

but is oftentimes beneficial in causing atrophy of the hypertrophied prostate gland.

Patients suffering from the effects of residual urine due to prostatic hypertrophy should not employ a catheter too frequently. A number of individuals have come under my cognizance who were affected with urethrocystitis complicating an obstructive prostate gland, and who were in the habit of inserting the catheter at least

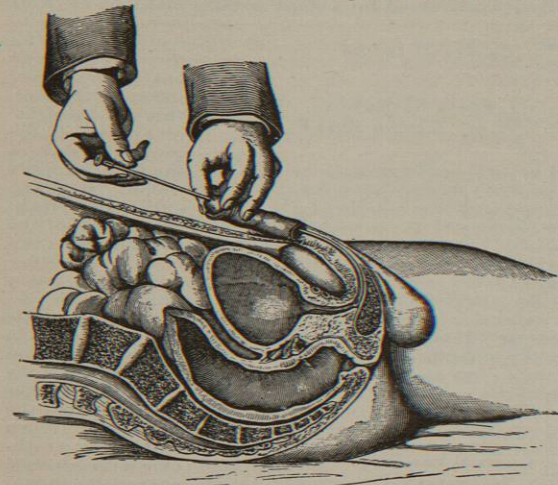


Fig. 1191.—Showing Passage of a Curved Instrument through the Anterior Urethra. (Englisch.)

once an hour. The too frequent use of the catheter undoubtedly increases the inflammation of the urethra and bladder. When the desire for urination is frequent and urgent, rendering the repeated introduction of a catheter necessary, the individual should be put to bed and continuous catheterism instituted until the inflammation at the neck of the bladder has subsided, after which some permanent relief should be afforded by an appropriate operation. In cases in which the urine is sterile the frequency with which catheterism may be resorted to is well formulated by White, who says: "When the urine is sterile it is rarely necessary to catheterize more than once in four hours. The frequency should be in proportion to the amount and character of the residual urine, a very good working rule being the use of the catheter once a day, preferably at bedtime, for three ounces, twice for six ounces, and then once more for every additional two ounces."

A curved metal instrument, whether catheter or bougie, is to be passed through the urethra on precisely the same principles as those which have already been stated. The patient is to be placed in the position which was recommended when I described the manner of introducing a rubber catheter. The surgeon stands on the left side, grasps the penis in the manner already described, and stretches it gently upward toward the middle line of the abdominal wall, thus obliterating the curve of the penile urethra and lessening the dilatability of the bulb. The proximal end of the catheter is held lightly in the right hand, with the handle well over the left thigh. The vesical end is then inserted into the meatus, and kept in contact with the floor of the urethra until the lacuna magna is passed and the curve of the instrument is fairly in the canal. The handle of the instrument is moved to the middle line of the abdomen, and the right hand gently, but firmly, and with uniform force, pushes the catheter into the urethra, at the same time stretching the penis gently on the shaft of the instrument until the right and left hands are about three inches apart.

The catheter continues to glide along the urethra until

its onward progress is slightly retarded; which means that the beak has reached the sinus of the bulb, is in contact with the anterior layer of the triangular ligament, and is ready to pass through the fixed curve of the canal. The operator now takes hold of the instrument with the left hand and slowly and gently changes it from the horizontal to the vertical position, bringing it down between the thighs, when the catheter will pass through the membranous and prostatic portions of the urethra. The changing of the instrument from a horizontal to a vertical position brings the curved portion directly under the pubic arch, which is opposite the opening of the membranous urethra, behind the triangular ligament. Should any obstruction be met with at this point, no attempt should be made to carry the instrument onward until the temporary contraction of the compressor urethrae muscles has relaxed. If the retraction be due to the impinging of the tip of the instrument on the triangular ligament, it should be slightly withdrawn, the handle of the instrument well depressed between the thighs, bringing the tip of the instrument in contact with the superior wall of the urethra, when, by gentle pressure made in the axis of the body, it can be readily passed into the bladder.

Occasionally it happens that the dilated mouths of the ducts leading to Cowper's glands will be sufficient cause for the arrest of the progress of an instrument. When this occurs it will be found that the point of the instrument has deviated either to the right or to the left of the median line and that it is impossible to urge it onward. By slightly withdrawing the instrument and keeping the tip in contact with the anterior wall of the urethra, the obstacle will be overcome.

Should the instrument be arrested at the bulb, the right hand should be passed back of the scrotum and with it the shaft of the instrument raised, whereby its onward progress will be greatly facilitated. When the arrest is due to a prostatic hypertrophy, the index finger of the right hand may be inserted into the rectum and the catheter gently lifted upward, when it will advance without further trouble.

