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Da Costa

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Modern Surgery - Chapter 36. Diseases and Injuries of the Genito-Urinary Organs - Diseases and Injuries of the Urethra, Penis, Testicles, Prostate, Seminal Vesicles, Prostatic Cord, and Tunica Vaginalis

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(page 968) hold the edges of the incision apart by means of a speculum (speculum of Keen or Watson) or with retractors, and reflect the electric light into the wound. Growths when seen can be twisted off, a pair of forceps holding the base and another pair being used to twist. Broad growths should be transfixed, ligated, and severed. Some growths (as cancer) are removed piece by piece with Thompson's forceps (Fig. 567), the base of the tumor being scraped. Soft growths are scraped away with a curet, a spoon, or a finger-nail. If bleeding is severe, check it by pressure, by hot water, by a 1 : 10,000 solution of adrenalin chlorid, or even by the actual cautery. In some cases the wound is allowed to heal rapidly. In others the bladder is drained for a considerable time. In some it is kept open permanently. Permanent drainage is desirable in some cases of enlarged prostate, and in such cases Senn's tube may be employed (Figs. 568 and 569), or Stevenson's tube (Figs. 570 and 571).

Median Cystotomy.—The same incision is made in the perineal raphé in median cystotomy as for median lithotomy. A grooved staff is introduced and is hooked up under the pubes; an incision is made into the membranous urethra, and is extended backward for three-quarters of an inch, and a finger is carried into the bladder. If searching for a growth, find it with the finger, catch it with Thompson's forceps, and twist it off. Soft growths can be scraped away. Stop bleeding by digital pressure or by injections of hot water or adrenalin chlorid (1 : 10,000). If median cystotomy does not allow access to the tumor, perform suprapubic cystotomy.

Growths in the Female Bladder.—Dilate the urethra as in a case of stone, and scrape, twist, or pull the growth away or ligate it. If the growth is large or if there are multiple growths, perform suprapubic cystotomy.

DISEASES AND INJURIES OF THE URETHRA, PENIS, TESTICLE, PROSTATE, SEMINAL VESICLE, SPERMATIC CORD, AND TUNICA VAGINALIS.

Injuries of the penis and urethra may arise from traumatism to the perineum or the penis, from cuts and twists of the penis, from the popular "breaking" of a chordee, from tying strings around the organ, from forcing rings over it, from the passage of instruments, or from the impaction of calculi.

Violence inflicted upon an erect penis may fracture the corpora cavernosa. The writer saw one man with a glass rod broken off in the canal, he having been in the habit of introducing it at the dictate of morbid sexual excitement. A patient in the Insane Department of the Philadelphia Hospital pushed a ring over his penis, which organ was lacerated into the urethra. These injuries are treated on general principles.

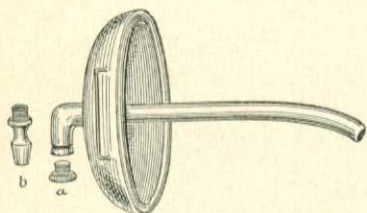


Fig. 570.—Stevenson's suprapubic drainage-tube.

Perineal Bruises.—If the perineum be bruised without rupture of the urethra, the perineum and scrotum swell and become discolored; water is passed with difficulty because the extravasated mass of blood in the peri-urethral tissues occludes more or less the canal; the water is not bloody; and

there are pain and profound shock. Some authors designate as rupture those cases in which laceration of the spongy tissue occurs, without involvement of the mucous membrane or of the fibrous coat, but they are properly contusions.

Treatment.—Place the patient in bed and establish reaction, and when reaction is complete employ opiates for the relief of pain. Apply an ice-bag to the perineum. If, notwithstanding these measures, swelling continues, introduce a silver catheter (No. 12 English), tie it in, and make pressure upon the perineum by a firmly applied T-bandage or by a crutch braced against the foot-board of the bed. Even when swelling is slight, retention of urine may occur from projection of a submucous blood-clot into the canal of the urethra. In some cases it may become necessary to incise and evacuate the blood-clot. After twenty-four hours have passed, if hemorrhage has ceased, substitute a hot-water bag for the ice-bag, and empty the bladder regularly with a soft catheter. Occasionally, though rarely, an abscess forms. *Punctured wounds of the urethra* require ordinary dressings. *Incised wounds of the urethra*, when longitudinal, are closed by suture. Healing is rapid, and ill consequences are not to be feared. Stricture does not follow. When the wound is transverse, introduce a catheter, suture the wound over the instrument, and remove the catheter at the end of the third day. If a catheter cannot be introduced, employ sutures, but at the first evidence of extravasation open the wound, and if drainage is not free perform external perineal urethrotomy.

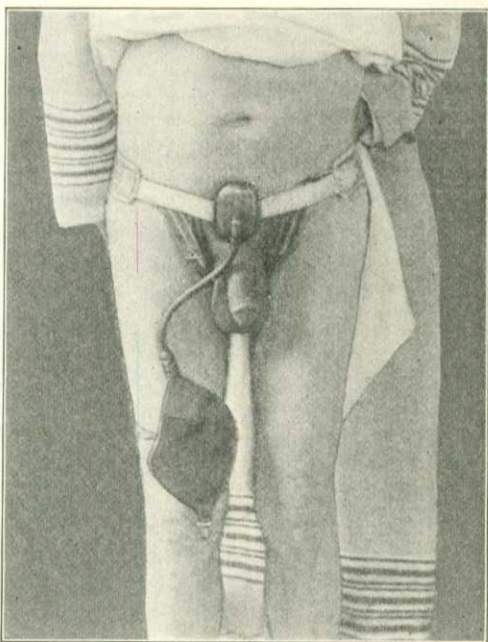


Fig. 571.—Stevenson's suprapubic drainage-tube in place and attached to a receptacle for urine.

Rupture of the Urethra.—By this term is meant a lacerated or a contused wound of the urethra, destroying partially or entirely the integrity of the canal. A lacerated wound may be induced by fracture of the cavernous bodies during erection, the symptoms being severe hemorrhage, intense pain, retention of urine, and inability to pass an instrument; infiltration of urine occurs, and gangrene is a common result. The writer has seen one case of rupture of the penile urethra due to a man's slipping while shaving, the penis being caught in a partially open drawer, the drawer being shut by his body coming against it. Rupture, however, is almost invariably located in the perineum, and it arises when the urethra is suddenly and forcibly pressed against the arch of the pubes by a blow, by a kick, or by falling astride a beam or a

fence-rail. Retention of urine due to stricture may lead to extravasation of urine. The lesion of urethral rupture consists in some cases of laceration of the spongy tissue and the mucous membrane, a cavity being formed which communicates with the canal, and which fills with urine during micturition. In other cases not only the spongy tissue and the urethral mucous membrane are rent asunder, but the fibrous coat is also torn, the canal opening directly into the perineal tissues, among which a huge cavity forms, that fills with blood and later with urine and pus. The urethra may be torn entirely across, but in most cases a small portion at least of its circumference is uninjured. Rupture never occurs primarily and alone in the prostatic urethra; it is extremely rare in the membranous urethra unless due to pelvic fracture; and it is very unusual in the penile urethra. The seat of rupture

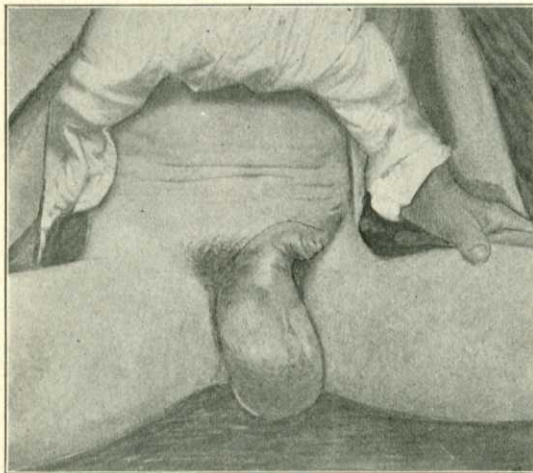


Fig. 572.—Ruptured urethra.

in the great majority of cases is in the region of the bulb. Very rarely is the skin broken.

Symptoms.—The symptoms of rupture of the urethra are considerable pain, aggravated by motion, pressure, and attempts to pass water; great shock; in some cases micturition is still possible, blood preceding and also discoloring the stream, for some blood usually runs into the bladder; retention of urine quickly arises; in a vast majority of the cases retention

is absolute from the very first, and it is due to the interruption in the integrity of the canal and to the occlusion of the channel by blood-clots. Bleeding, which is usually free, lasts for several hours, some little blood generally appearing externally and much being retained in the perineum, inducing progressive swelling. The presence of a large swelling is regarded as evidence of urethral rupture. The blood which is effused in the perineum may extend under the fascia to the penis and scrotum (Fig. 572). The swelling soon becomes reddish, purple, or even black, pressure upon it is apt to cause blood to run from the meatus, and it is augmented in volume when attempts are made to urinate. After a time, if the surgeon does not act, the urine fills the perineal cavity and widely infiltrates, and there ensue gangrene, sloughing, and sepsis, life being endangered or fistulæ being left as legacies. The course of the extravasated urine will often enable one to locate the seat of injury. In rupture of the membranous urethra, if uncomplicated, the urine remains between the two layers of the triangular ligament until a channel is opened for it by sloughing or by the knife. When extravasation occurs behind the posterior layer of the ligament the urine finds its way to the perineum in the neighborhood of

the anus. When the rupture is in front of the anterior layer of the ligament the urine, directed by the deep layer of the superficial fascia, finds its way into the scrotum and up on the belly, but does not pass into the thighs. A contusion is distinguished from a rupture by the facts that in the former the perineal swelling is not very extensive and does not enlarge on attempting micturition, while in the latter it is extensive and does enlarge on attempting to pass water. Furthermore, contusion does not cause urethral hemorrhage, while rupture does. A contusion sometimes, but not often, prevents the passage of a catheter; a rupture almost always, but not invariably, does so. The mortality from severe rupture with extravasation is about 14 per cent. (Kaufman).

Treatment.—In some cases it is possible to suture the urethra, and this procedure should be carried out when possible. In order to suture, perform suprapubic cystotomy and also make a perineal section. Find the posterior end of the ruptured urethra by passing a catheter from the bladder into the urethra. Suture with silk. The sutures pass through all of the coats of the urethra. The roof of the canal is sutured first, then a steel sound is introduced from the meatus, and the urethra is sutured around the instrument. The sound is withdrawn and the bladder is drained by Cathcart's siphon as modified by Keen (Fig. 561).* In recent cases of ruptured urethra the usual treatment is as follows: Immediately perform median perineal section and turn out the clot; trim off lacerated edges; find the proximal end of the urethra, pass a catheter from the meatus into the bladder, and leave it *in situ* until healing has begun around it. If the catheter cannot be passed from the meatus, open the bladder above the pubes and find the posterior urethra by retrograde catheterization. In retrograde catheterization we push an instrument from the bladder into the wound and use it to guide a catheter from the meatus into the bladder. When rupture occurs back of a stricture it is a good plan to excise the cicatricial tissue. In cases with extravasation make a median incision and numerous transverse cuts to secure drainage for areas of retained urine or pus. Then, at once perform suprapubic cystotomy. Drain suprapubically and from the perineum for about two weeks, by which time sloughing tissue will have separated. Then find the posterior urethra by retrograde catheterization and do a perineal operation to repair the damaged urethra. (See Eugene Fuller, in "N. Y. Med. Jour.," Nov. 23, 1901.) The wound is packed with iodoform gauze, and the bowels are tied up with opium for a few days. Many surgeons strongly disapprove of the custom of retaining the catheter, believing that the instrument does no real good, as urine is certain to get between the catheter and the walls of the urethra. In fact, it is quite enough to stuff the wound with gauze, the patient urinating through the wound for the first few days, after which time a catheter is used at regular intervals. Whatever method is employed, healing will require from six to eight weeks, and the patient must during the rest of his life, from time to time, introduce large-sized bougies.

Foreign Bodies in the Urethra.—These bodies may be calculi, bodies introduced by injury, as shot, bone, etc., bodies entering from a fistulous opening into the rectum, or bodies introduced from the meatus, as broken bits of catheters, straws, pins, etc.

* See Weir's report in Medical Record, May 9, 1896.

The **symptoms** vary with the size and the nature of the body. Sometimes there are almost no symptoms; at other times there are found great pain, retention of urine, and hemorrhage. Examination is made by feeling carefully with a finger in the rectum and by searching very gently with a sound, taking care not to push the body back. If the bladder is well filled with water when the body becomes impacted, inject a little oil into the meatus, close the lips with the fingers, and direct the patient to forcibly attempt urination, the surgeon opening the meatus when the urethra is widely distended, the foreign body being often forced out. If this maneuver fails, and the foreign body is impacted in the pendulous urethra, prevent its backward passage by at once tying a rubber tube around the penis. Try to squeeze the body out, and, if unsuccessful, endeavor to catch it with a wire loop, with a scoop, or with the long urethral forceps. If these methods fail, cut down upon the body and remove it, dividing any existing stricture. If it is lodged just back of the meatus incision of the meatus will permit extraction. If a hairpin is in the canal, the feet of the pin are almost always pointing to the meatus; to prevent them catching on attempted withdrawal, the penis must be squeezed to approximate the feet, and when they are adjacent a part of a silver catheter is slipped over to retain them in this position, when the pin can be extracted. If this fails, drag the penis against the belly, by rectal touch force the sharp ends of the pin out through the integument, cut one end off, and then withdraw the other. An ordinary large-headed pin is forced out in the same way, and when the head is turned externally it is extracted by way of the meatus. If a hard or sharp foreign body is lodged in the prostatic urethra, do not catch it with an instrument and try to drag it forward. To do so will be apt to tear the membranous urethra. It is better to push it into the bladder and remove it later by cutting, or, if it be a stone, by crushing (H. Hartmann, in "La Presse Méd.," July 24, 1901). If a lithotrite loaded with fragments be caught in the urethra, the surgeon must perform a perineal section, to enable him to clean and close the blades. After the blades have been closed the instrument may be easily withdrawn.

Urethrorrhea is not urethral inflammation, but is a condition of sensitiveness of the urethra and oversecretion of the glandular elements. It may be due to masturbation, sexual excess, and also, as Sturgis points out, to withdrawal during sexual intercourse, and to ungratified sexual passion. A drop or two of transparent mucus is found at the meatus in the morning, and a considerable amount may flow away while straining at stool or upon the diminution of an erection. This flow at stool is often called defecation spermatorrhœa. This discharge stains but does not stiffen linen (Sturgis). The discharge contains mucus, mucous corpuscles, epithelial cells, sometimes spermatozooids, but no gonococci or pus organisms. The patient may be well in all other respects, but in many cases there are neurasthenic symptoms, sexual weakness, or even impotence.

Treatment.—In an uncomplicated case improvement or cure will follow upon the abandonment of evil habits. If complications arise, they must be treated.

Urethritis, or Inflammation of the Urethra.—Urethral inflammations can be divided into two classes: (1) *simple*, in which infection is due alone to pyogenic cocci, and (2) *specific*, in which the gonococcus is present.

Simple urethritis may be due to several causes, such as traumatism; great acidity of the urine; chancre in the urethra; contact with menstrual fluid, leukorrhœal discharge, the discharge from malignant disease of the uterus, ordinary pus, or acrid vaginal discharge; the passage of instruments; the administration of irritant diuretics; strong injections; worms in the rectum; a febrile malady; venereal excess and masturbation; and the passage or impaction of foreign bodies. A temporary and mild urethritis sometimes accompanies early syphilitic eruptions. Simple urethritis is less severe and prolonged than gonorrhœal urethritis, though clinically in the early stage the physician cannot invariably distinguish between the two forms. The gonococcus is never found in the discharge of simple urethritis. In the non-specific inflammation pus is not always present, many cases stopping short of pus-formation after a varying period of catarrh, but any catarrh may become purulent. A simple urethritis may be caused or may be prolonged for an indefinite period by the presence of large amounts of oxalate in the urine or the existence of the uric-acid diathesis (see Gouty Urethritis).

Treatment.—Seek for the cause and remove it. Correct any abnormal condition of the urine by means of suitable diet, drugs, and mode of life. Mild astringent injections are useful. It may be necessary to flush the urethra repeatedly with a solution of silver nitrate (1 : 8000).

Traumatic Urethritis.—The pain in traumatic urethritis is coincident with the introduction of the foreign body. The discharge, which may be bloody, mucous, mucopurulent, or purulent, comes on within twenty-four hours.

Treatment.—If the inflammation is slight, prescribe diluent drinks, pectoric, and a saline. If severe, put the patient to bed, apply hot fomentations to the perineum, give diluent drinks, employ suppositories of opium and belladonna, and watch for fever and other complications.

Gouty Urethritis.—This condition first manifests itself in the posterior urethra, not in the anterior, as does clap. Its symptoms are great vesical irritability; pain on urination; discharge, usually scanty, associated with uric acid in the urine or other symptoms of gout. The *treatment* comprises dieting and the usual remedies for gout. Purgatives are given freely, and full doses of colchicum, piperazin, urotropin, or the alkalies; hot baths, low diet, diluent drinks, and diaphoretics are indicated. A chronic discharge from the prostatic region is apt to linger; for this there is nothing better than the usual gouty remedies and saline waters with copaiba, cubebs, or sandalwood oil. In many cases it is necessary to flush the urethra once a day with a solution of silver nitrate (1 : 8000).

