serous infiltration (first described by Pott) constituting infiltrated hydrocele. Scarpa has described it as a simple œdema. Boyers recognizes it as a special form of hydrocele. Vidal doubts its existence, and Pitha never saw it. It is very rare. Curling believes it may occur in general anasarca, and saw it once complicating acute orchitis. It is mainly interesting from its liability to be confounded with omental hernia. The symptoms readily differentiate it from ordinary hydrocele.

Symptoms.—The swelling is uniform, round, and smooth, the infiltration occupying the meshes of the connective tissue; toward the base there may be one large cavity. There is no communication with the cavity of the tunica vaginalis propria. Enlarged inguinal glands or any obstruction to the return of blood from the testis, may act as causes. The swelling ceases, according to Pott, just where the vessels enter the testicle, the latter organ being isolated from the general swelling. The tumor becomes more cylindrical in shape in the supine position, but it does not disappear. Pressure makes it recede upward slightly, but it returns in any position of the patient. The penis never appears so much retracted as in simple hydrocele of equal size.

Diagnosis is with omental hernia. The latter, however, when reduced, will remain in the abdomen until the patient stands up, while the hydrocele will return in any position (Pott). The surface is firmer in epiplocele, and the swelling larger above than below. Hydrocele is not so entirely reducible, and receives no impulse on coughing. In irreducible epiplocele the diagnosis is difficult, at times impossible. Fluctuation can be felt at the bottom, but not at the top, of diffuse hydrocele. The enlargement extends to the ring. The shape is rather pyramidal, but can be somewhat altered by pressure.

Treatment.—Palliative punctures may be made at the bottom of the swelling. Large incisions are dangerous. Pott lost a case in this way. When a diagnosis with omental hernia is impossible, and an operation seems advisable, an exploratory incision may be practised.

ENCYSTED HYDROCELE OF THE CORD.

Cysts may form along the cord in the habenula (remains of peritoneal process from the abdomen to the tunica vaginalis) when its occlusion has been imperfect at certain points. The "hydrocèle en chapelet" of Cloquet is so formed. Again, cysts may be developed at any point along the cord, in its connective tissue, or in the meshes of the tunica vaginalis communis. They vary in size from a pea to a hen's-egg, or larger. They are usually tense, smooth, oval, the long diameter parallel to the axis of the cord, translucent, sometimes fluctuating, although the tension of the cyst usually makes this sign valueless. Pain is absent or insignificant. The cysts usually occur between the external abdominal ring and the testicle, but may also be found in the inguinal canal. In the latter situation it is sometimes impossible to distinguish such a tumor from in complete inguinal hernia, without an exploratory herniotomy. When the cyst occupies this position, whether in the male on the cord, or in the female on the round ligament, unnecessary fear and anxiety are often excited in regard to hernia, and a truss or some other retaining bandage is usually applied. This always gives rise to pain, and considerably aggravates the trouble.

Treatment.—For large encysted hydrocele of the cord, injection, as in simple hydrocele, is the best treatment. Injection is inadmissible when the cysts are strung out and communicate, as the result would be necessarily imperfect. For small cysts, whether single or multiple, incision is the best treatment, care being taken to avoid wounding the constituents of the cord. Incision is indispensable for cysts situated within the inguinal canal, or where there is any doubt as to hernia. A fine seton may be used successfully in most cases external to the ring, where the cyst is small, the thread being left in till inflammation has consolidated the tumor. The patient need not keep his bed, but should wear a suspensory bandage.

Hæmatocele of the cord is rare, but may occur in the same way as hæmatocele of the tunica vaginalis, usually after injury. Indications for treatment are the same.

CHAPTER XXIV.

DISEASES OF THE TESTICLE.

Inflammation.—Orchitis.—Causes.—Symptoms.—Pathological Changes.—Prognosis.—Treatment.—Epididymitis.—Frequency and Date of Appearance in Gonorrhœa.—Causes.—Symptoms.—Sterility as a Result of Epididymitis.—Diagnostic Table of Orchitis and Epididymitis.—Treatment of Epididymitis.

