

On chronic cystitis and its treatment by injections of strong solutions of nitrate of silver / by T.G. Richardson.

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CHRONIC INFLAMMATION

OF THE

BLADDER, AND ITS TREATMENT.

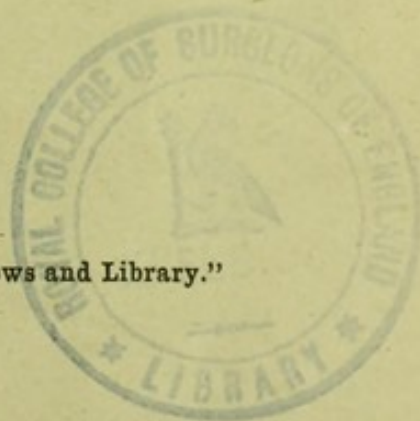
A CLINICAL LECTURE.

BY

T. G. RICHARDSON, M.D.,

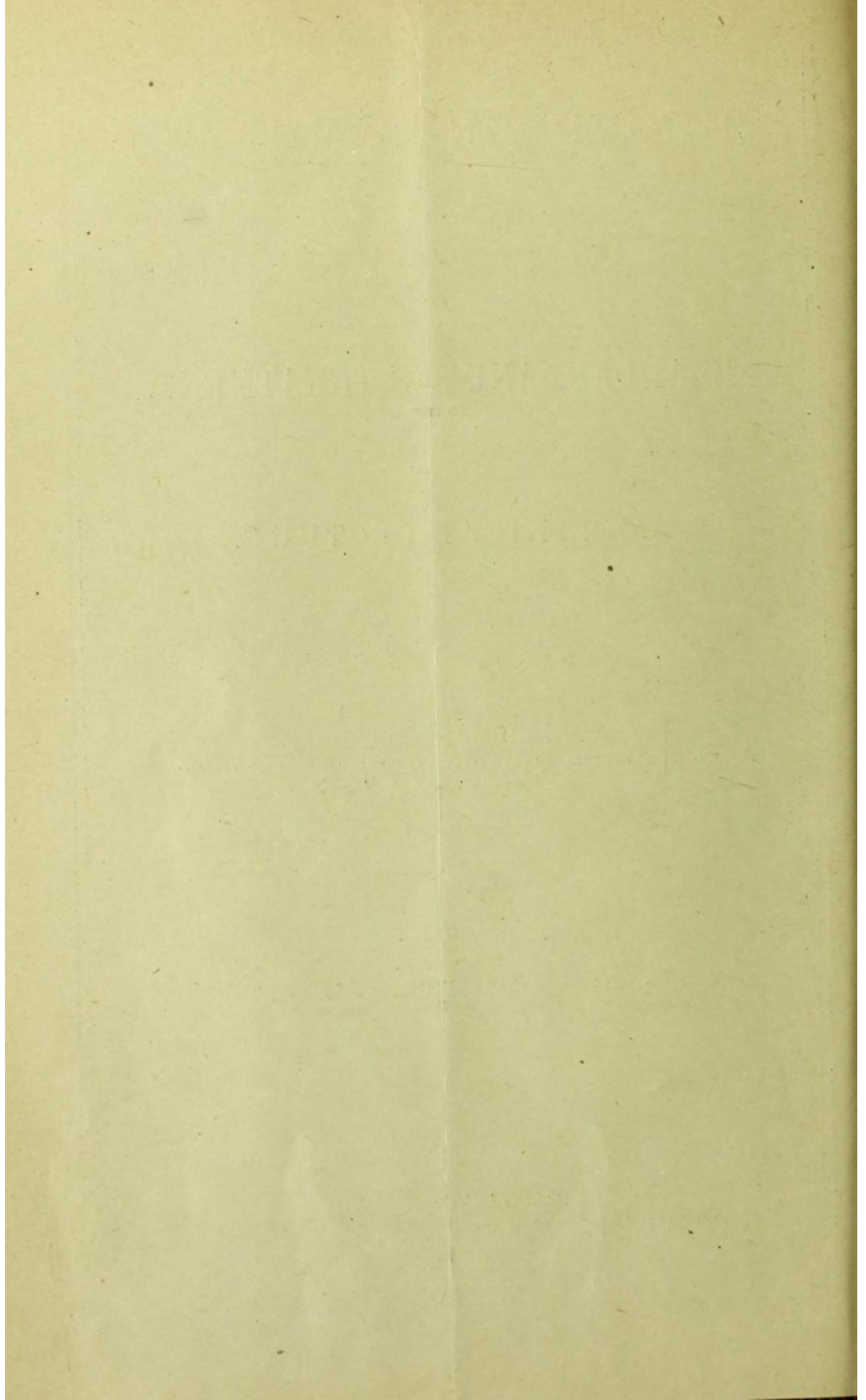
PROFESSOR OF SURGERY IN THE MEDICAL DEPARTMENT OF THE UNIVERSITY OF
LOUISIANA, NEW ORLEANS.