Eczematous Urethritis.—Berkley Hill states that this disease is very obstinate, is probably associated with gout, and is met with in adults of full habit or who are beer-drinkers and who have eczema of the surface of the body. He states also that the glans penis near the meatus is red and tender, and that the interior of the urethra is in the same condition. Pain is constant, and it is aggravated on micturition. The discharge is scanty. The *treatment* comprises injections of cold water or irrigation with iced water, and internally the administration of arsenic with the alkalies.

Tuberculous urethritis is due to a tuberculous ulcer, which is most apt to be seated near the vesical neck. There is a little pain on micturition, but

there is intense pain at one spot on passing a bougie. The discharge is slight and at times bloody. The bladder is very irritable, and severe cystitis arises and persists. The *treatment* includes warmth, nutritious diet, and cod-liver oil, removal to an equable climate, and living as much as possible out of doors. The bladder is washed out once a day with boric-acid solution. Iodoform emulsion is injected daily, but after a time the surgeon will be forced to drain by perineal or suprapubic cystotomy.

Examination when a Urethral Discharge Exists.—Learn accurately the history. Obtain some of the discharge and examine an unstained slide and a slide stained, for gonococci. In some cases take cultures. Learn the amount of the twenty-four hours' urine and study a sample chemically and microscopically, being sure to determine the amount of urea. Learn if the discharge discolors or stiffens linen; if it is only found in the morning; if it simply glues the lips of the meatus together; if it is seen during the day; if it is noted particularly or only after sexual excitement or straining at stool. Inquire as to pain, frequency of micturition, passage of blood, nocturnal emissions, manner of urinating, etc. In many cases insert a finger in the rectum, feel the prostate and vesicles, massage them, and see if discharge appears at the meatus after stripping the penis. If discharge does appear, collect a specimen and examine it. In some cases it is necessary to pass a sound. Follow Valentine's advice and cleanse the meatus, glans, prepuce, and urethra before passing a sound. Cleanse the meatus, glans, and prepuce with a 1:6000 solution of corrosive sublimate. Irrigate the urethra with boracic-acid solution and fill the clean urethra with emulsion of iodoform and glycerin (5 per cent.), and after using the instrument irrigate again with boracic-acid solution (Valentine's method). Examine the urine by the three-glass test.

The Three-glass Test (Valentine's Plan).—Take as many three-ounce tubes as are required to receive all the urine from the bladder. The first tube contains the washings from the anterior urethra. The second and other tubes, additional material from the bladder. The last tube contains material expressed from the posterior urethra, prostate, and seminal vesicles. Examine the urine and the sediment in the first two glasses and in the last glass. Note particularly if shreds are present. The shreds of gonorrhœa are white in color and of variable length, and float in the urine. They are composed of pus-corpuscles and of epithelial cells which have undergone fatty degeneration. Many of these shreds form in the ducts of Cowper's glands, but the glands of the entire length of the urethra also furnish them.

Gonorrhœa (Clap; Specific Urethritis; Tripper; Venereal Catarrh).—Gonorrhœa is an acute inflammation of the genital mucous membrane, of venereal origin, due to the deposition and multiplication of gonococci in the cells of the membrane and a mixed infection with the cocci of suppuration. In the male, clap begins within the meatus and fossa navicularis and extends backward throughout the length of the urethra. The mucous membrane swells and becomes hyperemic, and there is a discharge, first of mucus and serum, and then of pus. In severe cases the discharge is bloody (black gonorrhœa). For a week or more the inflammation increases, then becomes stationary for a time, and then declines, the discharge growing less profuse and thinner, a watery discharge lasting for some little time. An

ordinary case of genuine gonorrhœa lasts from six to ten weeks, and even a case limited purely to the anterior urethra will rarely be cured within four or five weeks. During the acute stage the entire penis swells and the corpus spongiosum becomes infiltrated with inflammatory exudate. Gonorrhœa may produce systemic complications and tends particularly to attack serous membranes or other endothelial structures (joints, pericardium, pleura, tendon-sheaths, intima of vessels, etc.). Among the complications are gonorrhœal arthritis, myelitis, poliomyelitis, and multiple neuritis. There are 3 cases of gonorrhœal myositis on record (Martin W. Ware, "Am. Jour. Med. Sciences," July, 1901). Phlebitis or endocarditis may arise and cerebral embolism may result. Cerebrospinal meningitis can occur (fluid obtained by lumbar puncture contains gonococci).

Gonorrhœal rheumatism is discussed on page 485. Gonorrhœal peritonitis is rare. Infection of the peritoneum through the blood is very rare. The majority of cases of gonorrhœal peritonitis occur in women and are due to direct extension from the Fallopian tubes. Gonococci have not been found in the exudates of cases of pleuritis and pericarditis supposed to be of gonorrhœal origin. True gonorrhœal septicemia occasionally occurs. In one case Blumer and Hayes found the bacteria in the blood. A child may contract gonorrhœal ophthalmia during delivery, and any person may develop it by getting gonococci into the eyes.

Symptoms of Acute Inflammatory Gonorrhœa.—The period of incubation of gonorrhœa is from a few hours to two weeks. The patient notices on arising a drop of thin fluid which glues together the lips of the meatus, and he feels some pain on urination. The meatus is red and swollen. Within forty-eight hours the *first stage*, or the stage of increase, becomes established. The meatus is now red, swollen, and everted (fish-mouth meatus); micturition causes severe pain (ardor urinæ); chordee occurs, especially when the patient is warm in bed. By chordee we mean a condition of painful erection in which the penis is markedly bent. The rigid infiltration of the corpus spongiosum prevents it distending to accommodate itself to the enlarged corpora cavernosa, and in consequence the organ curves. There is frequent micturition with tenesmus, and a profuse discharge which is yellow, greenish, or even bloody. The complications of this stage are *balanitis* (inflammation of the mucous membrane of the glans penis), *balanoposthitis* (inflammation of the surface of the glans and the mucous membrane of the prepuce), *phimosis* (thickening and contraction of the foreskin so that the glans cannot be uncovered), and *paraphimosis* (catching and fixation of the retracted prepuce behind the corona glandis). In the *second or stationary stage*, which lasts from the end of the first to the end of the second week, the acute symptoms of the first stage continue. The complications of this stage are peri-urethral abscess, lymphangitis, solitary and painful bubo of the groin which may suppurate, inflammation of Cowper's glands, inflammation of the prostate or of the bladder, and gonorrhœal ophthalmia. In the *third or subsiding stage* the symptoms gradually abate, the discharge becoming scantier and thinner, and finally drying up. This stage is of uncertain duration, and in it there may occur *epididymitis*, or inflammation of the epididymis. Among other possible complications we may mention gonorrhœal arthritis (page 485), infective endocarditis, tenosynovitis, pyelitis, purulent ophthalmia, perichondritis,

and peritonitis. Every urethral discharge should be examined for gonococci in order to make a positive diagnosis. This examination is made several times during the progress of the case, so as to determine when the organisms disappear. The examination can be easily made. Place a drop of discharge upon a cover-glass, lay another cover-glass over this, and slide the glasses apart. Dry the slides in the flame of an alcohol lamp. Bring the cover-glasses in contact with a saturated solution of methylene-blue in 5 per cent. carbolic-acid water. The staining-material is allowed to remain in contact with the slides for five or ten minutes, the glasses are washed with water, are then placed in a solution of 5 drops of acetic acid to 20 c.c. of water, and kept there "long enough to count one, two, three slowly," and again washed with water. Examination with the microscope shows the gonococci stained blue.* In doubtful cases, when the microscope fails to show gonococci, make cultures. Cultures should always be taken from a discharge in a child, from the fluid of an inflamed joint, from the discharge in gleet or purulent ophthalmia, and from the blood in obscure infections.

Subacute or catarrhal gonorrhoea develops in men who have previously had gonorrhoea, as a result of prolonged or repeated coition or of contact with menstrual fluid or leukorrhoeal discharge. There is profuse mucopurulent discharge, very little pain on micturition, but seldom chordee or marked irritability of the bladder.

Irritative or Abortive Gonorrhoea.—In this disease the symptoms, which are identical with those of beginning clap, do not increase, but are apt to disappear within ten days.

Chronic Urethral Discharges.—**Chronic urethral catarrh**, which may follow gonorrhoea, is characterized by the occasional presence of a drop of clear, tenacious liquid. This discharge becomes more profuse as a result of sexual excitement or the abuse of alcohol.

The persistence of a small amount of milky discharge, because of localization of inflammation in one spot or the production of a granular patch or a superficial ulcer, characterizes chronic gonorrhoea. There is some scalding on urination; erections produce aching pain; there are pain in the back and redness and swelling of the meatus. All the symptoms are intensified by sexual excitement, by coitus, by violent exercise, or by alcoholic excess.

Gleet.—If a chronic urethritis lasts over ten weeks, it is called gleet. In gleet the lips of the meatus are stuck together in the morning, and squeezing them discloses a drop of opalescent mucopurulent fluid. During the day the discharge is rarely found. The discharge is yellow or has a yellowish hue; it stains the linen distinctly, and contains pus, shreds, epithelium, and at times gonococci. The urine is clear and contains pus, gonorrhoeal shreds, and comma-shaped hooks. The discharge is not obviously purulent, and contains amyloid corpuscles. There are frequency of micturition, pains in the back, and dribbling of urine, and a bougie may find a stricture of large caliber, or at least will discover that the urethra is rigid from inflammatory infiltration. A discharge may be maintained by *chronic prostatitis*. In this condition there are frequency of micturition; a sense of weight or dull pain in the perineum; diminished projectile force of the stream of urine; there is often a tendency to sexual excitement and premature emis-

* Schütz's method, as set forth by R. W. Taylor in his work upon "Venereal Diseases."

sion. In prostatorrhœa a milky discharge gathers in the urethra during sleep and flows during muscular effort or while the patient is at stool. The linen is stained but slightly and the lips of the meatus are not glued together on waking. There is a history of masturbation or sexual excess. The condition is not aggravated particularly by alcohol or sexual intercourse. In chronic anterior urethritis there is a discharge from the meatus or sticking together of the lips in the morning. In chronic posterior urethritis there is no discharge of pus from the meatus. If the three-glass test is made, it will be found that in a case of chronic anterior urethritis only the first portion will be cloudy and show shreds; if he suffers from posterior urethritis of not very long standing, both portions will be a little clouded, the first containing clap shreds, the last hook-shaped shreds. In a very chronic case neither sample will be cloudy, but the first portion will contain shreds. In gleet the rigidity of the urethra causes the retention of small quantities of urine after each act of micturition, back of the thickened areas. This retained urine decomposes and adds to inflammation. Indulgence in alcohol, sexual excitement, or sexual intercourse aggravates the condition.

Treatment of Acute Gonorrhœa.—*General Care.*—Wash the hands after touching the parts and dry them on an *individual* towel, which is not used upon the face. Wear a suspensory bandage. Avoid violent exercise, especially bicycle riding, and also wet. Moderate exercise is allowable. The patient must not only refrain from sexual intercourse, but must not permit himself to indulge in sexual excitement, and must not drink a drop of liquor, malt, spirituous, or alcoholic. At least twice a day wash the penis in a cup of warm water containing ʒj of salt. If the foreskin is long, catch the discharge on a bit of absorbent cotton caught under the prepuce and change it at each act of micturition. If the foreskin is short, cut a small opening in a square piece of old linen, slip the linen over the glans, catch it back of corona, and bring the ends forward with the prepuce. If the glans is completely naked, pin an old stocking foot upon the undershirt, put absorbent cotton in the toe, and place the penis within this bag. Never tie or fasten any material about the penis. The patient should drink freely of plain water, of water containing a little bicarbonate of sodium, or of alkaline mineral water (Vichy or Apollinaris). He should obtain one bowel movement every day. I am accustomed to direct the patient, in accordance with Guitéras's rule (Begg, in "Phila. Med. Jour.," June 7, 1902), to avoid tea, much coffee, pickles, spices, condiments, rhubarb, tomatoes, and asparagus. Guitéras permits the moderate use of claret.

Abortive treatment may be tried if the case is seen early. The writer formerly believed that by cleansing the urethra several times a day with peroxid of hydrogen, following the hydrogen by the injection of oil of cinnamon and benzoinol, many cases of gonorrhœa could be quickly aborted. Further observations confirmed by bacterial investigation have shown that he was in error. True gonorrhœa cannot be aborted by the above-mentioned plan. Other abortive methods are the use of hot retro-injections of corrosive sublimate solution (1 : 20,000), two pints being run through the urethra once a day; strong injections of nitrate of silver or of tannin; scraping the meatus or the urethra adjacent with cotton, and injecting 15 drops of a 3 per cent. solution of nitrate of silver. If in seventy-two hours the symptoms are not

greatly improved, abortive treatment should be abandoned. Recent studies render it almost certain that there is no real abortive treatment. Abortive treatment, to be efficient, would have to be carried out before the gonococci penetrated the epithelial cells; in other words, would need to be instituted before the symptoms of the disease appear. Janet says that we must alter

our conception as to what constitutes abortive treatment, and he doubts if a case of true gonorrhœa was ever really aborted.* The method of irrigation with solutions of permanganate of potassium is really a prophylactic treatment. Janet applies his treatment as evidences of trouble present themselves, and before acute symptoms appear, and claims that in most persons the disease can be arrested in from eight to twelve days. The same plan of treatment is useful in a well-developed case.

Irrigation can be used in an incipient or in a well-developed case. Janet's method is as follows: An irrigator is filled with a warm solution of permanganate of potassium (1 : 4000). The patient after emptying his bladder is seated upon a chair and his sacrum rests upon the extreme front edge of the chair (Valentine). The reservoir is joined to a glass nozzle by a rubber tube. The nozzle is introduced into the meatus, and the fluid is permitted to run gradually at first, with full force later. In anterior trouble the fluid is allowed to run out of the meatus by the side of the nozzle. The anterior urethra is always irrigated first, the reservoir being two feet above the chair.

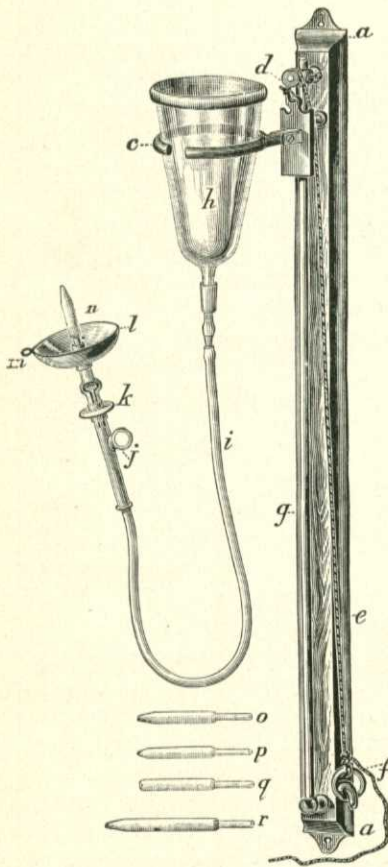


Fig. 573.—Valentine's urethral and intravesical irrigator: *a*, Board with attachments to be screwed to wall; *c*, open collar; *d*, pulley; *e*, cord; *f*, ring to suspend percolator; *g*, brass rod; *h*, percolator; *i*, rubber tube; *j*, ring for fourth finger; *k*, flange to graduate pressure; *l*, shield; *m*, ring to suspend shield; *n*, nozzle attached.

tight about the nozzle, and the fluid overcomes the force of the compressor muscles of the urethra and the bladder sphincter and enters the bladder. If the muscles do not quickly relax, continue the hydrostatic pressure for several minutes, when relaxation will usually occur; but if it does not do so, tell the patient to breathe slowly and deeply, and to make efforts at urination (Valentine). When the bladder is full the tube is withdrawn and the

* Ann. d. mal. d. org. gén.-urin., 1896, p. 1031.

patient micturates. This procedure is practised once or twice a day for five or six days, or even longer, and the strength of the solution is gradually increased up to 1 : 1000. It has been claimed that after one or two weeks of this treatment gonococci permanently disappear in the majority of cases. Fig. 573 shows the irrigator devised by Ferd. C. Valentine. Valentine, of New York,* has constructed the following table, which is of use to a practitioner who wishes to employ irrigations with permanganate of potassium in the treatment of acute gonorrhœa:

First day, first visit.	Anterior irrigation	I : 3000
First day, 7 P. M.	Anterior "	I : 4000
Second day, 9 A. M.	Anterior "	I : 3000
Second day, 7 P. M.	Anterior "	I : 4000
Third day, 9 A. M.	Intravesical "	I : 6000
Third day, 7 P. M.	Anterior "	I : 5000
Fourth day, 9 A. M.	Intravesical "	I : 5000
Fourth day, 7 P. M.	{ Intravesical "	I : 5000
	{ Anterior "	I : 2000
Fifth day, Noon.	Intravesical "	I : 5000
Sixth day, Noon.	Intravesical "	I : 5000
Seventh day, Noon.	Intravesical "	I : 5000
Eighth day, 9 A. M.	{ Intravesical "	I : 5000
	{ Anterior "	I : 3000
Eighth day, 7 P. M.	{ Intravesical "	I : 5000
	{ Anterior "	I : 2000
Ninth day, 9 A. M.	{ Intravesical "	I : 4000
	{ Anterior "	I : 1000
Ninth day, 7 P. M.	{ Intravesical "	I : 4000
	{ Anterior "	I : 1000
Tenth day, 9 A. M.	{ Intravesical "	I : 4000
	{ Anterior "	I : 1000
Tenth day, 7 P. M.	{ Intravesical "	I : 5000
	{ Anterior "	I : 500

For full directions regarding this method see Valentine's excellent book, "The Irrigation Treatment of Gonorrhœa." If a stricture exists, it is not advisable to employ this treatment. Excellent results can be obtained by irrigations with fluid containing silver nitrate (1 : 12,000 to 1 : 8000).

