V.

THERAPEUTICS OF PYURIA.

THE therapeutics of pyuria varies according as the process is an acute or a chronic one, and according to its location. Apart from acute urethritis—which is generally treated by injections at the same time that other means are employed—all experience teaches that acute pyuria and, above all, that of the bladder and neck of the bladder, ought never to be treated locally, but by internal medication and regulation of diet; while in chronic pyuria of any part of the urinary tract an appropriate local treatment takes a prominent place.

a. Therapeutics of Suppuration of the Urethra as far as the Compressor Urethræ Muscle.—Suppuration in this region includes the different varieties of urethritis. It is not the purpose of this work to give a complete review of the treatment of gonorrhœa, especially of the acute form. Neither shall we go into the endoscopic treatment. Those who wish instruction in this branch will find everything described minutely enough in the text-book of Zeissl, and further in the publications of Auspitz, Grünfeld, Gschirhakl, and others. On the other hand, we intend to give in detail the local and instrumental treatment of chronic gonorrhœa and its sequelæ, such as has done the author the best service, and such as can be easily carried out by every practicing physician.

Catarrhal Urethritis.—That form of urethral inflammation which follows trauma and injurious chemical influences needs only suitable dietetic treatment for its cure. Care and cleanliness of the affected urethra are the most important things. A weak astringent solution of alum, zinc, or potassic permanganate hastens the healing process considerably.

Gonorrhœal urethritis, under ordinary conditions, runs its course within four to six weeks. In this time the inflammatory process, beginning at the meatus, extends backward and stops at the compressor urethræ if no further complications occur. It is, however, not always entirely over in these four to six weeks, since numerous little shreds may still be seen in the urine, and, although the secretion has so far abated that nothing abnormal appears to escape from the meatus, the process plainly continues, though to a slight extent only. And these gonorrhœal threads in the urine, after a clap has apparently ceased, are no great rarity.

The object of treatment in acute gonorrhœa is to secure a cyclical, natural course, so that it shall cease, without further complication, at the proper time. It is also to prevent (as far as possible) the inflammation from extending further than the bulbar portion of the urethra, into the parts surrounded by the compressor urethræ, and involving any of the urinary or genital tract beyond. Unfortunately, the surgeon can not always hinder this extension. Individual peculiarity of the parts, morbid or even remote changes in the urinary tract, have much influence here. Thus, we not seldom see a gonorrhœa run a perfectly normal course in cavalrymen, who, at the same time, have to discharge their usual exercises, while in other cases the most unpleasant complications occur in spite of the greatest care. The

physician has, however, done his duty when, after the medical treatment, he has carefully regulated the patient's manner of living. The first clap is usually the most painful, as patients themselves will tell you, while subsequent attacks no longer show such violent inflammatory phenomena. It is also a well-known fact that successive claps are apt to follow the same course as the first. Thus, if the first gonorrhœa was followed by cystitis or epididymitis, it is quite likely that a second or third clap will have the same complications. So, in such cases, it is well to give especial attention to this point.

The dietetic precautions for the patient are, that he must keep as quiet as possible, and live very frugally. If it is necessary to go about considerably, a suspensory bandage is indispensable, and especially during the third and fourth week ; that is to say, at the time when the inflammation has reached the neighborhood of the compressor urethræ. Regarding food, a milk diet is very advisable ; likewise vegetables, fruit, or vegetable diet altogether, have a beneficial influence on the course of the disease. It is best to restrict the eating of meat as much as possible. The use of spices, of wine and beer, as well as of all effervescing and alcoholic drinks, is to be avoided. If the inflammation runs high in the first week, and if the urethra is very sensitive, cold applications to the penis are highly beneficial.