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1879.



ON
CHRONIC CYSTITIS

AND ITS

TREATMENT BY INJECTIONS OF STRONG SOLUTIONS
OF NITRATE OF SILVER.

BY

T. G. RICHARDSON, M.D.,
PROFESSOR OF SURGERY IN THE MEDICAL DEPARTMENT OF THE
UNIVERSITY OF LOUISIANA.

A Clinical Lecture delivered at the Charity Hospital, New Orleans.

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CHRONIC CYSTITIS.

GENTLEMEN :—

Those of you who have accompanied me through the surgical wards during the past few weeks have had the opportunity of seeing a number of cases of chronic cystitis, and of witnessing the results of the remedial measures employed in each. Without entering into the details of the histories of these cases, I propose, this morning, to use them as texts for a few remarks upon the disease in general, and its management.

Chronic cystitis, as you have already learned by observation, is by no means an uncommon malady, and is in this respect in marked contrast with the acute form, which is comparatively rare. It is far more frequently seen in the male than in the female, although some of the most intractable cases which have come into my hands have been in the latter sex. Except when associated in children with calculus, or some other foreign substance in the cavity of the bladder, it is almost altogether a disease of adult life. Its seat is the mucous membrane of the bladder, from which it may extend to the other tissues of the organ, and along the lining of the ureters to the pelves and uriniferous tubules of the kidneys.

The *causes* of chronic cystitis are very various, and as they determine in a large proportion of cases the mode of treatment which should be employed, I must call your attention to those most commonly observed.

1. Chronic cystitis may be a sequel of acute inflammation.
2. Notwithstanding the fact that the mucous membrane of the bladder is constantly in contact with a fluid which in relation to most of the tissues of the body is a decided irritant, the presence of a calculus or other foreign substance is resented with almost as much commotion as the entrance of a strange insect into a hive of bees; and, as in the latter instance reconciliation is impossible so long as the intruder remains within the hive,

so in the former the excitement continues until the offending substance is removed or expelled; and sometimes even for an indefinite time thereafter. It matters not that the stone enters quietly through the ureter in the form of a minute gravel, and attains its growth by slow degrees, or, as is sometimes the case, that it is so smooth as to glide about from one corner to another without appreciable friction; the organ rarely if ever consents quietly to its stay. You may readily imagine how much greater the disturbance produced when the offender is a rough prickly concretion of oxalate of lime, such as I show you here, or the jointed vertebræ of a squirrel's tail (introduced from without, of course), partially incrustated by phosphatic deposits, as you see in this other specimen. In certain localities, as for instance, the State of Tennessee and the adjacent parts of the contiguous States, calculus is probably the most common cause of chronic cystitis, but elsewhere in this country it occupies a subordinate place.

3. Undoubtedly the most universal cause of the disease in question is obstruction to the complete evacuation of the bladder. This may result from stricture of the urethra, hypertrophy of the prostate, transverse bar at the neck of the bladder, lodgment of the calculus or other foreign body in the urethra, etc. etc. In the first two of these conditions there is an additional liability arising from an extension of inflammation from the stricture or the enlarged prostate. The manner in which obstruction leads to inflammation requires a little explanation.

There is in health always more or less mucus in the urine, arising from the natural action of the lining membrane of the bladder, but the quantity is so small as to pass unnoticed in ordinary examinations. Nevertheless, it may sometimes be detected by allowing the fluid to stand for a few hours in a test tube, when it will be found to have settled in a slight cloud at the bottom. Where obstruction exists the protracted and violent effort to empty the bladder induces an increased secretion of mucus, which gravitates to the base of the organ. Now, bear in mind that the trigone in the male after middle life is a little below the level of the orifice of the neck of the organ, and is nearly fixed in its position, so that during micturition it *does not participate in the general contraction of the walls*. Any mucus having set-

tled here is very likely, therefore, to remain in place after micturition, more especially as patients laboring under obstruction generally stop short of the complete performance of this function from the fatigue and pain which the effort induces. The mucus which thus collects in the basin of the *bas fond* undergoes decomposition, and having thereby become acrid and irritating awakens inflammation of the mucous membrane already in a state of excitement and active congestion from the frequent and violent endeavors of the individual to relieve himself. Inflammation having been lighted up, pus is added to the mucus already largely increased in quantity from the same cause, and thus by the supply of more material the putrefactive processes are rendered more vigorous, and their products more abundant and irritating.