Englisch describes a rare form of obstruction which when present gives rise to a good deal of trouble. Owing to an unusually firm attachment of the penis to the symphysis pubis, by means of the suspensory ligament, a band is formed, and with it is associated a dilatation or pocket of the superior wall of the urethra, which is apt to catch the tip of the instrument and prevent its further progress. It is on lowering the beak of the catheter, in order to pass the obstruction, that a false passage is apt

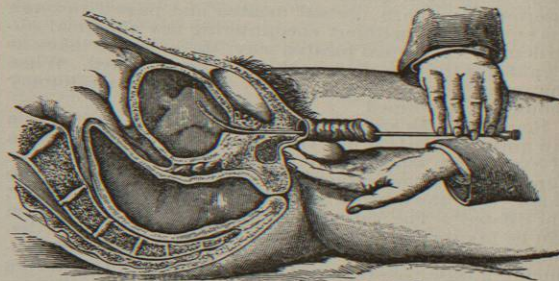


Fig. 1192.—Showing the Passage of a Curved Instrument through the Posterior Urethra. (Englisch.)

to be produced. When failure to pass a catheter is due to this cause, the right hand should be placed on the body of the penis, just in front of the symphysis, and the organ gently pressed downward; at the same time the instrument should be withdrawn about half an inch by means of the left hand; the handle of the catheter is then slightly elevated in order to place the tip of the instrument on the floor of the canal, after which it should be slowly pushed onward until the obstruction is passed.

The dilated mouths of the ejaculatory ducts will in rare instances impede the passage of a catheter. Should this condition exist, the tip of the instrument must be kept in contact with the roof of the prostatic urethra. But it must be borne in mind that the superior surface of the prostatic urethra, especially in the posterior portion, is quite thin and can be easily punctured. It must always be recollected that perineal and scrotal tumors, as well as prostatic hypertrophy, change very materially the fixed urethral curve. When any of these conditions exists catheters with a curve suitable for the altered condition must be selected.

In most instances when the catheter reaches the bladder the urine begins to flow; after the instrument has entered the cavity, it will be found that it is freely movable along its axis, and that the beak can be readily turned in all directions.

When there is an enlargement of the middle lobe of the prostate gland, the urethra is elongated to a marked degree, and the operator may fail to draw off the urine owing to the fact that the catheter has not been introduced sufficiently far, or that it is too short to reach the distended organ.

Occasionally it will be found that after the catheter has entered the bladder the urine will not be expelled. This may be owing to many reasons. The most common cause is the blocking up of the eye of the instrument with either pus or blood. These obstacles may be overcome by passing through the catheter a warm five-per-cent. solution of boric acid. The failure to evacuate may be due to an atonic condition of the bladder, owing to a lack of proper muscular contractility of the walls of the organ. This difficulty may be surmounted by placing a hand on the abdomen just above the pubes and making gentle pressure over the distended viscus.

The eye of the instrument may be obstructed by coming in contact with the mucous membrane of the bladder. This condition may be readily obviated by giving the wrist a slight twist, or by moving the catheter back and forth. When the bladder is distended this impediment cannot arise. In rare instances the urine is lodged in a diverticulum. When this occurs the fluid cannot be reached by a catheter.

Suppression of the urine may be mistaken for retention. When suppression exists the characteristic symptoms of retention are absent; there is no pain, spasm, or sense of weight in the pelvic region. A constant desire to urinate, associated with tension, is present. There may be dribbling of the urine, or but a few drops are passed at a time, but there is never a full stream. There will be absence of the characteristic, hard, pyriform tumor, which is fluctuating, but not affected by change of posture, and which is always situated in the median line. The absence of these well-marked symptoms of retention should prevent any difficulty in making a differential diagnosis.

When residual urine is associated with an excessive enlargement of the prostate gland, the beak of the catheter, on entering the bladder, is liable to be high above the level of the fluid lying in the pocket at its base. When this condition exists, it is recommended that the individual be instructed to lie on his side, or to assume the "kneechest position"; an attitude exceedingly unpleasant to many patients. The resort to such expedients shows that the time for operative interference has arrived.

In nervous patients, or in those in whom the urethra is inflamed or irritable, a urethral injection of one drachm of a two-per-cent. solution of cocaine should be administered, and it should be kept in contact with the irritated surface for the space of five minutes before instrumentation is attempted. An excellent local anesthetic has been suggested by Lydston, who claims that "it is absolutely safe, free from constitutional effects; distinctly lessening the hemorrhage both before and after operation; and causing less disturbance of nutrition of the wounded tissues." It consists of a ten-per-cent. solution of antipyrin in one per-cent. solution of carbolic acid. The solution should be fresh and allowed to remain in the urethra for

ten minutes. I have employed this frequently as a substitute for cocaine with most satisfactory results.