The treatment of gonorrhœa by internal medication has no great value. Since gonorrhœa is a local disease of the urethra, and has no constitutional symptoms (as is the case in syphilis), general treatment by internal medication appears irrational. In addition, the use of large doses of copaiba, cubebs, and other similar drugs is by no means a matter of indifference to the organism. It is not alone the stomach and digestion that suffer

from the use of these things, but, in isolated cases, albuminuria is also caused by such employment in large doses. Some observers think that gonitis is more apt to occur in those cases of gonorrhœa where large doses of copaiba have been used, than where a purely local treatment was employed. Small doses of these remedies have no effect, since, when they at last get into the urine, the dilution is too great to exert a healing effect upon the diseased urethral mucous membrane. Large doses, on the contrary, act injuriously in various ways. Hence it is better not to use internal medication in gonorrhœa at all, and to employ only local treatment. If copaiba, cubebs, oil of sandal-wood, and all these other remedies act so beneficially upon the diseased urethral mucous membrane, if they appear in the urine and affect the mucous membrane by coming in contact with it during urination, why do we not choose the shortest way and bring these drugs, in the form of an injection, at once into direct contact with the diseased part?

Since an acute clap always begins in front at the meatus, and only gradually extends backward toward the bulb, it is a very enticing thing to treat it locally in the first instance with great energy, and so, if possible, to nip the whole process in the bud. Favoring this idea, various abortive curative procedures were tried in former times, but these have none of them been found of sufficient value and are given up. Yet it remains for the future to institute trials of other abortive methods.

If it should appear true that the gonorrhœal infection is due to an actual transplanting of specific microorganisms, the idea of an abortive method with antibacterial agents could be at least entertained. At any rate, Watson Cheyne has very recently described an

abortive method consisting in the use of iodoform pessaries which shows very favorable results.

The method of treatment of acute gonorrhœa in vogue at the present time consists in regular injections into the urethra.

If the inflammation of the urethra is at the very commencement a severe and painful one, even weak astringent solutions are not well borne. In this case we inject either cold water or a one-tenth per cent solution of carbolic acid into the urethra. If, however, the urethra is not very sensitive, the use of mild astringent solutions may be begun at once. The following solutions are the best for this purpose :

℞ Alum. crud., zinci sulphat., acid. carbolic., āā 0·30=4·6 grains.
Aquæ..... 200·00=6¾ oz. (about).
M. Ft. sol.

Or else—

℞ Potassii permanganat..... 0·02=⅓ grain.
Aquæ destil..... 200·00=6½ fl. oz. (about).
M. Ft. sol.

We inject one of these solutions into the urethra three to six times a day, according to the amount of discharge. To do this properly, we have the patient urinate, just before taking the injection, in order to free the urethra from purulent secretion, and then inject at once the solution, two to four times. In the beginning inject but half a syringeful of the solution, and let it flow out immediately. Later on, in the second and third week, a whole syringeful of the solution can be injected with ease, and the meatus urethræ closed for one to two minutes by the fingers. The introduction of any instrument of the nature of a catheter during acute gonorrhœa is not advisable. By such a procedure the inflammatory process is but increased and driven backward along the urethra all the faster. According as the amount of discharge and the sensitiveness of the urethra decrease, the strength of the above injections may be increased two and three fold, and so remain until the end of the gonorrhœa. If it seems preferable, we can use tannin in the later stages, either by itself or combined with alum or some other astringent.

Again, certain mixtures holding the drug in suspension as a precipitate, or a mixture of zinc sulphate and plumbic acetate. These mixtures have the disadvantage that the fine powder sometimes stops up the ducts of the minute glands of the urethra, and in this way causes small follicular abscesses of the urethral mucous membrane. After using this kind of injection we see (sometimes even after many days) the precipitate, rolled up into little cylinders, eliminated with the discharge. Therefore it seems, on the whole, better to employ only clear filtered solutions in the treatment of acute gonorrhœa. If painful erections or chordee occur in the course of the disease, we must begin an appropriate symptomatic treatment at once.

If a clap has lasted longer than eight or ten weeks, we call it *chronic gonorrhœa.* Chronic gonorrhœa is caused (principally) by the fact that the mucous membrane, in isolated places, has not covered itself with epithelium, and for this reason these patches continue to secrete.

Patches affected in this way sometimes present the appearance of a fine granulating surface on the mucous membrane, sometimes like a superficial ulceration of the same. According to Grünfeld, small polypoid excrescences are occasionally a cause of chronic gonorrhœa.