4. Injuries of the spine producing complete or only partial paralysis are almost invariably followed by chronic cystitis. Not unfrequently the immediate cause of the inflammation in these cases is the injury inflicted upon the bladder by the overstretching of its walls from the retention of urine which results from such accidents. But even in cases where the medical attendant is upon his guard, and takes the precaution to draw off the urine by means of a catheter, and repeat this operation at proper intervals, evidences of morbid action are almost certain to appear within two or three days. The explanation may possibly be found in the passive congestion of the mucous membrane arising from loss of nerve power, and the impracticability of completely emptying the bladder by ordinary catheterism when its walls are in a flaccid condition. Under other circumstances, that is to say, when no paralysis exists, the withdrawal of the urine by the catheter is attended by contraction of the vesical walls, by which means all the fluid is expelled from the cavity. But, on the contrary, in such cases as we are now considering, and of which you have a marked example in ward 6, the urine being forced out by the pressure of the abdominal viscera and the temporary contraction of the abdominal muscles, the walls of the organ are crowded in upon themselves forming irregular folds, between which more or less urine is always retained. The mucus which is, of course, largely increased in quantity by the atonic congestion, settles to the bottom, whence it is only partially removed

by the catheter, the remainder undergoing putrefactive decomposition which, by its reaction, increases the inflammatory action, as in the previous case.

5. Excessive alkalinity and acidity of the urine are said to produce chronic cystitis, but I am inclined to think that in such cases the morbid action is due principally to the deposition of the solid constituents of the fluid, rather than to the chemical effect of the latter upon the mucous membrane. This membrane, being physiologically proof against harm from the varying qualities of the urine within the range of health, will often bear without resentment the contact of fluids of a tolerably pungent or acrid quality, while, on the contrary, as I have already stated, it rebels instantly and continuously against the lodgment of any solid substance, however simple, within its walls. From my own experience, I am led to believe that a close examination of the urine—or rather of the urinal—in such cases will always disclose sedimentary deposits in greater or less abundance. This is particularly true in reference to urine which is excessively alkaline, in which phosphatic deposits in the form of minute seed-like concretions sometimes occur, and become the cause of inflammatory excitement. These alkaline deposits are doubtless very often the *result* of the inflammation rather than the *cause*, and it is no easy matter always to distinguish between the two.

Morbid Anatomy.—The structural changes induced by chronic cystitis consist primarily in thickening and increased vascularity of the mucous membrane, in which, however, there is nothing peculiar, inasmuch as the same takes place in nearly all other similar membranes when invaded by chronic inflammation. The mucous follicles are, of course, much enlarged, and secrete, sometimes, a wonderful amount of viscid ropy mucus.

The most striking alteration, however, is seen in the muscular tunic, which in all cases of long standing is more or less hypertrophied, and projects into the cavity of the organ in the form of a very coarse netting, in the interstices of which the mucous membrane is depressed, forming shallow crypts or lacunæ, of various sizes, from that of a hempseed to that of a filbert. In very bad cases, the greatly thickened muscular bundles look not unlike the *columnæ carneæ* of the cardiac ventricles, and are characteristic of what some surgeons term 'columnar vesical

hypertrophy.' Under these circumstances the cavity of the organ is greatly reduced in its capacity, sometimes to such a degree, as you have seen in the case of the patient in ward 14, that it can contain only an ounce of urine, or even less. The walls themselves frequently measure an inch in thickness, as in the specimen I show you here. Associated with this remarkable hypertrophy of the muscular coat, we not unfrequently observe that the little shallow crypts formed in the interstices of the muscular bundles become very much deeper, and, in some instances, form hernia-like protrusions upon the outer face of the bladder, varying in diameter from that of a pea to that of a pullet's egg. When these become quite large the organ is said to be sacculated. Occasionally, one of these so-called herniæ will continue to enlarge until its capacity equals, or even surpasses, that of the bladder, with which it communicates by a comparatively small opening. An illustration of this is seen in the specimen upon the dish before you, which is, to all appearances, a double bladder, the two compartments communicating through an aperture not larger than a No. 7 or 8 catheter. I know nothing of the history of the case from which this interesting specimen was taken, save that the patient, a poor, simple-minded, emaciated, old countryman, entered the hospital for general debility, presenting also a urinary fistula leading from the umbilicus along the line of the urachus to the fundus of the bladder; and that he died within a very few days afterward, before any satisfactory history could be obtained.

