becomes obstructed the urine is passed through fistulous openings in the floor of the canal.

The foul discharge, the disgusting ulceration, and the liability to profuse hemorrhage are the symptoms of which the patient complains; pain is rarely troublesome until late in the disease. The ulceration spreads superficially quite as does epithelioma in other parts of the body, and the patient finally dies septic and cachectic. Lymphatic infection often gets no further than the inguinal glands, so that large visceral metastases are exceptional.

Diagnosis.—Penile epithelioma may be confused with chancre, chancroid, warts, tuberculous ulcers, and ulcers from chronic balanoposthitis. After the disease is well advanced there can be no possible doubt of its malignant nature; but in the early stages, when its character may still be doubtful, it is wiser to subject every growth of the penis which does not react promptly to treatment or which appears spontaneously or in an aged subject, to excision and microscopical examination for the purpose of determining its nature.

Treatment.—An epithelioma of the penis seen and recognized at its outset may usually be removed by circumcision if on the prepuce, or by cauterization with arsenious acid if on the glans; in this it resembles epithelioma of the other parts of the body. But if it has grown so widely as to destroy the greater part of the glans, or if the inguinal glands are already involved, the penis should be amputated close up to the pubes and the glands extirpated. Finally, if the greater part of the penis is covered by the ulcer, the treatment required is extirpation of the penis and simultaneous castration. Recurrence of the disease may be attacked by caustics or by the *x*-ray and thus controlled or even, exceptionally, cured.

XIII. Amputation of the Penis. — The patient should be prepared as for any aseptic operation; general anæsthesia is required. The operation is begun by tying a rubber catheter around the root of the penis; this may be held in place by harelip pins. Ample skin flaps are then elevated and dissected back fully an inch, after which the knife is inserted between the corpus spongiosum and the corpora cavernosa, and the latter are cut off three-fourths of an inch shorter than the former.

The elastic ligature is now removed and profuse hemorrhage immediately follows. The dorsal arteries must be caught and tied, and perhaps one or two arterial branches may require similar treatment; but after the first gush is conquered the oozing from the erectile bodies is controllable by pressure. The urethra is then split into two flaps and sutured to the skin flaps, which are then sutured in place and the whole dressed aseptically, with provision for the passage of urine through a retained catheter.

Flaps.—A circular skin incision may be employed, but neater apposition is obtained by employing skin flaps. Senn and Jacobson use long dorsal and short ventral flaps, Jacobson making the dorsal flaps so long that the urethra may be sutured into a perforation in its lower extremity. Other operators employ lateral flaps; while Dr. Davis, of Philadelphia, makes three urethral flaps each cut to a point and sutured to the skin, divided circularly. The urethra is split in order to avoid stricture at the new meatus.

After-Treatment.—The two things most to be feared are hemorrhage and tension on the flaps, both of which are due to erections. A light dressing and the free employment of bromides insure safety.

XIV. Extirpation of the Penis.—In order to remove the erectile bodies it is necessary to place the patient in the lithotomy position and to make a skin incision surrounding the base of the penis, thence splitting the scrotum from one end to the other of the raphé. Blunt dissection separates the two halves of the scrotum down to the corpus spongiosum. A sound is passed as far as the triangular ligament where the urethra is divided just in front of the bulb and thence freed back as far as the hole in the triangular ligament. The suspensory ligament is then divided, and each crus dissected out and separated from the pubic ramus by means of a stout periosteal elevator; this completes the removal of the organ. The edges of the scrotal incision are then united, the stump of the urethra being split and stitched to the lower end of the wound. Drainage is required, for there is likely to be some post-operative oozing as well as considerable hemorrhage during the operation. No retained catheter is needed.

Total Emasculation.—French surgeons seem generally agreed that it is wise, in extirpating the penis, to remove the testicles at the same time, since, as they allege, the removal of these glands lessens the hypochondriacal and maniacal tendency which this very operation has been said to cause when employed for the relief of prostatic hypertrophy. It is best in this matter to consult the wishes of the patient. The testicles are readily removed through the scrotal incision.

XV. Extirpation of the Inguinal Glands.—It is always wise to remove the inguinal glands as an accompaniment to any operation for penile epithelioma, since these glands may be infected even though they appear normal. If the glands are small they may readily be shelled out, if large or matted together there is danger of opening the femoral vein in the region of the saphenous opening in the fascia lata; hence, this should be sought for and worked away from in all difficult operations in this region.

XVI. Scrotal Injuries, Inflammations, and New Growths.—*Wounds.*—Scrotal wounds, whether surgical or accidental, bleed freely, and efficient hæmostasis of this bleeding is the most important feature of the treatment. Every bleeding vessel must be carefully caught and tied, for there is danger of the formation of an enormous hæmatoma, which may extend to the penis, thigh, and abdomen. Wounds of the scrotum, like those of the penis, heal readily and do not often suppurate.

