use of the steel sound is often followed by marked benefit, although it may temporarily seem to aggravate some of the symptoms. In these cases the sexual element must be attended to in some way, while the best effects are often produced by a cessation from business cares, traveling a few weeks in the country, or a course of baths at some watering-place—the character of the water being a matter of small importance.

CHAPTER XIII.

DISEASES OF THE BLADDER.

Acute Cystitis.—Gonorrhœal Cystitis.—Diagnostic Table of Cystitis of the Neck and Prostatitis—Pathological Lesions in Cystitis.—Treatment.—Chronic Catarrh of the Bladder.—Atony of the Bladder.—Paralysis, Heterologous Deposits, and Tumors, in the Bladder-Walls.

Inflammation of the bladder, according to the anatomical portion of its walls involved, is known as—

Cystitis mucosa—catarrh of the bladder.

Interstitial cystitis.

Peri-cystitis; epi-cystitis.

These varieties, however, do not demand detailed and separate descriptions, since they follow one upon the other as grades of intensity of the same morbid process. Thus, it may be said that no form of bladder-inflammation can exist alone, except that affecting the mucous coat. *Epi-cystitis* may do so, but only as a peritonitis involving the outside covering of the viscus. Vastly the greater proportion of morbid causes acting to produce bladder-inflammation in the male exert their influence directly upon its mucous membrane, and consequently the modality assumed by the inflammation is that of catarrh of the free (mucous) surface. If, now, from long continuance or great severity of the catarrhal inflammation (formation of ulcers and sloughing), the morbid action should extend deeper and involve the connective tissue of the walls of the bladder, the cystitis at once becomes interstitial, possibly eventuating in abscess. During all this time the catarrhal cystitis keeps up, the interstitial variety being only an extension of the latter. Abscess may form in the bladder-walls, and break externally, without communication with its cavity.

Peri-cystitis is the formation of matter in the connective tissue around and outside of the bladder. This may result from an extension of interstitial cystitis, or may, and usually does, depend upon infiltration of urine, or external violence. The diagnosis presents no difficulties. The affection occurs after great mechanical violence to or in the region of the bladder, from infiltration or as a result of long-continued interstitial cystitis. In peri-cystitis a point of suppuration will be found sooner or later outside of the bladder.

During *interstitial cystitis* the bladder gradually contracts down, undergoing concentric hypertrophy; its walls thicken enormously, possibly reaching the thickness of an inch. Abscess may form in them; its cavity becomes nearly obliterated, perhaps down to half an ounce; incontinence ensues; the mass, like a hard, smooth, wooden ball, may be felt in the hypogastrium, or from the rectum, of a size varying with the duration of the disease. It may be as large as a man's first. It is not necessarily very sensitive to pressure, and is smooth and of even hardness on its surface. This condition of bladder-disease is not curable. Its walls cannot be redilated. Palliation is the treatment.

Inflammation of the bladder is not found as an idiopathic essential disease; that is, it does not occur except through the intervention of some cause acting locally. Thus, the effect of cold, so active in producing catarrhal inflammation of certain mucous membranes (conjunctival, Schneiderian, gastric, intestinal), is powerless to excite inflammation in a healthy bladder, however active it may be in kindling an existing congestion, or chronic inflammation, into an acute state. The apparent exception to this rule, found with certain acute diseases, and with paralysis from spinal or brain lesions, is explained by recognizing the local effect of over-distention, or of acid or retained (decomposing) urine (Case XXVI.). Gonorrhœal cystitis is a complication, not an essential disease. In cheesy tubercle and cancer, as well as in diphtheria, there must be a local deposit in the bladder-walls before cystitis comes on. The nearest approach to an essential cystitis, if it may be so called, is found in that form produced by an overdose of cantharides. This substance has the power of directly congesting the vessels of the neck of the bladder and prostate—and such a cystitis could hardly be called idiopathic.