This hypertrophied condition of the muscular coat of which we are speaking is readily explained in most cases by the frequent and violent contractions of the bladder in its efforts to overcome a persistent obstruction to the exit of the urine. But it is not limited to such cases, for it is sometimes met with in chronic cystitis where no obstacle exists. This is well illustrated in the patient already referred to in ward 14, in whom, so far as I can ascertain, no difficulty in emptying the organ has ever existed, and in whom a No. 12 bougie may be readily passed. In this and other similar instances violent spasmodic contractions are of frequent occurrence daily in consequence of the excessive sensibility of the inflamed mucous membrane, and in the course of time give rise to the same condition of muscular hypertrophy as in the former cases.

In connection with these pathological conditions of the bladder itself, I must not neglect to call your attention for one moment at least to the serious changes which sometimes take place in the ureters and kidneys in consequence of an extension of the inflammation in this direction. Such extension is by no means rare, and commonly results not only in great thickening and induration of the walls of the ureters, but destructive ulceration and abscess of the kidneys. This is more particularly the case where the inflammation is caused and maintained by protracted obstruction to the discharge of the urine from the bladder.

Before leaving this branch of the subject, permit me to impress upon your minds the importance of a knowledge of the morbid changes upon which I have been descanting. Upon their existence or non-existence in any given case will depend to a large extent its curability or incurability.

The *Symptoms* usually presented by chronic cystitis are so well marked as to render its detection tolerably easy; but owing to the fact that the affection is sometimes simulated in hysteria, and at other times masked by concurrent diseases of the adjoining organs, it is desirable always to obtain as accurate a history of each case as possible. Without this, indeed, it is scarcely possible to appreciate the different phases which it assumes in consequence of the differences in the causes by which it is produced. The two immediate signs, however, upon which we mainly rely are, 1st, inability of the patient to retain his water longer than a few minutes, or, at most, an hour or two; 2d, the presence of tenacious mucus, mixed with more or less pus, in the urine; and, 3d, vesical tenesmus.

The first of these evidences, that is to say, the pressing and frequently recurring desire to empty the bladder, is often observed in other conditions, such as irritation at the neck of the bladder from gleet, from the lodgment of gravel in the prostatic urethra, from mental anxiety, from a morbid state of the urine, from the presence of ascarides in the rectum, from vaginitis, cervicitis, and other inflammatory states of the adjacent organs of the female, and from numerous other causes which I need not here mention. On the other hand, it may be almost entirely wanting, of which I have just now a most remarkable instance in a private patient who, although for a long time a subject of

the disease, has always been able to carry his water five or six hours without special inconvenience. Nevertheless, the symptom is an important one, and should be carefully investigated.

The appearance of thick viscid mucus in the urine is almost pathognomonic of chronic cystitis. It is usually quite abundant, almost transparent, except when mixed with pus or blood, and so tenacious that it clings to the bottom of the vessel in long stringy masses while the urine is poured off, and then, if the vessel is smooth, suddenly slips away like a mass of half-coagulated jelly. The quantity of this secretion is sometimes very great, and in such cases the disease is denominated by some writers *vesical catarrh*, a term which it seems to me is entirely unnecessary, and likely to mislead the student. As mucus of this description in the urine can come only from the lining membrane of the bladder, and is necessarily the result of chronic inflammation, you see very clearly how important it is in a diagnostic point of view. And here I take the opportunity of saying that *when this secretion is wanting true chronic cystitis does not exist*. In making this assertion I am well aware that I run counter to the opinions of many excellent surgeons who, under the abominable term of *irritable bladder*, recognize a species of chronic inflammation in which little or none of the usual glutinous mucus is secreted; but I can scarcely do otherwise, inasmuch as I have never seen and can scarcely imagine such a case. The morbid condition to which this name has been applied may be one of chronic inflammation of the lining membrane of the neck of the bladder, extending, possibly, a very little way into the body of the organ; but, to my mind, this is quite as distinct from chronic cystitis as chronic laryngitis is from chronic bronchitis. But in the majority of cases the so-called irritable bladder is no disease at all, but only a symptom of trouble elsewhere; it may be in the nervous system, in the rectum, in the kidneys, or in the urethra.

As already stated, there is very commonly mixed with the mucus more or less pus, which settles to the bottom along with the latter, as you see well exhibited in this glass, the contents of which were passed by the patient in ward 8. Oftentimes the pus is so abundant as to conceal the mucus from view until the supernatant fluid is poured off, when the ropiness of the latter readily discloses its presence.

Large quantities of phosphates are not unfrequently observed in the mucus, to which they impart a whitish slimy appearance, not unlike that of thin mortar. When this is the case, the urine is, of course, strongly alkaline, and gives off a powerful ammoniacal smell.

The vesical tenesmus which has been mentioned as an accompaniment of chronic cystitis is not characteristic, but often a most distressing symptom, seizing the patient suddenly, and not relaxing its painful grip until the last drop of water is expelled. It well deserves to be called *vesical cramp*; and when it occurs repeatedly every day for a great length of time is sure to result in hypertrophy of the muscular coat, of which it then becomes an important symptom.