Chronic gonorrhœa of the anterior urethra is characterized by the fact that, when the urine is passed into two separate vessels, the secretion of the gonorrhœa—the "gonorrhœal threads"—are always found only in the first urine passed, while the second half appears quite normal, i. e., clear, transparent, and free from these "threads." Since in chronic gonorrhœa the process is not always confined to the superficial layers of the mucous membrane, but, on the contrary, very often involves the deeper layers also, it does *not* answer to employ simply astringents or caustics, and to try to effect a cure in this way. For if a chronic process is thus brought to a close, the deeper layers may still remain cicatricially changed, and from this results a rigidity of the walls of the urethra, or a cicatricial contraction in isolated places which has unpleasant after-effects. If we wish to obtain the most perfect cure, we must at the same time bring the lumen of the urethra back to the normal, and the walls of the tube itself; this can never be brought about by simply local application of medicaments. The normal human urethra is a soft and elastic tube, which will easily allow the passage of sounds of the diameter of 30 (Charrière) and larger. Such sounds are not usually employed, because the external orifice of the urethra seems more or less contracted. If we slit up this orifice sufficiently, as is now often necessarily done in the operation of litholapaxy, any one can convince himself that instruments of calibre 30, Charrière, and larger, can be easily passed into the bladder. Otis deserves the credit for calling especial attention to these relations and introducing large steel sounds.

If, now, in a case of chronic gonorrhœa, we slit up the orifice of the urethra, where it will not admit of No. 30, Charrière, and then test the urethra with the large steel sounds, we find that the affected parts do, as a matter of fact, slightly narrow the lumen, and either do not let the large sound pass at all, or only with some difficulty. Otis calls these alterations of chronic gonorrhœa strictures of large diameter. Such slight narrowings of the diameter of the urethra, or the loss of the elasticity of the urethral walls, can never be discovered by the use of small instruments, much less cured. If, however, we wish to bring about a perfect cure, we must not only heal the process going on at the surface, but we must preserve the normal diameter of the urethra at the same time, and restore the elasticity of the previously diseased urethral walls. If this last be not done, or insufficiently done, the altered urethral walls exert a continual irritation upon the peripheral endings of the urethral nerves, and, as a result, we have either those neuroses of the genito-urinary sphere so often occurring after gonorrhœa, or that slight hypersecretion issuing from the meatus, falsely called prostatorrhœa, and which seems to be simply a consequence of the difficult circulation of the blood through a rigid wall of the urethra.

Looking at the situation from this stand-point, the use of large sounds in the treatment of chronic gonorrhœa is a *sine qua non*.

In many cases this treatment of chronic gonorrhœa by means of sounds is sufficient for a perfect and permanent cure. The "sound-treatment" is carried out by the use of slightly conical, heavy, metallic sounds, in the following manner: Begin with the smaller diameters, and very gradually go up the scale of Charrière, each day or every second day using an instrument one number larger in the series. When a sound is intro-

duced, let it remain quietly in position a few minutes. In this way we gradually rise in the scale to the numbers 27, 28, 29, and 30. Urethras which do not admit of No. 27 at least, must be carefully slit up along the frænum. If the sounds have been skillfully introduced, we very soon see the purulent secretion begin to diminish, and the gonorrhœal threads to disappear from the urine. This last circumstance is the surest guarantee of a speedy and perfect cure. If treatment with sounds alone does not suffice, we may employ a second treatment at the same time, that is, the use of various medicaments locally. After the sound has remained in the urethra a few minutes it is taken out, and the second procedure employed, so that two distinct modes of treatment are brought into use at the same sitting.

We may say here that in this case the sounds or other instruments must be smeared with glycerine, since, if the urethra-walls are covered with a layer of oil, watery solutions of astringents and caustics can not adhere to or moisten them ; and so the influence of the various medicaments upon the urethral mucous membrane is quite uncertain. We may employ local medication in a fluid, semi-fluid, or solid form. If in a fluid form, we may use them in a dilute or concentrated state. In a dilute form, we use to the best advantage the astringents as a large injection or irrigation. For this purpose we usually employ a quantity of 300 to 400 grammes, which is caused to flow slowly along the urethra.