When a patient is treated by irrigation, after the entire subsidence of acute symptoms, a thin, colorless discharge may persist. This can be cured by the use of astringents. Two or three times a day an astringent is injected by means of a half-ounce syringe. Dalton's formula is very useful: Zinc oxid and lead acetate, of each, $\frac{1}{2}$ gr. to 3 gr.; tincture of catechu, from $\mathfrak{m}\times$ to $\mathfrak{m}\text{xxx}$; glycerin, from $\mathfrak{v}\text{ss}$ to $\mathfrak{v}\text{j}$; and water to $\mathfrak{v}\text{j}$.

Many writers oppose the irrigation treatment, claiming that it increases the liability to complications, especially prostatic infiltration, and enhances the danger of recurrence. I believe in the method. I do not think it shortens the duration of the disease, but do believe that it mitigates its intensity, makes the patient much more comfortable, and quickly causes the discharge to become mucopurulent. That it increases complications and the danger of reinfection is very doubtful. Much of the trouble which has followed its use has been due to raising the reservoir to too great a height.

Irritative gonorrhœa will subside in a few days. The above directions should be followed, and the anterior urethra should be washed out several times daily with peroxid of hydrogen, or irrigated once a day with a hot solu-

* "The Irrigation Treatment of Gonorrhœa."

tion of permanganate of potassium (1 : 4000). In *catarrhal gonorrhoea*, at once order injections (1 grain to the ounce of sulphate of zinc; or zinci sulphas gr. viij, plumbi acetat gr. xv, water ℥viij; or gr. v of sulphocarbolate of zinc to ℥j of water; or White's prescription of ℥j each of acetate of zinc and tannic acid, ℥iij of boric acid, ℥vj of liq. hydrogen. peroxid.). For injecting use a blunt-pointed hard-rubber syringe of a capacity of three or four drams. Let the patient urinate and then sit on a chair, his buttocks hanging over the edge; throw a syringe-ful of the solution into the urethra and let it run out at once and throw in another syringe-ful and hold it in from three to five minutes.

In *ordinary acute gonorrhoea* the old rule was to order balsams. The common custom is to give two capsules three times a day, each capsule containing 5 grains of salol, 5 grains of oleoresin of cubeb, 10 grains of balsam of copaiba, and 1 grain of pepsin. Clinical observation indicates that the balsams are of distinct value in gonorrhoea. When used early, the discharge tends to become mucopurulent and the acute symptoms subside (S. Behrmann, in "Dermatologisches Centralblatt," Berlin, Nov. and Dec., 1901). Many practitioners will not use balsams until the third week. Bacteriological studies indicate that copaiba, when eliminated in the urine, has a certain amount of power in inhibiting the growth of gonococci, but that cubeb and sandal have not such power. Yet sandal is more useful than copaiba as a remedy. Salol is distinctly germicidal, hence it is given with the balsams. In a case treated with balsams an astringent injection is usually employed. The injection is used two or three times a day, immediately after micturition. As the inflammation subsides increase the strength of the injection. A good plan is to order an eight-ounce bottle and eight half-grain powders of sulphate of zinc. Direct the patient to fill the bottle with water, in which one powder is dissolved; when this is used dissolve two powders in a bottle-ful of water, and so progressively increase the strength. When the discharge ceases stop the injections gradually. Whenever a syringe-ful is taken from the bottle a syringe-ful of water is put into the bottle, and thus pure water is soon obtained, at which point injection is discontinued. If an astringent injection causes much pain, use a sedative injection—℥ij of boric acid, gr. viij of aqueous extract of opium, and ℥viij of liquor plumbi subacetatis dilutus.

Argonin, which is a combination of albumin, silver, and an alkali, is highly recommended by some authors as a local remedy for gonorrhoea (Schäffer, Guthiel). A solution of this material is non-irritant, the silver is not precipitated by chlorids, and the agent destroys gonococci. It is used by injection or irrigation. If used by irrigation, employ a 1 : 500 solution twice a day. If used as an injection, employ a 1 : 200 solution six or eight times a day. When the discharge is found free from gonococci and remains free for three days, stop the argonin and use an astringent injection.

Protargol, metallic silver combined with a proteid, is a yellow powder soluble in water, the solution not being acted on by light. It is a non-irritant germicide. Neisser, after demonstrating the presence of the gonococcus, administers protargol by injection, the first injections being of a strength of 0.25 per cent., the strength being gradually increased to 0.5 per cent., and finally to 1 per cent. In the beginning he orders three injections a day, each injection being retained from fifteen to thirty minutes; after several days, when the symptoms improve he gives only one or two injections a day,

and these are continued for ten days after gonococci disappear from the discharge. After protargol is abandoned an astringent injection should be used for a time. Some surgeons use a 1 : 1000 solution of protargol, and irrigate the anterior urethra and flush the bladder twice a day. The most powerful and useful of the silver salts is argyrol, or silver vitellin. This salt was discovered by A. C. Barnes and H. Hiller ("Med. Record," May 24, 1902). It is an extremely soluble preparation, contains 30 per cent. of silver, does not coagulate albumin, and is not precipitated by chlorids. When injected into the urethra it enters deeply into the mucous membrane and is powerful in destroying gonococci. (See "A Clinical Study of a New Silver Salt in the Treatment of Gonorrhœa," by H. M. Christian, in "Med. Record," vol. lxii, 1902.) In most cases gonococci disappear within two weeks. The injection used at first may be of a strength of 2 per cent. The drug should be retained in the urethra four or five minutes, and three or four injections should be given each day. The strength of the injection can be gradually increased to 5 per cent. or even more. Picric acid has been highly commended as an injection. The strength of solution is 1 : 200, and it is to be retained in the urethra three or four minutes (de Brun's method).

Methylene-blue internally is occasionally of service in gonorrhœa. A capsule containing gr. ij of the drug is given three times a day. It makes the urine greenish-blue and occasionally induces strangury. Urotropin renders the urine sterile. Salicylate of sodium may be of value late in the case.

Christian's plan of treating acute gonorrhœa is very useful. It is as follows: Two solutions are used during the first ten days. Three times a day a solution of permanganate of potash is injected (gr. $\frac{1}{2}$ of permanganate of potash in 8 ounces of water), six syringefuls being used at each séance. After a washing with permanganate protargol is injected (gr. x of protargol to $\bar{\text{v}}$ iv of water) and retained ten minutes. At the end of four days the strength of the protargol is increased to gr. xx in $\bar{\text{v}}$ iv and the strength of the permanganate to 1 : 4000. During the third week abandon the above-mentioned solutions, put the patient on balsams, and use an astringent injection. Christian uses gr. x of sulphate of zinc, gr. ij of subcarbonate of bismuth, 2 ounces of solution of hydrastis, and 4 ounces of water. Cure is obtained in six or seven weeks.

Ardor urinæ is relieved by urinating while the penis is immersed in hot water and by administering an alkaline diuretic. *Chordee* requires a bowel-movement in the evening, and sleeping in a cool room, under light covers, and on a hard mattress; bromid is given several times daily, and a considerable dose is given at night; it may be necessary to use suppositories of opium and camphor or to give hyoscin. *Balanitis* requires frequent washing with warm water, drying with cotton, and dusting with borated talc or with boric acid and subnitrate of bismuth (1 : 6). *Balanoposthitis* requires soaking in hot water, applications of lead-water and laudanum, and injections of black wash under the prepuce until edema of the foreskin subsides, and then cleanliness and the application of a drying powder. *Phimosis* requires soaking the penis in hot water, injections of hot water beneath the foreskin, followed by black wash, and the use of lead-water and laudanum externally. If this fails, circumcision must be performed. If *paraphimosis* occurs, grasp the head of the penis with the left hand, squeeze the blood out, and try to push

the head back while with the right hand the penis is pulled upon, as if the surgeon intended to lift the individual by the organ. If this fails, cut the collar on the dorsum with scissors; or, what is better, for it gives free exposure, incise each side of the prepuce between the middle of the dorsum and the frenum. *Bubo* requires the application of iodine, ichthyol, or blue ointment, the use of a spica bandage, and rest. If a bubo suppurates, it must be opened or aspirated. *Acute posterior urethritis* is treated by rest, and if the symptoms are severe, by rest in bed. If the balsams do not irritate, they are given; if they do, they are withdrawn. Urotropin or salol is given and the patient is placed upon a milk-diet with orders to drink largely of flaxseed tea. Alkaline fluids do harm by favoring ammoniacal decomposition of the urine. Injections and irrigations are abandoned. Pain and vesical spasm are controlled by suppositories of opium and belladonna. If retention of urine occurs, have the patient urinate while in a hot bath; if this fails, use a soft catheter. *Acute vesiculitis* is treated as is acute prostatitis. Chronic vesiculitis is considered on page 1005. *Pyelitis* is treated by rest in bed, hot baths, wet cupping of the loin, or milk-diet, the use of diuretics, the taking of a large quantity of bland liquid, and the administration of salol or urotropin. *Folliculitis* is treated by rest and the application of a hot-water bag to the perineum (if that be the part involved). If pus forms, evacuate by incision. Later the follicle may be dissected out or destroyed by cauterization. If the follicle opens into the urethra it may be cauterized through an endoscope. *Peri-urethritis* is treated by rest and hot applications. If pus forms, an incision must be made. If the abscess is permitted to break into the urethra, rest and hot fomentations may be used, but at the first sign of urinary extravasation make an external incision. *Cowperitis* is treated in the same way as peri-urethritis. Gonorrhoeal rheumatism is considered on page 485. *Acute prostatitis* and *cystitis* require confinement to bed, a milk-diet, the use of diuretics, hot applications to the perineum and hypogastrium, suppositories of opium, and belladonna or ichthyol, leeching the perineum, the discontinuance of balsams and injections, and the administration of urotropin or salol. *Abscess of the prostate* requires instant incision. In *retention of urine* the patient should try to pass the urine while in a hot bath; if this fails, a soft catheter is used. After relieving the bladder put the patient to bed and apply hot sand-bags as for acute prostatitis. *Chronic prostatitis* requires cold hip-baths, cold-water enemata, deep urethral injections, plain diet, avoidance of alcohol and over-exertion, counter-irritation of the perineum, and the relief of stricture or phimosis. Great benefit is occasionally derived from passing a soft bougie covered with blue ointment or with a 10 per cent. ointment of protargol. If *epididymitis* arises, put the patient to bed, abandon injections, shave the hair from the groin, leech over the cord, elevate the testicles, and apply an ice-bag. Give a cathartic, a fever mixture, and suitable doses of bromid of potassium and morphin. The application twice a day of 20 drops of guaiacol in ʒj of cosmolin or olive oil gives great relief. When swelling lingers, after tenderness subsides strap the testicle with adhesive plaster. A lingering case is benefited by the internal use of iodid of potassium and the local application of ichthyol. In *gonorrhoeal ophthalmia* secure a watch-crystal over the unaffected eye, put the patient in a darkened room, rub the infected conjunctival sac with cotton soaked in a

2 per cent. solution of silver nitrate, wash out the affected eye often with hot boric-acid solution, keep the pupil dilated with atropin, leech the temple, give purgatives, and employ hot mustard foot-baths. Always send for an ophthalmologist.

When is Gonorrhœa Cured?—When actual discharge ceases, a patient considers himself cured and yet he may have residuals of infection which are liable at any time to awaken into activity and produce anew an acute condition. Gonococci are frequently retained in the urethral glands and follicles or in areas surrounded by indurated mucous membrane. A man is considered to be well when shreds and pus disappear from the urine, when an examination of expressed mucus on three successive days fails to find gonococci, and when there has been no discharge for ten days. Furthermore, we must be sure that the prostate, Cowper's glands, and the seminal vesicles are free from disease.

Treatment of Chronic Gonorrhœa and of Chronic Urethritis following Gonorrhœa.—The first thing to do is to determine the *cause* of the prolongation of the discharge. Valentine's list of causes should be borne in

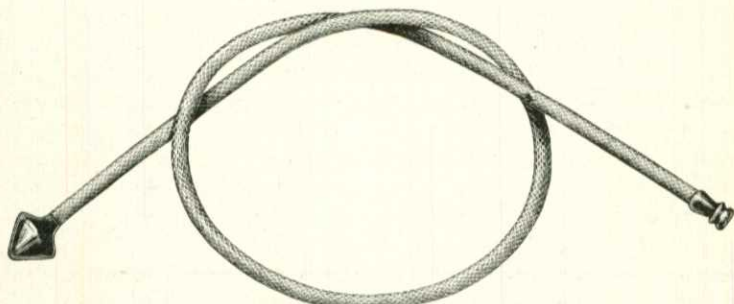


Fig. 574:—Bougie-à-boule.

mind ("Med. Record," June 29, 1901). They are as follows: (1) Lack of treatment; (2) misdirected treatment; (3) insufficient treatment; (4) over-treatment; (5) infraction of dietetic or hygienic regulations; (6) constitutional disturbances; (7) congenital or acquired deformities and complications; (8) involvement of the urethral adnexa; (9) marital reinfection. In a case in which a discharge persists or recurs, the symptoms and general condition must be closely studied, the discharge must be examined microscopically, the condition of the urine must be determined, and the urethra must be explored.

Exploration of the urethra is inaugurated by inspection and external palpation. Palpation detects induration, peri-urethritis, follicular abscess or inflammation, Cowperitis, etc. The prostate and seminal vesicles are examined by a finger in the rectum. The interior of the urethra is explored with a soft bougie-à-boule (Fig. 574). On withdrawing this instrument the shoulder catches in any contracture. It is to be borne in mind that a large steel sound can often be introduced with ease when the bougie-à-boule makes evident that a contracture exists. The emergence of the instrument is arrested by a patch of thickening, a granular area, a zone of epithelial proliferation,

a papilloma, or a stricture. In fact, anything which lessens the urethral caliber interferes with the withdrawal of the bougie-à-boule. It does not do

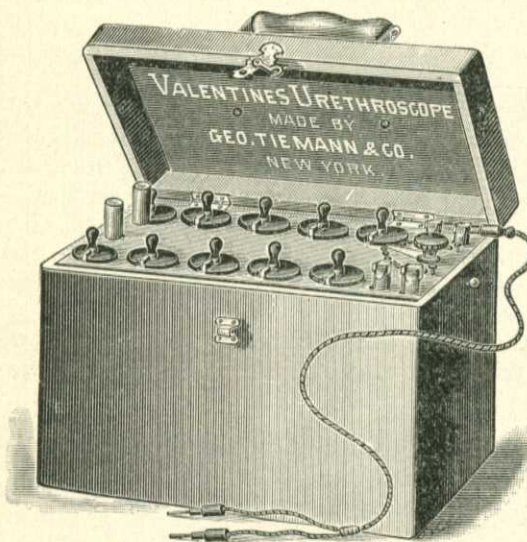


Fig. 575.—Valentine's urethroscope.

to conclude that stricture exists simply because some lessening of caliber is appreciated. The bougie-à-boule finds its chief use in exploring the anterior urethra. If introduced into the deep urethra its emergence will be normally checked as its shoulder comes against the posterior layer of the triangular ligament.

In most cases the diagnosis is only certainly determined by the use of the urethroscope. This instrument has been perfected of recent years and is now an absolutely essential part of an arma-

mentarium. I use Valentine's instrument and find it most satisfactory (Figs.



Fig. 576.—Valentine's urethrosopic tube.

575-578). The anterior and posterior urethra can be thoroughly examined with the utmost ease. Before inserting a urethrosopic tube place the patient



Fig. 577.—Valentine's obturator.

recumbent and cleanse the foreskin, glans, and anterior urethra as directed in the section on Cystoscopy. Insert a tube which readily passes the meatus,

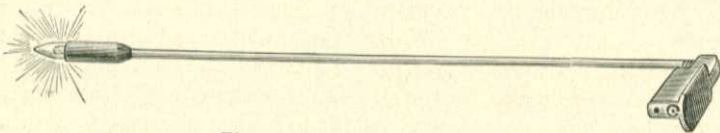


Fig. 578.—Valentine's light carrier.

first cleansing the tube and obturator by burning alcohol upon them. Carry the tube to the anterior layer of the triangular ligament. Withdraw the

obturator and insert the light. Turn on the light, mop the urethra with bits of cotton wrapped on a stick, and slowly withdraw the tube, examining the urethra as its walls fall together back of the retracting tube. After withdrawal of the tube irrigate the anterior urethra. To examine the deep urethra, carry the instrument through the prostatic urethra. After the examination give an intravesical irrigation.