The passage of straight tubes through the urethra into the bladder requires a slightly different manipulation, and more skill than is needed for the introduction of curved instruments. The procedure is also attended by greater danger of traumatism. At the start a straight instrument is inserted into the urethra in the same manner as an ordinary catheter, except that it is entered parallel with the middle line of the abdomen and slowly passed into the urethra toward the rectum until it cannot be advanced any farther in that direction; it is then slowly brought from the vertical to the horizontal position, pressure being made at the same time with the right hand on the body of the penis directly in front of the symphysis pubis; which not only assists to relax the suspensory ligament, but helps to straighten the curve of the urethra. In order to be sure that the point of the instrument is not caught in the dilatation at the bulb it should be slightly withdrawn, the handle of the instrument being brought well down between the thighs, and then pushed gently upward in the axis of the body. In old men with a dilated bulbous urethra or a prostatic hypertrophy the passage of a straight catheter is often impossible.

In attempting to pass filiform bougies it is well first to distend the canal by gently injecting a syringeful of liquid aseptic cosmoline. The filiform is then introduced into the meatus and passed slowly down to the obstruction, the patient's face meanwhile being carefully watched for the slightest expression of pain; should this arise the onward passage of the filiform must cease. The least impediment to the passage of the bougie should warn the operator that he has introduced the instrument as far as is justifiable. A second filiform should then be introduced in the same manner, and the process repeated until six or eight whalebones have been inserted, when the operator gently tries each in turn to see if the opening in the stricture can be found. This manœuvre requires care and patience. Under no circumstances is force to be employed. The opening in the stricture may be situated above or below, or at the right or left of the centre. When the attempt is made to pass a filiform bougie the tendency is for the operator to work toward himself; consequently if the opening is on the right side, and if, after a fair trial, he finds that the attempt to insert the instrument whilst standing on the left of the patient fails, he should change his position to the other side of the patient. Upon renewing the attempt in this new position he will often find that the instrument will readily pass through the stricture.

In eccentric stricture the opening will probably be found by this manipulation. When the instrument glides through the contraction with little or no pain, and without force being required, it will pass into the bladder and be freely movable in the urethra. These instruments are frequently made with a spiral twist or angle at the end, on the supposition that the physician can more readily pass such a one should the stricture be eccentric. As a rule, the straight instrument is all that is required.

The failure on the part of many practitioners to use successfully filiform bougies is owing to several reasons: The instruments sold in the shops are more often than otherwise worthless; they are too stiff, not well rounded, do not terminate in a proper neck, and are generally too large to serve as guides to small-sized tunnelled catheters which are designed to pass over them. The surgeon should make his own filiform bougies; a dozen properly constructed will, with ordinary care, last through several years of active practice. An important rule to follow is to employ the filiform before a bougie, catheter, or any other instrument has been passed into the urethra. If an instrument has been previously used it will generally be useless to attempt the passage of the filiform; failure being the usual result. The operator must not be sparing of his time in these cases; infinite patience is a necessary element of success.

To introduce a tunnelled catheter successfully over the



filiform and through the stricture the instrument should be gently passed down to the obstruction, then transferred from the right to the left hand, and whilst the hand holding the penis puts it on the stretch the filiform is slightly withdrawn about a quarter of an inch, and then both filiform and tunnelled catheter are to be carried together through the stricture. This procedure prevents the catheter from cutting the filiform in two and assists in guiding the instrument through the obstruction.

Catheterism in children must be very gently performed, as the urethra at the bulbo-membranous junction is very easily torn. Keegan has pointed out that the capacity of the urethra varies in children of the same age much more than does that of the adult. Litholapaxy in children has proven that the dilatability of the urethra is far greater than was formerly supposed. Freyer reports a successful case of litholapaxy in a child eighteen months old. Catheterism in children is to be conducted on the same principles as those which guide us in performing the operation in the case of an adult; the utensil used must be of a size suitable to the calibre of the urethra. When curved instruments are employed, the arc should be increased over that of the ordinary normal bend of the urethra and should describe the arc of a smaller circle.

Catheterism in women, as a rule, is easily accomplished by touch, without the assistance of the eye. It is difficult to locate the meatus in old women, especially if they have borne many children, the landmarks being obliterated, and the meatus being removed farther back than is normal. The dilatation of the mouths of the ducts leading to the glands situated in the vicinity of the urethra; an ante-flexed uterus; hypertrophy and cysts of the labia; papillomatous growths or cicatrices in the vicinity of the meatus—all these may render it very difficult or even impossible to locate the urinary opening by the sense of touch. When any of these conditions arises I am averse to catheterism being performed by touch. It is fraught with danger to the patient; infection of the bladder being very apt to ensue. I have seen many cases of cystitis in women thus produced. Before the catheter is used the external genitalia should be carefully sterilized and if practicable a vaginal douche should be administered. Especially is this to be done after childbirth, and following operations on the uterus, vagina, and external genitalia, or when the patient is suffering from some specific inflammatory condition. When attempts are made to pass the catheter by the sense of touch, the operator is unable to determine whether the pathological secretions have been removed and the parts properly cleansed before he inserts the instrument. There is always more or less uncertainty in at once locating the meatus; the instrument is apt to be thrust in different directions before the opening is located. If the vulva and vagina have not been properly sterilized an infected catheter will assuredly be inserted into the bladder; hence it should be insisted on in every case that female patients be catheterized by aid of the eye rather than by touch. To pass the catheter by touch, the woman lies on her back with the thighs slightly flexed and the knees elevated. The thumb and index finger of the left hand separate the labia. The middle finger is then inserted