Inflammation of the testicle may be limited to the epididymis (epididymitis), or may attack the secreting structure alone (orchitis). This has been explained by the fact that the arterial supply is different for the different constitutents of the testicle. Sometimes both parts inflame simultaneously—as after injury. The secreting structure may become secondarily involved by a simple inflammation commencing in the epididymis, but the latter rarely suffers in connection with primary, true orchitis. The sub-serous connective tissue of the tunica vaginalis being in direct continuation with the connective tissue of the epididymis, in the vast majority of cases of epididymitis also becomes inflamed, constituting peri-orchitis, or acute hydrocele. Peri-orchitis, on the other hand, is rarer with inflammatory orchitis, since the dense structure of the tunica albuginea keeps an inflammation originating on one side of it from being rapidly transmitted to the other.

ORCHITIS.

Causes.—True orchitis is very uncommon. As complicating mumps (so-called metastatic orchitis) no rational theory has been advanced to account for it. Observation abundantly proves that it occurs in at least five per cent. as a complication of mumps in young adults, and the fact must be accepted without explanation. It has been noticed, indeed, during the prevalence of an epidemic of mumps, that cases of orchitis occur spontaneously in some patients whose parotids escape.[1] Orchitis due to mumps is most often observed at about the age of puberty. It comes on near the end of the first week of the mumps, and is usually confined to a single testicle. The epididymis is perhaps also involved, but may escape. The affection runs a quick course of about a week or ten days, very rarely terminates in suppuration, usually subsides without leaving any impairment of the organ behind, but is sometimes followed by atrophy. Orchitis, after severe injury to the testis, is not uncommon. It tends to terminate in abscess or gangrene, and to be followed by atrophy, with loss of function of the organ. Orchitis as a result of cold is possible.

Case XXX.—A young gentleman, in perfect health, one summer evening sat out upon his door-step, and felt the cold stone through his pantaloons as his testicles rested upon it. The following day acute true orchitis of the right side set in, and passed through its regular stages without suppuration. Complete atrophy followed. The swelling continued to decrease in size, until nothing but the stump of the epididymis was left attached to the cord. The other testicle escaped. Afterward the remaining healthy testis became the seat of epididymitis during the course of a gonorrhœa, greatly to the patient's alarm, but this swelling subsided in due course, and got well without harming the testicle in any way. The patient afterward married, and impregnated his wife.

Sometimes orchitis comes on in children, and even in adults, where no sufficient cause can be assigned. Excessive sexual excitement has been adduced as a cause. Very rarely orchitis complicates variola or typhoid fever. A low grade of true orchitis, located in the fibrous covering of the organ, is liable to attack gouty individuals. Orchitis may come on secondarily during epididymitis. Occasionally, especially in the old or enfeebled, true orchitis originates spontaneously in patients having chronic inflammatory urethral or prostatic disease.

Case XXXI.—In 1868, a gentleman of seventy-five, with an enormous prostate, who had been obliged to employ the catheter constantly, for many years, in order to empty his bladder, failing in health during the cold of winter, was suddenly seized with a swelling of the right testicle, which became exceedingly painful, but not very large. The swelling remained stationary for a number of days, when the patient had a sharp chill. After a few days more the organ began to grow larger, the scrotum adhered in front, fluctuation became apparent, and an incision gave exit to a large collection of matter from the substance of the testicle. In 1872, the testicle was considerably atrophied, and a fistula remained. The patient died of apoplexy in 1873.

Case XXXII.—In 1870, a gentleman of very gouty habit, who also had enlarged prostate, was attacked by a subacute cystitis of the neck of the bladder, and ran down in health. He was obliged to continue the use of his catheter. Both testicles swelled, one shortly after the other, and, after much pain and suffering, abscesses formed in the substance of each. The epididymes and tunicæ vaginales were also, in this case, simultaneously affected with the secreting structure of the testis.

[1] *Medical Times and Gazette*, vol. xix., p. 512.