From the foregoing it is evident that acute cystitis does not occur spontaneously, and is an exceedingly rare affection, except as an exacerbation of already-existing chronic disease, or from traumatic causes, mechanical or chemical (irritating urine). Chronic cystitis, on the other hand, is very common, so much so that there are few diseases of the urinary passages of which it does not form a part. Chronic cystitis, moreover (unlike many other chronic inflammations), rarely commences as an acute disease, but is chronic from the first, becoming afterward acute, from time to time, by the action of provoking causes. Chronic cystitis, therefore, would naturally demand consideration first, but, for convenience of description, the artificial order is adopted.

ACUTE CYSTITIS.

The causes of acute cystitis are fourfold:

1. Traumatic, mechanical, or chemical.

2. Extension of inflammation (gonorrhœa, inflammation of prostate, neighboring abscess).

3. Exacerbation of existing chronic inflammation.

4. Specific action of drugs (cantharides).

1. *Traumatic Causes.*—Any thing capable of doing mechanical violence to the bladder-walls, especially to its mucous membrane near the neck, may occasion acute cystitis. The rough use of instruments, as in crushing stone; wounds of the bladder-walls by mechanical objects, or fracture of pelvis; the presence of stone; pressure of a neighboring tumor. In the last two cases some chronic cystitis always precedes its acute manifestation: mechanical distention from retention caused by stricture, acute febrile disease, coma, or paralysis, acting in conjunction with altered urine; chemical violence, irritating injections, very acid and concentrated urine—all these act as traumatic causes.

2. *Extension of Inflammation.*—As in gonorrhœal cystitis, prostatic inflammation, neighboring abscess. Here, also, chronic inflammation, perhaps of short duration, appears first.

3. *Exacerbation of existing chronic inflammation* from the effect of cold, acid urine, rough treatment by instruments, spontaneous increase of symptoms depending on neuralgia of the vesical neck, a diphtheritic patch of membrane, etc.

4. *Cantharides, terebinthinates, etc.*, acting specifically.

Symptoms.—The symptoms of acute cystitis are the same, whether the affection be primary or engrafted upon an already-altered state of the local circulation. The calls to urinate are frequent and imperative, by night and day. The feeling of relief after micturition is absent. The act is accompanied by smarting pain, with tenesmus. Pain of a heavy, burning character is felt in the perinæum, and above the pubes, radiating thence, perhaps, to the end of the penis, to the loins and back, or down the thighs. The urine contains pus in greater or less quantities, at first evenly distributed through the fluid, then voided as stringy mucus (whence the name catarrh). Portions of bladder-wall may slough from the intensity of the inflammation, in which case the urine contains shreds of sloughy tissue, gases, etc., and has a gangrenous odor. The reaction of the urine, at first acid or neutral, becomes alkaline. Triple and amorphous phosphates are found deposited in excess. Blood appears in the urine in greater or less quantities, perhaps pure and liquid, or in clots. There is rarely a chill, but fever may run high, with all its accompanying symptoms, dry tongue, great restlessness, jactitation—hiccough, if gangrene be present. Mental inquietude, apprehension, anxiety and distress, are prominent features of acute cystitis, and are never entirely absent.[1]

[1] It may be observed that cystitis, when acute, is a much more grave disease than when in the chronic form, especially if it extends from the neck so as to involve the body of the bladder. Toward the end, in a case which is to terminate fatally, constant but unavailing efforts at urination are a prominent feature.

Acute cystitis, from whatever cause, presents the above general group of symptoms. A few words of special detail are necessary regarding the gonorrhœal form.

Gonorrhœal Cystitis.—This affection comes on during the existence of gonorrhœa, or urethritis, or even of a gleet—if the gleet depend upon the stricture—by direct continuation of the inflammation backward upon the mucous membrane. The inflammation is confined to the region of the neck, and does not attack the body of the bladder. It never appears until after the first week of a gonorrhœa, rarely till after the third week, when the urethral inflammation has reached the lower portions of the canal. It is more frequently seen in practice as a result of simple extension of inflammation later in the course of the disease. Often, however, a second or provoking cause has been in action, and without its assistance the complication of gonorrhœal cystitis might have been escaped. These provoking causes are any thing which will irritate the urethra; the use of alcoholic beverages, sexual intercourse, abortive treatment of gonorrhœa, catheterism, jolting, violent or even sometimes moderate exercise, where the urine is acid, and the patient nervous and excitable. Any of these causes may light up a mild cystitis of the neck in any patient with urethritis.