This so-called *deep injection*, or *irrigation of the anterior urethra*, is best done in the following manner :

The patient stands ; a soft Mercier's catheter of No. 14 calibre (Charrière), with two lateral openings, is passed in as far as the bulb of the urethra. The patient holds the catheter with his left hand and a pus-

basin or other vessel with his right. Then we let the medicated solution flow in slowly, either by means of an irrigator or a hand-syringe. The solution first passes out of both openings of the catheter into the bulbus urethræ, and, since it can not pass backward into the neck of the bladder (and so into the bladder itself, being prevented by the compressor urethræ muscle), it turns about, washes out the entire anterior portion of the urethra, and finally escapes from the orifice of the urethra, by the side of the catheter, into the basin held beneath.

The advantage of this irrigation is, that the medicated solution comes in contact with the bulbus urethræ —the favorite seat of chronic gonorrhœa—with some little force ; it strikes it first of all, and in sufficient quantity. This is a perfectly painless procedure.

We may employ various astringents in the irrigation. The following solutions can be recommended :

℞ Alum. crud., zinci sulphat., acid. carbolic.... āā 1·00–2·00
Aquæ destillat..... 400·00
Ft. sol.

Or else—

℞ Potassii permanganat..... 0·20–0·50
Aquæ destillat..... 400·00
Ft. sol.

The irrigation may be done once a day.

A second way of using medicated solutions is in the concentrated form. Since these act partly as caustics, they can be employed only in a small quantity at a time, as drops. For this purpose a camel's-hair brush is best. The brush arrangement for the anterior urethra consists of three pieces, which are all made of hard rubber : *A* is a straight endoscopic tube, *B* is an obtu-

rator, and *C* a removable brush and handle. A drawing of this simple apparatus makes any further description unnecessary. The calibre of the tube is Nos. 20 to 22 (Charrière). By means of the small screw on the shaft of the brush-handle, the brush itself may be protruded half or its entire length from the tube. The way to use it is as follows: The patient lies flat on his back, the endoscopic tube is provided with its obturator, smeared with glycerine, and *lege artis* introduced as far as the bulbus. The obturator is now removed, and the brush, impregnated with the medicated solution, is put in its place. Now we take both brush and tube in one hand, and by a rotary movement wipe out the bulbus. Then we may remove the brush, dip it once more into the solution, and again swab out the bulbus or any other suspicious place. We may even wipe out the entire urethra by a combined rotary and withdrawing motion.* Any one fond of endoscopy can examine the diseased patches more exactly by means of a light thrown in from a reflector before treating them with the brush. Gschirhakl described a similar apparatus for endoscopic therapeutic purposes a few years ago.

We may employ any of the various solutions used in blennorrhœa of the eyelids. Solutions of argentic nitrate in distilled water can be especially recommended; such as—

℞ Argent. nitrat ..... 1·00
Aquæ destillat..... 30·00
Ft. sol.

* Where the urethra is very sensitive, it is well to introduce a large steel sound (No. 25 or 26 French) just before using the brush apparatus. The urethra is thus rendered anæsthetic, and the introduction of the smaller instrument and the application of the silver nitrate solution now scarcely felt.—W. B. P.