Symptoms.—In true orchitis the increase in size of the testis generally advances rather slowly, and seldom becomes considerable until the affection has lasted a length of time. This is accounted for by the unyielding nature of the albuginea, and the fact that there is usually no effusion into the tunica vaginalis. The pain is explained in the same manner. It is often excruciating, and always out of proportion to the amount of swelling. It has been compared to that of nephritic or hepatic colic. No position gives rest, and any handling of the organ is liable to induce syncope. The irritated cremaster contracts upon the sensitive testis, and draws it up toward the groin. The pain continues high for several days, and then gradually becomes more bearable, or it may suddenly cease altogether. This last circumstance is gratifying only to the patient. The surgeon learns it with regret, for he knows that it means mortification of the organ.

The shape of the testicle is rarely altered in orchitis; it is smoothly, regularly ovoid. The epididymis is not distinguishable from the rest of the tumor. The organ feels peculiarly indurated, the natural elastic feel having entirely disappeared. The scrotal tissues are often red, swollen, œdematous, inflamed. There is a strong tendency to suppuration or mortification, the latter marked by a sudden cessation of pain. The former is often announced by the occurrence of chill. After the chill the testicle commences to enlarge more rapidly, the scrotal tissues adhere to its surface, and, after a period longer or shorter, according to the depth at which the matter forms, a soft, fluctuating spot, surrounded by indurated borders, indicates clearly the position of the purulent collection. After the pus has escaped, all the severity of the symptoms abates, unless a second purulent collection exists in some other part of the gland. The flow of pus gradually diminishes. As it decreases, the swelling subsides, and partial or total atrophy of the testicle ensues, with perhaps a fistula remaining open for years. Sometimes exuberant granulations grow up out of the opening, forming a cauliflower excrescence (hernia testis), which may reach considerable size, and, growing as it does out of an enlarged, hardened testicle, perhaps at this stage irregularly lumpy, and containing some softer spots, while at the same time the glands in the groin may become enlarged, hardened, and tender, and the general health decline—all this array of symptoms is very liable to give rise to a suspicion of cancer—a suspicion which the result does not justify.

Sometimes an abscess forms centrally in true orchitis, and never comes to the surface. In such a case the symptoms run a despairingly slow course, but the hard and tender organ gradually reduces in size, undergoes chronic inflammatory induration, while the purulent collection

gradually becomes solidified, surrounded by a tough capsule; perhaps cretifies and so remains indefinitely, the function of the testicle being destroyed, unless the purulent collections have been very small. A somewhat similar state of affairs may succeed deep abscess, which has discharged and remained fistulous for a considerable time. These testicles remain long the seat of chronic pain, and are liable to repeated outbreaks of inflammation.

Pathological Changes.—On section, it is usual to find a concrete mass of more or less solidified pus in some portion of the organ, surrounded by a distinct fibrous capsule, while the contiguous structure of the testicle is modified by chronic inflammation, perhaps degenerated into a fibrous mass. Concrete pus is distinguishable from cheesy tubercle in that the latter usually lies not encapsulated in direct contact with the seminal tubules, which, though atrophied by pressure, are in other respects sound. The yellowish, gummy (syphilitic) tumor is distinguishable from concrete pus in not being (strictly) encapsulated, being usually homogeneous, consistent, tough (not friable, like concrete pus), and being infiltrated through the convoluted tubes.

Terminations.—When orchitis terminates in gangrene, after adhesion of the scrotum, the slough makes its way through the skin, and is found to be not black, or brown and fetid, like an ordinary slough, but yellowish, dry, and soft. It is a sort of dry gangrene, a necrosis, as Ricord calls it, and the slough may be pulled away in long filaments, constituted by the dead seminal tubules. Finally, two other terminations of orchitis are encountered:

1. Resolution, with a return of the organ to its full functional power.
2. Atrophy, without either necrosis or suppuration.

The general symptoms in true orchitis are marked, often severe: slight chills, pretty high fever, anorexia, nausea, vomiting, hiccough, constipation, sleeplessness, anxiety, great nervous irritation. The general symptoms have been compared to those of strangulated hernia, and, indeed, there is strangulation of the testicle within its tight, fibrous sheath.

Prognosis is always grave; the most energetic treatment is called for, to keep off impending destruction of the organ.

