra may occasionally assume the risk of using a small metallic instrument in the canal without a guide, but only in exceptional cases. Below No. 15, soft instruments only should be employed, unless there be a guide through the stricture.

Dilatation is carried on as already directed, steel instruments being used as soon as the stricture will admit No. 15. Progress is slower with soft than with steel instruments.

Cutting (internal or external urethrotomy) operations are daily growing in favour in the treatment of strictures of small calibre; yet, in a case of uncomplicated stricture in the deep urethra, no matter how tight, if not resilient, and not of traumatic origin, if any instrument at all can be passed, dilatation is still the best method of treatment. Scarification and divulsion are mentioned only to be condemned. If you cannot dilate, cut; never divulse. Cutting may be resorted to:

a. If the stricture will not dilate.

b. If the patient has not the time to go through a long course of dilatation.

c. If urethral fever follows all attempts at dilatation.

3. **Stricture admitting only a Filiform, but not complicated by Retention.**—In commencing the treatment it may be impossible to enter the bladder with any instrument, either on account of the tightness of the stricture, or because the point of the instrument does not engage in the latter, or is arrested by some fold or lacuna beyond. In these cases gentle perseverance and skill will rarely fail of success. The different varieties of filiform bougies, with the maneuvres and expedients of introduction already detailed, will rarely fail to triumph over all difficulties. Sooner or later the bladder is reached,[1] and the case is under control. On the third or the fourth day the same filiform instrument will pass with greater facility, and a larger one will usually follow; the treatment by dilatation is fairly under way.

In those exceptional cases just alluded to, where a filiform bougie can be introduced only after long and persevering effort, it becomes a serious question whether it is not better either to tie it in, thus obtaining a more rapid and certain dilatation, or to perform urethrotomy at once rather than to incur the risk of having to operate without a guide later. The temptation to operate on such a case is great, but the necessity for operation is more apparent than real. The selection of treatment depends upon the requirements of the case. Urethrotomy is certain, and is usually the speediest cure, but it puts the patient in bed for a week, perhaps longer. Continuous dilatation, with the filiform tied in, is somewhat dangerous if the patient is up and about, but is a very satisfactory way of commencing treatment if he is willing to go to bed for a few days. Intermittent dilatation may result in retention, leaving him worse off than at first; yet, as a rule, on the third day the filiform may be reintroduced and followed by larger instruments, and the cure is under way. The alternative so frequently employed of introducing a tunnelled sound forcibly over the filiform usually amounts to divulsion, and as such is a dangerous practice; but, if the tunnelled sound can be insinuated gently this is an excellent measure.

If continued dilatation is selected, the filiform should be replaced on the second or the third day by a slightly larger instrument, and this removed one or two days later, after which intermittent

[1] In one (personal) case it required ten sittings, most of them over one hour long, before any instrument could be made to enter the bladder. At the tenth effort, the instrument passed.

dilatation may be taken up, or dilatation may be begun when the filiform is removed.

4. **Retention.**—A patient with stricture may be enjoying good health, when suddenly, after exposure to cold, after a dinner or a carouse, or after the passage of a small instrument through his stricture, he finds that he cannot pass water. If he does not get relief, his bladder fills up, and after twenty-four to thirty-six hours, most of which time is passed in acute suffering, a little urine forces its way through the stricture, and he has overflow (often inaccurately styled incontinence). Such an overdistention of the bladder ultimately causes atony; hence every means should be employed to avert it, and to preserve the bladder from an injury the effects of which are sometimes permanent.