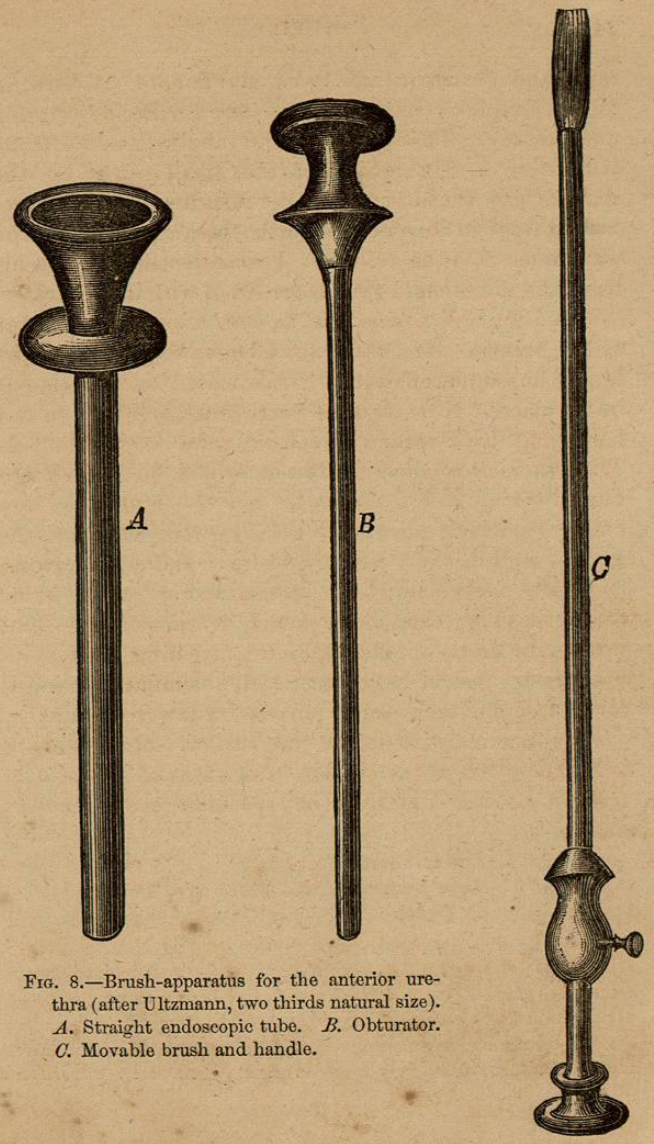

Fig. 8.—Brush-apparatus for the anterior urethra (after Ultzmann, two thirds natural size). *A*. Straight endoscopic tube. *B*. Obturator. *C*. Movable brush and handle.

℞ Argent. nitrat..... 1·00
Aquæ destil..... 20 00
Ft. sol.

Even stronger solutions can be employed up to one in ten, but in that case we ought not to use it over any extent of urethral mucous membrane, since great pain is thus caused; and later, when the scab so formed comes off, urethral hæmorrhage occurs—an event not likely to happen after using the weaker solutions.

The solution most often used is one of five per cent. If we touch up the urethral walls with this, and afterward examine the alterations caused, we find the diseased places colored a whitish gray, while the healthy parts show only the slightest suspicion of a grayish tint.

The anterior urethra may in this way be brushed out every second day, or even every day. After it is done, the patient feels a slight burning, which increases somewhat in intensity during the first few minutes, and then very soon entirely disappears.

The use of medicaments in semi-solid form includes salves and urethral suppositories. Formerly it was a favorite method to cover an elastic olive-headed bougie with precipitate salve, introduce, and leave it in. This method is altogether inefficient, since it is impossible thus to introduce the remedy into the deeper parts of the urethra. The ointment is rubbed entirely off the bougie at the very beginning of the urethra, and the bougie reaches the deeper portions almost perfectly dry. If we are determined to use an ointment, it must be introduced into the deeper parts of the urethra by means of the endoscopic tube and its obturator.

Two kinds of urethral *suppositories* are in use. These are the long and the short suppositoria urethralia, which consist of the required medicament diffused through cocoa-butter or gelatine. They are in the form of narrow rods. The long urethral suppositories are generally prescribed to be used by the patient himself, who can introduce them into his urethra without the aid of the surgeon. The short urethral suppositories, on the contrary, are narrow rods two centimetres long, designed exclusively for the deeper parts of the urethra, and which can be introduced only by means of the straight tube and obturator. The long suppositories may be made of either cocoa-butter or gelatine, but cocoa-butter alone must be employed for the principal mass of the short suppositories. Gelatine has not the desirable firmness for such small affairs as these.

The amount of the medicament used in the suppository is the same, whether it be long or short, the difference being only in more or less of the excipient. The suppositories mostly used in chronic gonorrhœa are such as contain alum, zinc, copper, tannin, and the like. The most practical are the following:

℞ Alum. crud..... 1·00
Ol. theobrom..... q. s.
M. Ft. suppos. long. or brev. no. v.

℞ Tannin. pur..... 0·30–0·50
Ol. theobrom..... q. s.
Ft. suppos. no. v.

℞ Zinc. sulphat..... 0·15–0·30
Ol. theobrom..... q. s.
M. Ft. suppos. no. v.

One of these small affairs is introduced each day. The short suppositories are introduced into the bulbous urethra with the patient in the recumbent posture.