Loss of Tissue.—Even though the greater part of the scrotum is destroyed by disease or by accident, the surgeon need not feel called upon to fill in the gap by a plastic operation. For such is the elasticity of the scrotal skin that cicatricial contraction will draw it over the exposed testicles and close the largest gaps within a few weeks, unless the patient is septic.

Contusion and Hæmatocele.—Scrotal contusions are manifested by great ecchymosis and œdema quite comparable to the familiar black eye. Compression (see Epididymitis, p. 181) and an ice-cap is the proper treatment if the case is seen early; later, absorption may be promoted by heat, while it is only in the most exceptional cases that incision is required. Extravaginal hæmatocele (blood cyst of the scrotum) is an encysted scrotal hæmatoma requiring incision (Fig. 4254).

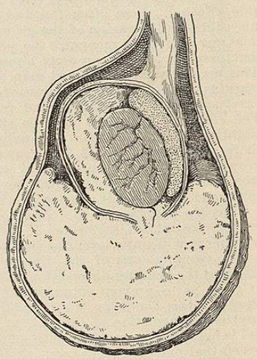

Fig. 4254. — Hæmatocele, Scrotal and Vaginal.

Scrotal Inflammations.—The inflammations of the scrotum closely resemble those of the penis in most of their characteristics. Gangrene of the scrotum following urinary infiltration in an aged or debilitated subject is often rapidly fatal, and must be combated by stimulants, free incisions, wet dressings, and excision of sloughs as fast as they form. Castration is never required.

Elephantiasis. See *Elephantiasis.*

Cysts.—Small sebaceous cysts showing pearly white through the distended skin may occur anywhere on the penis and scrotum, but are usually found on the raphé; they may grow very large. Jacobson and Tilden Brown have recorded cases of so-called cystic disease of the scrotum. Echinococcus cysts have also been found in this part of the body. Small subcutaneous capillary dilatations may occur in the skin of the scrotum; they show dark blue, and are totally harmless; but if the patient objects to them they may be cured by a minute incision and the application of nitrate of silver.

Solid Tumors.—Angioma, fibroma, lipoma, fibromyxoma, osteochondroma, and sarcoma occur in the scrotum; but the only neoplasm sufficiently common to merit notice is epithelioma, the so-called chimney-sweeps' cancer (see *Carcinoma of the Skin*).

XVII. Anomalies of the Testicle.—The accepted classification of anomalies of the testicle is that of Monod and Terrillon, as follows:

Anomalies in development	In number	In excess	Polyorchism.
		Deficient — Absence	Anorchism.
		Deficient — Fusion	Synochism.
	In size	In excess	Hypertrophy.
		Deficient	Atrophy.
Anomalies in migration	Undescended	Incomplete migration	Retention.
		Abnormal migration	Ectopia.
	Descended		Inversion.

1. *Anomalies in Development.*—Polyorchism.—According to Jacobson, supernumerary testicles are sometimes found in certain animals, and the older literature contains many alleged instances of this condition in man. The only case in which the diagnosis was confirmed by microscopical examination is that reported by Arbuthnot Lane in *The British Medical Journal* of 1894. I have seen one case diagnosed by an able surgeon as polyorchism, in which the third testicle proved to be a large spermatocele.

Anorchism.—The absence of one or both testicles is rare. It is usually associated with absence of the epididymis and part of the vas. Exceptionally, the whole vas is wanting; still more rarely the testicle alone is absent. On the other hand, the testicle may be present and the seminal ducts absent. During life anorchism can be differentiated from abdominal cryptorchism only by operation.

Synorchism.—A fusion of the testicles has twice been observed, the glands being retained in the abdomen in each case.

2. *Anomalies in Migration.*—Cryptorchism.—In contrast with the rarity of the anomalies enumerated above is the familiar condition of cryptorchism, *i.e.*, absence of one or both testicles from the scrotum. The testicle may be either retained or ectopic; if retained it is arrested at some point in its normal descent; if ectopic it is lodged out of its normal path. Marshall records 11 cases of cryptorchism among 10,800 English recruits, while Rennes encountered 6 cases among 3,600 French recruits. Of these 17 cases only 1 was bilateral.

Retention of the testicle is caused by obstruction to its progress from the abdomen or by traction from behind. Thus some cases are attributed to peritoneal adhesions which close the inguinal canal at some point before the testicle has descended; in other cases there is an alleged congenital shortness of the vas.

The *etiology* of this condition, however, is very obscure, and has no direct bearing upon its clinical aspects. Suffice it to say that the commonest form of retention is the inguinal variety, the testicle lying in the inguinal canal (Fig. 4255), sometimes near the external sometimes near the internal abdominal ring. A certain freedom is usually enjoyed by the gland, so that in many young subjects a testicle in inguinal retention may be reduced either into the abdomen or into the scrotum. Puboscrotal retention, in which the testicle lies high up in the scrotum close under the pubes, is a less common condition; while abdominal retention—the testicle not having reached the inguinal canal at all—is most exceptional.