Symptoms.—The symptoms of gonorrhœal cystitis vary from a hardly appreciable irritability—with congestion—up to the very highest grade these symptoms (of irritability) can assume, with a tenesmus so constant as to amount to actual incontinence, the patient voiding a few drops of blood or milky fluid every few minutes. The tenesmus is particularly painful, although the mere passage of urine is often attended by great pain. The pus, or blood, flows most abundantly at the end of the stream. A noteworthy feature of gonorrhœal cystitis is the absence of general phenomena. Fever is sometimes inappreciable, and rarely runs high. Anxiety, *malaise*, and nervous distress, are, however, disproportionately prominent. Constipation is habitual. The urethral discharge becomes greatly lessened, or even disappears on the advent of the bladder-symptoms; as the latter disappear, however, the former returns. The habitual duration of the malady, suitably treated, is four or five days for mild cases, a fortnight for the more severe. As a rule, no functional disturbance is left behind by this affection, nor does it predispose to any more serious lesion of the bladder's neck or vicinity.

The only affection with which gonorrhœal or other acute cystitis of the neck is liable to be confounded is prostatitis. The two may be not infrequently combined, but, when separate, the distinction is easy. The following comparative table, from Fournier,[1] shows the characteristic differences:

[1] "Dict. de Méd. et de Chir."

Cystitis of the Neck.	*Prostatitis.*
1. Characteristic vesical tenesmus, frequent uncontrollable calls to urinate.	1. Much less vesical tenesmus. Rectal tenesmus more marked.
2. Micturition particularly painful during the passage of the last drops of urine, when there is a convulsive contraction.	2. Nothing similar.
3. At the end of micturition excretion of a thick fluid—a mixture of pus and blood—often a flow of pure blood.	3. Nothing similar. Urine normal.
4. Simple perineal sensibility; pains irradiating toward the anus much less violent than in prostatitis.	4. Perineal pains deep, very violent, increased by movements, by defecation, etc.
5. Prostate normal.	5. Rectal exploration reveals a prostatic tumor—hard, very painful, etc.
6. No retention of urine.	6. Dysuria, retention of urine.
7. Slight or no general symptoms.	7. General symptoms well marked; fever, anorexia, etc.

That form of cystitis produced by cantharides is really a strangury. Great congestion of the vessels of the bladder's neck exists with constant tenesmus. It is rare to meet cases of this kind at the present day. Older authors refer to them produced by the administration of "love-potions" by "witches." Constant priapismus accompanies the tenesmus, and the result in the worst cases may be sloughing of the penis, and death.

The pathological changes produced by acute cystitis upon the bladder-walls and its membrane are, briefly, capillary injection of the mucous surface, changing the pale, salmon-tint into a brilliant crimson, the color being perhaps uniform, perhaps in patches, with a more or less punctate appearance. There may be ecchymotic spots, purple-colored patches mixed with the red. The mucous membrane is softened and swollen. These changes usually commence at the neck and often remain limited to this locality, but may extend over the whole internal surface of the bladder. The glandular follicles near the neck become involved, enlarged, and surrounded by a red areola. In certain high grades of inflammation, the membrane may be ulcerated, or patches of false membrane encountered. This croupous character has been especially observed in the cystitis caused by cantharides. True patches of diphtheritic exudation have been observed secondarily in the bladder. There may be sloughs of the mucous membrane, or of more or less of the thickness of bladder-walls, or interstitial thickening, with or without abscess (interstitial cystitis), or abscess around the bladder, in which case there will probably be more or less peritonitis.

With these evidences of acute cystitis may be mingled the marks of older chronic inflammation; such as a thickened, condensed, tough structure of the mucous membrane and bladder-walls, colored in purple and red or of a bluish-gray, slate-colored tint; trabeculization, sacculation, ulceration, perhaps pus in or around the bladder-walls; possible gangrenous patches; the mucous membrane may be incrusted with urinary salts, etc.