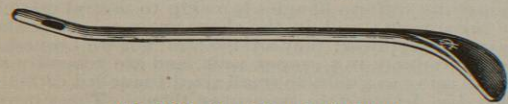


FIG. 1193.—Sims' Female Catheter.

into the vagina and passed backward and upward until the superior wall is reached; it is then to be brought forward until the depression in which the meatus is situated is felt. This spot having been determined, the finger is passed a little backward and held firmly in place while the catheter, which is in the surgeon's right hand, is passed over the finger, which is in contact with the upper wall of the vagina, and serves to guide the instrument into the urethra. After it has entered the meatus the in-

strument should be carried backward, upward, and then directly backward. When the instrument is to be passed by sight, the patient is brought to the edge of the bed, the legs are flexed, and the feet allowed to rest on the side of the bed. The genitals are cleansed and sterilized and the labia well separated by the index finger and thumb of the left hand. If the genital organs are in normal condition the meatus comes at once into view, when the catheter can be readily inserted. Female

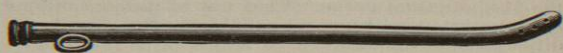


FIG. 1194.—Ordinary Pattern of Metal Female Catheter.

catheters are straight tubes made of either glass, silver, or German silver, the former being preferable. They should be six and one-half inches in length and 14 F. in circumference. They are always to be sterilized by boiling. When abnormal conditions exist, it may be necessary to employ either a male soft rubber or a flexible woven catheter.

The durability and usefulness of rubber urethral instruments depend on the care taken to preserve them. In order to employ catheterism with safety to the patient, it is essential that the surgeon should be thoroughly familiar with the modern methods in vogue for the preservation and sterilization of instruments, and for the proper sterilization of the urethra and hands of the operator. Like all other surgical procedures, aseptic catheterism requires that the hands of the operator, the instruments employed, as well as the preputial fold, glans penis, and urethra, should be rendered as nearly sterile as possible.

Unfortunately the urethra is the normal habitat of a variety of micro-organisms, some of which are harmless, while others become virulent when the physiological resisting power of the urethra is lowered by injury or disease. It is probable that when the urethra is in a pathological condition, the intra-urethral microbe life increases in activity, and also that the micro-organisms that were apparently harmless in the normal condition become virulent. The introduction, into the canal, of infected instruments producing slight traumatism from careless handling, or an abrasion of the mucous membrane from friction, may cause not only constitutional infection, giving rise to some of the various forms of urethral fever, but also secondary infection of some of the adjacent urinary organs which are connected with the urethra. Lustgarten, Mannaberg, Melchior, Legroin, and others have conclusively demonstrated that the urethra normally contains, among other forms of micro-organisms, staphylococci and streptococci, which in all probability become active when infected instruments are inserted into the healthy urethra. Dirty instruments, especially if they injure the mucous membrane at the same time, both give rise to a suitable soil for the nidus and growth of these microbes, and at the same time introduce into the urethra pathogenic micro-organisms which were not present previous to the passage of the catheter.

Many persons have contracted virulent gonorrhoea in this manner. In one instance, which I saw in consultation, violent infection followed the insertion of a steel bougie; it produced cellulitis, gangrene, and sloughing of the under portion of the corpus spongiosum, with extensive hypospadias—conditions which rendered necessary several plastic operations before the cure of the case was completed. Besides the micro-organisms enumerated a bacillus is found so closely resembling the tubercle bacillus that it is nearly impossible to distinguish between them. It is probably a smegma bacillus. Its presence is frequently the cause of a mistaken diagnosis of tuberculosis of the genito-urinary tract. There are also several varieties of diplococci which so closely resemble those of Neisser in every respect that in some forms of chronic urethritis they cannot be distinguished from the gonococci. From what has been said it is evident that it is impossible to render the urethra aseptic; therefore the term "aseptic

catheterism" is a misnomer. A catheter may be made aseptic, but efforts made to sterilize the urethral tract are abortive. Unfortunately, antiseptic remedies of sufficient strength to render the urethra sterile cannot be employed. When the urine is alkaline and purulent, much may be accomplished by the internal administration of such remedies as have a tendency to sterilize the urine. At the same time irrigation with any weak antiseptic solution should be employed, and the instruments and the surgeon's hands should be thoroughly cleaned and sterilized.