Treatment.—Rest on the back in bed, with the testicle supported in a sling, is essential to even moderate comfort. The patient needs no urging to keep him lying down. If the case is seen early, some of the large scrotal veins should be opened, and the bleeding encouraged, by causing the patient to sit in a hot bath, or ten to fifteen leeches may be applied in the neighborhood of the abdominal ring. If seen at the very commencement, it might be allowable to try the constant application of ice-water in bladders, but this expedient has little or no influence over inflammation once under way in the testicle. The constipation which always exists should be combated. The testicle may be enveloped in

strong belladonna-ointment, or a paste composed of powdered opium and glycerine, or, if the pain be not too excruciating, in a light tobacco poultice. In short, the organ must be narcotized and held suspended by an appropriate sling, so that the venous blood may be assisted in draining out of it. The diet should be low, non-stimulating, easily digestible. The early employment of these means gives the testicle its best chance. If in spite of them the symptoms fail to abate, in short, on the slightest suspicion of impending gangrene, or in any case where the symptoms run very high, it is wise to resort without delay to subcutaneous section of the tunica albuginea, to take off tension from the strangulated parts within. This simple operation is readily performed with a sharp tenotomy-knife introduced through the skin, and then made to cut the tense fibrous capsule, while the testicle is steadied in the other hand. The incisions should be carried fairly through the tunica albuginea, several short cuts being made at different points on the surface of the testicle (three to six), not over two or four lines long. In this way the tension being relieved, the pain will usually cease, and a continuance of the means above enumerated will probably lead to resolution. If abscess form, puncture should be made on the first appearance of fluctuation. In sphacelus, carbolized water-dressings are advisable.

Nature and time alone are able in many cases to close a fistula of the testicle, left behind by the opening of an abscess. All that art can do is to make the opening a depending one, slit up sinuses, keep the parts clean, apply some stimulating lotion or injection to the sinus, and build up and maintain the patient's general health.

In benign fungus (hernia testis), besides the above means applied to the opening from which it grows, the mass itself may be cauterized, cut or tied off, subjected to pressure by adhesive straps, or, preferably, after other diseased conditions have been subdued, the edges of the wound may be incised, freshened, and united by suture after the fungus has been replaced (Syme). Fungus should never be pulled upon, for fear of drawing out the entire contents of the testicle.

In severe, long-standing cases, where a testicle is the seat of chronic induration full of fistulæ, or with large, obstinate fungus, castration is advisable, sometimes necessary, in order to remove from the patient a source of physical irritation, and to save him from serious injury to the general health.

EPIDIDYMITIS.

Epididymitis is the most common of all the diseases of the testicle. It occurs at all ages, most frequently during early adult life, and middle age, since its chief cause—urethral inflammation or irritation—most commonly exists during these periods of life. It has an acute form, but is very prone to run into the chronic state, and may be subacute from the first. It habitually terminates in resolution, rarely in abscess. One attack predisposes to another. It is often double, but the two testicles

are very rarely simultaneously involved, one usually precedes the other by a number of days, or weeks, after which the disease sometimes returns to the testicle first invaded, chiefly in badly-managed cases. Fournier[1] has never seen double simultaneous epididymitis, but that it may occur is proved by the following (personal) case:

Case XXXIII.—An old gentleman with retention from enlarged prostate, in the fall of 1871, shortly after beginning the habitual use of the catheter, was attacked with mild double epididymitis, both inflammations commencing, running their course, and terminating simultaneously.

Although the epididymis bears the brunt of the disease, it rarely suffers alone, except in very mild or chronic cases. In all acute attacks the tunica vaginalis is more or less involved, giving rise to acute hydrocele, and sometimes the secreting structure of the testis takes fire as well. One particularly interesting feature of the disease is the fact, mainly brought out of late years by Gosselin, that the chronic induration so often left behind in the epididymis by inflammation sometimes blocks up the tubes sufficiently to prevent the passage of the spermatic elements, thus entailing temporary and sometimes permanent sterility, without an accompanying loss of sexual power.