When the cause of a discharge is once determined, rational treatment can be instituted, and to determine the cause the electric urethroscope is indispensable. An erosion of the mucous membrane or a granular patch requires touching from time to time with a solution of silver nitrate (1 or 2 per cent.). These applications are made through the tube of the urethroscope. A

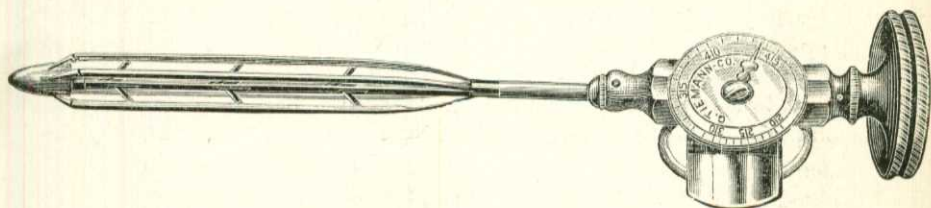


Fig. 579.—Kollmann's anterior dilator.



Fig. 580.—Oberlander's anterior dilator.

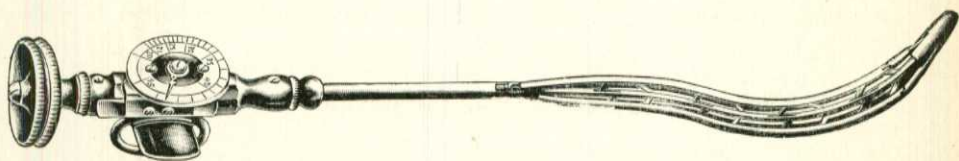


Fig. 581.—Kollmann's anteroposterior dilator.

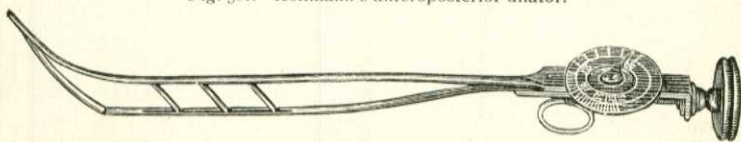


Fig. 582.—Oberlander's anteroposterior dilator.

stricture or an infiltration is treated by gradual dilatation. This combines pressure and massage. If the caliber of the urethra is less than No. 21 of the French scale, conical steel sounds are used twice a week. If there is much hyperesthesia they are retained but a brief time; but as hyperesthesia diminishes the period of retention is lengthened, until an instrument can be kept in place without causing severe suffering for ten or fifteen minutes. It is not desirable to use cocaine, as it is distinctly dangerous, obtunds the sensibility so that undue violence may be used, and increases the post-operative inflammation. Before and after using an instrument the urethra must be cleansed as previously directed (page 982).

When the urethra becomes tolerant to instrumentation, a special dilator

is employed to act particularly on the area of disease. If in the beginning of treatment the caliber of the urethra is equal to or greater than No. 21 of the French scale, it is rarely necessary to precede the dilator by the use of conical sounds. Figs. 579, 580, 581, and 582 show various dilators. Most dilators should be inserted in a sterile rubber cover before being used, otherwise they

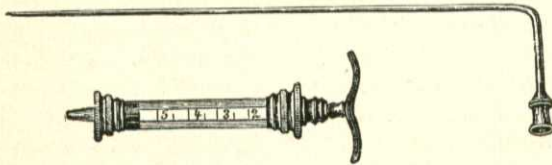


Fig. 583.—Kollmann's gland syringe.

will cut, tear, or pinch the urethra. Kollmann's dilator will not injure the mucous membrane and can be used without a cover (Fig. 579). A dilator should be lubricated

with lubrichondrin or synol soap. If a two-bladed dilator is used at first, a four-bladed dilator must be subsequently employed.

A dilator is cleansed by scrubbing its blades with soap and water, sticking them in alcohol, withdrawing, and burning the alcohol retained in the instrument.

The following rules are of the first importance (Ferd. C. Valentine, in "Med. Record," June 29, 1901):

1. The first dilatation must stop at that point at which the first resistance to further dilatation is felt by the operator's fingers turning the screw that separates the blades.
2. Dilatations, if done by a novice, must in the beginning of treatment be repeated no oftener than every three or four days.
3. Each dilatation, in point of time, must reach no greater duration than two minutes over that of the preceding session.
4. No dilatation must exceed one-half number Charière above the number attained at the next prior séance, regardless of any lack of resistance that may be present.

As a rule, glandular and follicular infiltrations are cured by the use of the dilator. If they are not, they must be treated through the tube of the urethroscope. The interior of a follicle may be cauterized with an electric wire or subjected to electrolysis, or touched with a 3 per cent. solution of silver nitrate. A thickened crypt, or gland, or follicle, or an area of induration, may be slit with a knife. A polyp can be removed with a snare, the cautery, or special forceps. In a chronic inflammation of the urethra, in which the inflammation is superficial and in which the glands are not involved, irrigations, urethral and intravesical, constitute the best treatment. (See Valentine's treatise on "The Irrigation Treatment of Gonorrhœa, its Local Complications and Sequels.")

In any lingering case of gonorrhœa examine the urine, and direct suitable treatment for oxaluria, lithemia, or phosphaturia, if any one of these conditions exists. Such morbid states of the urine are occasionally responsible for great prolongation of the inflammation. In some cases a discharge is kept up by inflammation of the seminal vesicles (page 1005).

Gonorrhœa of the anus and rectum occasionally, though very rarely, occurs. It may result from pederasty, or in a woman from a flow of infectious material from the genitalia to the anus. It causes severe burning pain, aggravated by defecation. The parts are red, swollen, and tender. The discharge

is profuse, being at first cream white, and then thicker and greenish. The diagnosis rests upon the history and the finding of gonococci in the discharge. The disease rarely extends above the anus.

Treatment.—If the anus only is involved spray several times daily with peroxid of hydrogen, wash with salt solution, irrigate with permanganate of potash (1 : 4000), dust with talc powder, and interpose a piece of iodoform gauze between the inflamed surfaces. An ulcer, a fissure, or an excoriation is touched with lunar caustic. If the rectum becomes involved, secure a daily bowel movement and irrigate the rectum twice a day with boracic-acid solution or permanganate of potash (1 : 4000).

Gonorrhœa of the Mouth.—This is a very uncommon malady. It occurs in infants more often than in older people. Infection in infants may take place during birth if the mother has gonorrhœa. The symptoms are those of violent stomatitis. The diagnosis is suggested by the condition of the mother and is proved by finding gonococci in the discharges from the mouth.

Treatment.—Wash the mouth frequently with boracic acid and listerine (gr. xlviij to \bar{z} vij), and swab the diseased areas at intervals with a 10 per cent. solution of argyrol.

Gonorrhœa of the Nose.—It is alleged that this condition can arise, but an absolutely authentic case does not seem to be on record.

Gonorrhœa of the female may affect the vulva, the vagina, the urethra, or the uterus. The danger is the development of metritis or salpingitis.

The **treatment** for *vulvitis* is to place the patient upon a low diet and put her at rest with the pelvis elevated; every two or three hours spray the parts with peroxid of hydrogen, dry them with absorbent cotton, and dust them with equal parts of starch and oxid of zinc. In severe cases purge, use hot baths, apply lead-water and laudanum locally or paint the vulva with silver solution (gr. xl to \bar{z} j), and leech the groins. If the vulvovaginal gland suppurates, open it.

For *vaginitis* follow the same general directions. Wash out the vagina every two hours, first with Oj of hot solution of bicarbonate of sodium, next with Oj of hot water, and finally with Oj of astringent solution (a teaspoonful of lead acetate, a teaspoonful of zinc sulphate, a teaspoonful of alum, or four teaspoonfuls of tannin to the pint of hot water) (White). As the attack subsides, use vaginal suppositories, each containing gr. v of tannic acid. In some cases apply solutions of silver nitrate (1 : 200) or of argyrol (10 per cent.), and insert tampons moistened with boroglycerid and ichthyol (8 per cent.) (Le Blonde). Metritis must be prevented, and it is a wise precaution to apply from time to time, iodine or a 10 per cent. solution of argyrol to the cervical canal.

For *urethritis* use astringent injections locally and copaiba and cubebs by the mouth. In chronic cases use strong solutions of silver nitrate. The urethra and bladder may be irrigated with silver nitrate (1 : 8000).

For *uterine gonorrhœa* observe the same general management. Swab out the uterus with tincture of iodine; use tampons of iodoform gauze and injections of peroxid of hydrogen.

Stricture of the urethra, or narrowing of the urethral caliber, is divided into *inflammatory*, *spasmodic*, and *organic*. The so-called *inflammatory* or congestive stricture is not a stricture, but is an inflammatory swelling of the mucous membrane.

Spasmodic stricture does not exist alone, but complicates organic stricture, a hyperesthetic urethra, or an inflamed bladder.

Organic stricture is a fibrous narrowing of the urethra, due, as a rule, to chronic gonorrhoeal inflammation or to traumatism. True organic stricture is very rare in children, but can occur. Abbe reported a case of impassable stricture in the deep urethra of a male child two and one-half years of age, due to urethral gonorrhoea. There were also two strictures of the anterior urethra. External urethrotomy was performed. Traumatic strictures occur in the bulbous or membranous urethra, and are due generally to force applied to the perineum, the urethra being squeezed between the subpubic ligament and the vulnerating body. Strictures resulting from gonorrhoeal inflammation occur in the penile, bulbous, or membranous urethra. Stricture never forms in the prostatic urethra except as a result of traumatism. Recent non-traumatic strictures are soft and are easily distended. Old strictures and traumatic strictures are very dense. A resilient stricture is one which contracts quickly after dilatation. The nearer a stricture is to the meatus, the more fibrous it is.

A *congenital* stricture is congenital narrowness of a portion of the urethra, usually the portion near the meatus. The more fibrous a stricture is, the more it narrows the urethra and the less dilatable it is. A stricture may be annular (forming a ring around the urethra), tubular (surrounding the urethra for a considerable distance), or bridle (when a band crosses the urethra from wall to wall). A stricture of large caliber will admit an instrument larger than a No. 15 French sound. A stricture of small caliber will not admit a No. 15 French sound. An impermeable stricture will not admit the passage of any instrument. Impermeable is more or less a relative term. A stricture may be impermeable when an anesthetic is not used, and permeable when the patient is anesthetized, or may be impermeable to one surgeon, but permeable to another. Impermeability is often a temporary condition due to inflammatory edema about an organic stricture.

Symptoms and Results of Stricture.—There is usually a history of repeated attacks of urethritis. A chronic discharge may exist, the amount of which is variable. There is a feeling of weight in the perineum, soreness of the back, and frequency of micturition. Hypochondriacal tendencies are usual. In a deep stricture there is difficulty in starting the stream in micturition. In most cases the stream is small, twisted, and forked. There is often interruption or "stammering" of the stream, and it dribbles long after the conclusion of the act, so that the penis must be "milked" before it is returned within the clothing. The urethra back of the stricture dilates, a pouch forms, drops of urine collect and decompose, and a chronic inflammation results in the mucous membrane or the parts adjacent, which inflammation may go on to ulceration or to peri-urethral abscess. A urinary fistula results from the opening externally of a peri-urethral abscess. Retention of urine may occur, not from actual obliteration of the tube by the growth of the stricture, but by closure of the lumen of the urethra by muscular spasm and by edematous swelling in the neighborhood of the stricture. Edematous swelling may be due to cold, wet, venereal excitement, the use of alcohol, overexertion, etc. Spasm of the muscles results, and contact of the urine increases the spasm, and spasm plus edema of the mucous membrane closes

the urethra. Spasm may exist in the urethra itself and in the muscles of the neck of the bladder, but is only a temporary condition. In old strictures the bladder is hypertrophied and often fasciculated, and is very liable to cystitis. The diagnosis of stricture and of its location is made by the use

of exploratory bougies. In this examination the author follows to a great extent the plan of Ramon Guitéras, which is as follows: * Have the patient pass urine into

two glasses. Examine the urine for clap-shreds. Cloudiness

in the first glass shows that urethral discharge exists. Cloudiness in the second glass points to cystitis. The patient is placed recumbent with his shoulders elevated, and the urethra is washed out with warm salt solution or boracic acid. Bulbous sounds are inserted, beginning with No. 15 French. If this passes with ease, take a larger size and note where strictures are situated by the catch on withdrawal. If No. 15 does not pass, use a smaller size. Remember that the posterior layer of the triangular ligament catches a bulbous instrument on withdrawal. If the meatus is too small to permit of exploration, divide it with a curved bistoury, cutting from within outward. After cutting the meatus bleeding is arrested with styptic cotton, and a piece of absorbent cotton is tucked into the cut. After each act of micturition the patient inserts a fresh bit of cotton, and after three days the urethral examination is proceeded with.

Treatment.—A stricture of large caliber in the deep urethra requires gradual dilatation. A steel bougie is introduced every fifth day, the size being gradually increased. Never anoint a bougie with cosmolin, as it may become a nucleus for a stone in the bladder; use oil, glycerin, synol soap, or lubrichondrin. Before passing an instrument the patient urinates and his urethra is washed out with salt solution or boracic acid solution. Glans, meatus, and urethra are cleansed as directed on page 982. The sound is rendered sterile by boiling before using. Gradual dilatation can be effected by the use of the dilator of Oberlander, the tube being distended to the extent of three millimeters every fifth day. If after dilatation there is urethral spasm, pain, or very frequent micturition, suspend the treatment for a number of days and order each night a hot hip-bath and a dose of pare-

* Med. Record, Nov. 14, 1896.

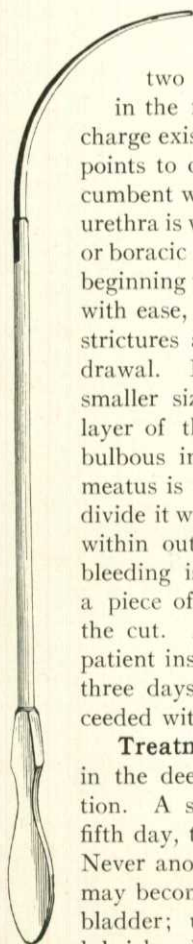


Fig. 584.
—Syme's
staff.

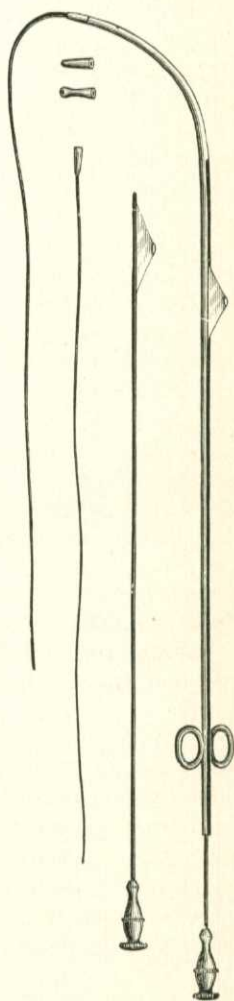


Fig. 585.—Maisonneuve's
urethrotome.

goric. In effecting gradual dilatation by sounds the instrument should be introduced every fifth day. During the treatment the patient should not use alcohol, should refrain from sexual excitement, should avoid cold and damp, and should take internally capsules containing boric acid and salol. It is rarely necessary to dilate above No. 32 French. After the surgeon finishes treatment he teaches the patient to use an instrument and directs him to pass it once a month. Strictures in the pendulous urethra, if soft, are treated by gradual dilatation; if fibrous and contractile, by internal urethrotomy. In performing internal urethrotomy prepare the patient carefully; for several days before the operation give salol and boric acid by the mouth, and wash out the bladder repeatedly with boric-acid solution. Be thoroughly aseptic. Anesthetize the patient. Before cutting irrigate the urethra with warm normal salt solution, and after cutting irrigate again and tie in a rubber catheter. These precautions will prevent urethral fever. In cutting, insert Gross's urethrotome (Fig. 587) back of the stricture, spring out the blade, cut the stricture on the roof of the urethra, close the blade, withdraw the instrument, and pass a full-sized bougie.

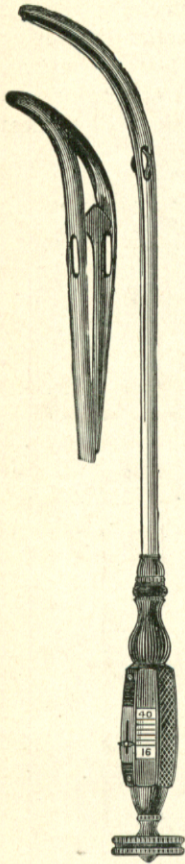


Fig. 586.—Gross's urethral dilator.