The general health is not necessarily seriously impaired by chronic cystitis, unless the disease is associated with other morbid conditions, or is attended with constantly recurring tenesmus. In the latter case the system may give way in consequence of the suffering, especially in the case of old men with enlarged prostates. On the contrary, the worst case of this disease which I have ever encountered, a case in which the patient is unable to retain his urine longer than five or six minutes, and in whom tenesmus occurs many times during the day, is that of a man in middle life whose general health continues most excellent now after six or eight years of suffering.

Diagnosis.—Bearing in mind the symptoms which have just been detailed, you can scarcely err in determining the presence of chronic inflammation of the bladder; but it is not always so easy to discover its cause. As without a knowledge of the latter it is impossible to pronounce a rational prognosis or institute suitable treatment, it is of the first importance that this question should be satisfactorily settled. For this purpose the history of the case should be accurately ascertained. If the disease succeeded to an injury of the spine, resulting in paralysis of the lower half of the body, there can be no doubt that the accident was the essential cause. If it was immediately preceded by gleet, the probability is that it was induced by an extension of inflammation from the latter, and is kept up by stricture of the urethra, and consequent inability to empty the bladder entirely. The urethra should be examined with a bougie under such circum-

stances in order to ascertain whether such is the case. If no stricture should be found, the examination should extend to the bladder itself, and thorough search made to determine whether calculus may not exist. If the patient is an old man, who relates that he has had great difficulty in emptying the bladder for several years, and that of late stringy mucus has made its appearance, the natural suspicion is that a hypertrophied prostate is the source of the trouble. This can be determined, of course, by the finger in the rectum, and a metallic bougie in the bladder. Not very unfrequently calculus and enlarged prostate coexist. None of these causes having been discovered, attention should be directed to the condition of the urine, for, as already stated, it occasionally happens that excessive acidity, or, more frequently, excessive alkalinity may give rise to the disease. Without dwelling longer upon this point, permit me to say that in nearly all cases of chronic cystitis careful exploration of the bladder and urethra by means of a metallic bougie is necessary. Even though no calculus, stricture, or enlarged prostate should be detected, valuable information is obtained as to the condition of the mucous membrane, and a hitherto unsuspected tumor of the bladder may be detected. It is also equally incumbent upon the surgeon to examine the urine, for aside from the effect which may be produced upon the bladder by morbid states of this fluid, it is by this means alone that we are enabled to ascertain whether the kidneys have become implicated in the inflammation. Extension of the morbid action to these organs by way of the ureters is, unfortunately, not a very rare occurrence; and, when such is the case, there can be but little expectation of permanent benefit by treatment. If albumen should be present in large quantities, there can be scarcely a doubt as to the existence of this serious complication; much less if great numbers of tubular casts should be discovered by the microscope. On the contrary, I have recently seen a case in consultation in which large quantities of albumen existed in the urine, but which disappeared almost entirely after the removal from the bladder of a calculus upon which the accompanying cystitis depended.

The *Prognosis* of chronic cystitis in relation to the life of the individual is nearly always favorable, except in those cases where the health has been broken down by previous disease,

neglect, bad habits, want of proper food, old age, or other similar causes; or where the inflammation has reached and taken firm hold of the kidneys. In the last-mentioned condition death is inevitable after a longer or shorter interval. What I wish to say is that there is nothing in the disease itself which seriously compromises the life of the patient.

The question as to the curability of the affection is a totally different one, and can be answered satisfactorily only in reference to specified cases. I may state, however, in general terms, that where there is a fair condition of health, no serious disease of the kidneys or surrounding parts, little or no hypertrophy of the muscular coat of the bladder, and *the cause removable*, the prospect of recovery is very good.

Treatment.—It is scarcely necessary that I should tell you that in the treatment of chronic cystitis, as in that of a great many other surgical affections, the first indication is to remove the exciting cause. Fortunately, in a large number of cases, as for instance in those dependent upon the presence of calculus or other foreign substance in the bladder, of stricture of the urethra or of excessive alkalinity of the urine, this is entirely practicable, and when it is accomplished the rapidity with which the morbid action subsides is sometimes truly astonishing. In calculus and phosphatic urine, nothing more is usually necessary, although it does occasionally happen, especially in old people, that the anatomical changes resulting from the long persistence of the inflammation continue to vex the patient long after the original source of trouble has been corrected. Where this is the case the special line of treatment which I am about to describe will frequently prove successful.