Frequency of Epididymitis and Date of its Appearance in Gonorrhœa.—Fournier states that epididymitis occurs about once for every eight or nine cases of gonorrhœa. In some individuals there seems to be a predisposition, so that every attack of the latter, notwithstanding the utmost care, is invariably attended by swelled testicles; while others, regardless of all hygienic precautions, go around with a raging gonorrhœa, employing perhaps no treatment, continuing sexual intercourse, and the abuse of alcohol, not even supporting the testicle with a suspender, and yet they escape. Fournier saw it develop, on the other hand, in a gonorrhœal patient with typhoid fever, who had not put his foot to the ground for six weeks. Here the generally shattered condition of the patient, brought about by typhoid fever, probably acted as a predisposing cause. It may, however, be stated dogmatically, that while a gonorrhœa of itself will sometimes, in spite of all precautions, occasion swelled testicle, yet this complication is not apt to ensue if the patient wear a suspensory bandage, abstain from violent or jolting exercise (horseback, dancing), and avoid bodily fatigue and efforts at lifting. Above all, sexual excitement or indulgence, and the use of alcohol in any shape, must be interdicted. The passage of instruments through a canal subject at the time to gonorrhœa is a sufficient cause for epididymitis. The power of the suppressive treatment of gonorrhœa by strong injections early in the disease, although somewhat active, has been overrated. It should, however, be borne in mind. Balsams and terebinthinates internally cannot give rise to the affection.

[1] Art. "Blennorrhagie," "Dict. de Méd. et de Chir. prat.," p. 211.

The remarks already made concerning the liability to epididymitis in gonorrhœa apply with about equal force to cases of stricture. Some patients suffer from the worst of the inflammatory sequences of stricture, but the testis escapes; while in other cases, perhaps of mild type, one or the other epididymis will be constantly falling into trouble on the slightest provocation, until the normal condition of the urethra has been restored. The treatment of stricture by instrument may itself originate epididymitis.

As to the date of occurrence of gonorrhœal epididymitis, Fournier has a personal tabulation of 222 cases, of which there occurred—

In the first week	0	Making in the first month	86
" second "	22	" second "	78
" third "	34	" third "	22
" fourth "	30	" fourth "	6
" fifth "	29	" fifth "	6
" sixth "	19	" sixth "	4
" seventh "	9	" seventh "	3
" eighth "	21	" eighth "	3
		" ninth "	4

later 10, of which in the seventh year 1; most of the latter cases depend evidently upon stricture.

De Castelnau's exhibit,[1] derived from the statistics of four surgeons, shows a total of 239 cases, of which there occurred—

In the first week	16	In the fourth week	39
" second "	34	" fifth "	54
" third "	24	" sixth " and later	72

Unfortunately, this "and later" is deceptive, since it includes all cases of epididymitis due to stricture.

It is probable that, as a rule, the time for the occurrence of epididymitis in gonorrhœa has been set down a little too late. In every-day practice it is perhaps nearly as common to find this complication before as after the sixth week. In a general way it may be laid down that epididymitis is to be looked for mainly from the third to the eighth week of gonorrhœa.

Causes.—Nearly all the causes enumerated as capable of producing orchitis may also exceptionally give rise to epididymitis: traumatic violence, cold.

Case XXXIV.—In 1869, a coachman, driving during a cold rain, sat for some hours in a pool of cold water, which collected upon the leather cushion under him. On the following day he was attacked by a perfectly characteristic epididymitis, which ran the usual course, without affecting the secreting portion of the testicle, and terminated in resolution.

Prolonged sexual excitement has been enumerated, and gout, but

[1] Quoted by Bumstead.

urethral inflammation or irritation is by far the most active cause. The most common form of this irritation is gonorrhœa, or urethritis, then stricture, finally any prostatic or urethral irritation, the passage of instruments, especially through a urethra already affected by mild chronic inflammation or stricture, but occasionally where no appreciable disease exists, the use of the lithotrite, cutting operations for stone, retention of a small calculus or stone fragment in the prostatic urethra; in short, any inflammatory affection of the prostatic sinus around the orifices of the ejaculatory ducts.