The ectopic testicle may be found in the perineum beneath the deep fascia just in front of the anus, or at the saphenous opening of the crural canal, or in the opposite side of the scrotum, or at the base of the penis in front of the pubes. These last two varieties have each been seen but twice; indeed, any form of ectopia is extremely rare.

Inversion of the testicle occurs when that organ is turned upside down in the scrotum or rotated so that its long axis is horizontal.

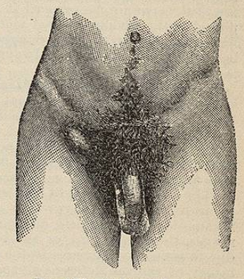

Fig. 4255.—Retained Testicle.

The only clinical significance of this very rare anomaly is that, in hydrocele, the inverted testicle may lie above and in front of the sac, instead of below and behind it, and thus be punctured by the aspirating needle.

The pathological condition of the retained testicle is a subject of great interest, both because it is alleged that pressure of the abdominal muscles makes the gland especially liable to sarcomatous degeneration, and because it seems proved that this pressure habitually destroys the functionating power of the gland. Thus a double cryptorchid is habitually sterile. So general is this rule that Curling, after enumerating several cases of children born of women married to cryptorchids, felt compelled to doubt their paternity. Yet recent investigations have shown that retained testicles may acquire and retain, at least for a few years, the power of secreting spermatozoa. Thus Beigel found numerous spermatozoa in the semen of a double cryptorchid aged twenty-two, while Valette found a few in a retained testicle removed from a man in his twenty-first year. Yet Bellingham Smith alleges that cryptorchids never retain their virility for more than five or ten years. The question of the sterility of any given case may be determined by examination of the seminal fluid.

But apart from the atrophy and sterility of the retained testicle, this gland is subject to other dangers. Neuralgia is often the first evidence that the testicle is being affected by pressure of the surrounding muscle, and any inflammation, whether traumatic, gonorrhœal, or tuberculous, is sure to run a severe course and is habitually followed by atrophy. Finally, the great danger of these patients is that the testicle may become sarcomatous. It is difficult to estimate how frequent this sarcomatous degeneration may be, and yet, viewing it merely as a possibility taken in connection with the congenital hernia which habitually accompanies cryptorchism, it is enough to determine the surgeon always to remedy the congenital defect.

In infancy the proper *treatment* of retained testicle is the application of a truss, whereby the hernia may be reduced and the testicle forced down into the scrotum. I have succeeded in curing a number of cases in this manner, and have always preferred it as a preliminary to operation, although a cure may not be expected after the child is ten years of age. If mechanical treatment fails or if the patient has passed his tenth year herniotomy offers the only hope of cure. And this should be strongly urged upon the patient as calculated to cure his hernia, to insure him as far as possible against sterility, and to relieve him from the danger of sarcoma.

Broca has operated 138 times without a death; 79 of these cases were followed for a year or more. Of these, 31 had testicles normal both in size and position; 35 had testicles normal in size, but abnormal in position (near the external ring); while only 13 had undergone atrophy. These brilliant results were obtained on young children.

In order to reduce the testicle the usual operation of herniotomy is performed. The testicle is freed from all obstructing envelopes, and the cord is followed up as far as possible into the abdominal cavity and freed by the finger from all fascial bands. The further the cord is followed the further can the testicle be pulled out into the scrotum. Wood's device of freeing the vas from the globus major and then inverting the testicle may be mentioned as an ingenious way in which to gain an inch. If the testicle cannot be reduced it may be removed or replaced in the abdomen; but since the latter alternative leaves it subject to every danger and relieves only the hernia, it is my preference always to castrate if reduction is impossible.

Hypertrophy and Atrophy of the Testicle.—There is considerable variation in the normal size of the testicles as in that of the penis. When one testicle is defective or wanting its fellow seems to take on a certain compensatory hypertrophy. On the other hand, atrophy may occur in two ways: there may be arrest of development, or a testicle previously normal may atrophy from injury; *e.g.*, section or obstruction of the spermatic vessels; from pressure, *e.g.*, large hydrocele or varicocele; from inflammation, *e.g.*, orchitis, and rarely from injuries to the nerves, the spinal cord, or the brain. Atrophy is never due to sexual continence, to the use of the iodides, or to injury of the vas deferens alone. A microscopical atrophy is physiological in old age.

Atrophy of the testicle cannot be cured, but it may be prevented by the removal of a cause whose continued action favors atrophy.

XVIII. Injuries of the Testicles.—*Luxation and Contusion.*—Luxation of the testicle has been reported as the result of injury, the testicle being extruded under the skin of the adjoining parts or into the inguinal canal. Mild contusions of the testicle produce shock to the sympathetic system with nausea and faintness, and are followed by more or less prolonged tenderness of the parts. Severe injuries may produce ecchymosis, hæmatocele, or orchitis, and may result in atrophy, in abscess, or in gangrene. Kocher has recorded two deaths from the shock of contusion.