Stricture of the meatus requires incision with a knife and the use of a meatus bougie until healing is complete. Strictures of small caliber in front of the membranous urethra require gradual dilatation and, if this fails, internal urethrotomy or divulsion. Internal urethrotomy can be performed with the urethrotome of Maisonneuve (Fig. 585). This instrument is shaped like a sound, has a groove upon its surface, and into this groove a shaft carrying a triangular knife can be inserted. The staff is screwed to a guide, the guide is carried into the bladder and the staff follows it. The point of the staff is carried to the prostatic urethra and the guide curls up in the bladder. The penis is held upon the stretch, the blade is inserted and pushed down through the stricture. This instrument cuts the stricture, but not the healthy urethra. For *divulsion* the patient is prepared as for internal urethrotomy. The divulsor of Gross, or of Sir Henry Thompson, or of Gouley (Figs. 586, 588, 589) is introduced, the blades are separated, the instrument is withdrawn, a large bougie is passed, and a catheter is tied in the bladder. Strictures of small caliber in the deep urethra require gradual dilatation; if this fails, employ external urethrotomy. In strictures of the deep urethra, if only a filiform bougie can be in-

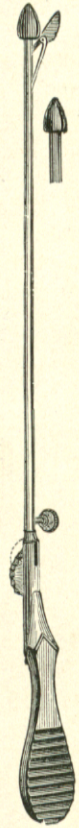


Fig. 587.—S. W. Gross's exploratory urethrotome.

roduced, the bougie may be left in place, and in a day or two another can be slipped in beside it, until in a few days the channel becomes permeable to a metal bougie. A tunnelled catheter can be slipped over the filiform bougie, both be withdrawn, and a metal bougie passed. A tunnelled and grooved staff can be carried in over the bougie and external urethrotomy be performed. Thompson's dilator can be carried in over the filiform and the stricture be divulsed. Fort's method of electrolysis is said to be of value, but I have had no personal experience with it. Fort treats stricture by linear elec-

trollysis. His instrument looks like a whip, and it has a platinum blade projecting from about the center. The blade is connected with the negative

pole of a galvanic battery and the positive pole is placed over the pubes. The guide carrying the blade is inserted into the urethra, and when the blade comes against the stricture the current is turned on and the platinum passes rapidly through the constriction. The current is turned off and the instrument is carried onward until it strikes another stricture, when the current is again turned on, and so on. The necessary current-strength is 10 to 15 ma. The operation requires twenty to thirty seconds and causes but little pain. After its performance a sound is passed (a No. 22

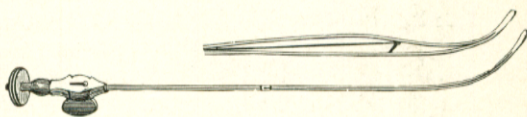


Fig. 588.—Thompson's divulsor.

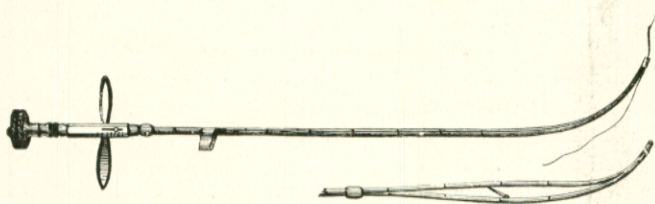


Fig. 589.—Gouley's divulsor.

of the French scale). The patient need not be confined to bed after this operation. By Fort's method we act purely upon the diseased tissue. In impassable stricture of the deep urethra perform external perineal urethrotomy without a guide (the operation of Wheelhouse).

If a perineal fistula exists, dilate, divulse, or cut the stricture; retain a catheter in the bladder for forty-eight hours. After this period dilate every few days with a metal instrument. Every morning and evening draw the urine with a soft catheter, introduce boric-acid solution into the bladder, remove the catheter, and let the man empty his bladder naturally. A portion will flow from the fistula and a part from the meatus. Day by day the quantity which comes from the fistula lessens, and finally the abnormal opening heals.

Urethral Fever.—Any operation upon the urethra may be followed by a chill owing to shock (urethral shock), and this may be followed by a nervous fever. Urethral fever proper is sapremia following a urethral operation. This condition is due to absorption of toxic elements which

may be in the urine, may have been in the urethra, or may have been introduced from without. It usually follows the first urinary act after operation. It begins with a violent chill and presents the characteristics of a septic fever. It is accompanied by a marked tendency to urinary suppression, and may eventuate in septicemia or pyemia. Urethral fever can be prevented by rigid antisepsis. If this fever should arise, a catheter must be tied in the bladder, the bladder and urethra must be repeatedly irrigated with aseptic or antiseptic fluids, and the patient must be given urinary antiseptics and stimulants by the mouth.

Urinary Fever.—Sir Benjamin Brodie pointed out that the withdrawal of residual urine in a case of enlarged prostate may be followed by very serious symptoms. The condition is spoken of as urinary fever, and is said by many to be due to the sudden and complete emptying of a bladder which has become accustomed to retaining permanently a considerable quantity of urine. Modern studies prove that urinary fever is due to infection of the bladder and kidneys, and not simply to the sudden withdrawal of all of the urine from the bladder, although such a procedure leads to vesical congestion and probably favors infection. The bacteria most often found are pyogenic cocci, colon bacilli, and micro-organisms which cause putrefaction and decomposition of urea.

The condition does not arise promptly, suddenly, and violently, as does urethral fever, but begins rather insidiously after several days. Mr. C. Mansell Moullin thus describes the condition: *

“So far as the broader features are concerned, the symptoms that present themselves in these cases are remarkably uniform. They do not begin at once. Nearly always some few days elapse before there is anything to excite suspicion. Then the urine becomes cloudy, though it may still retain its acid reaction. A small quantity of albumin, more than can be accounted for by the amount of pus that is present, makes its appearance. Under the microscope there are a few hyaline casts, perhaps a blood-corpuscle or two, numerous pus-corpuscles, and myriads of bacteria. The specific gravity is lower than it ought to be, and is lower than it was before the catheter was used. The total amount passed in the twenty-four hours may either increase until it is as much as seven or eight pints, or diminish until it scarcely reaches twenty ounces. There is seldom any definite rigor, but there may be numerous slight chills. The pulse grows more rapid and feeble. The tongue becomes red and dry. There is complete anorexia. Delirium sets in at night, and in a considerable proportion of cases the symptoms rapidly grow worse and worse until, at the end of a few days, the patient sinks into a semi-comatose condition from which he seldom rallies. Post-mortem there are all the signs of recent acute cystitis and pyelonephritis. The mucous membrane lining the pelvis and calices of the kidneys, the ureters, and the bladder is swollen and stained by old and recent hemorrhages, and here and there a thin layer of pus is adherent to it. The pelvis and the ureters are dilated, the apices of the pyramids are eaten away, the cortex is shrunken and hard, the capsule is adherent, and in places between the tubules are minute collections of pus differing in shape and outline according to the anatomical arrangement.”

* *Lancet*, Sept. 10, 1898.

Treatment.—Aseptic catheterization is necessary if we would avoid urinary fever; and as the urethra contains some of the causative organisms, the prepuce, glans, and meatus should be washed with soap and water and irrigated with boric-acid or permanganate of potassium solution, and the urethra be irrigated with boric-acid solution or permanganate of potassium before the sterile catheter is introduced to draw the urine.

If urinary fever arises, it may be possible to control it by frequently irrigating the bladder with warm normal salt solution, solution of nitrate of silver (1 : 8000), or boric-acid solution, and by administering stimulants, diuretics, diaphoretics, saline cathartics, and nutritious food. In severe cases perform suprapubic cystotomy for drainage.



Fig. 590.—Wheelhouse's staff.

Perineal section is external perineal urethrotomy. There are three methods—the operation of Syme, of Wheelhouse, and of Cock.

Syme's Operation.—This operation is employed if a stricture is very contractile, if dilatation fails to cure, or if urethral instrumentation invariably causes pronounced urethral fever. The patient is anesthetized, Syme's staff (Fig. 584) is introduced, and the surgeon makes an incision in the mid-line of the perineum and exposes the staff just above the shoulder of the instrument. The knife is carried along the groove and divides the stricture. A catheter is passed into the bladder from the meatus and is retained for several days, and the wound is dressed antiseptically. After the catheter is removed it must be used every six hours until the urine comes entirely by the meatus. During the rest of the patient's life, a full-sized sound should be passed at regular intervals.

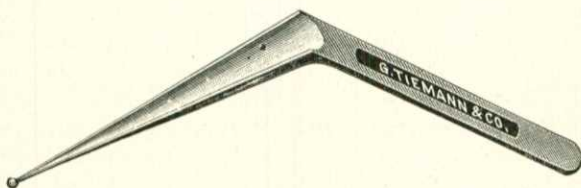


Fig. 591.—Teale's probe gorget.

Wheelhouse's Operation.—This operation is employed for the treatment of impermeable stricture. Wheelhouse's staff is passed into the urethra until it blocks on the stricture. The perineum is incised down to the staff and in front of the stricture. The edges of the cut urethra are held apart with forceps, the surgeon seeks for the opening through the stricture, passes a fine probe through it, divides the stricture, carries into the bladder from the wound an instrument known as a probe gorget to dilate the canal and furnish a solid floor to facilitate the introduction of a catheter. With the gorget in place a metal catheter is carried from the meatus into the bladder. The gorget is removed and the catheter is tied in place. After three or four days the catheter is removed and is then passed frequently. The perineal wound is,

of course, dressed antiseptically. Figs. 590 and 591 show the instruments for Wheelhouse's operation.

Cock's Operation.—This operation opens the urethra back of the stricture and without a guide and relieves retention of urine. The surgeon introduces into the rectum the index-finger of the left hand, and the tip of the finger is rested upon the apex of the prostate gland. The surgeon incises the median line of the perineum, the back of the knife being toward the anus. When the point of the knife is felt to be near the finger the handle is lowered slightly, the blade is placed a little oblique, and the urethra is opened. A catheter is passed into the bladder from the wound and retained for a time, and the stricture is subsequently treated.

Epispadias is a congenital cleft in the corpora cavernosa, the roof of

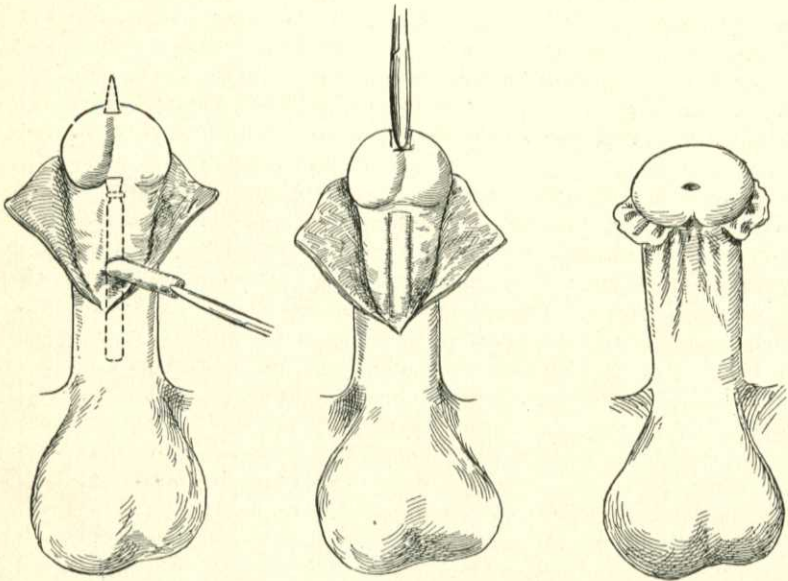


Fig. 592.—Beck's operation for hypospadias.

the urethra being completely or partly absent. In complete epispadias there are absence of the pubic arch and exstrophy of the bladder.

Partial epispadias may sometimes be remedied by a plastic operation.

Hypospadias is a congenital cleft on the floor of the urethra, the meatus opening on the floor at some point between the scrotum and the end of the glans penis, the channel in front of the meatus being a gutter and not a tube.

Hypospadias of the glans is the most common form. In this condition the urethra has no floor, as it passes beneath the glans, the site of the urethra is indicated by a groove, and the foreskin is absent below. Partial hypospadias requires no treatment except possibly dilatation or incision of the meatus. People who suffer from it are very prone to develop chronic urethral inflammation. In hypospadias of the penis the ill-developed cord-like corpus spongiosum draws the penis to the scrotum. In this variety of the deformity the penis is very short.

In complete hypospadias the opening of the urethra is back of the scrotum in the perineum, the penis is dwarfed and bound down, and looks not unlike a clitoris, the scrotum is divided into two portions, a gap existing between them, and in many cases the testicles have not descended. Such individuals are occasionally mistaken for females. In the penile complete forms of hypospadias a plastic operation should be performed between the eighth and tenth years of age. Such an operation unfortunately may fail. Hypospadias is rare in women, but it may occur. In such a case the urethra opens into the vagina. Fig. 592 shows the ingenious operation successfully practised by Carl Beck for penile hypospadias.

Chancroid (soft chancre; the local venereal sore) is an ulcer, usually of venereal origin. The name chancroid was introduced by Clerc, who believed that a soft sore resulted from inoculating a person already syphilitic with the products of a hard sore. He further held that when a soft sore arose the syphilitic poison lost its infective properties, and "could be transmitted as a soft sore to a healthy person, and not cause general infection." * The chancroidal ulcer is not connected with the syphilitic poison, but is developed by inoculation with the bacterium of Ducrey. Until recently it was believed that a chancroid was not produced by a special poison, but arose after inoculation with inflammatory products or irritating secretions. It seems to have been proved, however, by Krefling and Colombini that the organism discovered by Ducrey in 1889 is the real cause. This organism is grown on a medium of fresh blood and bouillon or in "unmixed human blood." (See Lincoln Davis, "Observations on the Distribution and Culture of the Chancroid Bacillus." Report of Research Work, 1902-1903; the Division of Surgery of the Medical School of Harvard University.) As a rule, chancroids are of venereal origin, and result from contact with other chancroids, pus, mucopus, or areas of ulceration. A chancroid appears soon after intercourse, usually within five days, always within ten days. It is first manifested by a pustule which ruptures and discloses an ulcer. This ulcer has sharply defined and undermined margins; it looks "punched out"; the base is gray and sloughy; the discharge is profuse, purulent, foul, and auto-inoculable, and causes fresh chancroids by flowing over the parts. The area around a chancroid is red and inflamed, and considerable pain is apt to be complained of. The original chancroid spreads and new sores appear. The edge of a chancroid is rarely indurated unless caustics have been used or there is mixed infection with syphilis. Inflammatory induration fades gradually into the tissues, but the induration of a hard chancre is sharply defined. Fournier says that a chancroid may have a hard base if the sore is located in the sulcus back of the glans, on a lip of the meatus, or on the lower border of the prepuce of a man with phimosis, or when the ulcer is inflamed. The surgeon should always ask if the sore has been cauterized and how it has been treated. When a chancroid after a time displays marked and sharply outlined induration it points to mixed infection of chancroid and syphilis. Chancroids are not followed by constitutional symptoms, but are apt to be accompanied by painful inflammatory buboes which are prone to suppurate. In hospital practice about 30 per cent. of patients develop buboes. The bubo may be one-sided or bilateral. The adenitis of chancroid

* "Syphilis," by Alfred Cooper.

is due in the majority of cases to the absorption of toxins and pus may be free from bacteria. Cases have been reported in which non-indurated sores were followed by syphilis. It is probable that a mixed infection existed, and that induration was overlooked, because a papular initial lesion was underneath the chancroidal ulcer. When inflammation in chancroids is high a rapidly destructive ulceration known as *phagedena* may arise, but this process is more common in syphilitic sores.

Treatment.—Ordinary cases of chancroid are treated by spraying with peroxid of hydrogen, drying with cotton, touching each sore first with pure carbolic acid and then with pure nitric acid, and dressing with black wash or dusting with iodoform or with calomel. Every few hours the patient soaks the penis in hot salt water (a teaspoonful of salt to a pint of water), sprays the sores with peroxid of hydrogen, dries with cotton, and dresses with black wash or dusts with iodoform or with calomel. As soon as granulation begins the sores should be dressed with 1 part of ointment of nitrate of mercury to 7 parts of cosmolin. Mild cases do well without cauterizing, peroxid of hydrogen being frequently used and a drying powder being employed. In chancroids with phimosis slit up the foreskin, smear the raw edges of the wound with pure carbolic acid, and treat the ulcers by cauterization. A regular circumcision often fails because of infection of the stitch-holes. Phagedena requires the internal use of iron, quinin, and milk-punch, and the local use of powerful caustics (bromin or nitric acid or even the actual cautery). In some cases continuous antiseptic irrigation is valuable. When a bubo first begins, order rest, apply iodine or an ointment of belladonna or ichthyol, and make pressure by a spica bandage of the groin. Some surgeons advise the injection of 20-40 minims of a solution of carbolic acid (gr. x to the ounce), but I have never seen any benefit from it. Some inject a 1 per cent. solution of bichlorid of mercury, but the proceeding causes intense pain. Welander recommends the injection of a 1 per cent. solution of benzoate of mercury. I have had no experience with this method. If the bubo persists, even though it does not suppurate, it should be completely excised. If pus forms, several methods of treatment are open to us: Aspiration, injection with a solution of carbolic acid, squeezing out the acid and injecting 10 per cent. ointment of iodoform and glycerin, and sealing the opening with collodion (Scott Helms). Hayden makes a puncture, squeezes out the pus, washes out the cavity with peroxid of hydrogen and then with corrosive sublimate solution, injects warm iodoform ointment, and dresses with cold, moist, corrosive sublimate gauze to set the ointment. Otis, Fountain, Perry, and others commend this plan. We have often found it to succeed. If the above-mentioned plan fails, if it is not used, or if an ulcer or sinus exists, incise, curet, cauterize with pure carbolic acid, cut away hopelessly infiltrated skin, and pack the wound with iodoform gauze. In some cases it will be necessary to extirpate fragments of gland.

Phimosis is a condition of the prepuce that renders retraction over the glans impossible. It is usually congenital, but it may arise from inflammation. Congenital phimosis causes retention of sebaceous matter, which decomposes and lights up inflammation and the prepuce is apt to grow fast to the glans. Congenital phimosis may induce irritability of the bladder, incontinence of urine, prolapse of the rectum, and various nervous symptoms.