Since the introduction of antiseptic methods of catheterism, not only has the mortality of urethral operations materially diminished, but patients make a more rapid convalescence; in most instances they escape urethral fever and such complications as urethritis, prostatitis, cystitis, orchitis, and infection of the kidney. Evacuating catheterism can be performed with less danger to the patient, cystitis and orchitis being infrequent complications under these circumstances.

When the urine is alkaline, containing pus or blood, especially if the microscope reveals the presence of the bacillus coli communis, the employment internally of such remedies as quinine, boric acid, salol, eucalyptus oil, and urotropine is indicated; the latter remedy is the most efficient. When the gonococci are present, methylene blue, given separately or in combination with cubeb, copaiba, or sandalwood, is frequently of service. The hands of the surgeon should be carefully washed and scrubbed with soap and water, especial attention being given to the subungual spaces. Afterward they should be rubbed with a piece of sterilized gauze saturated with alcohol, with a view to dissolving the fatty matter of the skin, thereby removing the material which serves to shelter microbe life. In order to perform catheterism with the least danger of infection, it is essential that the hands should be as clean as soap and water can make them; it is not necessary to complete the sterilization by immersing them in a solution of the bichloride of mercury, unless some more formal operation is to be performed.

As microbe life swarms in the vicinity of the foreskin, preputial folds, and glans penis, the parts should be thoroughly washed with soap and water, and then bathed with a solution of bichloride of mercury of a strength not greater than 1 to 5,000. Care should be observed not to allow the solution to be introduced into the urethra; severe urethritis might be produced. Antiseptic solutions which are employed to irrigate the urethra should be very weak. A corrosive sublimate solution should never be stronger than 1 to 20,000. Irrigation with a solution of the strength advised is indicated before an operation on the urethra, prostate gland, or bladder is commenced. It is sometimes beneficial in tuberculous lesions of the genito-urinary tract. It should not be employed as a daily irrigation by patients who practise auto-catheterism, as its continuous use is apt to give rise to urethritis. Permanganate of potassium solution may be employed in varying strength, from 1 to 5,000 to 1 to 2,000. In a solution not stronger than here indicated it can be used daily with great benefit, rarely giving rise to irritation. Nitrate of silver solution of a strength of 1 to 10,000 is sometimes employed, especially when chronic inflammatory conditions of the urethra and bladder exist.

One of the least irritating and most satisfactory cleansing solutions, when the catheter is being used daily, is a warm five-per-cent. solution of boric acid. If there is no infection of the urethra nothing is more serviceable, previous to catheterism, than an irrigation with a warm normal salt solution.

Beck, in the *Medical News* for January, 1900, has suggested the prophylactic injection of a five-per-cent. emulsion of iodoform and glycerin before the introduction of an instrument into the urethra. He claims that "if an abrasion is caused the iodoform will come in contact with the wound at the very moment when it is made and with the wound serum at the stadium nascendi. Iodine is set free and during this chemical process bacteria are de-

stroyed or the development at least is arrested." This is an excellent suggestion, and I have often employed the remedy, but patients frequently object to its use on account of the disagreeable smell of the iodoform.

It is useless to expect the patient to sterilize the external genitals and urethra whenever the catheter is to be inserted; nor is this absolutely essential. If the individual can be impressed with the danger of neglecting the ordinary methods of cleanliness, there will be but little difficulty in getting him to wash and cleanse the parts at least once or twice a day and to use only sterilized undamaged catheters. In cases in which the patient is able to pass his urine, but in which catheterism is necessary, it is well to instruct him first to urinate, thereby "flushing" the urethra before the canal is irrigated preparatory to the introduction of the instrument. In cases of retention of urine the urethra in front of the obstruction should always be irrigated with either the salt or the boric-acid solution previous to instrumentation. In retention due to acute urethritis the canal should be irrigated with a solution of permanganate of potassium not stronger than 1 to 3,000 before attempting catheterism. A catheter which has been employed in a case of retention of urine due to acute gonorrhoea should immediately be sterilized by boiling after using, when it may be laid aside until it is determined whether its employment is again necessary. It should be used on but one individual.

The preservation and durability of soft-rubber and web catheters depend on the manner in which they are cared for. Rubber or gum-coated catheters should never be coiled; they should be kept at full length, perfectly straight; means being taken to prevent them from coming in contact with each other. As soft-rubber catheters when exposed to the air undergo oxidation, it is essential after they have been sterilized that they should be wrapped in moist sterilized gauze and secured in tightly closed glass tubes. English states "that vulcanized caoutchouc catheters are best preserved in asbestos."

Web catheters are stored in the same manner. Coiling these instruments causes their gum coatings to crack, thus rendering sterilization impossible and increasing the chances of their injuring the urethral mucous membrane. If a soft-rubber instrument has become hard and brittle, or if it is greatly lengthened and softened by the use of the lubricants employed, it should be discarded. Flexible instruments should not be employed when the coating is not perfectly smooth or if they show the least abrasion, fissure, or crack.