The patient either lies still after the introduction of the suppository, or, if he must go about, turns the penis

up against the abdomen, compressing it beneath the body-band of his suspensory bandage, so as to prevent the melted suppository from escaping. The suppository ought to be retained in the urethra at least half an hour, and the patient should not urinate until at least this much time has elapsed.

Medicaments may be further used either in the form of powder or paste. Powders consist usually of alum, or of tannin, rubbed up with sugar, and blown into the urethra through the straight tube. Pastes which consist of the same medicaments mixed with some gelatine and gum are placed upon wax bougies, and these, as soon as dry, are introduced into the urethra. The medicinal bougies of Hochsinger are wax bougies prepared in this way, and contain zinc or tannin, alum or copper, or even argentic nitrate. These bougies are allowed to remain in the urethra until the paste has been melted off by the warmth of the urethra, and applied itself to the mucous membrane. Then the bougie is taken out of the urethra and the patient asked not to urinate before half an hour has elapsed. These bougies, as well as the urethral suppositories, may be used, according to circumstances, every day or every second day. In this place we must remark that there are varieties of urethritis which resist all these modes of local treatment. The persistence of such cases is usually due to some dyscrasia, and in that event constitutional, general treatment must be carried on at the same time. If syphilis be suspected, initiate an antisyphilitic treatment at once; if tuberculosis, we should prescribe change of climate, or a sojourn in the country, and especially advise spending the winter in a warm southern clime. In these ways we often obtain the most gratifying results.

b. The Therapeutics of Suppuration from the Urethra

when situated behind the Compressor Urethræ Muscle; Therapeutics of Catarrh of the Neck of the Bladder.—Catarrh of the neck of the bladder is sometimes acute, again chronic. Acute catarrh of this part is usually a consequence of gonorrhœa, and in this case we ought never to employ instrumental interference. It is only when retention of the urine sets in that we may introduce a soft elastic catheter, empty the bladder, and wash it out with an antiseptic or narcotic solution. The therapeutics of acute catarrh of the neck of the bladder must be purely a regulation of the diet, and some internal medication. Since an acute catarrh of the neck of the bladder is always accompanied by a catarrh of the bladder itself, the treatment of this condition will be considered along with that of the bladder in the next chapter.

Chronic catarrh of the neck of the bladder is usually the remnant of an obstinate gonorrhœal process which has lasted for some time in the posterior urethra. Chronic catarrh of the neck of the bladder is one of those diseases which often resist even the most energetic local treatment. We, moreover, find this catarrh in individuals who have practiced masturbation for some time, led a very dissipated life, and been much given to sexual excesses. Besides, this catarrh occurs primarily in beginning tuberculosis of the prostate, or of some other portion of the genito-urinary apparatus. Chronic catarrh of the neck of the bladder can, as a rule, be cured only by a rational local treatment. This consists in depositing the medicament in the prostatic portion by means of an appropriate instrument, or, if the medicament be used in a fluid form, it should be allowed to flow through the prostatic portion itself. The treatment by sounds is less fitted for catarrh of the neck of the blad-

der (i. e., the prostatic portion). Very often it causes an acute aggravation of the catarrh, with or without swelling of the prostate itself.

Local medication, by means of solutions, is carried out in different ways, according as dilute solutions of astringents are used or concentrated fluids for cauterizing. For dilute solutions irrigation by means of a *short* catheter is the best method. It is certainly sometimes possible to force a fluid into the bladder along the urethra without the use of a catheter. But this procedure is often very painful where the urethra is sensitive, and there is, at the same time, spasmodic contraction of the compressor urethræ muscle.

A much more convenient way is to overcome the spasmodically contracted compressor urethræ muscle by inserting a short catheter, and then proceed with the irrigation. By this method we always succeed perfectly, and with no pain worth mentioning. I described in detail an irrigating catheter of this sort some time since (see "Neuroses of the Genito-urinary Apparatus," Ultzmann, "Wiener Klinik," 1879). This consists of silver, is 16 cm. long, and has a diameter of Charrière Nos. 14–16. The vesical end has the usual medium curve of the metallic catheter, is smoothly rounded off, and either perforated with holes, like a sieve, or, as I have more recently ordered, provided with four longitudinal slits, 1 cm. long and 2–3 mm. wide each. The slits are to be preferred, since such a catheter is much easier to cleanse. The extra-vesical end has a disk of hard rubber on which is a mark to show in which direction the beak of the instrument points. A soft-rubber tube, 20 cm. long, is, in addition, attached to this extra-vesical end, that the irrigating syringe may be more easily connected.