The treatment is *circumcision*. Asepticize the parts. Grasp the foreskin and the mucous membrane with two forceps, draw the prepuce forward, catch the skin (at the point it is desired to cut) horizontally between the arms of the handle of a pair of scissors, and cut off the redundant prepuce. Retrench the excess of mucous membrane by cutting around with scissors one-quarter of an inch from the glans, stitch the skin to the mucous membrane with catgut, and dress with sterile gauze (Fig. 593).

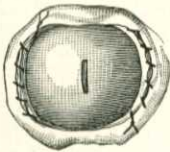


Fig. 593.—Circumcision completed (Es-march and Kowalzig).

Fracture of the penis, which is a laceration of the cavernous bodies with extravasation of blood, occurs occasionally during coition. The **treatment** consists of cold and bandaging to arrest bleeding, and occasionally incisions to let out clot.

Gangrene of the penis arises from phagedena, from tying constricting bands around the organ, from fracture with excessive hemorrhage, and from paraphimosis. If extensive, it requires amputation.

Cancer of the penis is commonest in persons with phimosis. In a limited epithelioma of the foreskin circumcision is performed and the glands of the groin are removed; if cancer affects the glans, amputation of the penis and removal of the inguinal glands is required.

Amputation of the Penis.—Ricord advised cutting off the organ with a single stroke of the knife, making four slits in the mucous membrane of the urethra, and stitching each of these flaps to the skin. Treves splits the skin of the scrotum along the raphé, separates the halves of the scrotum down to the corpus spongiosum, passes a metal catheter down to the triangular ligament, inserts a knife between the corpus spongiosum and the corpora cavernosa, withdraws the catheter, cuts the urethra across, detaches the urethra from the penis back to the triangular ligament, cuts around the root of the penis, divides the suspensory ligament, detaches each crus from the pubes, slits up the corpus spongiosum half an inch, stitches its edges to the rear end of the scrotal incision, introduces a drainage-tube, ligates the vessels, and sutures the wound.

Seminal Vesiculitis.—Inflammation of the seminal vesicles is due to the extension of a gonorrheal inflammation, a pyogenic process, or to tuberculosis.

Acute inflammation is made evident by frequent and painful micturition, pains in the anus, rectum, and perineum, and possibly the hip-joint, back, and thigh. Defecation and micturition are excessively painful. Persistent erections may take place, and in some cases bloody ejaculations occur. Rectal examination detects the enlarged and tender vesicles external to the lateral lobes of the prostate and on a higher level.

Treatment.—Abandon local urethral treatment, and treat the patient as for acute prostatitis.

Chronic vesiculitis may result from the acute form or may come on insidiously in an individual with gonorrhœa. It is one of the causes of chronic urethral discharge. The patient suffers from imperative and frequent demands to micturate, and he has a gleet discharge which becomes worse and better, but does not disappear. This chronic inflammation is believed to persist because of narrowing of the duct, and consequent incomplete drainage

of the vesicle. In chronic seminal vesiculitis there is usually sexual weakness, nocturnal emissions occur, and the semen may contain blood.

Treatment.—Treat the posterior urethritis by ordinary methods. Use hot rectal enemata. Milk the ducts by Fuller's method once every seven days. During massage the patient's bladder should be full. He leans over a chair-back, the knees being straight and the body at a right angle to the thighs. The surgeon covers his finger with a rubber stall and anoints it with oil or synol soap, and introduces it into the rectum, and makes pressure over the pubes with the fist of the other hand. The finger comes in contact with the lower half of the vesicle; it makes firm pressure for a moment, and is then drawn slowly toward the duct. This stroking is repeated several times. The other vesicle is treated in the same manner. This maneuver empties the vesicle and hastens the resolution of inflammation. After the completion of the stripping the patient should micturate, and the bladder and urethra should be irrigated.

Tuberculosis of the Seminal Vesicles.—Primary tuberculosis is very unusual. As a rule there is antecedent tuberculosis of the testicle or prostate gland. About 50 per cent. of the cases occur in individuals under forty years of age. The diseased vesicle is at first nodular and indurated, but later undergoes caseation and softening. Finally the disease passes through the capsule and invades adjacent structures. Dreyer collected 36 cases and found that in 34 of them the lungs were involved.

Tuberculous vesiculitis may be unilateral or bilateral. In unilateral tuberculous epididymitis the corresponding vesicle is apt to become diseased. In bilateral disease of the testicles both vesicles are liable to involvement. Peritoneal tuberculosis may follow tuberculous vesiculitis. In very unusual cases spontaneous cure is obtained by fibrous-tissue formation. On palpation a tuberculous vesicle is found to contain here and there hard and but slightly tender nodules.

Treatment.—If tuberculous epididymitis is followed by tuberculous vesiculitis it is justifiable to remove the vesicle after removing the testicle, provided the prostate and other parts of the genito-urinary tract are free from disease and there is no distant lesion of tuberculosis. If both testicles are removed, both vesicles can be extirpated. If a vesicle or both vesicles suffer from primary tuberculosis, an operation may be performed. Reported cases do not seem to favor operation.

Kraske, Schede, and Rydygier have removed the vesicles after preliminary resection of the sacrum. Zuckerkandl, Dittel, and Schede have employed the perineal route. Villeneuve reached them by way of the inguinal region. The curved perineal incision of Zuckerkandl is the method usually preferred. H. H. Young makes a suprapubic incision, strips the peritoneum from the bladder, and reaches the vesicles from behind. He calls it the suprapubic-retrocystic-extraperitoneal method (H. H. Young, in "Annals of Surgery," Nov., 1901).

Acute Prostatitis.—Acute inflammation of the prostate gland may be caused by inflammation in adjacent structures, the use of instruments or irritant applications in the deep urethra, injury by a passing or impacted calculus, various infectious diseases, a stricture of the urethra, but particularly by gonorrhea. The gland enlarges greatly, the prostatic fluid exudes mixed

with blood and pus, and the gland-ducts become distended with pus. A distinct abscess may form. The orifices of the ejaculatory ducts become distended and filled with pus, and the seminal vesicles or epididymis may also suffer. An abscess is liable to form in the cellular tissue outside of the prostate.

Symptoms.—A feeling of weight, fulness or soreness in the perineum; a persistent pain at the neck of the bladder; frequent micturition, pain being present and becoming most severe as the last drops are voided; perineal tenderness; painful defecation; and bulging of anal mucous membrane. If a finger is introduced into the rectum it causes severe pain and palpates the enlarged and tender gland, unless the outlines are destroyed by periprostatitis, in which case there will be felt a large, boggy, tender mass. (See Henry Morris on "Injuries and Diseases of the Genital and Urinary Organs.") These symptoms are accompanied by distinct elevation of temperature. The inflammation may abate with suppuration, but as a rule pus forms, the temperature becomes characteristic, the pain becomes pulsatile, micturition causes agony, the inflammatory mass is felt per rectum to be softening; and often the swollen perineum becomes dusky red. Retention of urine is almost certain to occur. The abscess may rupture into the urethra or the rectum, or may diffuse in the periprostatic cellular tissue and subsequently may open in the perineum. Spontaneous evacuation may be followed by recovery or by the development of annoying or dangerous complications.

Treatment.—Keep a hot-water bag on the perineum and three or four times a day use rectal injections of hot water. Place the patient on a milk-diet. Leech the perineum. Give suppositories of opium and belladonna, and also suppositories of ichthyol, and administer urotropin by the mouth. At the first sign of suppuration make a curved perineal incision. Retention of urine is relieved by a soft catheter.

Chronic Prostatitis.—May arise from stricture, venereal excess, chronic cystitis, or stone in the bladder, but gonorrhoea is the common cause. The prostate is usually, but not always, enlarged, is somewhat softened, and the ducts contain pus and blood.

Symptoms.—There is usually a mucopurulent discharge or fluid can be obtained by massage of the prostate. There is a feeling of weight and fulness in the perineum, increased frequency of micturition, and the prostate is very sensitive to digital pressure. The patients are neurotic, frequently suffer from nocturnal emissions, and have but feeble power of erection. The prostatic urethra is extremely hyperesthetic. All the symptoms are aggravated by worry, sexual excitement, or violent exercise. An abscess may form and rupture into the urethra.

Treatment.—Tonics and nutritious food are essential. Intravesical irrigations with nitrate of silver solution (1:8000) do good. Massage of the prostate is useful. Some cases are benefited by touching the posterior urethra through a urethroscope tube with nitrate of silver (3 grains to the ounce) or by injecting by means of Ultzman's syringe a few drops of silver nitrate solution (5 grains to the ounce). Rectal suppositories of ichthyol may be ordered. Blistering the perineum at intervals may prove of service. At intervals of three or four days a full-sized cold steel sound should be gently introduced. If an abscess refuses to heal, incise the perineum.

Prostatorrhœa.—Just as overaction of the glands of the urethra constitutes urethrorrhœa, so overaction of the glandular apparatus of the prostate gland constitutes prostatorrhœa. Prostatorrhœa is not inflammatory, although the prostate and posterior urethra are often congested, and the latter region is usually hyperæsthetic. In some cases urethrorrhœa exists with prostatorrhœa. Prostatorrhœa is produced by sexual excess, masturbation, ungratified sexual desire, and riding a bicycle with an improper seat. The condition is usually accompanied by marked neurasthenia, and may be associated with spermatorrhœa and impotence.

The patient notices a milky or gray discharge after straining at stool (defecation-spermatorrhœa), after violent exercise, sexual excitement, or a bicycle ride. The discharge also gathers in the urethra during sleep. Examination of the discharge shows it to be prostatic fluid, although spermatozooids are sometimes found. It is not purulent and contains amyloid corpuscles. The meatus is not glued up in the morning, and the linen is very slightly stained. The urine is clear and contains small comma-shaped hooks (Christian). Sexual excitement and alcohol do not appreciably aggravate the condition. The bladder is irritable, and there are frequency of micturition and often some pain in the head of the penis at the termination of the act. Nocturnal emissions may occur.

Treatment.—The patient should correct bad habits. If there is urethral hyperæsthesia or prostatic congestion, irrigate the bladder and urethra once a day with a solution of silver nitrate (1 : 4000), and every fourth or fifth day introduce a cold sound. In some cases the occasional instillation into the prostatic urethra of a few drops of a 1 per cent. solution of nitrate of silver does good.

For the irritable bladder give hot hip-baths at night. The following prescription is of service: gr. xv of bromid of potassium, $\frac{1}{2}$ dram of tincture of hyoscyamus in $\frac{1}{2}$ ounce of cinnamon-water, three times a day. Hot enemata are of service.

After the hyperæsthesia of the urethra has abated, and nocturnal emissions have ceased, the neurasthenia is treated by cold sponging of the body night and morning, the continued use at intervals of several days of a large-sized cold sound, irrigation every second or third day with silver nitrate (1 : 4000), and the administration of strychnin and other tonics.

Hypertrophy of the Prostate Gland.—Enlargement of the prostate gland may be brought about by different forms of growth. It is, as a general thing, a senile change, occurring only after the age of fifty, and being most likely to arise after the attainment of sixty years. It is very rare for enlargement of the prostate to begin long before the age of fifty or after the age of seventy. According to Freyer, 33 per cent. of all men past fifty-five years of age present some enlargement of the prostate.

There are some that oppose the view that prostatic enlargement is essentially a senile change. For instance, Dr. L. Bolton Bangs ("Jour. of Dermatol. and Gen.-Urin. Dis.," March, 1901) maintains that the change is not senile; that it really begins early in life, but that its effects do not become manifest until during or after middle age. Undoubtedly, the enlargement begins long before it occasions sufficient obstruction to induce symptoms; and the growth progresses very slowly. Guyon and the French

school maintain that hypertrophy of the prostate gland is always the result of arteriosclerosis, affecting not only the prostate, but also the entire urinary tract. The hypertrophy that ensues affects the bladder-walls notably, as well as the prostate, because of distinct growth. Caspar has apparently demonstrated that Guyon's view is not correct. He has shown that in many cases there is no sclerosis of the prostatic arteries, and that frequently there are no sclerotic changes in other portions of the urinary tract. Another important point made by Caspar is that arteriosclerosis tends to cause degeneration, and not hypertrophy.

In the hypertrophied prostate there is an excessive production of fibrous tissue and of ill-formed glandular tissue, the mass constituting a fibro-adenoma. Fibro-adenoma is the common cause of enlargement (W. Bruce Clarke). Again, in not a few prostates there is no real enlargement, but there is an indurated fibrous mass producing obstruction. Albarran and Hallé ("Anales des Maladies des Organes Genito-Urinaires," 1898, vol. xvi) point out that in an enlargement of the prostate different elements may usually be recognized: soft hypertrophy of the gland; indurated enlargement of the glandular elements; fibrous enlargement; circumscribed tumor-masses; distinct fibromata or myomata; or adenofibromyomata. The real cause of the various forms of prostatic enlargement is not known.

All the lobes may be enlarged equally; all may be enlarged unequally; the enlarged gland may surround the prostatic urethra like a horse-collar; or one lobe only may be enlarged. Symmetrical enlargement of the entire gland is not so apt to produce symptoms as is a non-symmetrical enlargement. In some cases the chief enlargement is into the bladder; in others, into the urethra. An enlarged prostate frequently shows a circular groove about it, due to the constriction exerted by the rectovesical fascia at the vesical neck.

The bridge of prostate which joins the two lateral lobes is known as the "middle lobe," and a comparatively trivial enlargement of the middle lobe may cause obstruction. Prostatic hypertrophy causes a narrowing and lengthening of the urethra, and gives this tube a tortuous course. The opening of the urethra into the bladder is usually pushed to a higher level, and there forms behind it a pouch, in which urine collects. The urine that gathers in this pouch is known as residual urine. It cannot be voluntarily expelled. It may, therefore, collect in large quantity, and it is likely to decompose, producing cystitis. The mechanical resistance to the expelling of the urine causes hypertrophy of the muscles of the bladder, and, in consequence, the bladder enlarges, thickens, and becomes fasciculated. When this takes place, micturition becomes very difficult and sometimes impossible. Enlargement of the middle lobe inevitably blocks the flow of urine and causes great distention of the bladder. In hypertrophy of the prostate gland, the ureters and the renal pelves and calices may distend and surgical kidney may develop.

It is useful to divide, as does Horwitz, persons with prostatic hypertrophy into three groups: (1) those in whom there is no obstruction or in whom the urinary symptoms are very trivial; (2) those in whom there is residual urine and disturbances of urinary function, who depend upon the catheter for relief, but who do very well by this method; and (3) those that suffer a com-

plete break-down during the period in which the catheter is depended upon (Orville Horwitz, in "Phila. Med. Jour.," Nov. 16, 1901).

Symptoms.—In 90 per cent. of the cases there is very trivial inconvenience, the patient merely being annoyed somewhat by episodes of nocturnal frequency of micturition. The stream of urine is slow to start and falls feebly from the end of the penis. In some cases there is interruption of the stream (stammering). The last drops fall entirely without control. If the patient becomes chilled or worried, or indulges inordinately in the pleasures of the table or in wine, beer, or alcoholic liquor, nocturnal frequency of micturition becomes for a short time most harassing. In 10 per cent. of all cases the bladder cannot be emptied entirely, and residual urine collects. Frequency of micturition comes on, particularly at night; the patient has to get up often; the bladder never feels empty; and cystitis is apt to arise. The urine, at first acid and clear, becomes neutral and cloudy, and finally ammoniacal and turbid, and contains bacteria, mucopus, precipitates of phosphates, and blood. Above the pubes there is aching pain, soon spreading to the perineum, which pain is increased when the bladder is distended and during micturition. The rectum becomes irritable, and piles form or prolapse of the mucous membrane occurs, because of straining in micturition. Attacks of retention of urine may occur. Enlargement of the lateral lobes can be detected by a finger in the rectum. The bladder becomes thin and distended, or hypertrophied, rigid, and fasciculated. In rare cases true incontinence is caused by the median lobe growing toward the neck of the bladder and preventing closure. The health breaks down because of pain, restless nights, indigestion, and disorder of the bowels. The kidneys may become involved (inflammation of the pelvis or calyces, or surgical kidney), and suppression may occur. Septic fever may arise. Calculi may form in the bladder. Death is due to exhaustion, suppression of urine, or septic cystitis. A foul catheter is the usual cause of septic cystitis, but micro-organisms sometimes enter by passing along the urethral mucous membrane.

A patient should be examined by rectal touch, by a sound, and by a cystoscope, if possible; the amount of residual urine must be determined, and the condition of the urine is carefully studied. After an examination by instruments the patient must remain in bed for twenty-four hours.