Resolution of the inflammation does not so often follow the dilatation of old stricture notwithstanding the fact that the bladder is thus enabled to empty itself completely. This is due principally to the hypertrophy of the muscular coat which has occurred in consequence of the accompanying tenesmus. Where such alteration has taken place, only palliation should be expected, and the patient may be obliged to wear a rubber urinal all the rest of his days. But as it is not always possible to determine in advance the existence of such a degree of hypertrophy, I make it a rule to subject all such patients to the cura-

tive treatment, trusting that some of these may thereby be materially benefited.

If the disease is dependent upon enlargement of the prostate gland, as we so often see in old men, the state of affairs is in some respects like that met with in stricture of the urethra, with the difference that in the latter we have some expectation of getting rid of the producing cause, while in the former we have no such hope. Nevertheless, by the daily introduction of a large-sized catheter, washing out the organ occasionally with some stimulating astringent, such as nitric, or, better, hydrochloric acid, two drops to the ounce of water, and the internal administration of balsam copaiba, the inflammation may often be subdued. If these remedies should fail, the heroic treatment presently to be described should be resorted to.

And now I take pleasure in exhibiting to you again the patient, from ward 8, for the purpose of illustrating my further remarks.

This man, as you are aware, has been the subject of severe stricture of the urethra for several years, and presented, until very recently, all the symptoms of confirmed chronic cystitis. When I took charge of the ward, a few weeks ago, the stricture had been pretty well dilated by my predecessor, so that a No. 9 bougie could be slowly introduced by the patient himself, any undue haste inducing severe tenesmus. The symptoms of cystitis, however, had not much abated. His desire to urinate was incessant, and it was only by great effort accompanied by much suffering that he could restrain the evacuation for an hour at a time. While he was in bed he was compelled to keep a urinal between the thighs continually, otherwise he was not able to sleep for frequent necessity of rising. The urine, upon standing, as you have just now seen, separated into two parts, the upper tolerably clear, the lower opaque, thick, tenacious, yellowish in colour, and loaded with phosphates. Upon decanting the former, the latter, you noticed, clung in stringy masses to the bottom of the glass, and upon close inspection was found to consist of mucus and pus. Vesical tenesmus was not very frequent, although at times severe. Introduction of the finger into the rectum was productive of so much pain that the attempt to ascertain thus the thickness of the walls of the bladder was not satisfactory.

He was first put upon the use of copaiba and cubebs, which of all the internal remedies employed by surgeons in such cases hold deservedly, in my estimation, the highest place. In private practice I am in the habit of using an unofficinal preparation known as the compound extract of cubebs and copaiba, which is nothing more than solidified balsam combined with powdered cubebs and some other minor ingredients, and made into a paste which is not disagreeable to take. Of this a pill of 20 or 25 grains may be swallowed two or three times a day. In whatever manner the two remedies may be combined, they not unfrequently disturb the stomach and bowels, and require the addition of a little opium and tannin. The best time to take the remedy is about two hours after eating. The effect upon the local symptoms is sometimes truly magical, and the patient passes in a few hours from a state of despondency to one of decided exhilaration in consequence of the great and sudden relief from painful micturition. By continuing these remedies for two or three weeks, employing at the same time a general tonic course if necessary, a cure may be sometimes produced, or, at any rate, such a degree of amelioration as to fully satisfy the expectations of the patient. I have sometimes thought that the addition of bicarbonate of potassa increased the efficacy of the medicine, but am not quite sure upon this point. I have not much confidence in uva ursi, notwithstanding it is so highly commended by my venerable private preceptor, Professor Gross, and still less in buchu. I have had no experience with cimicifuga, pareira brava, triticum repens, or matico.

If the copaiba and cubebs alone or in connection with the other means just enumerated should fail, as has happened in the case before us, local applications by injections are called for. For this purpose the following remedies may be employed in quantities sufficient to wash out the bladder thoroughly: nitric or hydrochloric acid ($\mathfrak{m}\text{j}$ to $\text{f}\overline{3}\text{j}$), liq. sodæ chlorinat. ($\mathfrak{m}\text{x}$ to $\text{f}\overline{3}\text{j}$), carbolic acid (grs. v to $\text{f}\overline{3}\text{j}$), tannic acid (᠑ss to $\text{f}\overline{3}\text{j}$). I have tried all of these repeatedly, and a great many other washes, but except in very mild cases, and as adjuvants to the cubebs and copaiba, have laid them aside. The remedy upon which I now rely almost exclusively is nitrate of silver in solutions of such strength as will make a decided impression upon the inflamed