It is probable, with all this last series of causes, that the mechanism of the cause is identical; namely, that the prostatic sinus in the neighborhood of the orifices of the ejaculatory ducts first becomes inflamed, if only slightly, and that the inflammation, starting there, travels rapidly down the continuous mucous membrane of the vas deferens to the epididymis, where it locates itself. That this is sometimes the method of propagation is demonstrable by the course of the symptoms, and by the traces of inflammation occasionally found in the vas deferens after death; but in the vast majority of instances the inflammation, passing rapidly through the vas deferens, announces its course by no symptoms, and leaves no vestige of its presence behind. This has induced Brown-Séquard to deny that epididymitis is a transmitted inflammation, and to claim that it is a reflected irritation. He draws a comparison between the passing of a sound through a seemingly healthy urethra, or an inflammation existing in the canal, and the subsequent epididymal swelling, and ulceration of the small intestine after extensive peripheral burns. Fournier has cautiously emitted the theory that epididymitis may be a specific gonorrhœal affection of the rheumatic type, like the gonorrhœal (rheumatic) affections of the eye; still this would fail to account for epididymitis from the passage of an instrument or the lodgment of a stone fragment. To sum up briefly, the theory most plausible and best borne out by observed facts is, that epididymitis from urethral inflammation or irritation is a direct but sudden transmission of inflammation over a continuous membrane, from the orifice of an ejaculatory duct to the epididymis. This is further supported by the following facts: Epididymitis from gonorrhœa rarely comes on early in the disease, unless instruments or irritating injections have been used, but occurs toward the end of the causing malady, just when the latter occupies the lower end of the urethra. The mucous membrane behind a tight stricture is always more or less inflamed, and this inflammation is liable at times, in bad cases, to run backward and affect the neck of the bladder. Under these circumstances, mild, continuous forms of epididymitis are not uncommon. The deeper down the urethra the stricture lies, the more apt is epididymitis to complicate it. Instrumental interference, or the retention of a stone fragment in the forward parts of the urethra, is very rarely attended by epididymitis, while this complication is not uncommon when the same irritation is applied to the prostatic portion of the canal.

Symptoms.—Epididymitis may come on in an acute or a subacute form, the latter where the epididymis has previously suffered from a similar attack. First attacks, like first attacks of gonorrhœa, are usually the most severe. Epididymitis is ushered in by premonitory symptoms which precede the swelling by some hours. Gonorrhœal or gleety discharge is usually not visibly modified until after the testicle begins to swell. Then it becomes lessened, perhaps stops, to return again as soon as the inflammation of the epididymis is fairly on the decline.

A vague uneasiness is felt in the testicle, and along the cord up into the back, as if the cord were being pulled upon. Attentive patients will frequently aver that the pain was noticeable in the groin for some hours before any uneasiness was experienced in the testicle. This forerunning inguinal pain is rarely absent where the epididymitis is of urethral origin—except in hospital patients, who are unintelligent observers. There is usually only a slight painful tension in the groin, but sometimes it is very severe, extending around to the lumbar region, and up the back. Sometimes there is a sense of weight in the perinæum, frequent desire to urinate, with perhaps pain and difficulty in the act. Occasionally a chill, with febrile action, will usher in the affection, but these symptoms are far more constant with orchitis.

Whether any of the foregoing symptoms have attracted attention or not, within a few hours decided pain is felt in the testicle, attended by a rapid increase in size. The amount of pain and swelling varies in different cases. In the subacute form of patients with stricture, the swelling is moderate, comes on rather slowly, palpation at once distinguishes the heat, sensibility, and hardness of the epididymis, and that the testicle itself is less affected. Peri-orchitis is absent, or not marked. There is but little, if any, fluid in the tunica vaginalis, or it may be felt loosely in the sac, not causing any considerable distention. With such mild cases there are no general constitutional symptoms, and the pain is not excruciating. It is aggravated by the erect posture, but wholly disappears after the patient has been on his back, with the testicle elevated, for a few moments. The scrotal structures escape implication.

But the picture changes vastly for the onset of an acute attack. The swelling commences promptly, and increases with rapidity. First it is localized posteriorly, but soon the subserous connective tissue of the tunica vaginalis carries the inflammation to the latter structure, which rapidly inflames, pouring out a plastic material upon its surface, and a sero-sanguinolent fluid into its cavity, which becomes rapidly tense and distended, greatly adding to the pain. The secreting structure of the testicle is often distended fully with blood, but is not the seat of any pathological changes. The scrotal tissues inflame and become œdematous, large veins sometimes appearing on its surface. Yet, even under