The *treatment* of contusion of the testicle consists in dorsal decubitus, elevation of the testicle, and application of ice. If orchitis ensues this must be combated.

Wounds.—Wounds of the testicle are very rare. Any incision of the tunica albuginea is likely to be followed by protrusion of the soft parts within (hernia testis). If the patient is seen immediately the wound should be cleaned and the tunica albuginea sutured in order to prevent hernia testis. If reduction is impossible, the hernia may be snipped off with scissors, but should not be pulled upon lest the whole testicle be eviscerated.

XIX. Torsion of the Spermatic Cord and Gangrene of the Testicle.—Gangrene of the testicle is usually caused by torsion of the spermatic cord. This occurs spontaneously and gives symptoms very closely resembling those of strangulated hernia. The groin and scrotum suddenly become swollen and sensitive; the patient vomits, feels faint, and has some fever; there may be chill and syncope. The onset of this condition is very sudden, and it may be distinguished from strangulated hernia by the mildness of the systemic disturbance after the first shock has passed. In doubtful cases immediate incision should be relied upon for an accurate diagnosis.

Dr. Charles Scudder has collected thirty-two cases, seventeen of which occurred on the right side and eleven on the left. Seventy-five per cent. of the cases occurred in patients under twenty-three years of age. In ten cases the testicle was retained in the inguinal canal, and in five others it was close under the pubes; in some the attacks were recurrent. Thus Dr. Van der Poel's patient learned to relieve his pain by untwisting the testicle.

The *treatment* of this condition consists in unrolling the testicle—if this be possible—or, if the swelling is great, as is usually the case, in incision. This operation has been performed twenty-nine times without a death; twenty-three times the testicle was removed; five times the cord was untwisted; this was followed twice by sloughing, thrice by atrophy. Once the testicle was allowed to slough away through a simple incision, and once the testicle was untwisted one hour and a half after the onset of symptoms, without incision. In this case the testicle subsequently atrophied.

Injury to the Spermatic Cord.—Tying off the veins of the cord—as is done in the operation for varicocele—has no effect upon the testicle; but if the spermatic artery is included in the ligature the testicle usually atrophies and sometimes sloughs. Similarly any injury to the cord destroying the continuity of the spermatic artery may be followed by gangrene of the testicle.

XX. Irritable and Neuralgic Testicle. — When there is pain in the testicle without disease of this organ it is said to be irritable or neuralgic. The terms are rather loosely used to cover a variety of conditions whose only obvious symptom is testicular pain; the testicle is said to be irritable if the pain is slight, neuralgic if the pain is severe.

The varieties of irritable and neuralgic testicle may be grouped under three heads:

1. Sexual excess, especially under the form of prolonged, ungratified sexual desire, is likely to be followed by what might be termed an acute neuralgia of the testicle, that gland being swollen, sore, and sometimes exquisitely tender. A single application of guaiacol and glycerin, equal parts, the wearing of a suspensory bandage, and the avoidance of the cause, are all that is required for a cure.

2. Reflex neuralgia from the prostate and seminal vesicles is the most common form of this condition. It may be due to any congestion or inflammation of the internal sexual organs, such as chronic inflammation or chronic sexual congestion. This form of the disease is both identified and treated by measures directed to the prostate and vesicles. These organs will be found sensitive, either to rectal touch or to the passage of a moderate-sized sound. The *treatment* consists of prostatic massage, with rectal douching, and perhaps the passage of a sound, or the instillation of a few drops of the nitrate of silver into the posterior urethra. Indeed, this condition is often concomitant with prostatic neuralgia and requires the same treatment, with mild counter-irritation on the scrotum as a temporary aid at the beginning of treatment.

3. Finally, there is a vague group of cases in which the testicular pain is due to causes neither sexual, nor prostatic, nor vesicular. Thus varicocele is often associated with neuralgia, although the cure of the varicocele by no means necessarily relieves the pain. Neuralgia of the testicle is sometimes due to renal or vesical calculus, and cases have been reported in which the pain was attributed to inflammations of the scrotum and of the tunica vaginalis.

If the local cause of such a neuralgia is ascertainable and can be removed a prompt cure may be expected. But in many cases this is impossible; or else the neuralgia has been started in a neurotic subject by some slight cause, which has ceased to act while the pain continues. Such is the nature of most varicocele neuralgias. These cases habitually improve under proper sexual hygiene—which is matrimony. Indeed, one never encounters them in men happily married. Cold-water applications often give great relief and may be all that is required if the pain is spasmodic; but if the agony is constant an endeavor may be made to relieve it by excising the nerves of the spermatic cord. This can be done by a careful dissection of the cord where it issues from the inguinal canal, the nerves being found close about the vas deferens. This operation, while not a sure cure, is sometimes the only hope that can be offered the patient, and should therefore not be denied him.