The most frequent cause of retention is sudden acute inflammation of the stricture, by which the already narrow canal becomes occluded. In this condition, as a rule, a fine catheter, or filiform bougie, can be introduced by the exercise of patient gentleness and skill. If the bladder is reached, a flow of urine will follow the withdrawal of the instrument. If the bladder cannot be reached, the patient should be placed in a hot bath, more hot water being added after he has become accustomed to the first heat, and this carried as high as bearable. He should remain in the bath from fifteen to twenty minutes, and will often be able to empty his bladder while in the water. A sitz bath, at a temperature of 100° to 104° F., is sometimes more effective than a full bath, but it should only be continued for about three minutes, and may be repeated after an interval of fifteen minutes. If the heat is sufficient to induce nausea or faintness, it is more likely to produce the desired effect of relaxing the stricture.[1] A piece of ice in the rectum every few minutes may be tried (Cazenave).

If these expedients fail and percussion reveals a bladder only slightly distended, reaching not more than half-way up to the umbilicus, 5 centigrammes of opium may be given every hour. The nervous excitability attending retention is thus relieved. The pain soon ceases, the patient's fears become quieted, and after the fourth or fifth dose urine will generally flow. Twenty-drop doses of the sesquichlorid of iron, administered every fifteen minutes, for two hours, at the same time with the opium, seem to facilitate relaxation of the stricture. Finally, an instrument can often be introduced under the entire relaxation of anesthesia.

[1] In a robust and full-blooded subject, blood may be drawn from the perineum by leeches.

In a case of retention, if a filiform bougie can be passed into the bladder, the advantage so gained should not be lost, but the instrument should be tied in and treatment by continuous dilatation (see above) or urethrotomy instituted. If no instrument can be passed and all other means fail, the bladder may be aspirated every eight hours for one day. Then the patient is put into a hot bath for twenty minutes, a 2% solution of cocain is injected into the urethra and held there for five minutes, and a final attempt made to introduce a filiform. This failing, the stricture may be fairly considered impassable.

In drawing the urine from a distended bladder it is well not to remove more than 25 c. c. (℥viij) at a time. If there is more than this draw off the remainder after twenty minutes. Too quick emptying of an acutely distended bladder has been followed by hemorrhage, collapse, and sudden death.

5. **Impassable Stricture.**—No stricture (congenital atresia excepted) is impervious unless the urethra has been cut across and united anteriorly, all the urine escaping behind the cut, or unless stricture has gone on contracting for an indefinite period, the urine escaping through large fistulæ. If a drop of urine can pass, the stricture is pervious, but nevertheless it may be impassable to any instrument, or to any skill and patience we may bring to bear upon it, and that, too, although the urine flows in a considerable stream. The absence of retention relieves the surgeon of the immediate necessity of emptying the patient's bladder and gives him time to coax the stricture into admitting an instrument. When there is retention time may be gained by aspiration.

How far the surgeon shall continue coaxing the urethra before resorting to external urethrotomy without a guide is a matter to be decided on the merits of each individual case. If the patient has had retention before, his experience then will aid in forming a judgment. If the surgeon is acquainted with the temper of the urethra and the character of the stricture (resiliency, traumatic origin), he may found his opinion on such previous knowledge. If the patient is difficult to manage, and there is fear that, once relieved from his present necessity, he may not submit to treatment, it would be only a kindness to take advantage of his misfortune by insisting upon perineal section at once, thus putting him in the way of keeping off further trouble by the passage of a large instrument.

But external perineal urethrotomy without a guide is an exceedingly difficult operation, and is not to be undertaken unadvisedly. If it is the patient's first retention, if he was previously passing a

fair-sized stream, and if the bladder is not already too full, it is always well to try palliative measures. But, on the other hand, it is not wise to fritter away time to the permanent detriment of the patient's bladder and kidneys when a single stroke of the knife would solve the difficulty.

6. **Traumatic and other Resilient Strictures.** — As has been observed (p. 37) traumatic strictures close down with great rapidity and are very rebellious to treatment. They are resilient. When dilated ever so little they recontract and often are made worse, rather than better, by sounds. Under such conditions dilatation is a losing game. The knife must be used. When the scar is linear, simple perineal section will suffice to render it amenable to the sound. When, as is often the case, the scar is annular and fibrous, all the scar tissue, both on roof and floor, must be cut away. The urethral wound may need to be closed by suture or graft, but that does not signify: the scar must be removed at all costs, since it never loses its retractile quality, and simple section will be followed by a recontraction almost as rapid as after the original injury.