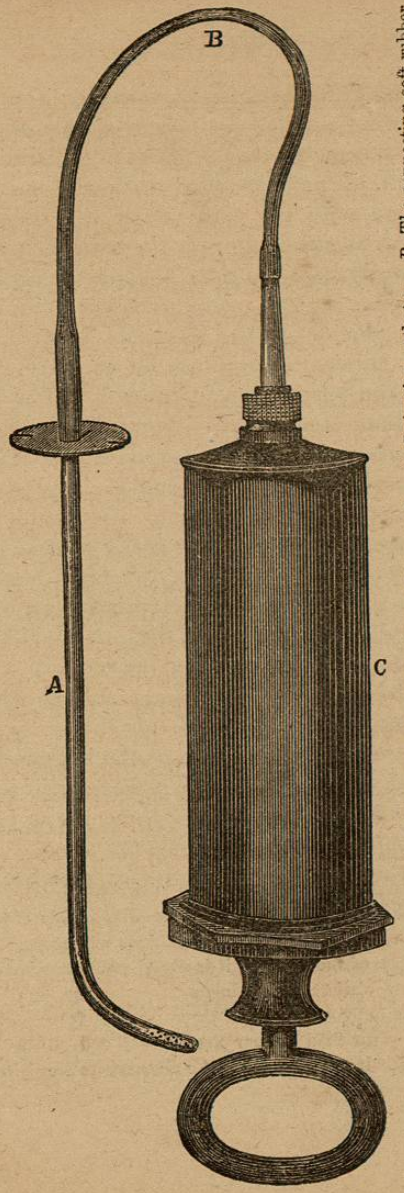

Fig. 9.—Irrigation catheter for the neck of the bladder (according to Ultzmann). *A*. Irrigation catheter. *B*. The connecting soft-rubber tube. *C*. The syringe.

Irrigation of the neck of the bladder is performed in the following manner by means of this apparatus: The patient lies on his back. A syringe holding 100–200 grammes of fluid is filled with the medicament and connected with the catheter by the India-rubber tube. The air is expelled from the catheter; both the latter and the syringe are then held in the right hand, and the catheter is now introduced *lege artis* into the membranous portion of the urethra. If with the patient in the horizontal posture the catheter be tilted 30° beyond the perpendicular, its end will usually be in the membranous portion of the urethra. The catheter, thus introduced, is then taken in the left hand, firmly held, and with the right hand the contents of the syringe * are caused to flow into the bladder under gentle pressure. If the bladder easily contains a large quantity of fluid, the syringe may be filled a second or even a third time. If the catheter has been correctly placed, the fluid can be injected into the bladder without any resistance being felt; for the internal sphincter is such a weak muscle that it is not able to withstand the onward pressure of the fluid. If the syringe be removed from the catheter as soon as the irrigation is finished, no fluid will flow from the catheter if it has been properly placed, since the end of the catheter is not in the bladder but in the membranous urethra.

On the other hand, if the end of the catheter is in

* It is next to impossible to avoid injecting a little air into the bladder if we use a *syringe*. While this does no apparent harm in catarrh of the neck of the bladder, it is disagreeable to some patients. It can be entirely obviated by using a "fountain syringe" instead; i. e., an irrigator, hung on the wall three or four feet above the patient. Let the warm fluid appear first at the end of the catheter, then introduce the latter, and allow the solution to slowly flow in.—W. B. P.

front of the compressor urethræ muscle (that is to say, in the bulb), the fluid can not be forced into the neck of the bladder, and will, in this latter case, flow out along the urethra by the side of the catheter, and thus escape from the meatus. Immediately after the irrigation, we have the patient empty his bladder completely.