Soft-rubber catheters may be sterilized by boiling for five minutes; they are not injured by the process. The finest grade of web catheter will withstand boiling without injury unless it be repeated too frequently or continued for too long a time, when the coating is liable to become blistered and the instrument rendered worthless. After a rubber or web catheter has been employed it should be thoroughly washed with soap and water and a full stream of water allowed to flow through it. It is

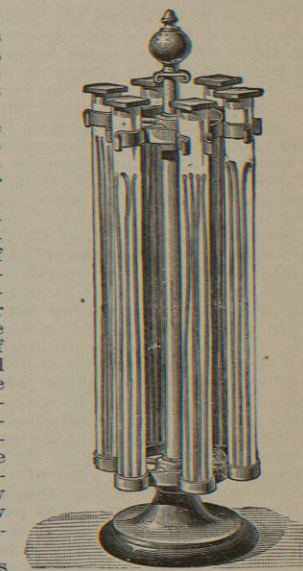


FIG. 1195.—Hermetically Sealed Glass Tubes for Storing Sterilized Catheters, with Convenient Form of Stand.



then placed in the glass cylinder known as a "catheterostat," which serves for both a sterilizing and a storing jar. It was devised by Frank and Dufaux. It consists of a glass cylinder sixteen inches long, having on the inside near the rim a shelf on which rests a perforated metal plate for holding the rubber instruments. In the bottom of the jar is placed a dozen tablets of trioxymethylene, which is a derivative of formal. It has been demonstrated by the experiments of Janet and Guyon that this antiseptic is the least harmful and the most efficient that can be employed for catheters of ordinary calibre. An exposure to the fumes of these tablets for twenty-four hours is sufficient, unless the instruments be of very small calibre, when they should be allowed to remain exposed to the sterilizing fumes for at least three days. These exhalations are given off at a temperature above 56° F.; below this point vaporization does not take place. The apparatus should, therefore, be kept in a warm room. The tablets preserve their efficiency for a long time and waste imperceptibly.

A metal box for the purpose of sterilizing rubber urethral instruments has been devised by Janet. It is of two sizes. The larger is for hospital use; the smaller for patients who have recourse to auto-catheterism. The box is seventeen inches long, three inches high, and three inches wide, and rests on four metal feet. It is closed at both ends, one extremity having a tightly fitting metal cap attached which can be removed when access to the interior is desired. The interior is furnished with two shelves which are perforated by holes; on these shelves the catheters are to be placed. In addition there is, at the bottom, a shelf covered with a perforated metal screen on which can be placed trioxymethylene tablets; or it may be covered with flannel which can be moistened with liquid paraform or covered with a powder of formal.

Patients who require the use of a catheter four times daily should have eight catheters, four to be placed on the upper and four on the lower shelf of the apparatus. At the end of twenty-four hours the instruments are ready for use. During the day the four catheters on the upper shelf are to be used, washed, and put aside; at the end of the day they are replaced on the empty shelf. On the following day the instruments on the lower shelf are to be employed, thereby allowing an opportunity for the catheters on the upper shelf to be resterilized and rendered ready for service when needed. If the catheters are not to be frequently used the instruments should be allowed to remain in either the closed catheterostat or in the metal box until thoroughly antiseptized, when they should be removed, wrapped in sterilized gauze, and placed in tightly corked glass tubes ready for use. By this means the surgeon has his rubber urethral instruments always prepared for any emergency that may arise. Before using the urethral instruments that have been sterilized by formalin or its derivatives, they should be either thoroughly washed with a five-per-cent. boric acid solution or placed in a tin cup containing boiling water for at least five minutes; as in many instances the formalin deposited on the catheter proves irritating to the mucous membrane of the urethra. This is especially necessary in the case of those who require daily catheterism and in whom frequent introduction of the instrument is necessary. For patients whose duties necessitate their absence from home and who cannot have access to sterilized catheters, a papier-maché pocket case has been devised, which is light and can be conveniently carried; the instruments in this case are kept in an aseptic condition. It holds four instruments which are curved, but not bent; it is supplied with a pocket in which three formalin tablets may be placed together with a small tube containing an antiseptic catheter paste suggested by Guyon and Frank.

Under no circumstances should the surgeon sanction the patient's carrying the catheter in his pocket or lining of his hat, as is frequently done. If the individual objects to employing the contrivance just described, he may use an inexpensive case made of

German silver which is large enough to carry two catheters.

An ingenious apparatus for the sterilization of catheters by means of steam has been devised by Kuttner. In this apparatus the catheters are so arranged that the steam passes down through the instruments, emerges at the eye, then passes back outside and escapes at the upper end of the apparatus.