Other resilient strictures must be dealt with similarly.

7. **Inodular or Indurated Stricture.**—Strictures which involve a considerable length of the urethra, masses of scar whose irregularities can be felt externally, and strictures complicated by fistula often do ill under dilatation. When they come to operation they may perhaps be improved by simple section, but the only way to do them justice is to excise the urethral roof and floor and if necessary to fill in the gap by suture or graft.

8. **Stricture complicated by Prostatitis** (*Irritable Stricture*).—Many strictures classed as irritable in reality present no peculiar irritability in themselves, but, situated in the bulb, they are complicated by a catarrhal prostatitis. As soon as the point of the sound or the bougie passes well through the stricture it glides over the prostatic urethra—the really irritable point—though, be it understood, only the minority of strictures complicated by prostatitis are irritable—and provokes an exacerbation of the prostatic inflammation, and very likely a sharp chill. When such a complication presents itself the simplest solution is perineal section; but this is not always essential. By bracing the patient's general health, by treating the prostatic inflammation, by using the utmost gentleness in sounding, by preferring bougies which are less violent to the prostatic urethra than sounds, or else blunt sounds whose points need not enter the prostate at all, and by treating the stricture only sufficiently to permit local treatment of the prostatitis until the latter is materially

improved—by such means the operation may often be avoided. Yet I know no condition which may more tax the surgeon's experience and ingenuity.

Summary of Treatment of Stricture

1. Alkalies, diluents, and rest are serviceable in most cases of stricture—sometimes indispensable if there be any serious complication.

2. All uncomplicated strictures, not highly irritable or resilient, should be treated by dilatation with soft instruments up to No. 15 French, and with conical steel sounds afterward; reintroductions being made every third or fourth day.

3. Until well acquainted with the temper of a given stricture every sounding should be preceded by urotropin, followed by nitrate of silver.

4. Dilatation need rarely be carried beyond the calibre of the normal meatus.

5. Any stricture resisting dilatation must be cut.

6. For the pendulous urethra, internal urethrotomy. For the perineal urethra, external urethrotomy or the combined operation.

7. In general, anterior stricture of the urethra is curable, deep stricture of the urethra incurable.

8. Impassable stricture without retention may usually be overcome with whalebone bougies by time, patience, and skill. If finally proved impassable, the treatment is external perineal urethrotomy.

9. Retention is treated by hot baths, ether, opium, tincture of the sesquichlorid of iron; failing these, by aspiration, or by external urethrotomy without a guide.

10. Traumatic stricture may be prevented by section at the time of injury. Once having shown itself, it usually requires excision for a cure.

11. Resilient and inodular strictures are best treated by excision.

12. Irritable strictures may often be cured without cutting.

Case of Urethral Instruments

The subjoined list includes the instruments required by the general practitioner for the treatment of stricture:

Gauge.
Conical steel sounds, Nos. 15 to 33, preferably double taper from 24 up.
Several whalebone filiform guides.
Conical woven French bougies, sizes 5 to 18.
Set of bulbous bougies, or blunt sounds, or a urethrometer.

Instillation syringe.
One soft-rubber catheter.
Conical woven olivary catheters, small and large.
One silver catheter, No. 6, tunnelled.
Steel sounds.
Otis or Maisonneuve urethrotome.
Aspirator.
Staffs, large and small (tunnelled).
Blunt-pointed straight bistoury.
Female catheter.
Heavy soft-rubber perineal tube.
Probes, directors, needles, knives, etc.
Bottle of 10% nitrate-of-silver solution.
Lubricant.
Clover's crutch.

Self-retaining catheters, straight sounds, dilators, urethrotomes, Wheelhouse staff, etc., may be added, according to the surgeon's preference.