XXI. Inflammations of the Testicle. — The inflammations of the testicle may be divided into (1) those that pass along the seminal canals, *i.e.*, gonorrhœa, tuberculosis, and simple pyogenic infection from the posterior urethra; and (2) those inflammations that do not travel along the seminal canals, *i.e.*, traumatic inflammations, syphilis, and the inflammation of infectious diseases. In each class of cases the testicle and the epididymis may both be affected; but in the former class the epididymis is the prime point of attack, while in the latter the testicle is chiefly assailed. Therefore, while remembering that any given case may well be at once an orchitis and an epididymitis, we shall find it convenient to classify the simple and the tuberculous inflammations as epididymitis; the traumatic, the metastatic, and the syphilitic ones as orchitis. Our present concern is with gonorrhœal and simple pyogenic epididymitis.

XXII. Epididymitis.—Epididymitis is always secondary to an inflammation at the inner end of the seminal canals. It is always associated with inflammation of the seminal vesicles and usually with posterior urethritis. The inflammation reaches the epididymis by direct extension along the mucous membrane of the vas deferens, as is proven (1) by the constant presence of vesiculitis, (2) by the frequent prodromal symptoms of deferentitis, and (3) by the fact that ligation of the vas checks at once and forever the most virulent case of relapsing epididymitis.

Thus the underlying cause of epididymitis is an inflammation of the urethra, habitually an acute gonorrhœa, less frequently stricture, chronic prostatitis, or an inflamed hypertrophied prostate. The exciting cause may be anything which determines an exacerbation of the posterior urethritis or which weakens the resisting power of the individual. Thus one patient with acute gonorrhœa may acquire epididymitis in spite of every precaution, while another may escape it in spite of every dissipation. Yet, other things being equal, exposure to cold and dampness, sexual excitement, and the action of any severe strain or the possession of a lymphatic or debilitated constitution are the causes on the part of the patient to which the inflamed testicle may usually be attributed; while, on the part of the physician, epididymitis may be caused by the passage of instruments or by the employment of injections, the danger to the testicle increasing in proportion to the violence of the manipulation, to the size and roughness of the instrument, and to the strength of the injection employed.

With chronic posterior urethritis, with stricture, and with prostatic hypertrophy the infecting bacteria are not so virulent and secondary epididymitis is less frequent and occurs only as a result of considerable trauma or debility.

Epididymitis rarely occurs before the second week of a gonorrhœa, since grave inflammation of the posterior urethra is rare before that time. The exceptional instances in which epididymal swelling appears before urethral discharge are apparently attributable to previous chronic posterior urethritis, and are no evidence that the new gonorrhœal infection begins in the epididymis. Though both epididymes may be inflamed at the same time, it is most exceptional for the two inflammations to begin simultaneously.

The inflammation begins at one end of the epididymis, usually the tail. Here are felt the first swelling and pain, and here the hard lump of induration remains long after the acute attack has passed. The testicle and the remainder of the epididymis are intensely congested and œdematous during the acute attack, the tunica vaginalis being inflamed and acute hydrocele resulting. The vas is catarrhal, and this catarrh in the vas and in the epididymis may in the end cause cicatricial occlusion of the duct. It is not possible to determine in how great a proportion of cases this occlusion occurs; but it may be considered that relapse of the epididymitis is sufficient evidence that the vas is not occluded; whence the paradox that the more often the testicle is inflamed the less likely is its possessor to be sterile.

An attack of epididymitis may run an acute or a chronic course. An acute attack is preceded for perhaps twenty-four hours by a general soreness and tenderness along the course of the vas throughout the groin and often to the loin. Then a tender point appears in the epididymis, which swells so rapidly that within a few hours it is many times its normal size, and usually within twenty-four hours testis and epididymis are swollen to an ovoidal mass exquisitely sensitive to the touch and nearly as large as the closed fist. Excruciating pain accompanies the swelling and continues for two or three days, after which the pain rapidly grows less and the swelling more slowly follows suit; so that at the end of a week the pain has become bearable, the swelling has diminished considerably, and at the end of two or three weeks more the attack has completely passed, leaving behind only a nodular scar in one end of the epididymis. During the acute attack there are severe constitutional symptoms. The disease may be ushered in by chill, and there is high fever for a few days with the accompanying lassitude and want of appetite, while usually the urethral discharge is greatly diminished, sometimes even checked, during the course of the attack, only to reappear as the epididymal inflammation subsides.

A subacute or chronic epididymitis comes on very mildly as a tender swelling at one end of the epididymis, and does not spread throughout the organ with the intensity of the acute process. This tender epididymal lump may remain smouldering for months and years so long as it is fed by a focus of inflammation in the deep urethra, breaking out from time to time into subacute or acute attacks of inflammation, though generally quiescent. On the other hand, a subacute attack may last only a few days and then proceed to entire resolution.