Treatment.—The treatment of acute cystitis from any cause—gonorrhœa as well—is always the same. It rests firmly, as already indicated for prostatitis (p. 208), upon the tripod of rest in bed, with elevation of pelvis; alkaline diluents; enough anodyne to relieve pain and tenesmus. To these may be added local application of heat. If there be any removable cause (presence of a catheter tied into the bladder), it should be taken away. If the cause be stone or a foreign body, no attempt should be made to remove it until the intensity of the inflammation has been quieted by the means above alluded to. If cantharides, turpentine, or cubebs, is being taken by the patient, it should be discontinued during the acute stage of the affection, to be resumed in the subacute stage. Copaiba sometimes works wonderfully well in quieting acute symptoms, but it cannot be relied upon. Asparagus should not be eaten by a patient with acute cystitis; common salt, strong coffee, and lemon-juice, should be also avoided. There is no occasion for any local or general abstraction of blood, but the medicines and measures detailed at pages 202–203 should be studiously enforced. If the cystitis be a strangury from cantharides, plenty of opium—or camphor in emulsion—and a very free use of diluents, must be relied upon. In all cases repeated use of a full hot bath has a soothing effect—or of the hip-bath. The rectum should be kept free by copious warm enemata, and opiates should be given by the rectum and not the mouth. Absolute rest, with the hips raised, and alkaline diluents, alone suffice in mild cases. If abscess form in or around the walls of the bladder, an opening should be made externally through the hypogastrium, rectum, or perinæum, at the earliest possible moment, to prevent perforation of the mucous membrane, and the possible danger of infiltration.

The key to the treatment of *peri-cystitis* is to open abscess wherever it tends to point, making the opening carefully and very early.

CHRONIC CATARRH OF THE BLADDER.

Of all the affections to which the bladder is subject, chronic catarrh holds the first rank in regard to frequency. It never occurs as an idiopathic affection, but is invariably a secondary result arising from other morbid conditions of the urinary passages. Once started, it does not tend to get well spontaneously, but to become slowly and steadily worse. Fortunately, its causes are well known, and most of them easy of demonstration. Many of these can be removed, and with them the chronic inflammation which they keep up. Some cases are incurable on account of permanent structural alterations in the bladder-walls, or where the cause cannot be reached. All, however, may be benefited by careful

and judicious management, and there are few abnormal conditions of the body whose amelioration is attended by more satisfaction on the part of the surgeon, or more gratitude on that of the sufferer.

Causes.—Almost all the organic diseases of the urinary passages are attended, during some part of their course, by more or less chronic catarrh of the bladder; so much so, that a study of the altered condition of the bladder forms a part of the picture of the disease, and has to be considered with it. Hence most of the varieties of chronic catarrh are disposed of elsewhere under the heads of other diseases. For their study the reader is referred to the proper section (stone, stricture, prostatic disease). All causes of chronic vesical catarrh may be arranged under two grand heads:

1. *Mechanical*, including obstructive prostatic and urethral diseases, stone, morbid growths in the bladder or rectum, or around the bladder, hernia of the bladder, extrophy, retention of urine, sudden taking off of the pressure of accumulated urine from an habitually over-distended bladder, neuralgia of the vesical neck.

2. *Chemical.* Very acid urine (rarely), frequently decomposing, alkaline urine, from the liberated ammonia; urine containing pus, from pyelitis; atony, paresis of the muscular coats and true paralysis, inasmuch as they invariably tend to produce decomposition of the urine by stagnation.