Filiform bougies which have been used should be washed with soap and water, dried, and sterilized in the same manner as the rubber instrument by the formalin process; or after thorough washing they may be immersed in a warm solution of the bichloride of mercury of a strength of 1 to 1,000, after which they should be rinsed in sterilized water and dried. These instruments if exposed to the air become hard and brittle and are destroyed by a parasite which attacks them. Consequently they should be preserved from contact with the air by either being kept in a metal case or by being wrapped in flannel smeared with mercurial ointment. Before using a metal instrument it should be examined to ascertain if it be smooth and polished. If any roughness or flaw can be detected it should be discarded.

Metal urethral instruments are readily sterilized by heat. After being used they should be thoroughly washed with hot water saturated with Johnston's ethereal soap (an admirable preparation, as the ether which it contains removes all the adherent fatty matter); they should then be boiled for ten minutes in a two-per-cent. solution of sodium carbonate, which prevents rusting; after which they should be either wrapped in sterilized gauze or placed in a rack made for the purpose. Before being again employed they should be placed in boiling water for five minutes, thoroughly dried on a sterilized towel, and dipped as far as the handle into a jar containing alcohol; after withdrawing the instrument, the adherent alcohol should be ignited. When the alcohol is consumed, the instrument is ready for use.

In cleansing the Gouley tunnelled catheter the same procedure is to be carried out; care being taken to observe whether the tunnel at the end of the instrument is clear and clean and whether the obturator works smoothly. This rule likewise applies to endoscopic tubes. Care should be taken to have the interior of the tube thoroughly dried after cleansing. This may be accomplished by passing a bit of absorbent cotton through the catheter. The most satisfactory mode of drying urethral instruments in order to prevent rusting is by placing them for a few minutes in a hot oven.

A very important matter connected with the use of urethral instruments relates to the question of the proper lubricant to be employed; it must be both aseptic and antiseptic. One of the best and by far the most satisfactory is petroleol (fluid cosmoline). It is a fixed oil from which all the volatile and offensive properties have been separated. It is not affected by climate and is not influenced by temperature; it contains no foreign ingredients. On exposure to the air it does not decompose nor turn rancid. Its reaction is neutral and it can be applied to the most sensitive urethra without producing irritation. It should be kept in a tall, wide-mouthed jar which can be tightly corked when not in use. It is easily rendered sterile by placing the jar containing the liquid in a sterilizer for a few minutes daily. I have used liquid cosmoline as a lubricant for many years with the most satisfactory results, and I can recommend it to the profession as one of the best of its class. The jar should be kept tightly corked and no instrument should be introduced into it until it has been sterilized. There is no lubricant that lessens the amount of friction as satisfactorily as oil. Guyon has suggested the use of a thick paste composed of:

- ℞ Pulv. saponis ..... ʒ iv.
- Acid. carbol. .... ʒ i.
- Glycerini,
- Aquæ ..... āā ʒ iv.
- M. Sig: Lubricant for urethral instruments.

- Or—
- ℞ Pulv. saponis ..... ʒ iv.
- Resorcin ..... ʒ iij.
- Glycerini,
- Aquæ ..... āā ʒ iv.
- M. Sig: Lubricant for urethral instruments.

These preparations have the advantage of being easily removed from the instrument. Unfortunately, in some cases their use is attended with a good deal of irritation. In the September number of the *Journal of Cutaneous and Genito-Urinary Diseases*, Dr. E. Wood Ruggles suggested a lubricant which I have found to be most efficacious. It contains:

- ℞ Gum tragacanth ..... gr. xlvij.
- Acid. carbol. (95-per-cent. sol.)... ʒ i.
- Glycerini ..... ʒ iij.
- Aquæ ..... ad ʒ iv.

"Mix the three last constituents, pour the resulting liquid on the gum tragacanth in a mortar, and allow the compound to stand over night. Then triturate with pestle until a homogeneous mass is formed. It can then be used from an ordinary ointment jar or put into paint tubes if thought more desirable."

Bangs highly recommends a preparation which he has named "lubrichondrin"; it is especially useful in lubricating metal instruments protected by a rubber coat, such as the dilators of Oberlaender, and Kollmann, and the Otis' urethrometer. It consists of Irish moss (*chondrus crispus*) to which oil of eucalyptus (1 to 1,000) and formaldehyde (1 to 500) have been added. It is sold in closed tubes which may be boiled, thereby sterilizing the material before it is used. White and Martin have suggested a lubricant that I can also recommend. It is:

- ℞ Boroglyceride ..... ʒ iij.
- Distilled water ..... ʒ ix.
- M. Sig: Use as lubricant for sounds.

It is not always necessary thoroughly to anoint metal instruments before they are inserted into the urethra. In many cases it will be found sufficient to lubricate well the meatus urinarius, by which means the instrument will be sufficiently lubricated to enable it to pass through the canal without difficulty. Should the slightest friction be experienced, the instrument should be at once removed and well anointed with whatever lubricant the surgeon may prefer.