membrane. Those of you who are aware of the great caution advised by nearly all surgical writers and teachers in reference to the use of this salt as an injection into the bladder, and their timid recommendation of a solution not stronger than *half a grain to four ounces of fluid*,¹ have doubtless been somewhat startled when you have seen twenty grains, thirty grains, and forty grains to a single ounce of water thrown into the organ with impunity, and with decided benefit to the patient. It is now nearly twenty years since I recognized the absurdity of weak solutions, having remarked that they no sooner reached the bladder than they were immediately decomposed and thus rendered entirely inert by the few drops of urine which they are always sure to encounter there despite the most thorough irrigation and the most rapid injection of the nitrate. Aside from this, I could see no good reason why the mucous coat of the bladder should be an exception to all other similar structures, such, for instance, as the conjunctiva, the lining membrane of the fauces, the larynx, the trachea, and the uterus, to which surgeons are in the habit of applying not simply strong solutions but the solid salt itself. It seemed to me that it was only necessary to provide for the quick withdrawal of the fluid or its rapid decomposition, after allowing it to remain in contact with the inflamed surface for a few seconds, and no damage could occur from solutions even stronger than those already mentioned. After considering the question from this point of view, the first case that came into my hands was that of a young man, who several months previously had suffered paralysis of the lower half of the body, including the bladder, from spinal injury. The paraplegia had entirely disappeared, but the cystitis, which had

¹ This is the strength of the solution recommended by Sir Henry Thompson, and repeated in nearly all the recent text-books on surgery. To prove its entire inefficiency I requested Mr. Johnson, the house chemist, to determine the relative incompatibility of urine and nitrate of silver, and he has shown by a number of experiments that 100 minims of the former of average quality will decompose 2.100 grains of the latter. Now when it is borne in mind that urine enters the bladder ordinarily at the rate of 18 or 20 minims per minute, that this quantity is largely increased by the reflex action upon the kidneys induced by the passage of instruments along the urethra, that it is impossible to free the bladder entirely of urine even for an instant, and that a certain delay is necessary in making the injection, it seems to me no one can doubt, that the injection must meet with not less than 20 to 30 minims of urine which will decompose instantly not less than .700 of a grain of the salt.

resulted from neglected retention of urine, was unabated, and he had not the slightest control of the function of micturition, the water dribbling from him continually. After washing out the cavity thoroughly I injected an ounce of a solution $\mathfrak{D}ij$ to $f\mathfrak{3}j$, permitted it to remain about ten seconds, and followed its withdrawal by an injection of a weak solution of iodide of potassium in order to decompose any of the former which failed to escape through the catheter. After a week or ten days sufficient improvement was manifested to justify a repetition of the operation. I then used the same quantity of a solution of the strength of $\mathfrak{3}j$ to $f\mathfrak{3}j$. The effect was all that could be desired. The symptoms improved within three or four days, and in less than a fortnight the patient returned to his home in Alabama entirely cured.

Before entering into further details, permit me to impress upon you two or three points of paramount importance in the use of this remedy. First of all *be sure that you are dealing with a case of genuine chronic cystitis*. Simulation of the disease, as already stated, is not uncommon in hysterical women, and irritation of the surrounding parts sometimes gives rise to symptoms which may mislead the unwary. Especially guard against the mistake of considering what is termed "irritable bladder" a condition of inflammation of the organ. You may rest assured, that, where a tolerably abundant discharge of vesical mucus is wanting, chronic cystitis does not exist. In the second place, be equally certain that the exciting cause has been removed, or at least so modified as to exert no further influence upon the disease. And, in the last place, never undertake this method of treatment unless the urethra is sufficiently large to readily admit a No. 9 or 10 catheter.

The only other instrument required besides a catheter of the size just mentioned is an elastic bag capable of holding one or two fluidounces, and provided with a bone or hard rubber nozzle well fitted to the former.

My custom is to begin with a 20 grain solution at the temperature of the body, using at least an ounce, so as to reach the entire surface of the interior of the organ. If no decided improvement should occur in the course of a week or ten days, the injection should be repeated, increasing the strength of the solution to thirty grains. No impression having been made by this

last, the strength may be further increased, until a drachm to the ounce has been attained.

An important point to determine is the length of time the solution should be allowed to remain in the bladder. This must vary somewhat in different cases. If severe pain is instantly produced, two or three seconds is long enough for the first injection. If, on the contrary, the suffering is not considerable, eight or ten seconds may be allowed to elapse.

To remove the fluid it is only requisite to keep the nozzle of the bag closely pressed into the mouth of the catheter, and to relax the grasp of the hand upon the former. In this way nearly the whole of the fluid will be drawn back into the bag, and the remainder will readily escape by turning the patient upon his side.

We shall now proceed to perform the operation. The patient has been already injected once with a twenty grain solution about a fortnight since in the ward, and we propose to increase the strength now to thirty grains.

No anæsthetic will be given, for by doing so we should fail to obtain the information which we desire in regard to the sensitiveness of the organ when the injection reaches it.