From the frequency with which certain cases of epididymitis, whether acute or subacute, relapse, has arisen a clinical type of the disease known as *relapsing epididymitis*, the characteristic feature of which is the tendency to recurrence of the inflammation at the slightest provocation or at no provocation at all. Even though these attacks be but subacute, they may be sufficiently annoying to render the patient miserable and to merit drastic measures for their removal.

Complications.—The acute hydrocele which often accompanies acute epididymitis in some cases assumes importance as a cause of pain from tension within the tunica vaginalis during the attack and as a cause of swelling through lack of spontaneous absorption of the fluid after the attack. Suppuration occurs but rarely in gonorrhœal epididymitis; but if the inflammation occurs in an old and septic prostatic, it often suppurates, and this suppuration, by increasing the sepsis, may lead to the patient's death.

Diagnosis.—Nothing is more characteristic than an acute epididymitis. Acute orchitis is distinguished by its etiology and by the preponderance of general symptoms and the involvement of the testicle rather than the epididymis. Subacute epididymitis may closely simulate tuberculosis (see Diagnostic Table, on p. 185).

Prognosis.—Epididymitis does not endanger life or sexual potency or desire. As stated above, double epididymitis may be followed by occlusion of both vasa and sterility. It is impossible to say in what proportion of cases this occurs, but it is certainly less frequent than is commonly supposed. Benzler's investigations showed that ten per cent. of gonorrhœal cases without epididymitis, twenty per cent. of those which had had a single epididymitis, and forty-one per cent. of those which had had a double epididymitis were sterile. These figures suggest that chronic prostatitis and vesiculitis is an important cause of sterility and may be the active agent even in a case in which the sterility is attributed to double epididymitis.

Treatment.—Epididymitis may often be prevented by the wearing of a suspensory bandage by the patient during an acute gonorrhœa or while being treated for stricture. Observance of sexual hygiene and gentleness in urethral instrumentation work to the same end.

The treatment of an acute case consists in elevation of the testicle, local applications to it, brisk catharsis, rest, and a light diet. A patient with a sharp epididymitis is much better in bed than out of it. One may ordinarily promise that four days in bed will bring him nearer to

a cure than eight days on his feet. But whether the patient will lie quiet or not, the testicle must be elevated as high as possible. With the patient in bed this is best accomplished by an adhesive plaster band across the two thighs with the testicles resting upon it (Fig. 4256), while, if the patient will be about, he can be made most

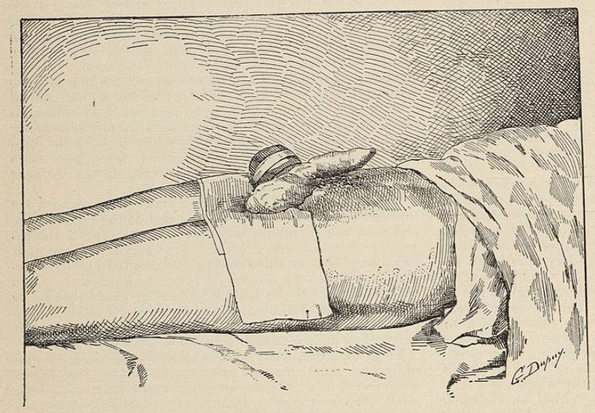

FIG. 4256.—Strapping Testicle.

comfortable by slinging his genitals up as high over his abdomen as possible in a T-bandage made with a towel, provision being made for the tenderness of the organ by a generous use of absorbent cotton padding.

Curling's support consists of a bandage, a large silk handkerchief, and a piece of tape. The bandage is tied around the patient's waist, the tape is attached to the back of the bandage and to the centre of the handkerchief, which is folded once into a triangular shape, the tape being so arranged as to hold the central point opposite the perineum. The two long angles of the triangle are then tied snugly to the waistband in each groin, while the short right angle is carried up over the genitals supporting them high up on the abdomen.

Of local applications to the testicle guaiacol is much the best in the first forty-eight hours of the inflammation. If applied pure before the swelling has reached its height it will often abort an attack. A mixture of equal parts of guaiacol and glycerin may be applied daily or twice a day during the first few days with marked benefit, and is far less irritating than the pure drug. If the patient is in bed it is advantageous to keep the testicle covered with hot poultices. The tobacco poultice is reputed an anæsthetic, but in this it falls far behind guaiacol, and, as the only real virtue of the poultice is its heat, the flaxseed poultice is adequate.

As the acute symptoms subside poultices may be replaced by a hot-water bag, and guaiacol is no longer useful.

As soon as it is bearable strapping is applied. The classic and dirty adhesive plaster strapping is obviously inferior to compression by a light rubber bandage held around the testicle by a single strap of adhesive plaster (Fig. 4256). This makes a light and comfortable dressing, the pressure of which can be varied at any moment without pain or discomfort to the patient. At first this dressing is changed every twenty-four hours. As the testicle rapidly decreases in size and bears more and more pressure without irritation, the strap is reapplied at longer intervals. Finally, a suspensory bandage is all the patient needs, and this he may wear until the general swelling has entirely subsided.