Treatment.—Many cases can be treated by regular and cleanly catheterization and a careful adherence to hygienic rules. Alexander has formulated several sound rules as to when catheterization is the proper treatment. He says, if the patient is intelligent and dexterous, if cystitis is not severe, if the amount of residual urine is not very large, if obstruction is not great, if the bladder retains considerable expulsive power, and if catheterization is easy and painless, rely upon this simple plan of treatment. Prevent cystitis by emptying the bladder each evening with a coudé catheter. If there is trouble in passing the catheter, strengthen the instrument by inserting a filiform bougie as a stylet (Brinton). It is very seldom that a metal instrument is used, but if it is required a catheter with a large curve is employed. If a soft semi-solid instrument can be passed, teach the patient how to clean it, how to use it, and how to keep it, but never permit the patient to use a metal instrument himself. A dirty instrument may cause fatal infection. It is true that some people use dirty instruments for long

periods without trouble, but in most cases there will be trouble if it is attempted. It is absolutely necessary to use only perfectly aseptic instruments. Metal instruments are sterilized by boiling in water. Rubber catheters can be cleansed by washing with soap and running water and boiling. Woven instruments can be placed in a glass cylinder, the bottom of which is like a sieve. This jar is placed for twenty-four hours in a vessel which contains formalin. The vapor of formalin is an excellent germicide, and does not injure the catheter. After sterilization the instruments are kept ready for use in a glass cylinder which contains calcium chlorid.* Guyon scrubs the catheters with soap and water, dries them outside and inside, and places them in a sealed jar, and exposes them to the vapor of sulphurous acid for forty-eight hours. If there are three ounces of residual urine, use the catheter only at night. If there are six ounces, use it night and morning. If there are more than six ounces of residual urine, add one more catheterization a day for every additional two ounces present until the catheter is used six times in the twenty-four hours. It should never be used oftener than this. Gradual dilatation with steel sounds is of benefit, but forcible dilatation is not advisable. The sound may be passed once a week. Tell the patient to avoid violent exercise, cold, damp, sexual excitement, and the use of alcoholic liquors; prevent constipation and indigestion, and direct him to drink milk and plenty of water. A hot hip-bath at night adds to his comfort. Hot enemata are of value. If a large quantity of residual urine exists, or if cystitis begins, wash out the bladder daily with boric-acid solution, or normal salt solution, or nitrate of silver (from 1 : 10,000 to 1 : 2000), and give urotropin or salol and boric acid by the mouth (Cystitis, page 962). In some severe cases, if a large-sized rubber catheter be tied in the bladder for a few days, great relief is obtained. Retention of urine can be relieved by the introduction of a coudé catheter strengthened with a whalebone. In exceptional cases a silver instrument with a prostatic curve must be employed or aspiration must be practised. Most cases can be kept comfortable by catheterization, and only when this fails should an operation be performed. If the symptoms grow constantly worse, if the suffering becomes severe, if the patient cannot urinate without the use of an instrument, if catheterization is painful or impossible, if the patient is too careless or ignorant to trust with a catheter, if only a catheter of very small size can be introduced, if attacks of obstinate retention occur, if there is persistent or recurring cystitis or hematuria, if there are signs of beginning infection of the kidney, if the residual urine gradually increases in amount, the bladder should be opened. Do not postpone operation until the patient becomes really ill. Give palliative measures a reasonable trial, and if they fail, operate.

In the majority of cases in which palliation fails the operative indication is to remove an obstructing mass and depress the level of the opening from the bladder into the prostatic urethra, so that the prostatic pouch is abolished and the bladder is thoroughly drained. It is to be borne in mind that prostatictomy of necessity destroys the power of procreation.

The perineal operation is as safe as the suprapubic, or safer, and can be rapidly performed. In this operation the drainage is at the lowest part of the bladder, and by an incision of the prostate gland the floor of the urethra

* R. W. Frank, in *Berliner klin. Woch.*, No. 44, 1895.

may be lowered to the level of the floor of the bladder (Dandridge). Simple incision of the prostate in this manner is known as prostatotomy. The mortality is small and the relief is often great. Prostatotomy is performed on old and exhausted patients with damaged kidneys. A large tube should be worn during the healing of the wound.

The suprapubic operation is easier than the perineal; it is no safer; it gives excellent results if temporary drainage only is needed. If siphon drainage is not used, the opening is better placed in the perineal operation, unless permanent drainage is required. After the suprapubic operation the floor of the urethra cannot be brought level with the floor of the bladder by a simple incision of the prostate; it can only be brought level by the performance of prostatectomy. Suprapubic prostatectomy damages the sphincter of the bladder and is often followed by inability to expel urine (John B. Murphy, "Jour. Amer. Med. Assoc.," March 29, 1902). The ureters may be damaged and subsequently become obstructed from contraction. It is most useful when the hypertrophy is very large and intravesical. It is the operation of choice if the bladder contains a stone. It is not a suitable method if the bladder is markedly contracted and if the belly-walls are thick. After a suprapubic cystotomy has been performed for drainage, the opening may be kept permanently patent by the retention of a tube (Hunter McGuire's operation). It is only in very advanced cases or in cancer that permanent suprapubic drainage is employed.

Suprapubic Prostatectomy.—After the bladder is opened the mass of prostate is enucleated or cut away with scissors or with cutting forceps. The bladder is drained for a time and the suprapubic cut is then allowed to heal. If the suprapubic method of prostatectomy is employed, it is wise to use also a perineal cut, in order to control hemorrhage and secure good drainage (Dandridge).

McGill's Operation: The bladder is opened by a suprapubic incision, the edges of the cut bladder are sutured to the abdominal wound by catgut, and the interior of the viscus is carefully explored with the finger and by sight, an electric light being used for illumination. If a sessile growth exists, the mucous membrane is incised and the growth enucleated with a finger or a curet. A pedunculated growth is cut away with sharp-edged forceps. If a mass projects into the bladder an incision is made to divide it into two portions and each half is enucleated. Hemorrhage is arrested by irrigation with hot salt solution and by compression with gauze pads. In some cases a tampon must be inserted. The bladder is drained for several days or a number of days by a siphon (Fig. 561). As a matter of fact, a dense fibrous prostate cannot be enucleated and can only be removed by scissors or cutting forceps.

Fuller's Operation: Open the bladder above the pubes; have an assistant push the gland up by means of a fist in the perineum. The gland can be lifted by two fingers in the rectum (Guitéras). The surgeon makes a small incision through the mucous membrane over the prostate, enucleates the gland by means of the finger, and drains through an incision in the membranous urethra, as well as through the suprapubic opening.

Belfield's Operation: Belfield performs suprapubic cystotomy, makes a perineal cut to enable the finger to approach the prostate, pushes the prostate up toward the belly, and enucleates it from within the bladder.

Perineal Prostatectomy.—Perineal prostatectomy is less bloody than suprapubic prostatectomy. The sphincter of the bladder is not damaged, the entire prostate can be brought into view and removed, and perfect drainage is obtainable after operation.

Nicoll's Operation: Perform suprapubic cystotomy. Then incise the perineum down to the prostate, split the capsule of the prostate, insert two fingers of the left hand into the bladder, and push the prostate into the perineum so as to bring it within reach. Enucleate the gland from the perineal wound without damaging the mucous membrane of the floor of the bladder.

Alexander's Operation: Alexander makes a suprapubic incision and uses it for the same purpose as does Nicoll, but he also opens the membranous urethra on a grooved staff. After enucleating the gland he inserts a drainage-tube through the incision in the membranous urethra. In a very thin subject it may not be necessary to perform suprapubic cystotomy. Alexander has brought the gland into an accessible position in the perineal wound by suprapubic pressure and Guitéras has done so by making an incision in the linea alba and inserting two fingers into the prevesical space. Syms advocates opening into the peritoneal cavity, inserting the hand, and pressing the prostate into the perineum without opening the bladder above the pubes.

Bryson's Operation: This is a very satisfactory method. The bladder is irrigated and filled with warm salt solution. A grooved staff is introduced and a median perineal section is made to open the urethra just in front of the apex of the prostate gland. The knife is pushed back in the groove of the staff sufficiently far to incise the ring at the apex of the prostate; the forefinger is passed into the prostatic urethra and the staff is withdrawn. Then, a short tear is made by means of a blunt instrument into the mass of the left lobe and the finger is introduced and enucleates the lobe. The same procedure is carried out on the right lobe, and finally, if necessary, on the middle lobe. If the middle lobe requires removal, but cannot be reached, a suprapubic cut is made into the cave of Retzius, two fingers are inserted, and the lobe is pushed within reach of the finger below. A large perineal tube is introduced for drainage and bleeding is arrested by packing. Horwitz also introduces a catheter and ties it in place.

Bottini's Galvanocaustic Prostatotomy.—Bottini, of Padua, in 1876 suggested cauterizing the prostate by means of a special instrument. This instrument is shaped like a catheter, and carries a platinum blade which is heated by an electric current. Bottini's early instrument was not satisfactory and the operation never became popular until Freudenberg improved the tools in 1897.

Bottini's galvanocaustic operation is performed as follows: The bladder should be emptied, irrigated, and distended with air and the posterior urethra must be anesthetized by instillation of cocain or eucaïn. The current is tried to see how many seconds it requires to heat the blade sufficiently. The current is broken, the instrument is introduced, the cooling current is set in motion, and one assistant watches this and nothing else. Turn on the current. Wait the required number of seconds for the blade to become red hot (twelve to fifteen seconds), turn the screw at the handle, and burn a groove in the prostate. A groove should be burned toward the rectum, one to the

side, and, if it is thought desirable, one to the opposite side. No groove should be burned toward the pubes. When a groove has been burned, return the blade into its sheath, increasing the current while doing so in order to keep

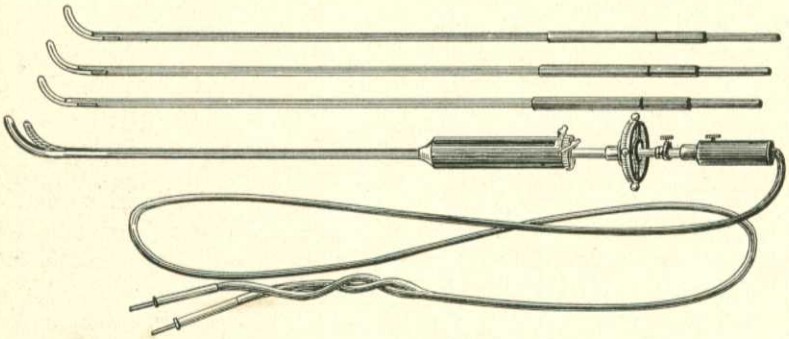


Fig. 594.—Young's modification of Freudenberg's instrument for prostatotomy by galvanocautery.

the blade from adhering to the tissue, then shut off the current. After withdrawing the instrument it is not necessary to introduce and retain a catheter. The patient is confined to bed only twenty-four hours, there is rarely bleeding

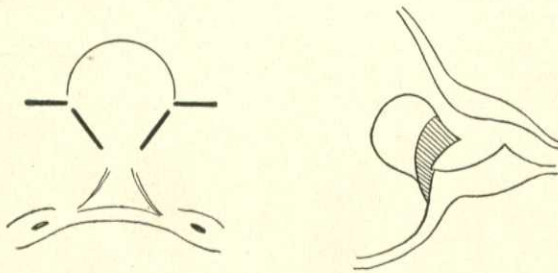


Fig. 595.—Incisions of the middle lobe (Young).

or fever, and the results are good. The scars contract and the gland atrophies. During the period of healing a steel sound should be passed from time to time (Bangs). It is alleged that fibrous stricture of the neck of the bladder may follow in some cases.*

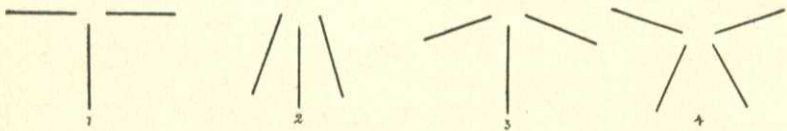


Fig. 596.—Different incisions of prostate gland in Bottini's operation (after Young).

Bottini's operation is the procedure to be selected for a sclerotic prostate, and for hypertrophy in a feeble and aged individual with damaged kidneys. It is not probable that the cautery operation will replace prostatectomy. The

*For description of this operation, see Freudenberg, in *Berliner klin. Woch.*, No. 46, 1897; and Willy Meyer, in *Med. Record* of March 5, 1898, and May 12, 1900.

best instrument is Young's modification of Freudenberg's apparatus (Fig. 594). Figs. 595 and 596 show various methods of making the cuts as advised by Hugh H. Young. When there is a distinct and pedunculated median lobe the ordinary operation fails entirely; but as Young shows (Figs. 595, 597), if an oblique cut is made on each side across the base, this lobe will drop out of the way and quickly atrophy.

Castration and Vasectomy.—In 1893 J. William White introduced the operation of bilateral orchidectomy. He proved that removal of the testicles causes a rapid shrinking in an enlarged prostate. Much of this shrinking may be due to diminution of congestion and edema, but true atrophy undoubtedly occurs. Very remarkable results have been recorded. In some cases the patients become absolutely comfortable and dispense entirely with the catheter. Cystitis ceases, and desire to urinate frequently becomes less marked. Unilateral orchidectomy has been employed, but it is not satisfactory. Bilateral division or excision of the vas deferens (vasectomy) may be employed instead of orchidectomy. This operation was suggested by Mears. It is slower in its results, but just as certain. In spite of the great simplicity of orchidectomy the mortality has been considerable (from 11 to 18 per cent.). In several instances mental disturbance has followed the operation, but there is no real evidence that it was due to this special form of operation and would not with certainty have followed any other. Castration is now very seldom performed, as vasectomy is just as useful. Vasectomy is valueless in cases of fibroid prostate, does some good in adenoma, but is most valuable when the prostate is generally hypertrophied and prone to great congestion causing violent symptoms.

Other Methods.—Among other operations which have been suggested are ligation of the spermatic cord; ligation of the vascular elements of the cord; resection of all the cord elements except the vas and its artery and vein (angioneurectomy); parenchymatous injections of cocain into the testicles; and ligation of both internal iliac arteries.

Results.—The relative merits of these various operations alluded to above are in dispute. It is certain that very many cases of prostatic hypertrophy can be kept comfortable by aseptic catheterism. If this procedure fails or for other reasons must be abandoned, a careful study of the case should be made before selecting a special operation. The Bottini operation is coming into extensive use. Some would apply it to almost any sort of case, and claim that the operation is practically free from danger. Meyer uses it for any case of uncomplicated hypertrophy; but if the prostate is very large ligates the vasa deferentia some weeks before cauterizing the prostate, in order to lessen the danger of thrombosis.

A more conservative view is that of Eugene Fuller, who doubts the per-

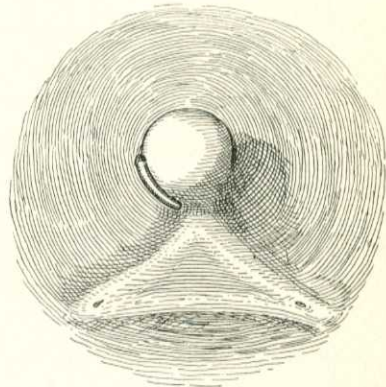


Fig. 597.—Incising the middle lobe (Young).

manence of the results of the Bottini operation, fears that stenosis of the vesical neck may follow, and would restrict the operation to uncomplicated cases, not of a grave character and in which the bladder has not been seriously damaged. It is the operation of choice if the prostate is fibrous; Horwitz prefers it if the patient is old, debilitated, or the victim of kidney disease. Some residual urine remains. In over 10 per cent. of cases no benefit follows. Vasectomy is used for an engorged and generally enlarged prostate. It may do great good and may fail completely. If the urine is extremely foul, some operation permitting drainage is advisable. In an adenomatous prostate in which enucleation is easy we should prefer the perineal method. In other cases in which it is probable enucleation will be hard, in cases of uncertain diagnosis, in cases in which a calculus may exist, and in cases in which the middle lobe is at fault, do a suprapubic operation, although sometimes a perineal incision may be made, and a cut be made in the prostate to bring the floor of the urethra level with the trigone.

In old men with great obstruction, and with serious disease of the bladder and involvement of the kidneys, permanent suprapubic drainage is sometimes the most useful procedure.

The mortality from Bottini's operation is over 5 per cent. Horwitz collected 888 operations: 84.3 per cent. were cured or improved; 10 per cent. were not improved; and 5.7 per cent. died ("Phila. Med. Jour.," Nov. 16, 1901). Young had 3 deaths in 41 operations.

Vasectomy done early gives a mortality of from 3 to 5 per cent. If performed later the mortality is 10 to 15 per cent.

The mortality of prostatectomy is variously estimated. Freudenberg collected 753 cases: 622 were cured, 44 died, and 87 were not improved.

Guitéras collected 152 cases done by various methods ("Jour. Amer. Med. Assoc.," Nov. 2, 1901). Twenty-five died. Bangs believes that the mortality from prostatectomy should not be above 8 per cent., but statistics indicate that it is from 10 to 15 per cent. in most hands. W. Bruce Clarke reports a mortality of 9 per cent. The mortality of the suprapubic operation is higher than that of the perineal operation. Belfield estimates the former at 16 per cent. and the latter at 9 per cent.

The earlier the operation is performed, the safer it is.

Malignant Disease of the Prostate Gland.—Primary malignant growths of the prostate are not very frequently encountered, and secondary growths are even more rare than are primary growths. When malignant disease does occur, it is almost always cancerous. Secondary cancer of the prostate finds its most usual antecedent in cancer of the rectum. Epithelioma does not occur. Scirrhus occasionally occurs; but the most frequent form is encephaloid. Round-celled, spindle-celled, or mixed-celled sarcoma may develop.

Carcinoma of the prostate may occur at an earlier age than ordinary hypertrophy of the prostate. The latter does not become evident until after the age of fifty; but carcinoma of the prostate may begin at any time after the age of forty, and sarcoma of the prostate may commence in early youth.