You observe that the catheter is passed with some little difficulty, owing to the stricture which is not yet fully dilated, and that the urethra is very tender. Now that it is fairly in you see mucus and pus issuing from its mouth. By means of the rubber bag we next throw in an ounce or two of tepid water, and allow it to escape. In doing this, forcible distension of the organ should be studiously avoided. While the water is flowing out of the catheter the bag is filled with the solution, and as soon as all the water is forced out by pressure made with the hand above the pubes the nozzle is tightly pressed into the catheter, and the bag immediately, but not suddenly, compressed. The pain is not excessive, but as six or eight seconds have elapsed, pressure upon the bag is relaxed, and nearly all the fluid is withdrawn. Upon squeezing it out into the bowl you notice that it has a very decided milky appearance, which is due to the partial decomposition which it has undergone in the bladder. Urine is constantly entering the cavity from the ureters, and, be as prompt as you may in the performance of the opera-

tion, a considerable portion of the nitrate is converted into chloride which is entirely inert. As already stated, I was formerly in the habit of following the injection by a solution of iodide of potassium, for the purpose of neutralizing the small quantity which is left behind, but this is entirely unnecessary, the urine which enters the organ proving quite as effective.

As you may readily suppose, the operation is followed by more or less tenesmus, and it is sometimes necessary to resort to a slight hypodermic injection of morphia, but ordinarily the pain subsides in the course of an hour or two, under the use of diluent drinks, aided, if necessary, by a warm hip-bath.¹

As it is my desire to give you a perfectly ingenuous account of my experience in the use of strong solutions of nitrate of silver, I cannot bring this lecture to a close without calling your attention again to the man in ward 14, in whom these injections have been made without the slightest benefit, and upon whom, as a last resort, I performed the operation of cystotomy with no better success.

From the history of the case, written by the patient himself, it is evident that he suffered from chronic cystitis as far back as 1861, resulting from sunstroke and retention of urine. He had not entirely recovered from this in 1871, when he contracted gonorrhœa, and when nearly well, as he supposed, had retention of urine. An attempt was made to pass a catheter by a drunken doctor, who after severely lacerating the urethra abandoned the case to nature. The retention continued for thirty-two hours, when the patient passed into a delirious state, during which he does not know what occurred, and from which he recovered several weeks afterwards, to find himself unable to hold his water longer than a few moments at a time. Since then he has been treated by several physicians, some of them excellent practitioners, but without improvement.

He came into my hands a month or six weeks ago, apparently in good general health. The history of the case and the mucopurulent state of the urine afforded abundant evidence of the existence of chronic cystitis. Exploration with a metallic bou-

¹ The patient upon whom this operation was performed was so much improved that he left the hospital ten days afterwards in search of work. He has reported at my office once since then, and expressed himself as still doing well.

gie showed that there was neither calculus of the bladder nor stricture of the urethra, but demonstrated excessive sensitiveness of the vesical mucous membrane, and probable columnar condition of the muscular coat. The bladder could not retain more than half an ounce of fluid without exciting severe tenesmus, and the patient was therefore compelled to wear a caoutchouc urinal. As the long duration of the case, the frequent tenesmus, and the evidence obtained by exploration rendered it more than probable that the hypertrophy of the muscular coat was considerable, I was unable to give the man any encouragement as to treatment. Nevertheless, as he was unwilling to return home without some attempt having been made to alleviate his distressing condition, and hoping that some benefit might possibly be conferred, I placed him upon the internal use of copaiba, cubebs, and belladonna, and injected his bladder in the usual way, three times, at intervals of a week, with the thirty grain solution. No good having been accomplished I suggested cystotomy, as a means of placing the bladder completely at rest for a given time, and permitting the further application of local remedies, but I explained that it would prove of no avail if the hypertrophy of the muscular coat should be found as great as I feared, and the extreme contraction of the bladder permanent. Like a drowning man, the patient grasped the slight hope that was thus held out, and in due time what is known as the lateral operation of lithotomy was performed in your presence. Upon introducing my finger through the wound into the bladder my fears as to the condition of the muscular coat and the rigidly contracted state of the bladder were more than realized, as I then announced to you. As usual in such cases, there was considerable hemorrhage from the dilated veins around the neck of the bladder, and I was obliged therefore to insert a canula and keep the wound firmly plugged for five or six days. Two injections each of twenty grains of nitrate of silver to the ounce were subsequently made through the wound, and the latter kept open for five or six weeks. Notwithstanding the free escape of the urine there was no relief from the vesical tenesmus except by large doses of morphia. The patient is now entirely well of the operation, but the condition of the bladder is unchanged, and will probably continue so indefinitely. In the mean time the man's general health is most excellent, better than it has been for several years.