The treatment for subacute cases need not be so energetic. Guaiacol may be applied in less strength and more frequently. A suspensory bandage is all the support required.

Relapsing epididymitis may often be relieved by attacking the prostatic or vesicular focus in which the disease centres, and every effort should be made to conquer this inflammation both by local treatment and by building up the patient's health before having recourse to any surgical procedure.

If these means fail—as they often do fail utterly—the patient is usually glad to submit to vasectomy, although this operation closes the canal forever; since by this means he can be absolutely assured against any further recurrence of the inflammation. Indeed, this operation performed in the midst of an attack will cut it short more quickly and more certainly than any other means I know.

The Operation of Vasectomy.—The operation of vasectomy may be performed under local anæsthesia. If the testicle is swollen the vas is most conveniently reached at the external inguinal ring. The technique of this operation is similar to that of the high, open operation for varicocele, which is described below. But if the testicle is not swollen, it is often a simpler matter to reach the duct through an incision in the back of the scrotum. The vas is identified as the thickest, most resisting member of the bundle of tissues making up the cord, and, as it is always behind and to the inner side of the large bundle of veins, it may be readily caught between two fingers and held close beneath the skin of the scrotum behind. The skin is infiltrated with cocaine; an incision through it and through the dartos permits the vas to be protruded. This is caught with a pair of forceps, freed from the surrounding fascial fibres, tied doubly and cut between the ligatures. If there is any suspicion of inflammation of the duct it is wiser to cauterize both ends before dropping them back into the scrotum. A single stitch closes the incision. The patient need remain in bed with his testicle supported for only three or four days.

XXIII. ORCHITIS.—The inflammations of the testicle to be described under this head are three: First, traumatic orchitis; second, subacute neuralgic or gouty orchitis; third, the orchitis of the exanthemata. The first two varieties may be dismissed with a word.

Traumatic Orchitis.—Traumatic orchitis, caused by a blow, a kick, a missile, or a fall, runs a course quite comparable to that of epididymitis; yet the excretory ducts are very rarely blocked, so that, even after a severe inflammation, sterility may not be anticipated; while, on the other hand, traumatic orchitis is far oftener followed by atrophy of the testicle than is the gonorrhœal inflammation. In the treatment of this form of orchitis poultices hold the first place.

Neuralgic or Gouty Orchitis.—Neuralgic or gouty orchitis is a mild inflammation with little swelling and tenderness, but with considerable neuralgia. It may result from sexual causes, or it may occur spontaneously in gouty or rheumatic individuals. The treatment is that of irritable or neuralgic testicle.

Orchitis of Infectious Diseases.—The orchitis of infectious diseases deserves more extended notice. It has been noted in the course of typhoid fever, influenza, smallpox, tonsillitis, and rheumatism, but it is commonly known as the orchitis of mumps on account of its frequency in this

disease as compared with its great rarity in other infectious conditions.

Orchitis of Mumps.—The orchitis of mumps does not occur in children. In young adults orchitis complicates the parotid inflammation in at least five per cent. of all cases; indeed, Laveran encountered orchitis one hundred and fifty-six times in four hundred and thirty-two cases of mumps among soldiers. The inflammation of the testicle usually appears at the end of the first week of the parotitis; exceptionally, the testicle is inflamed before the parotid, and there are a few recorded cases of alleged mumps of the testicle without any inflammation of the parotid gland. The affection is habitually unilateral, runs a very acute course lasting but a week or ten days, and is followed by atrophy of the organ in one-half the cases; suppuration and gangrene are exceptional terminations, and, if the testis does not atrophy, its function is in no way impaired.

Symptoms.—The chief symptom of orchitis is pain. On account of the unyielding nature of the tunica vaginalis, the testicle swells but slowly, requiring several days to attain its full size. But the pain of the inflamed gland, tightly bound down by its fibrous envelope, is instant and excruciating. This pain has been compared to nephritic or hepatic colic. It cannot be relieved by position, and is greatly intensified by the slightest touch upon the inflamed organ. It is accompanied by marked general symptoms; chills, fever, vomiting, sleeplessness, etc. The testicle retains its ovoid shape, and the epididymis is not distinguishable from the rest of the tumor; the scrotum is often œdematous, swollen, and red.

The disease usually terminates by resolution, the pain subsiding gradually, the tumor disappearing more slowly, after which the testicle may or may not atrophy. Abscess may occur and may prolong the attack indefinitely, while the onset of gangrene is announced by sudden cessation of the pain without relief of the other symptoms.

Diagnosis.—Orchitis is distinguished from epididymitis by its cause, and by the great disparity between the severity of the general symptoms and the intensity of the pain on the one hand, and the slight degree of swelling on the other.