Many, in fact most cases of chronic cystitis, result from the combined action of both mechanical and chemical causes. In obstructive disease from stricture, or large prostate, added to the mechanical stretching, the chemical action of the decomposing urine is always at work. The same may be said of retention. Retention alone, in a healthy bladder, will not necessarily cause cystitis, although it may do so from the mere mechanical violence done by stretching. The constant slight violence due to voluntary retention pushed beyond a normal limit, and often repeated, will eventuate in cystitis. The same holds good of the sudden but extreme retention occurring in coma, shock, the acute fevers, etc., if it be not relieved. In these conditions of unconsciousness, or delirium, the well-informed physician is always on the lookout for the state of the bladder, frequently palpating and percussing the hypogastrium to see that all goes well. It is very gratifying, in these cases, to observe the instantaneous relief which may be afforded by inserting a soft catheter, and emptying the over-distended bladder. Even if overflow has come on, the regular use of the catheter, preventing prolonged over-distention, may avert the impending cystitis and atony. Yet, in practice, not a few cases of cystitis will be found to take their origin in retention during fever, or unconsciousness, not promptly recognized. On the other hand very acid, or even slightly decomposing urine, would not excite inflammation in a bladder unless its circulation and tone were already impaired, as by atony, paralysis, etc. Finally, one other causative

factor of cystitis deserves a word; namely, extension of chronic inflammation backward from a urethra or prostate already chronically inflamed.

Of the two sets of causes the *mechanical* act far more frequently, the chemical usually coming in to assist them in their work.

Chronic cystitis, from mechanical causes, is disposed of elsewhere (stricture, hypertrophied prostate, inflammatory, tubercular, cancerous or other prostatic disease, cystitis from stone).

Traumatic violence in the bladder, as elsewhere, is attended by inflammation. Morbid growths in or around and pressing upon the bladder, cause chronic cystitis by obstruction to free escape of urine, by calling an extra amount of blood to the part, and by the mechanical bruising which the bladder-walls sustain against them. Again, the tumors themselves may inflame, or their discharges cause decomposition of the urine, thus exciting chronic catarrh. In hernia of the bladder there is mechanical obstruction to circulation, with distention, and decomposing urine. In extrophy there are friction with clothing, exposure to the air, and mechanical obstruction to circulation. A bladder gradually accustomed to habitual over-distention may give its owner no appreciable annoyance, but the mechanical stretching here has modified and weakened the circulation of the part, and produced atony, and when all the tension is suddenly let up, and the bladder allowed to collapse, the blood is very apt to rush suddenly into and over-distend the weakened vessels, and result in a condition of inflammation, the type of which, however, at first, is more often acute than chronic—and grave at all times.

In long-continued neuralgia of the vesical neck, the mechanical, acting cause is the constant and continued bruising of the bladder-neck, by often-repeated, perhaps violent and spasmodic contractions in micturition. Added to this sufficient cause is a second one, namely, an extension of congestion backward from the engorged membrane of the prostatic sinus.

The chemical causes conducing to cystitis have been alluded to in connection with over-distention of the organ (stricture, enlarged prostate). Very acid urine rarely causes cystitis, being more apt to produce urethral inflammation; acting, however, upon an already-congested bladder, it always tends to heighten the grade of the congestion or inflammatory process. Decomposing urine will sooner or later light up cystitis, on account of the irritating properties of the ammonia which it evolves, and in atony or paralysis there would be no cystitis without the action of this cause (Case XXVI.). The irritating properties of pus alone are sufficient to occasion symptoms of cystitis, as when the pus is derived from the kidneys in pyelitis. Attention is especially called to this fact, because it is often overlooked. The patient complains of frequent painful micturition, and the urine is loaded with pus. The seat of disease

is located in the bladder, and this organ is tormented by the use of instruments, or worried by useless stimulating injections—the true source of the pus (pyelitis) being overlooked.

Symptoms of Chronic Cystitis.—The symptoms of chronic cystitis resemble those of the acute form, in a degree proportionate to the grade of the inflammatory process. There may be only a little increased frequency of urination, with slight cloudiness of the fluid, as seen in the history of enlarged prostate; or the calls may be very frequent, and the pains excessive, varied, and constant, as in the acute disease. In fact, chronic cystitis is liable at any time to be lighted up into an acute state by the continued action of its own cause, or by the supervention of others (effect of cold, violent exercise, abuse of alcohol, acid urine). The urine of chronic cystitis always contains pus, either freely suspended through the fluid, or, more often, in gouts and clots of stringy mucopus, more or less mingled with crystals of triple phosphates and with blood. Pus which is passed in the liquid state may become converted into "stringy mucus," while standing, by the alkaline decomposition of the urine, or the process may be imitated artificially in a test-tube, by adding ammonia or liquor potassæ to urine containing free pus. The latter immediately becomes translucent, coherent, and is indeed the substance commonly called "stringy mucus."