It is only practicable and advisable to irrigate the neck of the bladder in this way, when we have to do with an entirely sufficient bladder—that is, when this latter can perfectly empty itself to the very last drop. If this is *not* the case, the irrigation by means of the short catheter had better be omitted, for, after the injection has taken place, an insufficient bladder could not perfectly empty itself of its contents, and necessarily a certain amount of fluid would remain behind, causing either a painful, constant desire to urinate, or other disturbances.

For an insufficient bladder, irrigation by means of an ordinary elastic catheter is much better. This is performed in the following way: The patient stands. He is caused to empty his bladder as much as he can spontaneously, then an elastic catheter is passed into the bladder. One of Mercier's catheters *coudé* is best, with two lateral openings. The amount of urine which can pass off now by the catheter is an index of the amount of the insufficiency of the bladder. When this latter is empty, draw out the catheter a little, so that the eyes of the instrument come to lie in the neck of the bladder; this is now irrigated by means of a good hand-syringe. When a proper amount of fluid has been thus employed, push the catheter back again into the bladder, and empty it entirely. An ordinary washing-out of the bladder by a catheter is no substitute for this procedure; since the eyes of the catheter lie in the

bladder-cavity, the neck of the bladder is stopped up by the catheter, and thus the bladder itself is indeed washed out, but the neck of the bladder—the pars prostatica—not at all.

Many varieties of astringent aqueous solutions may be employed in irrigation of the neck of the bladder. The following can be recommended :

℞ Acid. carbolic ..... 1·00
Aquæ destillat ..... 500·00
Ft. sol.

℞ Alum. crud., zinci sulphat., acid. carbolic ... āā 0·50–1·00
Aquæ destillat ..... 500·00
Ft. sol.

℞ Potass. permanganat ..... 0·10–0·50
Aquæ destillat ..... 500·00
Ft. sol.

℞ Argent. nitrat ..... 0·20–1·00
Aquæ destillat ..... 500·00
Ft. sol.

It is best to warm these solutions before injecting.

If it is desired to treat the neck of the bladder with concentrated solutions to affect the part in a cauterizing rather than in an astringent manner, and confine the action to the neck of the bladder, the prostate alone, and leave the bladder itself untouched, in such a case we use a drop-catheter. Such an instrument I have previously described in connection with the local treatment of pollutions and spermatorrhœa. It consists of a short, catheter-like instrument of pure silver, having very thick walls, and a capillary calibre. It is of the same form, length, and (entire) diameter of the irrigation-catheter just described. The extra-vesical end is provided with a hard-rubber termination, into which a hypodermic syringe fits exactly. The capillary lumen

of the catheter ends in the well-rounded tip. The instrument is so made that the entire capillary bore contains exactly as much as two divisions on the hypodermic syringe. If, now, we wish to inject one drop, we take up three into the syringe before attaching it to the catheter. If we would inject two drops, we fill the syringe with four drops, etc.

We employ the instrument in the following manner : The patient lies in the recumbent posture. We fill the hypodermic syringe with three to four drops of the solution, adapt it to the capillary-bore catheter, and then introduce the instrument *lege artis* into the pars prostatica, whereupon we force out the contents of the small syringe by gentle pressure with one finger. With the patient in the horizontal position, the end of the instrument will usually be in the prostatic portion, when the long axis of the catheter is 45° from the vertical. Should there be any uncertainty as to the position of the end of the instrument in the urethra, the fore-finger of the left hand in the rectum will always give us the desired information without further trouble. Immediately after cauterizing in this way, burning in the urethra sets in, and a few mo-

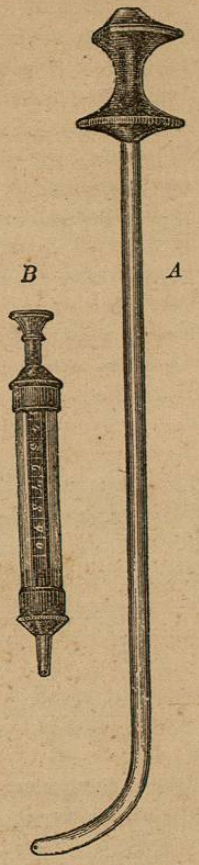

Fig. 10.—Urethral injector (according to Ultzmann). *A*. Capillary tubed catheter. *B*. Hypodermic syringe. (Two thirds natural size.)