Treatment.—An adult with mumps should be kept in bed during the first days of the disease, with testicles well supported in order to prevent orchitis. When the attack is once on little can be done in the way of treatment, except to ameliorate symptoms and to prevent abscess or gangrene. For internal medication jaborandi is the only drug that bears any reputation. Locally, poultices and guaiacol should be employed as in epididymitis. If these fail to relieve pain the tunica albuginea should be divided subcutaneously. A sharp-pointed tenotome knife is introduced through the skin, and then made to cut the tense fibrous capsule, while the testicle is steadied in the other hand. From three to six short cuts should be made at different points in the tunic. This relieves the pain almost instantaneously. If abscess forms it should be incised and drained, while gangrene demands castration.

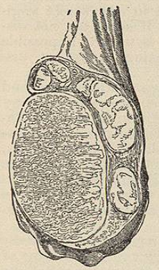

FIG. 4257.—Tuberculous Epididymitis.

XXIV. TUBERCULOSIS OF THE TESTICLE.—Tuberculosis of the testicle occurs under two forms: diffuse, miliary tuberculosis, part of a general miliary tuberculosis, and circumscribed tuberculosis; only this latter concerns us here (Fig. 4257). It occurs as one or more tuberculous deposits, appearing usually in the epididymis and affecting the testicle only secondarily. It may or may not be accompanied by pyogenic infection.

Etiology.—The recognized causes of epididymal tuberculosis are the tuberculous predisposition, the existence of a tuberculous focus elsewhere in the body, and a local trauma or inflammation, precedent or persistent. Of these causes the first is ascertainable almost always, the second sometimes, and the third rarely. The efficient cause of the disease is the tubercle bacillus. The belief is gradually gaining ground that tuberculosis of the genital organs habitually begins in the epididymis, and thence extends in one direction to the testicle, in the other to the vesicle and prostate. The opposite view, that the inflammation begins in the prostate or in the vesicles, has the authority of Kocher, of Lancereaux, and of Guyon, and to this view I am inclined to adhere. For I have often seen tuberculous prostatitis and vesiculitis without tuberculous epididymitis, and yet, having examined the urine of every case of tuberculous epididymitis that has come under my observation, I have never failed to find urinary evidences of prostatic congestion. Moreover, I have often found manifestly tuberculous nodules in the internal genitals and sometimes tubercle bacilli in the urine; while, finally, the affection of the opposite testicle which so often follows not long after the primary inflammation, is explicable only on the theory of transmission through the internal seminal tract. Thus, while it is patent that in many cases tuberculous epididymitis is the only striking evidence of tuberculosis in the individual, the disease is none the less systemic, and patient investigation will usually disclose some lesion of the prostate and sometimes an unsuspected disease in the kidneys or in the lungs.

I do not believe that genital tuberculosis can be acquired in coitus. The inflammation is most common in the third decade of life, and very rare before the fifteenth and after the fiftieth year.

Morbid Anatomy.—The discrepancy of opinions as to whether the tuberculous deposit begins in the tubules of the epididymis or in the intertubular tissue apparently has some connection with the views of the pathologist as to the primary or the secondary nature of the epididymal lesion. However this may be, the disease, as seen by the clinician, appears in an acute and a chronic form.

Acute tuberculosis is manifested by general swelling of the testis and epididymis with an accompanying hydrocele, considerable tenderness, and the fever and night sweats that go with acute tuberculosis. These cases of so-called galloping or fulminating tuberculosis of the testicle are apparently attributable to a mixed infection; they appear and extend rapidly and reach the stage of suppuration within a few weeks.

The chronic form of the disease may appear as such or may follow upon the subsidence of an acute tuberculosis. In this condition there is little or no hydrocele or inflammation of the testicle; while in the epididymis and in the vas are found rounded nodules of tuberculous inflammation, small, hard, and caseous, or fluctuating and purulent.

The urinary organs are often infected either primarily or secondarily, although the lungs are frequently spared. Thus even on autopsy Kocher found only ninety-five cases of pulmonary tuberculosis among four hundred and fifty-one autopsies on cases of urogenital tuberculosis.

Symptoms.—The patient, a young man with tuberculous antecedents, usually comes complaining of a spontaneous enlargement of one testicle. Exceptionally, the enlargement may be a persistence of an acute gonorrhœal epididymitis; more frequently it has appeared during the course of a chronic gleet of long duration, though often enough there is no obvious cause for the swelling.

The history may be acute, in which case the testicle will be found considerably enlarged, with much fluid in the tunica vaginalis, aspiration of which reveals an enlarged testicle surrounded by a lumpy, œdematous epididymis, the vas deferens of which is enlarged and perhaps nodular. All of the inflamed areas are rather tender to the touch.

On the other hand, if the attack is a chronic one, the general aspect of the organ is normal, while in one or more parts of the epididymis or of the vas tuberculous