The special symptoms attending chronic cystitis are enumerated under the heads of the causes occasioning them, and need not be repeated here.

Treatment.—Chronic cystitis being an affection always entertained by some other morbid process, its treatment consists in the removal of the cause. Some of these causes are removable, others are not. In the latter case the treatment is palliative, and addressed to symptoms. After the removal of the cause the chronic cystitis will get well in early life, or at any age, unless there has been organic, permanent change induced in the bladder-walls (hypertrophy, sacculation). For these latter cases, or where the cause cannot be removed, the palliative treatment is as follows: For acute exacerbations, the same as for acute cystitis, based on the tripod attitude, alkali, anodyne; for the formation of abscess in or around the bladder-walls, besides the above, an early and carefully-made opening; for the continuous chronic state the treatment consists in keeping the urine, as it comes from the kidneys, slightly alkaline, washing out the cavity of the bladder with warm water, then with medicated injections (p. 197), if an instrument can be introduced; and in the use of a small amount of anodyne in suppository at night, when the pain is great. The balsam of copaiba, cubebs, turpentine, and the infusions of buchu, triticum repens, uva-ursi, flaxseed, etc., may also be sometimes of use. The value of counter-irritation over the hypogastrium must always be kept in view. These means, aided by as much rest as is consistent with health, change of air, and

hygienic details in regard to food, etc., will effect all the relief that can be afforded. Where there is an element of neuralgia of the vesical neck in the case, it must be suitably treated (p. 239). The peculiarity of chronic cystitis, depending, as it always does, upon some other morbid condition, renders its special description unsatisfactory, and begets a necessity for constant reference to the other affections which underlie it.

Cystotomy for Chronic Cystitis.—Dr. Robert Battey, of Georgia, reports [1] a case of cystotomy performed as a last resource upon a patient with chronic cystitis, with the effect of affording much immediate relief, and prolonging life (he believes) for eighteen months.

Dr. Ingalls, of Chicago,[2] states that Dr. Powell performed this operation in 1866, and thereafter with good general effect, the wound being allowed to heal as after the operation for stone. In many cases it is only temporarily of service. It might be finally resorted to after the failure of other means, but with doubtful prospects of any permanent good effect; sometimes there is no relief, and often the trouble returns at once with the healing of the wound.

ATONY OF THE BLADDER.

Atony of the bladder is, as the name implies, simply a lack of tone in the organ. It is muscular paresis, and it is to be widely distinguished from paralysis, an affection of central and not of local origin, with which disease it is commonly confounded. Truly, a stretched muscle which will not contract is paralyzed; but, to avoid confusion, the term atony must be retained, paralysis only being applied where there is nerve-lesion. Every bladder suffers in a mild degree from what may be called physiological atony as the individual grows older. A healthy boy can throw a stream from his bladder to a much greater distance than he can when he becomes an adult, even taking into consideration the increased size of the prostate and enlarged calibre of the urethra, and the same remark holds true of adult life, when compared with healthy old age. The bladder being accustomed to a constant, slight distention, loses its expulsive power measurably with advancing age. Besides this mild condition of atony, however, there is a pathological form due to over-stretching of the muscular coats, either gradual and continued, or sudden and extreme (retention), or to constant congestion, as with hypertrophied prostate. Any one may observe the phenomenon of atony in his own person. If the urine be voluntarily retained for some hours after the bladder is full and the natural desire felt, it is noticeable, when an opportunity presents itself, and an attempt is made at passing water, that it is necessary to wait some time, perhaps several minutes, before the stream begins to flow. When it comes, it commences very gradually, and without force, getting stronger as the flow

[1] *Medical Companion*, June, 1869. [2] *Medical Record*, December, 1872.