The negligence of many physicians in permitting their patients to make use of rancid oil, lard, and even saliva for the lubrication of their urethral instruments cannot be too strongly condemned. When patients are taken to task for their carelessness they invariably reply that they were not aware of the danger they incurred, that their doctor had said nothing to them on the subject.

Patients who enter upon "catheter life" should always be warned of this danger, and of the pain and discomfort which may ensue from infection if proper cleanliness be not observed and if the instruments be not carefully sterilized.

**CATNIP.**—*Catavia*. *Catmint*. The leaves and flowering tops of *Nepeta cataria* L. (fam. *Labiatae*). This large and showy herb of Europe and Asia is very abundantly naturalized in the United States. It grows about deserted houses, barns, and in similar waste places. It becomes four or five feet high, and almost as broad, and, branching from the base, forms a pyramid of inflorescence, the flowers very small but very pretty. It is peculiarly aromatic and derives its name from the fondness of cats for it, which incites them to the most curious demonstrations. They not only eat it, but roll in it, and evince the utmost joy, and apparently affection, in its presence. Larger animals of the cat tribe, such as lions and tigers, act similarly, and great excitement may be caused at the "zoo" by introducing it into the cages.

With a small amount of volatile oil and an amaroid, it is a very mild aromatic bitter. It is usually given in decoction, in large doses, the warm water aiding its diaphoretic action. *Henry H. Rusby.*

**CATOOSA SPRINGS.**—Catoosa County, Georgia. POST-OFFICE.—Catoosa Springs. Hotel and cottages. ACCESS.—From Atlanta and Chattanooga via the Western and Atlantic Railroad. Distance north from Atlanta, 115 miles; east from Chattanooga, 26 miles. From railroad, 2 miles.

This resort is nestled among the mountains of North Georgia at an elevation of 945 feet above the sea level. The aspect of the country is quite rugged, the Sandstone Mountain, about a mile distant, reaching an altitude of 1,800 feet above the tide water. From the summit of this mountain may be seen Mission Ridge, the historic Lookout Mountain, and many other points of lesser interest. The hotel and cottages at the springs have room for six hundred guests, and are supplied with all modern conveniences. The climate is bracing and invigorating, even in the summer months; in winter it is temperate, and the weather is not subject to sudden changes of temperature. The springs are fifty-two in number, situated within an area of two acres. It is not unusual to find quite different properties even among springs only a few feet apart. Most of them are quite strongly mineralized. The ten principal ones are as follows: The "All-healing," the "Red Sweet," the "Cosmetic," the "Chalybeate," the "Magnesia," the "Congress," the "Alum," the "Black Sulphur," the "White Sulphur," and the "Buffalo." They range in mineral ingredients from about 84 to 104 grains to the United States gallon. Following are analyses of three of the springs by Prof. W. J. Land, of Atlanta:

One United States gallon contains. Solids.	No. 4, or Chalybeate Spring. Grains.	No. 9, White Sulphur Spring. Grains.	No. 10, Buffalo Spring. Grains.
Calcium sulphate .....	41.56	44.81	45.00
Magnesium sulphate.....	27.90	32.01	33.02
Strontium sulphate .....	.20	.21	.29
Sodium sulphate.....	1.59	1.67	1.67
Potassium sulphate.....	2.30	2.32	2.31
Aluminum sulphate.....	.87	2.47	2.39
Calcium carbonate.....	3.75	3.85	3.86
Magnesium carbonate.....	7.48	8.40	8.70
Iron carbonate.....	.19	.28	.28
Lithium carbonate.....	Trace.	Trace.	Trace.
Manganese carbonate.....	.02	.12	.12
Strontium carbonate.....	.04	.04	.04
Potassium carbonate.....	.11	.11	6.01
Sodium carbonate.....	.26	.26	.03
Calcium nitrate.....	.37	.32	.03
Ammonium nitrate.....	.11	.10	.91
Calcium bromide.....	.26	.15	.15
Magnesium bromide.....	.30	.31	.33
Calcium fluoride.....	.02	.02	.01
Sodium chloride.....	.14	.14	.11
Chloric and apocrenic acids.....	.02	.01	.01
Free sulphuric acid.....	.01	6.13	.13
Free carbonic acid.....	4.31	4.51	4.62
Hydro-sulphuric acid.....	....	.02	Trace.
Total ingredients.....	91.60	108.16	110.02

Total residue upon evaporation at 212° F. is 100.11.

All of these springs boil up through the hard black slate of the mountain side. They are perennial, the most severe and persistent droughts causing no perceptible difference in the rate of their flow. The waters are recommended for stomach, kidney, and bowel disorders, and for debility. The "All-healing" Spring is used for local troubles. The waters are shipped on order in bottles or barrels to any part of the country. *James K. Crook.*

**CAULOPHYLLUM.** See *Cohosh Blue*.

**CAUSTICS.**—Previous to the introduction of anæsthetics, caustics formed a very important part of the