At first, the carcinomatous growth enlarges slowly; but it soon begins to grow with rapidity. It breaks through the capsule and fungates into the bladder or into the urethra. The pelvic, the inguinal, and the femoral glands

become involved early in the course of the disease. It is not usual to find great obstruction to urination or to the passage of a catheter at an early period, but later both these conditions are noted. Early in the case there is pain only when obstruction to urination occurs; later, the pain in the neck of the bladder may be severe, and there may also be pain in the loin and in the sciatic nerves. Hemorrhage usually occurs. In the beginning the hemorrhage is trivial and intermittent, but when fungation exists, large hemorrhages generally take place. The blood is usually mixed with urine, but there is sometimes a large hemorrhage without micturition. The urine is not likely to contain pus or any quantity of mucus, unless the bladder is involved in the growth.

When the prostate gland is felt by means of a finger in the patient's rectum, it is found to be of stony hardness and to be firmly anchored in place. Reginald Harrison points out that an ordinary hypertrophied gland is not so firmly anchored as a carcinomatous gland; that the bowel moves over it with freedom; and that, although it is firm to the touch, it is not of stony hardness. The patient with carcinoma of the prostate loses flesh rapidly and develops distinct cachexia; and metastatic deposits are likely to form in the vertebral column, in the kidneys, and in other organs and structures.

In making a diagnosis Harrison insists upon the value of the cystoscope. He says that in cancer one does not find much intravesical projection, and that what projection there is is uneven and irregular. In an ordinary adenomatous prostate, on the contrary, the surface is smooth and rounded and projects into the bladder.

Treatment.—Radical operation is out of the question in these cases. Permanent suprapubic drainage is made in most instances, and usually gives the patient great relief. (See "Remarks on Cancer of the Prostate," by Reginald Harrison, in "Brit. Med. Jour." of July 4, 1903.)

Tuberculosis of the Prostate Gland.—Tuberculosis of the prostate is rarely primary. It is usually secondary to tuberculosis of the kidney or of the epididymis. In the majority of cases of tuberculosis of the prostate the lungs are involved in the tuberculous process when the patient is first seen by the surgeon. The disease appears particularly between the ages of twenty and thirty years, but it may attack elderly men and even the aged. It begins by the formation of a number of tuberculous nodules in the immediate neighborhood of the prostatic tubules. These nodules caseate and run together, forming cavities and, eventually, tuberculous abscesses, which are prone to rupture into the urethra. In very rare instances a large tuberculous abscess ruptures through the perineum, into the rectum, or into the peritoneum.

The disease occasionally undergoes spontaneous cure, through fibrous-tissue formation or calcification. The tuberculous process is liable to spread to the seminal vesicles, the bladder, the ureters, and possibly the peritoneum; and in some cases it inaugurates thrombophlebitis and pyemia.

Symptoms.—The patient suffers with pain during micturition; there is frequent micturition; and from time to time the urine contains blood. Attacks of cystitis take place, and weakness and a loss of flesh are greater than is commensurate with any ordinary inflammation. Tuberculosis of the prostate alone is said not to cause marked hectic fever; but when adjacent structures

become involved, the temperature attains a high level and becomes characteristic. When the disease has advanced, there is not unusually urinary incontinence, on account of the involvement of the circular muscular fibers about the neck of the bladder. Commonly, there is a mucopurulent discharge, or mucopurulent matter may be obtained by massaging the prostate. This matter may contain tubercle bacilli, and in some cases the urine also contains these bacilli. Early in the course of the case rectal examination detects some enlargement of the gland, many nodules, and tenderness; later in the disease it finds marked enlargement and areas of softening.

Treatment.—Early in the case Senn recommends parenchymatous injections of iodoform emulsion, the punctures being made through the perineum. If these fail, operation must be considered. When one takes into account how rare primary tuberculosis of the prostate is, one is impressed with the infrequency with which a radical operation should be attempted. If there is absolutely no evidence that any adjacent organ is involved or that any distant focus of disease exists, it is justifiable to perform perineal prostatectomy. As a rule, however, the only surgical methods that are employed consist in making a prerectal curvilinear incision, exposing the prostate, and curetting caseous foci. If an abscess forms, it should be evacuated by means of a perineal incision and cavities should be curetted and packed with iodoform gauze.

If it is determined that no operation is advisable, one should look to the patient's general health, administer urotropin, and avoid using instruments as much as possible; because, as Sir Henry Thompson has shown, instrumentation irritates the prostate, causes a great deal of pain, and makes the disease worse in every case.

Retained and Malplaced Testicle.—The testicle may be arrested in its passage to the scrotum: it may remain in the lumbar region; it may reach the internal abdominal ring; it may lodge in the inguinal canal; it may emerge from the external ring, but fail to enter the scrotum; or it may pass into unnatural positions, as into the perineum or the crural canal. It may or may not be functionally active. A retained testicle is subject to attacks of orchitis and may become sarcomatous. In 80 per cent. of cases the testicles have descended at birth; most often it is the right testicle which fails to descend. Sometimes a testicle descends after being retained for months or even years. In Keyes' case it descended in the thirtieth year. Late descent usually causes hernia.

Treatment.—If one testicle is undescended one year after birth, and the other testicle is sound, the former should be removed if it is found impossible to draw the gland into the scrotum and fasten it. Always try to get a retained gland into the scrotum, and operate before the age of puberty.

Orchitis is inflammation of the testicle. *Acute* orchitis may be due to cold, wet, traumatism or epididymitis, gout, mumps, rheumatism, or a specific fever. The testicle is round, swollen, tender, and very painful, the scrotum is red and swollen, the tunica vaginalis is filled with fluid, and there is fever. *Chronic* orchitis results from the acute form or from a chronic urethral inflammation, and is almost always combined with epididymitis.

The **treatment** of the *acute* form consists of rest in bed, and applications as for epididymitis (page 1020). The *chronic* form requires the removal of the

causative lesion, if possible, the wearing of a suspensory bandage, applications of ichthylol or mercurial ointment, and the administration of iodid of potassium by the mouth. Strapping may do good. Castration may be required.

Tuberculosis of the testicle may be primary, but in most instances is secondary to tuberculosis of the prostate, bladder, or seminal vesicles. The disease may be preceded by pulmonary tuberculosis, peritoneal tuberculosis, or tuberculous disease of bones or joints; and primary tuberculosis of the testicle may be followed by distant tuberculous lesions. In some cases involvement of the prostate exists, but cannot be detected (latent tuberculosis of the prostate); in other cases the prostate is in a state of subacute inflammation. The disease begins in one testicle, but in the vast majority of cases the other testicle becomes involved after a few weeks or months. If but one epididymis is involved the testicle may not be affected for weeks or months. Van Bruns says that in 40 per cent. of such cases the testicle is not involved for six months; in 18 per cent., for two months ("Archiv f. klin. Chir.," B. 63, H. 4). It may begin in either the epididymis or the testicle. As a rule it begins in the epididymis and attacks the testicle later. It usually comes on gradually; but it may begin acutely, as I have seen in two instances during the progress of tuberculous peritonitis. The disease is apt to follow a slight injury or inflammation, and is most common in young men, but may arise at any age. Nodules form most commonly in the epididymis, but sometimes in the testicles as well. These nodules soften and run together, and the cord is felt to be enlarged. After a time the skin becomes red and adherent, gives way, and exposes a caseous breaking-down epididymis or testicle. Except in the acute cases, the testicle is only slightly, if at all, painful, and tenderness is trivial. In one-sixth of the cases a small hydrocele forms. In a questionable case the tuberculin test should be employed. If a hydrocele exists the fluid should be withdrawn by tapping and cultures be made from it.

Treatment.—If the disease is limited to the epididymis or the epidermis and vas, resect the epididymis (epididymectomy) and the vas deferens. If the testicle is diseased, orchidectomy is performed. It was long believed that orchidectomy was useless if the vesicles and prostate were involved, but Koenig and others maintain that vesicular and prostatic tuberculosis improve after removing the diseased testicle or epididymis. If the epididymis of each testicle is involved, both should be removed. When both testicles are diseased, and other organs and structures are not extensively involved, double orchidectomy is performed, or, better, the testicle which is worse is removed and the diseased portion of the other is extirpated.

In association with and after operation employ antituberculous remedies, order a nourishing diet, send the patient to a good climate, and insist on an open-air life. A very large percentage of unilateral cases are cured by operation (over 40 per cent.). Some bilateral cases are also cured.

Orchidectomy, or Castration (Excision of a Testicle).—In this operation an incision is made over the cord, commencing just outside the external ring and running down over the base of the tumor. Clamp the cord and divide it near to the ring, remove the testicle, ligate the spermatic artery alone, and then ligate the entire thickness of the cord. The cord is ligated with chromic gut. The skin is sutured with silkworm-gut. Drainage is

not required. It is often advisable to remove a considerable amount of scrotal skin.

Epididymitis, or inflammation of the epididymis, is usually due to inflammation of the urethra. It is apt to occur in the stage of decline of a gonorrhoea, and is announced by a complete cessation of the discharge. It may result from the passage of a urethral instrument, the voiding of urine which contains fragments of calculi, or as a complication of prostatic hypertrophy. *Acute* epididymitis is characterized by swelling about the testicle, pain in the groin, and tenderness over the posterior part of the testicle. The pain becomes acute, swelling rapidly increases, and the constitution sympathizes. The swelling is due partly to engorgement of the epididymis and partly to fluid in the tunica vaginalis (acute hydrocele). *Chronic* epididymitis is usually linked with orchitis, and it follows an acute attack or a chronic urethral inflammation.

Treatment by aseptic puncture with a tenotome, if fluctuation is marked, will relieve tension and pain. Leeching over the external abdominal ring, use of an ice-bag, elevation, application of guaiacol, and administration of laxatives and opium constitute the usual treatment in the acute stage. Applications of guaiacol over the cord, epididymis, and testicle quickly relieve pain and distinctly lessen swelling. Two applications a day should be made for one week. At each application paint the scrotum and over the external ring with 15 drops of guaiacol in 1 dram of glycerin or olive oil. Strapping is employed as the inflammation subsides. The treatment of the chronic form is the same as that for chronic orchitis.

Strangulation of the Cord by Axial Rotation.—In nearly one-half of the cases the testicle is undescended or only partly descended. In every case there is a long mesorchium, and if a normal testicle is normally placed torsion of the cord will hardly occur (Chas. L. Scudder, "Annals of Surgery," Aug., 1901). The twisting may be toward the right or toward the left. The symptoms arise suddenly, and usually during exertion. In some cases a hernia also exists. When the rotation occurs, the testicle swells, hemorrhages take place into it, and gangrene may occur. If the cord of an undescended or partially descended testicle twists, swelling and tenderness are noted in the abdomen or the groin. If the swollen testicle is in the scrotum, the gland feels nodular and the epididymis is anterior. The symptoms are sudden pain, vomiting, moderate shock, and a swelling in the groin or a swollen testicle in the scrotum. The swelling receives no impulse on coughing. The symptoms resemble those of strangulated hernia, but are less violent, and the bowels are not obstructed.

Treatment.—An incision should be made, and if the twisting was recent and the testicle is not gangrenous, untwist and fasten the testicle to the scrotum by a catgut stitch. If the testicle is gangrenous, remove it. Scudder tells us that in 88 per cent. of cases the testicle is found to be gangrenous. According to Scudder, there are 32 cases on record; 31 were operated upon and 1 was not, but all recovered; in 3 the testicle sloughed and in 2 it atrophied ("Annals of Surgery," Aug., 1901).

Vaginal hydrocele (chronic hydrocele) (Fig. 598, *e*) is a collection of fluid in the tunica vaginalis testis. An enlargement of the testis may cause it, but in most instances the cause is unknown and no signs of inflammation

exist. The fluid is albuminous, but it does not coagulate spontaneously; it is thin, straw-colored, and may contain crystals of cholesterin. The testicle is at the lower and back part of the sac. The pyriform mass fluctuates, is translucent, grows from below upward, and the introduction of an exploring-needle permits the yellow fluid to flow out.

Treatment.—Simply tapping the sac with a trocar is only palliative; air must run in as fluid runs out, and suppuration may occur, which will be dangerous without drainage. Never tap a rigid sac. The injection of irritants should be abandoned, as it exposes the patient to serious danger because of inflammation occurring without provision for drainage. Hearn incises the sac, dries its anterior with bits of gauze, swabs it out with pure carbolic acid, packs it with iodoform gauze, and dresses it antiseptically. The packing is removed in twenty-four hours and the wound is allowed to close. In most cases I prefer this method. If the sac is rigid and will not collapse, either stitch it to the skin and pack it or excise a large portion of its parietal layer and insert a drainage-tube (Volkman's operation). It has recently been proposed to tap the sac with a trocar and cannula, to leave the cannula in place as a drain for some days, and to dress antiseptically.

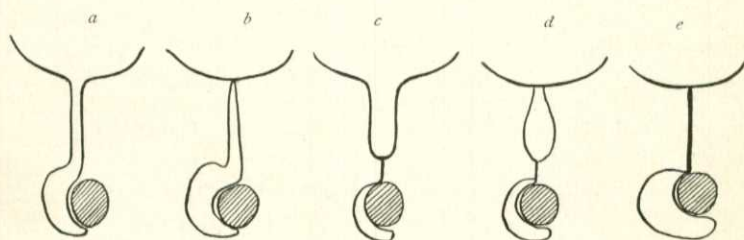


Fig. 598.—Varieties of hydrocele: *a*, Congenital; *b*, infantile; *c*, funicular; *d*, encysted; *e*, vaginal.

Longuet's operation is easy and successful. It is called extraserous transposition of the testicle. It was introduced by Longuet in 1898 ("Progrès Méd.," Sept. 21, 1901). A local anesthetic is injected and an incision two inches in length is made. The testicle is pulled out. The serous and all the other coats except the skin fall together behind and make a sheath for the cord. One catgut suture will hold them behind the cord. A bed is made for the testicle beneath the inner edge of the skin wound, by tearing with the fingers. The testicle is rotated on its long axis and inserted into this cavity. The testicle rests against the scrotal septum, and in front of the gland is the cord covered with tunic. The skin is sutured and the wound is dressed.

Congenital hydrocele (Fig. 598, *a*) is hydrocele through an unclosed funicular process into the tunica vaginalis. If the pelvis is raised, the fluid runs back into the peritoneal cavity, from which it originally came. The **treatment** is the application of a truss to obliterate the funicular process.

Infantile hydrocele (Fig. 598, *b*) is a collection of fluid in a funicular process and the tunica vaginalis, the funicular process being closed above, but not below. The **treatment** is to puncture the sac and to scarify the sac-wall with a needle.

Encysted Hydrocele of the Cord (Fig. 598, *d*).—In this variety the funicular process is obliterated above and below, but it is patent between

these two points, and fluid collects. The **treatment** is the same as that for infantile hydrocele. If this fails, incise and pack.

Funicular Hydrocele (Fig. 598, c).—The funicular process is closed below, but is open above. Raising the pelvis causes the fluid to trickle back into the peritoneal cavity. The **treatment** is the application of a truss.

Encysted hydroceles of the testicles and of the epididymis may occur. *Diffused hydrocele* of the cord is simply edema of the cord. *Hydrocele of a hernia* is the distention of a hernial sac with peritoneal fluid.

Hematocele.—*Vaginal hematocele* is blood in the tunica vaginalis, the result of traumatism, a tumor, or the tapping of a hydrocele. There is a pyriform tumor, which fluctuates, but which gradually becomes firmer; the scrotum is livid, and the testicle is below and posterior to the tumor. The *encysted* form of *hematocele of the cord* is a hydrocele of the cord into which bleeding has occurred. The *diffused* form is due to extravasation of blood into the cellular substance of the cord. *Encysted hematocele of the testicle* is due to effusion of blood into an encysted hydrocele of the testicle. *Parenchymatous hematocele* is extravasation of blood into the substance of the testicle.

The **treatment** of a recent case of vaginal hematocele is to put the patient to bed, support the scrotum, and apply an ice-bag over the testicle. If the swelling does not soon abate, incise, irrigate, and pack.

Varicocele is varicose enlargement of the veins of the venous plexus of the spermatic cord. The veins are thickened, lengthened, dilated, and convoluted. The assigned causes are straining, cough, constipation, and an occupation requiring prolonged standing. Some believe ungratified sexual desire is a cause. Hereditary predisposition is probable. There are more left-sided than right-sided varicoceles, because the right spermatic vein has valves and empties into the vena cava at an acute angle, but the left spermatic vein has no valves (Brinton) and empties into the left renal vein at a right angle. Varicocele is a very common condition. The elder Senn found it in 21 per cent. of 10,000 recruits. An irregular swelling exists in the scrotum and extends up the cord. This swelling feels like "a bag of earth-worms"; it exhibits a slight impulse on coughing; the scrotal skin and cremaster muscle are attenuated; the testicle lies at the bottom of the swelling and is softer and smaller than normal; the swelling diminishes on lying down and increases on standing or on making pressure over the external ring. The scrotum is pendulous and the scrotal skin frequently contains varicose veins. The testicle may be soft and shrunken. There is usually some discomfort, aching, or dragging in the testicle or the groin, and even neuralgic pain in the cord. There may be no discomfort of any sort. A large varicocele may be free from discomfort and a small varicocele may produce much annoyance, or *vice versa*. There is sometimes mental depression and hypochondria. As a man reaches middle age a varicocele usually ceases to give trouble.

Treatment.—In treating varicocele, reassure the patient: tell him there is no real danger of impotence; order cold shower-baths, correct constipation and indigestion, give occasional tonics, and order the patient to wear a suspensory bandage. If the testicle becomes much atrophied, if the pain and the dragging are annoying, or if the mind is much depressed, operate (page 330).